Congestion Management Process Report
Oahu Regional Transportation Plan 2035 Project

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Mobilizing Oahu | Fulfilling Our Legacy

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Acronyms Used in this Document

CMP	Congestion Management Process
CMS	Congestion Management System
HOV	High Occupant Vehicle
HOV2	Two-person High Occupant Vehicle
HOV3+	Three-or-More Person High Occupant Vehicle
ITS	Intelligent Transportation Systems
LOS	Level of Service
OahuMPO	Oahu Metropolitan Planning Organization
ORTP	Oahu Regional Transportation Plan
SOV	Single Occupant Vehicle
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TSM	Transportation System Management
V/C	Volume-to-Capacity Ratio
VMT	Vehicle Miles of Travel
VHT	Vehicle Hours of Travel
VHD	Vehicle Hours of Delay

Summary of Findings and Project Rankings

The Congestion Management Process (CMP) report provides the outcomes of a comprehensive analysis of 43 highway and transit projects that are considered potential congestion mitigation projects for consideration in the Oahu Regional Transportation Plan 2035. In addition, nine Transportation Demand Management/Transportation System Management projects were also evaluated. The report, which helps the OahuMPO meet federal Congestion Management Process reporting requirements as stated in the *Safe, Accountable Flexible, Efficient Transportation Equity Act: A Legacy for Users*, builds upon the Congestion Management System process and procedures adopted by the OahuMPO in 2005.

The CMP project packages (one or more individual road capacity projects) were developed to explore in more detail whether there were synergies among logical groupings of projects that were in close proximity to each other. Thus the metrics used to rank each of the projects could have effects on other projects that were included in within each of the CMP packages.

Highway Related Projects

Table S-1 shows the project rankings and corresponding descriptions for each of the 41 highway related projects. Three projects tied for the top ranking. They were the Kamehameha Highway widening between Lanikuhana Avenue and Ka Uka Boulevard, the extension of Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road, and the extension of Kapolei Parkway between Aliinui Drive and Kalaeloa Boulevard.

Key findings documented in this report include, but are not limited to, the following:

Change in V/C Ratio

All highway widening projects in each of the CMP packages showed a reduction in the V/C ratio. Changes in V/C ratios could not be measured for new roadways but they received points for providing additional capacity.

Vehicle Volume

The Kapolei Parkway extension from Aliinui Drive to Kalaeloa Boulevard project received the most points for having the largest change in AM two-hour peak period volume from the 2035 Baseline. The Kapolei Parkway extension from Kamokila Boulevard to Fort Barrette Road and the addition of the H-1 median HOV from Waiawa to Makakilo Interchange projects tied for second for the largest change in vehicular volume.

Work-Related Transit Mode Share

Most highway related CMP packages received a point for no change in work-related transit mode share compared to the Baseline. The CMP Project #2

package had a decrease in work-related transit mode share and thus received no points for this metric. The projects in this package included the H-1 eastbound widening from Waiawa to Halawa, the H-1 westbound widening from Waiau to Waiawa, and the H-1 westbound widening of the Waipahu Street off-ramp. These three H-1 corridor related projects attracted more auto-related traffic and drew trips away from the transit mode.

Vehicle Miles Traveled (VMT)

Most highway related CMP packages had a decrease or no change in daily VMT compared to the Baseline. The three packages that received an increase and thus no points were CMP Project #2 package (H-1 eastbound widening from Waiawa to Halawa, H-1 westbound widening between Waiau and Waiawa, and the H-1 westbound Waipahu Street off-ramp), CMP Project #25 package (H-1 HOV Median between Waiawa and Makakilo, H-1 westbound widening between Waiawa and Paiwa), and CMP Project #14 package (Farrington Highway widening between Golf Course Road and Fort Weaver Road, Farrington Highway widening between Fort Weaver Road and Waiawa Interchange).

Vehicle Hours of Delay (VHD)

All highway related CMP packages received either a decrease or no change in AM two-hour peak period VHD compared to the Baseline. The top three CMP packages that received the largest improvement in VHD were CMP Project #15 package (Farrington Highway widening from Hakimo Road to Kalaeloa Boulevard), CMP Project #4 package (Waianae Second Access Road, and Kunia Road Widening from Wilikina Drive to Farrington Highway), and CMP Project #6 package (H-2 Waipio Interchange widening, H-2 Pineapple Road Interchange, Central Mauka Road, and Wahiawa Second Access Road).

Vehicle Hours Traveled (VHT)

All highway related CMP packages received either a decrease or no change in AM two-hour peak period VHT compared to the Baseline. The top three CMP packages with the biggest improvement in VHT were the same as the top three packages for the VHD metric.

Transit Related Projects

Table S-2 shows the project rankings and corresponding descriptions for the two transit projects. For the metrics that were used to rank the two transit projects, the West Kapolei to East Kapolei (western-end) rail extension scored higher than the Ala Moana to University of Hawaii at Manoa and Waikiki (eastern-end) rail extension. However, it is important to mention that the eastern-end rail extension had 20 percent more rail boardings compared to the Baseline while the western-end rail extension had only 6.5 percent more rail boardings compared to the Baseline.

Key findings documented in this report include, but are not limited to, the following:

Work-Related Transit Mode Share

Both transit projects (eastern-end rail extension and western-end rail extension) had increases in work-related transit mode share. Overall work-related transit mode share increased from 12.2 percent to 12.5 percent.

VMT

Both transit projects had decreases in daily VMT over the 2035 Baseline. The western-end rail extension had a 27,100 decrease in VMT over the Baseline, while the eastern-end rail extension had a 32,600 decrease in VMT over the Baseline.

VHD

The western-end rail extension had a 360 decrease in AM two-hour peak period VHT over the 2035 Baseline. The eastern-end rail extension also had a decrease of 290, but this was within the threshold of no change (i.e. no change was VHT < 350 or VHT > -350). It is important to note that western-end rail extension project barely met the threshold for a change in VHD, while the eastern-end rail extension project fell within the threshold.

VHT

Both transit projects had decreases in AM two-hour peak period VHT over the 2035 Baseline. The western-end rail extension had a 580 decrease in VHT over the Baseline, while the eastern-end rail extension had a 490 decrease in VHT over the Baseline.

Transportation Demand Management/Transportation System Management Projects

Table S-3 shows the project rankings and corresponding descriptions for each of the nine Transportation Demand Management (TDM) / Transportation System Management (TSM) projects. Four projects tied for the top ranking. They were the TDM Program (2011-2020 Mid-Range Program, and 2021–2035 Long-Range Program), and the Human Services Transportation Coordination Program (2011-2020 Mid-Range Program, and 2021–2035 Long-Range Program).

Key findings documented in this report include, but are not limited to, the following:

Change in V/C Ratio

The TDM Program, Vanpool Hawaii Program, and Human Services Transportation Coordination Program projects would all help to reduce single occupant vehicle trips on local roadways by shifting trips to higher capacity modes, thereby helping to reduce congestion.

On List of Congested Roadways

All TDM/TSM projects scored equally because they are all expected to have a beneficial impact on congested roadways on the island.

Work-Related Transit Mode Share

The TDM Program projects and Human Services Transportation Coordination Program projects would all help to increase transit mode share by encouraging shifts from SOVs to transit.

Vehicle Volume Increase

All projects except the Joint Transportation Management Center and the ITS projects would likely reduce some SOV volumes, while the Management Center and ITS projects would likely see no change in vehicle volumes as a result of implementation of the projects.

VMT

The TDM Program, Vanpool Hawaii Program, and Human Services Transportation Coordination Program projects all would help reduce VMT. The Joint Transportation Management Center would not likely see any direct change in VMT as this project focus primarily on coordination among agencies and not on impacting traffic operations. The ITS projects would likely see an increase in VMT as roadway operations would be improved, thereby providing an inducement for more travel.

VHT

The TDM Program, Vanpool Hawaii Program, and Human Services Transportation Coordination Program projects all would help reduce VHT through encouragement of mode shift from SOVs to higher capacity modes.

VHD

The TDM Program, Vanpool Hawaii Program, and Human Services Transportation Coordination Program projects all would help reduce VHD through encouragement of mode shift from SOVs to higher capacity modes.

Table S-1: CMP Highway Project Package Descriptions and Rankings

CMP Package #	ORTP Highway Project Description	CMP Rank
18	• Extend the existing six-lane Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road.	1
23	• Extend Kapolei Parkway from Aliinui Drive to Kalaeloa Boulevard.	1
5	• Widen Kamehameha Highway from a three-lane to a four-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard.	1
6	• Construct Central Mauka Road, a new four-lane road from Mililani Mauka to Waiawa.	4
2	• Widen the Interstate Route H-1 by one lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.	5
4	• Widen Kunia Road from Wilikina Drive to Farrington Highway.	5
7	• Widen Kahekili Highway from two-to-four lanes, from Kamehameha Highway to Haiku Road.	5
25	• Construct two new lanes in the freeway median for HOV use, one in the westbound direction and one in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.	5
3	• Widen H-1 by one lane from Ola Lane to Vineyard Blvd.	5
4	• Construct a Waianae Second Access Road from Lualualei Homestead Road to Kunia Road	10
6	• Construct a new, full-service freeway interchange on Interstate Route H-2, between Meheula Parkway and Ka Uka Boulevard.	10
17	• Construct a new four-lane east-west spine road within Kalaeloa by realigning and connecting portions of the existing Saratoga Avenue from Kalaeloa Boulevard in the west and to Geiger Road in the east.	10
15	• Widen Farrington Highway from four to six lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.	10
14	• Widen Farrington Highway from two to four lanes, from Golf Course Road to just west of Fort Weaver Road.	14
6	• Widen both on- and off-ramps on Interstate Route H-2, at the Waipio Interchange.	14
7	• Widen Likelike Highway from Kamehameha Highway to Kahekili Highway.	14
14	• Widen Farrington Highway from Kunia to Waiawa by one lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.	14

CMP Package #	ORTP Highway Project Description	CMP Rank
1	• Construct new Interstate Route H-1 Kapolei Interchange for Kapolei between the Palailai Interchange and Makakilo Interchange.	14
12	• Widen Salt Lake Boulevard from two to six lanes, between Maluna Street and Ala Lilikoi Street.	14
12	• Widen Puuloa Road, from Pukuloa Road to Nimitz Highway.	14
16	• Extend Hanua Street from Malakole Street to Farrington Highway. • Construct new on- and off-ramps at Interstate Route H-1 Palailai Interchange to Hanua Street extension.	21
17	• Widen and extend Kualakai Parkway as follows: • From three to six lanes from Kapolei Parkway to Interstate Route H-1 • Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (six lanes).	21
6	• Construct a new two-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new two-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.	21
17	• Extend Kamokila Boulevard as a four-lane roadway between Roosevelt and Saratoga.	21
17	• Extend Fort Barrette Road as a four-lane roadway between Roosevelt and Saratoga.	21
5	• Extend Paiwa Street from north of Lumiauau Street, to the intersection of Kamehameha Highway and Ka Uka Boulevard.	21
25	• Widen the Interstate Route H-1 by one lane, in the westbound direction, through the Waiawa Interchange. This project will begin in the vicinity of the Waiawa Interchange and end at the Paiwa Interchange.	21
9	• Extend Makakilo Drive (vicinity of Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as four-lane roadway, connecting Makakilo Drive to Kualakai Parkway.	21
1	• Widen Fort Barrette Road from two to four lanes, from Farrington Highway to Barber's Point Gate.	21
13	• H-1 widening from Ward Avenue to Punahou Street.	21
20	• Widen East-West Road from two to four lanes, from Farrington Highway to Old Fort Weaver Road.	21
2	• Widen Interstate Route H-1 in the westbound direction by one lane from the Waiau Interchange to the Waiawa Interchange.	32
2	• Widen the Interstate Route H-1 Waipahu Street off-ramp from one-to-two lanes, in the westbound direction, at the Waiawa Interchange.	32

CMP Package #	ORTP Highway Project Description	CMP Rank
10	• Construct a new, two-lane elevated and reversible HOV flyover above Nimitz Highway, from the Keehi Interchange to Pacific Street. This project includes the removal of the existing eastbound contraflow lane in the AM peak and restoration of all turning movements on the at-grade portion of Nimitz highway.	32
3	• Widen H-1 by one lane from Vineyard Boulevard to Middle Street.	32
8	• Construct a secondary access road (tunnel) from the vicinity of Lunalilo Home Road to the vicinity of Kalanianaole Highway north of Sea Life Park.	36
24	• Construct a new two-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Kalaeloa Boulevard to Makakilo Drive.	36
19	• Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.	38
26	• Extend PM contra flow lane westbound from Waiawa Interchange to Kunia Interchange.	38
11	• Modify H-1 on-and-off ramps at University Interchange.	38
27	• Extend PM contra-flow lane westbound from Keehi Interchange to Radford Drive.	41

Table S-2: CMP Transit Project Package Descriptions and Rankings

CMP Package #	ORTP Transit Project Description	CMP Rank
21	• Extend Rail from West Kapolei to East Kapolei. The western terminus begins on the Waianae-side of the new Hanua Street extension on Kapolei Parkway, continues alongside Kapolei Parkway turning makai near Wakea Street toward Saratoga Avenue, then heading Koko Head along Saratoga Avenue, turning mauka near Kualakai Parkway, and connecting with the Honolulu Rail Transit alignment's first station (East Kapolei).	1
22	• Extend Rail from Ala Moana Center (at Kona Street) to the University of Hawaii (UH) at Manoa (at Lower Campus Road: this extension continues along Kona Street to the Convention Center to Kapiolani Boulevard, turning mauka on University Avenue toward UH's Lower Campus Road) and Waikiki (between Liliuokalani and Ohua Avenues: this extension continues along Kona Street toward the Convention Center turning at Kalakaua and continuing on Kuhio where it ends between Liliuokalani and Ohua Avenues).	2

Table S-3: CMP TDM/TSM Project Package Descriptions and Rankings

Project Name	ORTP TDM/TSM Project Description	CMP Rank
Transportation Demand Management (TDM) Program (2011-2020)	• Develop an aggressive TDM program that could include, but is not limited to: 1. Free real-time online carpool matching, 2. Outreach promotion and marketing of alternative transportation, 3. Emergency ride home program, 4. Major special events, 5. Employer based commuter programs, 6. Emerging and innovative strategies (e.g., car sharing)	1
TDM Program (2011-2020)		1
Human Services Transportation Coordination Program (2011 – 2020)	• Provide a range of transportation services targeted to disadvantaged populations under the Human Services Transportation Coordination Program.	1
Human Services Transportation Coordination Program ((2021 – 2035)		1
Vanpool Program (2011-2020)	• Continue implementation and expansion of the State's Vanpool Hawaii program.	5
Vanpool Program (2021-2035)		5
Joint Traffic Management Center	• Construct a transportation management center behind the Alapai Transit Center that will combine transportation management with City, State and emergency response agencies.	7
Intelligent Transportation Systems (ITS) (2011-2020)	• Implement ITS projects including, but not limited to, those identified in the Oahu Regional ITS Architecture.	8
Intelligent Transportation Systems (ITS) (2021-2035)		8

1 Introduction

1.1 Report Purpose

This report provides a summary of the results of analysis of twenty-seven Congestion Management Process (CMP) project packages, plus nine TDM/TSM projects. It is intended for the review of congestion mitigation projects that are being considered for inclusion in the Oahu Regional Transportation Plan (ORTP) 2035.

1.2 Report Overview

This report provides a review and evaluation of the forecasted 2035 CMP project package results affecting the transportation system on the island of Oahu. Chapter 2 provides a summary of the 2035 Baseline scenario with which each of the 27 CMP project packages will be compared. Then each chapter starting with Chapter 3 provides an overview of the 2035 CMP project package definition, the analyses of performance measures, including volume-to-capacity (V/C) ratios and vehicular volume of the roadway facility on which the project is planned, mode choice, vehicle miles of travel, vehicle hours of travel, vehicle-hours of delay, and transit boardings by mode. Finally, chapter 30 provides an assessment of how ORTP 2035 candidate transportation demand management and transportation system management projects affect system performance.

1.3 Congestion Management Process Overview

1.3.1 About the OahuMPO Congestion Management Process

The purpose of the CMP for the Oahu Metropolitan Planning Organization (OahuMPO) is to identify congested surface transportation facilities, evaluate projects proposed to mitigate congestion, and prioritize these projects using quantifiable performance measures to assist decision-makers in selecting projects for the ORTP 2035 and Transportation Improvement Program (TIP).

The CMP for the ORTP 2035 builds upon previous work by the OahuMPO, particularly the technical analysis protocol developed for use for project evaluation as part of the ORTP 2030. This process follows the procedures found in the OahuMPO's *CMS Performance Monitoring and Evaluation Plan, December 2005.*

Consistent with the previous process, the CMP covers the island of Oahu, including all segments and corridors that experience congestion. Included are freeways, expressways, arterials, and collectors as defined by the regional functional classification system and reflected in facilities contained within the OahuMPO travel demand forecasting model.

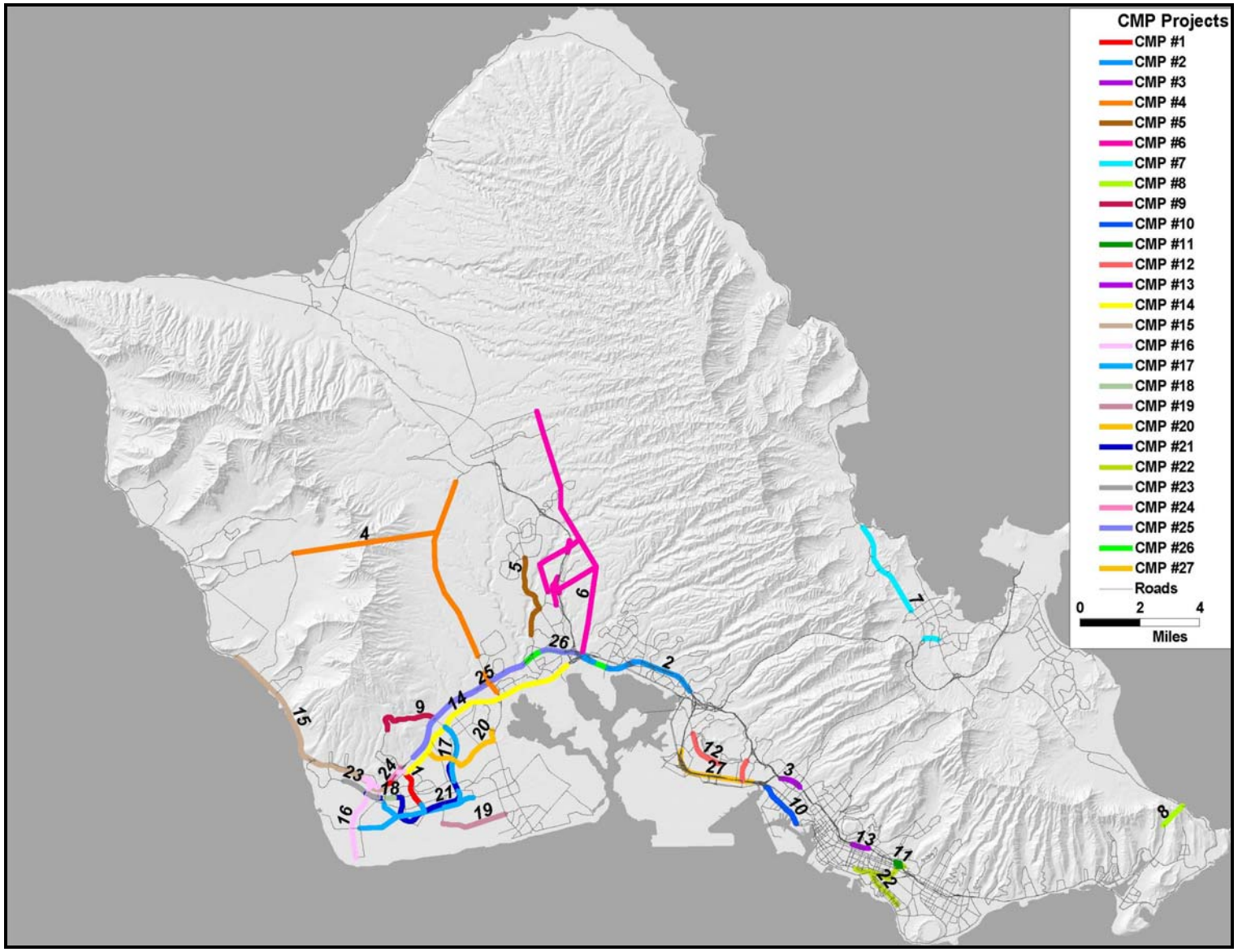
1.3.2 Selection of CMP Project Packages

The selection of projects for the 2010 CMP analysis differed slightly than what was done for the 2005 Congestion Management System (CMS) process. In the previous case, individual regionally significant roadway capacity projects that were identified through the ORTP 2030 plan development process were considered in the CMS analysis process. Each of these projects was coded into the OahuMPO travel demand model individually and the model was run to produce outputs for the CMS analysis.

For the 2010 CMP analysis, project packages (one or more individual road capacity projects) were defined to be run through the OahuMPO travel demand model. Project packages were developed to explore in more detail whether there were synergies among logical groupings of projects that were in close proximity to each other. It was felt that the analysis of the packages could highlight which projects were the more effective at reducing congestion within a subarea or corridor. Or, that the analysis might highlight unforeseen deficiencies in the transportation network, that modeling individual projects might miss. It was understood that the outcome of the CMP analysis might benefit future corridor or subarea planning studies, or performance monitoring programs based on the results of the analysis. It was also determined that while the effect of individual projects on the performance of the regional transportation system may be too small to be captured with the regional model, but grouping logical packages together may result in a noticeable effect.

See Figure 1-1 for a map of the projects modeled.

Figure 1-1. Map of CMP Projects Packages



1.3.3 Defining Congestion

For purposes of this report, and consistent with the process previously used by the OahuMPO for the ORTP 2030, the primary means of identifying congestion is the link-based volume-to-capacity ratio (V/C ratio).[1] The V/C ratio is the calculation of the demand flow rate divided by the capacity for a roadway facility. The OahuMPO 2035 Baseline travel demand forecasting model is the starting point from which to calculate the link-based V/C ratio. A roadway facility is defined as congested if the V/C ratio in during the A.M. peak period is greater than 0.90, which equates to LOS E or F.

1.3.4 Performance Measures

The CMP uses performance measures documented in the *CMS Performance Monitoring and Evaluation Plan.* Performance scores for all of the measures are generated by the OahuMPO travel demand forecast model. The included in the analyses are the following:

- Change in V/C Ratio
- Vehicle Volume
- Transit Mode Share
- Vehicle Miles Traveled (VMT)
- Vehicle Hours of Delay (VHD)
- Vehicle Hours Traveled (VHT)

The methodology for calculating these measures is described below.

Change in V/C Ratio

As mentioned above, the V/C ratio is used to calculate congestion for both 2035 Baseline conditions and for comparing CMP project packages with the Baseline. The measure is presented for the two-hour morning (AM) peak period.

Vehicle Volume

Vehicle volume is the number of vehicles that use a given roadway over a specified period of time. Vehicle volumes are presented in concert with V/C ratio to provide a comparison of project effectiveness. For example, does the project (or projects) in a CMP project package reduce congestion (reduced V/C ratio), while carrying more traffic (higher vehicle volumes)? A comparison to the Baseline alternative is also provided.

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[1] A complete definition of congestion can be found in the OahuMPO *CMS Performance Monitoring and Evaluation Plan*, December 2005.

Mode Share

This performance measure provides a comparison of the daily 2035 multi-modal mode share by 11 trip purposes, produced by the OahuMPO travel demand forecast model for each CMP project package. A comparison of the percentage change with the Baseline alternative is also provided.

Vehicle Miles Traveled

Vehicle-miles traveled (VMT) is a unit that measures travel distance made by a vehicle, such as an automobile, van, pickup truck, commercial vehicle, or motorcycle. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle. The measure reflects total year 2035 forecasted islandwide VMT produced by the CMP project package for the two-hour AM peak period. Total VMT is presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Vehicle Hours of Delay

Vehicle-hours of delay (VHD) is defined as the difference between vehicle-hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free flow (uncongested) conditions. VHD is calculated using travel times and travel speeds. The measure reflects total year 2035 forecasted islandwide VHD produced by the CMP project package for the two-hour AM peak period. Total VHD is presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Vehicle Hours Traveled

Vehicle-hours traveled (VHT) is a measurement of the total hours traveled by all vehicles. It is calculated by multiplying the number of vehicles times the travel time of those vehicles on a network or specific links within that network. VHT is an indicator of how additional travel demand influences congestion in the system from a travel time standpoint. The measure reflects total year 2035 forecasted islandwide VHT produced by the CMP project package for the two-hour AM peak period. Total VHT is presented by facility and Area Type and compared to the 2035 Baseline alternative (percent change).

Transit Boardings

Transit boardings are a new measure that has been added to this analysis. This measure tests the impacts of congestion mitigation projects on transit usage, in the form of transit boardings. This measure provides a summary of 2035 transit boardings by time period and by mode. Time periods include peak and off-peak travel. Transit modes include local, limited, and express bus; guideway (Honolulu Rail Transit); and ferry. A comparison to the Baseline alternative (percent change) is also provided.

2 Revised 2035 Baseline Scenario Overview

This chapter provides an overview of results of the 2035 Baseline scenario. These Baseline results vary slightly from the original Baseline results presented in ORTP 2035 deliverable 7.3.2 *Baseline Auto and Transit Travel Demand Forecasts Report* as the networks were updated recently to account for roadway projects recently completed. The performance of the Baseline scenario sets the benchmark against which all proposed congestion management projects are compared.

2.1 2035 Baseline Scenario Definition

The 2035 Baseline network consists of the 2007 existing conditions network plus 15 additional projects. The Baseline projects for the Oahu Regional Transportation Plan (ORTP) 2035 are described in the ORTP 2035 deliverable 7.3.2 *Baseline Auto and Transit Travel Demand Forecasts Report*.

Additional roadway network improvements have been added to the Baseline network in the Kapolei area to help capture future travel impacts anticipated by future large planned developments[2] and future transportation projects, including the Honolulu High Capacity Transit Corridor Project, which is assumed in the 2035 Baseline. These small additions to the street network were necessary to distribute anticipated roadway and transit volumes in this high growth area more accurately.

2.2 Baseline Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 Baseline scenario.

Table 2-1 shows that majority of resident trips are made by the private automobile, while majority of visitor trips are made by walking or biking, and majority of ground access for air passenger trips are made by shuttle bus.

[2] Some large developments such as Hoopili, UW West Oahu, and DHHL East Kapolei are in more than one Transportation Analysis Zone, or TAZ. The impacts of the anticipated developments can only be captured by providing additional street network to facilitate travel across TAZs so that the development's impact on the transportation system can be reasonably accounted for in the OahuMPO travel demand model. In the absence of some internal roadways, the only way travel from one end of the development to the other can be reflected in the network is by the trips having to go out to Farrington Highway or Kualakai Parkway, which places artificially higher volumes on those regional facilities.

Table 2-1. Total Daily Person Trips by Mode—2035 Baseline

Mode	2035 Baseline	
	Number	Percent by Category
Trips by Residents		
Private automobile	3,335,946	83%
Transit	245,640	6%
Bike/walk	461,594	11%
Total Trips by Residents	4,043,180	100%
Trips by Visitors		
Private Automobile	120,859	32%
Transit	30,225	8%
Taxi	9,531	3%
Tour Bus	57,915	15%
Bike/Walk	155,150	42%
Total Trips by Visitors	373,680	100%
Ground Access Trips by Air Passengers		
Private Automobile	28,797	26%
Transit	4,471	4%
Taxi	17,218	15%
Tour Bus	22,486	20%
Shuttle Bus	39,728	35%
Total Trips by Air Passengers	112,700	100%
Truck Trips		
Total Trips by Truck	237,306	100%
Total Daily Trips (All)	*4,766,866*	*100%*

Table 2-2 shows the year 2035 projected mode choice results by trip purpose for residents based on the 2035 Baseline scenario model results. Eighty-three percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode, with the vast majority of them being walk trips. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent). These purposes show a much higher percentage of trips on transit compared to the overall percentage of six percent at major employment centers (e.g., Downtown Honolulu) and colleges that are concentrated areas attracting high levels of trips which can typically be better served by transit.

Table 2-2. 2035 Baseline Scenario Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,253	81,413	162,232	29,251	115,850	2,957	8,251	35,852	112,456	264,166	142,231	1,492,912
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,801	73,760	42,100	33,740	29,909	1,708	65,381	8,508	131,889	300,642	221,518	1,059,956
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,973	46,439	12,659	15,972	11,644	427	104,802	2,871	95,429	247,258	204,604	783,078
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,448	222	2	527	0	0	237	205	0	0	0	4,641
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,351	4,243	7,096	5,138	4,465	4,541	16,072	9,450	9,903	26,062	3,667	145,988
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,485	1,850	5,041	1,844	1,679	1,116	3,186	5,762	1,322	10,615	1,859	61,759
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,125	48	0	7	0	0	259	97	138	214	0	1,888
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,548	0	0	0	0	0	4	1,565	11	537	0	14,665
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,649	252	14	0	1	1	1,549	1,842	752	1,636	3	16,699
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,706	10,805	13,761	3,109	52,747	1,240	74,370	4,126	30,081	122,569	51,100	415,614
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,606	1,858	950	33	2,106	12	8,470	3,432	2,567	11,406	2,540	45,980
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,945*	*220,890*	*243,855*	*89,621*	*218,401*	*12,002*	*282,581*	*73,710*	*384,548*	*985,105*	*627,522*	*4,043,180*

2.3 Baseline Scenario Travel Demand Model Assignment Results

This section describes the results from the travel demand forecasting model run for the Baseline scenario. These results include the daily vehicle-miles traveled (VMT), AM two-hour peak period vehicle-hours (VHT), and vehicle-hours of delay (VHD). Major roadways operating at LOS E or F in the AM two-hour peak period are documented, and daily transit boardings by mode are also discussed.

2.3.1 Baseline Highway Assignment

The highway assignment in the model produces summaries of the total islandwide daily VMT by motorized vehicles (automobiles, buses, and commercial vehicle) as estimated by the travel demand forecasting model. Table 2-3 shows the summary of the daily VMT by Facility Type and Area Type.[3] Of the more than 15.2 million daily VMT estimated, over 39 percent are estimated to occur on the Interstate freeway system (e.g., Interstate Routes H-1, H-2, H-3, and Moanalua Freeway), while the estimated percentages of VMT on the expressways (e.g., Likelike Highway and Pali Highway), ramps, arterials (e.g., Nimitz Highway, Dillingham Boulevard, and Moanalua Road) and collectors (e.g., Kaahumanu Street and Waipahu Street) would be 11 percent, 5 percent, 33 percent, and 12 percent, respectively.

Table 2-4 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 Baseline scenario. The model forecasts 89,279 hours of travel in the AM two-hour peak period. Arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Note that while VMT is projected to be higher on freeways, VHT is projected to be higher for arterials, reflecting the overall slower speeds (and increased travel times) on the arterial system.

Table 2-5 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 Baseline. The facilities with the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Again, while more travel occurs on the freeway system overall, the arterial system experiences proportionately higher congestion and delay overall.

Table 2-6 lists the major roadways that are projected to be operating at LOS E and F conditions in the AM two-hour peak period of the 2035 Baseline scenario. Many of the same problem spots identified in the 2007 base year such as the H-1/H-2 merge, Middle Street merge, Dillingham Boulevard in the Koko Head-bound direction are still expected to operate at LOS E or F conditions. Figure 2-1 graphically shows all roadways projected to operate at LOS E or F in the 2035 Baseline scenario AM two-hour peak period.

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[3] See Appendix A for Area Type definitions.

Table 2-3. 2035 Baseline Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,970	506,903	1,177,322	2,711,225	368,772	815,458	234,931	5,966,581
Expressways	0	0	37,483	170,529	448,050	372,459	515,266	159,817	1,703,604
Ramps	0	17,110	35,434	166,064	366,463	28,496	161,695	18,043	793,305
Arterials	127,609	253,837	619,829	723,146	1,525,282	261,794	1,054,819	399,118	4,965,434
Collectors	14,565	33,327	139,870	373,282	772,140	19,154	388,871	39,383	1,780,592
Total	142,174	456,244	1,339,519	2,610,343	5,823,160	1,050,675	2,936,109	851,292	15,209,516

Table 2-4. 2035 Baseline AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	477	2,599	6,053	10,706	911	3,223	558	24,527
Expressways	0	0	170	1,568	2,489	2,592	1,980	640	9,439
Ramps	0	224	453	1,499	3,106	130	1,121	77	6,610
Arterials	972	2,033	4,229	5,571	12,466	1,011	6,421	1,557	34,260
Collectors	102	338	1,007	3,287	6,618	169	2,753	169	14,443
Total	1,074	3,072	8,458	17,978	35,385	4,813	15,498	3,001	89,279

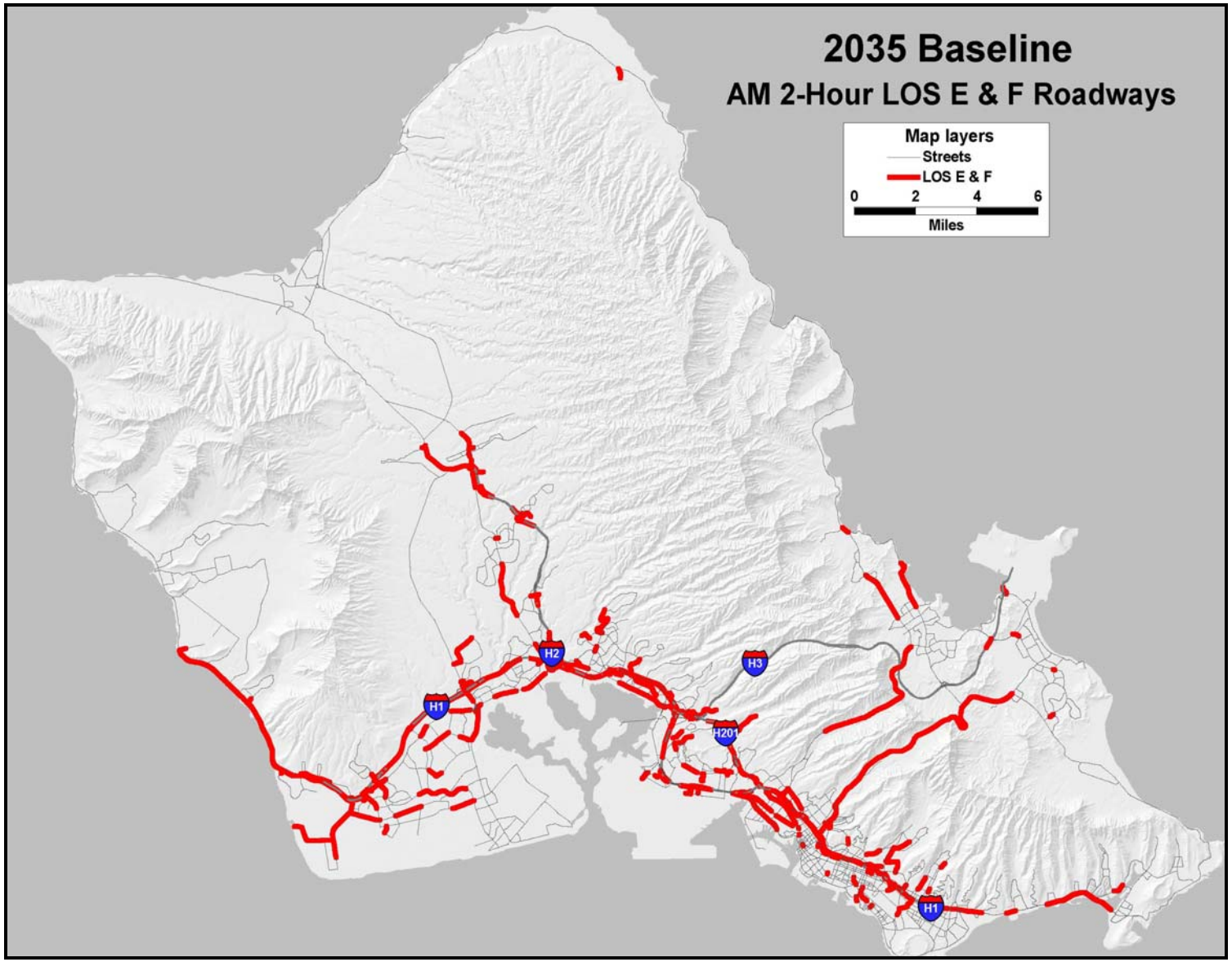
Table 2-5. 2035 Baseline AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	120	1,517	3,095	4,498	37	1,017	29	10,313
Expressways	0	0	75	1,070	1,341	1,597	753	217	5,053
Ramps	0	155	310	864	1,840	31	636	14	3,850
Arterials	179	642	655	2,361	5,008	151	2,465	219	11,680
Collectors	18	159	222	1,227	1,837	47	856	26	4,392
Total	197	1,076	2,779	8,617	14,524	1,863	5,727	505	35,288

Table 2-6. 2035 Baseline Major Roadways Operating at LOS E or F in AM Two-Hour Peak Period

1. Dillingham Boulevard Koko Head-bound between Middle Street and Alakawa Street.
2. Farrington Highway Koko Head-bound between Maliona Street in Waianae and the H-1 on-ramp in Waipahu.
3. Fort Barrette Road between Kamaaha Avenue and Farrington Highway mauka-bound.
4. Fort Weaver Road mauka-bound between Aawa Drive and the Farrington Highway underpass.
5. Ka Uka Boulevard Interchange (over H-2) both directions.
6. Kahekili Highway town-bound between Hui Iwa Street and Haiku Road.
7. Kalaeloa Boulevard makai-bound between Farrington Highway and makai of Malakole Street.
8. Kalakaua Avenue Koko Head-bound between Kanunu Street and Kuhio Avenue.
9. Kalanianaole Highway Ewa-bound between Lunalilo Home Road and Halemaumau Street.
10. Kalanianaole Highway Ewa-bound between Halemaumau Street and H-1 at Ainakoa Avenue.
11. Kamehameha Highway makai-bound between Whitmore Avenue in Wahiawa to the H-1/H-2 merge in Waipahu.
12. Kapolei Parkway Waianae-bound between Kolowaka Drive and the new University of Hawaii West Oahu campus East Kapolei Road.
13. Kunia Road makai-bound between Kupuna Loop and the H-1 west-bound on ramp.
14. Kunia Road mauka-bound between Farrington Highway and the H-1 east-bound on ramp.
15. Likelike Highway town-bound in Kaneohe.
16. Makakilo Drive makai-bound before the H-1 Interchange.
17. Malakole Street.
18. Moanalua Freeway Koko Head-bound between Red Hill and Middle Street.
19. Moanalua Road Koko Head-bound between the H-1 east-bound Waimalu/Pearlridge off ramp and Honomanu Street.
20. Nimitz Highway Koko Head-bound between Middle Street and Alakawa Street.
21. North King Street Koko Head-bound between the North King Street off-ramp from Moanalua Road to Liliha Street.
22. Old Waialae Road Ewa-bound over H-1 to South King Street.
23. Pali Highway town-bound from Kaneohe to Downtown (Vineyard Boulevard).
24. Puuloa Road mauka-bound toward H-1 makai of Pukoloa Street.
25. Salt Lake Boulevard Koko-Head bound between Ala Kapuna and Ala Lilikoi
26. Wilikina Drive town-bound between McCornack Road and H-2.
27. H-1 Ewa-bound between the H-1 / H-2 merge and Paiwa Street.
28. H-1 Ewa-bound between Fifth Avenue and Middle Street.
29. H-1 Koko Head-bound between the Kapolei Interchange at Kalaeloa Boulevard to the Halawa Interchange.
30. H-1 Koko Head-bound Middle Street merge to Punahou Street.

Figure 2-1. 2035 Baseline Scenario Roadways Operating at LOS E or F in AM Two-Hour Peak Period



2.3.2 Baseline Transit Assignment

Table 2-7 shows projected 2035 Baseline scenario transit boardings by period (peak versus off-peak) and transit mode for residents, visitors, and ground access air passengers combined. Transit modes include local bus, express bus (i.e., peak period, peak direction routes making limited stops), limited bus (i.e., all day, two direction routes making limited stops), and rail transit (i.e., rail transit). The majority of transit boardings are on local bus transit (69 percent) while approximately 26 percent of total system-wide boardings are on fixed-guideway transit.

Table 2-7. 2035 Baseline Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,111	7,520	6,849	73,111	0	261,592
Off-Peak	93,515	0	5,079	27,577	0	126,170
Total	267,626	7,520	11,928	100,688	0	387,762

3 CMP Project #1 Package – Kapolei Area Projects

This chapter provides the analysis results of the CMP Project #1 Package.

3.1 CMP Project #1 Package Definition

This CMP Package includes all the projects in the Baseline scenario plus the following two projects:

- Widen Fort Barrette Road from two to four lanes, from Farrington Highway to Barber's Point Gate.
- Construct new Interstate Route H-1 Kapolei Interchange for Kapolei between the Palailai Interchange and Makakilo Interchange. Project to be constructed in multiple phases.

The Fort Barrette Road widening project is located on the congested roadway as seen in the Baseline scenario between Kamaaha Avenue and Farrington Highway. The new H-1 Kapolei Interchange project is also situated on congested sections of H-1 near the existing Kalaeloa and Makakilo Interchange in the Baseline scenario. See Table 2-6 numbers 3 and 28.

3.2 CMP Project #1 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #1 Package.

Table 3-1 shows that the majority of resident trips are made by the private automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #1 Package mode share remains similar to the Baseline scenario.

Table 3-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #1 Package

Mode	2035 Baseline		2035 CMP Project #1		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,291	83%	0%
Transit	245,640	6%	245,812	6%	0%
Bike/walk	461,594	11%	461,136	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,239	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,056	32%	0%
Transit	30,225	8%	30,263	8%	0%
Taxi	9,531	3%	9,554	3%	0%
Tour Bus	57,915	15%	57,960	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,098	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,807	26%	0%
Transit	4,471	4%	4,470	4%	0%
Taxi	17,218	15%	17,229	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,708	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,343*	*100%*	*0%*

Table 3-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #1 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk modes. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 3-3 shows the comparison of the 2035 CMP Project #1 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #1 Package. This table shows that there is relatively no change in mode share across all purposes for the CMP Project #1 Package compared to the Baseline.

Table 3-2. 2035 CMP Project #1 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,185	81,410	162,215	29,251	115,886	2,957	8,252	35,878	112,465	264,197	142,239	1,492,935
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,823	73,760	42,108	33,745	29,920	1,709	65,391	8,499	131,890	300,667	221,539	1,060,051
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,056	46,470	12,688	15,976	11,648	427	104,849	2,866	95,431	247,274	204,620	783,305
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,410	220	2	522	0	0	236	200	0	0	0	4,590
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,365	4,246	7,103	5,147	4,465	4,541	16,080	9,476	9,902	26,080	3,669	146,074
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,521	1,856	5,049	1,847	1,679	1,116	3,197	5,743	1,316	10,646	1,858	61,828
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,127	48	0	7	0	0	259	95	138	214	0	1,888
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,594	0	0	0	0	0	4	1,567	11	538	0	14,714
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,664	253	15	0	1	1	1,552	1,840	752	1,637	3	16,718
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,621	10,791	13,729	3,101	52,711	1,239	74,277	4,118	30,070	122,465	51,067	415,189
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,586	1,853	949	33	2,105	12	8,474	3,429	2,566	11,402	2,538	45,947
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,952*	*220,907*	*243,858*	*89,629*	*218,415*	*12,002*	*282,571*	*73,711*	*384,541*	*985,120*	*627,533*	*4,043,239*

Table 3-3. Comparison of 2035 CMP Project #1 to 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											*Total*
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-68	-3	-17	0	36	0	1	26	9	31	8	23
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	22	0	8	5	11	1	10	-9	1	25	21	95
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	83	31	29	4	4	0	47	-5	2	16	16	227
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-38	-2	0	-5	0	0	-1	-5	0	0	0	-51
	-1%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	14	3	7	9	0	0	8	26	-1	18	2	86
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	36	6	8	3	0	0	11	-19	-6	31	-1	69
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	2	0	0	0	0	0	0	-2	0	0	0	0
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	46	0	0	0	0	0	0	2	0	1	0	49
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	15	1	1	0	0	0	3	-2	0	1	0	19
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-85	-14	-32	-8	-36	-1	-93	-8	-11	-104	-33	-425
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-20	-5	-1	0	-1	0	4	-3	-1	-4	-2	-33
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	7	17	3	8	14	0	-10	1	-7	15	11	59
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

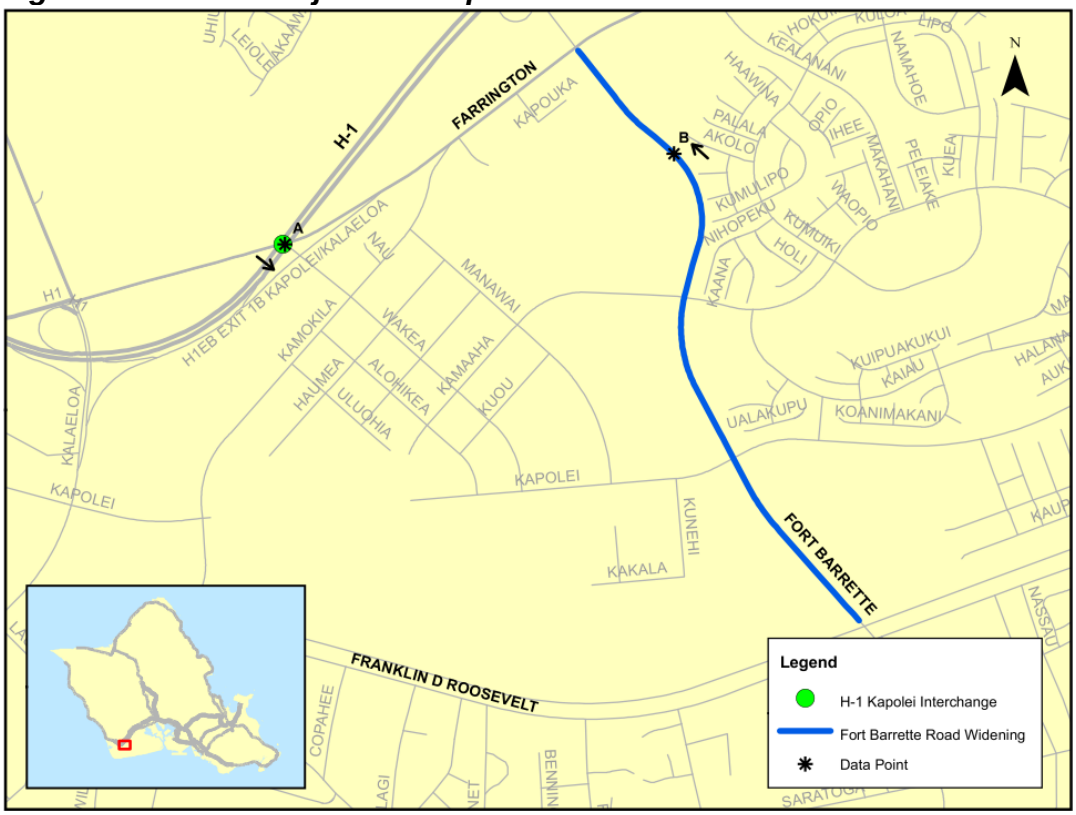
3.3 CMP Project #1 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #1. These include the AM two-hour V/C (Level of Service [LOS[4]]) and corresponding vehicular volume of the planned project, the daily VMT, and AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

3.3.1 CMP Project #1 Highway Assignment

Figure 3-1 shows the map of the approximate location of the projects included in CMP Project #1 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 3-1. CMP Project #1 Map and Data Points



[4] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 3-2 shows that the overpass at the new Kapolei Interchange is projected to operate at LOS B (V/C = 0.646) while accommodating 2,145 vehicles in the AM two-hour peak period. This new interchange provides relief from the Makakilo Interchange. The Fort Barrette Road widening shows a significant improvement in LOS from the Baseline to the build (V/C = 0.944 [LOS E] to V/C = 0.621 [LOS B]) even while the volume on this facility increases by nearly 700 vehicles in the AM two-hour peak period.

Figure 3-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #1

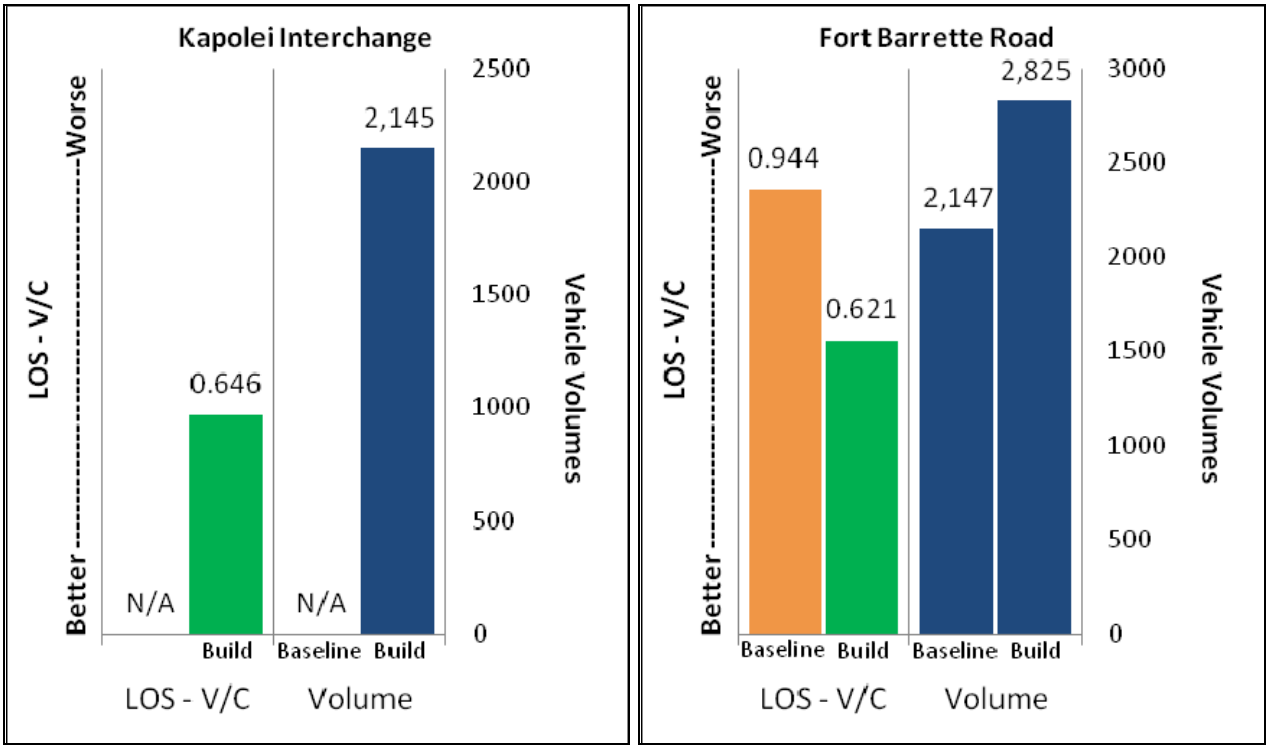


Table 3-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[5] There is negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 3-5.

Table 3-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #1 Package. The model forecasts 89,110 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 3-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #1 Package. The collectors in Area Type 2 show a six percent increase in VHT over the Baseline as more vehicles are on these roadways to get to the new Kapolei Interchange complex.

[5] See Appendix A for Area Type definitions.

Table 3-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #1 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 3-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #1 Package. Overall, AM two-hour VHD is projected to remain similar to the Baseline, but the collectors in Area Type 2 (roadways near the new Kapolei Interchange complex) increased by 11 percent.

Table 3-4. 2035 CMP Project #1 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,386	508,144	1,181,607	2,716,061	368,474	821,298	236,312	5,984,282
Expressways	0	0	37,477	170,416	448,199	372,402	514,528	159,781	1,702,803
Ramps	0	17,052	35,686	165,041	366,722	28,454	161,695	18,371	793,021
Arterials	127,352	252,550	619,071	720,377	1,528,108	261,463	1,045,332	399,097	4,953,350
Collectors	14,547	33,631	140,001	373,218	772,086	19,127	388,244	39,473	1,780,327
Total	141,899	455,619	1,340,379	2,610,659	5,831,176	1,049,920	2,931,097	853,034	15,213,783

Table 3-5. Percent Change from 2035 Baseline to 2035 CMP Project #1 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	1%	1%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	0%	-1%	0%	0%	0%	2%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	-1%	1%	0%	0%	0%	-1%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 3-6. 2035 CMP Project #1 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,581	6,104	10,703	911	3,254	566	24,598
Expressways	0	0	172	1,555	2,471	2,593	1,973	643	9,407
Ramps	0	224	444	1,433	3,058	130	1,125	80	6,494
Arterials	970	2,048	4,224	5,453	12,582	1,004	6,347	1,557	34,185
Collectors	102	358	1,002	3,253	6,624	168	2,750	169	14,426
Total	1,072	3,109	8,423	17,798	35,438	4,806	15,449	3,015	89,110

Table 3-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #1 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	1%	0%	0%	1%	1%	0%
Expressways	0%	0%	1%	-1%	-1%	0%	0%	0%	0%
Ramps	0%	0%	-2%	-4%	-2%	0%	0%	4%	-2%
Arterials	0%	1%	0%	-2%	1%	-1%	-1%	0%	0%
Collectors	0%	6%	0%	-1%	0%	-1%	0%	0%	0%
Total	0%	1%	0%	-1%	0%	0%	0%	0%	0%

Table 3-8. 2035 CMP Project #1 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,495	3,138	4,487	37	1,028	31	10,338
Expressways	0	0	77	1,058	1,326	1,598	749	220	5,028
Ramps	0	156	301	800	1,792	31	640	15	3,735
Arterials	178	658	652	2,257	5,112	148	2,445	220	11,670
Collectors	18	177	220	1,198	1,843	47	852	26	4,381
Total	196	1,113	2,745	8,451	14,560	1,861	5,714	512	35,152

Table 3-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #1 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-1%	1%	0%	0%	1%	7%	0%
Expressways	0%	0%	3%	-1%	-1%	0%	-1%	1%	0%
Ramps	0%	1%	-3%	-7%	-3%	0%	1%	7%	-3%
Arterials	-1%	2%	0%	-4%	2%	-2%	-1%	0%	0%
Collectors	0%	11%	-1%	-2%	0%	0%	0%	0%	0%
Total	-1%	3%	-1%	-2%	0%	0%	0%	1%	0%

3.3.2 CMP Project #1 Transit Assignment

Table 3-10 shows the 2035 CMP Project #1 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 3-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #1 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 3-10. 2035 CMP Project #1 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,310	7,503	6,858	73,242	0	261,913
Off-Peak	93,597	0	5,076	27,592	0	126,265
Total	267,907	7,503	11,934	100,834	0	388,178

Table 3-11. Percent Change in Transit Boardings, Baseline to CMP Project #1

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

3.4 Summary of CMP Project #1 Findings

These are the key findings related to the CMP Project #1 Package:

- The new Kapolei Interchange complex provides access and egress relief from the Makakilo Interchange. Over 2,100 vehicles enter the Kapolei area via the new interchange in the CMP Project #1 Package in the AM two-hour peak period.
- Fort Barrette Road widening provides relief to the growing surrounding Kapolei and Ewa areas. LOS on Fort Barrette Road improves to LOS B (green) from LOS E (orange).

4 CMP Project #2 Package – H-1 Pearl City/Aiea Projects

This chapter provides the analysis results of the CMP Project #2 Package.

4.1 CMP Project #2 Package Definition

This CMP Package includes all the projects in the Baseline plus the following three projects:

- Widen Interstate Route H-1 in the westbound direction by one lane from the Waiau Interchange to the Waiawa Interchange.
- Widen the Interstate Route H-1 Waipahu Street off-ramp from one to two lanes, in the westbound direction, at the Waiawa Interchange.
- Widen the Interstate Route H-1 by one lane in the eastbound direction, from the Waiawa Interchange to the Halawa Interchange.

The H-1 westbound widening project is located near the Baseline scenario's congested H-1 westbound section between the Waiawa Interchange and the Paiwa Interchange. The H-1 eastbound widening project is situated on congested sections of H-1 between Waiawa Interchange and Halawa Interchange in the Baseline scenario. See Table 2-6 numbers 26 and 28.

4.2 CMP Project #2 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #2 Package.

Table 4-1 shows that the majority of resident trips are made by the private automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #2 mode share remains similar to the Baseline scenario.

Table 4-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #2 Package

Mode	2035 Baseline		2035 CMP Project #2		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,276	83%	0%
Transit	245,640	6%	244,802	6%	0%
Bike/walk	461,594	11%	461,265	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,343	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,037	32%	0%
Transit	30,225	8%	30,255	8%	0%
Taxi	9,531	3%	9,536	3%	0%
Tour Bus	57,915	15%	57,985	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,080	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,809	26%	0%
Transit	4,471	4%	4,451	4%	0%
Taxi	17,218	15%	17,225	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,728	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,429*	*100%*	*0%*

Table 4-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #2 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk modes. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 4-3 shows the comparison of the 2035 CMP Project #2 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the absolute change and the percent change between the 2035 Baseline and the CMP Project #2 Package. This table shows that the CMP Project #2 Package provided some relief on the most congested sections of the H-1 freeway, as the Package had nearly 3,200 more drive alone and two-occupant vehicle person trips, 1,800 less three-plus occupant person trips, and over 800 fewer transit trips compared to the Baseline.

