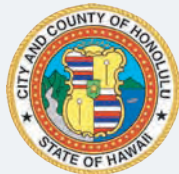


City & County of Honolulu: Department of Transportation Services
**Ewa Transportation Impact Fee Program Update:
Final Compilation Report**



Prepared for:



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Prepared by the City and County of Honolulu in Cooperation with the Oahu Metropolitan Planning Organization and the United States Department of Transportation.

Prepared by:

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In association with: **Belt Collins**

September 2017

**EWA TRANSPORTATION IMPACT FEE UPDATE:
FINAL COMPILATION REPORT:**

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Prepared for:

**CITY AND COUNTY OF HONOLULU
DEPARTMENT OF TRANSPORTATION SERVICES**

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EXECUTIVE SUMMARY

The Ewa region of Oahu is expected to experience significant population and employment growth during the next 10 years and beyond. This growth includes a range of development including residential land uses, commercial development both local and regional nature, an expanding University of Hawaii West Oahu campus, and other institutional and recreational facilities in support of these developments. In recognition of this growth and the need for improvements to the transportation system to support the increase in travel demand, the City and County of Honolulu Department of Transportation Services (DTS), State of Hawaii Department of Transportation-Highways Division (HDOT), and Ewa region land developers previously prepared a 2010 highway master plan and established a developer impact fee to help contribute to building roadway infrastructure. The impact fee is land use-specific (e.g., single-family homes, apartments, retail, etc.) but is also required to be updated regularly to ensure improvements are coordinated with changing development patterns and intensities. This report documents the planning process for updating the Ewa Transportation Impact Fee based on a new Highway Master Plan that will serve the region through 2020.

The 2020 Highway Master Plan was developed using traffic volume forecasts from the Oahu Metropolitan Planning Organization (OahuMPO) travel demand model. The model was validated for use in the Ewa region, and the future traffic forecasts were based on revised land use projections from DPP that were refined using input from the Executive Committee for this project. A project advisory Executive Committee was formed to guide this study and included representatives of developers, HDOT, the City and County Department of Planning and Permitting (DPP), and other affected government agencies. Roadway improvements were identified to address future congested facilities and provide desired operating levels through 2020. These improvements comprising the 2020 Ewa Highway Master Plan include gap closures, new interchange ramps, new street construction, and roadway widening.

With impact fee programs, new development is only responsible for its proportional contribution to projected deficiencies, and the public agency with jurisdiction over a given roadway is responsible for any existing operational deficiency. Accordingly, the OahuMPO model was used to identify the share of new development traffic for each impacted segment expressed as a percentage of total traffic.

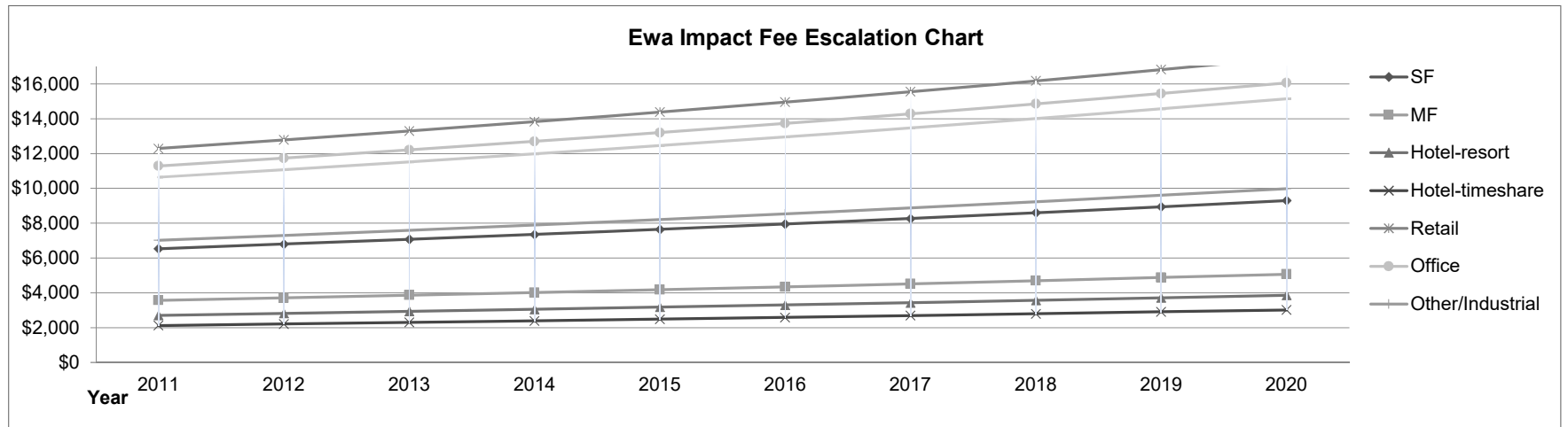
Construction cost estimates for each improvement were then prepared or assembled from previously available information and consultation with DTS and HDOT staff for their respective roadways. The percent share of new development traffic from the model was multiplied by each facility's cost estimate, and the resulting shares were added together to establish the total funding contribution required by new development projects.

The total funding contribution from new development was distributed amongst various land use categories and weighted based on the vehicle trip generation for each use. Standard vehicle trip rates were used to determine the relative weighting for all uses. In addition, rates were adjusted to account for selected uses consistent with the original impact fee program and programs in other jurisdictions. The total contribution from each land use was divided by the number of units (e.g., dwelling units for residential uses, building square footage for retail uses) to identify the specific fee for each use. To account for increases in construction costs over time, the fees for each use were increased by 4% per year based on research of several building industry sources and consultation with the project team.

An initial set of fees was calculated when the first draft of this report was prepared in December 2011. In September 2017, the fee program was refined based on a revised set of improvements and updated cost estimates for some roadway projects. The updated fees are illustrated in Table ES-1 on the following page (Table 18 in the body of this report) and are included in the latest draft ordinance that is expected to be presented to the Honolulu City Council for their consideration.

TABLE ES-1 - EWA IMPACT FEE (4% CAGR Escalation) (REVISED 2017)

Land Use Category	Units (Increment 2009 to 2020)	Distributed Construction Costs	New Impact Fee (Escalated to 2020)									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Residential												
SF per Dwelling unit	5,314	\$34,709,338	\$6,532	\$6,793	\$7,065	\$7,347	\$7,641	\$7,947	\$8,265	\$8,595	\$8,939	\$9,297
MF per Dwelling unit	9,810	\$34,950,416	\$3,563	\$3,705	\$3,853	\$4,008	\$4,168	\$4,335	\$4,508	\$4,688	\$4,876	\$5,071
Non-residential												
Hotel-resort per Room	1,179	\$3,194,102	\$2,709	\$2,818	\$2,930	\$3,047	\$3,169	\$3,296	\$3,428	\$3,565	\$3,708	\$3,856
Hotel-timeshare per Room	1,909	\$4,047,719	\$2,120	\$2,205	\$2,293	\$2,385	\$2,480	\$2,580	\$2,683	\$2,790	\$2,902	\$3,018
Retail per KSF	5,808	\$71,368,519	\$12,288	\$12,779	\$13,290	\$13,822	\$14,375	\$14,950	\$15,548	\$16,170	\$16,817	\$17,489
Office per KSF	1,978	\$22,311,080	\$11,282	\$11,733	\$12,203	\$12,691	\$13,198	\$13,726	\$14,275	\$14,846	\$15,440	\$16,058
Other/Industrial per KSF	5,032	\$35,296,844	\$7,014	\$7,295	\$7,586	\$7,890	\$8,206	\$8,534	\$8,875	\$9,230	\$9,599	\$9,983
College/University per KSF	835	\$8,884,567	\$10,642	\$11,068	\$11,511	\$11,971	\$12,450	\$12,948	\$13,466	\$14,005	\$14,565	\$15,147
		\$214,762,585										



1. INTRODUCTION

The Ewa region of Oahu is forecasted to experience significant growth within the next 10 years. This growth includes a range of development including residential land uses, commercial activities of local and regional nature, a university campus, and other institutional and recreational facilities in support of these activities. This growth and development is expected to generate a significant increase in travel demand to and from this area, as well as substantial increased travel demand within the Ewa region.

In recognition of this growth and the need for improvements to the transportation system to support the increase in travel demand, the Department of Transportation Services (DTS) for the City and County of Honolulu, the State of Hawaii Department of Transportation-Highways Division (HDOT), and the Ewa region land developers, have agreed to jointly participate in a planning effort to update *Ewa Highway Master Plan* (Kaku Associates, Inc., 2000). A project advisory Executive Committee was formed to provide input on any modification to this master plan. The Executive Committee includes representatives of developers, HDOT, the City and County Department of Planning and Permitting (DPP), and other affected government agencies. This update seeks to capture any changes in land use projections and plans that have occurred in the last 10 years since the 2000 Master Plan was published and focuses on a forecast year of 2020.

One of the main objectives for updating this master plan is to consider all recent transportation and land use plans for the Ewa region including the *Oahu Regional Transportation Plan* (OahuRTP), the *Ewa Roadway Connectivity Study* (PB Americas, 2009) sponsored by the DPP, and the *Statewide Transportation Improvement Program* (STIP) published by HDOT. In developing the master plan the Executive Committee assisted in establishing the nexus between new forecasted development in the region, and the highway improvements needed to provide necessary capacity to allow the roadway system to support expected 2020 traffic volumes. The highway master plan improvements are the basis to analyze and calculate the percentage contribution of traffic by each of the developers per improved facility. The corresponding transportation impact fee, originally approved in 2002, will be updated based on the new master plan and will provide a valuable contribution towards planning, design and implementation of required roadway improvements identified in the master plan.

STUDY AREA

Figure 1 illustrates the geographic region and roadways in the study area that were subsequently analyzed as part of the highway master plan and impact fee update.

PURPOSE, BACKGROUND AND OBJECTIVES

Purpose

The purpose of this study is to update the existing *Ewa Highway Master Plan* and corresponding transportation impact fee that will contribute towards roadway project implementation. This update required the preparation of 2020 land uses projections and a 2020 base roadway network in the Ewa region in order to develop a 2020 traffic forecast. The traffic forecast assisted in the identification of expected roadway deficiencies for the year 2020. An iterative process was conducted in conjunction with DTS and the Executive Committee in order to identify new improvements, analyze “priority projects,” test their effectiveness, and reanalyze the system to determine if the deficiencies were resolved. The contribution of traffic from new developments and revised construction cost estimates were then used to update the impact fee.

Ewa Highway Master Plan for Year 2020

Historical Background

In developing the current master plan of highways for the Ewa region, several previous planning efforts were superseded, some of which date back to the late 1990s. These efforts are documented in *Ewa Highway Master Plan* published in 2000. Efforts prior to 2000 resulted in products that did not completely satisfy the needs of each of the interested parties. Therefore, a need arose to revise and consolidate these efforts. The master plan published in 2000 sought to satisfy the objectives of all parties involved. The parties included the State of Hawai'i and the City and County of Honolulu, the governmental agencies responsible for the planning and implementation of transportation facilities, and the development community that owns the land and/or is responsible for the planning and implementation of the residential and commercial projects that have been generating the recent increase in travel demand in the Ewa region.

The work program established for the 2000 master plan sought to incorporate a process and methodology which was consistent with that used to develop the ORTP, which satisfied Federal requirements. As such, it was necessary to use the travel demand model developed by the Oahu Metropolitan Planning Organization (MPO), the regional planning agency for Oahu. Since then, a new travel demand forecasting model has been developed by the OahuMPO, and this impact fee update fully incorporates that model into the analysis. The 2000 master plan also incorporated growth projections for the study area consistent with the buildout plans and year 2010 market absorption expectations of the landowners and developed at the time. The 2000 *Ewa Highway Master Plan* produced the following products:

1. Year 2025 Buildout Master Plan of Highways for the Ewa Region
2. Year 2010 Highway Improvement Plan for the Ewa Region
3. An estimate of percentage of traffic contributed to each improvement in the master highway plan for year 2010 by each of the development projects in the study area.

Products 2 and 3 served as direct input into the process and were used to identify these jointly funded projects. Although Product 1 was not a direct input into this process, it was a necessary element in the development of Product 2.

Current Objective

The Ewa Highway Master Plan Update for the year 2020 is designed to include all the changes in plans that have occurred in the last 10 years; from these changes, the intent is to develop a more accurate forecast of 2020 traffic conditions in the Ewa region.

The 2020 Update will specify highway/street improvements which would be included in the package of measures whose cost to implement would be the joint responsibility of the various local agencies and developers. To accomplish this objective, this update will provide the following products:

1. Year 2020 Highway Improvement Plan for the Ewa Region
2. An estimate of percentage of traffic contributed to each improvement in the 2020 master highway plan by each of the development projects in the study area. This estimate of percentage contribution would include the existing 2009 traffic and 2020 regional growth as two of the "contributors."

It is important to recognize that this study does not address the following issues that will need to be addressed jointly by the local governmental agencies and area developers (i.e., representing the Executive Committee):

- *Directly identify or recommend the specific highway improvements that should be included in the package of jointly funded projects.* These specific improvements were developed from a mutually

agreed resolution by the Executive Committee, and these improvement projects have been incorporated in the Highway Improvement Plan presented in this document.

- *Directly develop the methodology or mechanism to be used to assess the fees or "fair share" of the costs for the implementation of these highway improvements.* The actual fair share analysis and calculations will be presented, in a separate document, to the Executive Committee to review, discuss, and provide direction.
- *Directly identify or recommend the percentage contribution by any member or all of the members of the developers group planning to implement projects in the study area.* The actual fair share estimates would seek to follow the existing Revised Ordinances of Honolulu (ROH) Section 33A – 1.6 (h). If these estimates diverge from this ordinance, they will be presented to the Executive Committee to review, discuss, and obtain general concurrence.

The products of this study are limited to the identification of the elements of the highway master plan that are needed to adequately accommodate the future traffic demands generated by the year 2020 forecasts for the Ewa region.

GENERAL APPROACH

The technical approach for this update was designed to maintain consistency with guidelines associated with the development of the ORTP and other planning documents prepared as part of the OahuMPO process. This includes the incorporation of the following data, technical assumptions, methodologies, and planning processes:

- Use of the latest TransCAD regional travel demand forecasting model for Oahu (OahuMPO5.0) used by OahuMPO and its participating agencies including HDOT and the City and County of Honolulu DTS
- Use of the latest projected future year 2020 socio-economic forecasts for the island of Oahu as used prepared by DPP
- Use of the latest projected land use forecasts for the Ewa region as obtained by Belt Collins Hawai'i (BCH), which entailed obtaining 2020 projections from each of the individual developers in the area

Active participation and coordination with the Executive Committee, which includes representatives of each of the developers in the area, the State of Hawai'i, and the City and County of Honolulu. The basic approach used in the completion of this update involved the use of land use and transportation data from developers and the transportation and planning agencies to develop the sub-area travel demand forecasting (TDF) model¹ specifically designed and validated for the Ewa Master Plan Update. This sub-area TDF model was validated to 2009 conditions and was used to identify future roadway deficiencies.

A year 2020 roadway improvement plan was generated in conjunction with the Executive Committee, so as to satisfy the travel demand needs expected to be generated in the next 10 years from Ewa area development projects. This 2020 roadway improvement plan was used to estimate the percentage contribution of traffic from each of the individual development projects on each of the proposed highway improvements.

¹ See Ewa Transportation Impact Fee Program Update: Model Validation Report (Fehr & Peers, April 2010)

Each of the tasks in the overall work program was conducted in the context of a planning process that used a series of progress meetings to obtain guidance and input from both the developers group and City and County of Honolulu DTS. These meetings were conducted at critical points in the process and involved a detailed presentation of results and a discussion of progress to date as well as future activities.