Table 4-2. 2035 CMP Project #2 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,978	81,518	162,298	29,249	115,873	2,958	8,261	35,962	112,473	264,212	142,242	1,494,024
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,899	74,076	42,332	33,777	29,914	1,709	65,664	8,565	131,880	300,682	221,530	1,062,028
	17%	*34%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	39,944	46,082	12,432	15,963	11,646	427	104,594	2,808	95,423	247,288	204,617	781,224
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,434	220	2	525	0	0	236	202	0	0	0	4,619
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,232	4,247	7,096	5,138	4,464	4,541	16,096	9,459	9,890	26,046	3,668	145,877
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,310	1,830	4,992	1,849	1,678	1,115	3,130	5,698	1,318	10,588	1,857	61,365
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,127	47	0	7	0	0	260	96	138	215	0	1,890
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,372	1	0	0	0	0	3	1,527	11	538	0	14,452
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,577	252	14	0	1	1	1,541	1,824	752	1,634	3	16,599
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,545	10,811	13,743	3,104	52,764	1,240	74,281	4,142	30,068	122,556	51,106	415,360
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,543	1,856	947	32	2,106	12	8,469	3,435	2,564	11,402	2,539	45,905
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,961*	*220,940*	*243,856*	*89,644*	*218,446*	*12,003*	*282,535*	*73,718*	*384,517*	*985,161*	*627,562*	*4,043,343*

Table 4-3. Comparison of the 2035 CMP Project #2 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	725	105	66	-2	23	1	10	110	17	46	11	1,112
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	1,098	316	232	37	5	1	283	57	-9	40	12	2,072
	1%	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-1,029	-357	-227	-9	2	0	-208	-63	-6	30	13	-1,854
	-3%	*-1%*	*-2%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-14	-2	0	-2	0	0	-1	-3	0	0	0	-22
	0%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	-119	4	0	0	-1	0	24	9	-13	-16	1	-111
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-175	-20	-49	5	-1	-1	-56	-64	-4	-27	-2	-394
	-1%	*-1%*	*-1%*	*0%*	*0%*	*0%*	*-2%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Informal Park-and-ride transit	2	-1	0	0	0	0	1	-1	0	1	0	2
	0%	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-176	1	0	0	0	0	-1	-38	0	1	0	-213
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*-25%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Kiss-and-ride transit	-72	0	0	0	0	0	-8	-18	0	-2	0	-100
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk	-161	6	-18	-5	17	0	-89	16	-13	-13	6	-254
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-63	-2	-3	-1	0	0	-1	3	-3	-4	-1	-75
	0%	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	16	50	1	23	45	1	-46	8	-31	56	40	163
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

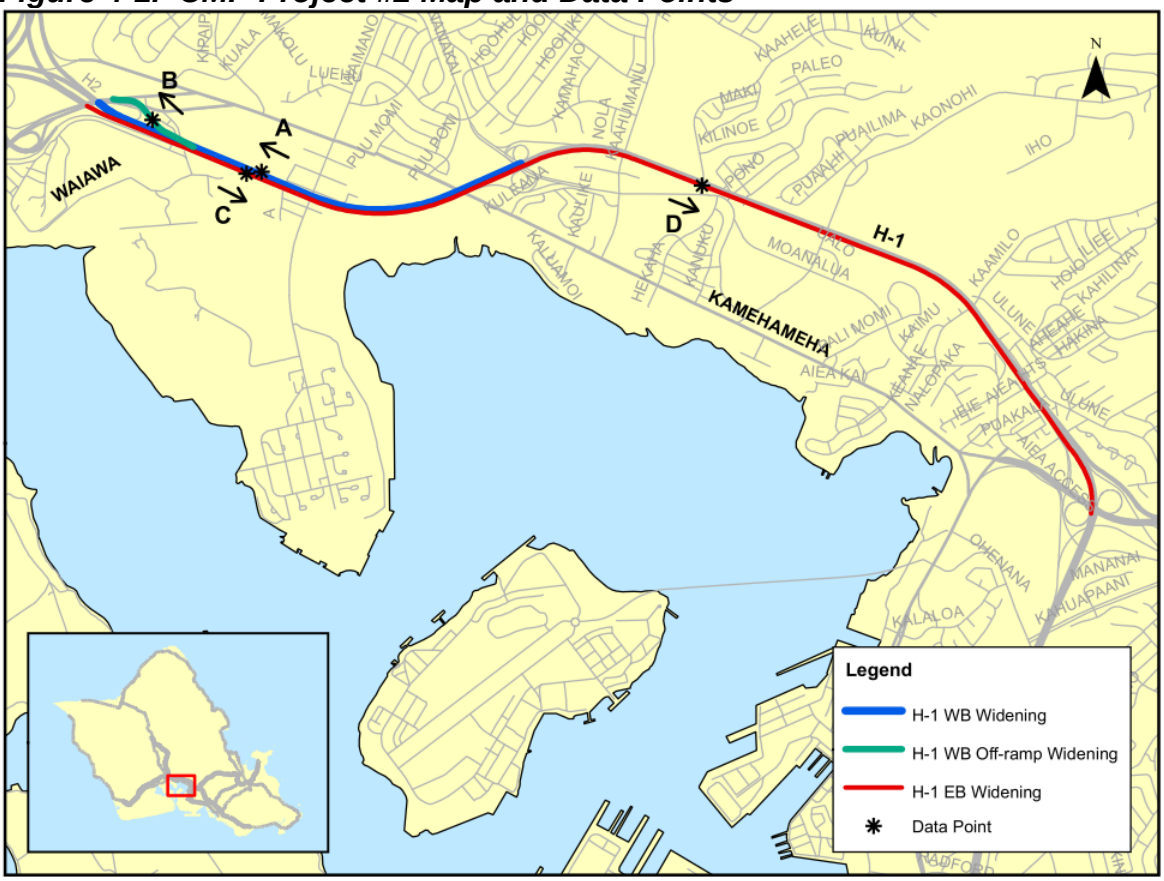
4.3 CMP Project #2 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #2. These include the AM two-hour V/C (Level of Service [LOS[6]]) and corresponding vehicular volume of the planned project, the daily VMT, and AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

4.3.1 CMP Project #2 Highway Assignment

Figure 4-1 shows the map of the approximate location of the projects included in the CMP Project #2 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 4-1. CMP Project #2 Map and Data Points



[6] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 4-2 shows that, although the H-1 eastbound freeway is still operating at LOS F, the LOS improved slightly while still accommodating nearly 3,000 more vehicles in the AM two-hour peak period. The H-1 westbound direction operates at LOS A in the AM two-hour peak period since that is the off-peak direction. The westbound Waipahu off-ramp from H-1 improved from LOS F to LOS D even though there was an increase of over 600 vehicles in the AM two-hour peak period.

Figure 4-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #2

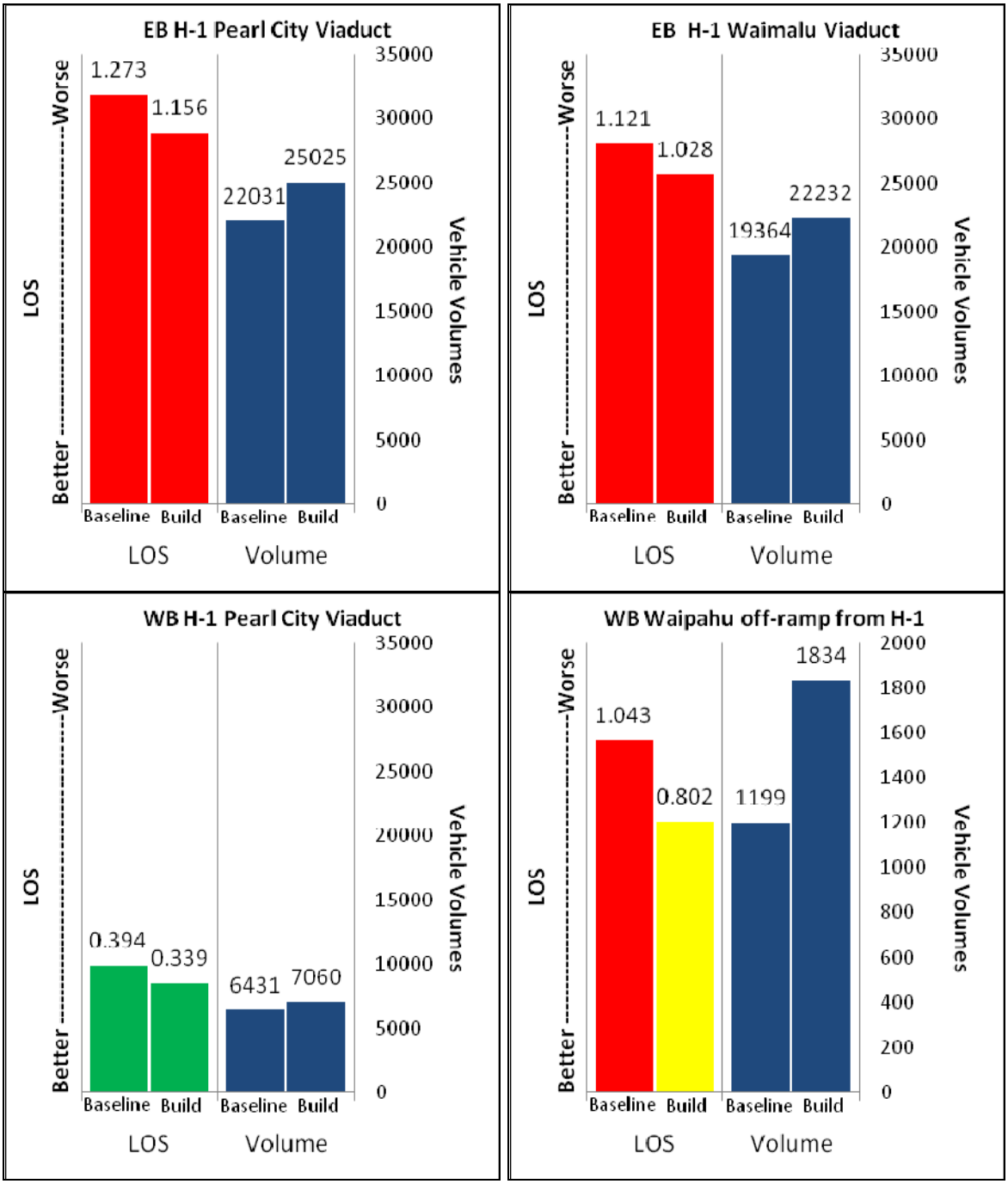


Table 4-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[7] There is negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 4-5.

Table 4-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #2 Package. The model forecasts 88,629 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 4-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #2 Package. The freeways for Area Types 4 and 5 (projected widened segments on H-1) have a seven and four percent decrease in VHT from the Baseline, respectively. The freeway in Area Type 7 where no widening was planned increased by eight percent due to the greater amount of traffic coming from the widened sections of H-1.

Table 4-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #2 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (28 percent), and expressways (15 percent). Table 4-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #2 Package. Overall, AM two-hour VHD is projected to decrease by two percent from the Baseline, with the VHD on freeways in Area Types 4 and 5 (projected widened segments on H-1) decreasing by 17 and 13 percent, respectively, from the Baseline. Like the VHT, the VHD on freeways in Area Type 7 where no widening was planned increased by 23 percent. This is due to the increased traffic on the widened sections of H-1.

[7] See Appendix A for Area Type definitions.

Table 4-4. 2035 CMP Project #2 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,224	508,711	1,206,267	2,741,821	372,554	830,142	235,742	6,047,461
Expressways	0	0	37,483	170,326	449,149	372,509	514,787	159,562	1,703,816
Ramps	0	17,097	35,655	167,998	370,908	28,564	169,217	18,060	807,499
Arterials	127,502	253,869	619,725	714,193	1,526,738	260,236	1,043,741	400,326	4,946,330
Collectors	14,572	33,365	140,153	372,406	772,428	19,087	389,442	39,621	1,781,074
Total	142,074	456,555	1,341,727	2,631,190	5,861,044	1,052,950	2,947,329	853,311	15,286,180

Table 4-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #2 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	2%	1%	1%	2%	0%	1%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	1%	1%	0%	5%	0%	2%
Arterials	0%	0%	0%	-1%	0%	-1%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	1%	0%
Total	0%	0%	0%	1%	1%	0%	0%	0%	1%

Table 4-6. 2035 CMP Project #2 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	476	2,604	5,630	10,226	932	3,485	562	23,915
Expressways	0	0	172	1,598	2,508	2,633	1,973	641	9,525
Ramps	0	229	449	1,495	3,278	131	1,155	78	6,815
Arterials	973	2,049	4,237	5,322	12,596	992	6,160	1,566	33,895
Collectors	102	338	1,007	3,281	6,641	167	2,773	170	14,479
Total	1,075	3,092	8,469	17,326	35,249	4,855	15,546	3,017	88,629

Table 4-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #2 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-7%	-4%	2%	8%	1%	-2%
Expressways	0%	0%	1%	2%	1%	2%	0%	0%	1%
Ramps	0%	2%	-1%	0%	6%	1%	3%	1%	3%
Arterials	0%	1%	0%	-4%	1%	-2%	-4%	1%	-1%
Collectors	0%	0%	0%	0%	0%	-1%	1%	1%	0%
Total	0%	1%	0%	-4%	0%	1%	0%	1%	-1%

Table 4-8. 2035 CMP Project #2 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,517	2,571	3,923	39	1,252	29	9,454
Expressways	0	0	77	1,100	1,356	1,638	750	219	5,140
Ramps	0	160	306	857	1,977	31	639	15	3,985
Arterials	181	656	658	2,135	5,151	145	2,278	225	11,429
Collectors	18	159	223	1,228	1,847	45	868	27	4,415
Total	199	1,098	2,781	7,891	14,254	1,898	5,787	515	34,423

Table 4-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #2 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	0%	-17%	-13%	5%	23%	0%	-8%
Expressways	0%	0%	3%	3%	1%	3%	0%	1%	2%
Ramps	0%	3%	-1%	-1%	7%	0%	0%	7%	4%
Arterials	1%	2%	0%	-10%	3%	-4%	-8%	3%	-2%
Collectors	0%	0%	0%	0%	1%	-4%	1%	4%	1%
Total	1%	2%	0%	-8%	-2%	2%	1%	2%	-2%

4.3.2 CMP Project #2 Transit Assignment

Table 4-10 shows the 2035 CMP Project #2 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 4-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #2 Package. Total boardings remain nearly identical to the 2035 Baseline scenario.

Table 4-10. 2035 CMP Project #2 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	173,457	7,479	6,829	72,464	0	260,229
Off-Peak	93,437	0	5,070	27,531	0	126,037
Total	266,893	7,479	11,898	99,995	0	386,266

Table 4-11. Percent Change in Transit Boardings, Baseline to CMP Project #2

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	-1%	0%	-1%	0%	-1%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	-1%	0%	-1%	0%	0%

4.4 Summary of CMP Project #2 Findings

These are the key findings related to the CMP Project #2 Package:

- The westbound H-1 widening project from Waiau Interchange to Waiawa Interchange performs better in reducing congestion (improved level of service) over Baseline conditions, while carrying more traffic.
- The eastbound H-1 widening project from Waiawa Interchange to Halawa Interchange performs better in reducing congestion (improved level of service) over Baseline conditions, while carrying more traffic. However the traffic queue is just moved farther along the freeway than it currently is, as indicated by the decreased VHT and VHD on the widened sections but the corresponding increased VHT and VHD on the sections following the widened project.
- The widening project on Waipahu Street off-ramp performs better in reducing congestion (improved level-of-service) over Baseline conditions, while carrying more traffic.

5 CMP Project #3 Package – H-1 Kalihi Projects

This chapter provides the analysis results of the CMP Project #3 Package.

5.1 CMP Project #3 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen the Interstate Route H-1 by one lane, in the eastbound direction, from Ola Lane to Vineyard Boulevard, as identified below:
  • From two to three lanes from Ola Lane/Middle Street to Likelike Highway off-ramp
  • From three to four lanes from Likelike Highway off-ramp to Vineyard Boulevard
  This project also includes the widening of:
  • Gulick Avenue overpass to allow five lanes to pass under it
  • Kalihi Interchange overcrossings to allow four lanes to pass under it.
- Widen the Interstate Route H-1 by one lane in the westbound direction, from Vineyard Boulevard to Middle Street.

The H-1 eastbound widening project is located on the congested roadway as seen in the Baseline scenario. The H-1 westbound widening project is also situated on congested sections of H-1 in the Baseline scenario. See Table 2-6 numbers 27 and 29.

5.2 CMP Project #3 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #3 Package.

Table 5-1 shows that the majority of resident trips are made by the private automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #3 mode share remains similar to the Baseline scenario.

Table 5-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #3 Package

Mode	2035 Baseline		2035 CMP Project #3		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,330	83%	0%
Transit	245,640	6%	245,389	6%	0%
Bike/walk	461,594	11%	461,482	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,201	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,899	32%	0%
Transit	30,225	8%	30,216	8%	0%
Taxi	9,531	3%	9,534	3%	0%
Tour Bus	57,915	15%	57,929	16%	0%
Bike/Walk	155,150	42%	155,149	42%	0%
Total Trips by Visitors	373,680	100%	373,727	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,831	26%	0%
Transit	4,471	4%	4,450	4%	0%
Taxi	17,218	15%	17,245	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,688	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,934*	*100%*	*0%*

Table 5-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #3 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 5-3 shows the comparison of the 2035 CMP Project #3 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #3 Package. This table shows that the CMP Project #3 Package had a small increase in drive alone and two-occupant vehicle person trips, a small decrease in three-plus occupant person trips, and slight decrease in transit trips compared to the Baseline.

Table 5-2. 2035 CMP Project #3 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,306	81,404	162,233	29,247	115,884	2,956	8,247	35,895	112,458	264,183	142,237	1,493,050
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,089	73,820	42,170	33,747	29,919	1,709	65,373	8,544	131,891	300,672	221,533	1,060,467
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,767	46,392	12,611	15,968	11,648	427	104,836	2,840	95,432	247,276	204,616	782,813
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,426	220	2	526	0	0	236	204	0	0	0	4,614
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,371	4,246	7,105	5,140	4,466	4,540	16,082	9,508	9,904	26,099	3,677	146,138
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,417	1,851	5,024	1,849	1,682	1,117	3,185	5,651	1,318	10,528	1,845	61,467
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,127	48	0	7	0	0	259	96	138	214	0	1,889
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,519	0	0	0	0	0	4	1,529	11	541	0	14,604
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,642	253	14	0	1	1	1,552	1,825	751	1,635	3	16,677
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,684	10,804	13,747	3,106	52,696	1,239	74,338	4,168	30,080	122,553	51,073	415,488
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,603	1,857	949	33	2,105	12	8,472	3,449	2,567	11,408	2,539	45,994
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,951*	*220,895*	*243,855*	*89,623*	*218,401*	*12,001*	*282,584*	*73,709*	*384,550*	*985,109*	*627,523*	*4,043,201*

Table 5-3. Comparison of the 2035 CMP Project #3 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	53	-9	1	-4	34	-1	-4	43	2	17	6	138
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	288	60	70	7	10	1	-8	36	2	30	15	511
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-206	-47	-48	-4	4	0	34	-31	3	18	12	-265
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-22	-2	0	-1	0	0	-1	-1	0	0	0	-27
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	20	3	9	2	1	-1	10	58	1	37	10	150
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-68	1	-17	5	3	1	-1	-111	-4	-87	-14	-292
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*-1%*	*-1%*	*0%*
Informal Park-and-ride transit	2	0	0	0	0	0	0	-1	0	0	0	1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-29	0	0	0	0	0	0	-36	0	4	0	-61
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*1%*	*0%*	*0%*
Kiss-and-ride transit	-7	1	0	0	0	0	3	-17	-1	-1	0	-22
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk	-22	-1	-14	-3	-51	-1	-32	42	-1	-16	-27	-126
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Bike	-3	-1	-1	0	-1	0	2	17	0	2	-1	14
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	6	5	0	2	0	-1	3	-1	2	4	1	21
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

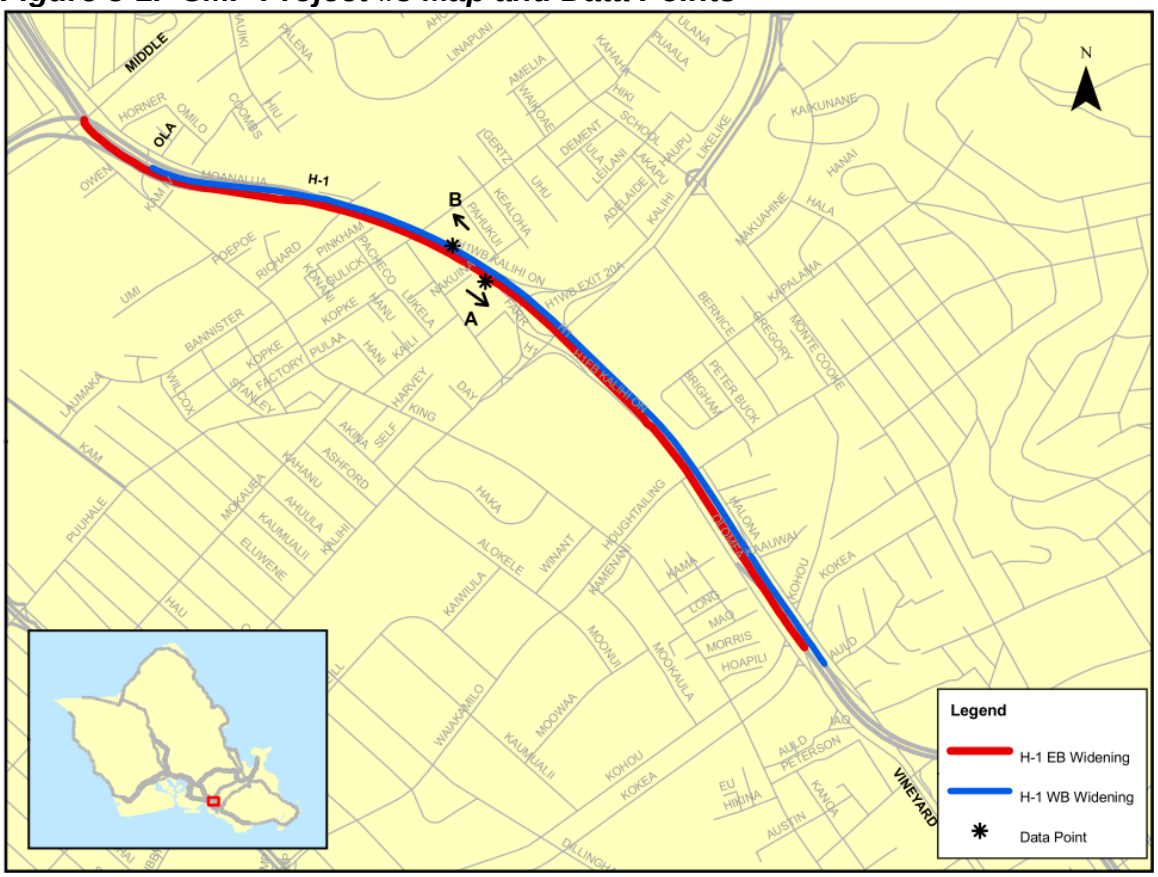
5.3 CMP Project #3 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #3. These include the AM two-hour V/C (Level of Service [LOS[8]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

5.3.1 CMP Project #3 Highway Assignment

Figure 5-1 shows the map of the approximate location of the projects included in CMP Project #3 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 5-1. CMP Project #3 Map and Data Points



[8] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 5-2 shows that the although the H-1 eastbound freeway is still operating at LOS F, the LOS improved slightly while still accommodating nearly 2,300 more vehicles in the AM two-hour peak period. The westbound H-1 freeway improved from LOS D to LOS B in the AM two-hour peak period.

Figure 5-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #3

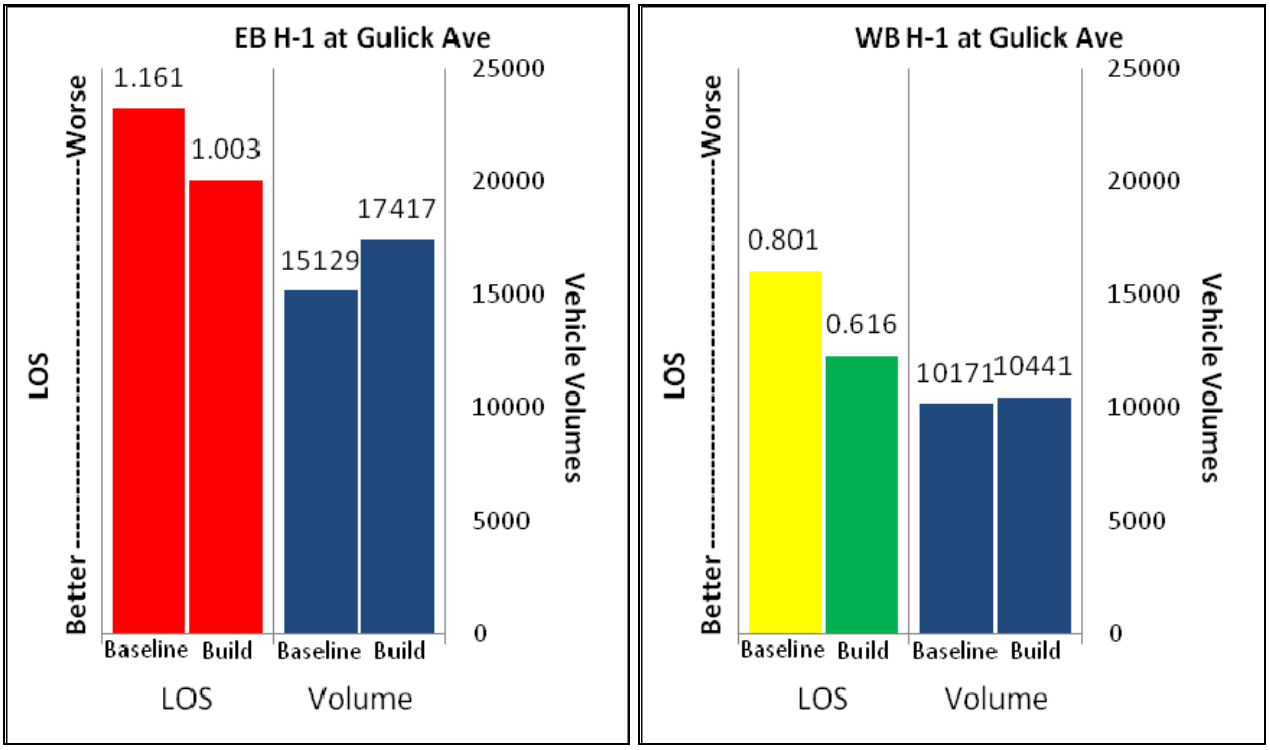


Table 5-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[9] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 5-5.

Table 5-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #3 Package. The model forecasts 89,134 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 5-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #3 Package. The freeways for Area Type 3 (projected widened segments on H-1) have a seven percent decrease in VHT from the Baseline.

Table 5-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #3 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 5-9 shows the percent

[9] See Appendix A for Area Type definitions.

change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #3 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline, but the VHD on freeways in Area Type 3 (projected widened segments on H-1) is forecasted to decrease by 14 percent from the Baseline.

Table 5-4. 2035 CMP Project #3 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,542	517,016	1,185,214	2,726,220	366,494	814,043	233,662	5,995,191
Expressways	0	0	37,701	170,619	448,656	372,774	514,915	160,290	1,704,955
Ramps	0	17,036	36,107	163,469	366,795	29,002	161,620	17,910	791,939
Arterials	126,546	251,163	620,606	719,015	1,518,055	261,551	1,046,525	399,256	4,942,717
Collectors	14,494	33,347	140,429	373,679	772,471	19,182	388,809	39,314	1,781,725
Total	141,040	454,088	1,351,859	2,611,996	5,832,197	1,049,003	2,925,912	850,432	15,216,527

Table 5-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #3 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	2%	1%	1%	-1%	0%	-1%	0%
Expressways	0%	0%	1%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	2%	-2%	0%	2%	0%	-1%	0%
Arterials	-1%	-1%	0%	-1%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	-1%	0%	1%	0%	0%	0%	0%	0%	0%

Table 5-6. 2035 CMP Project #3 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	488	2,415	6,114	10,802	905	3,221	555	24,500
Expressways	0	0	173	1,567	2,485	2,601	1,974	643	9,443
Ramps	0	233	460	1,433	3,103	139	1,126	77	6,571
Arterials	959	2,004	4,228	5,537	12,520	1,005	6,361	1,558	34,172
Collectors	103	340	1,004	3,283	6,619	169	2,762	168	14,448
Total	1,062	3,065	8,280	17,934	35,529	4,819	15,444	3,001	89,134

Table 5-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #3 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-7%	1%	1%	-1%	0%	-1%	0%
Expressways	0%	0%	2%	0%	0%	0%	0%	0%	0%
Ramps	0%	4%	2%	-4%	0%	7%	0%	0%	-1%
Arterials	-1%	-1%	0%	-1%	0%	-1%	-1%	0%	0%
Collectors	1%	1%	0%	0%	0%	0%	0%	-1%	0%
Total	-1%	0%	-2%	0%	0%	0%	0%	0%	0%

Table 5-8. 2035 CMP Project #3 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	131	1,302	3,123	4,559	37	1,018	29	10,199
Expressways	0	0	78	1,069	1,339	1,605	748	220	5,059
Ramps	0	163	316	808	1,845	38	640	14	3,824
Arterials	174	620	657	2,341	5,082	147	2,455	221	11,697
Collectors	18	161	222	1,228	1,833	47	859	26	4,394
Total	192	1,075	2,575	8,569	14,658	1,874	5,720	510	35,173

Table 5-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #3 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	9%	-14%	1%	1%	0%	0%	0%	-1%
Expressways	0%	0%	4%	0%	0%	1%	-1%	1%	0%
Ramps	0%	5%	2%	-6%	0%	23%	1%	0%	-1%
Arterials	-3%	-3%	0%	-1%	1%	-3%	0%	1%	0%
Collectors	0%	1%	0%	0%	0%	0%	0%	0%	0%
Total	-3%	0%	-7%	-1%	1%	1%	0%	1%	0%

5.3.2 CMP Project #3 Transit Assignment

Table 5-10 shows the 2035 CMP Project #3 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 5-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #3 Package. Total boardings remain nearly identical to the 2035 Baseline scenario.

Table 5-10. 2035 CMP Project #3 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,017	7,476	6,873	72,821	0	261,187
Off-Peak	93,453	0	5,027	27,460	0	125,941
Total	267,470	7,476	11,900	100,281	0	387,128

Table 5-11. Percent Change in Transit Boardings, Baseline to CMP Project #3

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	-1%	0%	0%	0%	0%
Off-Peak	0%	0%	-1%	0%	0%	0%
Total	0%	-1%	0%	0%	0%	0%

5.4 Summary of CMP Project #3 Findings

These are the key findings related to the CMP Project #3 Package:

- The westbound H-1 widening from Vineyard Boulevard to Middle Street is projected to reduce congestion and improve level-of-service as compared to the Baseline condition, while carrying more traffic.
- The eastbound H-1 widening project from Ola Lane to Vineyard Boulevard reduces congestion slightly over Baseline conditions but still remains at LOS F.
- These improvements are noted by the decreased AM two-hour peak period VHT and VHD on the widened sections.

6 CMP Project # 4 Package –Waianae/Kunia Area Projects

This chapter provides the analysis results of the CMP Project #4 Package.

6.1 CMP Project #4 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Construct a new two-lane second access road to Waianae from Farrington Highway in the vicinity of Maili, over the Waianae Mountain Range, to Kunia Road.
- Widen Kunia Road as follows:
  - From two to four lanes, from Wilikina Drive to Anonui Street.
  - From two to four lanes, Anonui Street to Kupuna Loop.
  - From four to six lanes, Kupuna Loop to Farrington Highway.
  - Add one lane eastbound loop on-ramp at Kunia Road & Interstate Route H-1.

The Kunia Road widening project is located on the congested roadway as seen in the Baseline scenario. See Table 2-6 numbers 13 and 14.

6.2 CMP Project #4 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #4 Package.

Table 6-1 shows that the majority of resident trips are made by the private automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #4 mode share remains similar to the Baseline scenario.

Table 6-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #4 Package

Mode	2035 Baseline		2035 CMP Project #4		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,317	83%	0%
Transit	245,640	6%	245,366	6%	0%
Bike/walk	461,594	11%	460,667	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,350	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,145	32%	0%
Transit	30,225	8%	30,240	8%	0%
Taxi	9,531	3%	9,538	3%	0%
Tour Bus	57,915	15%	57,951	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,139	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,859	26%	0%
Transit	4,471	4%	4,441	4%	-1%
Taxi	17,218	15%	17,267	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,647	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,495*	*100%*	*0%*

Table 6-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #4 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 6-3 shows the comparison of the 2035 CMP Project #4 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #4 Package. This table shows that the CMP Project #4 Package had a small increase (over 2,000) in drive alone and two-occupant vehicle person trips, and small decrease (over 600) in three-plus occupant person trips compared to the Baseline.

Table 6-2. 2035 CMP Project #4 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	539,189	81,484	162,431	29,261	115,877	2,958	8,255	35,915	112,479	264,237	142,259	1,494,345
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,071	73,818	42,169	33,766	29,915	1,709	65,431	8,503	131,885	300,719	221,564	1,060,550
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,399	46,395	12,491	15,968	11,647	427	104,837	2,868	95,427	247,317	204,646	782,422
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,454	222	2	525	0	0	237	203	0	0	0	4,643
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,420	4,260	7,108	5,141	4,464	4,541	16,063	9,479	9,884	26,026	3,636	146,022
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,495	1,850	5,037	1,847	1,677	1,114	3,182	5,749	1,321	10,551	1,813	61,636
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,108	47	0	7	0	0	259	95	138	214	0	1,868
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,822	0	0	0	0	0	4	1,551	11	540	0	14,928
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,269	251	14	0	1	1	1,545	1,804	751	1,631	2	16,269
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,230	10,764	13,662	3,097	52,757	1,240	74,274	4,126	30,065	122,526	51,103	414,844
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,500	1,855	943	32	2,105	12	8,450	3,424	2,563	11,400	2,539	45,823
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,957*	*220,946*	*243,857*	*89,644*	*218,443*	*12,002*	*282,537*	*73,717*	*384,524*	*985,161*	*627,562*	*4,043,350*

Table 6-3. Comparison of the 2035 CMP Project #4 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	936	71	199	10	27	1	4	63	23	71	28	1,433
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	270	58	69	26	6	1	50	-5	-4	77	46	594
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-574	-44	-168	-4	3	0	35	-3	-2	59	42	-656
	-1%	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	6	0	0	-2	0	0	0	-2	0	0	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	69	17	12	3	-1	0	-9	29	-19	-36	-31	34
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*
Walk to rail transit	10	0	-4	3	-2	-2	-4	-13	-1	-64	-46	-123
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*-2%*	*0%*
Informal Park-and-ride transit	-17	-1	0	0	0	0	0	-2	0	0	0	-20
	-2%	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Formal Park-and-ride transit	274	0	0	0	0	0	0	-14	0	3	0	263
	2%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*1%*	*0%*	*2%*
Kiss-and-ride transit	-380	-1	0	0	0	0	-4	-38	-1	-5	-1	-430
	-4%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*-33%*	*-3%*
Walk	-476	-41	-99	-12	10	0	-96	0	-16	-43	3	-770
	-1%	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-106	-3	-7	-1	-1	0	-20	-8	-4	-6	-1	-157
	-1%	*0%*	*-1%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	12	56	2	23	42	0	-44	7	-24	56	40	170
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

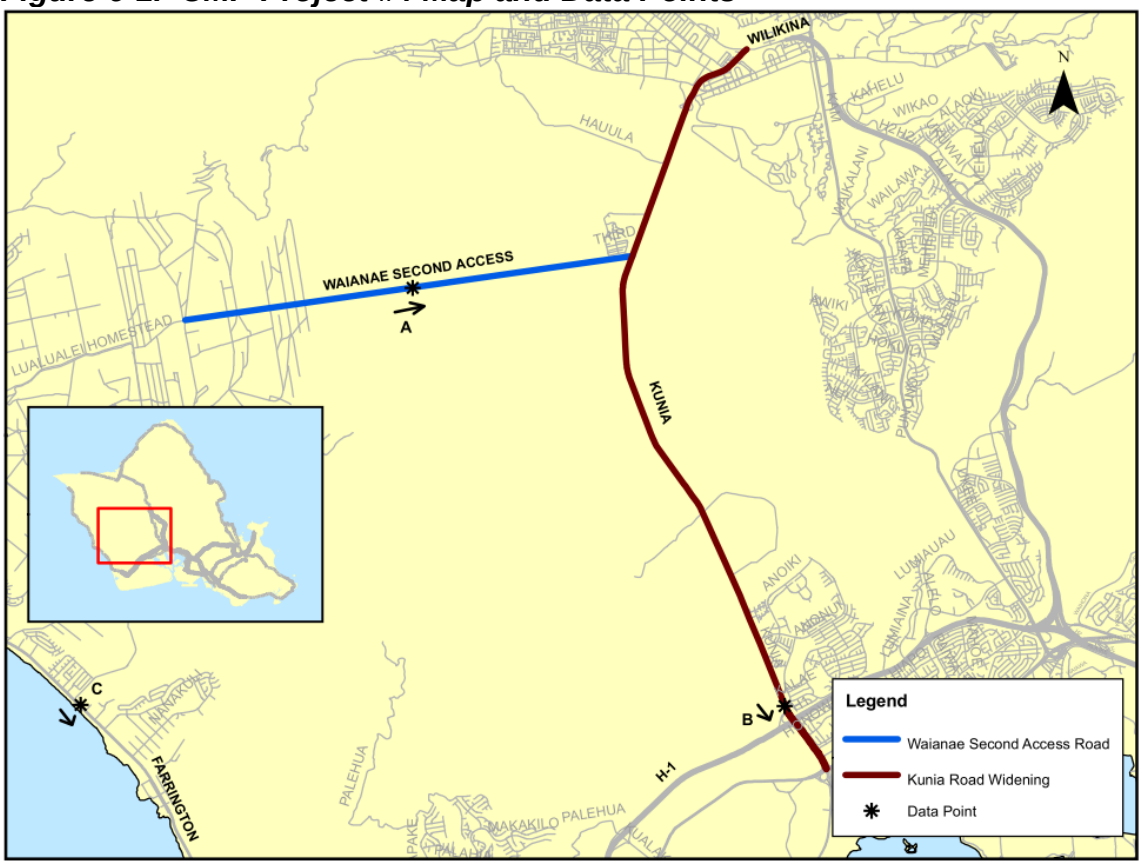
6.3 CMP Project #4 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #4. These include the AM two-hour V/C (Level of Service [LOS[10]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

6.3.1 CMP Project #4 Highway Assignment

Figure 6-1 shows the map of the approximate location of the projects included in CMP Project #4 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 6-1. CMP Project #4 Map and Data Points



[10] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 6-2 shows that the new Waianae Second Access Road provided much needed relief out of the Waianae area, but the LOS of the new facility operated at LOS F. Moreover, the LOS on a section of Farrington Highway out of Waianae improved somewhat but was still operating at LOS F. The Kunia road widening improved the town-bound direction LOS from F to D in the AM two-hour peak period.

Figure 6-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #4

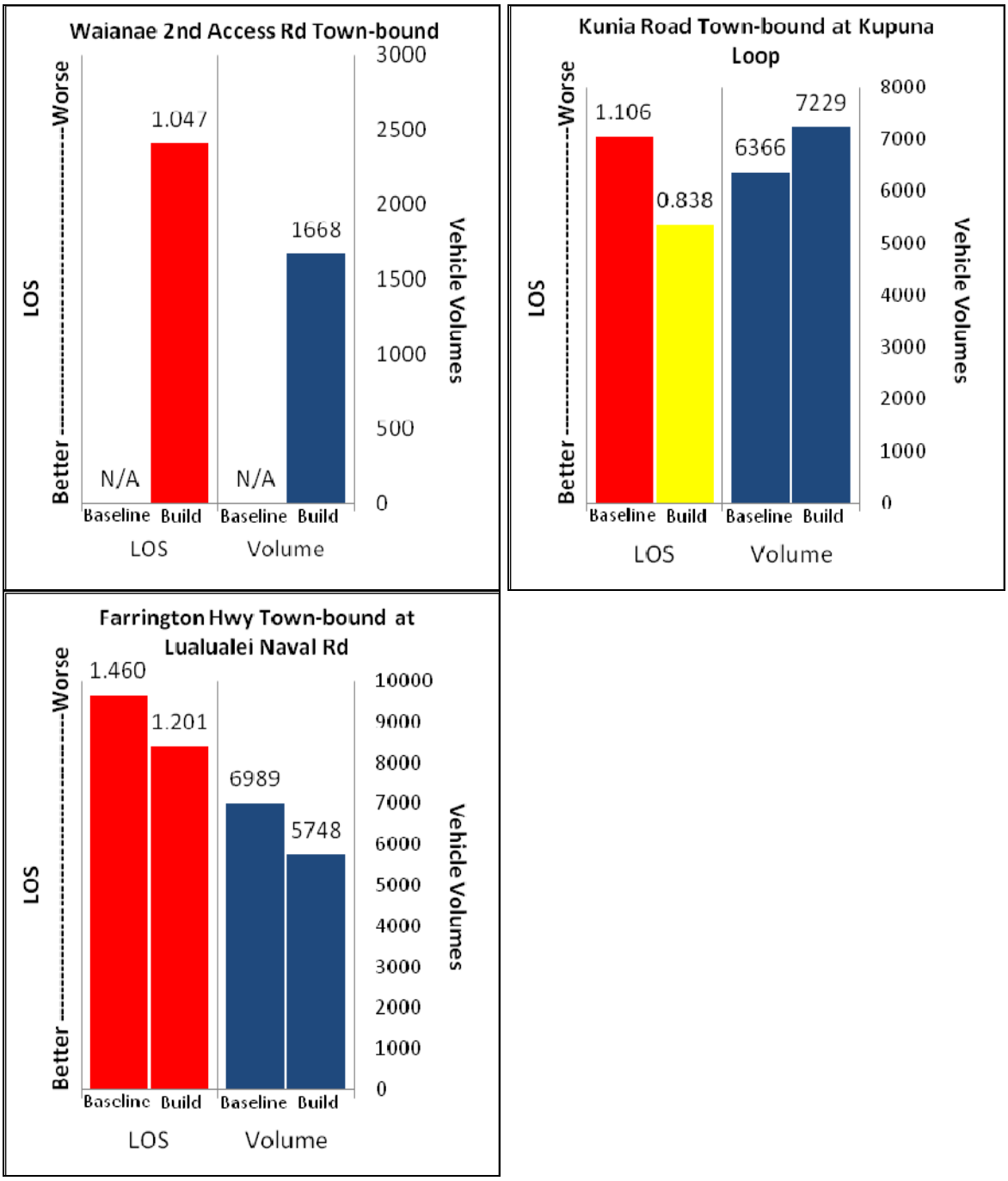


Table 6-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[11] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 6-5 with the VMT for arterials for Area Type 8 (the facilities that were added or widened) increased by 4 percent.

Table 6-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #4 Package. The model forecasts 85,985 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (17 percent). Table 6-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #4 Package. The arterials for Area Type 5 (Farrington Highway) have a nine percent decrease (or 1,100 hours saved) for the AM two-hour peak period VHT from the Baseline. This is the result of the relief from the Waianae Second Access Road project.

Table 6-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #4 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (32 percent), freeways (30 percent), and collectors (13 percent). Table 6-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #4 Package. Overall AM two-hour VHD is projected to decrease eight percent from the Baseline, with the VHD on facilities in Area Type 5 (Farrington Highway in Waianae, H-1 in Kapolei) decreasing by ten percent from the Baseline.

[11] See Appendix A for Area Type definitions.

Table 6-4. 2035 CMP Project #4 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	150,528	507,700	1,161,864	2,696,507	367,058	806,481	231,334	5,921,472
Expressways	0	0	37,481	168,481	445,995	365,810	511,908	159,121	1,688,796
Ramps	0	17,225	35,794	167,358	364,747	28,389	161,420	18,166	793,099
Arterials	127,262	253,034	618,996	729,204	1,512,341	261,858	1,045,279	415,947	4,963,921
Collectors	14,530	33,434	140,117	372,748	772,112	17,799	391,277	39,924	1,781,941
Total	141,792	454,221	1,340,088	2,599,655	5,791,702	1,040,914	2,916,365	864,492	15,149,229

Table 6-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #4 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-1%	0%	-1%	-1%	0%	-1%	-2%	-1%
Expressways	0%	0%	0%	-1%	0%	-2%	-1%	0%	-1%
Ramps	0%	1%	1%	1%	0%	0%	0%	1%	0%
Arterials	0%	0%	0%	1%	-1%	0%	-1%	4%	0%
Collectors	0%	0%	0%	0%	0%	-7%	1%	1%	0%
Total	0%	0%	0%	0%	-1%	-1%	-1%	2%	0%

Table 6-6. 2035 CMP Project #4 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	461	2,566	5,564	10,473	903	3,201	551	23,719
Expressways	0	0	171	1,245	2,254	2,069	1,940	643	8,322
Ramps	0	260	457	1,550	3,073	130	1,137	83	6,690
Arterials	968	2,028	4,224	5,546	11,357	1,011	6,140	1,620	32,894
Collectors	102	343	1,003	3,253	6,604	147	2,739	169	14,360
Total	1,070	3,092	8,421	17,158	33,761	4,260	15,157	3,066	85,985

Table 6-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #4 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-3%	-1%	-8%	-2%	-1%	-1%	-1%	-3%
Expressways	0%	0%	1%	-21%	-9%	-20%	-2%	0%	-12%
Ramps	0%	16%	1%	3%	-1%	0%	1%	8%	1%
Arterials	0%	0%	0%	0%	-9%	0%	-4%	4%	-4%
Collectors	0%	1%	0%	-1%	0%	-13%	-1%	0%	-1%
Total	0%	1%	0%	-5%	-5%	-11%	-2%	2%	-4%

Table 6-8. 2035 CMP Project #4 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	118	1,483	2,699	4,294	36	1,017	28	9,675
Expressways	0	0	76	763	1,116	1,102	717	220	3,994
Ramps	0	188	313	909	1,816	30	652	18	3,926
Arterials	177	641	653	2,306	4,011	151	2,244	188	10,371
Collectors	18	163	221	1,205	1,830	41	827	26	4,331
Total	195	1,110	2,746	7,882	13,067	1,360	5,457	480	32,297

Table 6-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #4 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-2%	-2%	-13%	-5%	-3%	0%	-3%	-6%
Expressways	0%	0%	1%	-29%	-17%	-31%	-5%	1%	-21%
Ramps	0%	21%	1%	5%	-1%	-3%	3%	29%	2%
Arterials	-1%	0%	0%	-2%	-20%	0%	-9%	-14%	-11%
Collectors	0%	3%	0%	-2%	0%	-13%	-3%	0%	-1%
Total	-1%	3%	-1%	-9%	-10%	-27%	-5%	-5%	-8%

6.3.2 CMP Project #4 Transit Assignment

Table 6-10 shows the 2035 CMP Project #4 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 6-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #4 Package. Total boardings remain nearly identical to the 2035 Baseline scenario.

Table 6-10. 2035 CMP Project #4 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	173,331	7,554	6,984	72,973	0	260,843
Off-Peak	93,255	0	4,982	27,438	0	125,675
Total	266,586	7,554	11,966	100,411	0	386,518

Table 6-11. Percent Change in Transit Boardings, Baseline to CMP Project #4

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	2%	0%	0%	0%
Off-Peak	0%	0%	-2%	-1%	0%	0%
Total	0%	0%	0%	0%	0%	0%

6.4 Summary of CMP Project #4 Findings

These are the key findings related to the CMP Project #4 Package:

- The addition of the Waianae Second Access Road provided some relief to the congested Farrington Highway in the Waianae area as level-of-service improved slightly compared to the Baseline condition but still remained at LOS F. Also, VHT and VHD in the AM two-hour peak period improved slightly.
- The Kunia Road widening project from Wilikina Drive to Farrington Highway reduces congestion slightly over Baseline conditions as it improves from LOS F to LOS D.

7 CMP Project # 5 Package – Mililani/Waipio Area Projects

This chapter provides the analysis results of the CMP Project #5 Package.

7.1 CMP Project #5 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen Kamehameha Highway from a three-lane to a four-lane divided facility between Lanikuhana Avenue and Ka Uka Boulevard. This project includes shoulders for bicycles and disabled vehicles, bridge crossing replacement, bikeways, etc.
- Extend Paiwa Street from north of Lumiauau Street, to the intersection of Kamehameha Highway and Ka Uka Boulevard.

The Kamehameha Highway widening project is located on the congested roadway as seen in the Baseline scenario. See Table 2-6 number 11.

7.2 CMP Project #5 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #5 Package.

Table 7-1 shows that the majority of resident trips are made by the private automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #5 mode share remains similar to the Baseline scenario.

Table 7-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #5 Package

Mode	2035 Baseline		2035 CMP Project #5		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,198	83%	0%
Transit	245,640	6%	245,596	6%	0%
Bike/walk	461,594	11%	460,484	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,278	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,960	32%	0%
Transit	30,225	8%	30,227	8%	0%
Taxi	9,531	3%	9,542	3%	0%
Tour Bus	57,915	15%	57,871	15%	0%
Bike/Walk	155,150	42%	155,152	42%	0%
Total Trips by Visitors	373,680	100%	373,752	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,999	26%	1%
Transit	4,471	4%	4,445	4%	-1%
Taxi	17,218	15%	17,419	15%	1%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,351	35%	-1%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,767,036*	*100%*	*0%*

Table 7-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #5 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 7-3 shows the comparison of the 2035 CMP Project #5 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #5 Package. This table shows that the CMP Project #5 Package had a small increase (over 1,200) in drive alone, two-occupant and three-plus occupant vehicle person trips compared to the Baseline.

Table 7-2. 2035 CMP Project #5 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,473	81,436	162,238	29,249	115,909	2,955	8,256	35,897	112,474	264,226	142,251	1,493,364
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,887	73,796	42,117	33,754	29,928	1,709	65,446	8,507	131,888	300,703	221,573	1,060,308
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,016	46,450	12,675	15,977	11,651	427	105,079	2,872	95,430	247,298	204,651	783,526
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,421	220	2	525	0	0	237	201	0	0	0	4,606
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,377	4,260	7,108	5,154	4,470	4,546	16,130	9,498	9,915	26,069	3,662	146,189
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,491	1,847	5,041	1,843	1,676	1,114	3,192	5,711	1,307	10,587	1,845	61,654
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,128	48	0	7	0	0	259	95	138	215	0	1,890
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,486	0	0	0	0	0	4	1,556	11	537	0	14,594
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,623	253	14	0	1	1	1,554	1,828	751	1,635	3	16,663
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,492	10,755	13,714	3,093	52,690	1,239	73,937	4,122	30,044	122,468	51,024	414,578
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,562	1,854	947	32	2,105	12	8,462	3,426	2,565	11,402	2,539	45,906
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,956*	*220,919*	*243,856*	*89,634*	*218,430*	*12,003*	*282,556*	*73,713*	*384,523*	*985,140*	*627,548*	*4,043,278*

Table 7-3. Comparison of the 2035 CMP Project #5 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	220	23	6	-2	59	-2	5	45	18	60	20	452
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	86	36	17	14	19	1	65	-1	-1	61	55	352
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	43	11	16	5	7	0	277	1	1	40	47	448
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-27	-2	0	-2	0	0	0	-4	0	0	0	-35
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	26	17	12	16	5	5	58	48	12	7	-5	201
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	6	-3	0	-1	-3	-2	6	-51	-15	-28	-14	-105
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*0%*	*-1%*	*0%*
Informal Park-and-ride transit	3	0	0	0	0	0	0	-2	0	1	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-62	0	0	0	0	0	0	-9	0	0	0	-71
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-26	1	0	0	0	0	5	-14	-1	-1	0	-36
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk	-214	-50	-47	-16	-57	-1	-433	-4	-37	-101	-76	-1,036
	0%	*0%*	*0%*	*-1%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-44	-4	-3	-1	-1	0	-8	-6	-2	-4	-1	-74
	0%	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	11	29	1	13	29	1	-25	3	-25	35	26	98
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

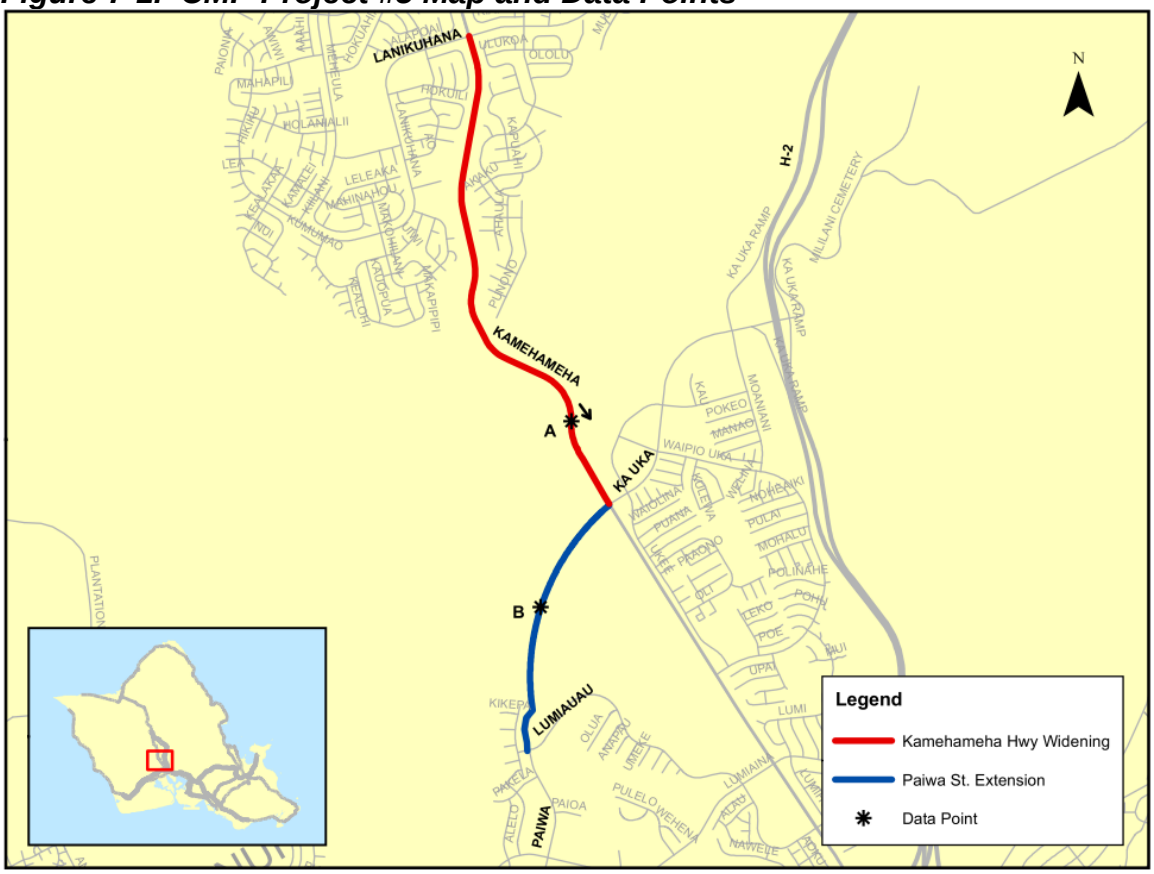
7.3 CMP Project #5 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #5. These include the AM two-hour V/C (Level of Service [LOS[12]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

7.3.1 CMP Project #5 Highway Assignment

Figure 7-1 shows the map of the approximate location of the projects included in CMP Project #5 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 7-1. CMP Project #5 Map and Data Points



[12] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 7-2 shows that the widening of Kamehameha Highway between Lanikuhana and Ka Uka Boulevard improved from LOS F to LOS C even while accommodating an additional 3,000 vehicles. Moreover, the extension of Paiwa Street from Lumiauau to Ka Uka Boulevard provided another route from Central Oahu to Waipahu, Ewa and Kapolei relieving some congestion on Kamehameha Highway.

Figure 7-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #5

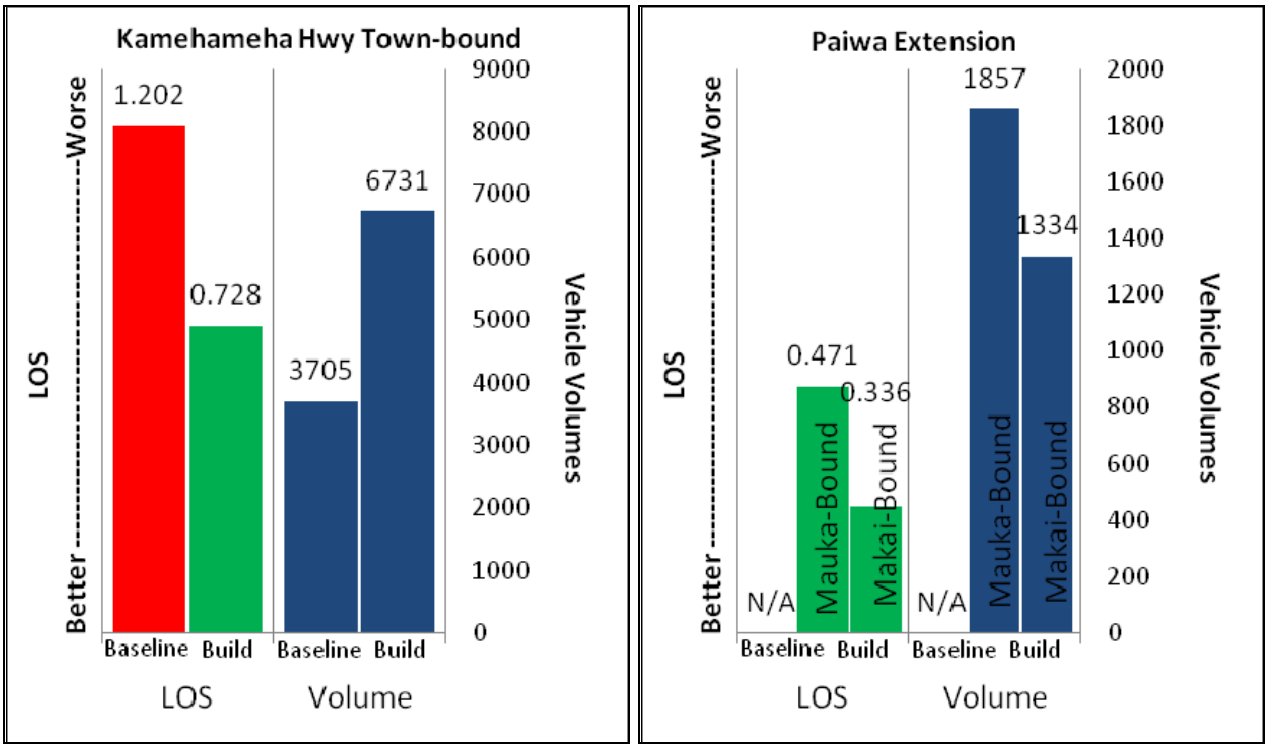


Table 7-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[13] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 7-5 with the VMT for expressways for Area Type 4, 5, and 8 (Kamehameha Widening) increased by 13, 11, and 7 percent, respectively.

Table 7-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #5 Package. The model forecasts 88,968 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (17 percent). Table 7-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #5 Package. The expressways for Area Type 4 (Kamehameha Highway) have a five percent decrease for the AM two-hour peak period VHT from the Baseline. Also the ramps for Area Types 4 and 5 also decrease by three and six percent respectively. This is a result of the widening of

[13] See Appendix A for Area Type definitions.

Kamehameha Highway and the new Paiwa extension that gives Central Oahu commuters another route to Waipahu, Ewa, and Kapolei besides using H-2 and H-1.

Table 7-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #5 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (34 percent), freeways (30 percent), and collectors (14 percent). Table 7-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #5 Package. Overall AM two-hour VHD is projected to decrease slightly (1 percent) from the Baseline, with the VHD on expressways in Area Types 4 and 5 (Kamehameha Highway) decreasing by 14 percent and 8 percent, respectively, from the Baseline. VHD on ramps in Area Types 4 and 5 also decreases five percent and eight percent, respectively, from the Baseline as the widening of Kamehameha Highway and the new Paiwa extension give Central Oahu commuters another route to Waipahu, Ewa, and Kapolei, instead of H-2 and H-1.

Table 7-4. 2035 CMP Project #5 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,252	508,034	1,172,235	2,653,273	368,261	805,081	234,836	5,893,972
Expressways	0	0	37,491	192,588	498,731	372,336	514,381	171,401	1,786,928
Ramps	0	17,104	35,712	165,864	358,426	28,414	161,811	17,935	785,266
Arterials	127,499	253,777	619,360	715,780	1,523,921	260,861	1,040,883	396,051	4,938,132
Collectors	14,603	33,325	139,800	373,386	784,707	19,076	407,102	39,800	1,811,799
Total	142,102	456,458	1,340,397	2,619,853	5,819,058	1,048,948	2,929,258	860,023	15,216,097

Table 7-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #5 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	-2%	0%	-1%	0%	-1%
Expressways	0%	0%	0%	13%	11%	0%	0%	7%	5%
Ramps	0%	0%	1%	0%	-2%	0%	0%	-1%	-1%
Arterials	0%	0%	0%	-1%	0%	0%	-1%	-1%	-1%
Collectors	0%	0%	0%	0%	2%	0%	5%	1%	2%
Total	0%	0%	0%	0%	0%	0%	0%	1%	0%

Table 7-6. 2035 CMP Project #5 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	478	2,584	6,051	10,571	910	3,218	559	24,371
Expressways	0	0	170	1,482	2,520	2,598	1,977	654	9,401
Ramps	0	233	451	1,457	2,915	130	1,151	77	6,414
Arterials	968	2,029	4,222	5,524	12,542	1,006	6,321	1,527	34,139
Collectors	102	339	1,004	3,292	6,715	168	2,854	169	14,643
Total	1,070	3,079	8,431	17,806	35,263	4,812	15,521	2,986	88,968

Table 7-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #5 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	0%	-1%	0%	0%	0%	-1%
Expressways	0%	0%	0%	-5%	1%	0%	0%	2%	0%
Ramps	0%	4%	0%	-3%	-6%	0%	3%	0%	-3%
Arterials	0%	0%	0%	-1%	1%	0%	-2%	-2%	0%
Collectors	0%	0%	0%	0%	1%	-1%	4%	0%	1%
Total	0%	0%	0%	-1%	0%	0%	0%	0%	0%

Table 7-8. 2035 CMP Project #5 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,498	3,099	4,479	37	1,026	29	10,290
Expressways	0	0	75	920	1,231	1,602	756	217	4,801
Ramps	0	163	307	822	1,685	31	666	14	3,688
Arterials	177	639	651	2,359	5,105	149	2,435	208	11,723
Collectors	18	160	222	1,233	1,853	46	871	26	4,429
Total	195	1,084	2,753	8,433	14,353	1,865	5,754	494	34,931

Table 7-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #5 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-1%	0%	0%	0%	1%	0%	0%
Expressways	0%	0%	0%	-14%	-8%	0%	0%	0%	-5%
Ramps	0%	5%	-1%	-5%	-8%	0%	5%	0%	-4%
Arterials	-1%	0%	-1%	0%	2%	-1%	-1%	-5%	0%
Collectors	0%	1%	0%	0%	1%	-2%	2%	0%	1%
Total	-1%	1%	-1%	-2%	-1%	0%	0%	-2%	-1%

7.3.2 CMP Project #5 Transit Assignment

Table 7-10 shows the 2035 CMP Project #5 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 7-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #5 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 7-10. 2035 CMP Project #5 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,377	7,504	6,859	72,973	0	261,713
Off-Peak	93,343	0	5,080	27,500	0	125,923
Total	267,720	7,504	11,939	100,473	0	387,636

Table 7-11. Percent Change in Transit Boardings, Baseline to CMP Project #5

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

7.4 Summary of CMP Project #5 Findings

These are the key findings related to the CMP Project #5 Package:

- The Kamehameha Highway widening between Lanikuhana Avenue and Ka Uka Boulevard coupled with the Paiwa Street extension provided another route for Central Oahu commuters to Waipahu, Ewa, and Kapolei areas, thus relieving sections of H-1 and H-2 near the Waiawa Interchange.
- The LOS on the Kamehameha Highway widening improved from F to C while still accommodating over 3,000 additional vehicles, and LOS on the new Paiwa Street extension remained at A, even while providing another outlet for Central Oahu commuters to Waipahu, Ewa, and Kapolei.

8 CMP Project # 6 Package – Central Oahu Area Projects

This chapter provides the analysis results of the CMP Project #6 Package.

8.1 CMP Project #6 Package Definition

This CMP Package includes all the projects in the Baseline plus the following four projects:

- Widen both on- and off-ramps on Interstate Route H-2, at the Waipio Interchange. This project includes the widening of the Ka Uka Boulevard overpass and intersection improvements to facilitate movement to and from the on- and off-ramps..
- Construct a new full-service freeway interchange on Interstate Route H-2, between Meheula Parkway and Ka Uka Boulevard, to accommodate future developments in Central Oahu. This project includes the widening of the existing Pineapple Road Overpass from two-to-four lanes; and addition of new on- and off-ramps to and from Interstate Route H-2 at Pineapple Road Overpass.
- Construct Central Mauka Road, a new four-lane road from Mililani Mauka to Waiawa. Road connects Meheula Parkway to Kamehameha Highway in Pearl City; parallel to and mauka of Interstate Route H-2. The new four-lane north-south road includes connections to Interstate Route H-2 interchanges.
- Construct a new two-lane second access road between Whitmore Village and Wahiawa, from Whitmore Avenue to California Avenue. Continue the new two-lane second access road to Mililani Mauka, from California Avenue to Meheula Parkway.

The H-2 Waipio widening project is located on the congested roadway as seen in the Baseline scenario. See Table 2-6 number 5.

8.2 CMP Project #6 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #6 Package.

Table 8-1 shows that the majority of resident trips are made by the automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #6 mode share remains similar to the Baseline scenario.

Table 8-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #6 Package

Mode	2035 Baseline		2035 CMP Project #6		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,984	83%	0%
Transit	245,640	6%	245,867	6%	0%
Bike/walk	461,594	11%	459,474	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,325	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,922	32%	0%
Transit	30,225	8%	30,218	8%	0%
Taxi	9,531	3%	9,533	3%	0%
Tour Bus	57,915	15%	57,897	15%	0%
Bike/Walk	155,150	42%	155,152	42%	0%
Total Trips by Visitors	373,680	100%	373,722	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,823	26%	0%
Transit	4,471	4%	4,474	4%	0%
Taxi	17,218	15%	17,237	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,680	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,767,053*	*100%*	*0%*

Table 8-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #6 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 8-3 shows the comparison of the 2035 CMP Project #6 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #6 Package. This table shows that the CMP Project #6 Package had a small increase (over 2,300) in drive alone, and two-occupant vehicle person trips compared to the Baseline.

Table 8-2. 2035 CMP Project #6 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,920	81,670	162,282	29,271	115,883	2,953	8,337	35,939	112,490	264,494	142,246	1,494,485
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,693	73,834	42,117	33,757	29,923	1,710	65,784	8,499	131,885	300,949	221,590	1,060,741
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,565	46,217	12,626	15,950	11,649	427	105,007	2,838	95,431	247,393	204,655	782,758
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,410	220	2	526	0	0	236	198	0	0	0	4,592
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,460	4,277	7,112	5,165	4,467	4,545	16,218	9,500	9,899	25,918	3,648	146,209
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,837	1,857	5,087	1,853	1,680	1,116	3,164	5,808	1,315	10,521	1,845	62,083
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,129	47	0	7	0	0	260	96	139	215	0	1,893
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,535	1	0	0	0	0	4	1,546	11	537	0	14,634
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,497	252	14	0	1	1	1,546	1,781	747	1,614	3	16,456
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,369	10,705	13,672	3,080	52,733	1,239	73,441	4,109	30,041	122,165	51,035	413,589
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,542	1,856	945	33	2,106	12	8,540	3,403	2,555	11,354	2,539	45,885
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,957*	*220,936*	*243,857*	*89,642*	*218,442*	*12,003*	*282,537*	*73,717*	*384,513*	*985,160*	*627,561*	*4,043,325*

Table 8-3. Comparison of the 2035 CMP Project #6 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	667	257	50	20	33	-4	86	87	34	328	15	1,573
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-108	74	17	17	14	2	403	-9	-4	307	72	785
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-408	-222	-33	-22	5	0	205	-33	2	135	51	-320
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-38	-2	0	-1	0	0	-1	-7	0	0	0	-49
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	109	34	16	27	2	4	146	50	-4	-144	-19	221
	0%	*1%*	*0%*	*1%*	*0%*	*0%*	*1%*	*1%*	*0%*	*-1%*	*-1%*	*0%*
Walk to rail transit	352	7	46	9	1	0	-22	46	-7	-94	-14	324
	1%	*0%*	*1%*	*0%*	*0%*	*0%*	*-1%*	*1%*	*-1%*	*-1%*	*-1%*	*1%*
Informal Park-and-ride transit	4	-1	0	0	0	0	1	-1	1	1	0	5
	0%	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*1%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-13	1	0	0	0	0	0	-19	0	0	0	-31
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-152	0	0	0	0	0	-3	-61	-5	-22	0	-243
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-3%*	*-1%*	*-1%*	*0%*	*-1%*
Walk	-337	-100	-89	-29	-14	-1	-929	-17	-40	-404	-65	-2,025
	-1%	*-1%*	*-1%*	*-1%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-64	-2	-5	0	0	0	70	-29	-12	-52	-1	-95
	-1%	*0%*	*-1%*	*0%*	*0%*	*0%*	*1%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Total	12	46	2	21	41	1	-44	7	-35	55	39	145
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

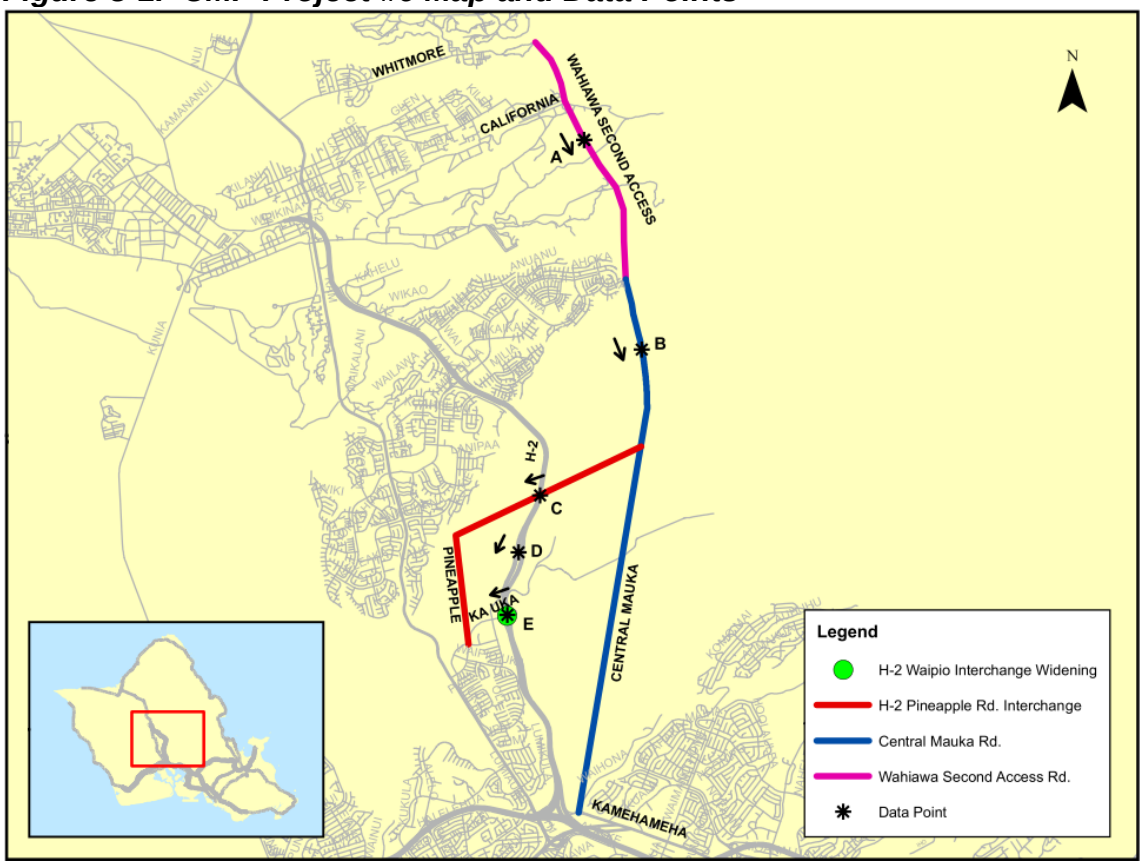
8.3 CMP Project #6 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #6. These include the AM two-hour V/C (Level of Service [LOS[14]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

8.3.1 CMP Project #6 Highway Assignment

Figure 8-1 shows the map of the approximate location of the projects included in CMP Project #6 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 8-1. CMP Project #6 Map and Data Points



[14] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 8-2 shows that the widening of the H-2 Waipio Interchange along with the new H-2 Pineapple Road Interchange, Central Mauka Road, and Wahiawa Second Access Road improved LOS at the H-2 Waipio Interchange (first figure) from LOS F to LOS C and revealed a reduction in vehicles using the H-2 Waipio Interchange. Moreover, the addition of the new H-2 Pineapple Road Interchange, Central Mauka Road, and Wahiawa Second Access Road provided another route to and from Central Oahu.

Figure 8-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #6

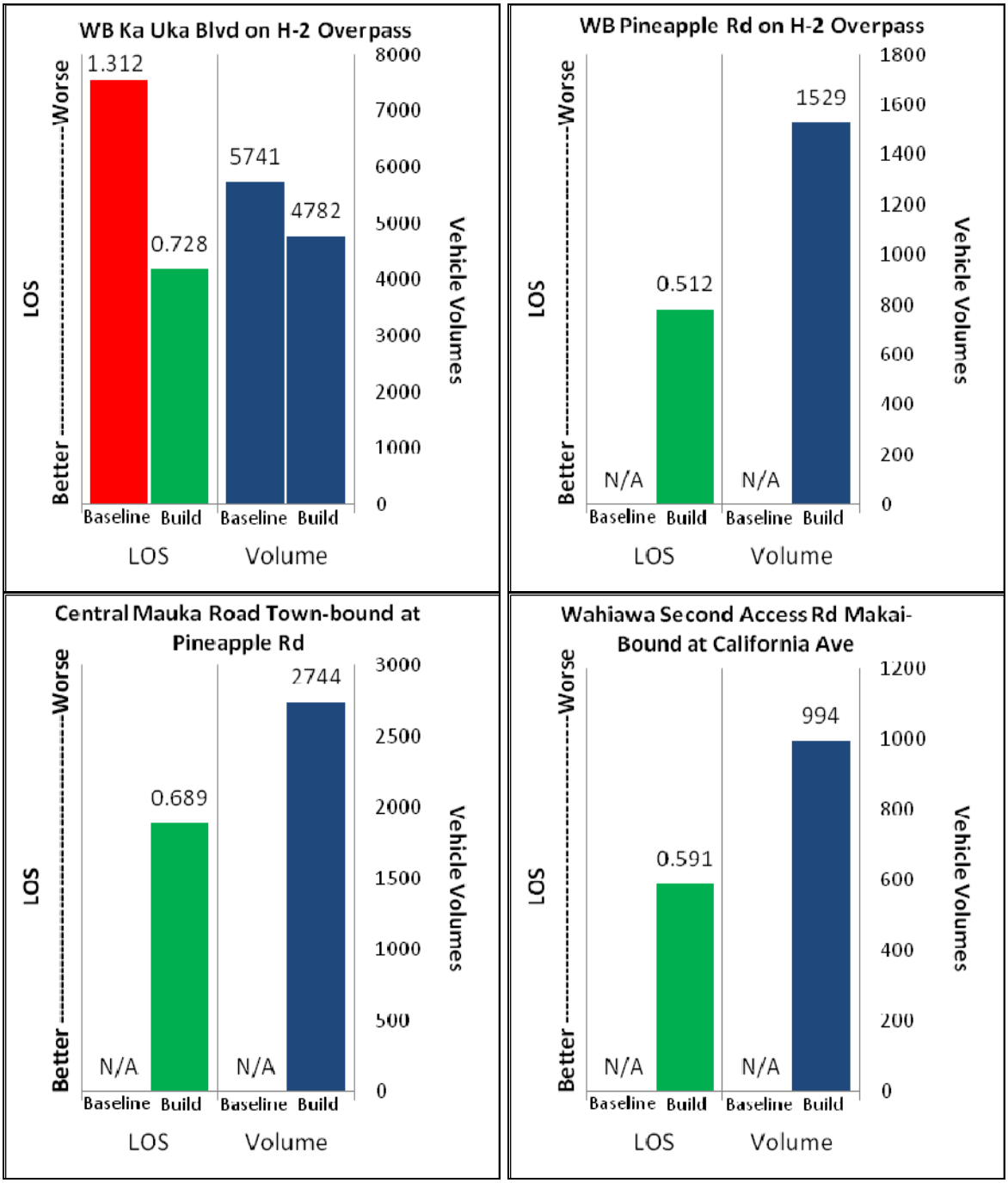


Table 8-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[15] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 8-5 with the VMT for collectors for Area Types 4, 7, and 8 (Central Mauka Road and Wahiawa Second Access Road) increased by 6, 9, and 40 percent, respectively, as these are new roads added to the system. Correspondingly, the freeways (H-2) and expressways (Kamehameha Highway) in these same Area Types decreased.

Table 8-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #6 Package. The model forecasts 88,085 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (27 percent) and collectors (17 percent). Table 8-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #6 Package. Like the daily VMT, the collectors for Area Types 4, 7, and 8 increase by five, six, and 43 percent, respectively, for the AM two-hour peak period VHT from the Baseline. Also the VHT for freeways, expressways, and ramps for those same Area Types decrease.

Table 8-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #6 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (34 percent), freeways (29 percent), and expressways (14 percent). Table 8-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #6 Package. Overall AM two-hour VHD is projected to decrease by four percent from the Baseline, with the VHD on freeways, expressways, and ramps in Area Types 4, 7 and 8 decreasing from the Baseline, and VHD increasing by 54 percent for Area Type 8 where the new Central Mauka Road and Wahiawa Second Access Road are.

[15] See Appendix A for Area Type definitions.

Table 8-4. 2035 CMP Project #6 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,907	507,485	1,171,240	2,648,130	367,816	799,733	234,017	5,880,328
Expressways	0	0	37,507	163,293	434,855	372,036	512,165	154,860	1,674,716
Ramps	0	17,096	35,748	163,394	355,482	28,416	153,336	17,919	771,391
Arterials	127,461	253,450	619,095	726,474	1,534,820	259,323	1,055,914	399,105	4,975,642
Collectors	14,510	33,273	139,960	395,316	783,582	19,038	425,075	55,157	1,865,911
Total	141,971	455,726	1,339,795	2,619,717	5,756,869	1,046,629	2,946,223	861,058	15,167,988

Table 8-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #6 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-1%	-2%	0%	-2%	0%	-1%
Expressways	0%	0%	0%	-4%	-3%	0%	-1%	-3%	-2%
Ramps	0%	0%	1%	-2%	-3%	0%	-5%	-1%	-3%
Arterials	0%	0%	0%	0%	1%	-1%	0%	0%	0%
Collectors	0%	0%	0%	6%	1%	-1%	9%	40%	5%
Total	0%	0%	0%	0%	-1%	0%	0%	1%	0%

Table 8-6. 2035 CMP Project #6 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	477	2,570	5,799	10,440	907	3,027	556	23,776
Expressways	0	0	170	1,491	2,355	2,606	1,961	608	9,191
Ramps	0	231	453	1,436	2,809	130	907	74	6,040
Arterials	967	2,033	4,219	5,766	12,585	988	6,101	1,539	34,198
Collectors	102	340	1,002	3,437	6,678	166	2,913	242	14,880
Total	1,069	3,081	8,414	17,929	34,867	4,797	14,909	3,019	88,085

Table 8-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #6 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	-4%	-2%	0%	-6%	0%	-3%
Expressways	0%	0%	0%	-5%	-5%	1%	-1%	-5%	-3%
Ramps	0%	3%	0%	-4%	-10%	0%	-19%	-4%	-9%
Arterials	-1%	0%	0%	4%	1%	-2%	-5%	-1%	0%
Collectors	0%	1%	0%	5%	1%	-2%	6%	43%	3%
Total	0%	0%	-1%	0%	-1%	0%	-4%	1%	-1%

Table 8-8. 2035 CMP Project #6 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,486	2,864	4,374	36	865	28	9,775
Expressways	0	0	75	1,007	1,236	1,611	742	202	4,873
Ramps	0	161	309	811	1,589	31	439	13	3,353
Arterials	176	643	651	2,528	5,070	137	2,135	214	11,554
Collectors	18	160	219	1,259	1,824	45	879	40	4,444
Total	194	1,086	2,740	8,469	14,093	1,860	5,060	497	33,999

Table 8-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #6 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-2%	-7%	-3%	-3%	-15%	-3%	-5%
Expressways	0%	0%	0%	-6%	-8%	1%	-1%	-7%	-4%
Ramps	0%	4%	0%	-6%	-14%	0%	-31%	-7%	-13%
Arterials	-2%	0%	-1%	7%	1%	-9%	-13%	-2%	-1%
Collectors	0%	1%	-1%	3%	-1%	-4%	3%	54%	1%
Total	-2%	1%	-1%	-2%	-3%	0%	-12%	-2%	-4%

8.3.2 CMP Project #6 Transit Assignment

Table 8-10 shows the 2035 CMP Project #6 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 8-11 shows the percent change in transit boardings from 2035 Baseline to the 2035 CMP Project #6 Package. Total boardings remain nearly identical to the 2035 Baseline scenario.

Table 8-10. 2035 CMP Project #6 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	175,110	7,451	7,249	73,244	0	263,054
Off-Peak	93,223	0	5,077	27,438	0	125,737
Total	268,333	7,451	12,325	100,681	0	388,791

Table 8-11. Percent Change in Transit Boardings, Baseline to CMP Project #6

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	1%	-1%	6%	0%	0%	1%
Off-Peak	0%	0%	0%	-1%	0%	0%
Total	0%	-1%	3%	0%	0%	0%

8.4 Summary of CMP Project #6 Findings

These are the key findings related to the CMP Project #6 Package:

- The widening of the H-2 Waipio Interchange coupled with the new H-2 Pineapple Road Interchange, Central Mauka Road, and Wahiawa Second Access Road provided much needed access into and out of the growing Central Oahu region.
- The LOS at the Waipio Interchange improved from F to C.
- The freeways, expressways, and ramps near the new and improved facilities showed decreased VMT, VHT, and VHD.

9 CMP Project # 7 Package – Kaneohe Area Projects

This chapter provides the analysis results of the CMP Project #7 Package.

9.1 CMP Project #7 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen Kahekili Highway from two to four lanes, from Kamehameha Highway to Haiku Road. This project also includes the following improvements:
  - Contraflow in existing right-of-way between Hui Iwa Street and Haiku Road
  - Intersection improvements at Hui Iwa Street and Kamehameha Highway.
- Likelike Highway widening from Kamehameha Highway to Kahekili Highway.

The Kahekili Highway widening project is located on the congested roadway as seen in the Baseline scenario. The Likelike Highway widening projects is also situated on the congested roadway in the Baseline scenario. See Table 2-6 numbers 6 and 15.

9.2 CMP Project #7 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #7 Package.

Table 9-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #7 mode share remains similar to the Baseline scenario.

Table 9-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #7 Package

Mode	2035 Baseline		2035 CMP Project #7		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,477	83%	0%
Transit	245,640	6%	245,558	6%	0%
Bike/walk	461,594	11%	461,204	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,239	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,157	32%	0%
Transit	30,225	8%	30,255	8%	0%
Taxi	9,531	3%	9,551	3%	0%
Tour Bus	57,915	15%	57,989	16%	0%
Bike/Walk	155,150	42%	154,148	41%	-1%
Total Trips by Visitors	373,680	100%	373,100	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,969	26%	1%
Transit	4,471	4%	4,448	4%	-1%
Taxi	17,218	15%	17,395	15%	1%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,402	35%	-1%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,345*	*100%*	*0%*

Table 9-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #7 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 9-3 shows the comparison of the 2035 CMP Project #7 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #7 Package. This table shows that the CMP Project #7 Package's mode choice is nearly identical to the Baseline.

Table 9-2. 2035 CMP Project #7 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,355	81,451	162,239	29,253	115,864	2,957	8,264	35,897	112,463	264,197	142,238	1,493,178
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,893	73,788	42,127	33,748	29,913	1,709	65,445	8,522	131,888	300,673	221,529	1,060,235
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,897	46,404	12,638	15,972	11,646	427	104,890	2,868	95,429	247,278	204,615	783,064
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,482	223	2	530	0	0	242	214	0	0	0	4,693
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,374	4,249	7,105	5,140	4,465	4,541	16,093	9,447	9,898	26,049	3,666	146,027
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,453	1,845	5,035	1,844	1,678	1,115	3,176	5,723	1,315	10,611	1,857	61,652
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,126	48	0	7	0	0	259	96	138	214	0	1,888
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,531	0	0	0	0	0	4	1,557	11	537	0	14,640
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,622	252	14	0	1	1	1,548	1,832	751	1,634	3	16,658
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,626	10,788	13,747	3,103	52,743	1,240	74,151	4,125	30,075	122,528	51,088	415,214
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,595	1,858	949	33	2,106	12	8,494	3,432	2,566	11,405	2,540	45,990
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,906*	*243,856*	*89,630*	*218,416*	*12,002*	*282,566*	*73,713*	*384,534*	*985,126*	*627,536*	*4,043,239*

Table 9-3. Comparison of the 2035 CMP Project #7 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	102	38	7	2	14	0	13	45	7	31	7	266
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	92	28	27	8	4	1	64	14	-1	31	11	279
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-76	-35	-21	0	2	0	88	-3	0	20	11	-14
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	34	1	0	3	0	0	5	9	0	0	0	52
	1%	*0%*	*0%*	*1%*	*0%*	*0%*	*2%*	*4%*	*0%*	*0%*	*0%*	*1%*
Walk to local bus transit	23	6	9	2	0	0	21	-3	-5	-13	-1	39
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-32	-5	-6	0	-1	-1	-10	-39	-7	-4	-2	-107
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	1	0	0	0	0	0	0	-1	0	0	0	0
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-17	0	0	0	0	0	0	-8	0	0	0	-25
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-27	0	0	0	0	0	-1	-10	-1	-2	0	-41
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk	-80	-17	-14	-6	-4	0	-219	-1	-6	-41	-12	-400
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-11	0	-1	0	0	0	24	0	-1	-1	0	10
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	16	1	9	15	0	-15	3	-14	21	14	59
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

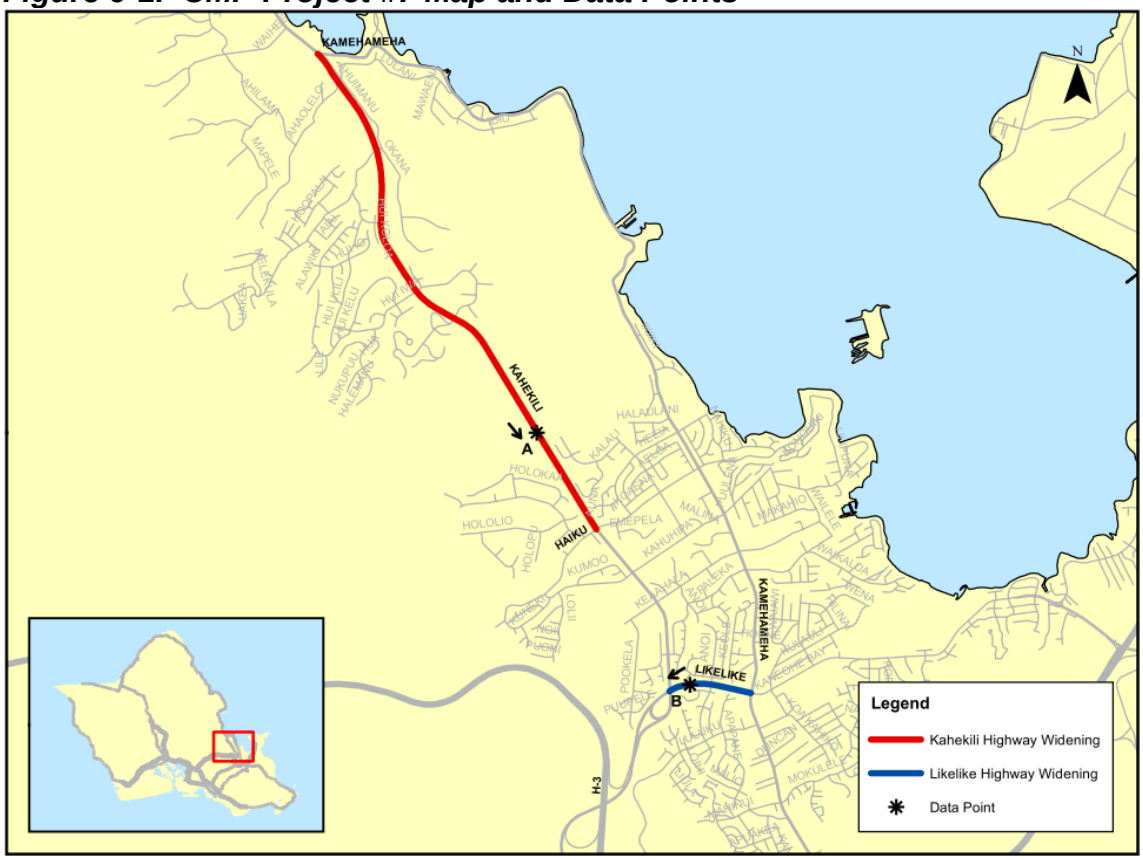
9.3 CMP Project #7 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #7. These include the AM two-hour V/C (Level of Service [LOS[16]]) and corresponding vehicular volume of the planned project, the daily VMT, and AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

9.3.1 CMP Project #7 Highway Assignment

Figure 9-1 shows the map of the approximate location of the projects included in the CMP Project #7 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 9-1. CMP Project #7 Map and Data Points



[16] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 9-2 shows that the widening of Kahekili Highway improved LOS from F to B while accommodating an additional 1,400 vehicles. Moreover, the widening of Likelike Highway also improved from LOS D to LOS A.

Figure 9-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #7

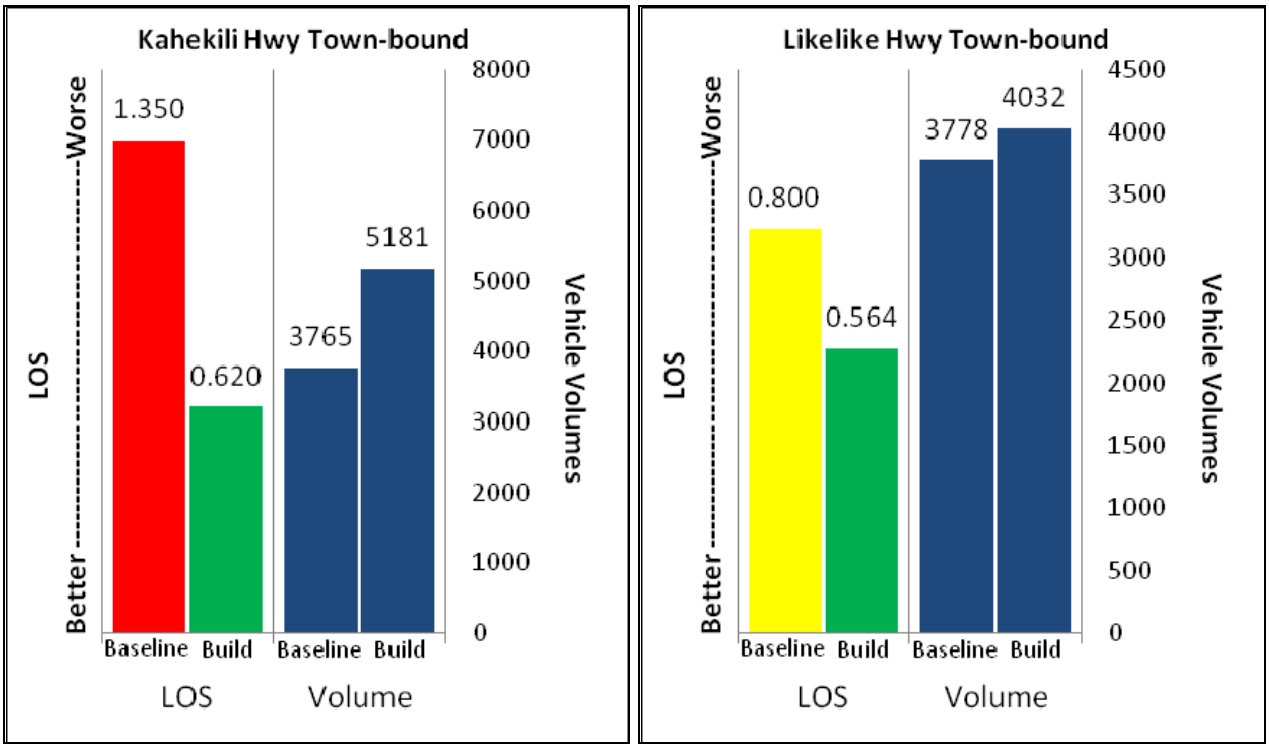


Table 9-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[17] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 9-5 with the VMT for collectors for Area Type 6 decreased 18 percent. This decrease is due to the highways being widened, and the collectors not being used as much to get around the congested sections of Kahekili and Likelike Highways.

Table 9-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #7 Package. The model forecasts 88,683 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 9-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #7 Package. Like the daily VMT, the collectors for Area Type 6 decreases 38 percent for the AM two-hour peak period VHT from the Baseline. Also, the VHT for arterials and collectors in Area Types 7 and 8 (facilities near the widened highways) decreases as a result of improved LOS on the widened

[17] See Appendix A for Area Type definitions.

highways (i.e. commuters are using Kahekili and Likelike Highways instead of the arterials and collectors nearby to get around them).

Table 9-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #7 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (15 percent). Table 9-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #7 Package. Overall, AM two-hour VHD is projected to decrease by two percent from the Baseline, with the VHD on collectors in Area Types 6, 7, and 8 decreasing from the Baseline by 72, eight, and 12 percent, respectively.

Table 9-4. 2035 CMP Project #7 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,017	507,893	1,177,339	2,709,333	369,326	815,099	234,904	5,965,911
Expressways	0	0	37,444	170,472	448,738	373,369	515,868	159,744	1,705,635
Ramps	0	17,127	35,622	166,330	366,240	28,533	161,547	18,089	793,488
Arterials	127,439	253,885	619,434	722,928	1,532,635	263,651	1,061,580	398,001	4,979,553
Collectors	14,665	33,290	140,074	373,156	770,628	15,767	381,264	39,308	1,768,152
Total	142,104	456,319	1,340,467	2,610,225	5,827,574	1,050,646	2,935,358	850,046	15,212,739

Table 9-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #7 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	1%	1%	0%	0%
Collectors	1%	0%	0%	0%	0%	-18%	-2%	0%	-1%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 9-6. 2035 CMP Project #7 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	477	2,567	6,029	10,669	917	3,194	559	24,412
Expressways	0	0	168	1,553	2,501	2,615	1,985	643	9,465
Ramps	0	231	441	1,508	3,125	132	1,126	76	6,639
Arterials	968	2,038	4,225	5,549	12,637	1,011	5,978	1,540	33,946
Collectors	102	339	1,005	3,294	6,594	104	2,620	163	14,221
Total	1,070	3,085	8,406	17,933	35,526	4,779	14,903	2,981	88,683

Table 9-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #7 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	0%	0%	1%	-1%	0%	0%
Expressways	0%	0%	-1%	-1%	0%	1%	0%	0%	0%
Ramps	0%	3%	-3%	1%	1%	2%	0%	-1%	0%
Arterials	0%	0%	0%	0%	1%	0%	-7%	-1%	-1%
Collectors	0%	0%	0%	0%	0%	-38%	-5%	-4%	-2%
Total	0%	0%	-1%	0%	0%	-1%	-4%	-1%	-1%

Table 9-8. 2035 CMP Project #7 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	121	1,482	3,071	4,473	38	995	29	10,209
Expressways	0	0	73	1,055	1,353	1,617	760	220	5,078
Ramps	0	161	298	870	1,858	31	641	14	3,873
Arterials	177	644	653	2,339	5,130	149	1,983	212	11,287
Collectors	18	160	221	1,232	1,820	13	789	23	4,276
Total	195	1,086	2,727	8,567	14,634	1,848	5,168	498	34,723

Table 9-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #7 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	-2%	-1%	-1%	3%	-2%	0%	-1%
Expressways	0%	0%	-3%	-1%	1%	1%	1%	1%	0%
Ramps	0%	4%	-4%	1%	1%	0%	1%	0%	1%
Arterials	-1%	0%	0%	-1%	2%	-1%	-20%	-3%	-3%
Collectors	0%	1%	0%	0%	-1%	-72%	-8%	-12%	-3%
Total	-1%	1%	-2%	-1%	1%	-1%	-10%	-1%	-2%

9.3.2 CMP Project #7 Transit Assignment

Table 9-10 shows 2035 CMP Project #7 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 9-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #7 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 9-10. 2035 CMP Project #7 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,057	7,545	6,862	72,949	0	261,413
Off-Peak	93,436	0	5,078	27,541	0	126,054
Total	267,493	7,545	11,940	100,490	0	387,468

Table 9-11. Percent Change in Transit Boardings, Baseline to CMP Project #7

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

9.4 Summary of CMP Project #7 Findings

These are the key findings related to the CMP Project #7 Package:

- The LOS on the widened Kahekili Highway improved from F to B, while the LOS on the widened Likelike Highway improved from D to A in the AM two-hour peak period.
- The arterials and collectors surrounding the widened highways showed decreased VMT, VHT, and VHD.
- The widening of Kahekili Highway and Likelike Highway helped improve the highways' LOS as well as the surrounding roadways in the Kaneohe and Kailua areas, as commuters were avoiding the congested highways in the Baseline.

10 CMP Project # 8 Package – Makapuu Tunnel Project

This chapter provides the analysis results of the CMP Project #8 Package.

10.1 CMP Project #8 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Construct a secondary access road (tunnel) from the vicinity of Lunalilo Home Road to the vicinity of Kalanianaole Highway north of Sea Life Park.

This project is a new facility that will provide an alternative route to travelers commuting to and from Hawaii Kai and Waimanalo areas.

10.2 CMP Project #8 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #8 Package.

Table 10-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #8 Package mode share remains similar to the Baseline scenario.

Table 10-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #8 Package

Mode	2035 Baseline		2035 CMP Project #8		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,118	83%	0%
Transit	245,640	6%	245,667	6%	0%
Bike/walk	461,594	11%	461,419	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,204	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,071	32%	0%
Transit	30,225	8%	30,255	8%	0%
Taxi	9,531	3%	9,541	3%	0%
Tour Bus	57,915	15%	57,963	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,095	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,805	26%	0%
Transit	4,471	4%	4,464	4%	0%
Taxi	17,218	15%	17,219	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,725	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,305*	*100%*	*0%*

Table 10-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #8 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 10-3 shows the comparison of the 2035 CMP Project #8 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #8 Package. This table shows that the CMP Project #8 Package's mode choice is nearly identical to the Baseline.

Table 10-2. 2035 CMP Project #8 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,266	81,416	162,240	29,254	115,861	2,956	8,251	35,922	112,467	264,198	142,236	1,493,067
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,800	73,763	42,094	33,741	29,913	1,709	65,384	8,496	131,891	300,665	221,532	1,059,988
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,956	46,441	12,655	15,970	11,645	427	104,799	2,859	95,433	247,263	204,615	783,063
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,394	219	2	527	0	0	237	202	0	0	0	4,581
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,415	4,248	7,105	5,140	4,464	4,541	16,075	9,450	9,904	26,072	3,659	146,073
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,455	1,850	5,035	1,843	1,679	1,115	3,189	5,739	1,324	10,628	1,857	61,714
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,130	48	0	7	0	0	259	96	138	214	0	1,892
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,587	0	0	0	0	0	4	1,565	11	540	0	14,707
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,649	253	15	0	1	1	1,552	1,837	752	1,637	3	16,700
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,694	10,800	13,758	3,107	52,733	1,239	74,359	4,118	30,067	122,491	51,085	415,451
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,608	1,857	950	33	2,106	12	8,472	3,425	2,560	11,406	2,539	45,968
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,895*	*243,854*	*89,622*	*218,402*	*12,000*	*282,581*	*73,709*	*384,547*	*985,114*	*627,526*	*4,043,204*

Table 10-3. Comparison of the 2035 CMP Project #8 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	13	3	8	3	11	-1	0	70	11	32	5	155
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-1	3	-6	1	4	1	3	-12	2	23	14	32
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-17	2	-4	-2	1	0	-3	-12	4	5	11	-15
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-54	-3	0	0	0	0	0	-3	0	0	0	-60
	-2%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	64	5	9	2	-1	0	3	0	1	10	-8	85
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-30	0	-6	-1	0	-1	3	-23	2	13	-2	-45
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	5	0	0	0	0	0	0	-1	0	0	0	4
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	39	0	0	0	0	0	0	0	0	3	0	42
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*
Kiss-and-ride transit	0	1	1	0	0	0	3	-5	0	1	0	1
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-12	-5	-3	-2	-14	-1	-11	-8	-14	-78	-15	-163
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	2	-1	0	0	0	0	2	-7	-7	0	-1	-12
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	5	-1	1	1	-2	0	-1	-1	9	4	24
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

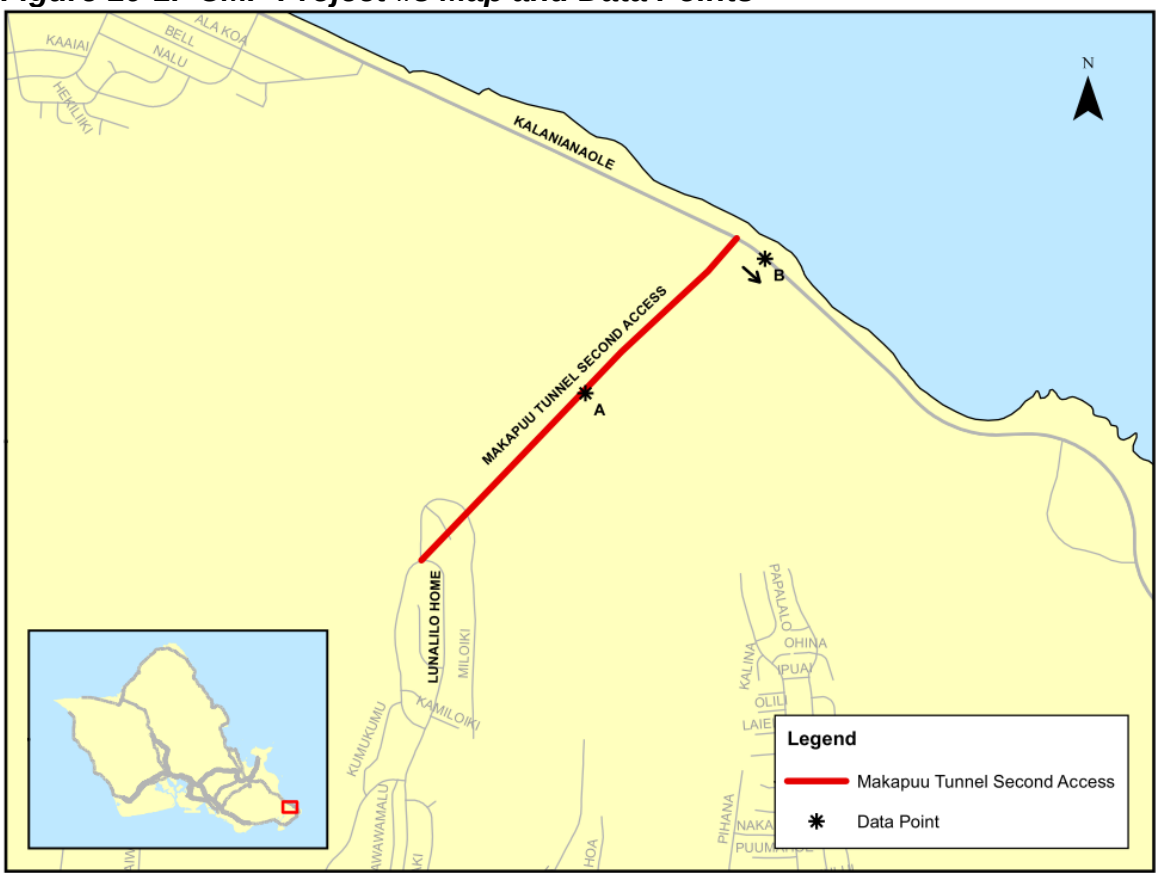
10.3 CMP Project #8 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #8. These include the AM two-hour V/C (Level of Service [LOS[18]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

10.3.1 CMP Project #8 Highway Assignment

Figure 10-1 shows the map of the approximate location of the projects included in CMP Project #8 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 10-1. CMP Project #8 Map and Data Points



[18] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 10-2 shows that the addition of the Makapuu Tunnel provided an additional route to and from the Waimanalo area from Hawaii Kai as the volume decreased to almost zero on Kalanianaole Highway just east of the tunnel road.

Figure 10-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #8

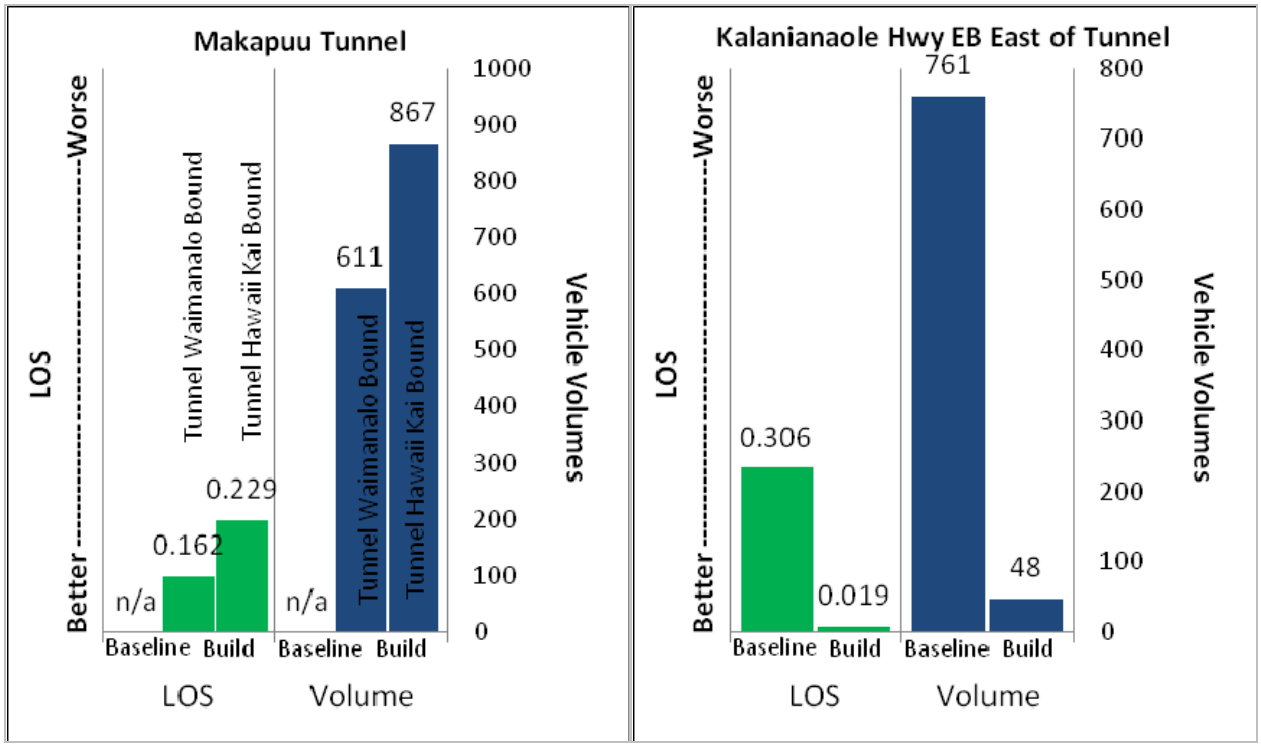


Table 10-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[19] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 10-5 with the VMT for collectors for Area Type 6 increased 32 percent. This increase is the result of the new Makapuu Tunnel roadway.

Table 10-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #8 Package. The model forecasts 89,223 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (17 percent). Table 10-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #8 Package. Like the daily VMT, the collectors for Area Type 6 increases 23 percent for the AM two-hour peak period VHT from the Baseline. Also the VHT decreased by three percent for arterials in Area Type 7 (Kalanianaole Highway in Waimanalo).

Table 10-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #8 Package. Similar to the

[19] See Appendix A for Area Type definitions.

Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 10-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #8 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline.

Table 10-4. 2035 CMP Project #8 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,027	507,619	1,177,659	2,710,450	368,449	816,192	234,897	5,967,293
Expressways	0	0	37,387	170,257	447,707	371,494	513,737	159,128	1,699,710
Ramps	0	17,140	35,618	166,447	366,925	28,423	161,562	18,042	794,157
Arterials	127,372	253,459	618,762	722,963	1,525,438	262,099	1,027,878	399,548	4,937,519
Collectors	14,514	33,336	139,776	373,198	772,353	25,288	388,617	39,451	1,786,533
Total	141,886	455,962	1,339,162	2,610,524	5,822,873	1,055,753	2,907,986	851,066	15,185,212

Table 10-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #8 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-3%	0%	-1%
Collectors	0%	0%	0%	0%	0%	32%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 10-6. 2035 CMP Project #8 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	478	2,577	6,040	10,696	911	3,223	559	24,484
Expressways	0	0	170	1,561	2,470	2,599	1,971	642	9,413
Ramps	0	230	461	1,502	3,106	130	1,116	77	6,622
Arterials	969	2,034	4,220	5,586	12,577	1,009	6,246	1,556	34,197
Collectors	101	339	1,004	3,288	6,629	208	2,769	169	14,507
Total	1,070	3,081	8,432	17,977	35,478	4,857	15,325	3,003	89,223

Table 10-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #8 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	-1%	0%	0%	0%	0%
Ramps	0%	3%	2%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	1%	0%	-3%	0%	0%
Collectors	-1%	0%	0%	0%	0%	23%	1%	0%	0%
Total	0%	0%	0%	0%	0%	1%	-1%	0%	0%

Table 10-8. 2035 CMP Project #8 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,493	3,082	4,492	37	1,018	29	10,273
Expressways	0	0	75	1,064	1,325	1,605	748	219	5,036
Ramps	0	160	317	867	1,841	32	632	14	3,863
Arterials	179	643	652	2,373	5,114	149	2,449	220	11,779
Collectors	18	160	221	1,229	1,837	48	868	26	4,407
Total	197	1,085	2,758	8,615	14,609	1,871	5,715	508	35,358

Table 10-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #8 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-2%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	-1%	-1%	1%	-1%	1%	0%
Ramps	0%	3%	2%	0%	0%	3%	-1%	0%	0%
Arterials	0%	0%	0%	1%	2%	-1%	-1%	0%	1%
Collectors	0%	1%	0%	0%	0%	2%	1%	0%	0%
Total	0%	1%	-1%	0%	1%	0%	0%	1%	0%

10.3.2 CMP Project #8 Transit Assignment

Table 10-10 shows the 2035 CMP Project #8 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 10-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #8 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 10-10. 2035 CMP Project #8 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,201	7,497	6,867	73,107	0	261,672
Off-Peak	93,545	0	5,078	27,589	0	126,212
Total	267,746	7,497	11,945	100,696	0	387,884

Table 10-11. Percent Change in Transit Boardings, Baseline to CMP Project #8

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

10.4 Summary of CMP Project #8 Findings

These are the key findings related to the CMP Project #8 Package:

- The LOS on the new Makapuu Tunnel facility was fairly uncongested and carried nearly 1,500 vehicles in the AM two-hour peak period.
- The LOS on Kalanianaole Highway in the Waimanalo area and around Makapuu Point improved as a result of the addition of the Makapuu Tunnel.
- The new tunnel provided an additional second access to and from the Waimanalo area.

11 CMP Project # 9 Package – Makakilo Drive Extension Project

This chapter provides the analysis results of the CMP Project #9 Package.

11.1 CMP Project #9 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend Makakilo Drive (vicinity of Pueonani Street) south to the Interstate Route H-1 Freeway Interchange as four-lane roadway, connecting Makakilo Drive to Kualakai Parkway.

This project is a new facility that will provide an alternative route to the H-1 Freeway to the Kualakai Parkway Interchange as opposed to the current Makakilo Interchange.

11.2 CMP Project #9 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #9 Package.

Table 11-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #9 Package mode share remains similar to the Baseline scenario.

Table 11-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #9 Package

Mode	2035 Baseline		2035 CMP Project #9		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,975	83%	0%
Transit	245,640	6%	245,644	6%	0%
Bike/walk	461,594	11%	460,604	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,223	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,067	32%	0%
Transit	30,225	8%	30,258	8%	0%
Taxi	9,531	3%	9,557	3%	0%
Tour Bus	57,915	15%	57,954	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,103	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,822	26%	0%
Transit	4,471	4%	4,455	4%	0%
Taxi	17,218	15%	17,238	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,698	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,332*	*100%*	*0%*

Table 11-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #9 Package scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 11-3 shows the change and the percent change between the 2035 Baseline and the CMP Project #9 Package. This table shows that the CMP Project #9 Package's mode choice has over 1,000 more drive alone, and two and three-plus occupant vehicle person-trips compared to the Baseline.

Table 11-2. 2035 CMP Project #9 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,301	81,442	162,238	29,257	115,872	2,956	8,259	35,853	112,475	264,285	142,242	1,493,180
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,966	73,814	42,127	33,750	29,916	1,710	65,597	8,520	131,894	300,767	221,562	1,060,623
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,859	46,409	12,643	15,970	11,647	427	104,949	2,861	95,436	247,336	204,635	783,172
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,405	218	2	523	0	0	233	202	0	0	0	4,583
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,419	4,257	7,106	5,148	4,462	4,541	16,117	9,472	9,918	26,060	3,666	146,166
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,395	1,846	5,029	1,839	1,677	1,116	3,193	5,734	1,321	10,544	1,853	61,547
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,129	48	0	7	0	0	260	97	138	215	0	1,894
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,595	0	0	0	0	0	4	1,571	11	542	0	14,723
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,667	254	15	0	1	1	1,556	1,844	753	1,637	3	16,731
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*3%*	*0%*	*0%*	*0%*	*0%*
Walk	51,622	10,761	13,748	3,101	52,735	1,239	73,908	4,127	30,030	122,334	51,029	414,634
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,591	1,857	949	33	2,105	12	8,494	3,428	2,561	11,401	2,539	45,970
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,949*	*220,906*	*243,857*	*89,628*	*218,415*	*12,002*	*282,570*	*73,709*	*384,537*	*985,121*	*627,529*	*4,043,223*

Table 11-3. Comparison of the 2035 CMP Project #9 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	48	29	6	6	22	-1	8	1	19	119	11	268
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	165	54	27	10	7	2	216	12	5	125	44	667
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-114	-30	-16	-2	3	0	147	-10	7	78	31	94
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-43	-4	0	-4	0	0	-4	-3	0	0	0	-58
	-1%	*-2%*	*0%*	*-1%*	*0%*	*0%*	*-2%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	68	14	10	10	-3	0	45	22	15	-2	-1	178
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-90	-4	-12	-5	-2	0	7	-28	-1	-71	-6	-212
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*
Informal Park-and-ride transit	4	0	0	0	0	0	1	0	0	1	0	6
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	47	0	0	0	0	0	0	6	0	5	0	58
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*
Kiss-and-ride transit	18	2	1	0	0	0	7	2	1	1	0	32
	0%	*1%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-84	-44	-13	-8	-12	-1	-462	1	-51	-235	-71	-980
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-15	-1	-1	0	-1	0	24	-4	-6	-5	-1	-10
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	4	16	2	7	14	0	-11	-1	-11	16	7	43
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

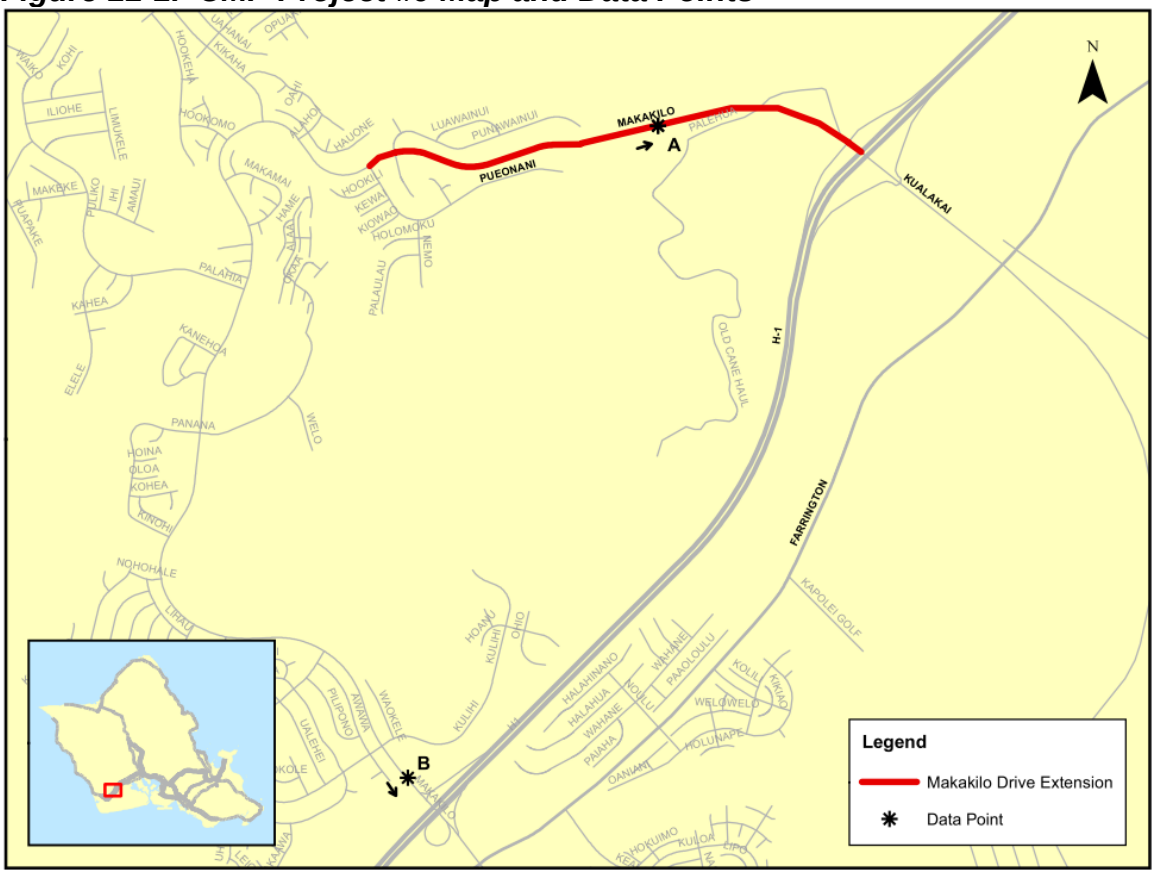
11.3 CMP Project #9 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #9. These include the AM two-hour V/C (Level of Service [LOS[20]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

11.3.1 CMP Project #9 Highway Assignment

Figure 11-1 shows the map of the approximate location of the projects included in CMP Project #9 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 11-1. CMP Project #9 Map and Data Points



[20] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 11-2 shows that the extension of the Makakilo Drive to the Kualakai Parkway Interchange provided an additional route to and from the Makakilo area and relieved the heavily congested Makakilo Drive near the Makakilo Interchange. LOS on Makakilo Drive near the Makakilo Drive Interchange improved from F to C in the AM two-hour peak period.

Figure 11-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #9

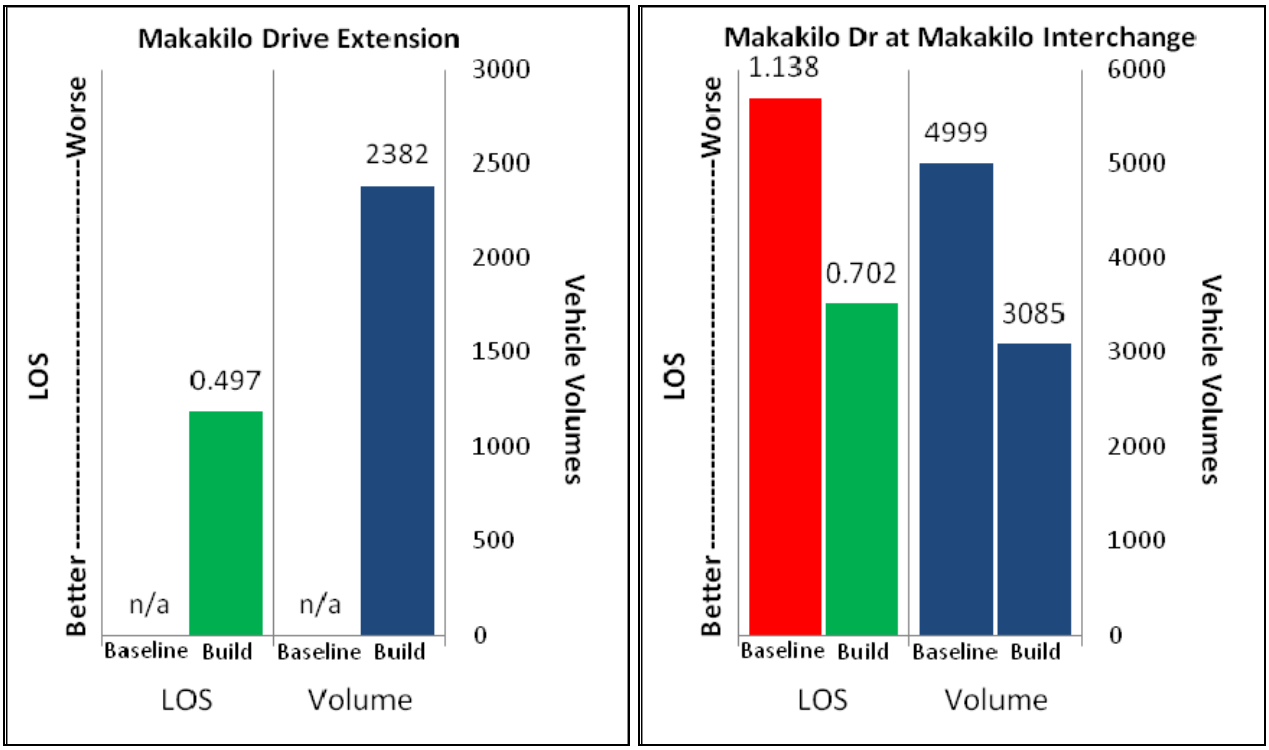


Table 11-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[21] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 11-5.

Table 11-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #9 Package. The model forecasts 89,227 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 11-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #9 Package. The VHT remains similar to the Baseline.

Table 11-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #9 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33

[21] See Appendix A for Area Type definitions.

percent), freeways (29 percent), and expressways (14 percent). Table 11-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #9 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline.