STUDY PROCESS

The study to develop the Ewa Region Master Plan of Highways was conducted through a joint planning effort administered by staff of the City and County of Honolulu DTS. The study was conducted for the Executive Committee, which includes representatives of the developers for each of the proposed development projects in the study area, as well as State of Hawai'i staff, and representatives from City and County of Honolulu. A detailed list of all parties involved in the Executive Committee is presented below.

PARTICIPANTS

Developers Group

The developer's group included representatives of the following organizations:

- Gentry Homes, Inc.
- Haseko (Ewa), Inc.
- D.R. Horton, Inc.
- Kapolei Property Development
- James Campbell Company
- Stanford Carr Development
- Hunt Development Group, Inc.
- University of Hawai'i – West Oahu (UHWO)
- Hawai'i Community Development Authority (HCDA)
- Land Use Research Foundation of Hawai'i (LURF)

Governmental Agencies

Representatives of the State of Hawai'i and the City and County of Honolulu were also included in the Executive Committee.

The City and County of Honolulu was represented by the following:

- Department of Transportation Services (DTS)
- Department of Planning and Permitting (DPP)

The State of Hawai'i had representatives from the following agencies:

- Department of Transportation (HDOT)
- Department of Hawai'i Home Lands (DHHL)
- Hawai'i Housing Finance Development Corporation (HHFDC)

A series of information/discussion meetings were held at key points in the study process to provide each participant with an update of the study progress. Material summarizing the information to be discussed at each meeting was provided to each of the participants prior to the meeting.

STUDY ACTIVITIES

The study process for updating the master plan was designed around the primary activities listed below, which, for the most part, mirror the activities conducted in the preparation of *Ewa Highway Master Plan*. Unlike the original master plan, the purpose of this update is limited to the development of the 2020 Highway Improvement Plan, and no other future horizon year plan was analyzed for this study. A more comprehensive update of the long-range Master Plan for Ewa is more appropriate at 10-year intervals or if substantial changes to land use patterns or zoning are anticipated.

Some of these activities required the various client representatives from both the private sector, i.e., the developers, and the governmental agencies to provide data to the consultant; however, the majority of the activities describe here relate to technical steps conducted by the consultant.

Figure 2 provides a flow chart identifying each of the tasks completed, as well as the relationship of the activities to one another. The following paragraphs provide a brief description of each these activities and their relationship to other relevant tasks.

Task 1 – Background Research and Existing Roadway Conditions

Before beginning the Highway Master Plan Update, Fehr & Peers examined the project area and its boundaries to document the existing traffic and transit conditions, roadway conditions, and the character and type of the surrounding development. Background research was conducted to review all relevant previous plans and studies related to the study area.

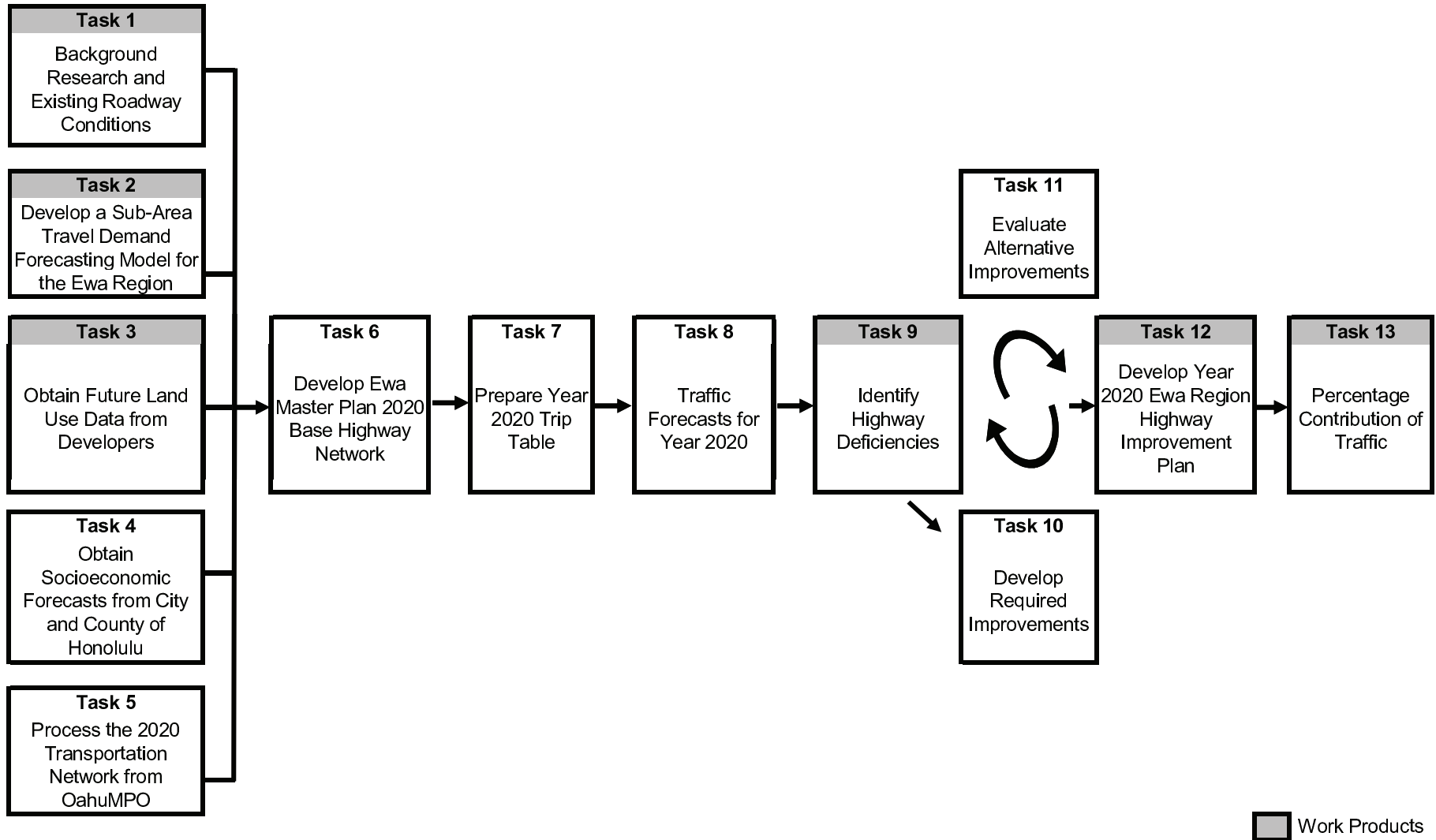
Research and Existing Roadway Conditions Report (Fehr & Peers, July 2010) documents the research conducted and presents the current baseline traffic conditions in the study area. Level of service (LOS) calculations are reported in the aforementioned document.

Task 2 – Develop a Sub-Area Travel Demand Forecasting Model for the Ewa Region

The OahuMPO regional travel model forecasting tool (OMPO5.0) provides a framework for transportation analysis on the island of Oahu. This study uses this model as the starting point. Starting with a regionally valid model such as the OMPO5.0 ensures that the sub-area model developed for this update captures regional traffic flow patterns while the additional detail allows the sub-area model to capture the local effects of land use and roadway network improvements planned for the Ewa region.

The model is built on TransCAD 5.0 and utilizes a typical four-step process consisting of trip generation, trip distribution, modal split, and assignment. The OMPO5.0 model also contains a feedback loop to measure the difference between forecasts from the current iteration and the previous iteration until no significant differences are observed. Additional detail on the sub-area model developed for this project can be obtained in *Ewa Transportation Impact Fee Program Update: Model Validation Report* (Fehr & Peers, April 2010).

Figure 2 - Ewa Master Plan Task Flow Chart



Task 3 – Land Use Data from Developers

This task involves gathering key land use inputs from local developers. Each developer was asked to provide land use projections for their individual development projects that described the 10-year absorption by Year 2020. These land use forecasts indicated the number of dwelling units and square footage of development for each type of non-residential development in each project.

The land use and socioeconomic forecasts obtained provide number of dwelling units and employment projections expected for each development area. The housing and employment levels were compiled by BCH. These forecasts show that the 2020 housing estimates provided by developers were substantially higher than DPP projections and historical trends; however, employment estimates were much closer in number.² The OMPO sub-area model developed uses socioeconomic data as a key input in the development of travel demand forecasts. The socioeconomic data is described in terms of households and employment, i.e., jobs, and needed to be converted and disaggregated into data consistent with the OMPO model. The manner in which this socioeconomic data is used in the model is discussed below and in greater detail on Chapter 3 of this report.

Task 4 – Socioeconomic Forecasts from City and County of Honolulu

On Oahu, the City and County of Honolulu DPP is responsible for the desegregation of these socioeconomic forecasts into data usable by the OahuMPO model. Fehr & Peers was responsible for further disaggregating the socioeconomic forecast for the Ewa region. These desegregations consider the sub-area model developed in order to be consistent with the Oahu travel demand model structure. The 2020 socioeconomic forecast for the rest of Oahu remained unchanged and followed DPP 2020 projections. The manner in which this socioeconomic data is used in the model to produce trip estimates is further described in *User's Guide for the OahuMPO Planning Model* (Parsons Brinkerhoff, June 2008).

Task 5 – Process the Highway Network from OahuMPO

The OahuMPO is responsible for the preparation and updating of the long-range ORTP for the island of Oahu. The most recent version of the ORTP was obtained from the OahuMPO. This document serves as the base for all regional transportation planning activities on the island, including this effort. The regional highway network from the ORTP, as coded in the OahuMPO regional model (OMPO5.0), was used as the starting point for the development of the 2020 highway network for the Ewa region.

Task 6 – Develop Ewa Master Plan 2020 Base Highway Network

Data from the original 2000 *Ewa Highway Master Plan* was used to identify the elements of the highway system that were proposed for implementation by the Executive Committee. This highway plan, which is limited to the Ewa study area, included both regional and local roadways and served to supplement the information provided by the OahuMPO. The base highway network for this update includes roadways with full funding sources expected to be completed by 2020 that do not need to be included in the proposed 2020 roadway improvement plan. Relevant access roads were included in the 2020 base network since they provide critical access to major collectors and arterials of Ewa and are not expected to receive funding from either the State of Hawai'i or the City and County of Honolulu.

² *Forecast 2020 Housing and Jobs for Ewa* (Belt Collins Hawaii, February 10, 2010).

Task 7 – Prepare Year 2020 Trip Table

The 2020 trip table generated for this analysis was developed using the same framework as the OMPO5.0 model. This sub-area model uses the same platform to generate trips, distributes them across the study area, develops mode choice estimates, and stratifies these demand tables into the different time periods. The 2020 land use forecasts and the 2020 highway network were the key inputs to develop the 2020 AM and PM trip tables.

Task 8 – Forecast Traffic for Year 2020

The 2020 traffic forecasts were assembled by using the sub-area model developed for the Ewa region. The most updated 2020 land use and socioeconomic forecast information from the developers was processed by BCH and these socioeconomic variables were further processed and inputted into the sub-area travel demand model³ developed by Fehr & Peers. The model was executed and the results were inspected and analyzed.

Task 9 – Identify Highway Deficiencies

Before the 2020 highway improvement plan could be developed, the highway deficiencies that the Ewa region would experience by year 2020 were identified. Note that this master plan update was designed in conjunction with the Ewa Impact Fee Program Update to properly identify the roadways and develop a nexus for the ultimate impact fee. Identifying roadway deficiencies is a key step into these planning processes.

The 2020 traffic volumes discussed above were compared to the roadway capacities established in the 2009 Base Highway Network to identify potential deficiencies under the year 2020 future traffic scenario. The deficiencies provide an indication of the additional roadway improvements needed to satisfy future conditions in the study area after 10-year absorption of the anticipated development projects and regional growth.

Task 10 – Update Year 2020 Ewa Highway Master Plan

Potential roadway improvements that would provide the necessary roadway capacity to accommodate the year 2020 traffic forecasts were identified in this task. The potential roadway improvements were limited to those required for deficiencies identified within the Ewa study area only and had to be part of the package of long-range improvements in the region. The product of this task was the preparation of a Year 2020 Ewa Highway Master Plan Update.

Task 11 – Percentage Contribution of Traffic

Finally, the sub-area travel demand forecasting model was used to estimate the percentage of traffic contributed to each highway by each of the development projects in the Ewa region.

Task 12 – Develop Year 2020 Ewa Region Highway Improvement Plan

Tasks 10 and 11 were conducted in an iterative fashion as necessary to develop a set of highway improvements most suited to satisfying the future travel demands of the area and the proper inclusion of

³ See: *Ewa Transportation Impact Fee Program Update: Model Validation Report* (Fehr & Peers, April 2010)

“top priority” projects identified by the Executive Committee. The product of this task was the preparation of a Year 2020 Ewa Region Highway Improvement Plan.

Task 13 – Percentage Contribution of Traffic

Finally, the sub-area travel demand forecasting model was used to estimate the percentage of traffic contributed to each highway by each of the development projects in the Ewa region.

PROGRESS AND COORDINATION MEETINGS

A regular series of progress and coordination meetings were built into the overall schedule of this planning process. Meetings that included invitations to representatives of each of the organizations and agencies identified in this chapter were held to discuss the issues associated with the progress of the master plan that will lead to the Ewa Impact Fee Program Update. A summary of these meetings is presented below.

Meeting 1 (07/24/2009)

Kick-off meeting to discuss process, format, schedule, activities and responsibilities of each participant. The developers were asked to provide their 10-year (i.e., Year 2020) absorption land use forecasts for each individual project.

Meeting 2 (09/28/2009)

Description of traffic forecasting methodology including use of land use data from the developers, socioeconomic data from City and County of Honolulu DPP, and ORTP highway network. The process to identify roadways to be included or excluded in the 2020 base highway network was presented. The nature of the sub-area travel demand forecasting model was discussed.

Meeting 3 (10/20/2009)

Preliminary discussions on alternative improvements for the Ewa highway system and their potential effectiveness were conducted. Discussion on traffic counts obtained to validate the travel demand model, and an update on developers input on their land use projections was provided. A more detailed discussion on the potential roads to be included or excluded in the highway improvement plans was conducted.

Meeting 4 (01/06/2010)

Discussion of the sub-area travel demand forecasting model developed. Preliminary drafts of the existing conditions and model validations memos were delivered by Fehr & Peers to DTS. Additional discussion of the land use data collected from the developers. A discussion on the criteria for identifying roadway deficiencies took place.

Meeting 5 (02/23/2010)

Discussion on final findings on the land use analysis conducted by BCH for this study. Discussion on the progress on the sub-area model developed and discussion on the methodology to forecast 2020 traffic.

Meeting 6 (04/20/2010)

Discussions were held on the proposed 2020 Highway Improvement Plan for the Ewa region. Presentation of preliminary analysis of the effectiveness of the proposed roadway improvements and discussion about potential costs were held.

Meeting 7 (05/18/2010)

Meeting 7 included presentation of final 2020 base roadway network and discussions on the preliminary set of roadways improvements analyzed for the development of the 2020 Highway Improvement Plan. Concurrence by the Executive Committee on the 2020 highway improvement plan was established.

Meeting 8 (11/23/2010)

Presentation of draft cost estimates and process and findings of determining split of share of traffic generated by existing and future land uses. The share was used to identify the fair-share responsibility of government agencies (to address deficiencies caused by existing traffic) and developers (from which the impact fee will be calculated). Discussion of the cost estimates included input on the inclusion of land costs, as well as assumptions regarding potential future federal funding.