Table 11-4. 2035 CMP Project #9 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,494	508,397	1,175,789	2,712,710	368,450	812,530	234,978	5,965,348
Expressways	0	0	37,495	170,505	448,380	372,472	514,583	159,796	1,703,231
Ramps	0	17,122	35,731	165,525	366,612	28,454	161,937	18,244	793,625
Arterials	127,310	252,662	619,197	720,940	1,511,130	261,431	1,069,386	399,010	4,961,066
Collectors	14,513	33,090	140,065	372,576	771,670	19,094	388,389	39,595	1,778,992
Total	141,823	455,368	1,340,885	2,605,335	5,810,502	1,049,901	2,946,825	851,623	15,202,262

Table 11-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #9 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	1%	0%
Arterials	0%	0%	0%	0%	-1%	0%	1%	0%	0%
Collectors	0%	-1%	0%	0%	0%	0%	0%	1%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 11-6. 2035 CMP Project #9 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	480	2,605	5,983	10,748	910	3,203	560	24,489
Expressways	0	0	170	1,566	2,487	2,605	1,978	643	9,449
Ramps	0	231	459	1,478	3,129	130	1,135	78	6,640
Arterials	967	2,022	4,221	5,565	12,369	1,004	6,477	1,559	34,184
Collectors	102	341	1,003	3,301	6,623	168	2,758	169	14,465
Total	1,069	3,074	8,458	17,893	35,356	4,817	15,551	3,009	89,227

Table 11-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #9 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	-1%	0%	0%	-1%	0%	0%
Expressways	0%	0%	0%	0%	0%	1%	0%	0%	0%
Ramps	0%	3%	1%	-1%	1%	0%	1%	1%	0%
Arterials	-1%	-1%	0%	0%	-1%	-1%	1%	0%	0%
Collectors	0%	1%	0%	0%	0%	-1%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 11-8. 2035 CMP Project #9 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	124	1,518	3,042	4,537	37	1,004	29	10,291
Expressways	0	0	75	1,068	1,341	1,609	753	219	5,065
Ramps	0	161	315	849	1,863	31	650	15	3,884
Arterials	176	637	651	2,361	4,994	147	2,460	221	11,647
Collectors	18	163	221	1,244	1,838	47	858	26	4,415
Total	194	1,085	2,780	8,564	14,573	1,871	5,725	510	35,302

Table 11-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #9 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	0%	-2%	1%	0%	-1%	0%	0%
Expressways	0%	0%	0%	0%	0%	1%	0%	1%	0%
Ramps	0%	4%	2%	-2%	1%	0%	2%	7%	1%
Arterials	-2%	-1%	-1%	0%	0%	-3%	0%	1%	0%
Collectors	0%	3%	0%	1%	0%	0%	0%	0%	1%
Total	-2%	1%	0%	-1%	0%	0%	0%	1%	0%

11.3.2 CMP Project #9 Transit Assignment

Table 11-10 shows 2035 CMP Project #9 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 11-11 shows the percent change in transit boardings from 2035 Baseline to the 2035 CMP Project #9 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 11-10. 2035 CMP Project #9 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,393	7,484	6,827	73,059	0	261,763
Off-Peak	93,469	0	5,063	27,493	0	126,025
Total	267,862	7,484	11,890	100,552	0	387,788

Table 11-11. Percent Change in Transit Boardings, Baseline to CMP Project #9

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

11.4 Summary of CMP Project #9 Findings

These are the key findings related to the CMP Project #9 Package:

- The LOS on the Makakilo Drive extension was fairly uncongested and carried nearly 2,400 vehicles in the AM two-hour peak period.
- The LOS on Makakilo Drive near the Makakilo Interchange improved as a result of the extension of Makakilo Drive to Kualakai Parkway Interchange.
- The extension provided a second access to and from the Makakilo area.

12 CMP Project # 10 Package – Nimitz Flyover Project

This chapter provides the analysis results of the CMP Project #10 Package.

12.1 CMP Project #10 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Construct a new, two-lane elevated and reversible HOV flyover above Nimitz Highway, from the Keehi Interchange to Pacific Street. This project includes the removal of the existing eastbound contraflow lane in the AM peak and restoration of all turning movements on the at-grade portion of Nimitz highway.

This project is a new facility that will provide the continuation of the HOV (zipper) lane facility into Downtown without the traffic lights that the current contraflow lane experiences.

12.2 CMP Project #10 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #10 Package.

Table 12-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #10 Package mode share remains similar to the Baseline scenario.

Table 12-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #10 Package

Mode	2035 Baseline		2035 CMP Project #10		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,335,724	83%	0%
Transit	245,640	6%	245,731	6%	0%
Bike/walk	461,594	11%	461,731	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,186	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,067	32%	0%
Transit	30,225	8%	30,253	8%	0%
Taxi	9,531	3%	9,552	3%	0%
Tour Bus	57,915	15%	57,953	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,090	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,829	26%	0%
Transit	4,471	4%	4,469	4%	0%
Taxi	17,218	15%	17,250	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,665	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,282*	*100%*	*0%*

Table 12-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #10 Package scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 12-3 shows the comparison of the 2035 CMP Project #10 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #10 Package. This table shows that the CMP Project #10 Package's mode choice has nearly 900 more drive alone and two-occupant vehicle person trips compared to the Baseline, and over 1,000 less three-plus occupant vehicle person trips as the Nimitz Highway HOV Flyover requires only two or more occupants compared with the Nimitz Highway Contraflow which requires three or more occupants.

Table 12-2. 2035 CMP Project #10 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,334	81,411	162,232	29,249	115,846	2,957	8,245	35,868	112,456	264,199	142,235	1,493,032
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,304	73,862	42,226	33,748	29,910	1,709	65,373	8,534	131,890	300,625	221,514	1,060,695
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,255	46,329	12,514	15,964	11,645	427	104,779	2,813	95,430	247,241	204,600	781,997
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,412	220	2	524	0	0	236	201	0	0	0	4,595
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,446	4,250	7,108	5,142	4,463	4,540	16,081	9,490	9,902	26,066	3,668	146,156
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,456	1,855	5,038	1,842	1,677	1,115	3,194	5,715	1,323	10,614	1,858	61,687
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,132	48	0	7	0	0	259	96	138	214	0	1,894
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,544	0	0	0	0	0	4	1,558	11	538	0	14,655
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,691	254	15	0	1	1	1,553	1,839	751	1,636	3	16,744
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,755	10,805	13,770	3,110	52,752	1,240	74,387	4,146	30,081	122,570	51,100	415,716
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,624	1,858	951	33	2,106	12	8,474	3,446	2,567	11,405	2,539	46,015
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,953*	*220,892*	*243,856*	*89,619*	*218,400*	*12,001*	*282,585*	*73,706*	*384,549*	*985,108*	*627,517*	*4,043,186*

Table 12-3. Comparison of the 2035 CMP Project #10 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	81	-2	0	-2	-4	0	-6	16	0	33	4	120
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	503	102	126	8	1	1	-8	26	1	-17	-4	739
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-718	-110	-145	-8	1	0	-23	-58	1	-17	-4	-1,081
	-2%	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-36	-2	0	-3	0	0	-1	-4	0	0	0	-46
	-1%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	95	7	12	4	-2	-1	9	40	-1	4	1	168
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-29	5	-3	-2	-2	-1	8	-47	1	-1	-1	-72
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	7	0	0	0	0	0	0	-1	0	0	0	6
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-4	0	0	0	0	0	0	-7	0	1	0	-10
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	42	2	1	0	0	0	4	-3	-1	0	0	45
	0%	*1%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	49	0	9	1	5	0	17	20	0	1	0	102
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	18	0	1	0	0	0	4	14	0	-1	-1	35
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	8	2	1	-2	-1	-1	4	-4	1	3	-5	6
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

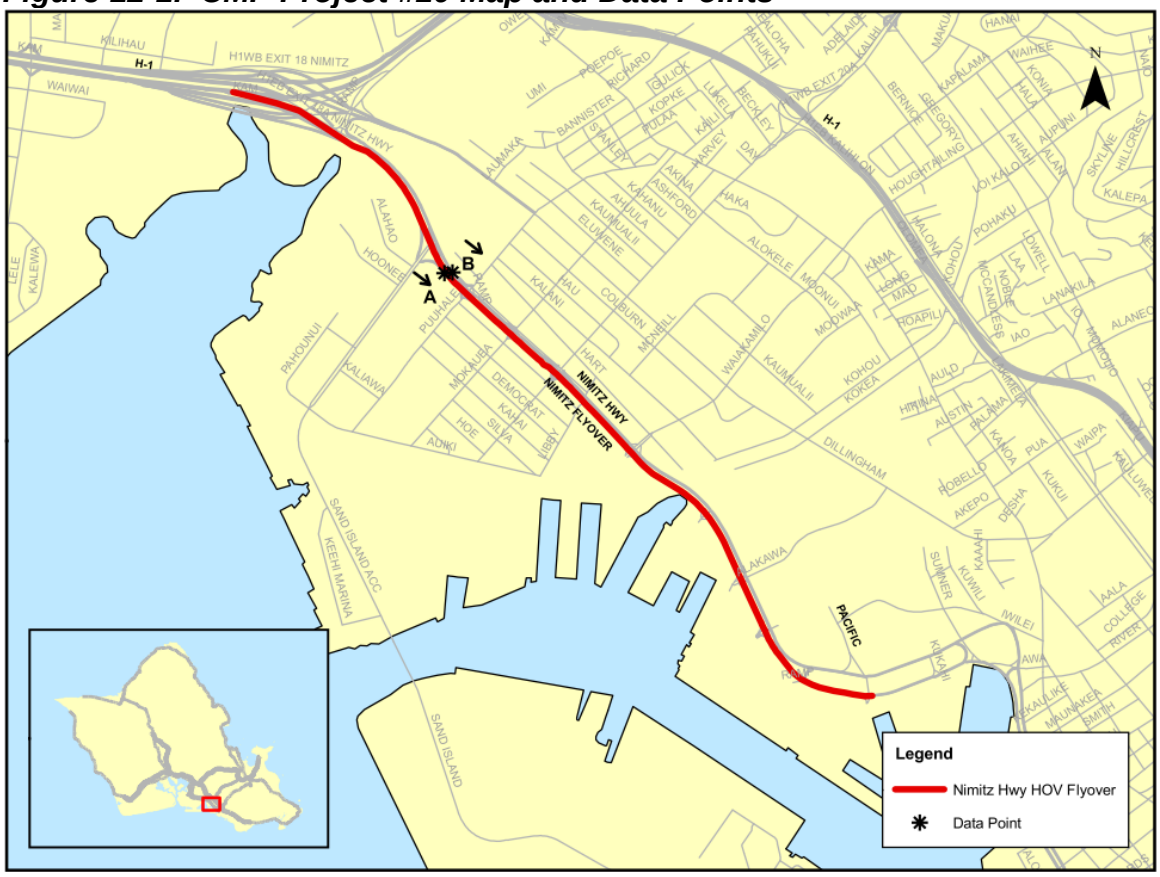
12.3 CMP Project #10 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #10. These include the AM two-hour V/C (Level of Service [LOS[22]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

12.3.1 CMP Project #10 Highway Assignment

Figure 12-1 shows the map of the approximate location of the projects included in CMP Project #10 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 12-1. CMP Project #10 Map and Data Points



[22] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 12-2 shows that the new Nimitz Highway HOV Flyover facility provided some relief to the congested Nimitz Highway. LOS on Nimitz Highway improved from LOS F to LOS E and had 500 less vehicles in the AM two-hour peak period. The flyover also accommodated nearly 700 more vehicles as it had one additional lane compared with the contraflow.

Figure 12-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #10

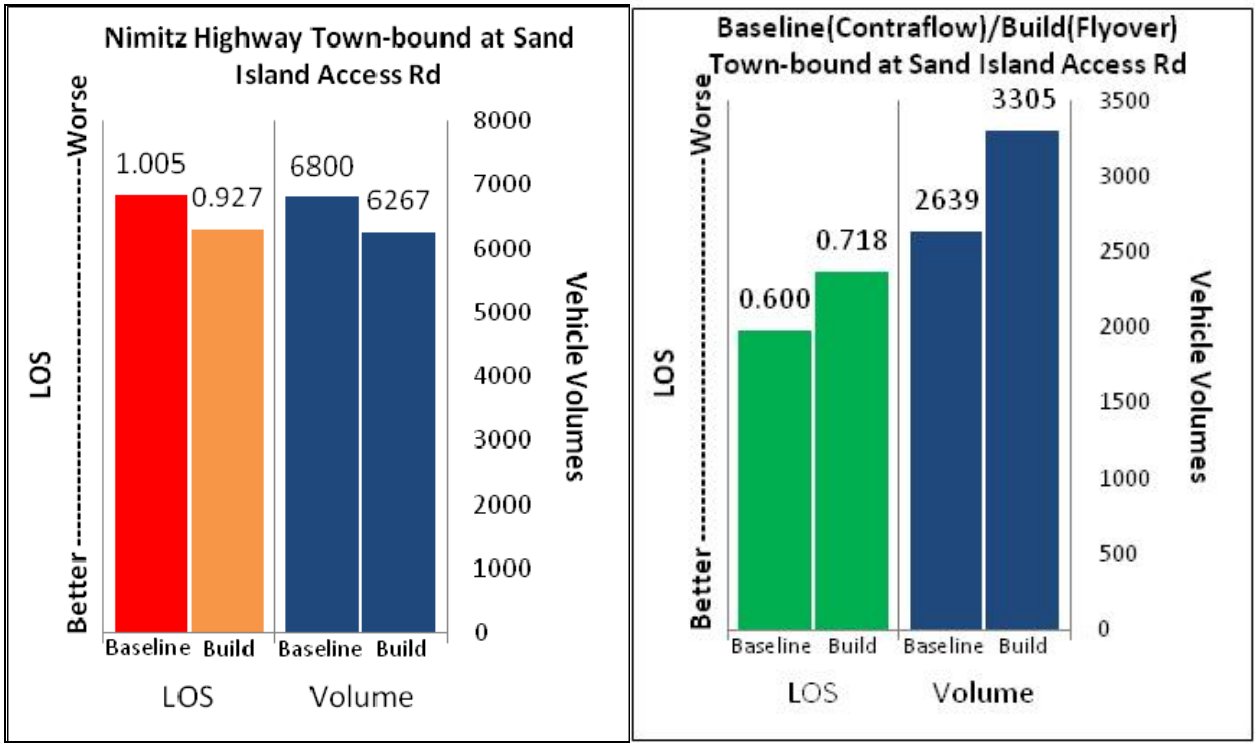


Table 12-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[23] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 12-5.

Table 12-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #10 Package. The model forecasts 89,536 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 12-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #10 Package. The VHT remains similar to the Baseline with slight increases on arterials in Area Types 4 and 5 (Kalihi area).

Table 12-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #10 Package. Similar to the

[23] See Appendix A for Area Type definitions.

Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 12-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #10 Package. Overall AM two-hour VHD is projected to increase slightly (one percent) compared to the Baseline. The surrounding roadways VHD near the Nimitz Flyover increase slightly as more traffic is brought into the Kalihi area (Area Types 4 and 5) with this new roadway.

Table 12-4. 2035 CMP Project #10 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	150,283	507,897	1,174,635	2,707,697	368,006	814,654	234,644	5,957,816
Expressways	0	0	37,528	170,400	448,291	372,797	515,183	159,647	1,703,846
Ramps	0	16,996	35,588	167,076	366,202	28,325	161,354	18,017	793,558
Arterials	127,857	253,815	618,715	730,816	1,522,663	265,553	1,046,000	399,439	4,964,858
Collectors	14,698	33,791	139,825	372,647	771,767	19,160	388,827	39,400	1,780,115
Total	142,555	454,885	1,339,553	2,615,574	5,816,620	1,053,841	2,926,018	851,147	15,200,193

Table 12-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #10 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-1%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	-1%	0%	1%	0%	-1%	0%	0%	0%
Arterials	0%	0%	0%	1%	0%	1%	-1%	0%	0%
Collectors	1%	1%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 12-6. 2035 CMP Project #10 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	456	2,584	6,074	10,746	910	3,214	558	24,542
Expressways	0	0	171	1,569	2,480	2,613	1,981	644	9,458
Ramps	0	224	448	1,517	3,105	129	1,124	77	6,624
Arterials	972	2,037	4,212	5,683	12,574	1,043	6,353	1,560	34,434
Collectors	103	337	1,002	3,289	6,640	169	2,771	167	14,478
Total	1,075	3,054	8,417	18,132	35,545	4,864	15,443	3,006	89,536

Table 12-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #10 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-4%	-1%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	1%	0%	0%	1%	0%	1%	0%
Ramps	0%	0%	-1%	1%	0%	-1%	0%	0%	0%
Arterials	0%	0%	0%	2%	1%	3%	-1%	0%	1%
Collectors	1%	0%	0%	0%	0%	0%	1%	-1%	0%
Total	0%	-1%	0%	1%	0%	1%	0%	0%	0%

Table 12-8. 2035 CMP Project #10 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	126	1,499	3,136	4,561	37	1,022	29	10,410
Expressways	0	0	76	1,070	1,333	1,616	755	220	5,070
Ramps	0	157	306	880	1,840	30	640	14	3,867
Arterials	181	624	648	2,379	5,122	153	2,451	221	11,779
Collectors	18	160	219	1,233	1,843	47	868	25	4,413
Total	199	1,067	2,748	8,698	14,699	1,883	5,736	509	35,539

Table 12-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #10 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	5%	-1%	1%	1%	0%	0%	0%	1%
Expressways	0%	0%	1%	0%	-1%	1%	0%	1%	0%
Ramps	0%	1%	-1%	2%	0%	-3%	1%	0%	0%
Arterials	1%	-3%	-1%	1%	2%	1%	-1%	1%	1%
Collectors	0%	1%	-1%	0%	0%	0%	1%	-4%	0%
Total	1%	-1%	-1%	1%	1%	1%	0%	1%	1%

12.3.2 CMP Project #10 Transit Assignment

Table 12-10 shows the 2035 CMP Project #10 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 12-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #10 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 12-10. 2035 CMP Project #10 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,364	7,467	6,863	73,062	0	261,756
Off-Peak	93,528	0	5,077	27,572	0	126,177
Total	267,892	7,467	11,940	100,634	0	387,933

Table 12-11. Percent Change in Transit Boardings, Baseline to CMP Project #10

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	-1%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	-1%	0%	0%	0%	0%

12.4 Summary of CMP Project #10 Findings

These are the key findings related to the CMP Project #10 Package:

- The LOS on the Nimitz Highway HOV Flyover was nearing congestion (LOS C) and carried nearly 3,300 vehicles in the AM two-hour peak period, nearly 700 more than the Nimitz Highway contraflow.
- The LOS on Nimitz Highway's general purpose lanes improved somewhat (LOS F to E) as a result of the elevated Nimitz Highway HOV Flyover facility.
- The surrounding roadways near the Nimitz Highway HOV Flyover (Kalihi makai area) resulted in slightly increased delays as slightly more vehicles traveled through that area with the new facility.

13 CMP Project # 11 Package – H-1 University Interchange Project

This chapter provides the analysis results of the CMP Project #11 Package.

13.1 CMP Project #11 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Modify on- and off-ramps at the University Avenue Interchange on Interstate Route H-1. This project includes the construction of new ramps to allow all movements, as well as safety improvements including the closure of the eastbound on-ramp at University Avenue Interchange to Interstate Route H-1 and the construction of a new makai bound off-ramp to University Avenue from Interstate Route H-1.

The modified H-1 University Interchange project is located near the congested roadway as seen in the Baseline scenario. See Table 2-6 number 29.

13.2 CMP Project #11 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #11 Package.

Table 13-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #11 Package mode share remains similar to the Baseline scenario.

Table 13-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #11 Package

Mode	2035 Baseline		2035 CMP Project #11		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,335,923	83%	0%
Transit	245,640	6%	245,603	6%	0%
Bike/walk	461,594	11%	461,662	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,188	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,116	32%	0%
Transit	30,225	8%	30,244	8%	0%
Taxi	9,531	3%	9,552	3%	0%
Tour Bus	57,915	15%	57,945	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,124	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,819	26%	0%
Transit	4,471	4%	4,457	4%	0%
Taxi	17,218	15%	17,237	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,701	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,318*	*100%*	*0%*

Table 13-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #11 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 13-3 shows the comparison of the 2035 CMP Project #11 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #11 Package. This table shows that the CMP Project #11 Package's mode choice is nearly similar to the Baseline.

Table 13-2. 2035 CMP Project #11 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,169	81,399	162,220	29,252	115,853	2,957	8,250	35,870	112,457	264,170	142,233	1,492,830
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,796	73,755	42,096	33,739	29,909	1,709	65,351	8,508	131,891	300,651	221,525	1,059,930
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,013	46,455	12,669	15,972	11,644	427	104,820	2,859	95,431	247,265	204,608	783,163
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,416	220	2	524	0	0	236	203	0	0	0	4,601
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,431	4,248	7,105	5,142	4,463	4,541	16,076	9,491	9,903	26,066	3,665	146,131
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,431	1,847	5,031	1,840	1,677	1,114	3,189	5,707	1,319	10,602	1,852	61,609
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,131	48	0	7	0	0	259	96	138	214	0	1,893
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,565	0	0	0	0	0	4	1,555	11	537	0	14,672
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,650	253	15	0	1	1	1,552	1,837	751	1,634	3	16,697
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,741	10,808	13,768	3,110	52,745	1,240	74,379	4,140	30,081	122,563	51,093	415,668
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,612	1,858	950	33	2,106	12	8,468	3,443	2,567	11,406	2,539	45,994
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,955*	*220,891*	*243,856*	*89,619*	*218,398*	*12,001*	*282,584*	*73,709*	*384,549*	*985,108*	*627,518*	*4,043,188*

Table 13-3. Comparison of the 2035 CMP Project #11 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-84	-14	-12	1	3	0	-1	18	1	4	2	-82
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-5	-5	-4	-1	0	1	-30	0	2	9	7	-26
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	40	16	10	0	0	0	18	-12	2	7	4	85
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-32	-2	0	-3	0	0	-1	-2	0	0	0	-40
	-1%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	80	5	9	4	-2	0	4	41	0	4	-2	143
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-54	-3	-10	-4	-2	-2	3	-55	-3	-13	-7	-150
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	6	0	0	0	0	0	0	-1	0	0	0	5
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	17	0	0	0	0	0	0	-10	0	0	0	7
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	1	1	1	0	0	0	3	-5	-1	-2	0	-2
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	35	3	7	1	-2	0	9	14	0	-6	-7	54
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	6	0	0	0	0	0	-2	11	0	0	-1	14
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	10	1	1	-2	-3	-1	3	-1	1	3	-4	8
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

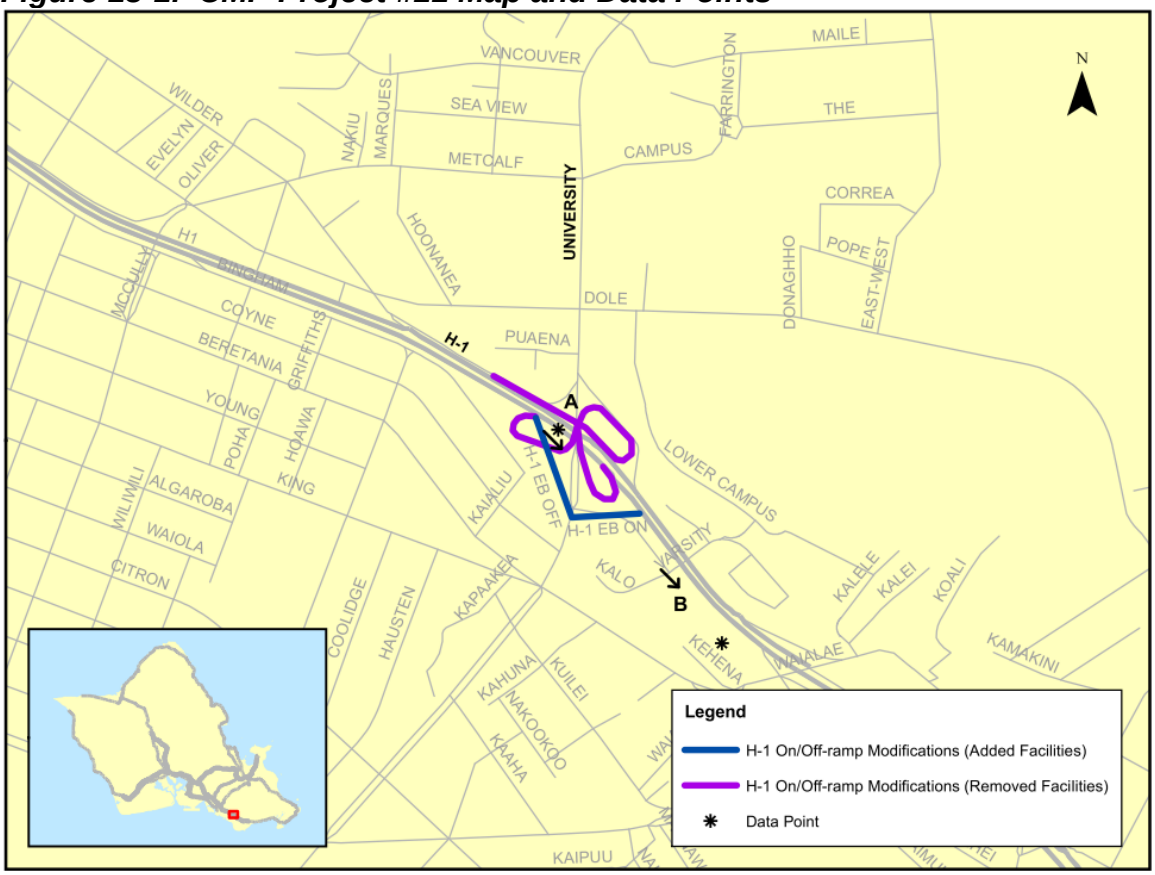
13.3 CMP Project #11 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #11 Package. These include the AM two-hour V/C (Level of Service [LOS[24]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

13.3.1 CMP Project #11 Highway Assignment

Figure 13-1 shows the map of the approximate location of the projects included in the CMP Project #11 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 13-1. CMP Project #11 Map and Data Points



[24] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 13-2 shows that the revised H-1 University Avenue Interchange ramps provided some relief at the H-1 University Avenue overpass. LOS at this overpass improved from LOS B to LOS A and had over 2,200 less vehicles in the AM two-hour peak period. The LOS and volumes on H-1 Koko Head-bound just after the University Avenue Interchange remain unchanged.

Figure 13-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #11

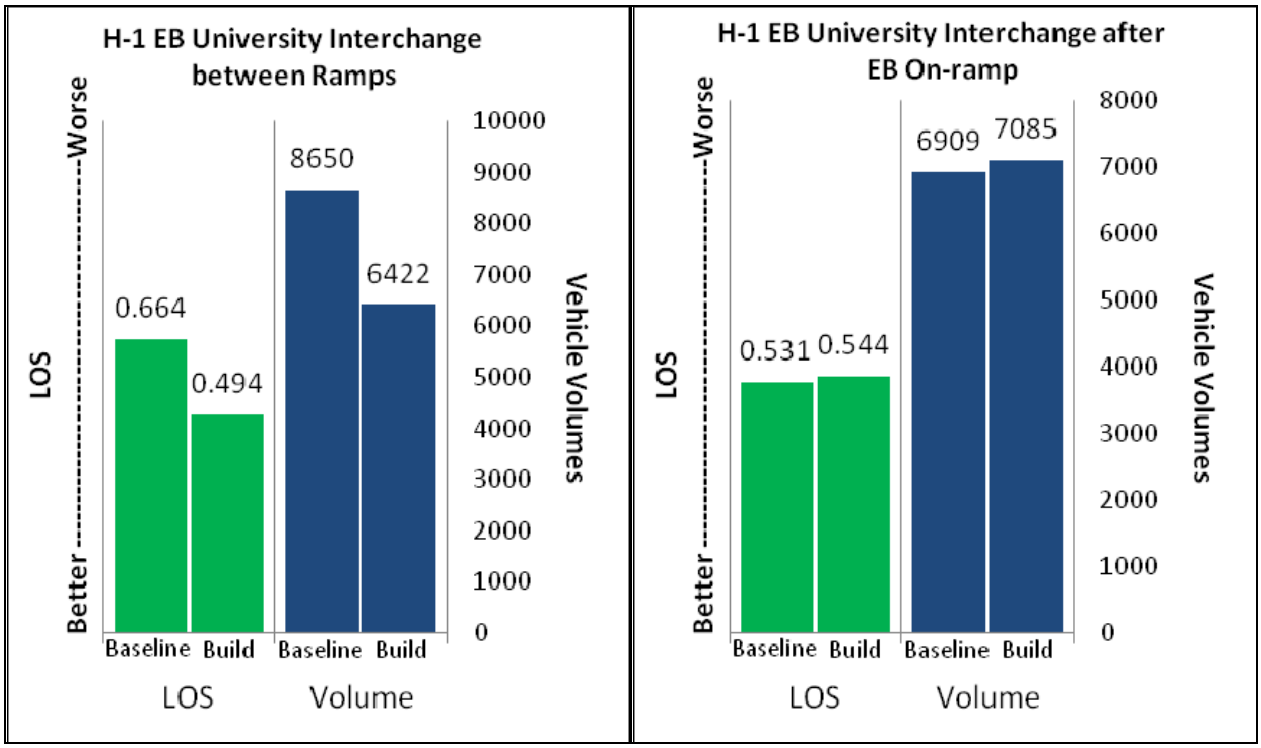


Table 13-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[25] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 13-5.

Table 13-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #11 Package. The model forecasts 89,221 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 13-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #11 Package. The VHT remains similar to the Baseline as this project only updates the existing interchange to a modern diamond interchange without the loop ramps.

Table 13-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #11 Package. Similar to the

[25] See Appendix A for area type definitions.

Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 13-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #11 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline.

Table 13-4. 2035 CMP Project #11 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,255	508,988	1,177,124	2,710,085	368,511	815,558	234,845	5,967,366
Expressways	0	0	37,435	170,483	448,122	372,509	514,809	159,814	1,703,172
Ramps	0	17,136	35,675	166,415	365,300	28,438	161,434	17,992	792,390
Arterials	127,237	253,469	618,978	723,100	1,525,727	261,626	1,045,813	399,204	4,955,154
Collectors	14,517	33,389	139,374	373,164	771,777	19,109	388,751	39,473	1,779,554
Total	141,754	456,249	1,340,450	2,610,286	5,821,011	1,050,193	2,926,365	851,328	15,197,636

Table 13-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #11 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 13-6. 2035 CMP Project #11 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	484	2,609	6,039	10,686	911	3,217	558	24,504
Expressways	0	0	170	1,563	2,490	2,600	1,978	643	9,444
Ramps	0	228	451	1,480	3,109	130	1,120	77	6,595
Arterials	965	2,032	4,210	5,560	12,570	1,003	6,342	1,556	34,238
Collectors	102	339	1,001	3,287	6,616	168	2,757	170	14,440
Total	1,067	3,083	8,441	17,929	35,471	4,812	15,414	3,004	89,221

Table 13-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #11 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	2%	0%	-1%	0%	0%	0%	0%	0%
Arterials	-1%	0%	0%	0%	1%	-1%	-1%	0%	0%
Collectors	0%	0%	-1%	0%	0%	-1%	0%	1%	0%
Total	-1%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 13-8. 2035 CMP Project #11 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	127	1,521	3,081	4,483	37	1,012	29	10,290
Expressways	0	0	75	1,065	1,342	1,604	754	220	5,060
Ramps	0	158	308	846	1,848	30	635	15	3,840
Arterials	176	642	648	2,353	5,116	147	2,441	219	11,742
Collectors	18	160	220	1,228	1,831	47	856	26	4,386
Total	194	1,087	2,772	8,573	14,620	1,865	5,698	509	35,318

Table 13-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #11 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	6%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	1%	0%
Ramps	0%	2%	-1%	-2%	0%	-3%	0%	7%	0%
Arterials	-2%	0%	-1%	0%	2%	-3%	-1%	0%	1%
Collectors	0%	1%	-1%	0%	0%	0%	0%	0%	0%
Total	-2%	1%	0%	-1%	1%	0%	-1%	1%	0%

13.3.2 CMP Project #11 Transit Assignment

Table 13-10 shows the 2035 CMP Project #11 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 13-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #11 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 13-10. 2035 CMP Project #11 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,118	7,535	6,854	73,011	0	261,518
Off-Peak	93,363	0	5,177	27,540	0	126,079
Total	267,481	7,535	12,031	100,551	0	387,598

Table 13-11. Percent Change in Transit Boardings, Baseline to CMP Project #11

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	2%	0%	0%	0%
Total	0%	0%	1%	0%	0%	0%

13.4 Summary of CMP Project #11 Findings

These are the key findings related to the CMP Project #11 Package:

- The LOS on the H-1 University Avenue Overpass eastbound improved from LOS B to LOS A and carried over 2,200 less vehicles in the AM two-hour peak period with the modern diamond interchange as opposed to the interchange with loop ramps.
- The modification of this interchange does not change VMT, VHT, or VHD, but improves the safety of vehicles entering and exiting H-1 at University Avenue.

14 CMP Project # 12 Package – Salt Lake Area Projects

This chapter provides the analysis results of the CMP Project #12 Package.

14.1 CMP Project #12 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen Salt Lake Boulevard from two to six lanes, between Maluna Street and Ala Lilikoi Street.
- Widen Puuloa Road, from Pukuloa Road to Nimitz Highway:
  • From three lanes (one lane southbound and two-lane northbound) to five-lanes (two lanes southbound and three lanes northbound), from Pukuloa Road to Kamehameha Highway.

The Puuloa road widening project is located on the congested roadway as seen in the Baseline scenario. See Table 2-6 number 24.

14.2 CMP Project #12 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #12 Package.

Table 14-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #12 mode share remains similar to the Baseline scenario.

Table 14-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #12 Package

Mode	2035 Baseline		2035 CMP Project #12		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,090	83%	0%
Transit	245,640	6%	245,624	6%	0%
Bike/walk	461,594	11%	461,496	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,210	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,078	32%	0%
Transit	30,225	8%	30,260	8%	0%
Taxi	9,531	3%	9,561	3%	0%
Tour Bus	57,915	15%	57,948	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,114	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,823	26%	0%
Transit	4,471	4%	4,465	4%	0%
Taxi	17,218	15%	17,244	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,682	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,330*	*100%*	*0%*

Table 14-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #12 Package scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 14-3 shows the comparison of the 2035 CMP Project #12 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #12 Package. This table shows that the CMP Project #12 Package's mode choice is nearly similar to the Baseline.

Table 14-2. 2035 CMP Project #12 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,281	81,420	162,236	29,253	115,857	2,956	8,256	35,887	112,459	264,172	142,233	1,493,010
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,816	73,776	42,103	33,743	29,911	1,709	65,388	8,501	131,886	300,649	221,528	1,060,010
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,952	46,425	12,654	15,970	11,645	427	104,838	2,860	95,427	247,260	204,612	783,070
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,445	220	2	526	0	0	236	205	0	0	0	4,634
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,390	4,249	7,103	5,141	4,464	4,541	16,089	9,474	9,911	26,076	3,668	146,106
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,445	1,846	5,033	1,844	1,679	1,116	3,176	5,721	1,321	10,611	1,857	61,649
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,128	48	0	7	0	0	259	95	138	215	0	1,890
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,532	0	0	0	0	0	4	1,558	11	537	0	14,642
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,656	252	14	0	1	1	1,552	1,837	752	1,635	3	16,703
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,699	10,802	13,759	3,107	52,741	1,240	74,300	4,132	30,074	122,554	51,085	415,493
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,610	1,858	950	33	2,107	12	8,482	3,438	2,567	11,406	2,540	46,003
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,896*	*243,854*	*89,624*	*218,405*	*12,002*	*282,580*	*73,708*	*384,546*	*985,115*	*627,526*	*4,043,210*

Table 14-3. Comparison of the 2035 CMP Project #12 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											*Total*
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	28	7	4	2	7	-1	5	35	3	6	2	98
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	15	16	3	3	2	1	7	-7	-3	7	10	54
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-21	-14	-5	-2	1	0	36	-11	-2	2	8	-8
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-3	-2	0	-1	0	0	-1	0	0	0	0	-7
	0%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	39	6	7	3	-1	0	17	24	8	14	1	118
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-40	-4	-8	0	0	0	-10	-41	-1	-4	-2	-110
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	3	0	0	0	0	0	0	-2	0	1	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-16	0	0	0	0	0	0	-7	0	0	0	-23
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	7	0	0	0	0	0	3	-5	0	-1	0	4
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-7	-3	-2	-2	-6	0	-70	6	-7	-15	-15	-121
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	4	0	0	0	1	0	12	6	0	0	0	23
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	6	-1	3	4	0	-1	-2	-2	10	4	30
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

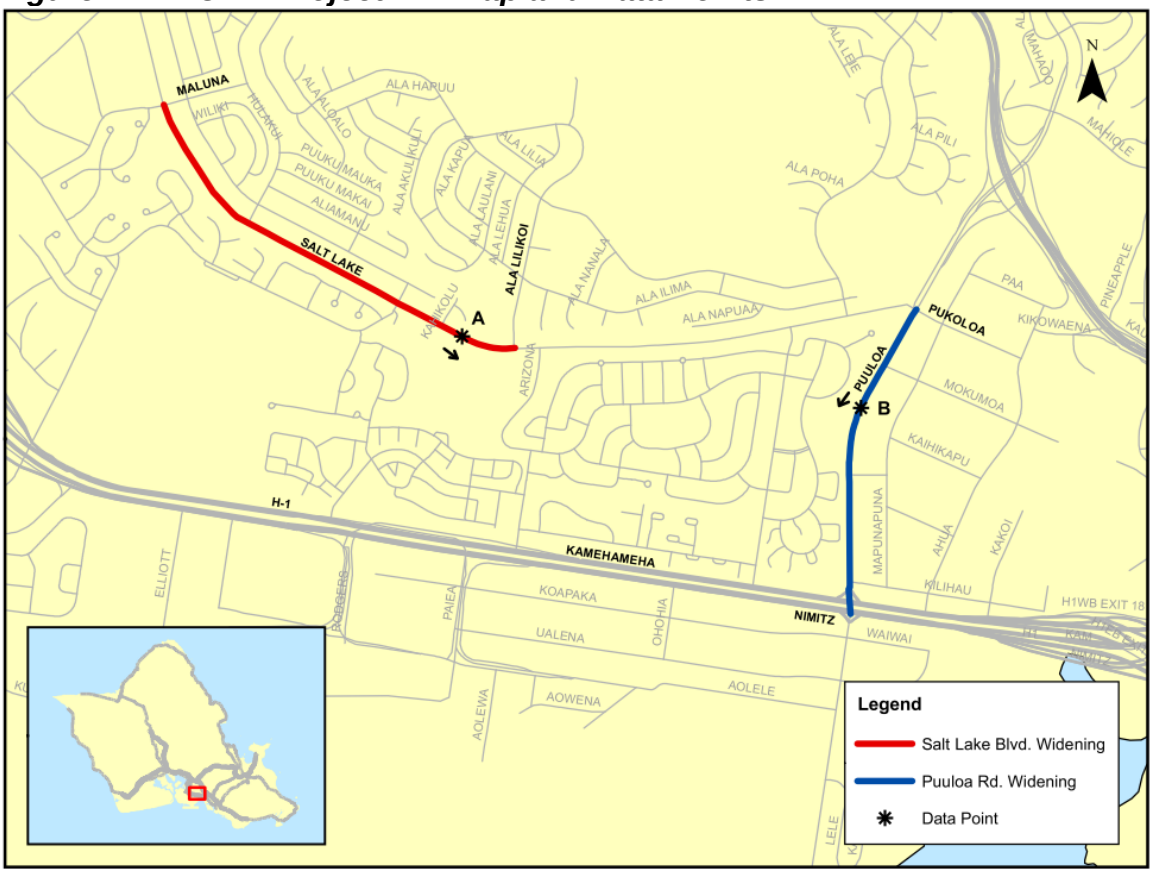
14.3 CMP Project #12 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #12 Package. These include the AM two-hour V/C (Level of Service [LOS[26]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

14.3.1 CMP Project #12 Highway Assignment

Figure 14-1 shows the map of the approximate location of the projects included in the CMP Project #12 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 14-1. CMP Project #12 Map and Data Points



[26] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 14-2 shows that the widening of Salt Lake Boulevard significantly improved LOS in the town-bound direction from LOS E to LOS A while still accommodating over 1,100 more vehicles in the AM two-hour peak period. The LOS also improved on Puuloa Road makai-bound while adding nearly 1,400 vehicles in the AM two-hour peak period.

Figure 14-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #12

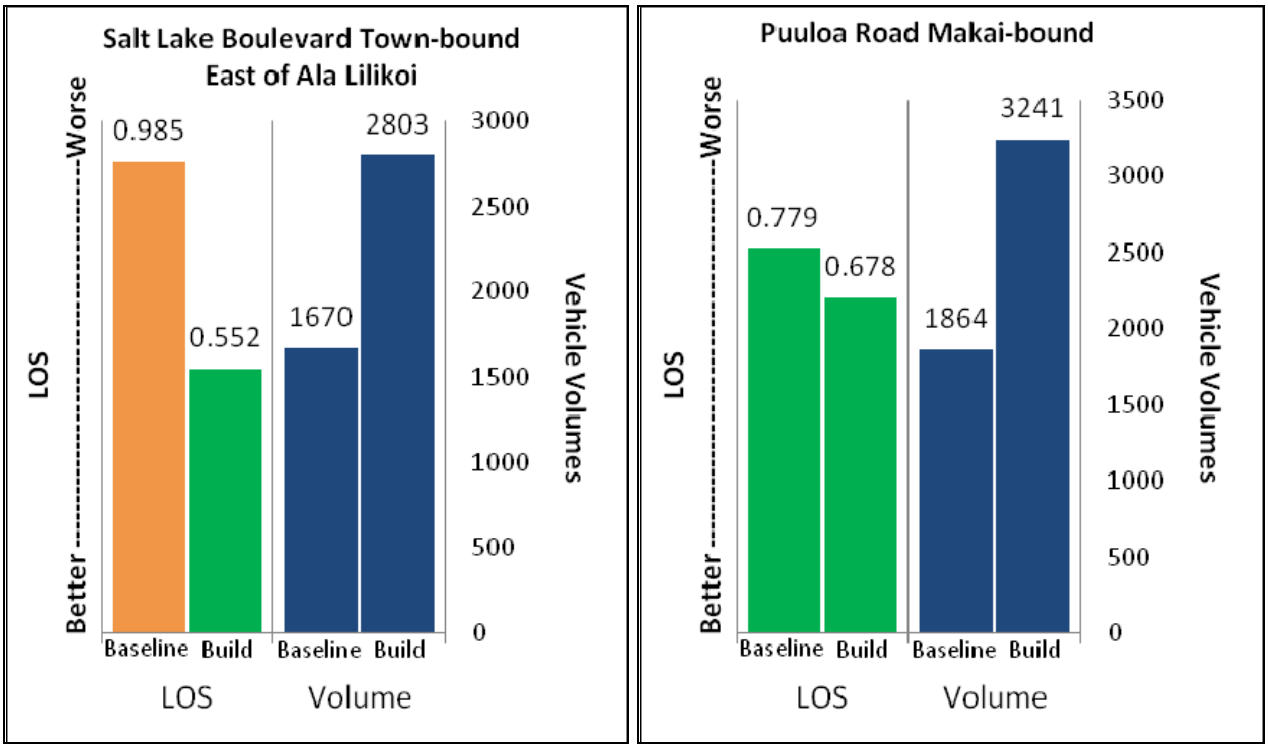


Table 14-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[27] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 14-5.

Table 14-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #12 Package. The model forecasts 89,123 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 14-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #12 Package. The overall AM two-hour peak period VHT remains similar to the Baseline with slight decreases on roadways for Area Types 4 and 7 (Salt Lake Boulevard widening, and Puuloa Road widening sections).

[27] See Appendix A for Area Type definitions.

Table 14-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #12 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 14-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #12 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline with slight decreases on roadways in Area Types 4 and 7 (sections where Salt Lake Boulevard and Puuloa Road are widened).

Table 14-4. 2035 CMP Project #12 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,133	508,000	1,176,521	2,709,676	368,878	815,154	235,096	5,965,458
Expressways	0	0	37,440	170,294	448,284	372,434	514,783	159,704	1,702,939
Ramps	0	17,134	35,721	165,991	365,930	28,350	161,208	18,103	792,437
Arterials	127,396	253,463	619,566	721,982	1,527,380	261,531	1,044,090	399,446	4,954,854
Collectors	14,530	33,337	140,033	376,254	771,788	19,122	391,365	39,517	1,785,946
Total	141,926	456,067	1,340,760	2,611,042	5,823,058	1,050,315	2,926,600	851,866	15,201,634

Table 14-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #12 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	-1%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	1%	0%	0%	1%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 14-6. 2035 CMP Project #12 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,593	6,035	10,667	915	3,216	561	24,466
Expressways	0	0	170	1,554	2,474	2,587	1,967	639	9,391
Ramps	0	230	454	1,467	3,104	131	1,106	77	6,569
Arterials	967	2,024	4,230	5,554	12,559	1,004	6,324	1,558	34,220
Collectors	102	338	1,003	3,299	6,629	169	2,769	168	14,477
Total	1,069	3,071	8,450	17,909	35,433	4,806	15,382	3,003	89,123

Table 14-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #12 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	1%	0%
Expressways	0%	0%	0%	-1%	-1%	0%	-1%	0%	-1%
Ramps	0%	3%	0%	-2%	0%	1%	-1%	0%	-1%
Arterials	-1%	0%	0%	0%	1%	-1%	-2%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	1%	-1%	0%
Total	0%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 14-8. 2035 CMP Project #12 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	124	1,506	3,083	4,467	38	1,013	29	10,260
Expressways	0	0	75	1,056	1,327	1,592	743	216	5,009
Ramps	0	160	310	835	1,841	32	622	15	3,815
Arterials	176	637	657	2,359	5,079	148	2,433	221	11,710
Collectors	18	159	220	1,210	1,856	47	847	26	4,383
Total	194	1,080	2,768	8,543	14,570	1,857	5,658	507	35,177

Table 14-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #12 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	0%	-1%	3%	0%	0%	-1%
Expressways	0%	0%	0%	-1%	-1%	0%	-1%	0%	-1%
Ramps	0%	3%	0%	-3%	0%	3%	-2%	7%	-1%
Arterials	-2%	-1%	0%	0%	1%	-2%	-1%	1%	0%
Collectors	0%	0%	-1%	-1%	1%	0%	-1%	0%	0%
Total	-2%	0%	0%	-1%	0%	0%	-1%	0%	0%

14.3.2 CMP Project #12 Transit Assignment

Table 14-10 shows the 2035 CMP Project #12 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 14-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #12 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 14-10. 2035 CMP Project #12 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,163	7,521	6,863	72,997	0	261,544
Off-Peak	93,525	0	5,091	27,552	0	126,168
Total	267,688	7,521	11,954	100,550	0	387,712

Table 14-11. Percent Change in Transit Boardings, Baseline to CMP Project #12

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

14.4 Summary of CMP Project #12 Findings

These are the key findings related to the CMP Project #12 Package:

- The LOS on Salt Lake Boulevard in the town-bound direction improved from LOS E to LOS A and carried over 1,100 more vehicles in the AM two-hour peak period.
- The LOS on Puuloa Road makai-bound improved slightly (LOS C to B) while accommodating nearly 1,400 more vehicles in the AM two-hour peak period.

15 CMP Project # 13 Package – H-1 Makiki Project

This chapter provides the analysis results of the CMP Project #13 Package.

15.1 CMP Project #13 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- H-1 widening from Ward Avenue to Punahou Street.

15.2 CMP Project #13 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #13 Package.

Table 15-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #13 Package mode share remains similar to the Baseline scenario.

Table 15-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #13 Package

Mode	2035 Baseline		2035 CMP Project #13		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,171	83%	0%
Transit	245,640	6%	245,571	6%	0%
Bike/walk	461,594	11%	461,436	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,178	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,017	32%	0%
Transit	30,225	8%	30,268	8%	0%
Taxi	9,531	3%	9,537	3%	0%
Tour Bus	57,915	15%	57,982	16%	0%
Bike/Walk	155,150	42%	154,259	41%	-1%
Total Trips by Visitors	373,680	100%	373,063	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,792	26%	0%
Transit	4,471	4%	4,461	4%	0%
Taxi	17,218	15%	17,211	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,750	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,247*	*100%*	*0%*

Table 15-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #13 Package scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 15-3 shows change and the percent change between the 2035 CMP Project #13 Package mode choice results by purpose to the 2035 Baseline scenario results, which are nearly similar to the Baseline.

Table 15-2. 2035 CMP Project #13 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,374	81,410	162,256	29,251	115,874	2,956	8,250	35,908	112,457	264,171	142,235	1,493,142
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,773	73,760	42,091	33,741	29,916	1,708	65,387	8,503	131,891	300,649	221,530	1,059,949
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,946	46,448	12,655	15,972	11,647	427	104,811	2,867	95,431	247,264	204,612	783,080
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,441	220	2	525	0	0	236	202	0	0	0	4,626
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,391	4,247	7,101	5,141	4,468	4,542	16,079	9,467	9,909	26,078	3,668	146,091
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,426	1,850	5,029	1,843	1,680	1,116	3,188	5,724	1,320	10,604	1,857	61,637
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,128	48	0	7	0	0	259	96	138	214	0	1,890
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,515	0	0	0	0	0	4	1,560	11	539	0	14,629
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,651	253	14	0	1	1	1,551	1,837	751	1,636	3	16,698
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,691	10,796	13,758	3,107	52,706	1,239	74,354	4,115	30,074	122,545	51,074	415,459
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,610	1,857	950	33	2,106	12	8,468	3,427	2,567	11,408	2,539	45,977
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,946*	*220,889*	*243,856*	*89,620*	*218,398*	*12,001*	*282,587*	*73,706*	*384,549*	*985,108*	*627,518*	*4,043,178*

Table 15-3. Comparison of the 2035 CMP Project #13 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	121	-3	24	0	24	-1	-1	56	1	5	4	230
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-28	0	-9	1	7	0	6	-5	2	7	12	-7
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-27	9	-4	0	3	0	9	-4	2	6	8	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-7	-2	0	-2	0	0	-1	-3	0	0	0	-15
	0%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	40	4	5	3	3	1	7	17	6	16	1	103
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-59	0	-12	-1	1	0	2	-38	-2	-11	-2	-122
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	3	0	0	0	0	0	0	-1	0	0	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-33	0	0	0	0	0	0	-5	0	2	0	-36
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	2	1	0	0	0	0	2	-5	-1	0	0	-1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-15	-9	-3	-2	-41	-1	-16	-11	-7	-24	-26	-155
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	4	-1	0	0	0	0	-2	-5	0	2	-1	-3
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	1	-1	1	-1	-3	-1	6	-4	1	3	-4	-2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

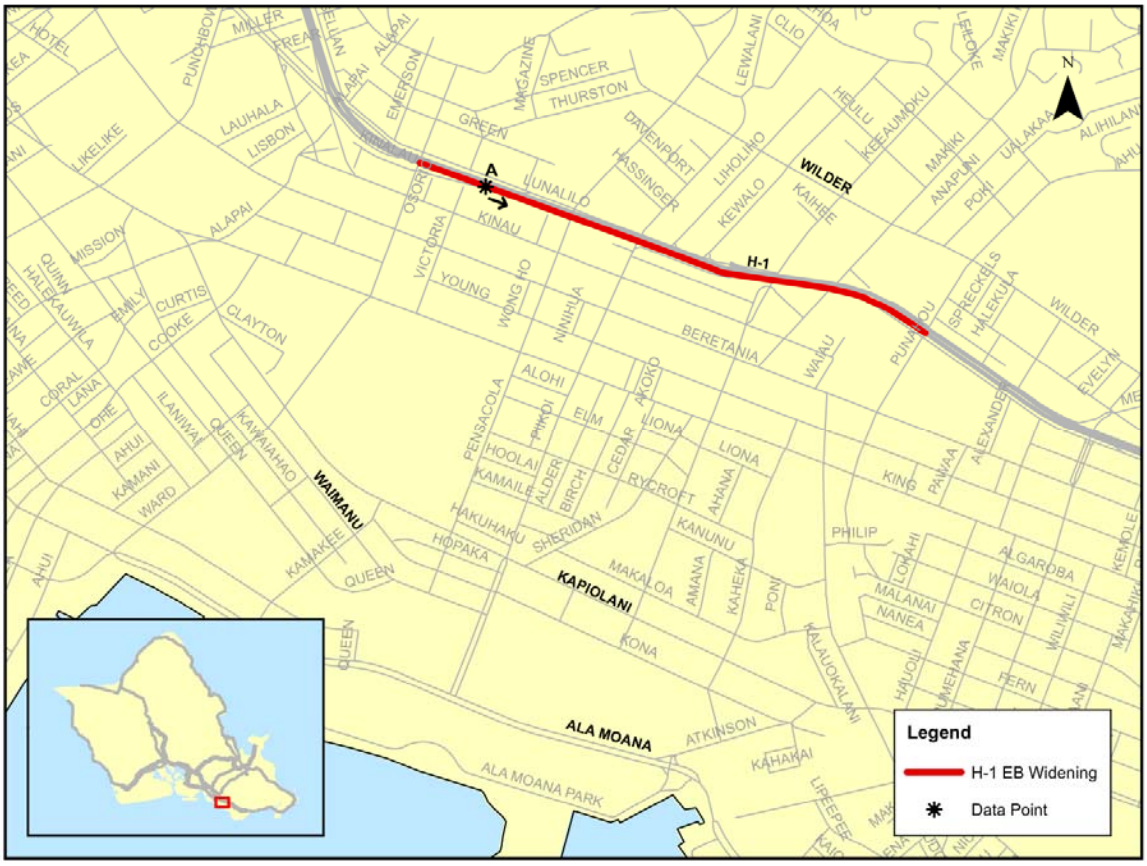
15.3 CMP Project #13 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #13 Package. These include the AM two-hour V/C (Level of Service [LOS[28]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

15.3.1 CMP Project #13 Highway Assignment

Figure 15-1 shows the map of the approximate location of the project included in the CMP Project #13 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 15-1. CMP Project #13 Map and Data Points



[28] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 15-2 shows that the eastbound widening of H-1 between Ward Avenue and Punahou Street improved LOS from F to D while still accommodating over 800 more vehicles in the AM two-hour peak period.

Figure 15-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #13

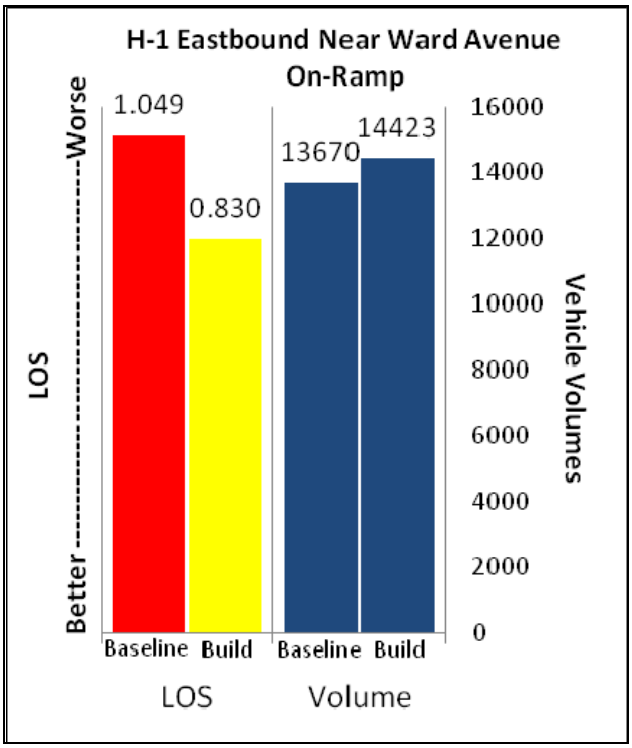


Table 15-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[29] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 15-5.

Table 15-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #13 Package. The model forecasts 89,306 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 15-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline to the 2035 CMP Project #13 Package. The overall AM two-hour peak period VHT remains similar to the Baseline with slight decreases on roadways for Area Type 3.

Table 15-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #13 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 15-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline

[29] See Appendix A for Area Type definitions.

and the 2035 CMP Project #13 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline with slight decreases on roadways in Area Type 3.

Table 15-4. 2035 CMP Project #13 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	153,194	513,289	1,177,609	2,713,442	368,517	815,525	234,726	5,976,302
Expressways	0	0	37,521	170,457	447,999	372,641	514,789	160,009	1,703,416
Ramps	0	17,392	36,237	166,268	366,545	28,428	161,687	18,112	794,669
Arterials	126,883	253,014	616,182	723,352	1,525,428	261,512	1,045,875	399,524	4,951,770
Collectors	14,460	33,311	139,687	373,226	772,146	19,157	389,153	39,348	1,780,488
Total	141,343	456,911	1,342,916	2,610,912	5,825,560	1,050,255	2,927,029	851,719	15,206,645

Table 15-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #13 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	1%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	2%	2%	0%	0%	0%	0%	0%	0%
Arterials	-1%	0%	-1%	0%	0%	0%	-1%	0%	0%
Collectors	-1%	0%	0%	0%	0%	0%	0%	0%	0%
Total	-1%	0%	0%	0%	0%	0%	0%	0%	0%

Table 15-6. 2035 CMP Project #13 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	500	2,511	6,064	10,729	911	3,226	558	24,499
Expressways	0	0	173	1,568	2,481	2,607	1,979	644	9,452
Ramps	0	223	477	1,474	3,155	130	1,123	77	6,659
Arterials	959	2,026	4,189	5,581	12,568	1,004	6,348	1,558	34,233
Collectors	102	340	1,001	3,295	6,617	169	2,771	168	14,463
Total	1,061	3,089	8,351	17,982	35,550	4,821	15,447	3,005	89,306

Table 15-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #13 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	5%	-3%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	2%	0%	0%	1%	0%	1%	0%
Ramps	0%	0%	5%	-2%	2%	0%	0%	0%	1%
Arterials	-1%	0%	-1%	0%	1%	-1%	-1%	0%	0%
Collectors	0%	1%	-1%	0%	0%	0%	1%	-1%	0%
Total	-1%	1%	-1%	0%	0%	0%	0%	0%	0%

Table 15-8. 2035 CMP Project #13 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	141	1,409	3,105	4,512	37	1,020	29	10,253
Expressways	0	0	78	1,069	1,334	1,611	754	221	5,067
Ramps	0	152	331	841	1,888	31	637	14	3,894
Arterials	172	637	642	2,369	5,119	148	2,447	221	11,755
Collectors	18	161	218	1,233	1,832	47	869	25	4,403
Total	190	1,091	2,678	8,617	14,685	1,874	5,727	510	35,372

Table 15-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #13 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	18%	-7%	0%	0%	0%	0%	0%	-1%
Expressways	0%	0%	4%	0%	-1%	1%	0%	2%	0%
Ramps	0%	-2%	7%	-3%	3%	0%	0%	0%	1%
Arterials	-4%	-1%	-2%	0%	2%	-2%	-1%	1%	1%
Collectors	0%	1%	-2%	0%	0%	0%	2%	-4%	0%
Total	-4%	1%	-4%	0%	1%	1%	0%	1%	0%

15.3.2 CMP Project #13 Transit Assignment

Table 15-10 shows the 2035 CMP Project #13 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 15-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #13 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 15-10. 2035 CMP Project #13 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,115	7,502	6,877	72,959	0	261,454
Off-Peak	93,560	0	5,041	27,554	0	126,155
Total	267,675	7,502	11,918	100,513	0	387,609

Table 15-11. Percent Change in Transit Boardings, Baseline to CMP Project #13

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	-1%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

15.4 Summary of CMP Project #13 Findings

These are the key findings related to the CMP Project #13 Package:

- The LOS on H-1 eastbound between Ward Avenue and Punahou Street improved from LOS F to LOS D and carried over 800 more vehicles in the AM two-hour peak period.

16 CMP Project # 14 Package – Farrington Highway Ewa/Waipahu Area Projects

This chapter provides the analysis results of the CMP Project #14 Package.

16.1 CMP Project #14 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen Farrington Highway from two to four lanes, from Golf Course Road to just west of Fort Weaver Road.
- Widen Farrington Highway from Kunia to Waiawa by one lane in each direction, from west of Fort Weaver Road to Waiawa Interchange.

The Farrington Highway widening projects are located on the congested roadway as seen in the Baseline scenario. See Table 2-6 number 2.

16.2 CMP Project #14 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #14 Package.

Table 16-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #14 Package mode share remains similar to the Baseline scenario.