Meeting 9 (04/26/2011)

Refinements to the costs estimates were made based on input from staff and developers. The draft impact fee was presented and discussed. The discussion also included issues regarding fee credits and how they should be applied.

Meeting 10 (05/19/2017)

Copies of the Ewa Transportation Impact Fee Program 2015 Update and draft bill for an ordinance were provided to stakeholders. Members expressed concerns about missing projects.

Meeting 11 (10/23/2017)

H-1 Kapolei Interchange, Kapolei Parkway, and Bicycle, Pedestrian, and Transit Access Improvement share projects were added. Refinements to the costs estimates were made based on input from staff and developers. The draft impact fee was presented and discussed. A comment and response matrix was distributed.

Figure 2 includes an indication of the relationship of these meetings with the various tasks conducted as part of the planning process.

REPORT ORGANIZATION

The remainder of this report is divided into six chapters. Chapter 2 presents a description of the existing transportation conditions, as well as the planning process used to conduct this master plan update. Chapter 3 presents the existing roadway operations. Chapter 4 presents the methodology to analyze 2020 traffic conditions and the evaluations of the traffic study conducted. Chapter 5 presents the Ewa Highway Master Plan update results, as well as the percentage contribution of vehicular traffic that new development brings on the transportation system. Chapter 6 presents the construction cost estimates. Finally, Chapter 7 presents the proposed transportation impact fees.

2. EXISTING TRANSPORTATION FACILITIES AND POLICIES

This chapter describes the regulatory and policy framework for transportation and the available facilities and services in the Ewa region of the island of Oahu.

REGULATORY AND POLICY FRAMEWORK

City and County of Honolulu

The City and County of Honolulu guides and directs Oahu land use and development through its General Plan, Development Plans, and Sustainable Community Plans, which are adopted by ordinance, and the implementation of ordinances and regulations. To fulfill this role, the City Council of Honolulu has several departments that take on specific tasks to address the specific elements and needs of these studies as they relate to land use and transportation. Two of the departments are briefly discussed below.

Department of Planning and Permitting

DPP is responsible for providing services and information on building permits, development projects, and planning activities for the City and County. DPP staff are responsible for many of the island's planning documents, including Neighborhood Transit-Oriented District (TOD) Plans, and Development/Sustainability Plans. In terms of roadway improvements, DPP maintains a list of planned local roadway improvements for the Kapolei/Makakilo/Honokai Hale Neighborhood Board Areas, some of which include new street segments, widenings, interchange improvements, and signal installation projects.

Department of Transportation Services

The DTS consists of four divisions: Traffic Engineering, Transportation Planning, Traffic Signals & Technology, and Public Transit. The Traffic Engineering division provides for the safe and efficient operations of streets and intersections, while Traffic Signals & Technology Division manages, operates, develops, and implements Honolulu's traffic signal system, Traffic Management Center, traffic camera system, traveler information page, Intelligent Transportation Systems, and Street Use Permits. The Transportation Planning Division performs the citywide transportation planning tasks required by the Federal transportation funding program. The Transportation Planning division is also responsible for reviewing any environmental impact assessment documents. The Public Transit Division oversees the contractor operating the City's public transit system, TheBus and TheHandi-Van. The Rapid Transit Division, which administered project oversight of the Honolulu High-Capacity Transit Corridor Project, recently came under the auspices of the Honolulu Authority for Rapid Transit.

Hawai'i Department of Transportation

HDOT has authority over the State highway system, including freeways, interchanges, and arterial State routes. HDOT is responsible for planning, design, construction, operation, and maintenance of all State facilities in the Ewa area of Oahu, which include H-1, Route 76 (Fort Weaver Road), Route 93 (Farrington Highway), Route 95 (Kalaheo Boulevard) and the associated interchanges for these facilities. Other state facilities include Franklin D. Roosevelt Avenue and Kualaka'i Boulevard. HDOT maintains a District Office on Oahu that is directly responsible for performing field inspections of highway construction projects and maintenance of roads and highway and their associated structures in the State Highway System on Oahu.

HDOT is also responsible for the State of Hawai'i's STIP that provides a multi-year listing of the State and County projects and identifies those projects slated for federal funding. The STIP is a multi-modal transportation improvement program that delineates the funding categories and the federal and local share

required for each project. The Oahu Metropolitan Planning Organization (OahuMPO) prepares the island's Transportation Improvement Program (TIP) that provides input on the projects to include in the STIP.

Oahu Metropolitan Planning Organization

The OahuMPO is the island's transportation planning agency and federally-designated Metropolitan Planning Organization. The OahuMPO is responsible for coordinating transportation planning on Oahu, including the preparation of the Regional Transportation Plan (RTP), a comprehensive blueprint for the development of mass transit, highway, airport, seaport, railroad, bicycle, and pedestrian facilities.

The OahuMPO Policy Committee is a 13-member board responsible for providing Oahu's MPO's policy direction. In recent years, state and federal laws have given OahuMPO an increasingly important role in financing the island's transportation improvements. Most significant was the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), which increased the powers of MPOs like OahuMPO to determine the mix of transportation projects best suited to meet their region's needs. The current federal funding program is known as Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was enacted as public law in 2005 and TEA-21 authorized the Federal surface transportation programs for highways, highway safety and transit from 2005 through 2009. Reauthorization of SAFETEA-LU has been delayed and a definitive schedule has not been identified. OahuMPO administers the island's TIP, which is part of the state's STIP program.

The OahuMPO is also responsible for the production of the Congestion Management Process program, which identifies congested surface transportation facilities, evaluates projects proposed to mitigate congestion, and prioritizes these projects using quantifiable performance measures in order to assist decision-makers in selecting projects for inclusion in the TIP and the Oahu Regional Transportation Plan.

RELEVANT DOCUMENTS AND STUDIES

The Ewa region of Oahu is expected to absorb a significant portion of the future Oahu population and offer over 60,000 jobs by the Year 2030. As such, Ewa has been and will continue to experience significant growth in land use development. A critical infrastructure component of the land use development is the transportation network. Currently the Ewa region has an incomplete transportation network that serves only certain areas or includes gaps in streets and multi-modal corridors. Several transportation documents and studies have been completed to help provide for a comprehensive mobility framework for the Ewa region of Oahu that can accommodate the anticipated growth in development. A review of the guiding documents and studies is provided below.

Oahu General Plan

The Oahu General Plan was last amended in October 2006. The plan sets forth long-range objectives and policies and provides a direction and framework to guide programs and activities of the City and County of Honolulu. The Transportation & Utilities section of the plan lays out goals and implementation policies to help ensure that the visions and aspirations of the residents of Oahu are met. One of the main goals pertaining to transportation states that it is the plan's objective:

To create a transportation system which will enable people and goods to move safely, efficiently, and at reasonable cost; serve all people, including the poor, the elderly, and the physically handicapped; and offer a variety of attractive and convenient modes of travel.

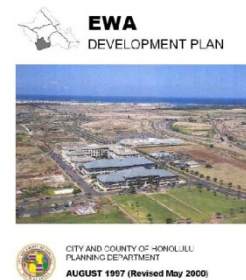
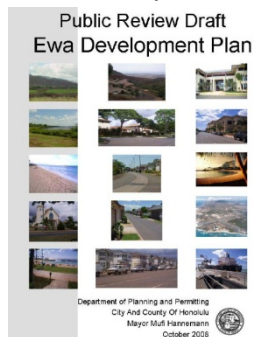
The document includes 13 policies designed to meet the above stated objective. In general, the policies recognize the importance of providing a balanced transportation system that accommodates vehicles, bicycles, and pedestrians. Directly related to Ewa, a policy is included that aims to improve transportation

facilities and services in the Ewa corridor and in the trans-Koolau corridors to meet the needs of the Ewa and Windward communities.

DPP is currently in the process of conducting a focused update of the General Plan known as O`ahu 2035 but transportation is not one of the specific issues. Related issue areas in the update include growth and development, as well as sustainability.

Ewa Development Plan

Development Plans for each of the eight geographic regions on Oahu, including Ewa, are required by the Charter of the City and County of Honolulu. Together with the General Plan, they guide population and use growth over 20+ years. The goal of the *Ewa Development Plan* is to provide conceptual, long-range visions and policies to guide land use and infrastructure decisions in the Ewa area. The *Ewa Development Plan* was originally completed in August 1997 and amended in May 2000. One of the main changes between the 1997 and 2000 document is that the comprehensive review requirement was amended from every three to five years to allow for adequate time for assessment of the progress in implementing the plan's vision and policies.



The vision for the Ewa area included in the 2000 Development Plan addresses many different issues that aim to preserve agricultural land while focusing on key areas. The plan specifies the development of a secondary urban center around the City of Kapolei, promotion of walking, biking, and transit ridership in master planned communities, phased development and provision of adequate infrastructure as some of its key visions for Ewa.

The *Ewa Development Plan* is currently in its five-year development review process. The Public Review Draft was released in October 2008, and the City and County of Honolulu DPP is in the process of compiling the final report for future submittal to the Planning commission and City Council for review and approval.

Some of the key transportation network improvement projects included in the Development Plan are:

- Widening Existing Roadways, such as Farrington Highway, Fort Barrette Road, and Fort Weaver Road at select locations;
- Constructing New Roadways including extensions of Kapolei Parkway, North-South Road, Makakilo Drive, Kalaheo East-West Spine Road and Mauka Frontage Road;
- Interchange Improvements at the Kunia, Makakilo, and Palailai H-1 interchanges; and
- Construction of New Interchanges including the H-1 Kapolei interchange, North-South Interchange, and Makaiwa Hills.

These identified roadway improvements are needed to accommodate the planned growth in Ewa.

As compared to the 2000 plan, some of the key changes proposed in the October 2008 document include:

- Support place making with commercial development design and mixed-use
- Improve connectivity: ¼-mile collector/connector system, shorter blocks and more connections within new subdivisions

- Finance infrastructure through TIF and CFD financing
- Remove phasing designations
- Add transit loop through Kalaeloa and delete Kapolei Parkway from existing transit corridor
- Move the main University of Hawai'i West Oahu campus (UH WOC) back to the corner of Farrington & North-South Road
- Add Community Commercial Centers near the Kapolei Parkway & North-South Road intersection and the Farrington & Fort Weaver Road intersection

Overall, the *Ewa Development Plan* serves as the basis for providing guidelines for future land use and infrastructure development in Ewa.

Oahu Regional Transportation Plan 2035

The Oahu Regional Transportation Plan (ORTP) 2035 was approved by the OahuMPO Policy Committee in April 2011. The ORTP 2035 is a blueprint that guides mobility issues and transportation needs of the community. The plan integrates planned growth patterns and reflects available financial resources over the next 25 years. The plan includes visions and goals, identifies projects, and provides an implementation program for mid-and long-range investment of the available transportation funds across Oahu.

The vision of the ORTP 2035 is that Oahu will be a place where transportation choices are efficient, safe and convenient and support the quality of life, natural beauty and economic vitality of the island. The ORTP 2035 includes numerous transportation facility and service improvements from freeway widening, the provision of a fixed-guideway transit system between East Kapolei and Ala Moana that will help to relieve the H-1 corridor, implementation of the island's bikeway plan, and expansion of the bus system.



Transportation Enhancement Program

The OahuMPO is responsible for the maintenance of the Transportation Enhancement Program. The program was established by federal legislation to fund activities that enhance the transportation experience. Projects included in the Transportation Enhancement program should add community or environmental value to a transportation project. Such projects generally go beyond what is required by normal environmental mitigation for transportation improvements. Projects relevant to the Ewa region that are currently eligible for the Transportation Enhancement Program include the proposed Oahu Pedestrian Master Plan proposed by the Department of Transportation.

Ewa Roadway Connectivity Study

The *Ewa Roadway Connectivity Study* (May 2009) is a report commissioned by the City and County of Honolulu DPP to evaluate how roadway connectivity in the Ewa area could be improved. As Ewa has been developing over the past 20 years, the pace of land use development has occurred faster than the implementation of transportation infrastructure improvements that would provide for good connectivity in the area. This has led to increases congestion on the major arterials. The goal of the report is to make recommendations that would improve roadway connectivity and influence roadway patterns during the planning phases of planned developments. As stated in the study, the recommended roadway plan for the Ewa region incorporates elements of Smart Growth and a homogenous grid roadway layout while

recognizing physical and policy constraints. Improvements are not only recommended for roadways, as the study also includes recommendations for a bicycle facilities plan to provide a continuous bicycle facilities network to serve neighborhood schools, parks, community centers, and residential and commercial areas. The study also provides guidelines for roadway and bikeway planning, sets priority guidelines, and recommendations for non-arterial roadway connectivity between developments.

Though the *Ewa Roadway Connectivity Study* lays out a framework for improving mobility in Ewa, the plan does not address some of the implementation issues, such as the coordination of state roads and schools development with residential development and coordination with development authorities for specific/master planned communities, such as with the DHHL in East Kapolei and with the HCDA in the Kalaeloa Waipahu Neighborhood TOD plans.

The Oahu Bike Plan

The draft *Oahu Bike Plan* was available for public review during the summer of 2009, and the final plan is in the process of being completed. The goal of the plan is to provide a strategy for better integrating bicycling into the City and County of Honolulu's transportation system. The plan will provides an array of important policy and program recommendations and identify and integrated network of on-road bike lanes and routes and off-road paths that will link people with destinations throughout the island.

According to the draft Plan, Ewa has approximately 10 miles each of bike lanes and bike paths provided by the County or State. This equates to a total bikeway network of 20 miles. The draft plan proposes to increase Ewa's bikeway network to 125 miles with the implementation of new bike lanes, paths, and routes throughout the area. Completion of the bikeway network proposed in the draft Plan would provide for a comprehensive network that would improve cyclists' ability to easily and conveniently travel throughout the Ewa region.

Ewa Highway Master Plan

The *Ewa Highway Master Plan* was last updated in 2000 and prepared for HDOT in conjunction with the Ewa Area Developers Group. In recognition of the anticipated growth in the Ewa area, the Highway Master Plan lays out a foundation for future roadway network needed to meet the expected increase in land use development. The Highway Master Plan aims to satisfy the objectives of both governmental agencies and the development community; and therefore bring sometimes competing interests together to try to form a cohesive vision for Ewa's transportation network improvements. The plan contains the Year 2010 highway improvement plan, which lists a set of roadway improvements necessary to accommodate the anticipated development of the Ewa region with adequate roadway improvements while protecting the health, safety and general welfare of the public. The projects identified in the Highway Master Plan are consistent with those identified in the Ewa Development Plan. The Highway Master Plan is the plan on which the Ewa Highway Impact Fee Program is based.

Ewa Highway Impact Fee Program

The *Highway Impact Fee Program* was last updated in 2002 by HDOT. The Ewa Highway Impact Fee is based on the roadway improvements identified in *Ewa Highway Master Plan* and is an essential component of implementing the Master Plan by providing a funding mechanism for the transportation network improvements. The Impact Fee Program is comprised of Ewa regional development projections, forecasts of new vehicular trips, and the estimated cost of the Master Plan improvements for the region... Generally, the fees are developed based on the number of forecasted vehicle trips generated by the anticipated new land development activities and based on the assessment of cost for the roadway improvements identified in the Highway Master Plan. Thus, a cost per unit (such as dwelling unit or 1,000 square feet) is developed for residential and non-residential land use categories.