Table 16-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #14 Package

Mode	2035 Baseline		2035 CMP Project #14		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,385	83%	0%
Transit	245,640	6%	245,557	6%	0%
Bike/walk	461,594	11%	460,407	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,349	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,024	32%	0%
Transit	30,225	8%	30,296	8%	0%
Taxi	9,531	3%	9,543	3%	0%
Tour Bus	57,915	15%	57,957	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,087	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,808	26%	0%
Transit	4,471	4%	4,485	4%	0%
Taxi	17,218	15%	17,232	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,689	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,442*	*100%*	*0%*

Table 16-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #14 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 16-3 shows the comparison of the 2035 CMP Project #14 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #14 Package. This table shows that the CMP Project #14 Package has over 1,400 more single occupant, and two, and three-plus occupant person trips compared to the Baseline.

Table 16-2. 2035 CMP Project #14 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,522	81,443	162,249	29,259	115,902	2,956	8,266	35,906	112,484	264,242	142,245	1,493,474
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,937	73,806	42,130	33,758	29,925	1,709	65,537	8,517	131,888	300,703	221,557	1,060,467
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,019	46,460	12,678	15,973	11,650	427	105,000	2,874	95,430	247,297	204,636	783,444
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,437	220	2	524	0	0	236	203	0	0	0	4,622
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,363	4,253	7,106	5,145	4,472	4,545	16,096	9,496	9,910	26,117	3,681	146,184
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,386	1,848	5,033	1,854	1,677	1,115	3,214	5,702	1,316	10,579	1,851	61,575
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,126	48	0	7	0	0	259	97	138	214	0	1,889
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,513	0	0	0	0	0	4	1,557	11	538	0	14,623
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,630	253	14	0	1	1	1,554	1,830	752	1,626	3	16,664
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,454	10,763	13,698	3,094	52,714	1,239	73,872	4,110	30,024	122,444	51,050	414,462
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,567	1,853	947	33	2,107	12	8,492	3,428	2,563	11,403	2,540	45,945
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,947*	*243,857*	*89,647*	*218,448*	*12,004*	*282,530*	*73,720*	*384,516*	*985,163*	*627,563*	*4,043,349*

Table 16-3. Comparison of the 2035 CMP Project #14 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	269	30	17	8	52	-1	15	54	28	76	14	562
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	136	46	30	18	16	1	156	9	-1	61	39	511
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	46	21	19	1	6	0	198	3	1	39	32	366
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-11	-2	0	-3	0	0	-1	-2	0	0	0	-19
	0%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	12	10	10	7	7	4	24	46	7	55	14	196
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-99	-2	-8	10	-2	-1	28	-60	-6	-36	-8	-184
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*1%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	1	0	0	0	0	0	0	0	0	0	0	1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-35	0	0	0	0	0	0	-8	0	1	0	-42
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-19	1	0	0	0	0	5	-12	0	-10	0	-35
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*-1%*	*0%*	*0%*
Walk	-252	-42	-63	-15	-33	-1	-498	-16	-57	-125	-50	-1,152
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-39	-5	-3	0	1	0	22	-4	-4	-3	0	-35
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	57	2	26	47	2	-51	10	-32	58	41	169
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

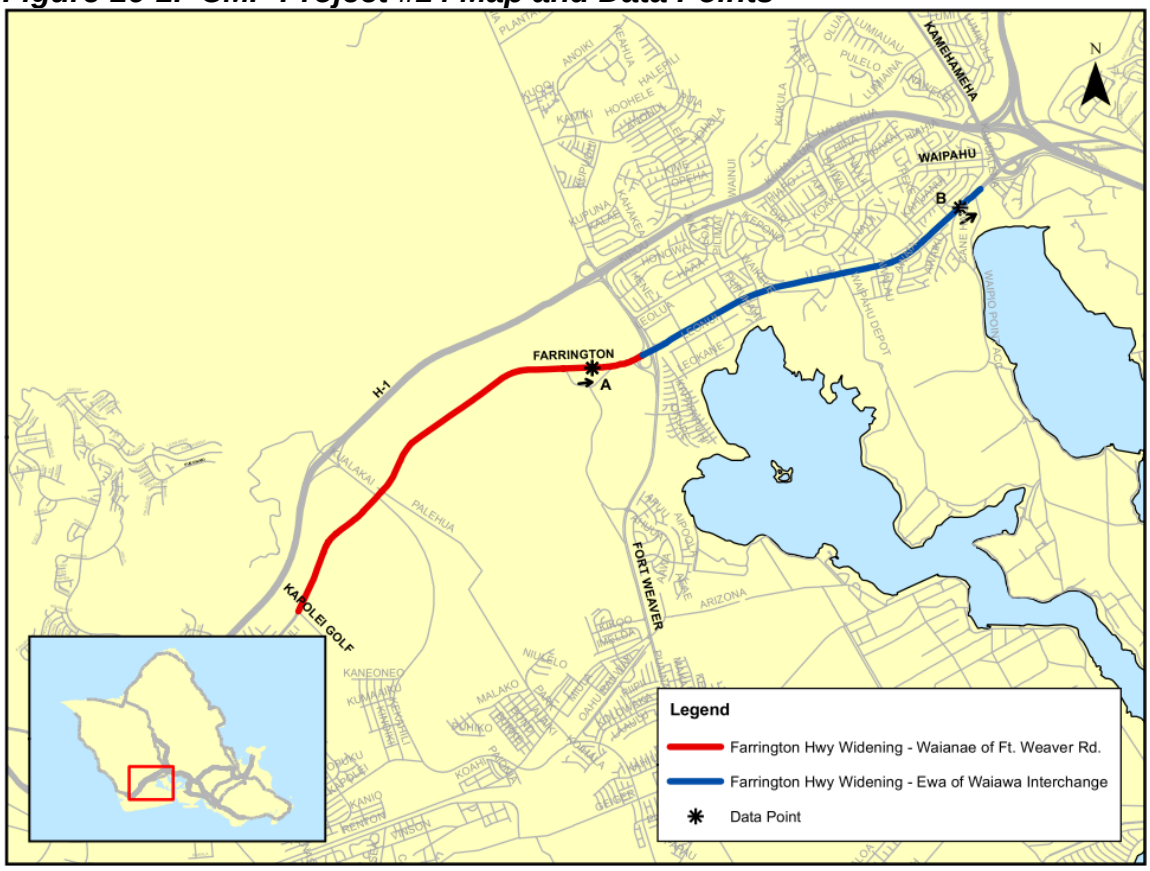
16.3 CMP Project #14 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #14 Package. These include the AM two-hour V/C (Level of Service [LOS[30]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

16.3.1 CMP Project #14 Highway Assignment

Figure 16-1 shows the map of the approximate location of the projects included in the CMP Project #14 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 16-1. CMP Project #14 Map and Data Points



[30] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 16-2 shows that the Farrington Highway widening between Golf Course Road and just west of Fort Weaver Road improved LOS slightly from F to E at Fort Weaver Road while still accommodating over 1,000 more vehicles in the AM two-hour peak period. The LOS also improved slightly for Farrington Highway near the Waiawa Interchange but still remained at LOS F in the AM two-hour peak period.

Figure 16-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #14

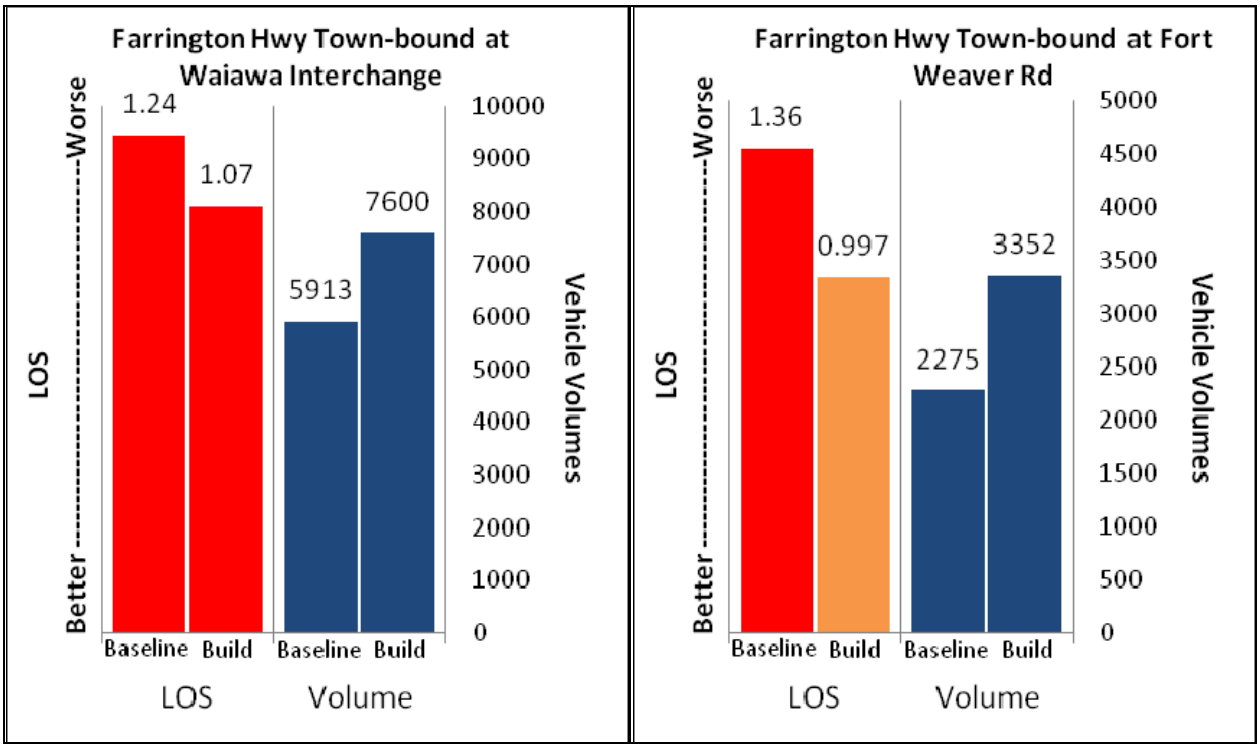


Table 16-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[31] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 16-5.

Table 16-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #14 Package. The model forecasts 88,889 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 16-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #14 Package. The overall AM two-hour peak period VHT remains similar to the Baseline with slight decreases on freeways for Area Types 4, 5, and 7. This is the result of the widening of Farrington Highway, providing another parallel route to the H-1 Freeway in the Ewa and Kapolei areas.

[31] See Appendix A for Area Type definitions.

Table 16-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #14 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (34 percent), freeways (29 percent), and expressways (15 percent). Table 16-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #14 Package. Overall AM two-hour VHD is projected to decrease two percent from the Baseline with slight decreases on freeways in Area Types 4, 5, and 7.

Table 16-4. 2035 CMP Project #14 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,034	507,704	1,176,837	2,706,614	368,745	812,368	233,904	5,958,206
Expressways	0	0	37,464	169,745	448,630	372,363	515,001	159,832	1,703,035
Ramps	0	17,173	35,697	166,881	366,328	28,471	162,960	17,558	795,068
Arterials	127,277	253,038	619,706	723,974	1,540,773	261,459	1,047,839	398,882	4,972,948
Collectors	14,570	33,141	139,938	388,619	770,295	19,157	390,400	39,402	1,795,522
Total	141,847	455,386	1,340,509	2,626,056	5,832,640	1,050,195	2,928,568	849,578	15,224,779

Table 16-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #14 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	1%	-3%	0%
Arterials	0%	0%	0%	0%	1%	0%	-1%	0%	0%
Collectors	0%	-1%	0%	4%	0%	0%	0%	0%	1%
Total	0%	0%	0%	1%	0%	0%	0%	0%	0%

Table 16-6. 2035 CMP Project #14 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	478	2,588	5,990	10,469	910	3,159	557	24,151
Expressways	0	0	171	1,553	2,469	2,607	1,980	644	9,424
Ramps	0	231	449	1,522	3,027	130	1,086	72	6,517
Arterials	968	2,034	4,223	5,627	12,561	1,003	6,384	1,558	34,358
Collectors	102	332	1,001	3,277	6,607	169	2,783	168	14,439
Total	1,070	3,075	8,432	17,969	35,133	4,819	15,392	2,999	88,889

Table 16-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #14 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-1%	-2%	0%	-2%	0%	-2%
Expressways	0%	0%	1%	-1%	-1%	1%	0%	1%	0%
Ramps	0%	3%	-1%	2%	-3%	0%	-3%	-6%	-1%
Arterials	0%	0%	0%	1%	1%	-1%	-1%	0%	0%
Collectors	0%	-2%	-1%	0%	0%	0%	1%	-1%	0%
Total	0%	0%	0%	0%	-1%	0%	-1%	0%	0%

Table 16-8. 2035 CMP Project #14 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,502	3,044	4,294	37	973	28	10,001
Expressways	0	0	76	1,058	1,323	1,611	754	221	5,043
Ramps	0	161	305	878	1,770	32	583	12	3,741
Arterials	177	642	652	2,409	4,979	147	2,472	222	11,700
Collectors	18	154	219	1,101	1,824	47	870	25	4,258
Total	195	1,080	2,754	8,490	14,190	1,874	5,652	508	34,743

Table 16-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #14 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	-2%	-5%	0%	-4%	-3%	-3%
Expressways	0%	0%	1%	-1%	-1%	1%	0%	2%	0%
Ramps	0%	4%	-2%	2%	-4%	3%	-8%	-14%	-3%
Arterials	-1%	0%	0%	2%	-1%	-3%	0%	1%	0%
Collectors	0%	-3%	-1%	-10%	-1%	0%	2%	-4%	-3%
Total	-1%	0%	-1%	-1%	-2%	1%	-1%	1%	-2%

16.3.2 CMP Project #14 Transit Assignment

Table 16-10 shows the 2035 CMP Project #14 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 16-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #14 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 16-10. 2035 CMP Project #14 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,276	7,512	6,862	72,917	0	261,566
Off-Peak	93,690	0	5,000	27,527	0	126,218
Total	267,966	7,512	11,862	100,444	0	387,784

Table 16-11. Percent Change in Transit Boardings, Baseline to CMP Project #14

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	-2%	0%	0%	0%
Total	0%	0%	-1%	0%	0%	0%

16.4 Summary of CMP Project #14 Findings

These are the key findings related to the CMP Project #14 Package:

- The LOS on Farrington Highway improved slightly but still remained at LOS E and F in the AM two-hour peak period.
- The H-1 Freeway's VHT and VHD improved as a result of the Farrington Highway widening.
- The Farrington Highway widening project provided another route to the already congested H-1 Freeway.

17 CMP Project # 15 Package – Farrington Highway Waianae Area Project

This chapter provides the analysis results of the CMP Project #15 Package.

17.1 CMP Project #15 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Widen Farrington Highway from four to six lanes, from Hakimo Road to Kalaeloa Boulevard, including intersection of Lualualei Naval Road.

The Farrington Highway widening projects is located on the congested roadway as seen in the Baseline scenario. See Table 2-6 number 2.

17.2 CMP Project #15 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #15 Package.

Table 17-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #15 Package mode share remains similar to the 2035 Baseline scenario.

Table 17-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #15 Package

Mode	2035 Baseline		2035 CMP Project #15		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,918	83%	0%
Transit	245,640	6%	246,044	6%	0%
Bike/walk	461,594	11%	460,431	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,393	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,103	32%	0%
Transit	30,225	8%	30,251	8%	0%
Taxi	9,531	3%	9,555	3%	0%
Tour Bus	57,915	15%	57,964	16%	0%
Bike/Walk	155,150	42%	154,268	41%	-1%
Total Trips by Visitors	373,680	100%	373,141	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,788	26%	0%
Transit	4,471	4%	4,470	4%	0%
Taxi	17,218	15%	17,210	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,745	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,540*	*100%*	*0%*

Table 17-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #15 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 17-3 shows the comparison of the 2035 CMP Project #15 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #15 Package. This table shows that the CMP Project #15 Package has nearly 1,900 more single and two-occupant auto person trips, and over 900 less three-plus occupant auto person trips compared to the Baseline.

Table 17-2. 2035 CMP Project #15 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	539,096	81,501	162,412	29,259	115,884	2,958	8,252	35,864	112,480	264,241	142,247	1,494,194
	60%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,147	73,840	42,194	33,768	29,918	1,709	65,352	8,507	131,879	300,715	221,543	1,060,572
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,212	46,360	12,459	15,965	11,648	427	104,845	2,872	95,423	247,315	204,626	782,152
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,497	223	2	526	0	0	237	205	0	0	0	4,690
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,602	4,279	7,134	5,151	4,464	4,542	16,056	9,477	9,889	26,036	3,665	146,295
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,627	1,857	5,064	1,849	1,676	1,114	3,199	5,800	1,317	10,565	1,855	61,923
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,104	47	0	7	0	0	259	95	138	215	0	1,865
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,976	0	0	0	0	0	4	1,561	11	539	0	15,091
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,180	251	14	0	1	1	1,547	1,797	752	1,634	3	16,180
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,054	10,742	13,635	3,091	52,753	1,240	74,318	4,125	30,063	122,517	51,098	414,636
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,459	1,855	942	32	2,106	12	8,458	3,422	2,566	11,403	2,540	45,795
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,955*	*243,856*	*89,648*	*218,450*	*12,003*	*282,527*	*73,725*	*384,518*	*985,180*	*627,577*	*4,043,393*

Table 17-3. Comparison of the 2035 CMP Project #15 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	843	88	180	8	34	1	1	12	24	75	16	1,282
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	346	80	94	28	9	1	-29	-1	-10	73	25	616
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-761	-79	-200	-7	4	0	43	1	-6	57	22	-926
	-2%	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	49	1	0	-1	0	0	0	0	0	0	0	49
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*
Walk to local bus transit	251	36	38	13	-1	1	-16	27	-14	-26	-2	307
	0%	*1%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	142	7	23	5	-3	-2	13	38	-5	-50	-4	164
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	-21	-1	0	0	0	0	0	-2	0	1	0	-23
	-2%	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-1%*
Formal Park-and-ride transit	428	0	0	0	0	0	0	-4	0	2	0	426
	3%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*3%*
Kiss-and-ride transit	-469	-1	0	0	0	0	-2	-45	0	-2	0	-519
	-4%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-3%*
Walk	-652	-63	-126	-18	6	0	-52	-1	-18	-52	-2	-978
	-1%	*-1%*	*-1%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-147	-3	-8	-1	0	0	-12	-10	-1	-3	0	-185
	-1%	*0%*	*-1%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	65	1	27	49	1	-54	15	-30	75	55	213
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

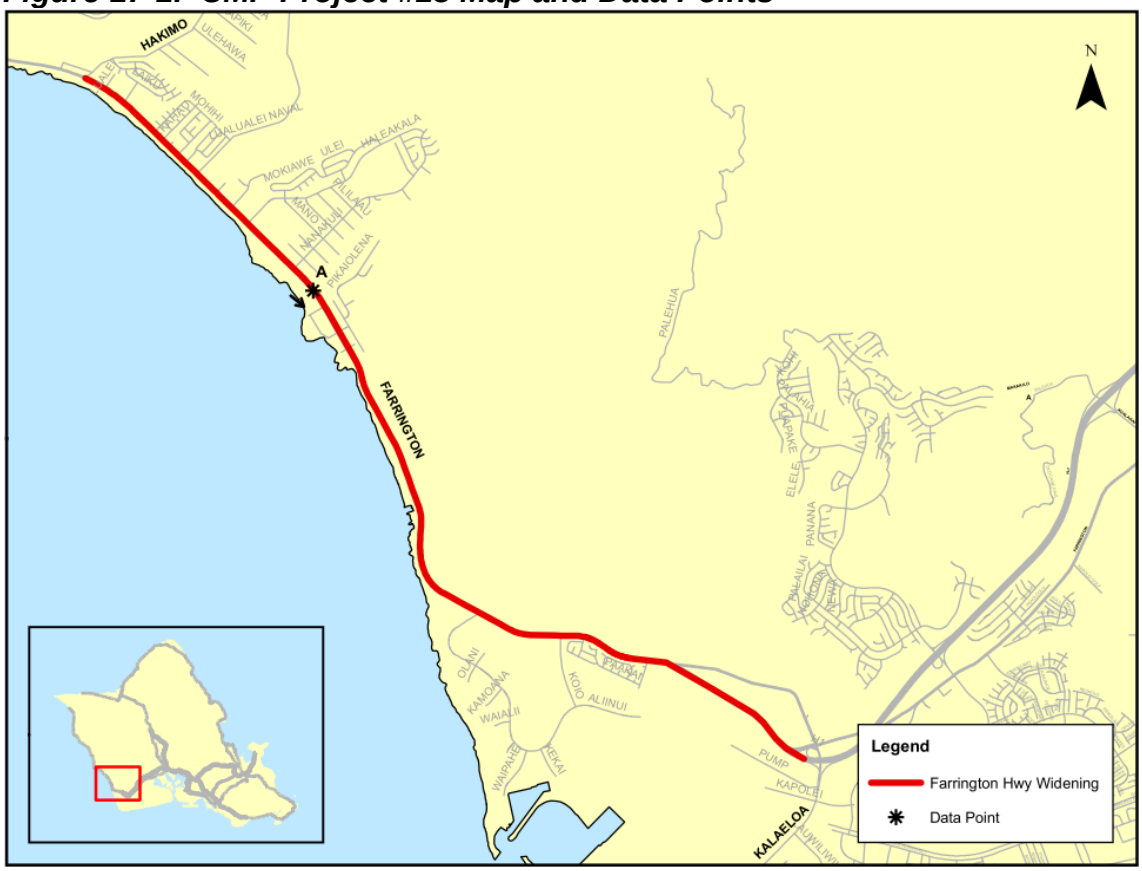
17.3 CMP Project #15 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #15 Package. These include the AM two-hour V/C (Level of Service [LOS[32]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

17.3.1 CMP Project #15 Highway Assignment

Figure 17-1 shows the map of the approximate location of the projects included in CMP Project #15 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 17-1. CMP Project #15 Map and Data Points



[32] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 17-2 shows that the Farrington Highway widening between Hakimo Road and Kalaeloa Boulevard improved LOS slightly but still remained at LOS F in the AM two-hour peak period.

Figure 17-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #15

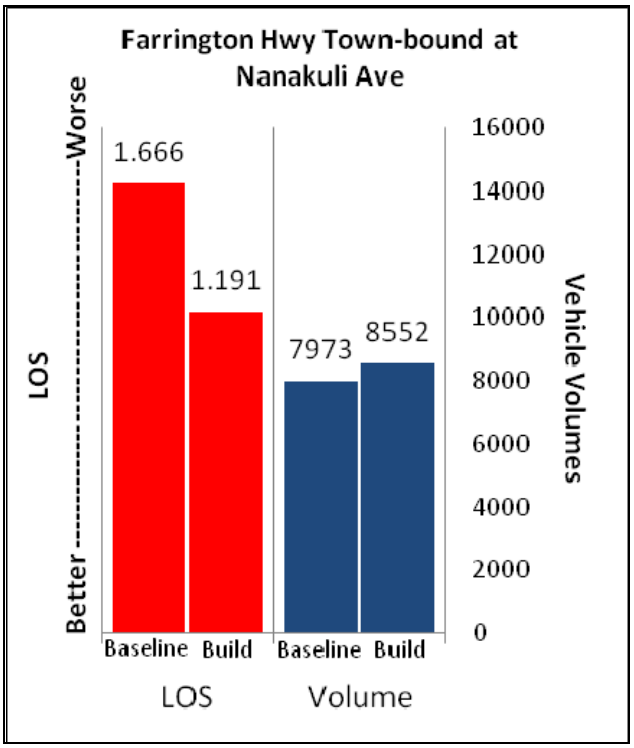


Table 17-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[33] There is negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 17-5.

Table 17-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #15 Package. The model forecasts 85,500 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (17 percent). Table 17-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #15 Package. The overall AM two-hour peak period VHT decreases four percent from the Baseline on roadways for Area Types 4, 5, 6, and 7.

Table 17-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #15 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (32 percent), freeways (31 percent), and collectors (14 percent). Table 17-9 shows the

[33] See Appendix A for Area Type definitions.

percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #15 Package. Overall AM two-hour VHD is projected to decrease by 10 percent from the Baseline with significant decreases on expressways and arterials in Area Types 4, 5, 6, and 7.

Table 17-4. 2035 CMP Project #15 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,822	507,457	1,172,088	2,705,150	366,036	808,284	232,090	5,942,927
Expressways	0	0	37,523	172,865	450,221	379,025	517,348	159,742	1,716,724
Ramps	0	17,369	35,691	166,715	366,896	28,336	162,474	18,192	795,673
Arterials	127,117	252,755	619,064	721,649	1,535,199	261,468	1,048,606	397,311	4,963,169
Collectors	14,591	33,459	139,972	372,156	772,356	18,953	390,370	39,675	1,781,532
Total	141,708	455,405	1,339,707	2,605,473	5,829,822	1,053,818	2,927,082	847,010	15,200,025

Table 17-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #15 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	-1%	-1%	-1%	0%
Expressways	0%	0%	0%	1%	0%	2%	0%	0%	1%
Ramps	0%	2%	1%	0%	0%	-1%	0%	1%	0%
Arterials	0%	0%	0%	0%	1%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	-1%	0%	1%	0%
Total	0%	0%	0%	0%	0%	0%	0%	-1%	0%

Table 17-6. 2035 CMP Project #15 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	472	2,545	5,880	10,403	897	3,153	540	23,890
Expressways	0	0	172	1,158	2,123	1,894	1,916	645	7,908
Ramps	0	302	456	1,614	3,101	129	1,129	74	6,805
Arterials	967	2,022	4,222	5,428	11,253	1,003	6,145	1,538	32,578
Collectors	101	349	1,005	3,229	6,595	169	2,704	167	14,319
Total	1,068	3,145	8,400	17,309	33,475	4,092	15,047	2,964	85,500

Table 17-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #15 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-1%	-2%	-3%	-3%	-2%	-2%	-3%	-3%
Expressways	0%	0%	1%	-26%	-15%	-27%	-3%	1%	-16%
Ramps	0%	35%	1%	8%	0%	-1%	1%	-4%	3%
Arterials	-1%	-1%	0%	-3%	-10%	-1%	-4%	-1%	-5%
Collectors	-1%	3%	0%	-2%	0%	0%	-2%	-1%	-1%
Total	-1%	2%	-1%	-4%	-5%	-15%	-3%	-1%	-4%

Table 17-8. 2035 CMP Project #15 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	119	1,464	2,940	4,229	35	984	26	9,797
Expressways	0	0	77	645	963	874	683	222	3,464
Ramps	0	228	312	972	1,838	30	643	13	4,036
Arterials	177	636	653	2,247	3,740	147	2,232	213	10,045
Collectors	18	167	222	1,191	1,823	47	801	25	4,294
Total	195	1,150	2,728	7,995	12,593	1,133	5,343	499	31,636

Table 17-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #15 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	-1%	-3%	-5%	-6%	-5%	-3%	-10%	-5%
Expressways	0%	0%	3%	-40%	-28%	-45%	-9%	2%	-31%
Ramps	0%	47%	1%	13%	0%	-3%	1%	-7%	5%
Arterials	-1%	-1%	0%	-5%	-25%	-3%	-9%	-3%	-14%
Collectors	0%	5%	0%	-3%	-1%	0%	-6%	-4%	-2%
Total	-1%	7%	-2%	-7%	-13%	-39%	-7%	-1%	-10%

17.3.2 CMP Project #15 Transit Assignment

Table 17-10 shows the 2035 CMP Project #15 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 17-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #15 Package. Total boardings remain nearly identical with a slight increase in limited stop boardings as Express Route C in Waianae, along Farrington Highway, showed improved service with the widening.

Table 17-10. 2035 CMP Project #15 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	173,682	7,561	7,125	73,241	0	261,608
Off-Peak	93,374	0	5,047	27,501	0	125,922
Total	267,057	7,561	12,171	100,741	0	387,530

Table 17-11. Percent Change in Transit Boardings, Baseline to CMP Project #15

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	1%	4%	0%	0%	0%
Off-Peak	0%	0%	-1%	0%	0%	0%
Total	0%	1%	2%	0%	0%	0%

17.4 Summary of CMP Project #15 Findings

These are the key findings related to the CMP Project #15 Package:

- The LOS on Farrington Highway improved but still remained at LOS F in the AM two-hour peak period.
- The VHT and VHD for expressways and arterials in the Waianae area improved significantly as a result of the Farrington Highway widening.

18 CMP Project # 16 Package – Kalaeloa Area Projects

This chapter provides the analysis results of the CMP Project #16 Package.

18.1 CMP Project #16 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Extend Hanua Street from Malakole Street to Farrington Highway.
- Construct new on- and off-ramps at Interstate Route H-1 Palailai Interchange to Hanua Street extension.

The new Hanua Street extension will provide direct access to Kalaeloa Harbor. And the new Palailai Interchange will provide direct access to the new Hanua Street extension into Kalaeloa Harbor.

18.2 CMP Project #16 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #16 Package.

Table 18-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of air passenger trips are made by shuttle bus. The CMP Project #16 Package mode share remains similar to the 2035 Baseline scenario.

Table 18-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #16 Package

Mode	2035 Baseline		2035 CMP Project #16		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,351	83%	0%
Transit	245,640	6%	245,634	6%	0%
Bike/walk	461,594	11%	461,287	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,272	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,858	32%	0%
Transit	30,225	8%	30,176	8%	0%
Taxi	9,531	3%	9,543	3%	0%
Tour Bus	57,915	15%	57,931	16%	0%
Bike/Walk	155,150	42%	155,152	42%	0%
Total Trips by Visitors	373,680	100%	373,660	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,812	26%	0%
Transit	4,471	4%	4,457	4%	0%
Taxi	17,218	15%	17,229	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,716	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,938*	*100%*	*0%*

Table 18-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #16 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 18-3 shows the comparison of the 2035 CMP Project #16 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #16 Package. This table shows that the CMP Project #16 Package's mode choice by purpose is similar compared to the Baseline.

Table 18-2. 2035 CMP Project #16 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,303	81,431	162,252	29,255	115,862	2,958	8,253	35,874	112,465	264,194	142,237	1,493,084
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,867	73,776	42,116	33,750	29,910	1,709	65,368	8,505	131,886	300,663	221,519	1,060,069
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,012	46,443	12,680	15,971	11,645	427	104,838	2,869	95,428	247,278	204,607	783,198
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,453	222	2	532	0	0	236	205	0	0	0	4,650
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,379	4,250	7,112	5,148	4,462	4,542	16,085	9,463	9,897	26,041	3,664	146,043
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,458	1,845	5,037	1,842	1,676	1,113	3,175	5,734	1,322	10,637	1,855	61,694
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,128	48	0	7	0	0	259	96	138	214	0	1,890
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,551	0	0	0	0	0	4	1,562	10	537	0	14,664
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,648	252	15	0	1	1	1,550	1,839	749	1,635	3	16,693
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,574	10,788	13,698	3,094	52,760	1,240	74,323	4,133	30,072	122,534	51,117	415,333
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,584	1,857	948	33	2,105	12	8,473	3,434	2,566	11,402	2,540	45,954
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,957*	*220,912*	*243,860*	*89,632*	*218,421*	*12,002*	*282,564*	*73,714*	*384,533*	*985,135*	*627,542*	*4,043,272*

Table 18-3. Comparison of the 2035 CMP Project #16 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	50	18	20	4	12	1	2	22	9	28	6	172
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	66	16	16	10	1	1	-13	-3	-3	21	1	113
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	39	4	21	-1	1	0	36	-2	-1	20	3	120
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	5	0	0	5	0	0	-1	0	0	0	0	9
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	28	7	16	10	-3	1	13	13	-6	-21	-3	55
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-27	-5	-4	-2	-3	-3	-11	-28	0	22	-4	-65
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	3	0	0	0	0	0	0	-1	0	0	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	3	0	0	0	0	0	0	-3	-1	0	0	-1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-9%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-1	0	1	0	0	0	1	-3	-3	-1	0	-6
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-132	-17	-63	-15	13	0	-47	7	-9	-35	17	-281
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-22	-1	-2	0	-1	0	3	2	-1	-4	0	-26
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	12	22	5	11	20	0	-17	4	-15	30	20	92
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

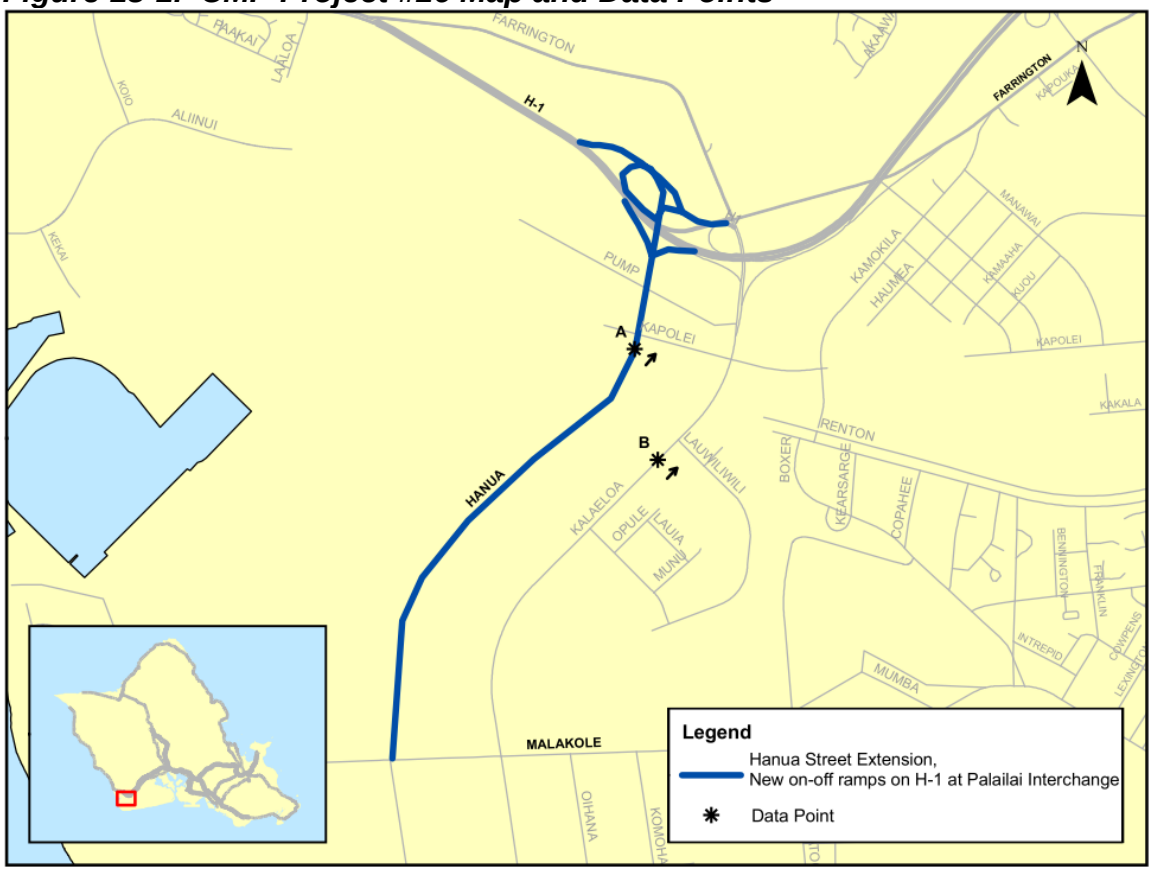
18.3 CMP Project #16 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #16 Package. These include the AM two-hour V/C (Level of Service [LOS[34]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

18.3.1 CMP Project #16 Highway Assignment

Figure 18-1 shows the map of the approximate location of the projects included in the CMP Project #16 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 18-1. CMP Project #16 Map and Data Points



[34] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 18-2 shows that the Hanua Street extension provided some relief to the congested Kalaeloa Boulevard. LOS on Kalaeloa Boulevard improved slightly but still remained at LOS F (almost at LOS E) and had over 700 less vehicles in the AM two-hour peak period.

Figure 18-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #16

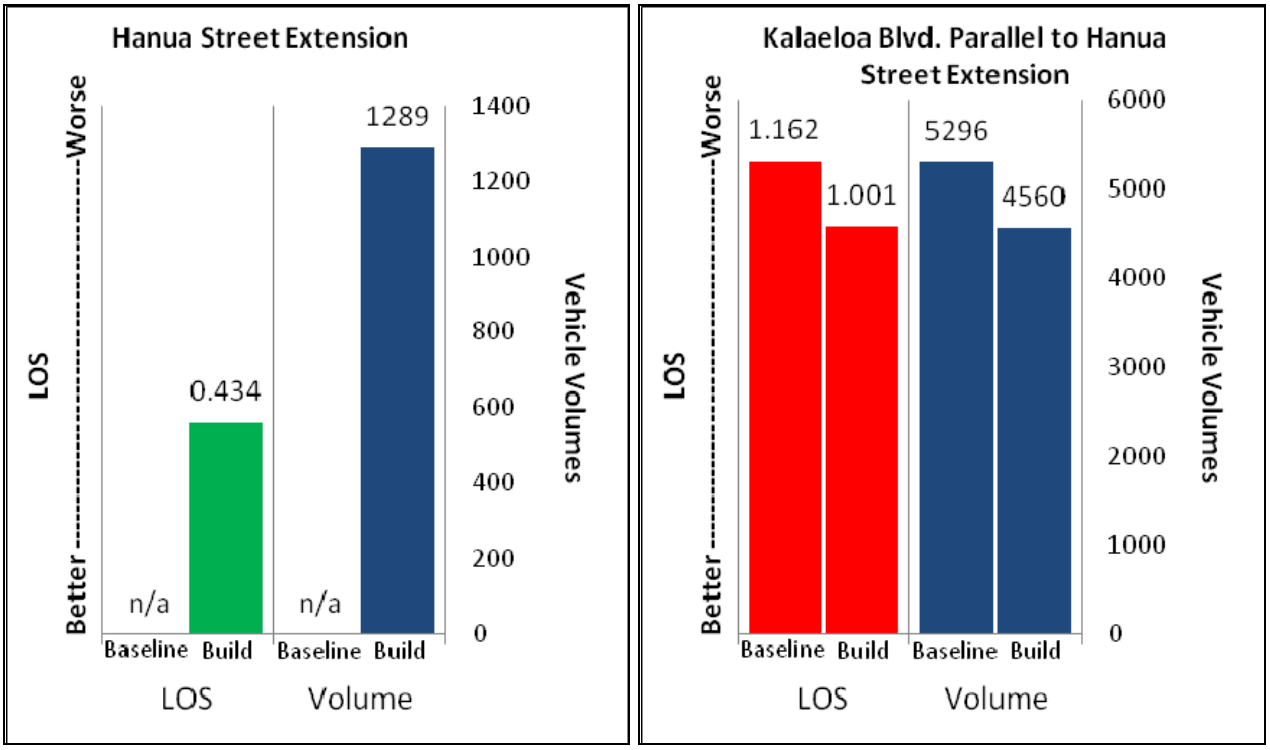


Table 18-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[35] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 18-5.

Table 18-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #16 Package. The model forecasts 88,697 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 18-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #16 Package. The overall AM two-hour peak period VHT decreases one percent from the Baseline with decreases on roadways for Area Type 4 (Hanua Street extension, Kalaeloa Boulevard and the new Palailai Interchange).

Table 18-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #16 Package. Similar to the

[35] See Appendix A for Area Type definitions.

2035 Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (30 percent), and expressways (15 percent). Table 18-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #16 Package. Overall AM two-hour VHD is projected to decrease by one percent from the Baseline with significant decreases on arterials in Area Types 2 and 4 (Hanua Street and Kalaeloa Boulevard).

Table 18-4. 2035 CMP Project #16 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,723	507,969	1,176,569	2,715,318	368,633	818,023	235,352	5,974,587
Expressways	0	0	37,503	170,381	448,360	372,325	514,460	159,766	1,702,795
Ramps	0	16,900	35,639	166,695	367,576	28,442	161,662	18,149	795,063
Arterials	127,520	253,600	619,403	722,990	1,522,905	261,455	1,045,647	399,144	4,952,664
Collectors	14,588	33,214	139,954	372,502	771,971	19,106	388,480	39,492	1,779,307
Total	142,108	456,437	1,340,468	2,609,137	5,826,130	1,049,961	2,928,272	851,903	15,204,416

Table 18-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #16 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	-1%	1%	0%	0%	0%	0%	1%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 18-6. 2035 CMP Project #16 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,571	6,014	10,722	911	3,240	561	24,498
Expressways	0	0	172	1,548	2,496	2,593	1,980	643	9,432
Ramps	0	227	455	1,472	3,079	130	1,126	78	6,567
Arterials	972	1,956	4,227	5,247	12,542	1,004	6,335	1,554	33,837
Collectors	101	324	1,004	3,225	6,623	169	2,749	168	14,363
Total	1,073	2,986	8,429	17,506	35,462	4,807	15,430	3,004	88,697

Table 18-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #16 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	-1%	0%	0%	1%	1%	0%
Expressways	0%	0%	1%	-1%	0%	0%	0%	0%	0%
Ramps	0%	1%	0%	-2%	-1%	0%	0%	1%	-1%
Arterials	0%	-4%	0%	-6%	1%	-1%	-1%	0%	-1%
Collectors	-1%	-4%	0%	-2%	0%	0%	0%	-1%	-1%
Total	0%	-3%	0%	-3%	0%	0%	0%	0%	-1%

Table 18-8. 2035 CMP Project #16 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,486	3,060	4,497	37	1,025	30	10,258
Expressways	0	0	77	1,051	1,348	1,598	755	220	5,049
Ramps	0	157	311	830	1,810	30	640	15	3,793
Arterials	179	564	653	2,059	5,099	147	2,436	219	11,356
Collectors	18	146	221	1,173	1,837	47	849	25	4,316
Total	197	990	2,748	8,173	14,591	1,859	5,705	509	34,772

Table 18-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #16 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-2%	-1%	0%	0%	1%	3%	-1%
Expressways	0%	0%	3%	-2%	1%	0%	0%	1%	0%
Ramps	0%	1%	0%	-4%	-2%	-3%	1%	7%	-1%
Arterials	0%	-12%	0%	-13%	2%	-3%	-1%	0%	-3%
Collectors	0%	-8%	0%	-4%	0%	0%	-1%	-4%	-2%
Total	0%	-8%	-1%	-5%	0%	0%	0%	1%	-1%

18.3.2 CMP Project #16 Transit Assignment

Table 18-10 shows the 2035 CMP Project #16 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 18-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #16 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 18-10. 2035 CMP Project #16 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,162	7,541	6,844	73,041	0	261,587
Off-Peak	93,427	0	5,096	27,567	0	126,090
Total	267,589	7,541	11,940	100,608	0	387,677

Table 18-11. Percent Change in Transit Boardings, Baseline to CMP Project #16

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

18.4 Summary of CMP Project #16 Findings

These are the key findings related to the CMP Project #16 Package:

- The LOS on Kalaeloa Boulevard improved slightly as a result of the Hanua Street extension but still remained at LOS F in the AM two-hour peak period.
- The VHT and VHD for arterials in the Kapolei and Kalaeloa area improved as the Hanua Street extension and new Palailai Interchange provided another route out of the Kalaeloa Barbers Point Harbor and Campbell Industrial Park areas.

19 CMP Project # 17 Package – Kapolei/Kalaeloa Area Projects

This chapter provides the analysis results of the CMP Project #17 Package.

19.1 CMP Project #17 Package Definition

This CMP Package includes all the projects in the Baseline plus the following four projects:

- Widen and extend Kualakai Parkway as follows:
  - From three-to-six lanes from Kapolei Parkway to Interstate Route H-1
  - Extend from Kapolei Parkway to Franklin D Roosevelt Avenue (six lanes).
- Construct a new four-lane east-west spine road within Kalaeloa by realigning and connecting portions of the existing Saratoga Avenue from Kalaeloa Boulevard in the west and to Geiger Road in the east.
- Extend Kamokila Boulevard as a four-lane roadway between Roosevelt and Saratoga.
- Extend Fort Barrette Road as a four-lane roadway between Roosevelt and Saratoga.

These Kapolei area widenings and extensions will provide better connectivity between the Kapolei and Kalaeloa areas.

19.2 CMP Project #17 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #17 Package.

Table 19-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #17 Package mode share remains similar to the 2035 Baseline scenario.

Table 19-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #17 Package

Mode	2035 Baseline		2035 CMP Project #17		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,891	83%	0%
Transit	245,640	6%	245,755	6%	0%
Bike/walk	461,594	11%	460,647	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,293	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,105	32%	0%
Transit	30,225	8%	30,251	8%	0%
Taxi	9,531	3%	9,550	3%	0%
Tour Bus	57,915	15%	57,947	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,118	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,797	26%	0%
Transit	4,471	4%	4,457	4%	0%
Taxi	17,218	15%	17,220	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,739	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,417*	*100%*	*0%*

Table 19-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #17 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 19-3 shows the comparison of the 2035 CMP Project #17 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #17 Package. This table shows that the CMP Project #17 has nearly 1,000 more automobile person trips compared to the Baseline.

Table 19-2. 2035 CMP Project #17 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,313	81,486	162,276	29,265	115,908	2,954	8,257	35,889	112,498	264,266	142,244	1,493,356
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,806	73,775	42,107	33,753	29,930	1,710	65,417	8,507	131,899	300,732	221,578	1,060,214
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,048	46,414	12,686	15,961	11,652	428	104,867	2,869	95,442	247,306	204,648	783,321
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,441	222	2	534	0	0	236	205	0	0	0	4,640
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,441	4,257	7,116	5,156	4,465	4,543	16,090	9,490	9,909	26,067	3,665	146,199
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,504	1,850	5,047	1,849	1,681	1,117	3,201	5,715	1,316	10,567	1,853	61,700
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,126	48	0	7	0	0	261	98	138	214	0	1,892
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,506	0	0	0	0	0	3	1,557	11	538	0	14,615
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,662	252	14	0	1	1	1,551	1,838	752	1,635	3	16,709
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,542	10,771	13,664	3,081	52,692	1,238	74,186	4,120	30,003	122,420	51,021	414,738
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,568	1,853	946	33	2,107	12	8,473	3,428	2,552	11,399	2,538	45,909
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,957*	*220,928*	*243,858*	*89,639*	*218,436*	*12,003*	*282,542*	*73,716*	*384,520*	*985,144*	*627,550*	*4,043,293*

Table 19-3. Comparison of the 2035 CMP Project #17 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	60	73	44	14	58	-3	6	37	42	100	13	444
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	5	15	7	13	21	2	36	-1	10	90	60	258
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	75	-25	27	-11	8	1	65	-2	13	48	44	243
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-7	0	0	7	0	0	-1	0	0	0	0	-1
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	90	14	20	18	0	2	18	40	6	5	-2	211
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	19	0	6	5	2	1	15	-47	-6	-48	-6	-59
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	1	0	0	0	0	0	2	1	0	0	0	4
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-42	0	0	0	0	0	-1	-8	0	1	0	-50
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*-25%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	13	0	0	0	0	0	2	-4	0	-1	0	10
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-164	-34	-97	-28	-55	-2	-184	-6	-78	-149	-79	-876
	0%	*0%*	*-1%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-38	-5	-4	0	1	0	3	-4	-15	-7	-2	-71
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*
Total	12	38	3	18	35	1	-39	6	-28	39	28	113
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

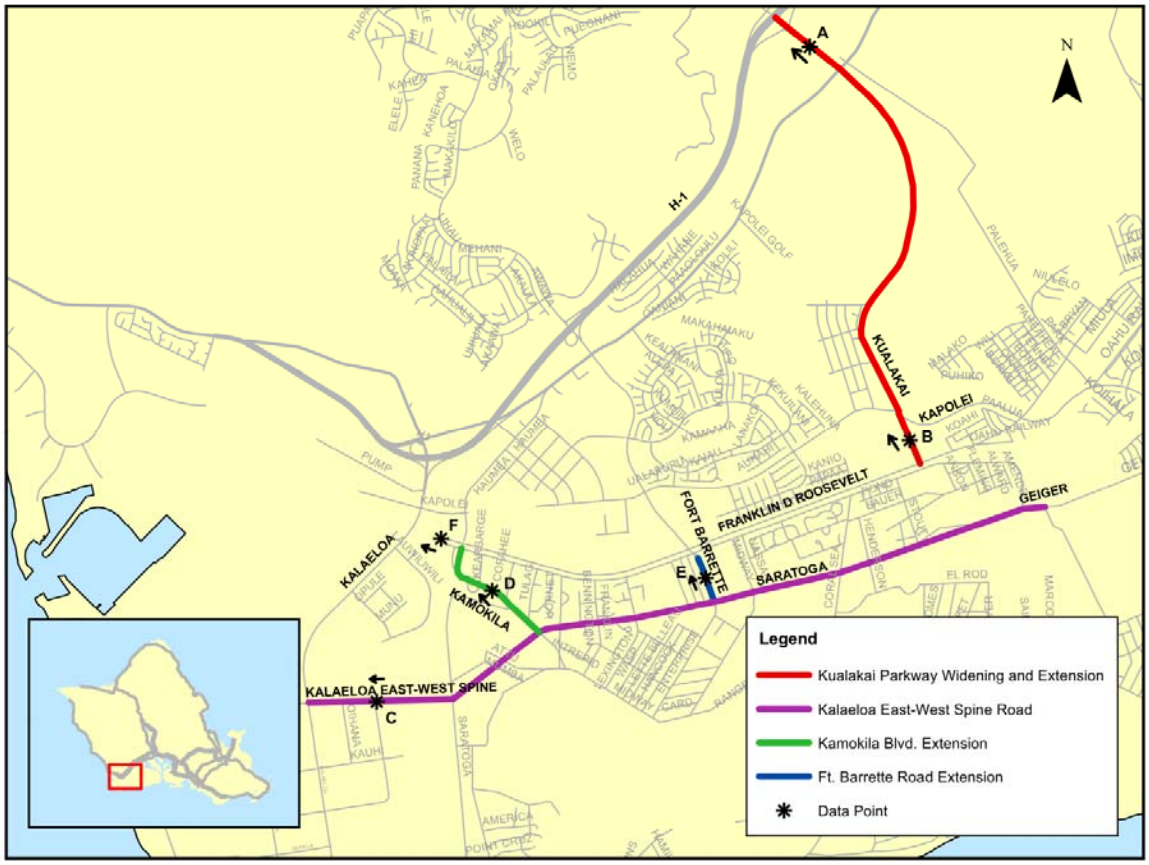
19.3 CMP Project #17 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #17 Package. These include the AM two-hour V/C (Level of Service [LOS[36]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

19.3.1 CMP Project #17 Highway Assignment

Figure 19-1 shows the map of the approximate location of the projects included in the CMP Project #17 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 19-1. CMP Project #17 Map and Data Points



[36] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 19-2 shows that the widening of Kualakai Parkway provided some additional improvement at the Kualakai Parkway Interchange although it was already operating at LOS A. Figure 19-3 shows that the Franklin D. Roosevelt Avenue Waianae-bound was relieved as a result of the new East-West Spine Road, Kamokila Boulevard extension, Fort Barrette Road extension, and the Kualakai Parkway extension. LOS on Franklin D. Roosevelt Avenue Waianae-bound improved from LOS E to LOS C in the AM two-hour peak period.

Figure 19-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #17

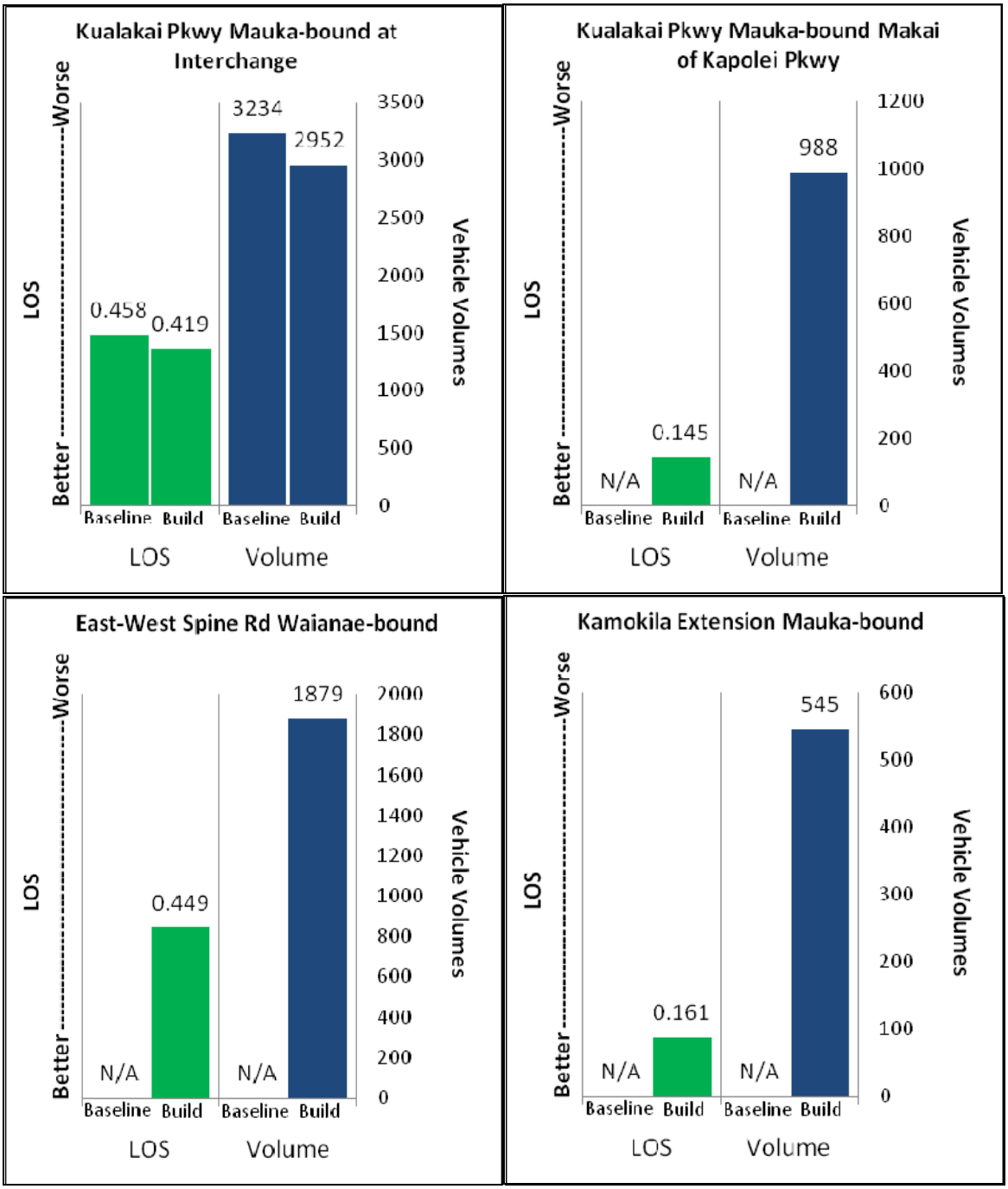


Figure 19-3. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #17 (continued)

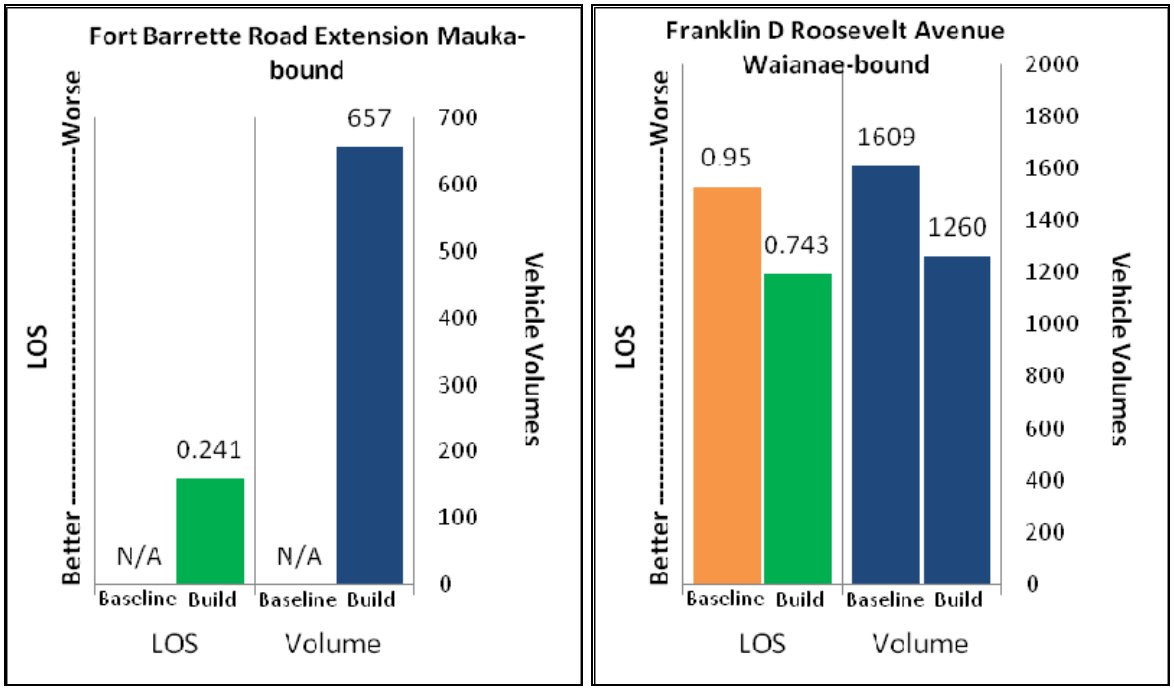


Table 19-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[37] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 19-5.

Table 19-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #17 Package. The model forecasts 88,187 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 19-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #17 Package. The overall AM two-hour peak period VHT decreases one percent from the Baseline with decreases on roadways for Area Type 2, 4, and 7 (Kualakai Parkway widening and extension, Fort Barrette Road extension, Kamokila extension and East West Spine Road).

Table 19-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #17 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (30 percent), and expressways (15 percent). Table 19-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #17 Package. Overall AM two-hour VHD is projected to

[37] See Appendix A for area type definitions.

decrease by three percent from the Baseline with significant decreases on roadways in Area Types 2 (roadways in the City of Kapolei), and 4 (arterials and collectors in the Kapolei area).

Table 19-4. 2035 CMP Project #17 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,669	507,507	1,175,548	2,709,817	368,162	813,440	234,584	5,960,727
Expressways	0	0	37,447	169,548	447,736	372,228	514,836	159,716	1,701,511
Ramps	0	16,929	35,827	166,290	366,344	28,443	161,599	17,848	793,280
Arterials	127,561	252,099	620,356	735,686	1,524,757	261,512	1,041,451	398,354	4,961,776
Collectors	14,524	32,997	140,113	366,778	771,266	19,081	386,503	39,420	1,770,682
Total	142,085	453,694	1,341,250	2,613,850	5,819,920	1,049,426	2,917,829	849,922	15,187,976

Table 19-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #17 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	-1%	1%	0%	0%	0%	0%	-1%	0%
Arterials	0%	-1%	0%	2%	0%	0%	-1%	0%	0%
Collectors	0%	-1%	0%	-2%	0%	0%	-1%	0%	-1%
Total	0%	-1%	0%	0%	0%	0%	-1%	0%	0%

Table 19-6. 2035 CMP Project #17 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,572	6,031	10,623	909	3,196	553	24,363
Expressways	0	0	170	1,545	2,493	2,580	1,981	643	9,412
Ramps	0	227	452	1,440	3,062	130	1,122	72	6,505
Arterials	970	1,913	4,226	5,348	12,446	1,003	6,269	1,548	33,723
Collectors	102	272	1,002	3,106	6,639	169	2,728	166	14,184
Total	1,072	2,891	8,422	17,470	35,263	4,791	15,296	2,982	88,187

Table 19-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #17 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	0%	-1%	0%	-1%	-1%	-1%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	1%	0%	-4%	-1%	0%	0%	-6%	-2%
Arterials	0%	-6%	0%	-4%	0%	-1%	-2%	-1%	-2%
Collectors	0%	-20%	0%	-6%	0%	0%	-1%	-2%	-2%
Total	0%	-6%	0%	-3%	0%	0%	-1%	-1%	-1%

Table 19-8. 2035 CMP Project #17 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,487	3,076	4,442	37	1,009	28	10,201
Expressways	0	0	75	1,049	1,346	1,585	756	220	5,031
Ramps	0	158	308	808	1,799	32	637	12	3,754
Arterials	178	541	654	2,065	4,986	146	2,388	218	11,176
Collectors	18	99	220	1,086	1,848	47	837	25	4,180
Total	196	920	2,744	8,084	14,421	1,847	5,627	503	34,342

Table 19-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #17 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-2%	-1%	-1%	0%	-1%	-3%	-1%
Expressways	0%	0%	0%	-2%	0%	-1%	0%	1%	0%
Ramps	0%	2%	-1%	-6%	-2%	3%	0%	-14%	-2%
Arterials	-1%	-16%	0%	-13%	0%	-3%	-3%	0%	-4%
Collectors	0%	-38%	-1%	-11%	1%	0%	-2%	-4%	-5%
Total	-1%	-14%	-1%	-6%	-1%	-1%	-2%	0%	-3%

19.3.2 CMP Project #17 Transit Assignment

Table 19-10 shows the 2035 CMP Project #17 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 19-11 shows the percent change in transit boardings from 2035 Baseline to the 2035 CMP Project #17 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 19-10. 2035 CMP Project #17 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,561	7,588	6,857	73,125	0	262,131
Off-Peak	93,497	0	5,070	27,509	0	126,077
Total	268,059	7,588	11,928	100,634	0	388,208

Table 19-11. Percent Change in Transit Boardings, Baseline to CMP Project #17

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	1%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	1%	0%	0%	0%	0%

19.4 Summary of CMP Project #17 Findings

These are the key findings related to the CMP Project #17 Package:

- The widening of Kualakai Parkway provided some relief at the Kualakai Parkway Interchange although it was already operating at LOS A.
- Franklin D. Roosevelt Avenue Waianae-bound was relieved as a result of the new East-West Spine Road, Kamokila Boulevard extension, Fort Barrette Road extension, and the Kualakai Parkway extension. LOS on Franklin D. Roosevelt Avenue Waianae-bound improved from LOS E to LOS C in the AM two-hour peak period.
- The AM two-hour peak period VHT and VHD for roadways in the Kapolei and Kalaeloa area improved as the result of the better connectivity in these areas with the extensions and widening projects.

20 CMP Project # 18 Package – Kapolei Parkway Extension Project

This chapter provides the analysis results of the CMP Project #18 Package.

20.1 CMP Project #18 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend the existing six-lane Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road.[38]

This extension project provides the direct connection between the established Kapolei community and Kalaeloa Boulevard.

20.2 CMP Project #18 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #18 Package.

Table 20-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #18 Package mode share remains similar to the Baseline scenario.

[38] Only Kamokila Boulevard to Kamaaha Avenue would be federally funded.

Table 20-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #18 Package

Mode	2035 Baseline		2035 CMP Project #18		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,396	83%	0%
Transit	245,640	6%	245,697	6%	0%
Bike/walk	461,594	11%	461,194	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,287	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,767	32%	0%
Transit	30,225	8%	30,303	8%	0%
Taxi	9,531	3%	9,519	3%	0%
Tour Bus	57,915	15%	57,923	16%	0%
Bike/Walk	155,150	42%	155,152	42%	0%
Total Trips by Visitors	373,680	100%	373,664	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,810	26%	0%
Transit	4,471	4%	4,460	4%	0%
Taxi	17,218	15%	17,221	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,723	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,957*	*100%*	*0%*

Table 20-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #18 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 20-3 shows the comparison of the 2035 CMP Project #18 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #18 Package. This table shows that the CMP Project #18 Package's mode choice is similar to the Baseline.

Table 20-2. 2035 CMP Project #18 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,308	81,464	162,261	29,266	115,904	2,956	8,253	35,859	112,471	264,216	142,242	1,493,200
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,752	73,765	42,102	33,754	29,925	1,710	65,346	8,507	131,885	300,682	221,553	1,059,981
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,036	46,425	12,683	15,969	11,650	427	104,810	2,874	95,428	247,285	204,628	783,215
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,411	219	2	511	0	0	236	202	0	0	0	4,581
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,454	4,252	7,109	5,160	4,464	4,541	16,074	9,459	9,892	26,003	3,661	146,069
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,477	1,848	5,040	1,846	1,684	1,117	3,197	5,752	1,327	10,685	1,873	61,846
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,125	48	0	7	0	0	259	96	138	214	0	1,887
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,496	-1	0	0	0	0	4	1,562	11	538	0	14,610
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,656	252	14	0	1	1	1,550	1,839	750	1,638	3	16,704
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,657	10,798	13,699	3,091	52,695	1,239	74,362	4,132	30,059	122,481	51,049	415,262
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,579	1,853	948	33	2,106	12	8,460	3,434	2,565	11,403	2,539	45,932
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,951*	*220,923*	*243,858*	*89,637*	*218,429*	*12,003*	*282,551*	*73,716*	*384,526*	*985,145*	*627,548*	*4,043,287*

Table 20-3. Comparison of the 2035 CMP Project #18 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	55	51	29	15	54	-1	2	7	15	50	11	288
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-49	5	2	14	16	2	-35	-1	-4	40	35	25
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	63	-14	24	-3	6	0	8	3	-1	27	24	137
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-37	-3	0	-16	0	0	-1	-3	0	0	0	-60
	-1%	*-1%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	103	9	13	22	-1	0	2	9	-11	-59	-6	81
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-8	-2	-1	2	5	1	11	-10	5	70	14	87
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*1%*	*0%*
Informal Park-and-ride transit	0	0	0	0	0	0	0	-1	0	0	0	-1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-52	-1	0	0	0	0	0	-3	0	1	0	-55
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	7	0	0	0	0	0	1	-3	-2	2	0	5
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-49	-7	-62	-18	-52	-1	-8	6	-22	-88	-51	-352
	0%	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-27	-5	-2	0	0	0	-10	2	-2	-3	-1	-48
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	6	33	3	16	28	1	-30	6	-22	40	26	107
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

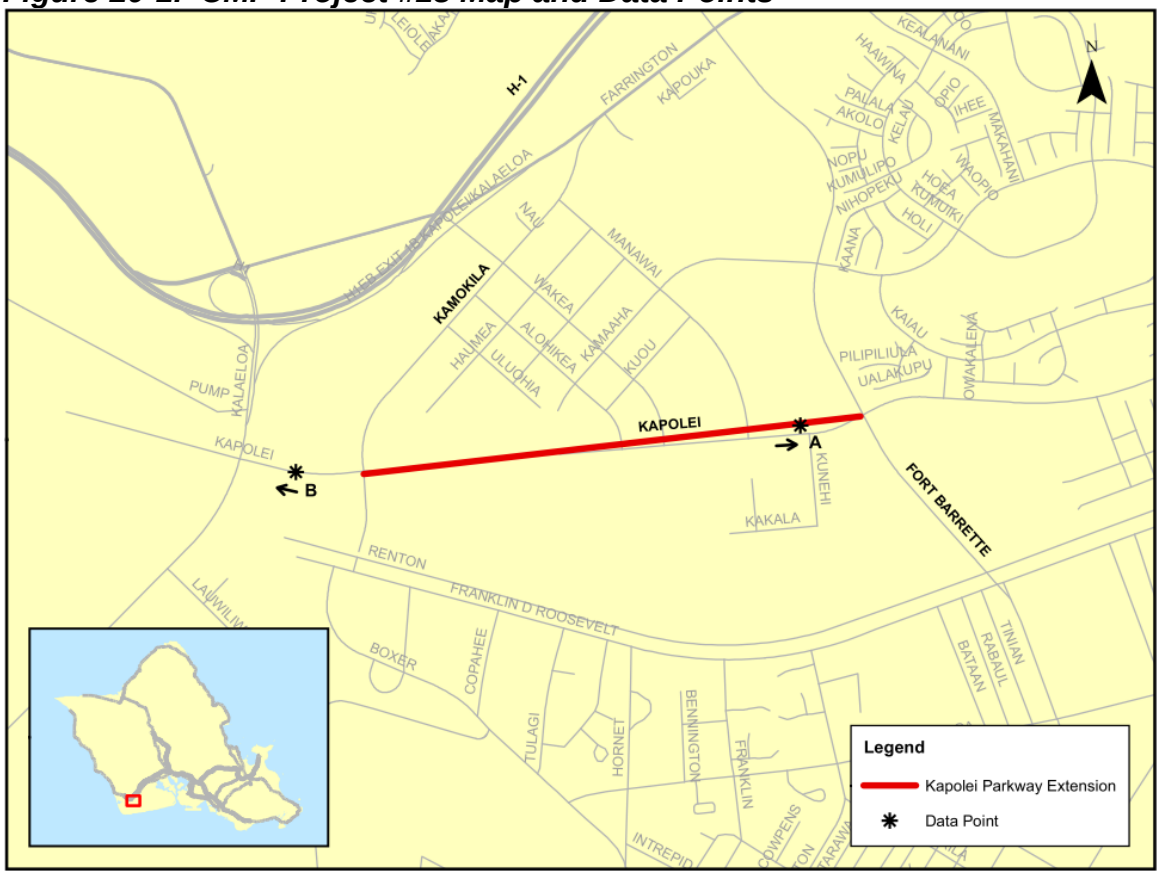
20.3 CMP Project #18 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #18 Package. These include the AM two-hour V/C (Level of Service [LOS[39]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

20.3.1 CMP Project #18 Highway Assignment

Figure 20-1 shows the map of the approximate location of the projects included in the CMP Project #18 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 20-1. CMP Project #18 Map and Data Points



[39] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 20-2 shows that the extension of Kapolei Parkway between Kamokila Boulevard and Fort Barrette Road provided an important connection for travelers in the City of Kapolei who want to use Kalaeloa Boulevard to get to the H-1 Freeway and those that want to use Fort Barrette Road to get to H-1. The new extension was operating at LOS D and accommodated nearly 3,600 vehicles in the AM two-hour peak period. Also, the LOS on the existing section of Kapolei Parkway went from LOS A to C and carried nearly 1,000 more vehicles in the AM two-hour peak period.

Figure 20-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #18

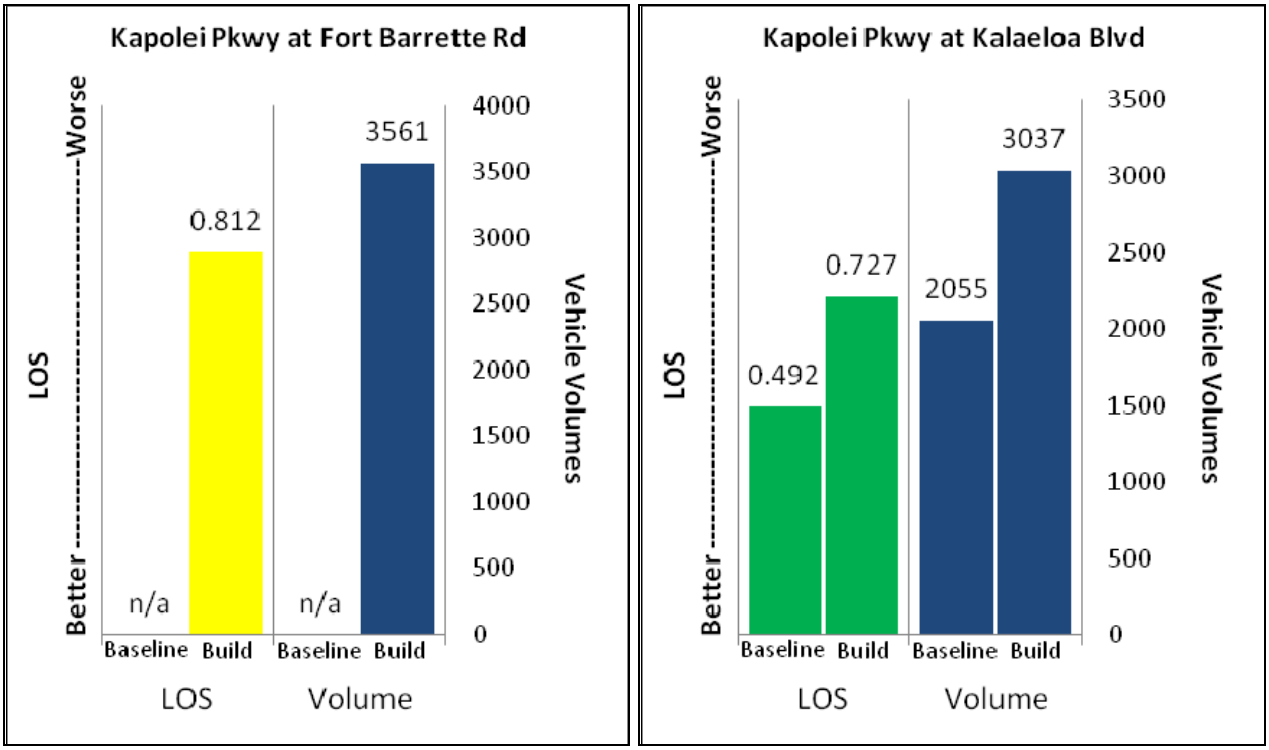


Table 20-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[40] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 20-5.

Table 20-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #18 Package. The model forecasts 88,555 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 20-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #18 Package. The overall AM two-hour peak period VHT decreases one percent from the Baseline with significant decreases on arterials for Area Type 2 (Kapolei Parkway) and collectors for Area Type 4 (Franklin D. Roosevelt Avenue [parallel connecting route between Kalaeloa Boulevard and Fort Barrette Road]).

[40] See Appendix A for Area Type definitions.

Table 20-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #18 Package. Similar to the 2035 Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (30 percent), and expressways (15 percent). Table 20-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #18 Package. Overall AM two-hour VHD is projected to decrease by two percent from the Baseline with significant decreases on arterials in Area Type 2 (Kapolei Parkway), and on collectors in Area Type 4 (Franklin D. Roosevelt Avenue).

Table 20-4. 2035 CMP Project #18 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,747	507,837	1,174,348	2,708,323	367,769	813,517	234,027	5,957,568
Expressways	0	0	37,490	170,388	447,875	372,277	514,895	159,741	1,702,666
Ramps	0	16,953	35,787	166,236	366,038	28,396	161,440	17,960	792,810
Arterials	127,375	259,041	619,092	724,324	1,539,497	261,377	1,047,353	398,501	4,976,560
Collectors	14,522	33,084	139,913	357,297	770,381	19,102	388,706	39,409	1,762,414
Total	141,897	460,825	1,340,119	2,592,593	5,832,114	1,048,921	2,925,911	849,638	15,192,018

Table 20-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #18 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	-1%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	2%	0%	0%	1%	0%	-1%	0%	0%
Collectors	0%	-1%	0%	-4%	0%	0%	0%	0%	-1%
Total	0%	1%	0%	-1%	0%	0%	0%	0%	0%

Table 20-6. 2035 CMP Project #18 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	481	2,590	6,036	10,640	909	3,199	552	24,407
Expressways	0	0	171	1,553	2,495	2,583	1,980	643	9,425
Ramps	0	231	458	1,429	3,059	130	1,116	76	6,499
Arterials	969	1,923	4,221	5,478	12,593	1,004	6,336	1,549	34,073
Collectors	102	257	1,005	3,101	6,609	167	2,741	169	14,151
Total	1,071	2,892	8,445	17,597	35,396	4,793	15,372	2,989	88,555

Table 20-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #18 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	0%	-1%	0%	-1%	-1%	0%
Expressways	0%	0%	1%	-1%	0%	0%	0%	0%	0%
Ramps	0%	3%	1%	-5%	-2%	0%	0%	-1%	-2%
Arterials	0%	-5%	0%	-2%	1%	-1%	-1%	-1%	-1%
Collectors	0%	-24%	0%	-6%	0%	-1%	0%	0%	-2%
Total	0%	-6%	0%	-2%	0%	0%	-1%	0%	-1%

Table 20-8. 2035 CMP Project #18 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	124	1,504	3,078	4,458	37	1,012	27	10,240
Expressways	0	0	76	1,055	1,347	1,588	756	220	5,042
Ramps	0	161	314	799	1,796	31	632	14	3,747
Arterials	178	493	652	2,273	5,081	146	2,434	217	11,474
Collectors	18	80	222	1,086	1,830	46	842	26	4,150
Total	196	858	2,768	8,291	14,512	1,848	5,676	504	34,653

Table 20-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #18 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	-1%	-1%	0%	0%	-7%	-1%
Expressways	0%	0%	1%	-1%	0%	-1%	0%	1%	0%
Ramps	0%	4%	1%	-8%	-2%	0%	-1%	0%	-3%
Arterials	-1%	-23%	0%	-4%	1%	-3%	-1%	-1%	-2%
Collectors	0%	-50%	0%	-11%	0%	-2%	-2%	0%	-6%
Total	-1%	-20%	0%	-4%	0%	-1%	-1%	0%	-2%

20.3.2 CMP Project #18 Transit Assignment

Table 20-10 shows the 2035 CMP Project #18 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 20-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #18 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 20-10. 2035 CMP Project #18 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,219	7,466	6,863	73,083	0	261,631
Off-Peak	93,461	0	5,205	27,702	0	126,368
Total	267,680	7,466	12,068	100,785	0	387,999

Table 20-11. Percent Change in Transit Boardings, Baseline to CMP Project #18

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	-1%	0%	0%	0%	0%
Off-Peak	0%	0%	2%	0%	0%	0%
Total	0%	-1%	1%	0%	0%	0%

20.4 Summary of CMP Project #18 Findings

These are the key findings related to the CMP Project #18 Package:

- The LOS on the Kapolei Parkway extension is operating at LOS D, but provides an important connection between Kalaeloa Boulevard and Fort Barrette Road, two significant roadways that lead up to the H-1 Freeway.
- The extension of Kapolei Parkway provided some relief to the parallel facilities, like Franklin D. Roosevelt Avenue.
- The AM two-hour peak period VHT and VHD for roadways in the Kapolei and Kalaeloa area improved as the result of the better connectivity in these areas with the Kapolei Parkway extension.

21 CMP Project # 19 Package – Keoneula Boulevard Extension Project

This chapter provides the analysis results of the CMP Project #19 Package.

21.1 CMP Project #19 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend Keoneula Boulevard from Kapolei Parkway to Franklin D. Roosevelt Avenue.

This extension is a new facility that will provide better connectivity between Kalaeloa and Ewa Beach.

21.2 CMP Project #19 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #19 Package.

Table 21-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #19 mode share remains similar to the Baseline scenario.

Table 21-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #19 Package

Mode	2035 Baseline		2035 CMP Project #19		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,108	83%	0%
Transit	245,640	6%	245,705	6%	0%
Bike/walk	461,594	11%	461,413	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,226	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,096	32%	0%
Transit	30,225	8%	30,254	8%	0%
Taxi	9,531	3%	9,555	3%	0%
Tour Bus	57,915	15%	57,948	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,120	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,815	26%	0%
Transit	4,471	4%	4,471	4%	0%
Taxi	17,218	15%	17,234	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,693	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,352*	*100%*	*0%*

Table 21-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #19 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 21-3 shows the comparison of the 2035 CMP Project #19 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #19 Package. This table shows that the CMP Project #19's mode choice results are similar to the Baseline.

Table 21-2. 2035 CMP Project #19 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,182	81,409	162,217	29,251	115,854	2,958	8,249	35,879	112,464	264,181	142,232	1,492,876
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,861	73,776	42,112	33,743	29,910	1,709	65,392	8,509	131,891	300,655	221,525	1,060,083
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,982	46,443	12,661	15,972	11,645	427	104,850	2,865	95,432	247,265	204,607	783,149
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,424	220	2	525	0	0	236	205	0	0	0	4,612
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,416	4,249	7,108	5,144	4,462	4,541	16,088	9,472	9,899	26,058	3,667	146,104
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,480	1,851	5,042	1,845	1,676	1,114	3,190	5,740	1,320	10,619	1,856	61,733
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,128	48	0	7	0	0	259	95	138	214	0	1,889
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,540	0	0	0	0	0	4	1,561	11	537	0	14,653
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,664	253	15	0	1	1	1,552	1,838	751	1,636	3	16,714
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,674	10,795	13,751	3,106	52,755	1,240	74,279	4,120	30,071	122,549	51,096	415,436
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,606	1,857	950	33	2,106	12	8,478	3,428	2,564	11,404	2,539	45,977
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,957*	*220,901*	*243,858*	*89,626*	*218,409*	*12,002*	*282,577*	*73,712*	*384,541*	*985,118*	*627,525*	*4,043,226*

Table 21-3. Comparison of the 2035 CMP Project #19 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-71	-4	-15	0	4	1	-2	27	8	15	1	-36
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	60	16	12	3	1	1	11	1	2	13	7	127
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	9	4	2	0	1	0	48	-6	3	7	3	71
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-24	-2	0	-2	0	0	-1	0	0	0	0	-29
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	65	6	12	6	-3	0	16	22	-4	-4	0	116
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-5	1	1	1	-3	-2	4	-22	-2	4	-3	-26
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	3	0	0	0	0	0	0	-2	0	0	0	1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	-8	0	0	0	0	0	0	-4	0	0	0	-12
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	15	1	1	0	0	0	3	-4	-1	0	0	15
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-32	-10	-10	-3	8	0	-91	-6	-10	-20	-4	-178
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	0	-1	0	0	0	0	8	-4	-3	-2	-1	-3
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	12	11	3	5	8	0	-4	2	-7	13	3	46
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

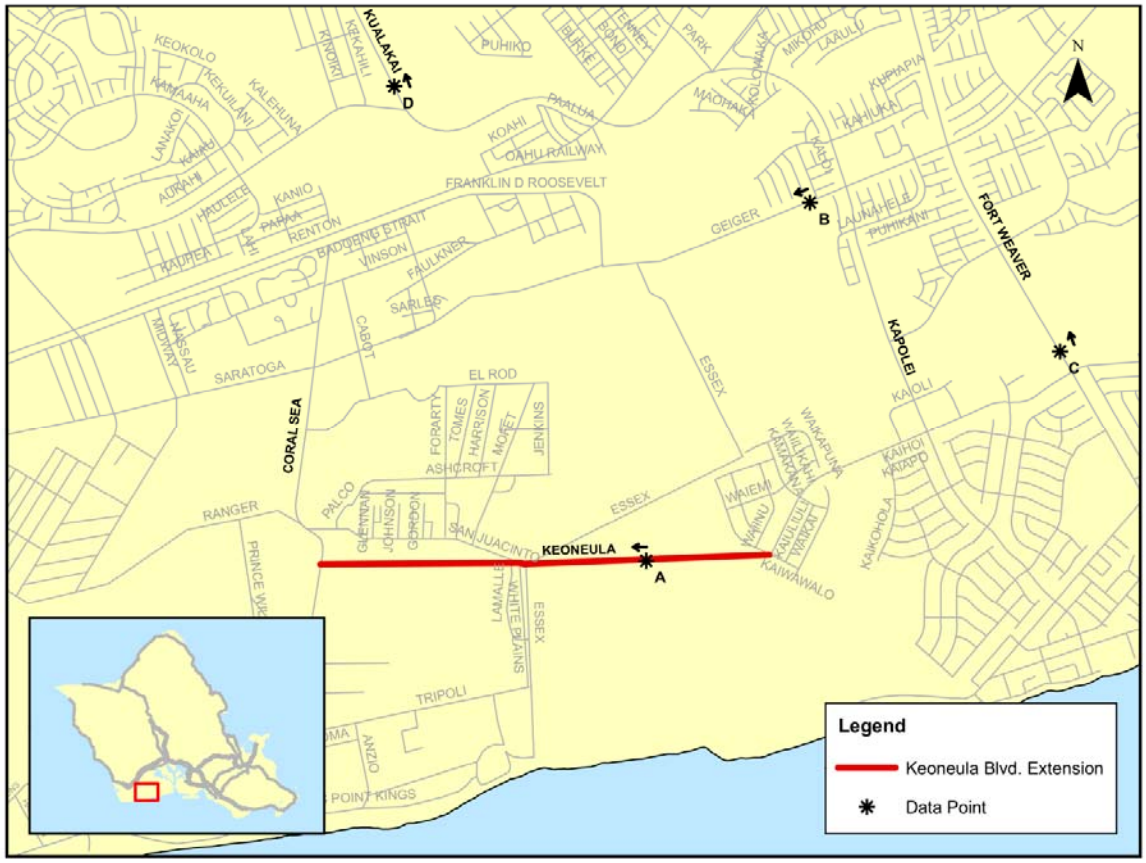
21.3 CMP Project #19 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #19 Package. These include the AM two-hour V/C (Level of Service [LOS[41]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

21.3.1 CMP Project #19 Highway Assignment

Figure 21-1 shows the map of the approximate location of the projects included in the CMP Project #19 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 21-1. CMP Project #19 Map and Data Points



[41] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 21-2 shows that the extension of Keoneula Boulevard provides another outlet for Ewa Beach travelers. The new extension was operating at LOS A and accommodated nearly 800 vehicles in the AM two-hour peak period. Also, the LOS on Geiger Road, a parallel route to the extension, from Ewa Beach improved from LOS F to E in the AM two-hour peak period. Fort Weaver Road mauka-bound mauka of Keoneula Boulevard also improved from LOS D to LOS C in the AM two-hour peak period. The LOS on Kualakai Parkway mauka-bound mauka of Kapolei Parkway remains the same.

Figure 21-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #19

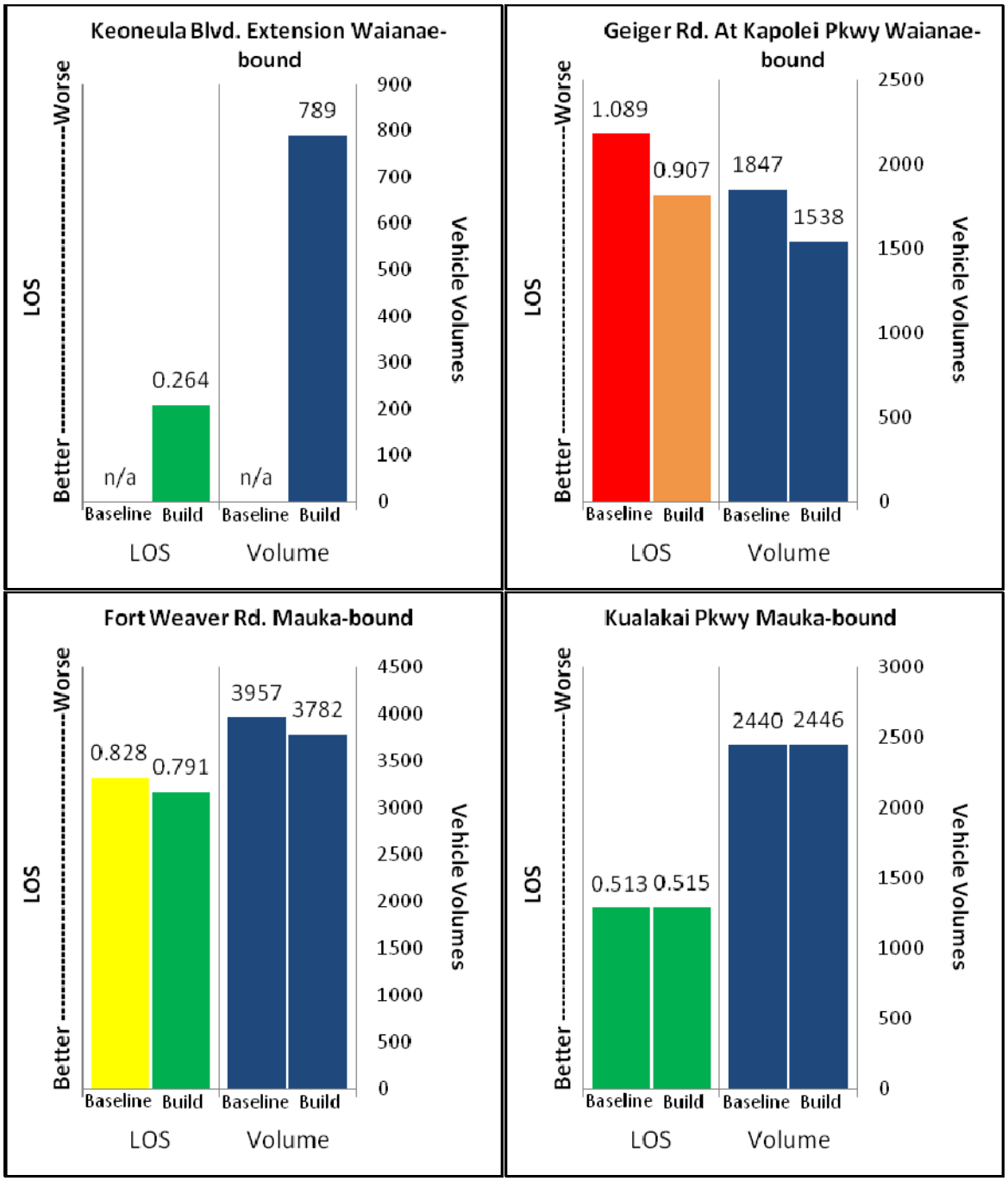


Table 21-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[42] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 21-5 with a slight increase on collectors in Area Type 5 and 6 (the Keoneula Boulevard extension).

Table 21-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #19 Package. The model forecasts 89,149 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 21-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #19 Package. The overall AM two-hour peak period VHT remains similar to the Baseline with slight increases for collectors for Area Types 5 and 6 (Keoneula Boulevard extension) and slight decreases for arterials for Area Type 4 (Geiger Road and Franklin D. Roosevelt Avenue [parallel routes to Keoneula Boulevard extension]).

Table 21-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #19 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 21-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #19 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline with slight decreases in Area Type 4 (Geiger Road and Franklin D. Roosevelt Avenue) and on collectors in Area Type 6 (Keoneula Boulevard extension).

[42] See Appendix A for Area Type definitions.

Table 21-4. 2035 CMP Project #19 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,290	508,127	1,176,975	2,710,109	368,443	815,289	234,715	5,965,948
Expressways	0	0	37,548	170,384	448,038	372,467	514,740	159,754	1,702,931
Ramps	0	17,085	35,708	166,327	366,099	28,452	161,332	18,039	793,042
Arterials	127,452	253,359	619,204	722,180	1,521,730	262,252	1,045,827	399,151	4,951,155
Collectors	14,518	33,376	140,028	370,443	777,551	21,889	388,776	39,317	1,785,898
Total	141,970	456,110	1,340,615	2,606,309	5,823,527	1,053,503	2,925,964	850,976	15,198,974

Table 21-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #19 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	-1%	1%	14%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 21-6. 2035 CMP Project #19 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	480	2,591	6,042	10,695	910	3,213	556	24,487
Expressways	0	0	171	1,565	2,490	2,600	1,980	643	9,449
Ramps	0	234	453	1,490	3,111	130	1,117	76	6,611
Arterials	968	2,028	4,222	5,541	12,479	1,011	6,339	1,555	34,143
Collectors	102	339	1,004	3,234	6,667	192	2,754	167	14,459
Total	1,070	3,081	8,441	17,872	35,442	4,843	15,403	2,997	89,149

Table 21-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #19 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	1%	0%	0%	0%	0%	0%	0%
Ramps	0%	4%	0%	-1%	0%	0%	0%	-1%	0%
Arterials	0%	0%	0%	-1%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	-2%	1%	14%	0%	-1%	0%
Total	0%	0%	0%	-1%	0%	1%	-1%	0%	0%

Table 21-8. 2035 CMP Project #19 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,505	3,083	4,489	37	1,010	28	10,275
Expressways	0	0	76	1,067	1,343	1,604	755	220	5,065
Ramps	0	164	309	856	1,847	31	633	13	3,853
Arterials	177	636	651	2,340	5,060	148	2,438	219	11,669
Collectors	18	161	221	1,198	1,834	49	853	26	4,360
Total	195	1,084	2,762	8,544	14,573	1,869	5,689	506	35,222

Table 21-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #19 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	0%	0%	0%	-1%	-3%	0%
Expressways	0%	0%	1%	0%	0%	0%	0%	1%	0%
Ramps	0%	6%	0%	-1%	0%	0%	0%	-7%	0%
Arterials	-1%	-1%	-1%	-1%	1%	-2%	-1%	0%	0%
Collectors	0%	1%	0%	-2%	0%	4%	0%	0%	-1%
Total	-1%	1%	-1%	-1%	0%	0%	-1%	0%	0%

21.3.2 CMP Project #19 Transit Assignment

Table 21-10 shows the 2035 CMP Project #19 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 21-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #19 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 21-10. 2035 CMP Project #19 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,320	7,492	6,868	73,090	0	261,771
Off-Peak	93,511	0	5,081	27,570	0	126,163
Total	267,831	7,492	11,950	100,661	0	387,934

Table 21-11. Percent Change in Transit Boardings, Baseline to CMP Project #19

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

21.4 Summary of CMP Project #19 Findings

These are the key findings related to the CMP Project #19 Package:

- The LOS on the Keoneula Boulevard extension is operating at LOS A while accommodating nearly 800 vehicles in the AM two-hour peak period.
- The extension of Keoneula Boulevard provides some relief to parallel facilities, like Geiger Road and Franklin D Roosevelt Avenue.
- Fort Weaver Road mauka of Keoneula Boulevard also saw improvements in LOS in the AM two-hour peak period.

22 CMP Project # 20 Package – East-West Road Widening Project

This chapter provides the analysis results of the CMP Project #20 Package.

22.1 CMP Project #20 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Widen East-West Road to four lanes from Farrington Highway along the Waianae-side of the University of Hawaii West Oahu (UHWO) campus across Kualakai Parkway and upward connecting with Old Fort Weaver Road.

This widening provides more capacity to the UHWO and Hoopili communities where growth is expected.

22.2 CMP Project #20 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #20 Package.

Table 22-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #20 mode share remains similar to the Baseline scenario.

Table 22-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #20 Package

Mode	2035 Baseline		2035 CMP Project #20		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,016	83%	0%
Transit	245,640	6%	245,629	6%	0%
Bike/walk	461,594	11%	461,580	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,225	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,088	32%	0%
Transit	30,225	8%	30,255	8%	0%
Taxi	9,531	3%	9,553	3%	0%
Tour Bus	57,915	15%	57,955	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,116	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,796	26%	0%
Transit	4,471	4%	4,465	4%	0%
Taxi	17,218	15%	17,216	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,737	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,347*	*100%*	*0%*

Table 22-2 shows negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #20 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 22-3 shows the comparison of the 2035 CMP Project #20 mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #20 Package. This table shows that the CMP Project #20's mode choice results are similar to the Baseline.

Table 22-2. 2035 CMP Project #20 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,179	81,399	162,206	29,251	115,856	2,957	8,249	35,874	112,461	264,181	142,233	1,492,846
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,771	73,749	42,093	33,740	29,910	1,709	65,342	8,502	131,888	300,656	221,522	1,059,882
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,058	46,476	12,682	15,975	11,645	427	104,849	2,872	95,429	247,268	204,607	783,288
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,420	220	2	525	0	0	236	205	0	0	0	4,608
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,419	4,251	7,106	5,143	4,463	4,540	16,079	9,468	9,902	26,054	3,667	146,092
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,420	1,846	5,037	1,842	1,679	1,115	3,187	5,725	1,322	10,612	1,858	61,643
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,129	48	0	7	0	0	259	96	138	214	0	1,891
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,560	0	0	0	0	0	4	1,563	11	537	0	14,675
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,668	253	15	0	1	1	1,553	1,839	751	1,636	3	16,720
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,714	10,807	13,765	3,110	52,752	1,240	74,345	4,133	30,073	122,557	51,101	415,597
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,611	1,857	950	33	2,106	12	8,470	3,435	2,566	11,404	2,539	45,983
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,949*	*220,906*	*243,856*	*89,626*	*218,412*	*12,001*	*282,573*	*73,712*	*384,541*	*985,119*	*627,530*	*4,043,225*

Table 22-3. Comparison of 2035 CMP Project #20 to 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-74	-14	-26	0	6	0	-2	22	5	15	2	-66
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-30	-11	-7	0	1	1	-39	-6	-1	14	4	-74
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	85	37	23	3	1	0	47	1	0	10	3	210
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-28	-2	0	-2	0	0	-1	0	0	0	0	-33
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	68	8	10	5	-2	-1	7	18	-1	-8	0	104
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-65	-4	-4	-2	0	-1	1	-37	0	-3	-1	-116
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	4	0	0	0	0	0	0	-1	0	0	0	3
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12	0	0	0	0	0	0	-2	0	0	0	10
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	19	1	1	0	0	0	4	-3	-1	0	0	21
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	8	2	4	1	5	0	-25	7	-8	-12	1	-17
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	5	-1	0	0	0	0	0	3	-1	-2	-1	3
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	4	16	1	5	11	-1	-8	2	-7	14	8	45
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

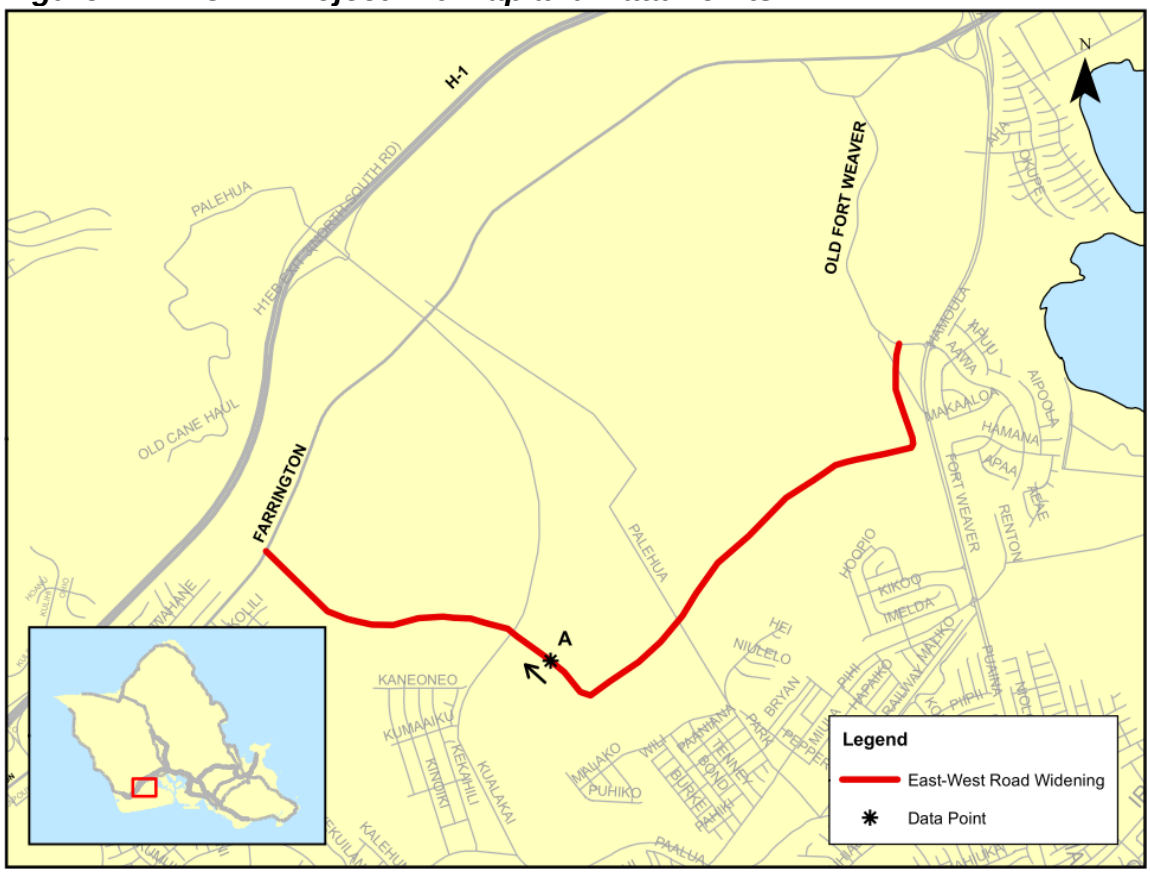
22.3 CMP Project #20 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #20. These include the AM two-hour V/C (Level of Service (LOS[43])) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

22.3.1 CMP Project #20 Highway Assignment

Figure 22-1 shows the map of the approximate location of the projects included in CMP Project #20 and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 22-1. CMP Project #20 Map and Data Points



[43] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 22-2 shows that the new East-West Road around UHWO and Hoopili provided a major route connecting Kapolei and the Hoopili community where growth is expected. The new road operated at LOS A and accommodated over 1,600 vehicles in the AM two-hour peak period.

Figure 22-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #20

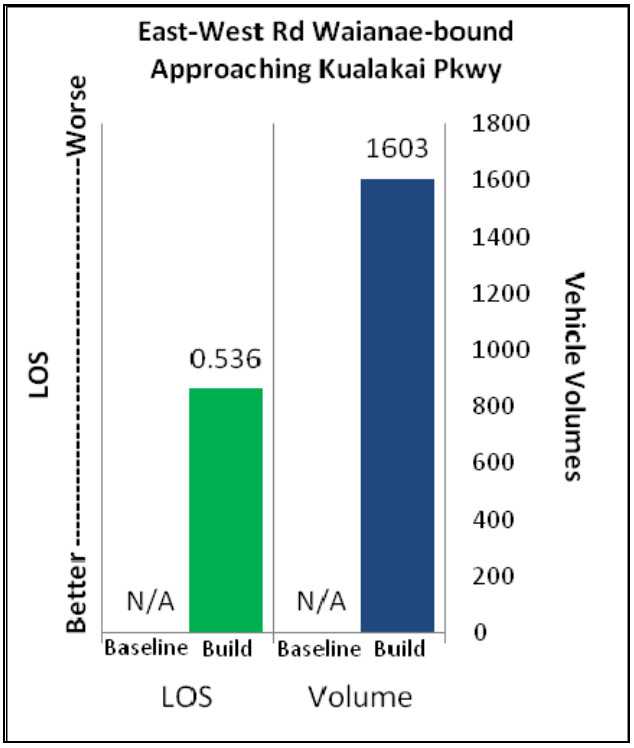


Table 22-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.44 There is negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 22-5.

Table 22-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #20 Package. The model forecasts 89,203 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 22-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #20 Package. The overall AM two-hour peak period VHT remains similar to the Baseline.

Table 22-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #20 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 22-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline

[44] See Appendix A for area type definitions.

and the 2035 CMP Project #20 Package. Overall AM two-hour VHD is projected to remain similar to the Baseline.

Table 22-4. 2035 CMP Project #20 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,172	507,827	1,177,541	2,711,533	368,474	815,878	234,789	5,968,214
Expressways	0	0	37,477	170,379	448,206	372,547	514,803	159,772	1,703,184
Ramps	0	17,112	35,766	166,322	366,674	28,452	161,734	18,069	794,129
Arterials	127,390	253,389	619,497	722,605	1,524,384	261,550	1,045,945	399,087	4,953,847
Collectors	14,504	33,262	140,057	372,952	774,401	19,130	388,659	39,382	1,782,347
Total	141,894	455,935	1,340,624	2,609,799	5,825,198	1,050,153	2,927,019	851,099	15,201,721

Table 22-5. Percent Change from 2035 Baseline to 2035 CMP Project #20 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 22-6. 2035 CMP Project #20 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,567	6,030	10,677	911	3,216	558	24,438
Expressways	0	0	171	1,562	2,482	2,601	1,975	643	9,434
Ramps	0	232	457	1,480	3,105	130	1,122	76	6,602
Arterials	970	2,035	4,228	5,589	12,570	1,004	6,344	1,556	34,296
Collectors	102	336	1,005	3,280	6,612	169	2,761	168	14,433
Total	1,072	3,082	8,428	17,941	35,446	4,815	15,418	3,001	89,203

Table 22-7. Percent Change from 2035 Baseline to 2035 CMP Project #20 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-1%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	1%	0%	0%	0%	0%	0%	0%
Ramps	0%	4%	1%	-1%	0%	0%	0%	-1%	0%
Arterials	0%	0%	0%	0%	1%	-1%	-1%	0%	0%
Collectors	0%	-1%	0%	0%	0%	0%	0%	-1%	0%
Total	0%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 22-8. 2035 CMP Project #20 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	122	1,482	3,073	4,472	37	1,009	29	10,224
Expressways	0	0	76	1,064	1,335	1,605	751	219	5,050
Ramps	0	163	312	846	1,841	32	637	15	3,846
Arterials	177	643	654	2,376	5,121	147	2,443	220	11,781
Collectors	18	158	222	1,224	1,811	47	860	25	4,365
Total	195	1,086	2,746	8,583	14,580	1,868	5,700	508	35,266

Table 22-9. Percent Change from 2035 Baseline to 2035 CMP Project #20 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-2%	-1%	-1%	0%	-1%	0%	-1%
Expressways	0%	0%	1%	-1%	0%	1%	0%	1%	0%
Ramps	0%	5%	1%	-2%	0%	3%	0%	7%	0%
Arterials	-1%	0%	0%	1%	2%	-3%	-1%	0%	1%
Collectors	0%	-1%	0%	0%	-1%	0%	0%	-4%	-1%
Total	-1%	1%	-1%	0%	0%	0%	0%	1%	0%

22.3.2 CMP Project #20 Transit Assignment

Table 22-10 shows 2035 CMP Project #20 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 22-11 shows the percent change in transit boardings from 2035 Baseline to the 2035 CMP Project #20 Package. Total boardings remain identical to the 2035 Baseline scenario.

Table 22-10. 2035 CMP Project #20 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,208	7,498	6,873	73,047	0	261,626
Off-Peak	93,483	0	5,081	27,556	0	126,121
Total	267,691	7,498	11,955	100,603	0	387,746

Table 22-11. Percent Change in Transit Boardings, Baseline to CMP Project #20

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

22.4 Summary of CMP Project #20 Findings

These are the key findings related to the CMP Project #20 Package:

- The LOS on the new East-West arterial was operating at LOS A while accommodating nearly 1,600 vehicles in the AM two-hour peak period.
- The new East-West arterial around UHWO and Hoopili provided a major route connecting Kapolei and the growing Hoopili community.

23 CMP Project # 21 Package – Western End Rail Extension Project

This chapter provides the analysis results of the CMP Project #21 Package.

23.1 CMP Project #21 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend Rail from West Kapolei to East Kapolei. The western terminus begins on the Waianae-side of the new Hanua Street extension on Kapolei Parkway, continues alongside Kapolei Parkway turning makai near Wakea Street toward Saratoga Avenue, then heading Koko Head along Saratoga Avenue, turning mauka near Kualakai Parkway, and connecting with the Honolulu Rail Transit alignment's first station (East Kapolei).

23.2 CMP Project #21 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #21 Package.

Table 23-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #21 mode share remains similar to the Baseline scenario with a slight increase (two percent) in resident transit trips.

Table 23-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #21 Package

Mode	2035 Baseline		2035 CMP Project #21		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,331,252	82%	0%
Transit	245,640	6%	249,869	6%	2%
Bike/walk	461,594	11%	461,646	11%	0%
Total Trips by Residents	4,043,180	100%	4,042,767	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,780	32%	0%
Transit	30,225	8%	30,344	8%	0%
Taxi	9,531	3%	9,528	3%	0%
Tour Bus	57,915	15%	57,888	15%	0%
Bike/Walk	155,150	42%	155,150	42%	0%
Total Trips by Visitors	373,680	100%	373,690	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,791	26%	0%
Transit	4,471	4%	4,497	4%	1%
Taxi	17,218	15%	17,219	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,707	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,463*	*100%*	*0%*

Table 23-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #21 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 82 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 13 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 23-3 shows the comparison of the 2035 CMP Project #21 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #21 Package. This table shows that the CMP Project #21 has nearly 4,700 less automobile person trips compared to the Baseline. There are also seven percent more walk-to-rail trips and 11 percent more park-and-ride trips in this Package compared to the Baseline of which most of those were from the Journey-to-Work – Home-Based-Work trip purpose.

Table 23-2. 2035 CMP Project #21 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	536,247	81,303	162,065	29,185	115,670	2,937	8,234	35,774	112,367	263,946	142,174	1,489,902
	59%	*37%*	*66%*	*33%*	*53%*	*24%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,378	73,681	42,062	33,670	29,860	1,691	65,320	8,481	131,861	300,434	221,416	1,058,854
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,858	46,377	12,639	15,937	11,625	423	104,773	2,854	95,408	247,089	204,513	782,496
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,408	219	2	519	0	0	236	205	0	0	0	4,589
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	54,560	4,205	6,995	5,063	4,349	4,413	16,028	9,370	9,787	25,687	3,573	144,030
	6%	*2%*	*3%*	*6%*	*2%*	*37%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	29,356	2,000	5,396	2,039	1,940	1,282	3,406	5,967	1,545	11,276	2,080	66,287
	3%	*1%*	*2%*	*2%*	*1%*	*11%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,048	49	0	6	0	0	262	97	135	207	0	1,804
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	14,161	0	0	1	0	0	3	1,542	18	595	0	16,320
	2%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,713	254	15	0	1	0	1,571	1,856	780	1,647	2	16,839
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*3%*	*0%*	*0%*	*0%*	*0%*
Walk	51,650	10,804	13,734	3,100	52,709	1,236	74,378	4,121	30,175	122,682	51,103	415,692
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,577	1,856	948	32	2,103	12	8,482	3,421	2,573	11,410	2,540	45,954
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,956*	*220,748*	*243,856*	*89,552*	*218,257*	*11,994*	*282,693*	*73,688*	*384,649*	*984,973*	*627,401*	*4,042,767*

Table 23-3. Comparison of the 2035 CMP Project #21 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-2,006	-110	-167	-66	-180	-20	-17	-78	-89	-220	-57	-3,010
	0%	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-423	-79	-38	-70	-49	-17	-61	-27	-28	-208	-102	-1,102
	0%	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-115	-62	-20	-35	-19	-4	-29	-17	-21	-169	-91	-582
	0%	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-40	-3	0	-8	0	0	-1	0	0	0	0	-52
	-1%	*-1%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	-791	-38	-101	-75	-116	-128	-44	-80	-116	-375	-94	-1,958
	-1%	*-1%*	*-1%*	*-1%*	*-3%*	*-3%*	*0%*	*-1%*	*-1%*	*-1%*	*-3%*	*-1%*
Walk to rail transit	1,871	150	355	195	261	166	220	205	223	661	221	4,528
	7%	*8%*	*7%*	*11%*	*16%*	*15%*	*7%*	*4%*	*17%*	*6%*	*12%*	*7%*
Informal Park-and-ride transit	-77	1	0	-1	0	0	3	0	-3	-7	0	-84
	-7%	*2%*	*0%*	*-14%*	*0%*	*0%*	*1%*	*0%*	*-2%*	*-3%*	*0%*	*-4%*
Formal Park-and-ride transit	1,613	0	0	1	0	0	-1	-23	7	58	0	1,655
	13%	*0%*	*0%*	*0%*	*0%*	*0%*	*-25%*	*-1%*	*64%*	*11%*	*0%*	*11%*
Kiss-and-ride transit	64	2	1	0	0	-1	22	14	28	11	-1	140
	1%	*1%*	*7%*	*0%*	*0%*	*-100%*	*1%*	*1%*	*4%*	*1%*	*-33%*	*1%*
Walk	-56	-1	-27	-9	-38	-4	8	-5	94	113	3	78
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-29	-2	-2	-1	-3	0	12	-11	6	4	0	-26
	0%	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	11	-142	1	-69	-144	-8	112	-22	101	-132	-121	-413
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

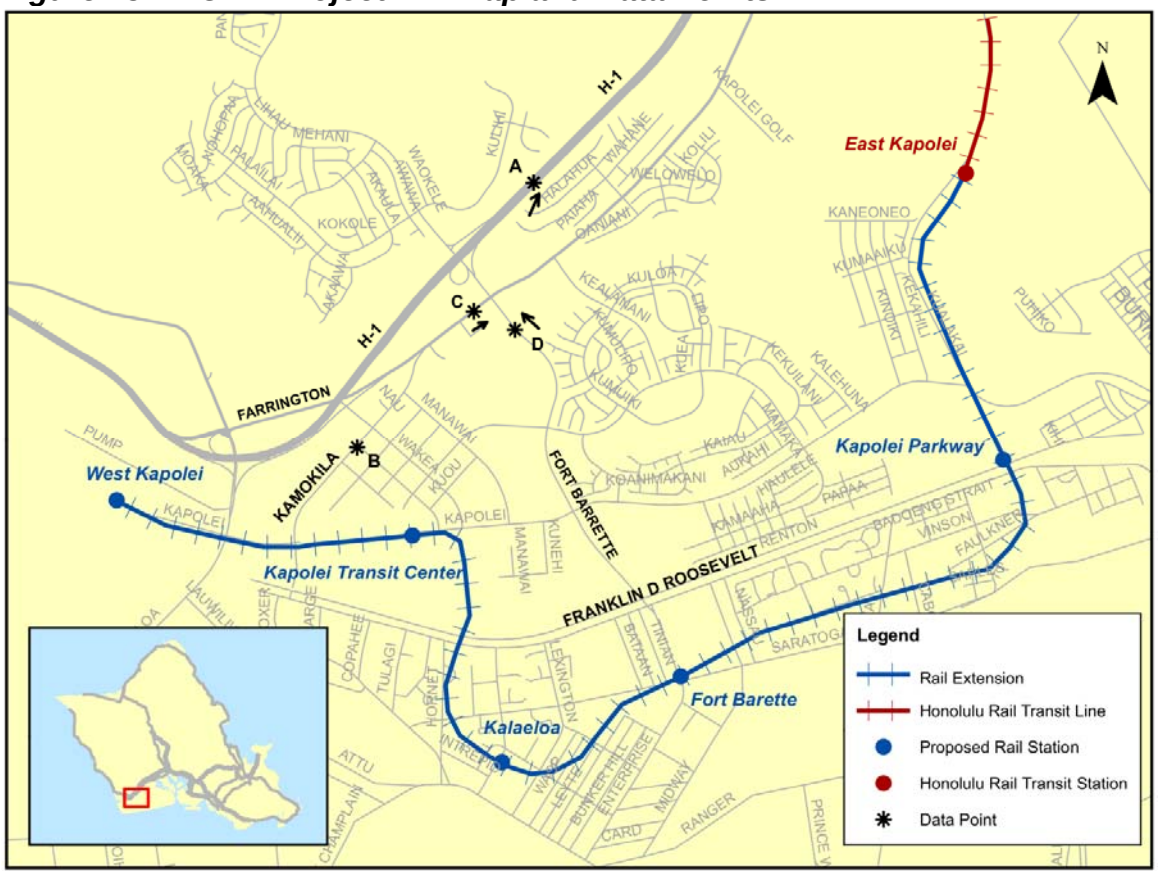
23.3 CMP Project #21 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #21 Package. These include the AM two-hour V/C (Level of Service [LOS[45]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

23.3.1 CMP Project #21 Highway Assignment

Figure 23-1 shows the map of the approximate location of the projects included in the CMP Project #21 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 23-1. CMP Project #21 Map and Data Points



[45] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 23-2 shows that with the western-end rail extension added, Kamokila Boulevard, the H-1 Freeway in the eastbound direction at the Makakilo Interchange, Farrington Highway town-bound, and Fort Barrette Road mauka-bound did not improve significantly.

Figure 23-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #21

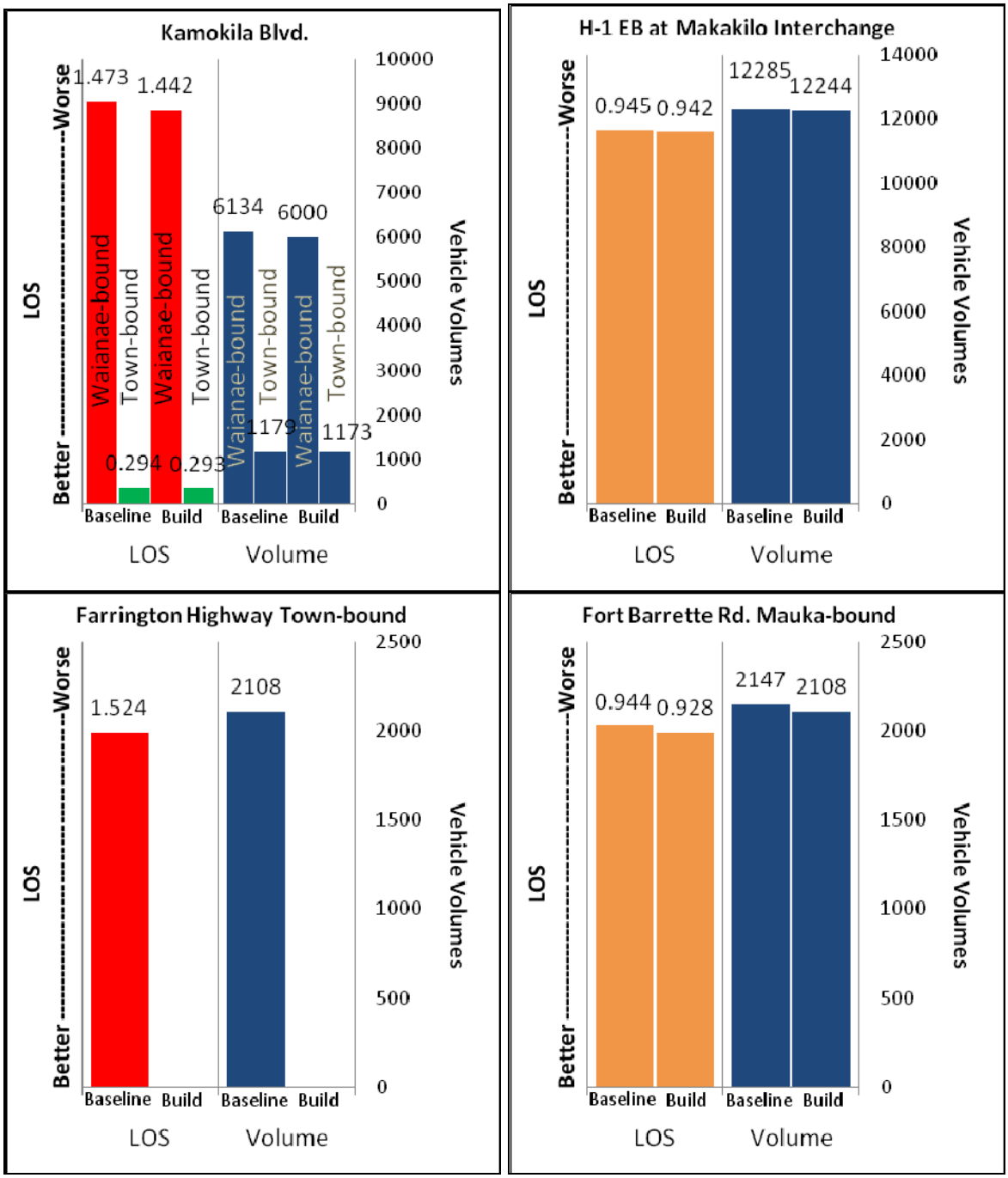


Table 23-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[46] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 23-5.

Table 23-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #21 Package. The model forecasts 88,741 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 23-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to the 2035 CMP Project #21 Package. The overall AM two-hour peak period VHT decreases by one percent compared to the Baseline with slight decreases on roadways in Area Type 2 (City of Kapolei), 4 (Kalaeloa Boulevard and Franklin D. Roosevelt Avenue), and 7 (Kapolei Parkway and sections of H-1).

Table 23-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #21 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 23-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #21 Package. Overall AM two-hour peak period VHD decreases by one percent compared to the Baseline with small decreases on Kapolei and Kalaeloa roadways in Area Types 2, 4, 5 and 7.

[46] See Appendix A for area type definitions.