Honolulu High-Capacity Transit Corridor Project



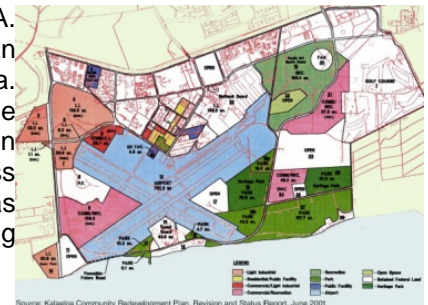
The project is an approximately 20-mile elevated rail line that will run between Kapolei and the University of Hawai'i at Manoa and will connect West Oahu with downtown Honolulu and the Ala Moana Center. The goal of the transit project is to improve east-west mobility, increase reliability of travel especially during peak commute times, improve the island's economy, protect the environment, provide for sustainable growth, and provide for fair and equitable transportation options on the island of Oahu.

Proposed stations in the Ewa region include Ho'opili, University of Hawai'i at West Oahu, and East Kapolei. The project is currently under construction with utility relocations underway. Future alignments of the system are proposed further west into the Ewa region with potential stations at Kapolei Parkway, Fort Barrette Road,

Kalaeloa, Kapolei Transit Center, and West Kapolei.

Kalaeloa Master Plan

The *Kalaeloa Master Plan* was prepared in March 2006 for the HCDA. Kalaeloa is the former Naval Air Station at Barber Point. The plan offers an overview towards revitalization of the opportunities and vision for Kalaeloa. The overall goal of the plan is to develop a land use plan that maximizes the social, economic, open space, and cultural resources and opportunities in Kalaeloa. The plan includes a set of implementation measures that address phasing, infrastructure improvements, financing and governance. HCDA has been working with developers on refining a development plan and determining the ultimate infrastructure requirements within the Kalaeloa planning area.



Waipahu Neighborhood Transit-Oriented Development Plan

The public review draft of the *Waipahu Neighborhood Plan* was released in March 2009. The plan focuses on community-based planning efforts for the two future rail stations along the future fixed guideway system connecting Waipahu with the City of Kapolei. The two future transit stations proposed include the Farrington/Leoku and Farrington/Mokuola stations. The plan focuses on development within a ¼- and ½-mile radius of the stations with the goal to foster more livable communities that take advantage of the benefits of transit.



East Kapolei Neighborhood Transit-Oriented Development Plan

The City and County of Hawai'i is in the process of developing a TOD plan for the three stations planned in the East Kapolei area as a result of the Honolulu High-Capacity Rail Transit Project. Stations include the Ho'opili, UHWOC, and East Kapolei (Kroc Center) stations. Similar to the Waipahu Neighborhood TOD plan, this plan will focus on guiding development within a ¼- and ½-mile radius of the stations. Community workshops were held in 2009 and a public review draft report was prepared in June 2010.

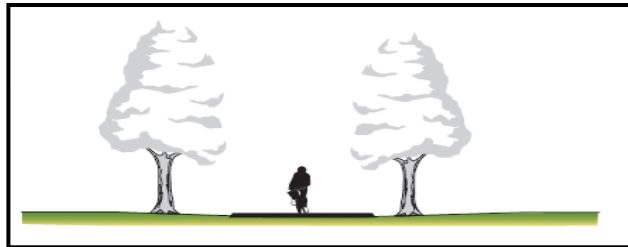


BICYCLE AND PEDESTRIAN FACILITIES

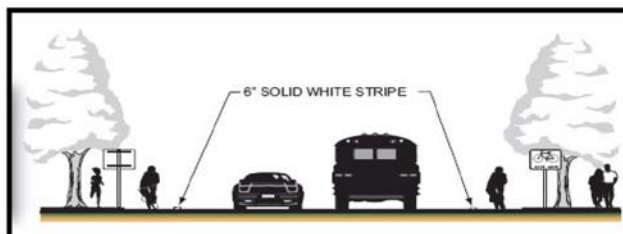
Bicycle Facilities

The three major types of bicycle facilities that are part of Oahu's bicycle network include bike lanes, paths, and routes. The facilities are briefly described below. It should be noted that bicyclists are allowed to travel on any roadway excluding freeways as long as they obey traffic rules and regulations.

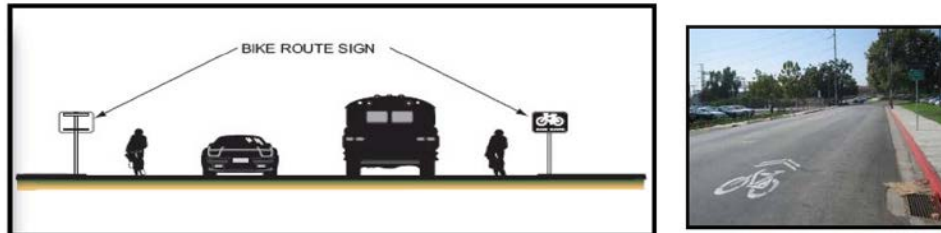
- **Bike paths** are paved pathways separated from roadways that are designated for the exclusive use of bicycles and pedestrians. At minimum bike paths are 10 feet wide, though typically they are 12 feet wide. In general, bike paths serve corridors not served by streets and highways or where sufficient right-of-way exists to allow such facilities to be constructed away from the influence of parallel streets and numerous vehicle conflicts. Example facilities include the trail along Kapolei Parkway in the Ewa Gentry area.



- **Bike lanes** are lanes for bicyclists adjacent to the outer vehicle travel lanes. These lanes have special lane markings, pavement legends, and signage. Typically bike lanes are five to six feet wide (four-foot minimum). Bike lanes are usually constructed to better accommodate bicyclists through corridors where insufficient room exists for safe bicycling on existing streets. Example facilities include bike lanes on Kamokila Boulevard, Kealanani Avenue, and Kama'aha Avenue in the Kapolei area.



- **Bike routes** in general are located on low traffic volume streets that provide alternate routes for recreational, and in some cases, commuter and school-age cyclists. These facilities are signed for bike use, but have no separated bike right-of-way or lane striping. A wide outside traffic lane of 14 feet is typically preferred for bike routes to enable cars to pass bicyclists without crossing the centerline. There are no bike routes in Ewa.



The existing Ewa bicycle network consists of approximately 20 miles of facilities, but the network in its beginning stages and does not yet provide a comprehensive system that allows bicyclists to travel easily throughout the area. The *Oahu Bike Plan*, which is now being finalized, includes a comprehensive future network of approximately 125 miles for the Ewa region that allows for increased bicycle connectivity and mobility.

Pedestrian Network

Pedestrian facilities include sidewalks, crosswalks, pedestrian signals, and off-street paths meant to provide safe and convenient routes for pedestrians to access destinations such as institutions, businesses, public transportation, and recreation facilities. Most street segments within Ewa include a sidewalk or path on at least one side of the street and many include sidewalks on both sides. Separate bike facilities are provided along several major streets such as Fort Weaver Road where pedestrians and bicyclists can use a multi-use path located east of the curb-to-curb right of way. Current City and County policy calls for the inclusion of sidewalks and paths on all streets as part of new development.

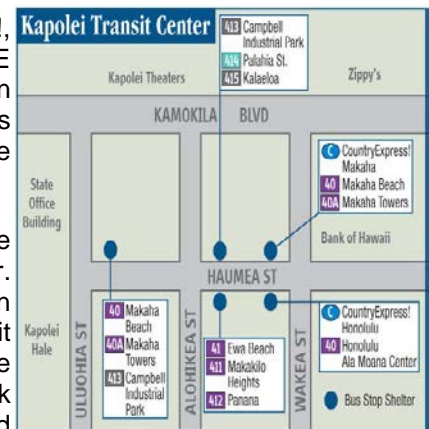
TRANSIT SERVICE

TheBus

TheBus system is operated by the City and County of Honolulu and provides fixed-route bus service on the island of Oahu. The majority of the routes serve downtown Honolulu and Waikiki. TheBus provides a total of 100 fixed-route services, and the entire TheBus system has an average weekday ridership of approximately 240,000 passengers and serves approximately 74 million passengers annually.

Bus routes that serve the Ewa region fall within four route classifications. These classifications, their function, and service headways as relevant to the Ewa region are described below:

- **Rapid Bus** – Rapid Bus includes CityExpress!, CountyExpress!, and Route 1L. In the Ewa region CountyExpress! Routes C and E provide limited-stop express service to and from downtown Honolulu and Waikiki. Service is provided all day on weekdays, as well as on weekends. The CountyExpress! routes typically provide 30-minute service headways.
- **Suburban Trunk** – Suburban Trunk routes typically provide service through late evening from outlying communities to the urban center. These routes also provide connections between suburban communities that connect with community circulators at transit centers. Routes typically stop at all local bus stops and operate every day with typical headways of 30 minutes. Suburban trunk routes that serve the Ewa regional include Routes 40, 41, 42, and 43.
- **Community Circulators** – Community Circulators provide circulation in their established communities. They connect at neighborhood hubs or transit centers. Community Circulators provide coordinated connections to other circulators and Suburban Trunk routes. These routes generally fall within three categories of service provision: 1) higher-demand routes with 30-minute headways, 2) lower-demand routes with 60-minute headways, 3) low-demand routes with intermittent or peak period-only service. Community Circulators that serve the Ewa region include Routes 411, 412, 413, 414, and 415.
- **Peak Express** – Peak Express serves predominantly home-to-work trips by connecting specific neighborhoods to employment centers. These trips are provided in the peak period, peak direction only, with minimal scheduled departures. Routes 91, 92, 93, 94, 101, 102, and 201 are Peak Express routes that serve the Ewa region.



There are six transit centers on TheBus system. The Kapolei Transit Center serves the Ewa region. Currently, the Kapolei Transit Center is a temporary on-street transit center along Haumea Street between Uluohia and Wakea Streets. The former off-street facility about a block away was closed to allow for the construction of a new ramps to the H-1 Freeway. In the future, the proposed Kapolei Wakea Transit Center will be a permanent off-street transit center that will replace the existing on-street facility.

TheHandi-Van Service

TheHandi-Van Service is the City's paratransit service for persons who are eligible according to the Americans with Disabilities Act of 1990 (ADA) or persons certified by the City. The service area, days, and hours of operation are the same as for TheBus, though trips need to be reserved 24 hours in advance.

TheBoat

The City and County of Honolulu used to run TheBoat service, which provided passenger ferry access between the Kalaeloa Station at the Barbers Point harbor station and the Aloha Tower Station in downtown Honolulu. Service was launched in September 2007; however, as of July 2009 TheBoat ferry service was suspended due to financial constraints. The potential for resumption of passenger ferry service is unclear at this time.

Other Transit Service

Leeward Oahu Transportation Management Association

In addition to the public transportation services described above, the Leeward Oahu Transportation Management Association (LOTMA) is a transportation resource center that provides free carpool matching services, LOTMA commuter express, and emergency ride home programs. Both the carpool matching service and the emergency ride home programs are available to Leeward (including Ewa), Central, and North Shore Oahu residents. For the commuter express service, LOTMA contracts with Polynesian Adventures Tours Gray Line Hawai'i to provide commuter service for Central Oahu to Downtown Honolulu and Waikiki using tour buses.

HDOT Rideshare Services

HDOT supports a statewide vanpool program and carpool matching service. Individuals can sign up on a website to be entered into the State's carpool database. The database uses residence and work locations to provide potential matches for residents island-wide.

ROADWAY SYSTEM

Roadways are classified into categories depending upon the service they provide. Major categories in Ewa are generally based on the standard Functional Classification system as described in *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000): freeways, arterials, collectors, and local streets. Local streets are designed for high accessibility (access to adjacent properties) and low mobility (throughput of traffic movement). Conversely, freeways are designed for low accessibility, with limited connections to other facilities provided by grade-separated interchanges, and high mobility. This chapter describes the roadway system serving Ewa.

Freeways

Freeways are facilities designated solely for traffic movement, providing no access to abutting properties and designed to separate all conflicting traffic movements through the use of grade-separated interchanges.

H-1 traverses the Ewa region along its northern edge. H-1 serves as a major Ewa-Diamond Head connection between the Waianae coast and the Kahala area of Honolulu. The freeway generally includes three through lanes in each direction and transitions to a four-lane highway (Farrington Highway) Ewa of Kalaeloa Boulevard. Existing interchanges are provided at Kalaeloa Boulevard (with connections to Kamokila Boulevard), Makakilo Drive, and Fort Weaver Road.

Arterials

Arterials are facilities that accommodate major movements of traffic not served by expressways or freeways. They are designed mainly for the movement of through traffic, and the provision of access to abutting properties is a secondary function. Although abutting properties have access to the facilities, parking and loading may be restricted or prohibited to improve the capacity for moving traffic. The number

of lanes on this type of facility depends on its function, its location, and the volume of traffic it is expected to handle; however, arterials are generally planned to have four or more travel lanes. Selected roadways designated as arterials are described below:

- Farrington Highway (Route 93) is a major east-west connection that runs makai of the H-1 freeway. Farrington Highway is a mostly two-lane arterial. Farrington Highway joins the H-1 Freeway west of Kalaeloa Boulevard.
- Fort Weaver Road (Route 76) is a major mauka-makai connection towards the eastern border of Ewa that provides direct access from the Ewa Beach area to Farrington Highway, H-1 Freeway, and Kunia Road mauka of the H-1 Freeway. Fort Weaver is currently a four-lane facility (two lanes per direction), with additional right-of-way set aside for future widening. Due to a lack of interconnectivity between developments adjacent to Fort Weaver Road, this arterial must handle short distance trips as well as sub-regional trips in the corridor. This results in significant congestion during peak periods.
- Fort Barrette Road is another major mauka-makai connection that currently connects Roosevelt Avenue towards the northern border of Kalaeloa to Farrington Highway and H-1. Mauka of the H-1 Freeway, Fort Barrette Road continues as Makakilo Drive. Fort Barrette Road is a mostly two-lane rural arterial roadway while the section between Farrington Highway and the H-1 freeway has been widened to four lanes and improved to more urban standards.
- Roosevelt Avenue is primarily a two-lane arterial that provides a major east-west connection between Kapolei Parkway near Fort Barrette Road and Geiger Road. East of Kapolei Parkway, Roosevelt Avenue continues as Geiger Road, which is a four-lane arterial that continues to Keaunui Drive. East of Keaunui Drive, Geiger Road continues as a two-lane rural arterial as Iroquois Point Road. Prior to the closure of the former Barbers Point Naval Air Station (Kalaeloa), access to Roosevelt Avenue was restricted to military purposes only.
- Kapolei Parkway is an arterial roadway that runs from the Ewa Beach area north towards Ewa Gentry, where it then turns west and runs north of and roughly parallel to Roosevelt Avenue. Kapolei Parkway is discontinuous because the segments of Kapolei Parkway east and west of North-South Road have not been completed. The majority of the existing Kapolei Parkway is four-lane arterial segments, though some more rural two-lane configurations remain.
- Kalaeloa Boulevard (Route 95) is a mauka-makai arterial that connects the Campbell Industrial Park area with the H-1 Freeway. It is currently a four-lane roadway that is being widened to six lanes.
- Keoneula Boulevard is a short, east-west, four-lane arterial that provides direct access into Ocean Point from Fort Weaver Road west towards its current terminus. In the future, it is envisioned that Keoneula Boulevard will provide east-west mobility between the Ewa Beach and Kalaeloa areas.
- North-South Road is a future four-lane roadway oriented in a mauka-makai direction that will include an interchange at H-1 and will be a major arterial spine through Ewa. This roadway is scheduled to open in early 2010.