Table 23-4. 2035 CMP Project #21 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,064	507,971	1,174,850	2,707,542	368,328	813,603	234,139	5,958,497
Expressways	0	0	37,456	170,307	448,081	372,339	514,631	159,736	1,702,550
Ramps	0	17,094	35,772	166,105	366,049	28,446	161,517	17,983	792,966
Arterials	127,290	253,338	619,136	725,085	1,521,633	261,272	1,044,731	398,904	4,951,389
Collectors	14,531	33,193	139,961	371,649	770,845	19,099	388,300	39,439	1,777,017
Total	141,821	455,689	1,340,296	2,607,996	5,814,150	1,049,484	2,922,782	850,201	15,182,419

Table 23-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #21 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 23-6. 2035 CMP Project #21 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	478	2,587	5,996	10,640	910	3,197	555	24,363
Expressways	0	0	170	1,552	2,478	2,589	1,976	642	9,407
Ramps	0	231	447	1,481	3,096	130	1,117	76	6,578
Arterials	965	2,005	4,217	5,511	12,465	1,002	6,321	1,551	34,037
Collectors	103	332	1,001	3,238	6,601	167	2,746	168	14,356
Total	1,068	3,046	8,422	17,778	35,280	4,798	15,357	2,992	88,741

Table 23-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #21 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-1%	-1%	0%	-1%	-1%	-1%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	3%	-1%	-1%	0%	0%	0%	-1%	0%
Arterials	-1%	-1%	0%	-1%	0%	-1%	-2%	0%	-1%
Collectors	1%	-2%	-1%	-1%	0%	-1%	0%	-1%	-1%
Total	-1%	-1%	0%	-1%	0%	0%	-1%	0%	-1%

Table 23-8. 2035 CMP Project #21 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,501	3,043	4,446	37	1,002	28	10,180
Expressways	0	0	75	1,054	1,332	1,594	752	219	5,026
Ramps	0	162	304	848	1,833	30	633	14	3,824
Arterials	177	617	651	2,300	5,036	146	2,425	218	11,570
Collectors	18	153	219	1,192	1,826	46	849	26	4,329
Total	195	1,055	2,750	8,437	14,473	1,853	5,661	505	34,929

Table 23-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #21 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	-2%	-1%	0%	-1%	-3%	-1%
Expressways	0%	0%	0%	-1%	-1%	0%	0%	1%	-1%
Ramps	0%	5%	-2%	-2%	0%	-3%	0%	0%	-1%
Arterials	-1%	-4%	-1%	-3%	1%	-3%	-2%	0%	-1%
Collectors	0%	-4%	-1%	-3%	-1%	-2%	-1%	0%	-1%
Total	-1%	-2%	-1%	-2%	0%	-1%	-1%	0%	-1%

23.3.2 CMP Project #21 Transit Assignment

Table 23-10 shows the 2035 CMP Project #21 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 23-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #21 Package. Total boardings increase one percent compared to the Baseline with a seven percent increase in rail boardings.

Table 23-10. 2035 CMP Project #21 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	171,153	7,474	6,698	78,248	0	263,572
Off-Peak	92,471	0	4,794	29,372	0	126,637
Total	263,623	7,474	11,492	107,620	0	390,209

Table 23-11. Percent Change in Transit Boardings, Baseline to CMP Project #21

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	-2%	-1%	-2%	7%	0%	1%
Off-Peak	-1%	0%	-6%	7%	0%	0%
Total	-1%	-1%	-4%	7%	0%	1%

23.4 Summary of CMP Project #21 Findings

These are the key findings related to the CMP Project #21 Package:

- The LOS and volumes on key roadways near the western end of the rail extension did not improve significantly.
- The AM two-hour peak period VHT and VHD decreased one percent compared to the Baseline.
- Even though there was a 4,700 drop in daily automobile person-trips, and a 4,500 increase in daily walk-to-rail trips, the AM two-hour peak period LOS and volumes did not improve significantly since transit trips make up only six percent of all resident trips and automobile person trips make up over 82 percent of all resident trips where resident trips total over four million.

24 CMP Project # 22 Package – Eastern End Rail Extension Project

This chapter provides the analysis results of the CMP Project #22 Package.

24.1 CMP Project #22 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend Rail from Ala Moana Center (at Kona Street) to the University of Hawaii (UH) at Manoa (at Lower Campus Road: this extension continues along Kona Street to the Convention Center to Kapiolani Boulevard, turning mauka on University Avenue toward UH's Lower Campus Road) and Waikiki (between Liliuokalani and Ohua Avenues: this extension continues along Kona Street toward the Convention Center turning at Kalakaua and continuing on Kuhio where it ends between Liliuokalani and Ohua Avenues).

24.2 CMP Project #22 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #22 Package.

Table 24-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #22 Package residential mode share remains similar to the 2035 Baseline scenario with a two percent increase in resident transit trips. The visitor and air passenger transit trips increase by 12 percent and 8 percent, respectively, as the rail is extended to Waikiki.

Table 24-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #22 Package

Mode	2035 Baseline		2035 CMP Project #22		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,332,585	82%	0%
Transit	245,640	6%	249,726	6%	2%
Bike/walk	461,594	11%	460,950	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,261	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	119,562	32%	-1%
Transit	30,225	8%	33,952	9%	12%
Taxi	9,531	3%	8,919	2%	-6%
Tour Bus	57,915	15%	57,228	15%	-1%
Bike/Walk	155,150	42%	154,219	41%	-1%
Total Trips by Visitors	373,680	100%	373,880	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,735	25%	0%
Transit	4,471	4%	4,835	4%	8%
Taxi	17,218	15%	17,123	15%	-1%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,520	35%	-1%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,767,147*	*100%*	*0%*

Table 24-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #22 scenario as compared to the 2035 Baseline scenario. As with the Baseline, 82 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 13 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 25 percent).

Table 24-3 shows the comparison of the 2035 CMP Project #22 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between 2035 Baseline and the CMP Project #22 Package. This table shows that the CMP Project #22 has nearly 3,400 less automobile person trips compared to the Baseline. There was also 20 percent more walk-to-rail trips and eight percent more kiss-and-ride trips in this Package compared to the Baseline of which most of those were the journey-to-work – home-based-work trip purpose.

Table 24-2. 2035 CMP Project #22 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	536,889	81,403	162,091	29,217	115,789	2,949	8,250	35,938	112,427	264,116	142,222	1,491,291
	59%	*37%*	*66%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,128	73,736	42,063	33,702	29,892	1,701	65,340	8,520	131,812	300,553	221,505	1,058,952
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,585	46,380	12,609	15,950	11,638	425	104,749	2,857	95,374	247,185	204,590	782,342
	4%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,412	218	2	557	0	0	243	196	0	0	0	4,628
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	50,458	3,778	6,457	4,776	4,253	4,377	15,800	8,874	9,288	24,929	3,528	136,518
	6%	*2%*	*3%*	*5%*	*2%*	*36%*	*6%*	*12%*	*2%*	*3%*	*1%*	*3%*
Walk to rail transit	33,790	2,460	5,936	2,281	2,018	1,300	3,568	6,165	2,131	12,092	2,075	73,816
	4%	*1%*	*2%*	*3%*	*1%*	*11%*	*1%*	*8%*	*1%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,051	48	0	6	0	0	255	80	130	206	0	1,776
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,881	0	0	1	0	0	3	1,526	14	564	0	14,989
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	11,717	254	15	0	1	1	1,616	1,942	783	1,667	3	17,999
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*3%*	*0%*	*0%*	*0%*	*0%*
Walk	51,521	10,778	13,735	3,103	52,723	1,237	74,282	4,168	30,019	122,435	51,087	415,088
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,516	1,846	948	32	2,104	12	8,458	3,449	2,563	11,395	2,539	45,862
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,948*	*220,901*	*243,856*	*89,625*	*218,418*	*12,002*	*282,564*	*73,715*	*384,541*	*985,142*	*627,549*	*4,043,261*

Table 24-3. Comparison of the 2035 CMP Project #22 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-1,364	-10	-141	-34	-61	-8	-1	86	-29	-50	-9	-1,621
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-673	-24	-37	-38	-17	-7	-41	12	-77	-89	-13	-1,004
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-388	-59	-50	-22	-6	-2	-53	-14	-55	-73	-14	-736
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-36	-4	0	30	0	0	6	-9	0	0	0	-13
	-1%	*-2%*	*0%*	*6%*	*0%*	*0%*	*3%*	*-4%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	-4,893	-465	-639	-362	-212	-164	-272	-576	-615	-1,133	-139	-9,470
	-9%	*-11%*	*-9%*	*-7%*	*-5%*	*-4%*	*-2%*	*-6%*	*-6%*	*-4%*	*-4%*	*-6%*
Walk to rail transit	6,305	610	895	437	339	184	382	403	809	1,477	216	12,057
	23%	*33%*	*18%*	*24%*	*20%*	*16%*	*12%*	*7%*	*61%*	*14%*	*12%*	*20%*
Informal Park-and-ride transit	-74	0	0	-1	0	0	-4	-17	-8	-8	0	-112
	-7%	*0%*	*0%*	*-14%*	*0%*	*0%*	*-2%*	*-18%*	*-6%*	*-4%*	*0%*	*-6%*
Formal Park-and-ride transit	333	0	0	1	0	0	-1	-39	3	27	0	324
	3%	*0%*	*0%*	*0%*	*0%*	*0%*	*-25%*	*-2%*	*27%*	*5%*	*0%*	*2%*
Kiss-and-ride transit	1,068	2	1	0	0	0	67	100	31	31	0	1,300
	10%	*1%*	*7%*	*0%*	*0%*	*0%*	*4%*	*5%*	*4%*	*2%*	*0%*	*8%*
Walk	-185	-27	-26	-6	-24	-3	-88	42	-62	-134	-13	-526
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Bike	-90	-12	-2	-1	-2	0	-12	17	-4	-11	-1	-118
	-1%	*-1%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	3	11	1	4	17	0	-17	5	-7	37	27	81
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

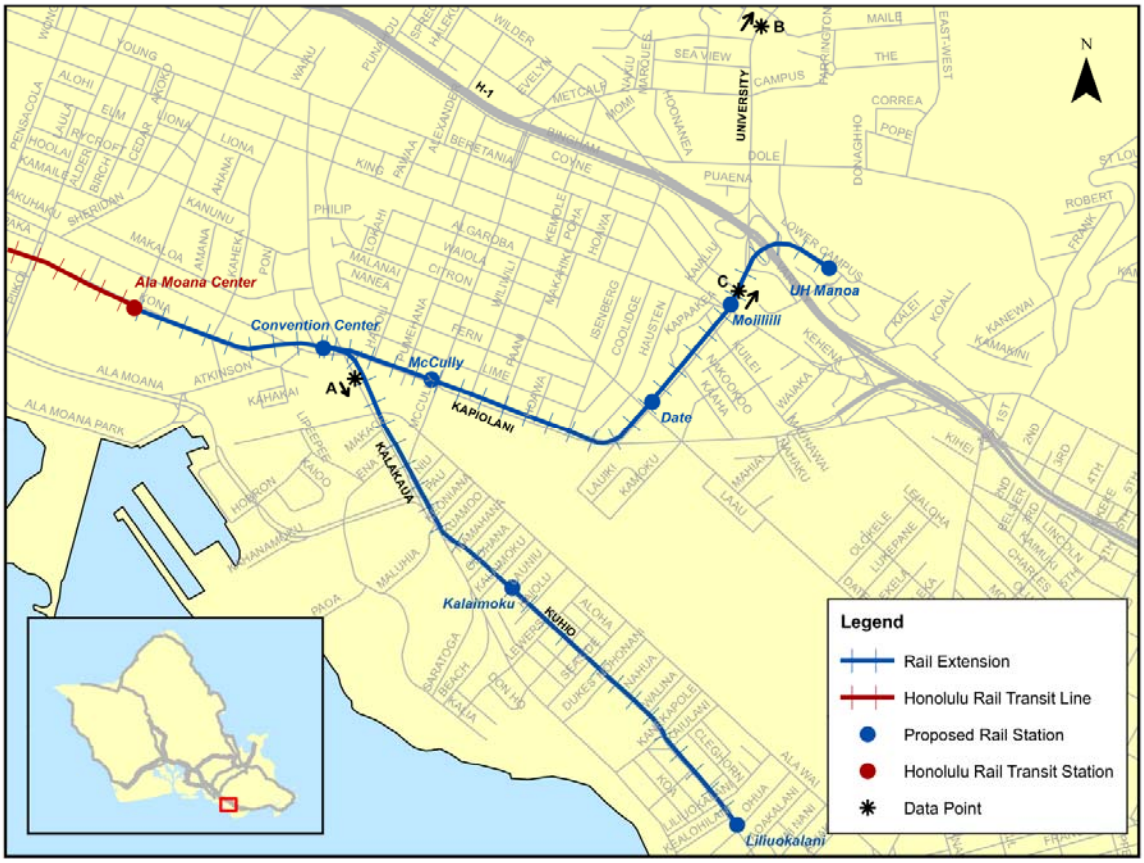
24.3 CMP Project #22 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #22 Package. These include the AM two-hour V/C (Level of Service [LOS[47]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

24.3.1 CMP Project #22 Highway Assignment

Figure 24-1 shows the map of the approximate location of the projects included in the CMP Project #22 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 24-1. CMP Project #22 Map and Data Points



[47] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 24-2 shows that with the eastern-end rail extension added, AM two-hour peak period LOS and volumes on Kalakaua Avenue Waikiki-bound and University Avenue mauka-bound near both Maile Way and King Street did not improve significantly.

Figure 24-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #22

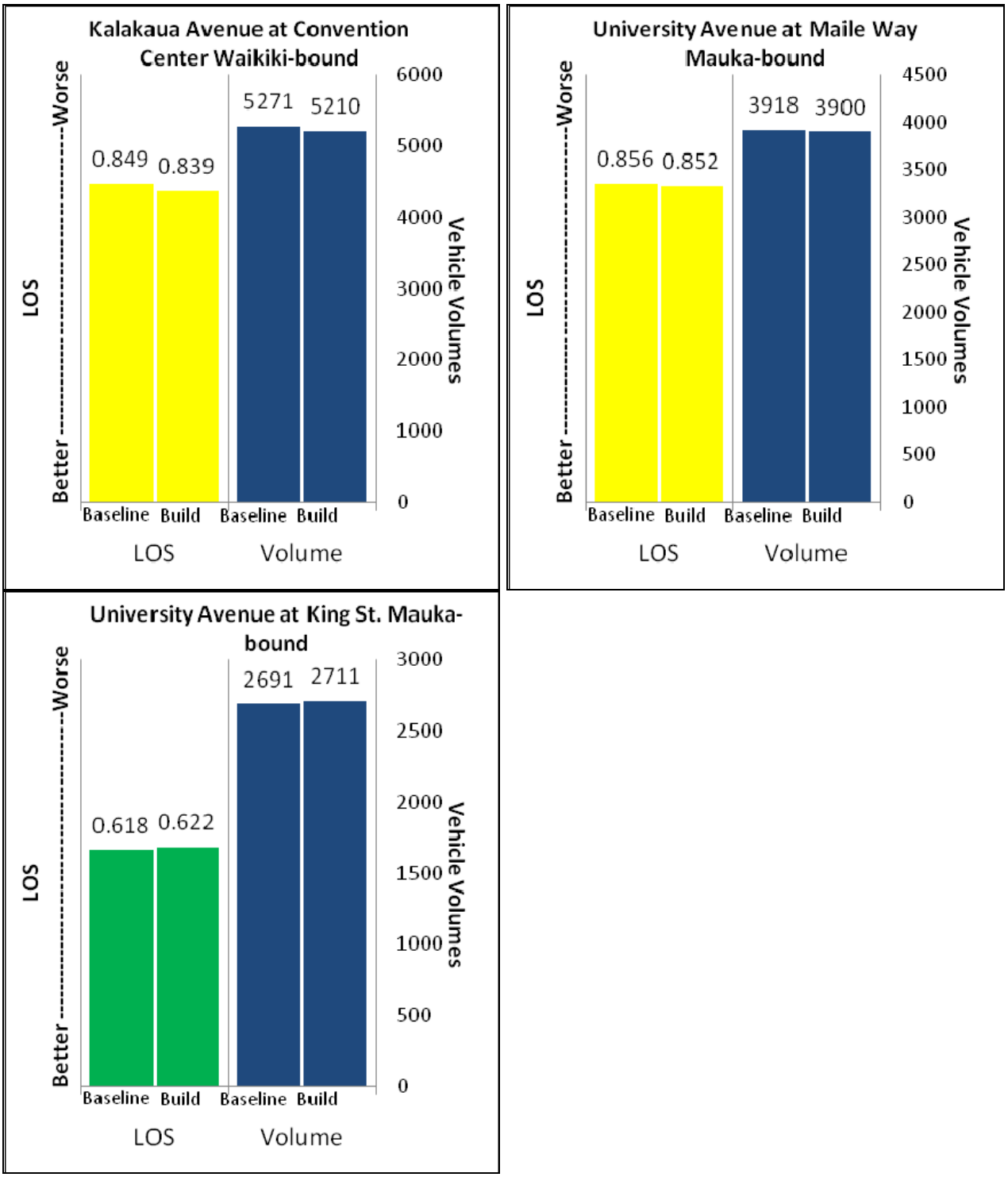


Table 24-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[48] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 24-5 with slight decreases on roadways in Area Type 1 (Downtown), and Area Types 2 and 3 (roadways between Downtown and Waikiki).

Table 24-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #22 Package. The model forecasts 88,794 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 24-7 shows the percent change in AM two-hour peak period VHT from 2035 Baseline scenario to 2035 CMP Project #22 Package. The overall AM two-hour peak period VHT decreases by one percent compared to the Baseline with slight decreases on arterials and collectors in Area Type 1 (Downtown), and Area Types 2 and 3 (roadways between Downtown and Waikiki). Freeways also have a slight decrease as some travelers use the extended rail system.

Table 24-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #22 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 24-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #22 Package. Overall AM two-hour peak period VHD decreases by one percent compared to the Baseline with small decreases on freeways, arterials and collectors.

[48] See Appendix A for Area Type definitions.

Table 24-4. 2035 CMP Project #22 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,992	507,523	1,176,273	2,708,395	368,418	814,455	234,759	5,961,815
Expressways	0	0	37,456	170,389	447,956	372,272	514,409	159,664	1,702,146
Ramps	0	17,124	35,664	166,114	366,218	28,431	161,436	18,092	793,079
Arterials	126,890	251,787	614,152	721,405	1,523,006	261,040	1,044,726	399,117	4,942,123
Collectors	14,472	33,150	138,793	373,078	771,100	19,076	388,557	39,533	1,777,759
Total	141,362	454,053	1,333,588	2,607,259	5,816,675	1,049,237	2,923,583	851,165	15,176,922

Table 24-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #22 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	-1%	-1%	-1%	0%	0%	0%	-1%	0%	0%
Collectors	-1%	-1%	-1%	0%	0%	0%	0%	0%	0%
Total	-1%	0%	0%	0%	0%	0%	0%	0%	0%

Table 24-6. 2035 CMP Project #22 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	476	2,553	5,990	10,626	911	3,193	558	24,307
Expressways	0	0	170	1,554	2,478	2,587	1,972	642	9,403
Ramps	0	229	465	1,488	3,114	129	1,115	76	6,616
Arterials	958	2,008	4,165	5,558	12,483	1,003	6,327	1,555	34,057
Collectors	101	336	997	3,275	6,610	168	2,756	168	14,411
Total	1,059	3,049	8,350	17,865	35,311	4,798	15,363	2,999	88,794

Table 24-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #22 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	-2%	-1%	-1%	0%	-1%	0%	-1%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	2%	3%	-1%	0%	-1%	-1%	-1%	0%
Arterials	-1%	-1%	-2%	0%	0%	-1%	-1%	0%	-1%
Collectors	-1%	-1%	-1%	0%	0%	-1%	0%	-1%	0%
Total	-1%	-1%	-1%	-1%	0%	0%	-1%	0%	-1%

Table 24-8. 2035 CMP Project #22 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	121	1,470	3,040	4,430	37	997	29	10,124
Expressways	0	0	75	1,056	1,332	1,592	748	219	5,022
Ramps	0	159	320	853	1,849	30	631	15	3,857
Arterials	172	630	629	2,351	5,044	147	2,431	219	11,623
Collectors	18	158	218	1,220	1,827	46	856	26	4,369
Total	190	1,068	2,712	8,520	14,482	1,852	5,663	508	34,995

Table 24-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #22 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	-3%	-2%	-2%	0%	-2%	0%	-2%
Expressways	0%	0%	0%	-1%	-1%	0%	-1%	1%	-1%
Ramps	0%	3%	3%	-1%	0%	-3%	-1%	7%	0%
Arterials	-4%	-2%	-4%	0%	1%	-3%	-1%	0%	0%
Collectors	0%	-1%	-2%	-1%	-1%	-2%	0%	0%	-1%
Total	-4%	-1%	-2%	-1%	0%	-1%	-1%	1%	-1%

24.3.2 CMP Project #22 Transit Assignment

Table 24-10 shows the 2035 CMP Project #22 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 24-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #22 Package. Total boardings decrease three percent compared to the Baseline with a 20 percent increase in rail boardings. The limited stop boardings decreased significantly as Express Route A (a limited stop route) in the Baseline was eliminated since the route serviced Middle Street Transit Center and UH at Manoa, and the rail extension in this Package covered that section.

Table 24-10. 2035 CMP Project #22 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	156,839	7,480	1,505	86,322	0	252,146
Off-Peak	85,604	0	4,339	34,629	0	124,571
Total	242,443	7,480	5,844	120,951	0	376,718

Table 24-11. Percent Change in Transit Boardings, Baseline to CMP Project #22

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	-10%	-1%	-78%	18%	0%	-4%
Off-Peak	-8%	0%	-15%	26%	0%	-1%
Total	-9%	-1%	-51%	20%	0%	-3%

24.4 Summary of CMP Project #22 Findings

These are the key findings related to the CMP Project #22 Package:

- The LOS and volumes on key roadways near the eastern end of the rail extension did not improve significantly.
- The AM two-hour peak period VHT and VHD decreased one percent compared to the Baseline. The VHT and VHD on freeways, arterials, and collectors in Downtown, Waikiki, and the areas in between improved very slightly.
- Even though there was a 3,400 decrease in daily automobile person-trips and a 12,000 increase in daily walk-to-rail trips, the AM two-hour peak period LOS and volumes did not improve significantly since transit trips make up only six percent of all resident trips and automobile person trips make up over 82 percent of all resident trips, where resident trips total over four million.

25 CMP Project # 23 Package – Kapolei Parkway Extension (Ko Olina) Project

This chapter provides the analysis results of the CMP Project #23 Package.

25.1 CMP Project #23 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend Kapolei Parkway (six lanes), from Aliinui Drive to Hanua Street. This project includes widening of Kapolei Parkway from four to six lanes from Hanua Street to Kalaeloa Boulevard.

This extension will provide another route in and out of the Ko Olina community besides H-1/Farrington Highway.

25.2 CMP Project #23 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #23 Package.

Table 25-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #23 mode share remains similar to the Baseline scenario.

Table 25-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #23 Package

Mode	2035 Baseline		2035 CMP Project #23		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,295	83%	0%
Transit	245,640	6%	245,280	6%	0%
Bike/walk	461,594	11%	460,793	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,368	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,027	32%	0%
Transit	30,225	8%	30,363	8%	0%
Taxi	9,531	3%	9,552	3%	0%
Tour Bus	57,915	15%	57,931	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,138	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,803	26%	0%
Transit	4,471	4%	4,475	4%	0%
Taxi	17,218	15%	17,220	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,716	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,512*	*100%*	*0%*

Table 25-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #23 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 25-3 shows the comparison of the 2035 CMP Project #23 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #23 Package. This table shows that the CMP Project #23 Package has over 1,300 one- and two-occupant vehicle person trips compared to the Baseline.

Table 25-2. 2035 CMP Project #23 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,426	81,442	162,249	29,261	115,890	2,957	8,256	35,878	112,493	264,256	142,244	1,493,352
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	151,250	73,843	42,170	33,763	29,922	1,710	65,499	8,532	131,897	300,732	221,550	1,060,868
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,917	46,421	12,646	15,969	11,649	428	104,789	2,864	95,438	247,324	204,630	783,075
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,429	220	2	516	0	0	236	204	0	0	0	4,607
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,406	4,260	7,109	5,158	4,465	4,542	16,084	9,464	9,871	25,983	3,665	146,007
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,567	1,835	5,048	1,846	1,679	1,115	3,166	5,766	1,323	10,568	1,855	61,768
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,106	47	0	7	0	0	259	94	138	215	0	1,866
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,642	0	0	0	0	0	4	1,571	11	537	0	14,765
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,275	249	14	0	1	1	1,544	1,796	751	1,633	3	16,267
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,361	10,756	13,671	3,088	52,726	1,240	74,230	4,124	30,043	122,540	51,081	414,860
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,570	1,867	946	33	2,108	12	8,473	3,426	2,560	11,398	2,540	45,933
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,949*	*220,940*	*243,855*	*89,641*	*218,440*	*12,005*	*282,540*	*73,719*	*384,525*	*985,186*	*627,568*	*4,043,368*

Table 25-3. Comparison of the 2035 CMP Project #23 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	173	29	17	10	40	0	5	26	37	90	13	440
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	449	83	70	23	13	2	118	24	8	90	32	912
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	-56	-18	-13	-3	5	1	-13	-7	9	66	26	-3
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-19	-2	0	-11	0	0	-1	-1	0	0	0	-34
	-1%	*-1%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	55	17	13	20	0	1	12	14	-32	-79	-2	19
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	82	-15	7	2	0	-1	-20	4	1	-47	-4	9
	0%	*-1%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	-19	-1	0	0	0	0	0	-3	0	1	0	-22
	-2%	*-2%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*-1%*
Formal Park-and-ride transit	94	0	0	0	0	0	0	6	0	0	0	100
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*
Kiss-and-ride transit	-374	-3	0	0	0	0	-5	-46	-1	-3	0	-432
	-4%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*-3%*
Walk	-345	-49	-90	-21	-21	0	-140	-2	-38	-29	-19	-754
	-1%	*0%*	*-1%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-36	9	-4	0	2	0	3	-6	-7	-8	0	-47
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	4	50	0	20	39	3	-41	9	-23	81	46	188
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

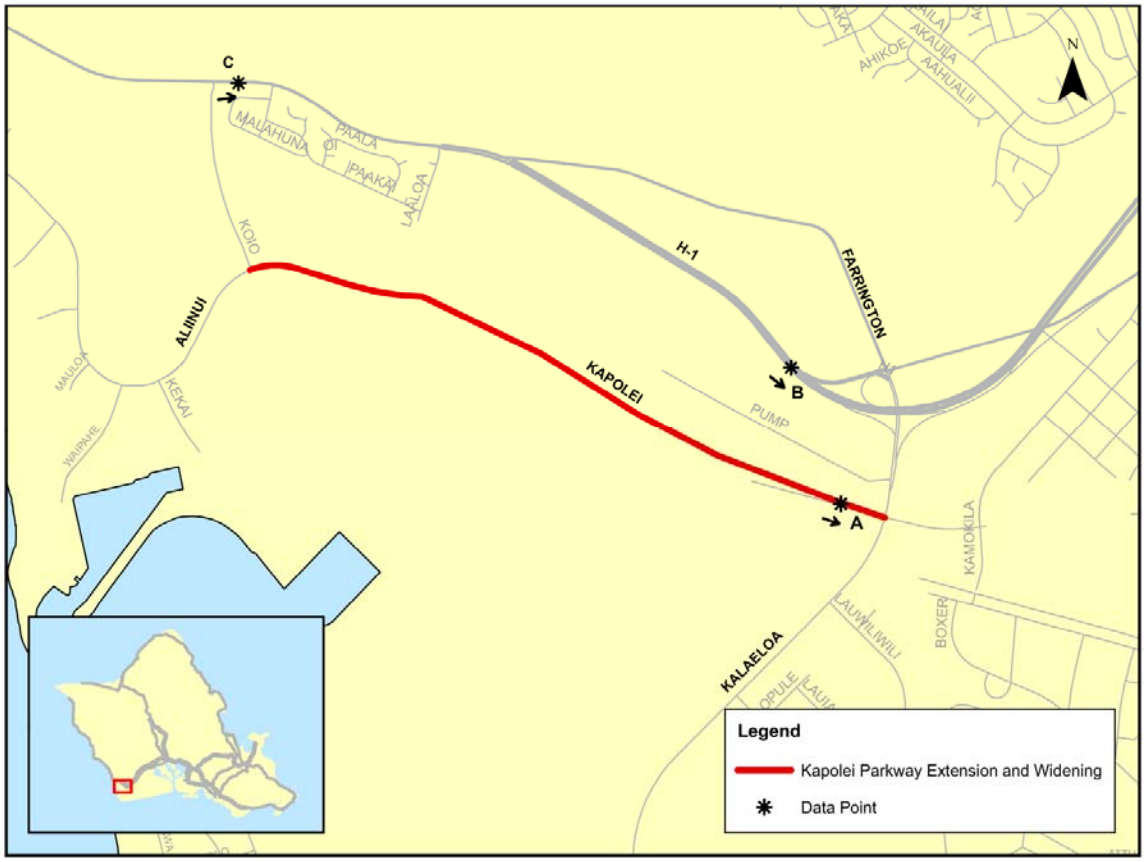
25.3 CMP Project #23 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #23 Package. These include the AM two-hour V/C (Level of Service [LOS[49]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

25.3.1 CMP Project #23 Highway Assignment

Figure 25-1 shows the map of the approximate location of the projects included in the CMP Project #23 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 25-1. CMP Project #23 Map and Data Points



[49] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 25-2 shows that the Kapolei Parkway extension to Ko Olina operated at LOS C and accommodated nearly 4,400 vehicles in the AM two-hour peak period. Also H-1 eastbound at the Kalaeloa Interchange improved from LOS F to LOS E and carried nearly 1,200 fewer vehicles in the AM two-hour peak period. Farrington Highway Koko Head-bound east of Koio Drive also improved from LOS F with a V/C ratio of 1.4 to LOS F with a V/C ratio of 1.1 and carried over 1,800 fewer vehicles in the AM two-hour peak period.

Figure 25-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #23

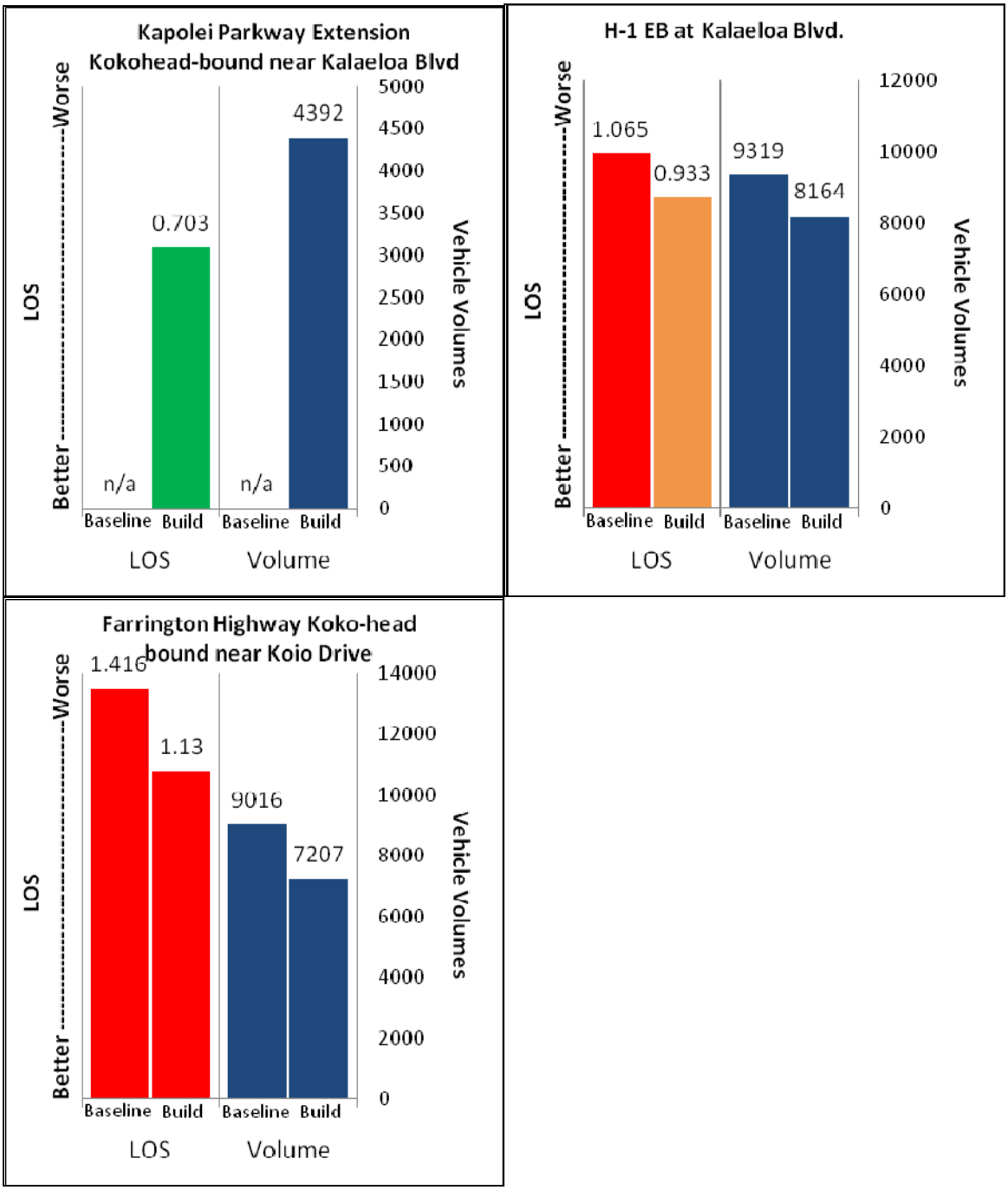


Table 25-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.[50] There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 25-5 with slight decreases on roadways in Area Type 7 (Farrington Highway mauka of Ko Olina, Kapolei Parkway near Kualakai Parkway), and slight increases on roadways in Area Type 5 (new Kapolei Parkway extension to Ko Olina). The parallel roadways, Farrington Highway and Kapolei Parkway, offset each other in this Package.

Table 25-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #23 Package. The model forecasts 88,421 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 39 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 25-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #23 Package. The overall AM two-hour peak period VHT decreases by one percent compared to the Baseline. There are decreases on expressways in Area Types 4, 5 and 7 (Farrington Highway). Moreover, there are slight decreases on arterials and collectors in Area Types 2 (City of Kapolei), 4 (most roadways in Kapolei and Kalaeloa) and 7 (Kapolei Parkway and Renton Road near Kualakai Parkway).

Table 25-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #23 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (34 percent), freeways (30 percent), and expressways (14 percent). Table 25-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #23 Package. Overall AM two-hour peak period VHD decreases by two percent compared to the Baseline with significant decreases on expressways, arterials and collectors.

[50] See Appendix A for area type definitions.

Table 25-4. 2035 CMP Project #23 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,820	507,905	1,175,313	2,706,583	368,093	816,071	234,692	5,960,477
Expressways	0	0	37,450	170,562	445,366	372,901	511,752	159,676	1,697,707
Ramps	0	17,330	35,739	166,039	366,306	28,437	161,564	18,169	793,584
Arterials	127,433	255,436	619,620	725,384	1,536,852	261,508	1,045,399	398,816	4,970,448
Collectors	14,571	33,253	140,041	373,466	771,546	19,146	383,299	39,441	1,774,763
Total	142,004	457,839	1,340,755	2,610,764	5,826,653	1,050,085	2,918,085	850,794	15,196,979

Table 25-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #23 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	-1%	0%	-1%	0%	0%
Ramps	0%	1%	1%	0%	0%	0%	0%	1%	0%
Arterials	0%	1%	0%	0%	1%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Total	0%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 25-6. 2035 CMP Project #23 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	479	2,611	6,005	10,611	908	3,230	559	24,403
Expressways	0	0	170	1,529	2,109	2,639	1,905	645	8,997
Ramps	0	242	468	1,450	3,073	130	1,134	77	6,574
Arterials	969	1,946	4,223	5,373	12,731	1,005	6,360	1,555	34,162
Collectors	102	310	1,005	3,259	6,653	170	2,619	167	14,285
Total	1,071	2,977	8,477	17,616	35,177	4,852	15,248	3,003	88,421

Table 25-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #23 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-1%	-1%	0%	0%	0%	-1%
Expressways	0%	0%	0%	-2%	-15%	2%	-4%	1%	-5%
Ramps	0%	8%	3%	-3%	-1%	0%	1%	0%	-1%
Arterials	0%	-4%	0%	-4%	2%	-1%	-1%	0%	0%
Collectors	0%	-8%	0%	-1%	1%	1%	-5%	-1%	-1%
Total	0%	-3%	0%	-2%	-1%	1%	-2%	0%	-1%

Table 25-8. 2035 CMP Project #23 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	124	1,525	3,050	4,396	37	1,020	29	10,181
Expressways	0	0	75	1,033	981	1,642	684	221	4,636
Ramps	0	167	324	820	1,809	31	647	14	3,812
Arterials	178	538	652	2,156	5,193	147	2,458	220	11,542
Collectors	18	134	221	1,179	1,855	47	756	25	4,235
Total	196	963	2,797	8,238	14,234	1,904	5,565	509	34,406

Table 25-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #23 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	1%	-1%	-2%	0%	0%	0%	-1%
Expressways	0%	0%	0%	-3%	-27%	3%	-9%	2%	-8%
Ramps	0%	8%	5%	-5%	-2%	0%	2%	0%	-1%
Arterials	-1%	-16%	0%	-9%	4%	-3%	0%	0%	-1%
Collectors	0%	-16%	0%	-4%	1%	0%	-12%	-4%	-4%
Total	-1%	-11%	1%	-4%	-2%	2%	-3%	1%	-2%

25.3.2 CMP Project #23 Transit Assignment

Table 25-10 shows the 2035 CMP Project #23 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 25-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #23 Package. Total boardings remain similar to the 2035 Baseline scenario.

Table 25-10. 2035 CMP Project #23 Transit Boardings By Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	173,832	7,571	6,873	72,906	0	261,181
Off-Peak	93,407	0	5,065	27,579	0	126,051
Total	267,239	7,571	11,938	100,485	0	387,233

Table 25-11. Percent Change in Transit Boardings, Baseline to CMP Project #23

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	1%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	1%	0%	0%	0%	0%

25.4 Summary of CMP Project #23 Findings

These are the key findings related to the CMP Project #23 Package:

- The AM two-hour peak period LOS on the Kapolei Parkway extension to Ko Olina operated at LOS C and carried 4,400 vehicles.
- The AM two-hour peak period LOS on Farrington Highway just mauka of Ko Olina improved slightly and carried over 1,800 less vehicles while LOS on H-1 eastbound near the Kalaeloa Interchange improved from LOS F to LOS E and carried 1,200 less vehicles. This shows that the Kapolei Parkway extension provided another route out of Ko Olina.
- The AM two-hour peak period VHT decreased one percent compared to the Baseline with a five percent decrease for expressways (Farrington Highway).
- The AM two-hour peak period VHD decreased two percent compared to the Baseline with an eight percent decrease for expressways (Farrington Highway).

26 CMP Project # 24 Package – Makakilo Mauka Frontage Road Project

This chapter provides the analysis results of the CMP Project #24 Package.

26.1 CMP Project #24 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Construct a new two-lane Makakilo Mauka Frontage Road, mauka of Interstate Route H-1, from Farrington Highway to Makakilo Drive.

This new roadway will provide a parallel alternative to H-1 on the mauka end between Makakilo Drive and Farrington Highway.

26.2 CMP Project #24 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #24 Package.

Table 26-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #24 Package mode share remains similar to the Baseline scenario.

Table 26-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #24 Package

Mode	2035 Baseline		2035 CMP Project #24		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,336,014	83%	0%
Transit	245,640	6%	245,682	6%	0%
Bike/walk	461,594	11%	461,509	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,205	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,085	32%	0%
Transit	30,225	8%	30,253	8%	0%
Taxi	9,531	3%	9,541	3%	0%
Tour Bus	57,915	15%	57,955	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,099	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,815	26%	0%
Transit	4,471	4%	4,461	4%	0%
Taxi	17,218	15%	17,233	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,704	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,310*	*100%*	*0%*

Table 26-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #24 Package scenario as compared to the 2035 Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 26-3 shows the comparison of the 2035 CMP Project #24 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #24 Package. This table shows that the CMP Project #24 Package mode share is similar to the Baseline.

Table 26-2. 2035 CMP Project #24 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,251	81,424	162,236	29,254	115,871	2,956	8,249	35,862	112,458	264,179	142,237	1,492,977
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,778	73,759	42,099	33,742	29,915	1,709	65,343	8,505	131,890	300,652	221,532	1,059,924
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,973	46,433	12,665	15,971	11,647	427	104,822	2,869	95,430	247,260	204,616	783,113
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,406	219	2	524	0	0	236	203	0	0	0	4,590
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,382	4,244	7,102	5,143	4,467	4,542	16,074	9,463	9,907	26,078	3,666	146,068
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,495	1,853	5,037	1,844	1,678	1,115	3,190	5,752	1,320	10,614	1,855	61,753
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,127	48	0	7	0	0	259	95	138	215	0	1,889
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,566	0	0	0	0	0	4	1,563	11	536	0	14,680
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,652	252	15	0	1	1	1,551	1,840	751	1,636	3	16,702
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,719	10,807	13,751	3,106	52,719	1,239	74,385	4,127	30,075	122,533	51,076	415,537
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,604	1,857	950	33	2,106	12	8,466	3,431	2,567	11,406	2,540	45,972
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,953*	*220,896*	*243,857*	*89,624*	*218,404*	*12,001*	*282,579*	*73,710*	*384,547*	*985,109*	*627,525*	*4,043,205*

Table 26-3. Comparison of the 2035 CMP Project #24 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-2	11	4	3	21	-1	-2	10	2	13	6	65
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-23	-1	-1	2	6	1	-38	-3	1	10	14	-32
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	0	-6	6	-1	3	0	20	-2	1	2	12	35
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-42	-3	0	-3	0	0	-1	-2	0	0	0	-51
	-1%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	31	1	6	5	2	1	2	13	4	16	-1	80
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	10	3	-4	0	-1	-1	4	-10	-2	-1	-4	-6
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	2	0	0	0	0	0	0	-2	0	1	0	1
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-2%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	18	0	0	0	0	0	0	-2	0	-1	0	15
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	3	0	1	0	0	0	2	-2	-1	0	0	3
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	13	2	-10	-3	-28	-1	15	1	-6	-36	-24	-77
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-2	-1	0	0	0	0	-4	-1	0	0	0	-8
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	8	6	2	3	3	-1	-2	0	-1	4	3	25
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

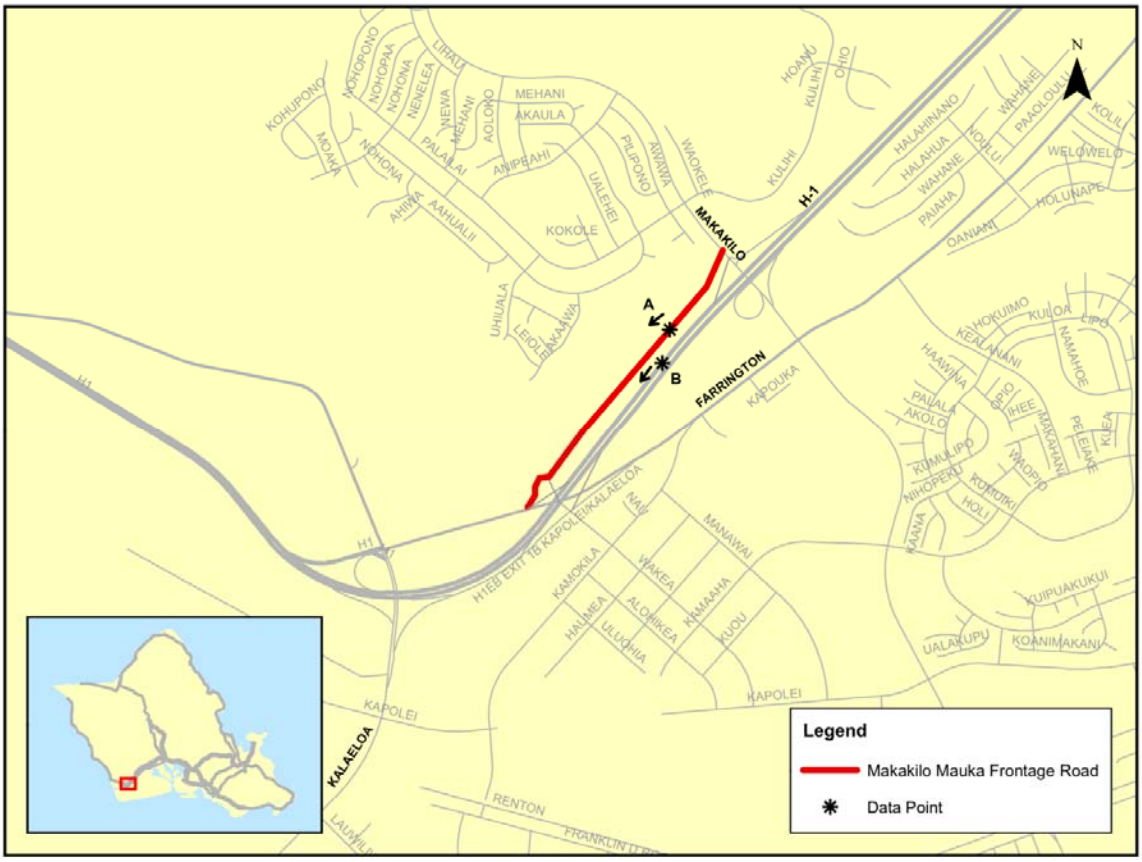
26.3 CMP Project #24 Package Assignment Results

This section describes the results from the travel demand forecasting model run for CMP Project #24. These include the AM two-hour V/C (Level of Service [LOS[51]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

26.3.1 CMP Project #24 Highway Assignment

Figure 26-1 shows the map of the approximate location of the projects included in the CMP Project #24 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 26-1. CMP Project #24 Map and Data Points



[51] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Table 26-2 shows that Makakilo Mauka Frontage Road operates at LOS C and accommodates over 1,400 vehicles in the AM two-hour peak period. Also H-1 westbound after the Makakilo Interchange improves slightly in the AM two-hour peak period.

Figure 26-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #24

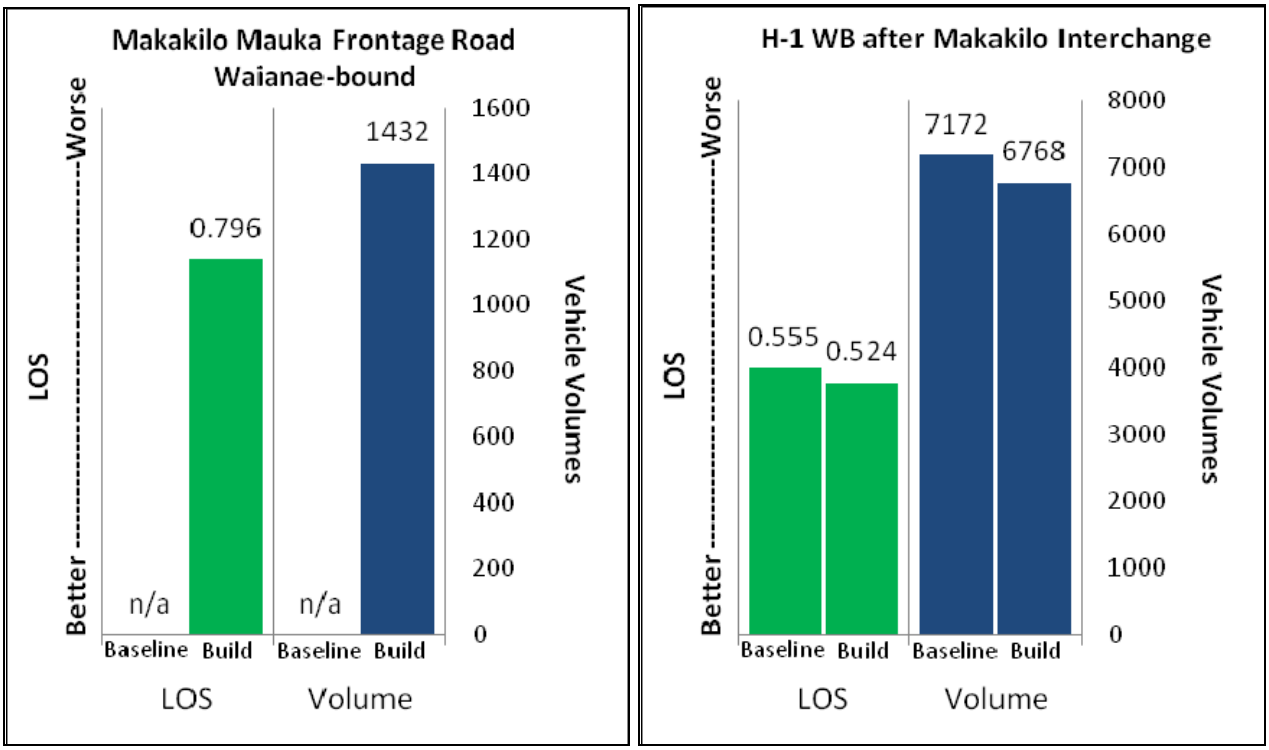


Table 26-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.52 There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 26-5 with slight decreases on roadways in Area Type 2 (City of Kapolei).

Table 26-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #24 Package. The model forecasts 88,223 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 26-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #24 Package. The overall AM two-hour peak period VHT remains similar to the Baseline. There are slight decreases on arterials in Area Type 4 (Farrington Highway, parallel to the Makakilo Mauka Frontage Road), and slight increases on arterials and collectors in Area Type 5 (Farrington Highway near Wet and Wild Hawaii, and the new Makakilo Mauka Frontage Road).

[52] See Appendix A for Area Type definitions.

Table 26-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #24 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (33 percent), freeways (29 percent), and expressways (14 percent). Table 26-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #24 Package. Overall AM two-hour peak period VHD remains similar to the Baseline with slight decreases on arterials in Area Type 4 and slight increases on arterials and collectors in Area Type 5.

Table 26-4. 2035 CMP Project #24 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	151,923	508,123	1,176,384	2,710,841	368,400	815,225	234,602	5,965,498
Expressways	0	0	37,459	170,467	448,177	372,642	514,925	159,781	1,703,451
Ramps	0	16,993	35,681	166,609	366,559	28,460	161,467	18,062	793,831
Arterials	127,432	251,724	619,401	719,185	1,525,744	261,524	1,045,722	399,191	4,949,923
Collectors	14,537	33,074	139,980	373,583	779,387	19,145	388,587	39,394	1,787,687
Total	141,969	453,714	1,340,644	2,606,228	5,830,708	1,050,171	2,925,926	851,030	15,200,390

Table 26-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #24 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	-1%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	-1%	0%	-1%	0%	0%	-1%	0%	0%
Collectors	0%	-1%	0%	0%	1%	0%	0%	0%	0%
Total	0%	-1%	0%	0%	0%	0%	0%	0%	0%

Table 26-6. 2035 CMP Project #24 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	482	2,602	6,024	10,672	911	3,214	557	24,462
Expressways	0	0	170	1,560	2,499	2,604	1,980	642	9,455
Ramps	0	227	447	1,485	3,116	130	1,121	76	6,602
Arterials	971	2,033	4,227	5,464	12,580	1,004	6,353	1,558	34,190
Collectors	102	342	1,007	3,297	6,682	168	2,750	166	14,514
Total	1,073	3,084	8,453	17,830	35,549	4,817	15,418	2,999	89,223

Table 26-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #24 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	1%	-1%	-1%	0%	0%	0%	-1%	0%
Arterials	0%	0%	0%	-2%	1%	-1%	-1%	0%	0%
Collectors	0%	1%	0%	0%	1%	-1%	0%	-2%	0%
Total	0%	0%	0%	-1%	0%	0%	-1%	0%	0%

Table 26-8. 2035 CMP Project #24 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	125	1,515	3,067	4,478	37	1,014	29	10,265
Expressways	0	0	75	1,062	1,352	1,608	755	219	5,071
Ramps	0	157	303	850	1,848	32	636	15	3,841
Arterials	179	642	653	2,279	5,125	148	2,450	221	11,697
Collectors	18	163	222	1,232	1,852	46	848	25	4,406
Total	197	1,087	2,768	8,490	14,655	1,871	5,703	509	35,280

Table 26-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #24 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	4%	0%	-1%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	-1%	1%	1%	0%	1%	0%
Ramps	0%	1%	-2%	-2%	0%	3%	0%	7%	0%
Arterials	0%	0%	0%	-3%	2%	-2%	-1%	1%	0%
Collectors	0%	3%	0%	0%	1%	-2%	-1%	-4%	0%
Total	0%	1%	0%	-1%	1%	0%	0%	1%	0%

26.3.2 CMP Project #24 Transit Assignment

Table 26-10 shows the 2035 CMP Project #24 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 26-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #24 Package. Total boardings remain similar to the 2035 Baseline scenario.

Table 26-10. 2035 CMP Project #24 Transit Boardings By Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,146	7,498	6,853	73,157	0	261,655
Off-Peak	93,555	0	5,073	27,554	0	126,182
Total	267,701	7,498	11,926	100,711	0	387,836

Table 26-11. Percent Change in Transit Boardings, Baseline to CMP Project #24

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

26.4 Summary of CMP Project #24 Findings

These are the key findings related to the CMP Project #24 Package:

- The AM two-hour peak period LOS on new Makakilo Mauka Frontage Road in the Waianae-bound direction operated at LOS C (nearly LOS D) and carried over 1,400 vehicles.
- The overall AM two-hour peak period VHT and VHD remains similar to the Baseline. There are slight decreases on arterials in Area Type 4 (Farrington Highway, parallel to the Makakilo Mauka Frontage Road), and slight increases on arterials and collectors in Area Type 5 (Farrington Highway near Wet and Wild Hawaii, and the new Makakilo Mauka Frontage Road).
- The new Makakilo Mauka Frontage Road provided another option for travelers from the Makakilo area to Kapolei.

27 CMP Project # 25 Package – H-1 Waipahu/ Makakilo Projects

This chapter provides the analysis results of the CMP Project #25 Package.

27.1 CMP Project #25 Package Definition

This CMP Package includes all the projects in the Baseline plus the following two projects:

- Widen the Interstate Route H-1 by one lane, in the westbound direction, through the Waiawa Interchange. This project will begin in the vicinity of the Waiawa Interchange and end at the Paiwa Interchange.
  - From two to three lanes in AM peak
  - From four to five lanes in PM peak
- Construct two new lanes in the freeway median for HOV use, one in the westbound direction and one in the eastbound direction, on Interstate Route H-1, from the Waiawa Interchange to the Makakilo Interchange.

The H-1 westbound widening project is located on the Baseline scenario's congested H-1 westbound section between the Waiawa Interchange and the Paiwa Interchange. See Table 2-6 number 26.

27.2 CMP Project #25 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #25 Package.

Table 27-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #25 mode share remains similar to the 2035 Baseline scenario.

Table 27-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #25 Package

Mode	2035 Baseline		2035 CMP Project #25		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,337,033	83%	0%
Transit	245,640	6%	245,237	6%	0%
Bike/walk	461,594	11%	461,030	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,300	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,138	32%	0%
Transit	30,225	8%	30,245	8%	0%
Taxi	9,531	3%	9,551	3%	0%
Tour Bus	57,915	15%	57,949	16%	0%
Bike/Walk	155,150	42%	154,265	41%	-1%
Total Trips by Visitors	373,680	100%	373,148	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,799	26%	0%
Transit	4,471	4%	4,456	4%	0%
Taxi	17,218	15%	17,220	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,738	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,454*	*100%*	*0%*

Table 27-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #25 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 27-3 shows the comparison of the 2035 CMP Project #25 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #25 Package. This table shows that the CMP Project #25 Package had over 1,000 more vehicle person-trips of which nearly 870 were three-plus occupant vehicle person trips compared to the Baseline. There were also 400 fewer transit trips compared to the Baseline.

Table 27-2. 2035 CMP Project #25 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,260	81,372	162,206	29,244	115,873	2,957	8,248	35,898	112,470	264,214	142,238	1,492,980
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,872	73,745	42,119	33,755	29,915	1,709	65,376	8,511	131,885	300,687	221,533	1,060,107
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,394	46,567	12,754	15,991	11,647	427	104,939	2,894	95,426	247,290	204,617	783,946
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,432	220	2	524	0	0	237	204	0	0	0	4,619
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,169	4,235	7,077	5,127	4,464	4,541	16,059	9,422	9,894	26,053	3,665	145,706
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,443	1,847	5,025	1,854	1,679	1,116	3,209	5,748	1,321	10,598	1,856	61,696
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,121	48	0	7	0	0	259	96	138	214	0	1,883
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,582	-1	0	0	0	0	4	1,555	11	538	0	14,689
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,595	252	14	0	1	1	1,550	1,841	752	1,635	3	16,644
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,538	10,790	13,715	3,102	52,747	1,240	74,225	4,120	30,067	122,517	51,094	415,155
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,548	1,852	946	32	2,106	12	8,450	3,425	2,565	11,400	2,539	45,875
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,954*	*220,927*	*243,858*	*89,636*	*218,432*	*12,003*	*282,556*	*73,714*	*384,529*	*985,146*	*627,545*	*4,043,300*

Table 27-3. Comparison of the 2035 CMP Project #25 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	7	-41	-26	-7	23	0	-3	46	14	48	7	68
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	71	-15	19	15	6	1	-5	3	-4	45	15	151
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	421	128	95	19	3	0	137	23	-3	32	13	868
	1%	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-16	-2	0	-3	0	0	0	-1	0	0	0	-22
	0%	*-1%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	-182	-8	-19	-11	-1	0	-13	-28	-9	-9	-2	-282
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-42	-3	-16	10	0	0	23	-14	-1	-17	-3	-63
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	-4	0	0	0	0	0	0	-1	0	0	0	-5
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	34	-1	0	0	0	0	0	-10	0	1	0	24
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-54	0	0	0	0	0	1	-1	0	-1	0	-55
	-1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	-168	-15	-46	-7	0	0	-145	-6	-14	-52	-6	-459
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	-58	-6	-4	-1	0	0	-20	-7	-2	-6	-1	-105
	0%	*0%*	*0%*	*-3%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	9	37	3	15	31	1	-25	4	-19	41	23	120
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

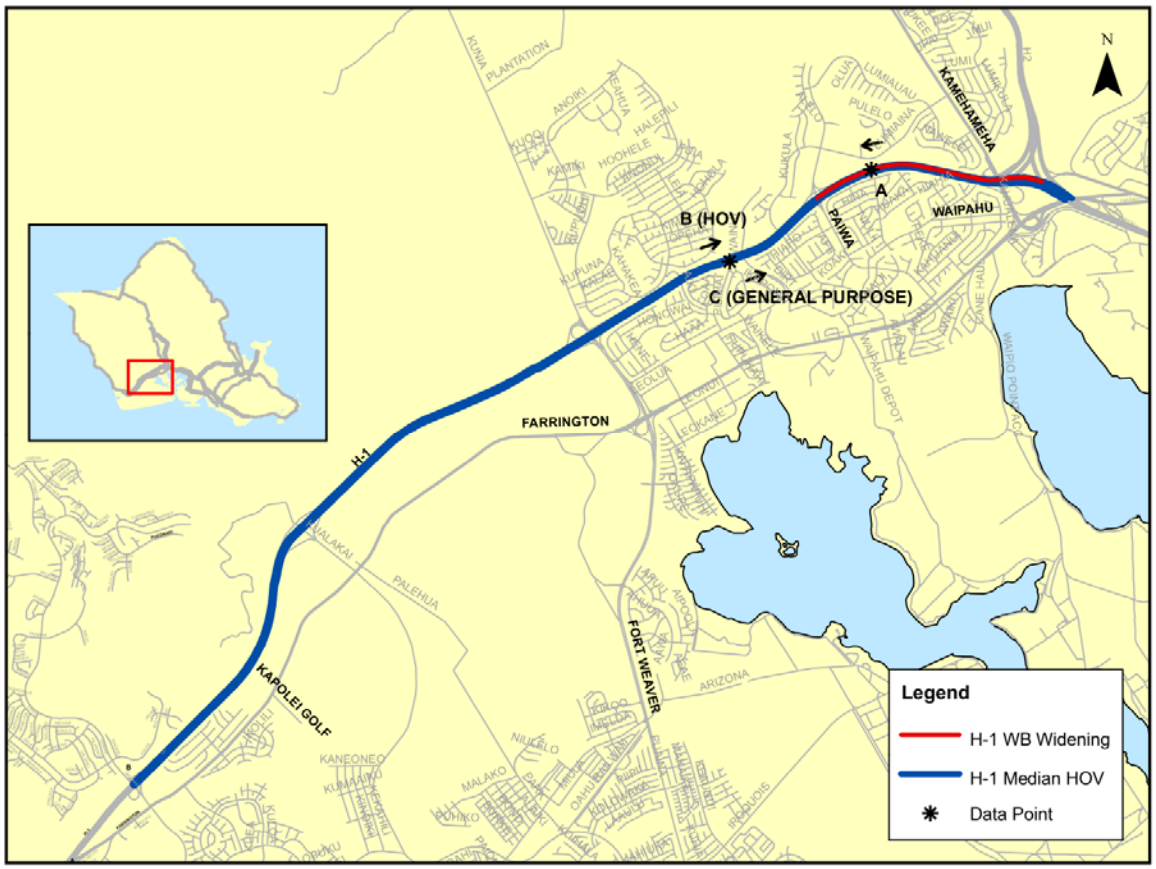
27.3 CMP Project #25 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #25 Package. These include the AM two-hour V/C (Level of Service [LOS[53]]) and corresponding vehicular volume of the planned project, the daily VMT, AM two-hour peak period VHT and VHD. Daily transit boardings by mode are also discussed.

27.3.1 CMP Project #25 Highway Assignment

Figure 27-1 shows the map of the approximate location of the projects included in the CMP Project #25 Package and the data points with the direction used for the AM two-hour peak period V/C (LOS) and vehicular volumes.

Figure 27-1. CMP Project #25 Map and Data Points



[53] V/C values less than or equal to 0.8 correspond to LOS A to C (graph is green), i.e., congestion free or vehicles traveling at or near posted speed limit. V/C values between 0.81 and 0.9 correspond to LOS D (graph is yellow), i.e., speeds remain at or near posted speed limit, though roadway approaching vehicle demands that could begin to slow traffic. V/C values between 0.91 and 1.0 correspond to LOS E (graph is orange), i.e., roadway is at capacity and vehicles braking, merging, or minor incidents can cause a serious breakdown with extensive queuing. V/C values greater than 1.0 correspond to LOS F (graph is red), i.e. roadway exceeds capacity and weaves, braking, and incidents create extended stop-and-go traffic conditions.

Figure 27-2 shows that with the widening of the H-1 Freeway in the westbound direction improved LOS from B to A while accommodating nearly 600 more vehicles in the AM two-hour peak period. The H-1 median HOV in the eastbound direction after the Kunia Interchange operated at LOS D but improved the parallel H-1 general purpose lanes LOS from F to D in the AM two-hour peak period.

Figure 27-2. AM Two-Hour LOS–V/C and Vehicular Volumes for CMP Project #25

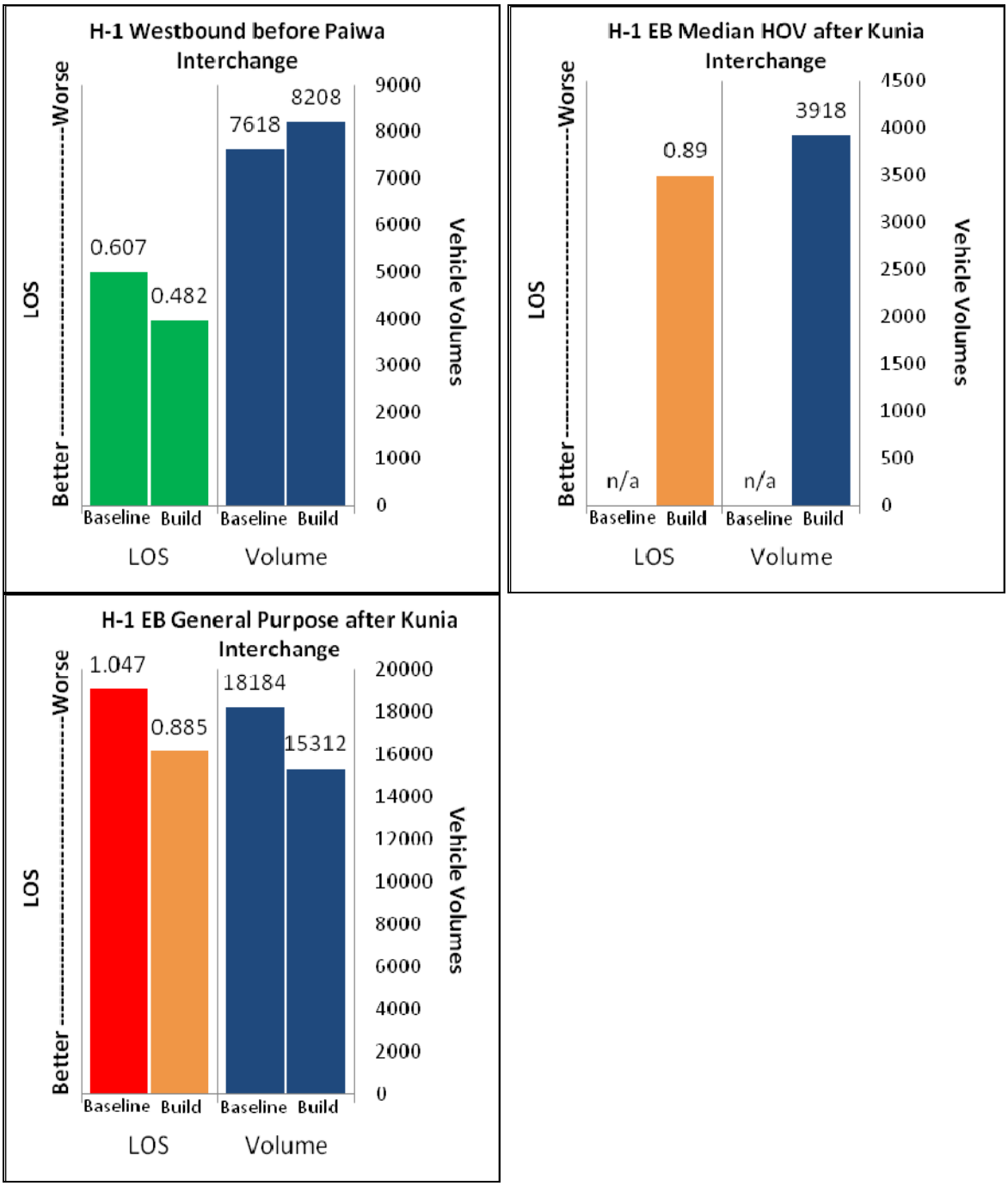


Table 27-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.54 There is a negligible change from the Baseline scenario on islandwide VMT as shown in the comparison in Table 27-5 with a small increase on freeways in Area Type 8 (the new H-1 median HOV facility near the Kunia Interchange).

Table 27-6 shows the AM two-hour peak period VHT by Facility Type and Area Type for the 2035 CMP Project #25 Package. The model forecasts 88,925 hours of travel in the AM two-hour peak period. As in the Baseline scenario, arterials are expected to carry the greatest share of AM two-hour peak period VHT, with 38 percent of the total, followed by freeways (27 percent) and collectors (16 percent). Table 27-7 shows the percent change in AM two-hour peak period VHT from the 2035 Baseline scenario to the 2035 CMP Project #25 Package. The overall AM two-hour peak period VHT remains similar to the Baseline. There are slight increases on freeways in Area Type 8 (H-1 median HOV near Kunia Interchange). Moreover, there are slight decreases on freeways in Area Type 4 (H-1 median HOV and general purpose lanes between the Kapolei and Kunia Interchanges).

Table 27-8 shows the AM two-hour peak period VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #25 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (34 percent), freeways (28 percent), and expressways (15 percent). Table 27-9 shows the percent change in AM two-hour peak period VHD between the 2035 Baseline and the 2035 CMP Project #25 Package. Overall AM two-hour peak period VHD decreases by one percent compared to the Baseline with increases on freeways in Area Type 8 and decreases on freeways in Area Type 4.

[54] See Appendix A for Area Type definitions.

Table 27-4. 2035 CMP Project #25 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,390	508,037	1,189,087	2,721,502	368,895	811,915	268,901	6,020,727
Expressways	0	0	37,501	170,468	448,893	372,620	515,098	159,709	1,704,289
Ramps	0	17,213	35,642	167,147	367,981	28,457	162,577	18,327	797,344
Arterials	127,540	253,727	619,857	722,963	1,525,127	261,632	1,045,867	398,966	4,955,679
Collectors	14,607	33,395	139,873	372,882	771,571	19,125	388,899	39,450	1,779,802
Total	142,147	456,725	1,340,910	2,622,547	5,835,074	1,050,729	2,924,356	885,353	15,257,841

Table 27-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #25 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	1%	0%	0%	0%	14%	1%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	1%	1%	1%	0%	0%	1%	2%	1%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	4%	0%

Table 27-6. 2035 CMP Project #25 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	481	2,587	5,621	10,471	913	3,248	767	24,088
Expressways	0	0	170	1,565	2,491	2,612	1,977	643	9,458
Ramps	0	231	449	1,541	3,182	130	1,143	82	6,758
Arterials	969	2,031	4,222	5,565	12,473	1,002	6,381	1,548	34,191
Collectors	102	341	1,002	3,253	6,631	169	2,763	169	14,430
Total	1,071	3,084	8,430	17,545	35,248	4,826	15,512	3,209	88,925

Table 27-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #25 AM Two-Hour Peak Period VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	-7%	-2%	0%	1%	37%	-2%
Expressways	0%	0%	0%	0%	0%	1%	0%	0%	0%
Ramps	0%	3%	-1%	3%	2%	0%	2%	6%	2%
Arterials	0%	0%	0%	0%	0%	-1%	-1%	-1%	0%
Collectors	0%	1%	0%	-1%	0%	0%	0%	0%	0%
Total	0%	0%	0%	-2%	0%	0%	0%	7%	0%

Table 27-8. 2035 CMP Project #25 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	123	1,501	2,642	4,247	37	1,060	62	9,672
Expressways	0	0	75	1,067	1,343	1,616	752	219	5,072
Ramps	0	161	305	898	1,904	31	653	17	3,969
Arterials	177	643	652	2,358	5,023	146	2,477	218	11,694
Collectors	18	162	220	1,205	1,846	47	862	26	4,386
Total	195	1,089	2,753	8,170	14,363	1,877	5,804	542	34,793

Table 27-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #25 AM Two-Hour Peak Period VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	3%	-1%	-15%	-6%	0%	4%	114%	-6%
Expressways	0%	0%	0%	0%	0%	1%	0%	1%	0%
Ramps	0%	4%	-2%	4%	3%	0%	3%	21%	3%
Arterials	-1%	0%	0%	0%	0%	-3%	0%	0%	0%
Collectors	0%	2%	-1%	-2%	0%	0%	1%	0%	0%
Total	-1%	1%	-1%	-5%	-1%	1%	1%	7%	-1%

27.3.2 CMP Project #25 Transit Assignment

Table 27-10 shows the 2035 CMP Project #25 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 27-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #25 Package. Total boardings remain similar to the 2035 Baseline scenario.

Table 27-10. 2035 CMP Project #25 Transit Boardings By Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	173,612	7,502	6,834	73,064	0	261,012
Off-Peak	93,510	0	5,031	27,546	0	126,087
Total	267,122	7,502	11,865	100,610	0	387,100

Table 27-11. Percent Change in Transit Boardings, Baseline to CMP Project #25

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	-1%	0%	0%	0%
Total	0%	0%	-1%	0%	0%	0%

27.4 Summary of CMP Project #25 Findings

These are the key findings related to the CMP Project #25 Package:

- The AM two-hour peak period LOS on the westbound H-1 lanes near the Waiawa Interchange improved from LOS B to LOS A, while carrying nearly 600 more vehicles.
- The AM two-hour peak period LOS on H-1 median HOV in the eastbound direction after the Kunia Interchange operated at LOS D and carried 3,900 vehicles. This relieved the congested H-1 general purpose lanes in this same area. LOS improved from F to D.
- The AM two-hour peak period overall VHT remain similar to the Baseline with a 37 percent increase for freeways in Area Type 8 (H-1 median HOV near the Kunia Interchange) and a seven percent decrease for freeways in Area Type 4 (H-1 between the Kapolei and Kunia Interchanges).
- The AM two-hour peak period overall VHD decreased one percent compared to the Baseline with a 114 percent increase for freeways in Area Type 8 (H-1 median HOV near the Kunia Interchange) and a 15 percent decrease for freeways in Area Type 4 (H-1 between the Kapolei and Kunia Interchanges).

28 CMP Project # 26 Package – PM Contraflow Western End Extension Project

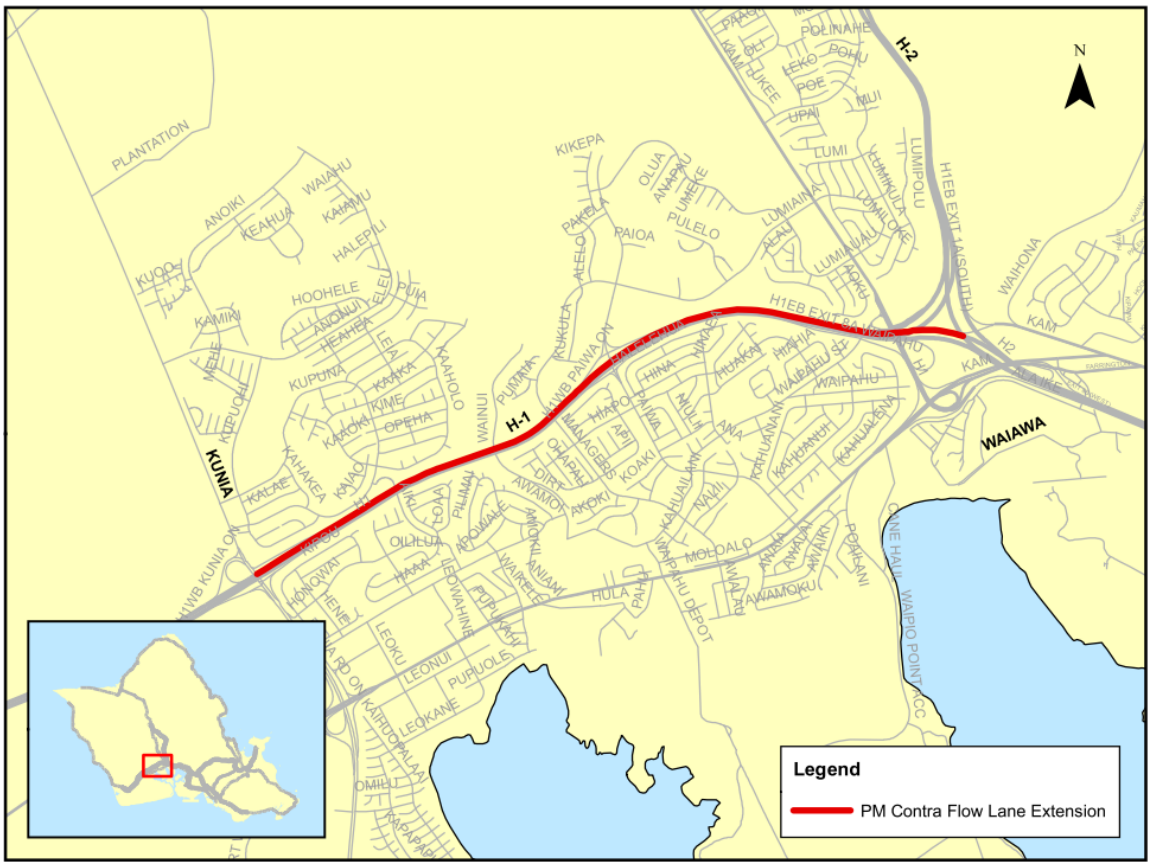
This chapter provides the analysis results of the CMP Project #26 Package.

28.1 CMP Project #26 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend PM contraflow lane westbound from Waiawa Interchange to Kunia Interchange. Figure 28-1 shows the location of the project.

Figure 28-1. CMP Project #26 Map



28.2 CMP Project #26 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #26 Package.

Table 28-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground

access air passenger trips are made by shuttle bus. The CMP Project #26 Package mode share remains similar to the Baseline scenario.

Table 28-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #26 Package

Mode	2035 Baseline		2035 CMP Project #26		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,335,875	83%	0%
Transit	245,640	6%	245,645	6%	0%
Bike/walk	461,594	11%	461,660	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,180	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	121,080	32%	0%
Transit	30,225	8%	30,249	8%	0%
Taxi	9,531	3%	9,544	3%	0%
Tour Bus	57,915	15%	57,963	16%	0%
Bike/Walk	155,150	42%	154,267	41%	-1%
Total Trips by Visitors	373,680	100%	373,103	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,816	26%	0%
Transit	4,471	4%	4,458	4%	0%
Taxi	17,218	15%	17,234	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,705	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,289*	*100%*	*0%*

Table 28-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #26 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 28-3 shows the comparison of the 2035 CMP Project #26 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #26 Package. This table shows that the CMP Project #26 Package mode share is similar to the Baseline.

Table 28-2. 2035 CMP Project #26 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,182	81,402	162,224	29,251	115,849	2,957	8,249	35,890	112,456	264,162	142,232	1,492,854
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,795	73,756	42,098	33,739	29,908	1,708	65,373	8,503	131,891	300,639	221,519	1,059,929
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	40,988	46,446	12,663	15,971	11,644	427	104,798	2,863	95,431	247,256	204,605	783,092
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,421	220	2	526	0	0	236	204	0	0	0	4,609
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,416	4,246	7,103	5,140	4,465	4,541	16,075	9,469	9,907	26,071	3,665	146,098
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,451	1,849	5,035	1,841	1,678	1,115	3,186	5,727	1,321	10,613	1,857	61,673
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,130	48	0	7	0	0	259	96	138	214	0	1,892
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,571	0	0	0	0	0	4	1,558	11	537	0	14,681
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,648	253	15	0	1	1	1,549	1,837	751	1,634	3	16,692
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*	*0%*	*0%*	*0%*
Walk	51,738	10,809	13,768	3,110	52,745	1,240	74,383	4,128	30,078	122,572	51,100	415,671
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,613	1,858	950	33	2,106	12	8,471	3,434	2,566	11,406	2,540	45,989
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,953*	*220,887*	*243,858*	*89,618*	*218,396*	*12,001*	*282,583*	*73,709*	*384,550*	*985,104*	*627,521*	*4,043,180*

Table 28-3. Comparison of the 2035 CMP Project #26 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-71	-11	-8	0	-1	0	-2	38	0	-4	1	-58
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	-6	-4	-2	-1	-1	0	-8	-5	2	-3	1	-27
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	15	7	4	-1	0	0	-4	-8	2	-2	1	14
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-27	-2	0	-1	0	0	-1	-1	0	0	0	-32
	-1%	*-1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	65	3	7	2	0	0	3	19	4	9	-2	110
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-34	-1	-6	-3	-1	-1	0	-35	-1	-2	-2	-86
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	5	0	0	0	0	0	0	-1	0	0	0	4
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	23	0	0	0	0	0	0	-7	0	0	0	16
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	-1	1	1	0	0	0	0	-5	-1	-2	0	-7
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	32	4	7	1	-2	0	13	2	-3	3	0	57
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	7	0	0	0	0	0	1	2	-1	0	0	9
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	8	-3	3	-3	-5	-1	2	-1	2	-1	-1	0
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

28.3 CMP Project #26 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #26 Package. These include the daily VMT, VHT and VHD. Daily transit boardings by mode are also discussed.

28.3.1 CMP Project #26 Highway Assignment

Table 28-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.55 There is a negligible change from the Baseline scenario on islandwide VMT, as shown in the comparison in Table 28-5.

Table 28-6 shows the daily VHT by Facility Type and Area Type for the 2035 CMP Project #26 Package. The model forecasts 463,361 hours of travel daily. As in the Baseline scenario, arterials are expected to carry the greatest share of the daily VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 28-7 shows the percent change in daily VHT from the 2035 Baseline scenario to the 2035 CMP Project #26 Package. The overall daily VHT remains similar to the Baseline.

Table 28-8 shows the daily VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #26 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (30 percent), freeways (28 percent), and ramps (18 percent). Table 28-9 shows the percent change in daily VHD between the 2035 Baseline and the 2035 CMP Project #26 Package. Overall daily VHD decreases by one percent compared to the Baseline with most of the decrease on freeways.

[55] See Appendix A for Area Type definitions.

Table 28-4. 2035 CMP Project #26 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,221	508,335	1,177,914	2,713,504	368,803	814,756	235,035	5,970,568
Expressways	0	0	37,536	170,404	448,258	372,582	514,878	159,765	1,703,423
Ramps	0	17,100	35,699	166,667	367,020	28,448	161,335	18,116	794,385
Arterials	127,399	253,571	619,509	721,867	1,524,865	261,430	1,045,916	399,518	4,954,075
Collectors	14,546	33,315	139,543	373,195	772,111	19,133	388,962	39,353	1,780,158
Total	141,945	456,207	1,340,622	2,610,047	5,825,758	1,050,396	2,925,847	851,787	15,202,609

Table 28-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #26 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 28-6. 2035 CMP Project #26 Daily VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	3,807	16,264	25,182	55,926	6,941	16,016	4,702	128,838
Expressways	0	0	861	5,210	10,527	9,190	10,767	3,125	39,680
Ramps	0	1,645	2,604	10,238	17,303	654	7,528	881	40,853
Arterials	5,794	12,713	28,836	28,313	55,146	7,526	30,173	9,339	177,840
Collectors	720	2,618	7,252	17,431	33,857	675	12,593	1,004	76,150
Total	6,514	20,783	55,817	86,374	172,759	24,986	77,077	19,051	463,361

Table 28-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #26 Daily VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	-1%	0%	0%	-2%	0%	0%
Expressways	0%	0%	0%	-1%	0%	0%	0%	0%	0%
Ramps	0%	0%	2%	1%	0%	0%	-1%	2%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	-1%	0%	0%

Table 28-8. 2035 CMP Project #26 Daily VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	1,311	7,932	6,182	12,855	1,086	3,084	970	33,420
Expressways	0	0	214	2,322	3,056	2,979	2,326	505	11,402
Ramps	0	1,085	1,578	5,643	8,758	80	3,920	498	21,562
Arterials	697	2,570	4,054	7,928	12,052	981	5,990	836	35,108
Collectors	138	1,285	1,670	4,677	6,965	104	2,442	131	17,412
Total	835	6,251	15,448	26,752	43,686	5,230	17,762	2,940	118,904

Table 28-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #26 Daily VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	-1%	-3%	0%	0%	-8%	1%	-1%
Expressways	0%	0%	0%	-1%	0%	0%	-1%	0%	0%
Ramps	0%	0%	2%	2%	0%	-1%	-2%	3%	1%
Arterials	0%	0%	0%	-1%	1%	-1%	0%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	-1%	0%	0%	-2%	1%	0%

28.3.2 CMP Project #26 Transit Assignment

Table 28-10 shows the 2035 CMP Project #26 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 28-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #26 Package. Total boardings remain similar to the 2035 Baseline scenario.

Table 28-10. 2035 CMP Project #26 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,132	7,525	6,883	73,058	0	261,598
Off-Peak	93,508	0	5,083	27,553	0	126,144
Total	267,640	7,525	11,966	100,611	0	387,742

Table 28-11. Percent Change in Transit Boardings, Baseline to CMP Project #26

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

28.4 Summary of CMP Project #26 Findings

These are the key findings related to the CMP Project #26 Package:

- The overall daily VMT, VHT, and VHD remained similar to the Baseline with some decreases on freeways (PM contra flow extension through the Waiawa merge provides some relief to the congested Waiawa Interchange).

29 CMP Project # 27 Package – PM Contraflow Eastern End Extension Project

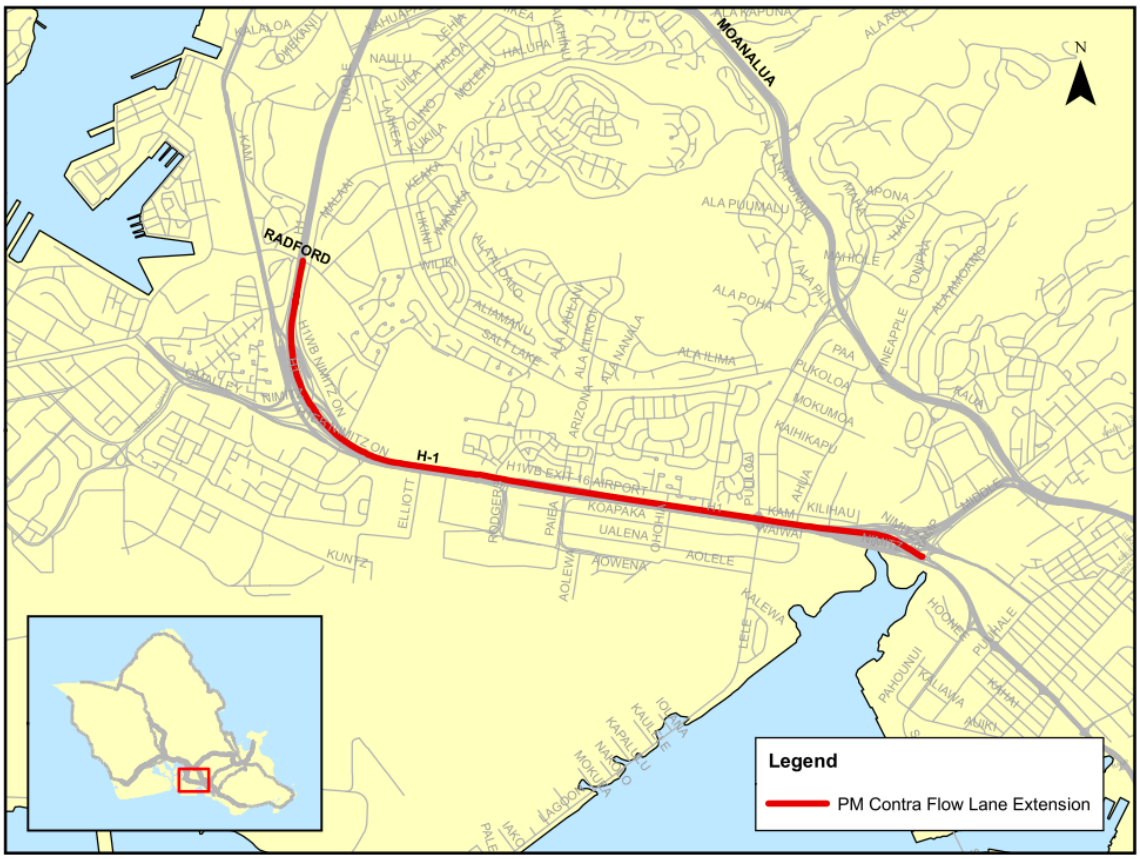
This chapter provides the analysis results of the CMP Project #27 Package.

29.1 CMP Project #27 Package Definition

This CMP Package includes all the projects in the Baseline plus the following project:

- Extend PM contra-flow lane westbound from Keehi Interchange to Radford Drive. Figure 29-1 shows the location of the project.

Figure 29-1. CMP Project #27 Map



29.2 CMP Project #27 Person Trips by Purpose and Mode

This section describes travel demand forecasting model results as reflected by islandwide person trips and mode choice associated with the 2035 CMP Project #27 Package.

Table 29-1 shows that the majority of resident trips are made by automobile, the majority of visitor trips are made by walking or biking, and the majority of ground access air passenger trips are made by shuttle bus. The CMP Project #27 Package mode share remains similar to the 2035 Baseline scenario.

Table 29-1. Total Daily Person Trips by Mode—2035 Baseline and 2035 CMP Project #27 Package

Mode	2035 Baseline		2035 CMP Project #27		Percentage Growth
	Number	Percent by Category	Number	Percent by Category	
Trips by Residents					
Private automobile	3,335,946	83%	3,335,902	83%	0%
Transit	245,640	6%	245,659	6%	0%
Bike/walk	461,594	11%	461,630	11%	0%
Total Trips by Residents	4,043,180	100%	4,043,191	100%	0%
Trips by Visitors					
Private Automobile	120,859	32%	120,898	32%	0%
Transit	30,225	8%	30,222	8%	0%
Taxi	9,531	3%	9,543	3%	0%
Tour Bus	57,915	15%	57,891	15%	0%
Bike/Walk	155,150	42%	155,150	42%	0%
Total Trips by Visitors	373,680	100%	373,704	100%	0%
Ground Access Trips by Air Passengers					
Private Automobile	28,797	26%	28,814	26%	0%
Transit	4,471	4%	4,469	4%	0%
Taxi	17,218	15%	17,234	15%	0%
Tour Bus	22,486	20%	22,486	20%	0%
Shuttle Bus	39,728	35%	39,697	35%	0%
Total Trips by Air Passengers	112,700	100%	112,700	100%	0%
Truck Trips					
Total Trips by Truck	237,306	100%	237,306	100%	0%
Total Daily Trips (All)	*4,766,866*	*100%*	*4,766,901*	*100%*	*0%*

Table 29-2 shows a negligible difference in the mode choice results by purpose for residents in the 2035 CMP Project #27 scenario as compared to the Baseline scenario. As with the Baseline, 83 percent of all resident trips were made by private vehicles (single occupant, two occupants, and three-plus occupants), while about six percent of all resident trips were made by transit (express, local, rail, park-and-ride, or kiss-and-ride). About 11 percent of the resident trips were made with the bike and walk mode. The journey-to-work/home-based work trip purpose shows that nearly 12 percent of the trips are made by transit. Home-based college trips also show a high percentage is made by transit (over 26 percent).

Table 29-3 shows the comparison of the 2035 CMP Project #27 Package mode choice results by purpose to the 2035 Baseline scenario results. This table shows the change and the percent change between the 2035 Baseline and the CMP Project #27 Package. This table shows that the CMP Project #27 mode share is similar to the Baseline.

Table 29-2. 2035 CMP Project #27 Package Mode Choice Summary Results by Trip Purpose for Residents (Daily)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	538,115	81,397	162,204	29,251	115,847	2,957	8,250	35,848	112,457	264,164	142,233	1,492,723
	59%	*37%*	*67%*	*33%*	*53%*	*25%*	*3%*	*49%*	*29%*	*27%*	*23%*	*37%*
Double-occupant vehicle	150,843	73,761	42,108	33,741	29,908	1,709	65,350	8,507	131,889	300,643	221,519	1,059,978
	17%	*33%*	*17%*	*38%*	*14%*	*14%*	*23%*	*12%*	*34%*	*31%*	*35%*	*26%*
Three-or-more occupant vehicle	41,030	46,456	12,674	15,973	11,644	427	104,831	2,874	95,430	247,258	204,604	783,201
	5%	*21%*	*5%*	*18%*	*5%*	*4%*	*37%*	*4%*	*25%*	*25%*	*33%*	*19%*
Walk to express transit	3,417	218	2	524	0	0	234	205	0	0	0	4,600
	0%	*0%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to local bus transit	55,408	4,249	7,103	5,142	4,463	4,540	16,085	9,461	9,903	26,064	3,664	146,082
	6%	*2%*	*3%*	*6%*	*2%*	*38%*	*6%*	*13%*	*3%*	*3%*	*1%*	*4%*
Walk to rail transit	27,461	1,846	5,036	1,839	1,677	1,115	3,174	5,751	1,323	10,618	1,857	61,697
	3%	*1%*	*2%*	*2%*	*1%*	*9%*	*1%*	*8%*	*0%*	*1%*	*0%*	*2%*
Informal Park-and-ride transit	1,129	48	0	7	0	0	259	97	138	214	0	1,892
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	12,549	0	0	0	0	0	4	1,566	11	537	0	14,667
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*2%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	10,669	252	15	0	1	1	1,551	1,844	751	1,634	3	16,721
	1%	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*3%*	*0%*	*0%*	*0%*	*0%*
Walk	51,720	10,807	13,763	3,110	52,754	1,240	74,372	4,124	30,081	122,570	51,103	415,644
	6%	*5%*	*6%*	*3%*	*24%*	*10%*	*26%*	*6%*	*8%*	*12%*	*8%*	*10%*
Bike	12,611	1,858	950	33	2,106	12	8,472	3,433	2,567	11,405	2,539	45,986
	1%	*1%*	*0%*	*0%*	*1%*	*0%*	*3%*	*5%*	*1%*	*1%*	*0%*	*1%*
Total	*904,952*	*220,892*	*243,855*	*89,620*	*218,400*	*12,001*	*282,582*	*73,710*	*384,550*	*985,107*	*627,522*	*4,043,191*

Table 29-3. Comparison of the 2035 CMP Project #27 to the 2035 Baseline Mode Choice Results by Purpose for Residents (Change and Percent Change)

Mode	Purpose											Total
	Journey-to-Work / Home-Based-Work	Journey-to-Work / Home-Based-Other	Journey-to-Work / Work-Based	Journey-to-Work / Non-Home-Based	Journey-at-Work / Work-Based	Journey-at-Work / Non-Home-Based	Non-Work-Related / Home-Based-School (K-12)	Non-Work-Related / Home-Based-College	Non-Work-Related / Home-Based-Shopping	Non-Work-Related / Home-Based-Other	Non-Work-Related / Non-Home-Based	
Single-occupant vehicle	-138	-16	-28	0	-3	0	-1	-4	1	-2	2	-189
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Double-occupant vehicle	42	1	8	1	-1	1	-31	-1	0	1	1	22
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Three-or-more occupant vehicle	57	17	15	1	0	0	29	3	1	0	0	123
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to express transit	-31	-4	0	-3	0	0	-3	0	0	0	0	-41
	-1%	*-2%*	*0%*	*-1%*	*0%*	*0%*	*-1%*	*0%*	*0%*	*0%*	*0%*	*-1%*
Walk to local bus transit	57	6	7	4	-2	-1	13	11	0	2	-3	94
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk to rail transit	-24	-4	-5	-5	-2	-1	-12	-11	1	3	-2	-62
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Informal Park-and-ride transit	4	0	0	0	0	0	0	0	0	0	0	4
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Formal Park-and-ride transit	1	0	0	0	0	0	0	1	0	0	0	2
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Kiss-and-ride transit	20	0	1	0	0	0	2	2	-1	-2	0	22
	0%	*0%*	*7%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Walk	14	2	2	1	7	0	2	-2	0	1	3	30
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Bike	5	0	0	0	0	0	2	1	0	-1	-1	6
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Total	7	2	0	-1	-1	-1	1	0	2	2	0	11
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*

29.3 CMP Project #27 Package Assignment Results

This section describes the results from the travel demand forecasting model run for the CMP Project #27 Package. These include the daily VMT, VHT and VHD. Daily transit boardings by mode are also discussed.

29.3.1 CMP Project #27 Highway Assignment

Table 29-4 shows the summary of the islandwide daily VMT by Facility Type and Area Type.56 There is negligible change from the 2035 Baseline scenario on islandwide VMT as shown in the comparison in Table 29-5.

Table 29-6 shows the daily VHT by Facility Type and Area Type for the 2035 CMP Project #27 Package. The model forecasts 463,392 hours of travel daily. As in the Baseline scenario, arterials are expected to carry the greatest share of the daily VHT, with 38 percent of the total, followed by freeways (28 percent) and collectors (16 percent). Table 29-7 shows the percent change in daily VHT from the 2035 Baseline scenario to the 2035 CMP Project #27 Package. The overall daily VHT remains similar to the Baseline.

Table 29-8 shows the daily VHD forecasted by the travel demand forecasting model for the 2035 CMP Project #27 Package. Similar to the Baseline scenario, the largest forecasted delays are expected on arterials (30 percent), freeways (28 percent), and collectors (15 percent). Table 29-9 shows the percent change in daily VHD between the 2035 Baseline and the 2035 CMP Project #27 Package. Overall daily VHD remains similar to the Baseline with some decreases on freeways for Area Types 3, 4 and 6.

[56] See Appendix A for Area Type definitions.

Table 29-4. 2035 CMP Project #27 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	152,242	508,150	1,175,427	2,709,462	368,331	821,480	234,863	5,969,955
Expressways	0	0	37,518	170,398	448,276	372,423	514,825	159,753	1,703,193
Ramps	0	17,118	35,649	166,361	366,143	28,386	161,432	18,031	793,120
Arterials	127,449	253,460	619,233	722,286	1,524,382	261,479	1,045,523	399,235	4,953,047
Collectors	14,557	33,314	139,538	373,236	772,148	19,118	388,692	39,437	1,780,040
Total	142,006	456,134	1,340,088	2,607,708	5,820,411	1,049,737	2,931,952	851,319	15,199,355

Table 29-5. Percent Change from the 2035 Baseline to the 2035 CMP Project #27 Daily VMT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	0%	0%	0%	0%	0%	1%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	0%	1%	0%	0%	0%	0%	0%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 29-6. 2035 CMP Project #27 Daily VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	3,816	16,245	25,234	55,857	6,864	16,353	4,686	129,055
Expressways	0	0	862	5,212	10,526	9,168	10,764	3,124	39,656
Ramps	0	1,657	2,604	10,133	17,222	653	7,555	856	40,680
Arterials	5,791	12,720	28,812	28,387	55,134	7,528	30,155	9,334	177,861
Collectors	721	2,617	7,250	17,441	33,864	676	12,564	1,007	76,140
Total	6,512	20,810	55,773	86,407	172,603	24,889	77,391	19,007	463,392

Table 29-7. Percent Change from the 2035 Baseline to the 2035 CMP Project #27 Daily VHT by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	1%	0%	0%	0%	-1%	0%	0%	0%
Expressways	0%	0%	0%	0%	0%	0%	0%	0%	0%
Ramps	0%	1%	2%	0%	0%	0%	-1%	-1%	0%
Arterials	0%	0%	0%	0%	0%	0%	-1%	0%	0%
Collectors	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 29-8. 2035 CMP Project #27 Daily VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0	1,321	7,914	6,275	12,849	1,016	3,314	957	33,646
Expressways	0	0	215	2,325	3,053	2,960	2,325	505	11,383
Ramps	0	1,098	1,580	5,547	8,693	81	3,941	473	21,413
Arterials	693	2,580	4,042	7,990	12,052	986	5,983	838	35,164
Collectors	139	1,283	1,668	4,685	6,969	103	2,422	131	17,400
Total	832	6,282	15,419	26,822	43,616	5,146	17,985	2,904	119,006

Table 29-9. Percent Change from the 2035 Baseline to the 2035 CMP Project #27 Daily VHD by Facility Type and Area Type

	Area Type								
Facility Type	1	2	3	4	5	6	7	8	All Areas
Freeways	0%	2%	-1%	-1%	0%	-6%	-1%	-1%	-1%
Expressways	0%	0%	0%	-1%	0%	0%	-1%	0%	0%
Ramps	0%	1%	2%	0%	0%	0%	-1%	-2%	0%
Arterials	0%	0%	0%	0%	1%	0%	-1%	0%	0%
Collectors	1%	0%	0%	0%	0%	-1%	-1%	0%	0%
Total	0%	0%	0%	0%	0%	-2%	-1%	0%	0%

29.3.2 CMP Project #27 Transit Assignment

Table 29-10 shows the 2035 CMP Project #27 Package transit boardings by period (peak versus off-peak) and mode for residents, visitors, and ground access air passengers combined. Table 29-11 shows the percent change in transit boardings from the 2035 Baseline to the 2035 CMP Project #27 Package. Total boardings remain similar to the 2035 Baseline scenario.

Table 29-10. 2035 CMP Project #27 Transit Boardings by Period and Mode

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	174,206	7,489	6,880	73,082	0	261,657
Off-Peak	93,518	0	5,083	27,564	0	126,164
Total	267,724	7,489	11,963	100,646	0	387,822

Table 29-11. Percent Change in Transit Boardings, Baseline to CMP Project #27

	Boardings By Mode					
Period/Mode	Local	Express	Limited	Guideway	Ferry	Total
Peak	0%	0%	0%	0%	0%	0%
Off-Peak	0%	0%	0%	0%	0%	0%
Total	0%	0%	0%	0%	0%	0%

29.4 Summary of CMP Project #27 Findings

These are the key findings of the CMP Project #27 Package:

- The overall daily VMT, VHT, and VHD remained similar to the Baseline with some decreases on freeways (PM contra flow extension from Keehi Interchange to Radford Drive provided some relief to the congested sections on H-1).

30 Transportation Demand Management / Transportation System Management Projects

30.1 Evaluation System

The proposed TDM/TSM projects were evaluated using a high-level rating system based on each project's potential to perform under various performance measures. These measures included:

- Change in V/C ratio
- List of congested roadways
- Transit mode share
- Vehicle volume increase
- Vehicle miles traveled
- Vehicle hours traveled
- Vehicle hours of delay

A literature review of performance data from other TDM/TSM projects was conducted, and the results were used as a basis for evaluating the potential performance for each project. Literature review sources included the U.S. Department of Transportation's ITS Benefits Database[57], the Transportation Research Board[58], the National Center for Transit Research[59], and the Victoria Transport Policy Institute[60]. The results of the literature review indicated the types of performance results that can be expected for different types of TDM/TSM projects. For example, an ITS program probably would not increase transit mode share, but it could decrease vehicle hours of delay by reducing congestion. For all of the projects, a "1" was given for the measure "list of congested roadways" because they are all expected to have a beneficial impact on congested roadways on the island.

Table 30-1: Point System for TDM/TSM Projects

Performance Measure	Possible Points				
	Increase	No Change	Decrease	New Roadway	On List of Congested Roadways
Change in V/C Ratio	0	2	5	3	-
List of Congested Roadways	-	-	-	-	1
Transit Mode Share	3	1	0	-	-
Vehicle Volume Increase	3	1	0	-	-
VMT	0	1	2	-	-
VHT	0	1	2	-	-
VHD	0	1	2	-	-
Total Points Possible: 18					

[57] http://www.itsbenefits.its.dot.gov/
[58] http://www.trb.org
[59] http://www.nctr.usf.edu/
[60] http://www.vtpi.org/

30.2 Evaluation Results

Joint Transportation Management Center

The proposed transportation management center would combine transportation management with City, State, and emergency response agencies, and would house the City's Emergency Operations Center. The main benefits of the facility are expected to focus on coordination between agencies and incident response, rather than any changes in volumes, mode share, or congestion-related measures.

Table 30-2: Points Summary for Joint Transportation Management Center Project

Change in V/C Ratio	2
List of Congested Roadways	1
Transit Mode Share	1
Vehicle Volume Increase	1
VMT	1
VHT	1
VHD	1
Total	8

30.2.1 Intelligent Transportation Systems (ITS) (2011-2020)

Implementation of ITS projects reflected in the Oahu ITS architecture would be expected to increase V/C ratios and VMT by facilitating greater throughput on roadways, while also reducing congestion-related measures such as VHT and VHD. ITS systems would not be expected to influence transit mode share or vehicle volumes.

Table 30-3: Points Summary for ITS Program Project (2011 – 2020)

Change in V/C Ratio	0
List of Congested Roadways	1
Transit Mode Share	1
Vehicle Volume Increase	1
VMT	0
VHT	2
VHD	2
Total	7

30.2.2 Transportation Demand Management (TDM) Program (2011 - 2020)

An aggressive TDM program would decrease V/C ratios and VMT by reducing demand for travel by single-occupancy vehicle (SOV) on roadways. It would also

reduce congestion-related measures such as VMT and VHT, while increasing the transit mode share by encouraging a shift from SOVs to transit.

Table 30-4: Points Summary for TDM Program Project (2011 – 2020)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	3
Vehicle Volume Increase	0
VMT	2
VHT	2
VHD	2
Total	15

30.2.3 Vanpool Hawaii Program (2011-2020)

The Vanpool Hawaii Program would likely decrease V/C ratios and VMT by shifting travel on roadways from SOVs to shared commuter vans. It would also reduce congestion-related measures such as VMT and VHT, but would not be expected to increase the transit mode share.

Table 30-5: Points Summary for Vanpool Hawaii Program Project (2011 – 2020)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	1
Vehicle Volume Increase	0
VMT	2
VHT	2
VHD	2
Total	13

30.2.4 Human Services Transportation Coordination Program (2011-2020)

A human services transportation coordination program, including such project as the *TheHandi-Van* and local shuttle services, would decrease V/C ratios and VMT by shifting travel on roadways from SOVs to these services. It would also increase the transit mode share, assuming the *TheHandi-Van* and local shuttles are considered "transit."

Table 30-6: Points Summary for Human Services Transportation Coordination Program Project (2011-2020)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	3
Vehicle Volume Increase	0

VMT	2
VHT	2
VHD	2
Total	15

30.2.5 Intelligent Transportation Systems (ITS) (2021-2035)

Implementation of ITS systems reflected in the Oahu ITS architecture would be expected to increase V/C ratios and VMT by facilitating greater throughout on roadways, while also reducing congestion-related measures such as VHT and VHD. ITS systems would not be expected to influence transit mode share or vehicle volumes.

Table 30-7: Points Summary for ITS Project (2021 – 2035)

Change in V/C Ratio	0
List of Congested Roadways	1
Transit Mode Share	1
Vehicle Volume Increase	0
VMT	0
VHT	2
VHD	2
Total	6

30.2.6 Transportation Demand Management (TDM) Program (2021-2035)

An aggressive TDM program would decrease V/C ratios and VMT by reducing demand for travel by single-occupancy vehicle (SOV) on roadways. It would also reduce congestion-related measures such as VMT and VHT, while increasing the transit mode share by encouraging a shift from SOVs to transit.

Table 30-8: Points Summary for TDM Program Project (2021-2035)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	3
Vehicle Volume Increase	0
VMT	2
VHT	2
VHD	2
Total	15

30.2.7 Vanpool Hawaii Program (2021-2035)

The Vanpool Hawaii Program would help decrease V/C ratios and VMT by shifting travel on roadways from SOVs to shared commuter vans. It would also reduce

congestion-related measures such as VMT and VHT, but would not be expected to increase the transit mode share.

Table 30-9: Points Summary for Vanpool Hawaii Program Project (2021-2035)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	1
Vehicle Volume Increase	0
VMT	2
VHT	2
VHD	2
Total	13

30.2.8 Human Services Transportation Coordination Program (2021-2035)

A human services transportation coordination program, including such project as TheHandi-Van and local shuttle services, would decrease V/C ratios and VMT by shifting travel on roadways from SOVs to these services. It would also increase the transit mode share, assuming TheHandi-Van and local shuttles are considered "transit."

Table 30-10: Points Summary for Human Services Transportation Coordination Program Project (2021-2035)

Change in V/C Ratio	5
List of Congested Roadways	1
Transit Mode Share	3
Vehicle Volume Increase	0
VMT	2
VHT	2
VHD	2
Total	15

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Appendix A: Area-Type Definitions

Table A - 1. Area Type Definitions Based on Populations and Employment Densities

Employment Category (Employees per Square Mile)		1 ≤12	2 ≤93	3 ≤397	4 ≤1,615	5 ≤6,202	6 ≤22,630	7 ≤78,500	8 >78,500
Population Category (Population per Square Mile)									
1	0	8	8	7	6	4	4	2	1
2	≤192	8	8	6	6	4	4	2	1
3	≤1,623	7	7	7	6	4	4	2	1
4	≤4,975	7	7	7	7	4	4	2	1
5	≤11,588	5	5	5	5	5	4	2	1
6	≤24,000	5	5	5	5	5	5	2	1
7	≤42,866	3	3	3	3	3	3	3	1
8	>42,866	3	3	3	3	3	3	3	1

Area types apply to the following land uses:

(1) Central Business District
(2) Core Commercial
(3) Core Residential
(4) Urban Commercial
(5) Urban Residential
(6) Suburban Commercial
(7) Suburban Residential
(8) Rural

Appendix B: CMP Point System Tables

The CMP evaluation was based on a process[61] developed by the OahuMPO for its Congestion Management System evaluation of projects for the ORTP 2030. Performance measures were defined to evaluate performance for highway and transit projects. In addition, this CMP process includes a point scoring scheme for transportation demand and system management projects (TDM/TSM).

Like the previous process, this CMP evaluation is targeted at specific projects and not project packages. The CMP project packages (one or more individual road capacity projects) were developed to explore in more detail whether there were synergies among logical groupings of projects that were in close proximity to each other. Thus the metrics used to rank each of the projects could have effects on other projects that were included in within each of the CMP packages.

Both highway and transit projects evaluation and point scoring is based on comparison of the CMP projects to the 2035 Baseline alternative using data derived from the OahuMPO travel demand model. For virtually all projects, the AM peak period analysis results were used. Two projects (CMP 26 and 27), did not use the AM peak period as these projects tested the effectiveness of freeway contraflow lanes operating the PM peak period. In these cases, the daily results were presented.

Change in V/C Ratio

The V/C ratio is used to calculate congestion for both 2035 Baseline conditions and for comparing CMP project packages with the Baseline. The measure is presented for the two-hour morning (AM) peak period. Points were assigned to a project based on how well it reduced the V/C ratio when compared to the Baseline condition. Projects that showed a reduction in the V/C ratio scored five points. Projects that showed no change, received two points. Projects that showed an increase in the V/C ratio received zero points. Projects that showed an increase in the V/C ratio, received zero points.

Congested Roadways

Projects that are located on or adjacent to facilities that operate under LOS E or F will receive one point. For purposes of this report, and consistent with the process previously used by the OahuMPO for the ORTP 2030, the primary means of identifying congestion is the link-based volume-to-capacity ratio (V/C ratio).[62] The V/C ratio is the calculation of the demand flow rate divided by the capacity for a

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[61] Oahu Metropolitan Planning Organization. *Congestion Management System: Performance Monitoring and Evaluation Plan*, December 2005.

[62] A complete definition of congestion can be found in the OahuMPO *Congestion Management System: Performance Monitoring and Evaluation Plan*, December 2005.

roadway facility. The OahuMPO 2035 Baseline travel demand forecasting model will be used to provide a starting point from which to calculate the link-based V/C ratio. A roadway facility will be defined as congested if the V/C ratio in during the A.M. peak period is greater than 0.90, which equates to LOS E or F.

Vehicle Volume

Vehicle volume is the number of vehicles that use a given roadway over a specified period of time. Vehicle volumes are presented in concert with V/C ratio to provide a comparison of project effectiveness. For example, does the project (or projects) in a CMP project package reduce congestion (reduced V/C ratio), while carrying more traffic (higher vehicle volumes)? For this particular metric, points are assigned based on the ability of project to show higher vehicle volumes on an existing facility. Points range from zero for no change in comparison to the Baseline alternative during the AM peak period up to eight points for increases in vehicle volumes between 3,501 to 4,000 vehicle trips.

Transit Mode Share

Points assigned for this metric are based on the ability of the project to increase transit mode share relative to the Baseline alternative for the AM peak period. Projects that increase transit mode share receive three points, one point for no change and zero points for a reduction in transit mode share.

Vehicle Miles Traveled

Vehicle Miles Traveled (VMT) is a unit that measures travel distance made by a vehicle, such as an automobile, van, pickup truck, commercial vehicle, or motorcycle. This measure reflects total year 2035 forecasted islandwide VMT produced by the CMP project package for all facility and area types for the two-hour AM peak period. Projects in a CMP package that show a decrease in VMT receive two points, one point for no change, and zero points for an increase in VMT.

Vehicle Hours of Delay

Vehicle Hours of Delay (VHD) is defined as the difference between vehicle-hours traveled under congested conditions and vehicle hours of travel that would otherwise be expected under free flow (uncongested) conditions. VHD is calculated using travel times and travel speeds. This measure reflects total year 2035 forecasted islandwide VHD produced by the CMP project package for all facility and area types for the two-hour AM peak period. Projects in a CMP package that show a decrease in VHD receive two points, one point for no change, and zero points for an increase in VHD.

Vehicle Hours Traveled

Vehicle Hours Traveled (VHT) is a measurement of the total hours traveled by all vehicles. It is calculated by multiplying the number of vehicles times the travel time of those vehicles on a network or specific links within that network. VHT is an

indicator of how additional travel demand influences congestion in the system from a travel time standpoint. This measure reflects total year 2035 forecasted islandwide VHT produced by the CMP project package for all facility and area types for the two-hour AM peak period. Projects in a CMP package that show a decrease in VHT receive two points, one point for no change, and zero points for an increase in VHT.

Transit Person Trips

This measure tests the impacts of congestion mitigation projects on transit usage, in the form of transit person trips. Like the scoring for vehicle volumes, this particular metric reflects points scored based on the ability of a transit project to show higher transit person trips than what is produced by the Baseline alternative. Points range from zero for no change in comparison to the Baseline alternative during the AM peak period up to eight points for increases in transit person trips between 35,001 to 40,000 trips.

Table B-1 CMP Point System for Highway Projects

	Possible Points													
						Additional Vehicle Volume								
Performance Measure	Increase	No Change	Decrease	New Road	On List of Congested Roads	0	1-500	501-1,000	1,001-1,500	1,501-2,000	2,001-2,500	2,501-3,000	3,001-3,500	3,501-4,000
Change in V/C Ratio	0	2	5	3										
List of Congested Roadways					1									
Transit Mode Share	3	1	0											
Vehicle Volume Increase						0	1	2	3	4	5	6	7	8
VMT	0	1	2											
VHT	0	1	2											
VHD	0	1	2											
Total	Points Possible: 23													

Table B-2 CMP Point System for Transit Projects

	Possible Points													
						Additional Transit Person Trips								
Performance Measure	Increase	No Change	Decrease	New Road	On List of Congested Roads	0	1-5,000	5,001-10,000	10,001-15,000	15,001-20,000	20,001-25,000	25,001-30,000	30,001-35,000	35,001-40,000
List of Congested Roadways					1									
Transit Mode Share	3	1	0											
Transit Person Trips						0	1	2	3	4	5	6	7	8
VMT	0	1	2											
VHT	0	1	2											
VHD	0	1	2											
Total	Points Possible: 18													

Table B-3 CMP Point System for TDM/TSM Projects

	Possible Points				
Performance Measure	Increase	No Change	Decrease	New Road	On List of Congested Roads
Change in V/C Ratio	0	2	5	3	
List of Congested Roadways					1
Transit Mode Share	3	1	0		
Vehicle Volume Increase	3	1	0		
VMT	0	1	2		
VHT	0	1	2		
VHD	0	1	2		
Total	Points Possible: 18				

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
19	18	Kapolei Parkway, Extension, Kamokila Boulevard to Kamaaha Avenue	18	3	8	0	2	2	2	1	N/A
18	23	Kapolei Parkway, Extension & Widening, Aliinui Drive to Kalaeloa Boulevard	18	3	9	0	2	2	1	1	N/A
26	5	Kamehameha Highway, Widening, Lanikuhana Avenue to Ka Uka Boulevard	18	5	7	1	1	2	1	1	N/A
N/A	6	Central Mauka Road, Mililani/Waiawa Area, from Meheula Parkway to Kamehameha Highway	16	3	6	0	2	2	2	1	N/A
61	2	Interstate Route H-1, Widening, Waiawa Interchange to Halawa Interchange	15	5	6	1	1	2	0	0	N/A
71	4	Kunia Road, Widening and Interchange Improvement, Wilikina Drive to Farrington Highway	15	5	2	1	2	2	2	1	N/A
62	7	Kahekili Highway, Widening, Kamehameha Highway to Haiku Road	15	5	3	1	2	2	1	1	N/A
N/A[63]	25	Interstate Route H-1 Median High-Occupancy Vehicle (HOV) between Waiawa and Makakilo Interchanges	15	3	8	0	1	2	0	1	N/A
32	3	Interstate Route H-1, Widening, Ola Lane to Vineyard Boulevard	15	5	5	1	1	1	1	1	N/A
77	4	Waianae Second Access, Farrington Highway to Kunia Road	14	3	4	0	2	2	2	1	N/A
60	6	Interstate Route H-2, New Interchange, Pineapple Road Overpass	14	3	4	0	2	2	2	1	N/A

[63] Project was evaluated as part of the CMP process, but was not included in ORTP 2035.

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
57	17	Kalaeloa East-West Spine Road, New Roadway, Kalaeloa Boulevard to Geiger Road	14	3	4	0	2	2	2	1	N/A
54	15	Farrington Highway, Widening, Hakimo Road to Kalaeloa Boulevard	14	5	2	1	2	2	1	1	N/A
20	14	Farrington Highway, Widening, Golf Course Road to west of Fort Weaver Road	13	5	3	1	1	2	0	1	N/A
27	6	Interstate Route H-2, Widening, Waipio Interchange	13	5	0	1	2	2	2	1	N/A
N/A	7	Likelike Highway Widening, from Kamehameha Highway to Kahekili Highway	13	5	1	1	2	2	1	1	N/A
59	14	Farrington Highway, Widening, west of Fort Weaver Road to Waiawa Interchange	13	5	3	1	1	2	0	1	N/A
15	1	Interstate Route H-1, New Interchange, Kapolei Interchange	13	3	5	1	1	1	1	1	N/A
31	12	Salt Lake Boulevard Widening Project	13	5	3	1	1	1	1	1	N/A
N/A	12	Puuloa Road Widening, from Pukuloa Road to Nimitz Highway	13	5	3	1	1	1	1	1	N/A
16	16	Hanua Street Extension, Farrington Highway to Malakole Street; Interstate Route H-1, New On- & Off-Ramps, Palailai Interchange	12	3	3	0	2	2	1	1	N/A
22	17	Kualakai Parkway, Widening & Extension, Interstate Route H-1 to Franklin D. Roosevelt Avenue	12	3	2	0	2	2	2	1	N/A
N/A	6	Wahiawa Second Access Road, from Whitmore Village to California Avenue and from California Avenue to Meheula Parkway	12	3	2	0	2	2	2	1	N/A
55	17	Kamokila Boulevard, from Franklin D. Roosevelt Avenue to Saratoga Street	12	3	2	0	2	2	2	1	N/A

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
56	17	Fort Barrette Road, from Franklin D. Roosevelt Avenue to Saratoga Street	12	3	2	0	2	2	2	1	N/A
N/A	5	Paiwa Street Extension, from Ka Uka Boulevard to Lumiauau Street	12	3	4	0	1	2	1	1	N/A
25	25	Interstate Route H-1 Widening, Waiawa to Paiwa	12	5	2	1	1	2	0	1	N/A
35	9	Makakilo Drive, Second Access, Makakilo Drive to Kualaka'i Parkway / Interstate Route H-1 Interchange	12	3	5	0	1	1	1	1	N/A
21	1	Fort Barrette Road, Widening, Farrington Highway to Barber's Point Gate	12	5	2	1	1	1	1	1	N/A
76	13	Interstate Route H-1, Widening, Ward Avenue to Punahou Street	12	5	2	1	1	1	1	1	N/A
N/A	20	East-West Road Widening Project, from Farrington Highway to Old Fort Weaver Road	12	3	4	1	1	1	1	1	N/A
72	2	Interstate Route H-1 Widening, from Waiau to Waiawa Interchanges	11	5	2	1	1	2	0	0	N/A
24	2	Interstate Route H-1, Widening, Waipahu Off-Ramp	11	5	2	1	1	2	0	0	N/A
75	10	Nimitz Highway High-Occupancy Vehicle (HOV) Flyover, Keehi Interchange to Pacific Street	11	5	2	0	1	1	1	1	N/A
74	3	Interstate Route H-1, Widening, Vineyard Boulevard to Middle Street	11	5	1	1	1	1	1	1	N/A
N/A	8	Makapuu Tunnel Second Access, from Lunalilo Home Road to Kalanianaole Highway north of Sea Life Park	10	3	2	0	1	1	2	1	N/A
58	24	Makakilo Mauka Frontage Road, New Roadway, Kalaeloa Boulevard to Makakilo Drive	10	3	3	0	1	1	1	1	N/A
23	19	Keoneula Boulevard, Extension, Kapolei Parkway to Franklin D. Roosevelt Avenue	9	3	2	0	1	1	1	1	N/A

ORTP 2035 Project No.	CMP Package No.	Facility/Project Title	Points	Change in V/C Ratio	Vehicle Volume	List of Congested Roadways	VHT	VHD	VMT	Transit Mode Share	Transit Person Trips
28	26	Interstate Route H-1, Contra Flow Lane extension (PM), Waiawa Interchange to Kunia Interchange	9	2	0	1	2	2	1	1	N/A
34	11	Interstate Route H-1, Operational Improvements, Ward Avenue On-Ramp to University Avenue Interchange	9	5	0	0	1	1	1	1	N/A
28	27	Interstate Route H-1, Contra Flow Lane extension (PM), Keehi Interchange to Radford Drive	8	2	0	1	2	1	1	1	N/A
78	21	Fixed Guideway, West Kapolei to East Kapolei	10			1	2	2	1	3	1
79	22	Fixed Guideway, Ala Moana to UH Manoa and Waikiki	10			1	2	2	1	3	1
7	N/A	Transportation Demand Management (TDM) Program (2011-2020)	15	5	0	1	2	2	2	3	N/A
3	N/A	Human Services Transportation Coordination Program (2011-2020)	15	5	0	1	2	2	2	3	N/A
48	N/A	Transportation Demand Management (TDM) Program (2021-2035)	15	5	0	1	2	2	2	3	N/A
45	N/A	Human Services Transportation Coordination Program (2021-2035)	15	5	0	1	2	2	2	3	N/A
8	N/A	Vanpool Program (2011-2020)	13	5	0	1	2	2	2	1	N/A
49	N/A	Vanpool Program (2021-2035)	13	5	0	1	2	2	2	1	N/A
5	N/A	Joint Traffic Management Center	7	2	0	1	1	1	1	1	N/A
4	N/A	Intelligent Transportation Systems (ITS) (2011-2020)	6	0	0	1	2	2	0	1	N/A
46	N/A	Intelligent Transportation Systems (ITS) (2021-2035)	6	0	0	1	2	2	0	1	N/A