Collector Roadways

Collectors are facilities that serve internal traffic movements in a specific area or neighborhood and provide connections to the arterial system. Major collectors typically do not serve through trips but can provide access to abutting properties. Traffic control devices may be installed to protect or facilitate traffic on a collector street. Selected roadways designated as arterials are described below:

- Renton Road is a primarily two-lane collector street with select segments near major arterials having four lanes. It provides an east-west connection from east of Fort Weaver Road to Kalaeloa Boulevard.
- Hanua Street is a two-lane connector that provides a mauka-makai connection in the Campbell Industrial Park from north of Malakole Street to Olai Street.
- Kama'aha Avenue provides primary east-west connection in the Villages of Kapolei development. Currently, it is configured as a four-lane collector street.
- Kealanani Avenue is a four-lane, mauka-makai collector roadway that connects the Village of Kapolei development to Farrington Highway.
- Keaunui Drive is a four-lane mauka-makai collector roadway that provides access and circulation to the Ewa Gentry subdivisions east of Fort Weaver Road.

Local Streets

Local streets are facilities with the primary function of providing access to immediately adjacent properties. These low-speed streets may be subdivided into classes according to the type of land served, such as residential or industrial. The majority of existing streets in Ewa are local streets.

3. EXISTING ROADWAY OPERATIONS

EXISTING CONGESTION PATTERNS

The limited arterial roadway network and the location of the majority of trip-generating land uses have led to substantial congestion in the Ewa region. Most of the residences have been located along the Fort Weaver Road corridor, while the majority of the commercial and office development has occurred within the Kapolei core area of Kalaeloa Boulevard. With the predominant number of jobs and trip attractions located in downtown Honolulu and other points along the H-1 corridor, the primary flow pattern is to and from the east.

As such, excessive queuing occurs on Fort Weaver Road during the AM peak and PM peak periods and sometimes throughout the day. To avoid this congestion, some drivers have been observed traveling west to Fort Barrette Road via Roosevelt Avenue and accessing H-1 via the Makakilo Road interchange. While this route is relatively circuitous to access the Ewa Beach area, it is perceived to be faster than waiting in the Fort Weaver Road queues. Recent anecdotal evidence indicates that some drivers are now using the new Kamokila Avenue connection to Kapolei Parkway and using the Kalaeloa Boulevard interchange to avoid peak period congestion on Fort Barrette Road.

On most local and major collector streets in Ewa, congestion is limited or non-existent during most periods. As development continues to be occupied, volumes will increase but traffic patterns will change as new roadway facilities are constructed and opened. The majority of new development will use the existing Kalaeloa Boulevard and Makakilo Road interchanges as well as new ramps in the future Kapolei interchange complex and the new North-South Road interchange.

EXISTING ROADWAY SEGMENT OPERATIONS

Roadway segment operations were evaluated based on a combination of existing counts, preliminary model results, and field reconnaissance. We compared roadway volumes to the roadway capacities to calculate volume-to-capacity (V/C) ratios and describe roadway operations in terms of level of service (LOS). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the best operating conditions, to LOS F, with the worst operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. Roadway capacities are based on the roadway type (collector, arterial, freeway, etc.), number of travel lanes, and posted speed limits. Table 1 summarizes the relationship between V/C ratios and LOS that were assumed for this report.

TABLE 1 – ROADWAY SEGMENT LEVEL OF SERVICE DEFINITIONS	
Level of Service	V/C Ratio
A	0.59
B	0.60 to 0.69
C	0.70 to 0.79
D	0.80 to 0.89
E	0.90 to 0.99
F	> 0.99

Source: Fehr & Peers, January 2010.

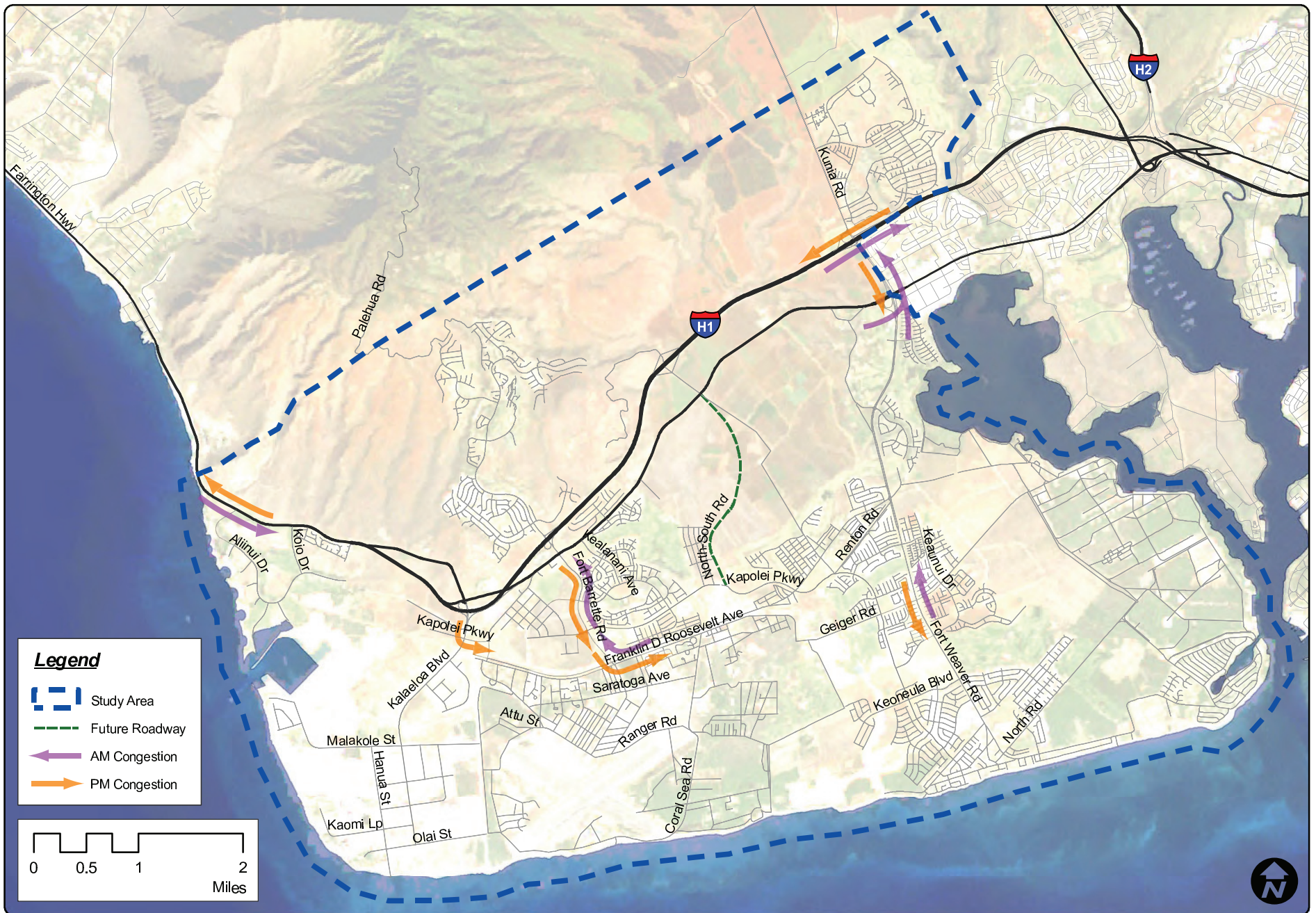
Table 2 summarizes the LOS for select roadway segments in the study area for which existing counts were available. It should be noted that the reported LOS in some cases is better than the observed LOS, especially on the corridors with the greatest congestion. This is the result of roadway counts only capturing vehicles as they pass a certain location and not capturing queued vehicles stuck in traffic that are not able to travel through the corridor.

Under AM peak hour conditions, operations on some segments of mauka-bound Fort Weaver Road, as well as Farrington Highway and H-1 in the Diamond Head direction operate at LOS E or LOS F, with Fort Weaver Road being the most congested corridor. Franklin D. Roosevelt Road operates at unacceptable LOS in the eastbound direction during the morning peak period, as vehicles avoid the heavily congested Fort Weaver Road corridor to access H-1 via Fort Barrette Road or Kalaeloa Boulevard. In the PM peak hour, operating conditions are similar to the AM peak, though the direction of congestion is reversed with makai-bound traffic on Fort Weaver Road and ewa-bound traffic on Farrington Highway and H-1 experiencing the LOS E and LOS F. Most other roadways in the Ewa region operate at LOS D or better during both peak periods. Figure 3 illustrates the prevailing congestion flow patterns in the AM and PM peak hours.

Table 2: Existing Raodway Levels of Service

Street Name	Location	Direction	Lanes	Capacity		AM Peak Hour			PM Peak Hour		
				Per Lane	Total	Vol	V/C	LOS	Vol	V/C	LOS
Franklin D Roosevelt	East of Kamokila Blvd	EB	1	800	800	298	0.37	A	508	0.64	B
Franklin D Roosevelt		WB	1	800	800	341	0.43	A	208	0.26	A
Franklin D Roosevelt	East of Enterprise St	EB	1	800	800	479	0.60	A	795	0.99	E
Franklin D Roosevelt		WB	1	800	800	727	0.91	E	541	0.68	B
Franklin D Roosevelt	West of Coral Sea St	EB	1	950	950	511	0.54	A	775	0.82	D
Franklin D Roosevelt		WB	1	950	950	969	1.02	F	620	0.65	B
Franklin D Roosevelt	East of Coral Sea St	EB	1	950	950	464	0.49	A	813	0.86	D
Franklin D Roosevelt		WB	1	950	950	1,010	1.06	F	518	0.55	A
Franklin D Roosevelt	East of Corregidor St	EB	1	950	950	443	0.47	A	1011	1.06	F
Franklin D Roosevelt		WB	1	950	950	955	1.01	F	543	0.57	A
Franklin D Roosevelt	East of Phillipine Sea St	EB	1	950	950	347	0.37	A	737	0.78	C
Franklin D Roosevelt		WB	1	950	950	698	0.73	C	485	0.51	A
Geiger Rd	East of Essex Rd	EB	1	700	700	336	0.48	A	779	1.11	F
Geiger Rd		WB	1	700	700	737	1.05	F	413	0.59	A
Geiger Rd	West of Kaplei Pkwy	EB	1	700	700	274	0.39	A	617	0.88	D
Geiger Rd		WB	1	700	700	613	0.88	D	457	0.65	B
Geiger Rd	East of Kaplei Pkwy	EB	2	700	1400	268	0.19	A	420	0.30	A
Geiger Rd		WB	2	700	1400	345	0.25	A	397	0.28	A
Geiger Rd	East of Fort Weaver Rd	EB	2	700	1400	258	0.18	A	530	0.38	A
Geiger Rd		WB	2	700	1400	462	0.33	A	268	0.19	A
Enterprise St	South of Franklin D Roosevelt	NB	2	700	1400	219	0.16	A	543	0.39	A
Enterprise St		SB	2	700	1400	218	0.16	A	352	0.25	A
Fort Barrette Rd	South of Farrington Hwy	NB	1	950	950	594	0.63	B	623	0.66	B
Fort Barrette Rd		SB	1	950	950	650	0.68	B	463	0.49	A
Fort Barrette Rd	North of Farrington Hwy	NB	2	950	1900	1,169	0.62	B	1608	0.85	D
Fort Barrette Rd		SB	2	950	1900	1,617	0.85	D	1294	0.68	B
Coral Sea Rd	South of Franklin D Roosevelt	NB	1	700	700	49	0.07	A	237	0.34	A
Coral Sea Rd		SB	1	700	700	137	0.20	A	97	0.14	A
Kamokila Blvd	North of Franklin D Roosevelt	NB	1	800	800	397	0.50	A	263	0.33	A
Kamokila Blvd		SB	1	800	800	370	0.46	A	576	0.72	C
Kamokila Blvd	North of Kapolei Pkwy	NB	2	800	1600	352	0.22	A	650	0.41	A
Kamokila Blvd		SB	2	800	1600	364	0.23	A	492	0.31	A
Kamokila Blvd	North of Uluohia St	NB	2	800	1600	313	0.20	A	691	0.43	A
Kamokila Blvd		SB	2	800	1600	424	0.27	A	494	0.31	A
Kamokila Blvd	South of Farrington Hwy	NB	2	800	1600	670	0.42	A	878	0.55	A
Kamokila Blvd		SB	2	800	1600	1,243	0.78	C	860	0.54	A
Farrington Hwy	South of Koio Dr	EB	2	1550	3100	n/a	-	-	n/a	-	-
Farrington Hwy		WB	2	1550	3100	2,648	0.85	D	1993	0.64	B
Farrington Hwy	West of Kalaeloa Blvd	EB	2	1550	3100	1,179	0.38	A	2540	0.82	D
Farrington Hwy		WB	2	1550	3100	2,315	0.75	C	1696	0.55	A
Farrington Hwy	West of Kamokila Blvd	EB	1	800	800	740	0.93	E	612	0.77	C
Farrington Hwy		WB	1	800	800	629	0.79	C	695	0.87	D
Farrington Hwy	East of Kamokila Blvd	EB	2	800	1600	767	0.48	A	1063	0.66	B
Farrington Hwy		WB	2	800	1600	1,229	0.77	C	1128	0.71	C
Farrington Hwy	East of Fort Barrette Rd	EB	2	800	1600	664	0.42	A	895	0.56	A
Farrington Hwy		WB	2	800	1600	754	0.47	A	675	0.42	A
Farrington Hwy	East of Kealanani Ave	EB	2	800	1600	682	0.43	A	547	0.34	A
Farrington Hwy		WB	2	800	1600	570	0.36	A	541	0.34	A
Farrington Hwy	West of Old Fort Weaver Rd	EB	1	950	950	1,058	1.11	F	462	0.49	A
Farrington Hwy		WB	1	950	950	264	0.28	A	503	0.53	A
Farrington Hwy	East of Old Fort Weaver Rd	EB	1	950	950	1,048	1.10	F	281	0.30	A
Farrington Hwy		WB	1	950	950	228	0.24	A	723	0.76	C
Farrington Hwy	East of Fort Weaver Rd	EB	2	950	1900	868	0.46	A	754	0.40	A
Farrington Hwy		WB	2	950	1900	641	0.34	A	1163	0.61	B
Kapolei Pkwy	East of Fort Barrette Rd	EB	3	950	2850	452	0.16	A	342	0.12	A
Kapolei Pkwy		WB	3	950	2850	480	0.17	A	348	0.12	A
Kapolei Pkwy	North of Kahiuka St	NB	2	800	1600	352	0.22	A	304	0.19	A
Kapolei Pkwy		SB	2	800	1600	360	0.23	A	354	0.22	A
Kapolei Pkwy	North of Geiger Rd	NB	2	800	1600	373	0.23	A	361	0.23	A
Kapolei Pkwy		SB	2	800	1600	395	0.25	A	252	0.16	A
Kapolei Pkwy	South of Geiger Rd	NB	2	800	1600	688	0.43	A	491	0.31	A
Kapolei Pkwy		SB	2	800	1600	448	0.28	A	519	0.32	A
Kapolei Pkwy	South of Puuloa Rd	NB	3	800	2400	796	0.33	A	582	0.24	A
Kapolei Pkwy		SB	3	800	2400	592	0.25	A	584	0.24	A
Renton Rd	East of Kaplei Pkwy	EB	1	700	700	491	0.70	B	341	0.49	A
Renton Rd		WB	1	700	700	495	0.71	C	281	0.40	A
Renton Rd	West of Fort Weaver Rd	EB	2	700	1400	636	0.45	A	420	0.30	A
Renton Rd		WB	2	700	1400	235	0.17	A	535	0.38	A
Renton Rd	East of Fort Weaver Rd	EB	2	700	1400	117	0.08	A	80	0.06	A
Renton Rd		WB	2	700	1400	6	0.00	A	31	0.02	A
Fort Weaver Rd	South of Geiger Rd	NB	2	950	1900	1,227	0.65	B	976	0.51	A
Fort Weaver Rd		SB	2	950	1900	1,038	0.55	A	1380	0.73	C
Fort Weaver Rd	North of Geiger Rd	NB	3	950	2850	1,547	0.54	A	1078	0.38	A
Fort Weaver Rd		SB	2	950	1900	959	0.50	A	1594	0.84	D
Fort Weaver Rd	South of Renton Rd	NB	3	950	2850	2,379	0.83	D	1483	0.52	A
Fort Weaver Rd		SB	2	950	1900	1,084	0.57	A	2132	1.12	F
Fort Weaver Rd	North of Renton Rd	NB	3	1200	3600	2,812	0.78	C	1594	0.44	A
Fort Weaver Rd		SB	3	1200	3600	1,227	0.34	A	2407	0.67	B
Fort Weaver Rd	South of Laulaunui Ln	NB	3	1200	3600	3,600	1.00	E	1571	0.44	A
Fort Weaver Rd		SB	3	1200	3600	1,150	0.32	A	2904	0.81	D
Fort Weaver Rd	South of H-1 EB ramps	NB	3	1550	4650	3,590	0.77	C	2502	0.54	A
Fort Weaver Rd		SB	3	1550	4650	1,522	0.33	A	3154	0.68	B

Source: Fehr & Peers, January 2010



4. YEAR 2020 TRAVEL DEMAND AND OPERATIONS ANALYSIS

The intent of this study was to update the Ewa Highway Master and corresponding transportation impact fee based on projected 2020 conditions. This required development of 2020 travel demand and its impact on the anticipated roadway system at that time. The methodology to develop 2020 traffic forecasts and the results of the operations analysis are described in this chapter.

TRAVEL DEMAND FORECASTING MODEL

The OahuMPO regional travel model forecasting tool (OMPO5.0) provides a framework for transportation analysis on the island of Oahu. Starting with a regionally valid model such as the OMPO5.0 ensures that the sub-area model developed for this master plan captures regional traffic flow patterns while the additional detail allows the sub-area model to capture the local effects of land use and roadway network improvements planned for the Ewa region. The model is built on TransCAD 5.0 and utilizes a typical four-step process consisting of trip generation, trip distribution, modal split, and assignment. The OMPO5.0 model also contains a feedback loop to measure the difference between forecasts from the current iteration and the previous iteration until no significant differences are observed.

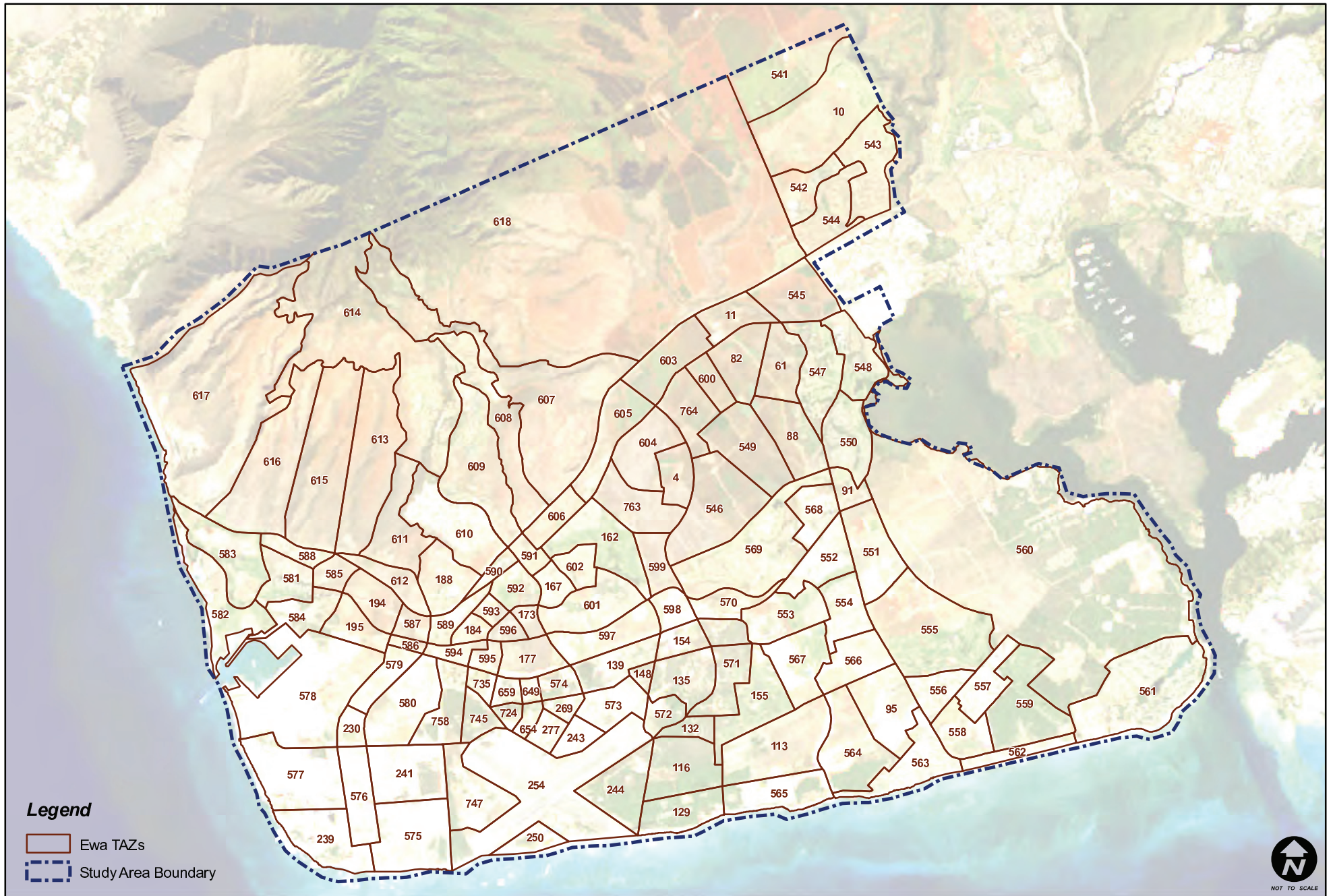
The sub-area model was designed and validated to produce AM and PM peak hour vehicular flows on the Ewa region roadways. The original OMPO5.0 structure divides the Ewa region into traffic analysis zones (TAZs) connected to the roadway and transit networks by centroid connectors. This TAZ structure was subsequently disaggregated to facilitate more accurate loading of vehicle trips to the study area roadways. Originally, the Ewa region, as coded in the OMPO5.0 model, was divided into 82 TAZs. This TAZ structure was used as a starting point and was subsequently disaggregated into a total of 124 TAZs. Following this disaggregation, new and existing centroid connectors were reconnected to the network to enhance trip assignments. Figure 4 presents the detailed TAZ structure used for this study. The detail allows for the incorporation of future land use patterns in areas expected to experience significant changes. The TAZs were typically split along major roadways, rail lines, geographical boundaries, and development regions. Additional detail on the sub-area model used in this master plan update can be obtained in *Ewa Transportation Impact Fee Program Update: Model Validation Report* (Fehr & Peers, April 2010).

The methodology to develop 2020 traffic forecast involved three components explained in detail on this chapter, these components are: (1) Year 2020 base land use forecast, (2) Year 2020 base transportation system networks, and (3) Year 2020 base trip matrix.

BASE 2020 LAND USE FORECAST

The land use data produced and used for the 2020 forecast scenario serves as the primary difference between the planning activities of the OMPO, in the development of the ORTP, and this planning study. For this study, detailed land use projections in the Ewa region were produced in conjunction with the developers in the region. Each developer was asked to provide land use projections for their individual projects that described the 10-year absorption by Year 2020.

The OMPO sub-area model uses socioeconomic data as the fundamental input for the development of future travel demand forecasts. The original socioeconomic data obtained was described in terms of households and employment, i.e., jobs, and needed to be converted and disaggregated into data consistent with the OMPO model structure.



Ewa Highway Master Plan for Year 2020

The land use projections, whose density were described in terms of dwelling units, number of jobs, number of visiting units (i.e., hotel rooms and resort condos), and number of enrolled students in schools and universities, were converted into the type of data used by the travel demand forecasting structure. This conversion used socioeconomic proportionalities found in the 2020 DPP projections to further disaggregate the new densities into the variables used by the OMPO model, such as employment categories, and household size proportionalities within each TAZ. The employment forecasts were further divided into employment categories, such as retail or service employment, these divisions and assumptions matched the proportionalities found in the original 2020 DPP projections. The model provides a visitor module, which can forecast the trip demand generated by hotel rooms and resort condominiums. In addition, the model generates trip estimates for different educational institutions, including K-12 schools, and universities.

On Oahu, the City and County of Honolulu DPP is responsible for the disaggregation of these socioeconomic forecasts into data usable by the OahuMPO model. Fehr & Peers was responsible for further disaggregating the socioeconomic forecast into the sub-area model. The 2020 socioeconomic forecast for the rest of Oahu followed DPP 2020 projections.

The manner in which the socioeconomic data is used to produce trip estimates is further described in *User's Guide for the OahuMPO Planning Model*. Table 3 presents a summary of the base 2009 and 2020 socioeconomic estimates in the Ewa region.

TABLE 3 – SOCIOECONOMIC ESTIMATES IN THE EWA REGION

Inputs to the Model	Model Base	Recommended 2020	Absolute Δ	Growth
Population in TAZ	102,544	148,384	45,840	45%
Number of hotel rooms	701	1,880	1,179	168%
Number of resort condos (Units held for use by visitors)	610	2,520	1,909	313%
Number of households with 1 person	4,392	7,059	2,667	61%
Number of households with 2 person	7,435	11,865	4,431	60%
Number of households with 3 person	5,794	8,794	3,001	52%
Number of households with 4 person	5,920	8,642	2,721	46%
Number of households with 5+ person	6,735	9,039	2,304	34%
Military employment	1,220	1,194	-26	-2%
Government employment	2,074	2,795	721	35%
Hotel employment	362	1,747	1,385	383%
Agricultural employment	162	209	47	29%
Wholesale, transportation, communication, & utilities	1,267	1,707	440	35%
Manufacturing employment	1,829	3,791	1,962	107%
Finance, insurance, & real estate employment	286	1,902	1,616	565%
Service employment	22,753	34,141	11,388	50%
Retail employment	5,690	14,274	8,584	151%
Construction employment	11,325	14,980	3,655	32%
Total employment	46,968	76,741	29,773	63%
Total number of households	30,276	45,400	15,124	50%
Number of students enrolled in private university	0	0	0	-
Number of students enrolled in public university	0	7,600	7,600	-
Number of students enrolled in private school	464	464	0	0%
Number of students enrolled in public school	11,636	19,986	8,350	72%

The land use and 2020 socioeconomic data assumptions, as discussed, are summarized in detail by TAZ in Appendix A of this report.

BASE 2020 TRANSPORTATION SYSTEM

The OahuMPO is responsible for the preparation and updating of the long-range ORTP. The most recent version of the ORTP was approved in 2006. This document serves as the basis for all regional transportation planning activities on the island, including this master plan update.

The regional highway network from the ORTP, as coded in the OahuMPO regional model (OMPO5.0), was used as the starting point for the development of the 2020 highway network for the Ewa region. Sufficient detail was added to the network to ensure that all relevant roads were included in the analysis and to provide better assignment volumes in the Ewa region. All roads functionally classified as major collectors or arterials were included in the 2020 network. Access roads to key development areas, such as Ho'opili, were incorporated in the modeling network.

The 2020 base roadway network includes roadways expected to be completed by 2020 and have received full funding, and therefore would not be included in the impact fee program list:

- Pueonani Street (Makakilo Drive extension) north of Interstate H-1
- North-South Road (Kualaka'i Parkway) from Interstate H-1 to Kapolei Parkway
- H-1 Freeway on- and off-ramps providing access to North-South Road (Kualaka'i Parkway)
- Kapolei Parkway from Renton Road to Kinoiki Street

In addition, a set of access roads were included in the 2020 model, since they provide critical access to major collectors and arterials of Ewa.

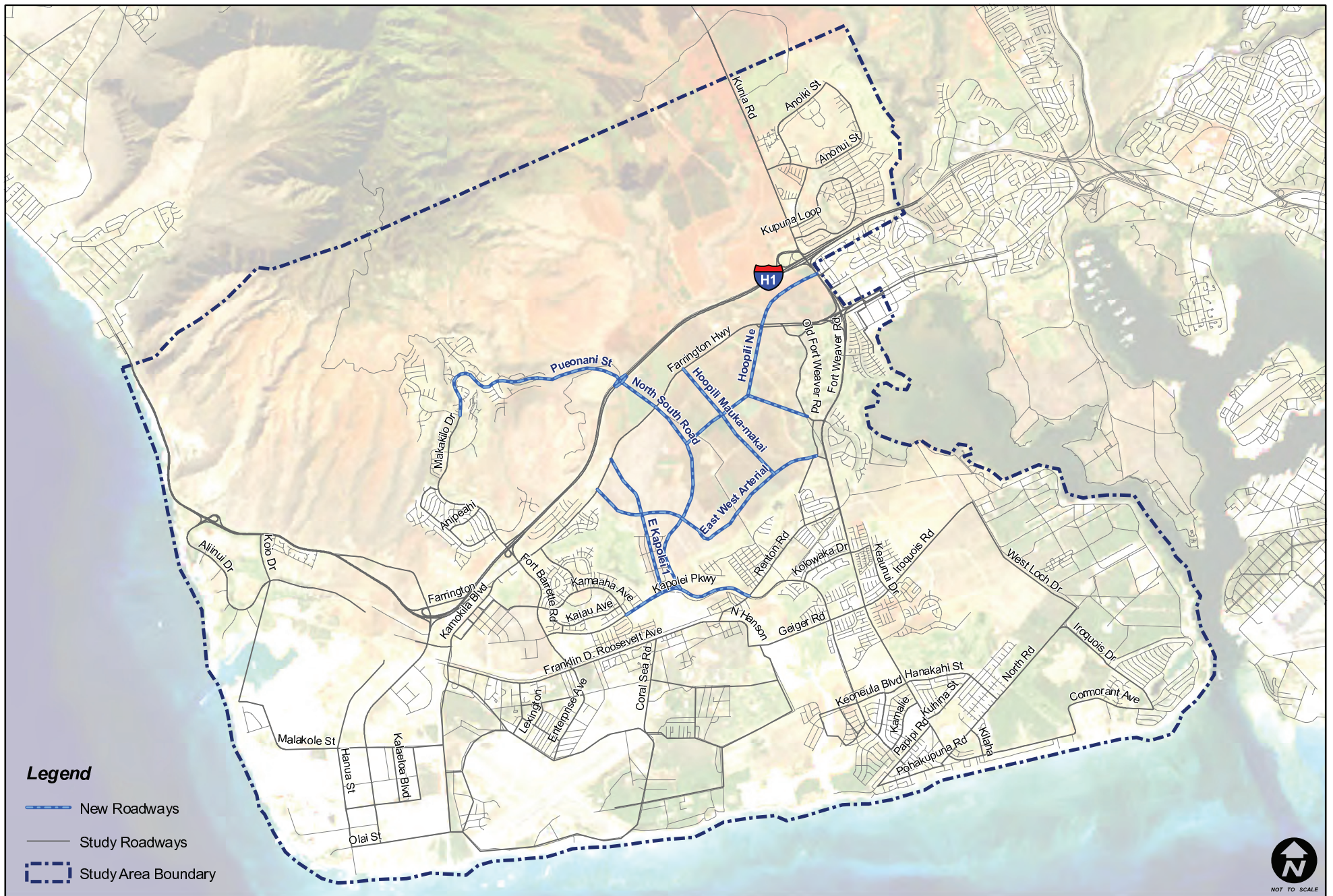
Note that the roadways specified above are not included as part of the improvement plan, and therefore are not planned to be added in the updated impact fee program list of improvements. Figure 5 shows all the roadways included in the 2020 base network.

The base year OMPO5.0 model transit network was also maintained in the sub-area model so that the transit effects in the Ewa region could be properly accounted for in the mode choice and the highway assignment components of the model. The transit network used in the 2020 model scenario incorporated the Honolulu High-Capacity Transit Corridor (HHCTC) as coded in the OMPO5.0 model. Full service between East Kapolei and the Ala Moana Center is expected to be provided by 2019. For more details on the model networks, refer to *Ewa Transportation Impact Fee Program Update: Model Validation Report*.

The transportation system presented includes all proposed highway improvements, both improvements to existing facilities and new facilities. The 2020 highway network represented in this chapter serves as the base highway system and was used as the starting point for studying future highway deficiencies.

BASE 2020 TRIP TABLE

The sub-area model developed for this planning effort uses the same platform as the OahuMPO model to generate trips, distribute them across the area, develop mode choice estimates, and stratified these demand tables into the different time periods. The 2020 land use forecasts and the 2020 highway network were key inputs to develop the 2020 AM and PM trip tables explained below.



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After the trips are generated for the project area, trip distribution is performed. This step generates trip tables, which represent the tripmakers' origins and destinations by time of the day and mode of travel. The trip table contains the number of trips going from each origin TAZ to each destination TAZ. The 2020 trip table generated for this analysis was developed using the same framework as the OMPO5.0 model.

A sub-area extraction was performed in the Ewa region to obtain AM and PM peak period origin-destination auto trip tables. This process involved establishing a cordon around the Ewa region in order to capture the destination of trips leaving the Ewa region and the origin of trips entering the region. Table 4 shows the travel patterns obtained from both the 2009 base model and the 2020 model. As shown in the table, internal trips (I-I) more than double from the 2009 base to the 2020 base model, and trips from and to the Ewa region (IX-XI) increase by about 28% in the AM and PM peak periods. Through trips (X-X), or trips starting outside the Ewa region and ending outside the Ewa region, decrease by approximately 10% in both the AM and PM peak periods. As compared to the existing 2009 estimates, total trips around the region are expected to increase about 47% in the AM peak period and 51% in the PM peak period by 2020.

The trip patterns produced for this analysis are logical given that many of the developments proposed would internalize trips in the Ewa region as more retail, housing and employment land uses are developed there. Increasing the amount of trip attractors (retail and employment land uses) in the Ewa region would reduce the need to satisfy these trips by leaving the study area, while increasing the trip productions (housing) increases overall trip-making. Through trips decrease minimally, as locations that may satisfy the needs of the through trips, such as businesses and retail areas, would be satisfied in the Ewa region, thereby decreasing the need to go from one side of the Ewa region to the other to shop, work, or attend school.

TABLE 4 – EWA REGION AUTO TRIP TABLE BY TYPE

Scenario	Peak Period	Internal Trips (I-I)	One Trip End in the Study Area (IX-XI)	Through Trips (X-X)	Total Trips	% I-I	% IX-XI	% X-X
Model Base Year	AM 4-hr	22,313	49,476	10,421	82,210	27%	60%	13%
	PM 4-hr	27,009	59,519	11,356	97,884	28%	61%	12%
2020 Base	AM 4-hr	48,136	63,145	9,264	120,545	40%	52%	8%
	PM 4-hr	61,478	75,608	10,285	147,371	42%	51%	7%

The product of these three steps (developing land use forecasts, developing the 2020 transportation system networks, and producing the 2020 trip matrix) provides the necessary elements to forecast roadway deficiencies for the year 2020.

OVERVIEW OF 2020 TRAFFIC FORECASTS

The traffic forecasts obtained from the model were used to analyze traffic conditions by calculating V/C ratios and determining LOS for each relevant roadway segment. Appendix B summarizes the results of the LOS analysis by roadway location. The tables in Appendix B the projected traffic volumes and assumed capacities for each link; the V/C ratio is calculated for each roadway during the morning and evening peak hour. The V/C ratio provides a numeric assessment of the operating condition of the roadway. This ratio was used to develop level of service analysis; LOS is a qualitative measure used to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. LOS D is typically recognized as the minimum acceptable level of service in urban areas. Using these standards, it would be necessary to develop additional roadway improvements for those locations with LOS E or F. The results in Appendix B present all relevant roadway segments with a LOS E or F during one or both of the peak hours. Figure 6 shows the roadways network assumptions for the 2020 base forecast year.

The Ewa region is estimated to experience significant growth, from 102,544 people in 2009 to 162,890 by year 2020. Total employment would increase from 46,968 to 75,861. Usually large increases in population and employment trigger increases in VMT. VMT calculations are useful when assessing macro-level environmental impacts of transportation related projects, since VMT is used as a proxy to measure vehicle emissions, including carbon dioxide. Table 5 shows Ewa regional statistics for the 2009 base year model, and the 2020 forecast. VMT and VHT estimates are presented. These figures indicate that the VMT experienced in the Ewa region would increase by approximately 37% in the AM peak hour and 34% in the PM peak hour. The VHT would increase by 55% in the AM peak hour and by 50% in the PM peak hour when compared to the 2009 base traffic conditions.

TABLE 5 – EWA REGION PEAK HOUR VMT AND VHT

Scenario	Peak Hour	VMT	% Change	VHT	% Change
Model Base Year	AM	142,085	-	5,969	-
	PM	148,103	-	5,716	-
2020 Future Year	AM	194,504	37%	9,250	55%
	PM	198,374	34%	8,560	50%

The large increases in population and employment in the Ewa region are the primary reason VMT shows a substantial increase between 2009 and 2020. However, in Ewa the rate and length of tripmaking may actually decrease due to the change in land use composition (i.e., more complimentary uses will be in closer proximity to one another). As a result of the future land use patterns, travel behavior in the Ewa region is expected to produce more internalized trip-making, which in turn would reduce overall vehicle trip lengths.

One way to illustrate the reduced length and number of trips per person is to calculate the ratio of VMT to the total number of residents and employees, or service population. Table 6 presents the rate of VMT per service population for daily and peak hour conditions in 2009 and 2020 in the Ewa region. The reduction under each time period in 2020 indicates that the mix of uses in proximity to existing development will result in a benefit to trip-making per person.

TABLE 6 – VMT PER SERVICE POPULATION

Scenario	Time	VMT per Service Population
Model Base Year	Daily	12.4
	AM Peak Hr	0.95
	PM Peak Hr	0.99
2020	Daily	10.4
	AM Peak Hr	0.82
	PM Peak Hr	0.83



CRITERIA FOR IDENTIFYING ROADWAY DEFICIENCIES

Although the City and County of Honolulu has not established guidelines for assessing traffic impacts on specific arterial or freeway segments, it is generally accepted that LOS D is the minimum acceptable LOS for urban areas on Oahu. Using this standard, the following methodology was used for the purpose of evaluating roadway system deficiencies:

- A roadway segment operating at LOS D or better under the 2009 Base condition which degrades to LOS E or F under the year 2020 scenario would result in a deficiency caused by the proposed 2020 land use changes.
- A roadway segment operating at LOS E or F under the 2009 Base scenario which experiences a vehicular volume increase in the year 2020 scenario would result in a deficiency caused by the proposed 2020 land use changes.

YEAR 2020 ROADWAY DEFICIENCIES

The roadway deficiency analysis was based on the assignment of year 2020 trip tables to the 2020 base highway network. This analysis was used to identify deficiencies and potential shortcomings of the highway network. Appendix B shows the existing and future operations of all study segments, and those segments operating at unacceptable levels of service (LOS E or F) during the morning and evening peak hours are highlighted. Figure 7 illustrates the locations where projected roadway deficiencies are expected by year 2020 if no improvements were adopted and constructed.

The deficiencies identified in this chapter served to develop potential roadway improvements that would provide the necessary capacity to allow the roadway system to support the year 2020 traffic volumes at acceptable operating levels. The measures to mitigate these deficiencies are part of the Ewa Highway Master Plan for Year 2020 document.



Ewa Highway Master Plan for Year 2020

Ewa Region Roadway Deficiencies Analysis

Figure 7

5. EWA HIGHWAY MASTER PLAN UPDATE FOR 2020

The base highway network was modified and revised with the goal of providing sufficient additional capacity to eliminate locations expected to operate at LOS E or F under the base highway forecast presented in Chapter 4 of this report. Prior to developing this Highway Improvement Plan, roadway improvements were tested by using the Ewa sub-area model. This iterative process was performed to develop a set of highway improvements that were most suited to satisfying the future travel demands of the Ewa region, and that would properly included “top priority” projects as identified by the Executive Committee.

The Highway Improvement Plan for year 2020 presented herein seeks to accommodate the traffic generated by the 10-year absorption of each of the development projects in the study area, as well as the growth and development on the remainder of Oahu through year 2020. The Executive Committee came to a consensus on the roadway improvements needed to be included in this highway improvement plan.

As discussed with the Executive Committee, the criteria for selecting roadways projects for the Master Plan, which would subsequently be incorporated in the Ewa Impact Fee Program Update, are listed below. A proposed roadway project improvement project must be:

- Included in the 2035 ORTP
- Included in the Ewa Development Plan (EDP)
- Classified as major collector or arterial
- Benefit more than one specific community or development
- Buildable in the next 10 years by the City, State, or a developer

Because the EDP is currently under revision, the current version of this document will govern until formal adoption of the new update.

PROPOSED EWA REGION 2020 MASTER PLAN OF HIGHWAYS

The base highway network was modified to provide additional capacity to help improve critical congestion locations expected to occur in the Ewa region by year 2020. Table 7 presents the roadway improvements incorporated in this Master Plan program. Figure 8 provides an illustration of the proposed Ewa Region Highway Improvement Plan indicating the type of improvement proposed for each roadway segment.

LINK ANALYSIS OF TRAFFIC FORECAST WITH ROADWAY IMPROVEMENTS

The traffic forecasts obtained from the model were used to analyze traffic conditions by calculating V/C ratios and determining LOS for each roadway segment under the 2020 improvement plan.

Table 8 shows Ewa regional statistics for the 2020 base highway model, and the 2020 Improvement Plan highway model; in the table, VMT and VHT estimates are presented. These figures indicate that the projected VMT in the Ewa region would decrease by approximately 1% in the AM peak hour and 0.5% in the PM peak hour if the proposed plan is implemented. The VMT would remain roughly the same for both alternatives, as some of the improvements planned only add capacity to existing routes; however, as capacity is added, it would lower the congestion in the system and shorter travel times would occur in the system overall. With plan implementation, the VHT would decrease by 9% in the AM peak hour and by 7% in the PM peak hour when compared to the 2020 base traffic conditions.

TABLE 7 – SUMMARY OF 2020 HIGHWAY IMPROVEMENT PLAN

Facility	Location	2020 Highway Improvement Plan
		Description
Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Construct Phase 2 Interchange: on- and off- ramps at Interstate Route H-1
Interstate H-1	Palailai Interchange	Construct new on- and off-ramps at Interstate Route H-1
Kapolei Parkway	Between Kalaeloa Blvd to Fort Barrette Rd	Extend the existing 6-lane Kapolei Parkway by constructing a new 6-lane street segment (ultimate 6-lane facility)
Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)
Hanua Street	From Farrington Highway to Malakole	Construct a new 2-lane street from Malakole St. to Farrington Highway (ultimate 4-lane facility)
Fort Barrette Road	Kamokila Blvd to Roosevelt Ave	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)
Kapolei Parkway	Ali'inui Drive to Kalaeloa Blvd	Extend Ali'inui Drive to connect to Kapolei Pkwy by constructing a new 4-lane street segment (ultimate 6-lane facility)
Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	Extend Kualaka'i Pkwy by constructing a new 4-lane street segment (ultimate a 6-lane facility)





TABLE 8 – EWA REGION PEAK HOUR VMT AND VHT

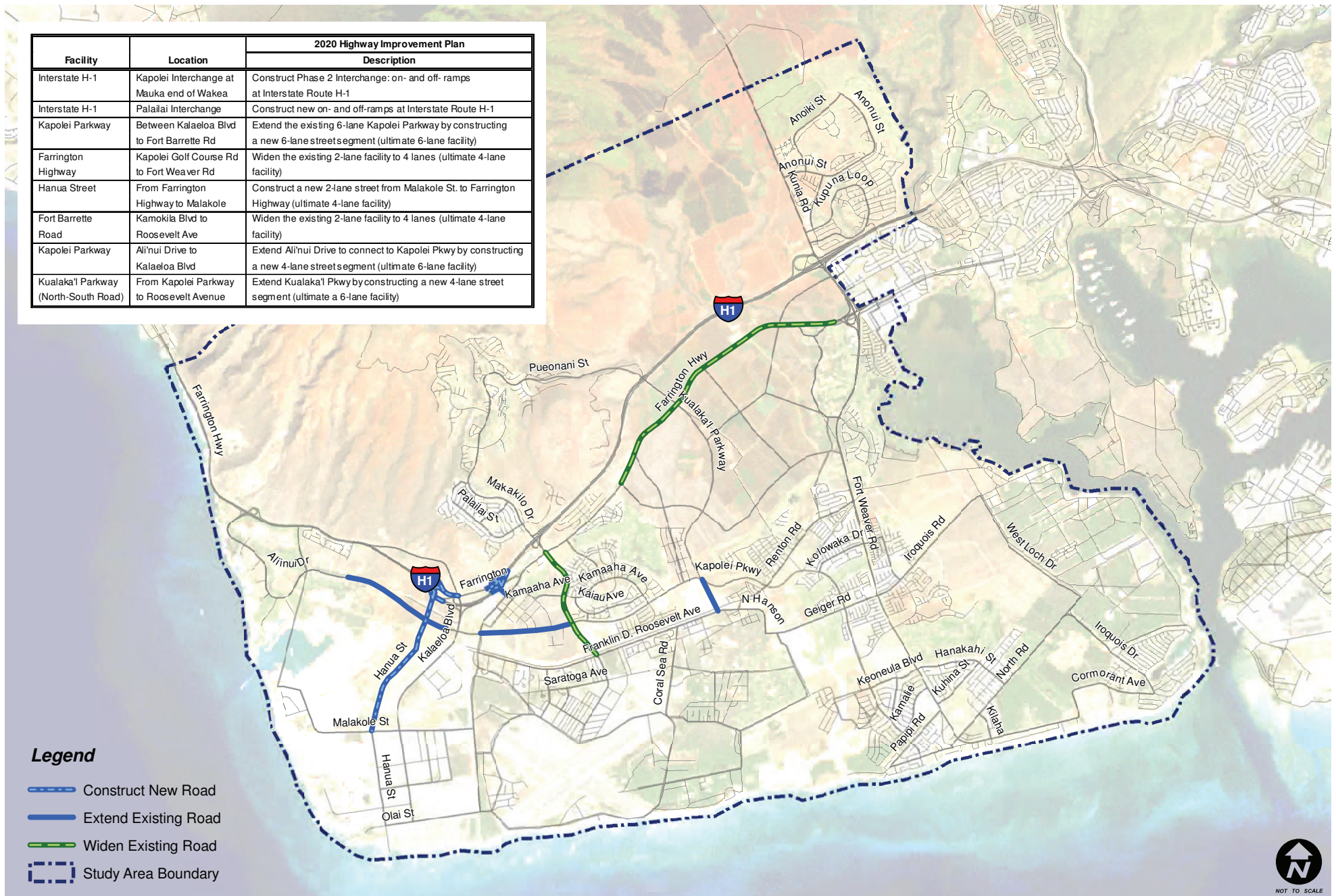
Scenario	Peak Hour	VMT	% Δ	VHT	% Δ
2020 Base	AM	194,504	-	9,250	-
	PM	198,374	-	8,560	-
2020 Highway Improvement Plan	AM	193,226	-1.0%	8,421	-9%
	PM	197,427	-0.5%	7,963	-7%

Appendix C summarizes the results of this analysis by roadway location. This table includes the projected traffic volumes and capacity of each link. The V/C ratio is calculated for each roadway during the AM and PM peak hours. The V/C ratio provides a numeric assessment of the operating conditions of the roadway. The results in Appendix C indicate roadway segments with a LOS E or F during one or both of the peak hours.

Facility	Location	2020 Highway Improvement Plan
		Description
Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Construct Phase 2 Interchange: on- and off- ramps at Interstate Route H-1
Interstate H-1	Palailai Interchange	Construct new on- and off-ramps at Interstate Route H-1
Kapolei Parkway	Between Kalaeloa Blvd to Fort Barrette Rd	Extend the existing 6-lane Kapolei Parkway by constructing a new 6-lane street segment (ultimate 6-lane facility)
Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)
Hanua Street	From Farrington Highway to Malakole	Construct a new 2-lane street from Malakole St. to Farrington Highway (ultimate 4-lane facility)
Fort Barrette Road	Kamokila Blvd to Roosevelt Ave	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)
Kapolei Parkway	Ali'i Drive to Kalaeloa Blvd	Extend Ali'i Drive to connect to Kapolei Pkwy by constructing a new 4-lane street segment (ultimate 6-lane facility)
Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	Extend Kualaka'i Pkwy by constructing a new 4-lane street segment (ultimate a 6-lane facility)

Legend

-  Construct New Road
-  Extend Existing Road
-  Widen Existing Road
-  Study Area Boundary



Ewa Highway Master Plan for Year 2020

PERCENTAGE CONTRIBUTION OF TRAFFIC

The traffic assignments used to develop the 2020 Highway Master Plan for Ewa were further analyzed to assess the source of the traffic using each of the roadway segments in the system. The system was analyzed to estimate the percentage of traffic contributed by each development project to the total volume on each of the links. Included in this estimate were the existing traffic under current conditions and the through traffic using Ewa highways.

The calculations performed to obtain the percentage contribution of traffic seek to obtain the level of new traffic attributable to the new development on each of the proposed roadway improvements. The tool used to develop these percentages was the select link analysis. Select link analysis has the primary objective of establishing the areas that are accountable for the traffic using a designated road. This analysis can identify the total volume of traffic, or the percentage of the total traffic, that has an origin or destination from specific locations in the study area using a designated roadway or highway link.

The fair share data is presented in Table 9. The contribution of new development traffic calculated for each of the proposed improvements is shown. Contributions range from 33% (Kapolei Interchange Project) to 81% (Hanua Street Project) based on an average of the AM and PM peak hour percentages.

FAIR SHARE TRAFFIC CONTRIBUTION

The legal requirements of a transportation impact fee call for establishing a nexus between the proposed improvements in a fee program and the effect of new development that generates traffic. Improvements required by existing traffic volumes are the responsibility of the government agency that has jurisdiction over a subject roadway. The nexus is, in effect, the fair-share contribution of traffic from new development on each of the proposed roadway improvements.

The proportions of traffic attributable to existing and new development were developed using a select link analysis from the travel demand model discussed previously. Select link analysis has the primary objective of establishing the areas accountable for the traffic using a designated road. This analysis can identify the total volume of traffic, or the percentage of the total traffic, that has an origin or destination from specific locations within the study area using a designated roadway or highway link. The results from the select link analysis are in the form of vehicular trip matrices. These matrices contain the travel demand between different locations using a specific link/facility. By separating the traffic growth that would occur in each development area between 2009 and 2020, it is possible to estimate the percentage of traffic subject to the impact fee. The remaining trips represent existing volumes and the financial contribution towards a roadway improvement from that proportion of traffic would have to come from other sources (City and County of Honolulu Capital Improvement Plan [CIP], state and/or federal funding, etc.).

Table 9 illustrates the contribution of new development traffic for each of the proposed improvements in the Ewa Highway Master Plan update based on an average of the AM and PM peak hour percentages. The contributions range from 34% (for the Kapolei Interchange Project) to 80% (for the State Harbor Access Road/Hanua Street Project). In total, new development is responsible for just over 61% of all traffic using the proposed improvements.

**TABLE 9 - PROPORTION OF TRAFFIC FROM NEW DEVELOPMENT
USING NEW HIGHWAY IMPROVEMENTS**

ID	Facility	Location	Description of 2020 Improvement	Proportion of Traffic from New Development
1	Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Construct Phase 2 Interchange: on- and off- ramps at Interstate Route H-1	34%
2	Interstate H-1	Palailai Interchange	Construct new on- and off-ramps at Interstate Route H-1	77%
3	Kapolei Parkway	Between Kalaeloa Blvd to Fort Barrette Rd	Extend the existing 6-lane Kapolei Parkway by constructing a new 6-lane street segment (ultimate 6-lane facility)	58%
4	Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)	66%
5	State Harbor Access Rd Hanua Street	From Farrington Hwy to State Harbor Entrance From Farrington Hwy to State Harbor Entrance to Malakole	Construct a new 4-lane roadway Construct a new 2-lane street from State Harbor Entrance to Malakole St.	80%
6	Fort Barrette Road	Kamokila Blvd to Roosevelt Ave	Widen the existing 2-lane facility to 4 lanes (ultimate 4-lane facility)	25%
7	Kapolei Parkway (Ali'i I nui Extension)	Ali'inui Drive to State Harbor Access Rd.	Extend Ali'inui Drive to connect to Kapolei Pkwy by constructing a new 4-lane street segment (ultimate 6-lane facility)	67%
8	Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	Extend Kualaka'i Pkwy by constructing a new 4-lane street segment (ultimate 6-lane facility)	43%

6. CONSTRUCTION COST ESTIMATES

This chapter documents the cost estimates for the proposed roadway improvements including construction costs and potential land acquisition costs. This information was developed primarily by Belt Collins staff within input and review by DTS, DPP, Department of Design and Construction (DDC) staff and members of the Executive Committee. Also presented in this chapter is a recommended cost escalation factor to ensure that fees are not unreasonably decreased by inflation and/or market changes.

COST ESTIMATES

As part of the study team, Belt Collins was responsible for developing cost estimates for the improvement projects identified in the deficiencies report. The analysis undertaken by Belt Collins is summarized in the *Roadway and Land Cost for the Ewa Transportation Impact Fee Program* memorandum dated December 2010 and is included in Appendix D. The memorandum included typical cross-sections for each facility, construction cost estimates, cost estimates for land acquisition, and a recommended escalation factor (see next section).

City and State standards for street design were used to establish the typical cross-sections for each proposed roadway improvement. Sections included curbs, gutters, sidewalks, bike lane accommodations, landscaping, and street lights, while traffic signals were also included in the overall estimates. The typical sections for each of the road segments were reviewed and approved by DPP and HDOT Highways staff as appropriate.

The cost of each project is presented in Table 10 and illustrates the cost for all improvements in Year 2010 dollars. As shown in the table, the total cost to construct the highway improvements included in the program is \$204,612,500. Of this total, \$125,769,928, or 61.5%, is the fair share amount that is to be paid by land developers in the Ewa region.

The information in Appendix D includes estimates for land or right-of-way acquisition costs. These costs were estimated using several different methods including the assessed value of parcels to produce an average cost per square foot, recent sales data for comparable purchases, and information direct from land owners. However, the Executive Committee (i.e., the major developers) recommended that land acquisition costs be excluded from the total cost estimates and the fee calculation assuming that all land owners with affected property would dedicate that land to the appropriate agency for purposes of road construction. This process is consistent with the current process of road construction implemented by DPP.

ESCALATION FACTOR

The existing Ewa Impact Fee ordinance (Chapter 33A - Revised December 13, 2010) did not include any type of adjustment or escalation factor to account for changes in material costs, inflation, etc. As a result, the estimates for construction costs on several projects identified under the existing ordinance were significantly lower than the actual costs to construct because of major increases in concrete and asphalt caused by global market changes. Other factors include increases in labor costs and overall changes in the consumer price index.

Given that the fee program forecasts development and roadway projects for a 10-year period, it is important that the fees be escalated over time to account for market and inflation fluctuations. To ensure that fees collected more closely align with future costs, several sources were reviewed to establish an appropriate escalation factor. These include:

**TABLE 10 - 2020 EWA REGION HIGHWAY IMPROVEMENT PROGRAM UPDATE
COST OF IMPROVEMENTS ATTRIBUTED TO NEW DEVELOPMENT**

ID	Facility	Location	Improvement *	Responsible Agency	Roadway Construction Costs (2010 dollars)	Government Share [a]		Developer Share	
						Percentage**	Amount	Percentage**	Amount
1	Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Phase 2A (Bridges) Phase 2B (Ramps)	Hawaii DOT	\$29,600,000	66.2%	\$19,607,739	33.8%	\$9,992,261
2	Interstate H-1	Palailai Interchange (Kapolei Interchange Complex)	Phase 3 (Ramps) Phase 4 (Ramps and Bridges)	Hawaii DOT Hawaii DOT	\$19,250,000 \$45,000,000	23.3% 23.3%	\$4,485,468 \$10,485,509	76.7% 76.7%	\$14,764,532 \$34,514,491
3	Kapolei Parkway	Between Kamaaha Ave. to Kamokila Blvd	New 6-Lane Segment	C&C Honolulu	\$7,350,000	42.1%	\$3,093,621	57.9%	\$4,256,379
4	Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen to 4-Lanes	C&C Honolulu	\$43,825,000	34.0%	\$14,897,845	66.0%	\$28,927,155
5	State Harbor Access Road Hanua St	From Farrington Highway to State Harbor Entrance From State Harbor Entrance To Malakole	5B (4 lane) 5A (2 lane)	Hawaii DOT C&C Honolulu	\$11,525,000 \$8,937,500	20.1% 20.1%	\$2,313,082 \$1,793,768	79.9% 79.9%	\$9,211,918 \$7,143,732
6	Fort Barrette Road	Kamokila Blvd to Roosevelt Ave	Widen to 4-Lanes	Hawaii DOT	\$19,050,000	74.5%	\$14,199,483	25.5%	\$4,850,517
7	Kapolei Parkway (Ali'i Nui Extension)	Ali'i Drive to State Harbor Access Rd.	New 4-Lane Segment	C&C Honolulu	\$14,350,000	32.9%	\$4,720,126	67.1%	\$9,629,874
8	Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	New 4-Lane Segment (Ultimately 6-lanes per ORTP)	DHHL	\$5,725,000	56.7%	\$3,245,932	43.3%	\$2,479,068
Totals					\$204,612,500	\$78,842,572		\$125,769,928	
						Developers Percent of Total Cost:		61.5%	

+ Ultimate improvement unless otherwise noted.

++ The percentages presented herein were obtained by using the select link analysis tool in the Travel Demand Forecasting Model developed for this study. These percentages represent the level of existing traffic (Government Share) and traffic attributable to new development (Developer Share).

[a] While some projects will be eligible for Federal funding, this analysis does not assume any Federal funds are guaranteed or the historic split of 80% Federal and 20% local funding.

Hawaii DOT = Hawaii Department of Transportation

C&C Honolulu = City and County of Honolulu

DHHL = Department of Hawaii Home Lands

Note: Updated on 8/2/2011

- Federal Highway Administration's price trend series (FHWA-45) – discontinued in 2006
- Consumer Price Index (CPI) for Honolulu calculated by the Federal Bureau of Labor Statistics
- State Department of Business, Economic Development and Tourism (DBEDT) – Cost series for single family and high-rise building construction
- Engineering News-Record (ENR) – Construction and building cost index for 20 US cities
- Operations and Maintenance Cost Escalation Assumptions in the Draft Financial Plan for the Honolulu Rapid Transit Project
- Various roadway construction cost indices for mainland State highway departments.

Unfortunately, none of these sources provides a definitive escalation for roadway construction. They all have limitations such as dated information, different construction types (residential or commercial building, or rail instead of roadways), or mainland data only. A review of all of this information resulted in annual escalation rates varying from just under 3% to over 4%. Based on the reviewed data and input from DTS staff, an escalation factor of 4% per year is recommended to address market and inflation issues that will affect construction costs. The application of this factor is discussed in Chapter 7.

7. PROPOSED TRANSPORTATION IMPACT FEES

This chapter presents the new fee schedule for the Ewa Transportation Impact Fee Update based on the results of the technical analysis presented in the preceding chapters and direction from City and County DTS staff and the project's Executive Committee.

FEE CALCULATION PROCESS

The impact fee essentially distributes the proportional share of roadway improvement construction costs attributable to new development to new land uses based on the projected number of new vehicle trips generated by those uses. Thus, the key inputs to this process are:

1. Fair-share contribution from developers based on traffic from new development
2. Cost of improvements required by new development
3. Corresponding fair share amount to be paid by developers for highway improvements included in impact fee program
4. Total vehicle trips generated by land use type for all new development in the Ewa region expected to be complete and occupied by Year 2020

Items 1 and 2 were presented in Tables 9 and 10 of Chapters 5 and 6, respectively. Item 3 is simply the product of the fair share percentage and the construction cost for each improvement. Item 4 is presented in this chapter and is the means by which the fees are distributed by land use type (i.e., per dwelling unit of residential development, per hotel and timeshare unit, per College/University student, and per 1,000 square feet for all other non-residential development (e.g., office, retail, or industrial uses).

TRIP GENERATION BY NEW DEVELOPMENT

The new development in the study area is categorized into residential and non-residential development. The previous impact fee included seven different land use categories, while this update includes an additional land use category: College/University, to account for the planned University of Hawaii West Oahu campus located ewa of Kualaka'i Parkway and makai of Farrington Highway. While this campus will draw heavily from the west side of Oahu, it will also be a regional attraction in Ewa.

The two categories of residential development are single family (SF) and multi-family (MF). The six categories of non-residential development are hotel-resort, hotel-timeshare, retail, office, other/industrial, and College/University. The level of new development estimated for the 2020 timeframe for each category was developed by the Executive Committee and is summarized below:

Residential:

Single family residential	5,314 d.u.
Multi family residential	9,810 d.u.

Non-Residential:

Hotel-resort	1,179 rooms
Hotel-timeshare	1,909 rooms
Retail	5,808 k.s.f. (thousand square feet)
Office	1,978 k.s.f.
Industrial/Other	5,032 k.s.f.
College/University	7,600 students

The trip generation rates used for this study were obtained from *Trip Generation, 8th Edition* (Institute of Transportation Engineers [ITE], 2008). To provide a consistent analysis with the previous impact fee, appropriate adjustments to trips rates were applied. The following modifications were performed: hotel-timeshare trips rates were adjusted based on the travel demand model's "visitor" purpose trip rates, so as to account for local differences; retail ITE trip rates were modified to account for pass-by trips (trips that are already on the adjacent street) by applying a 30% reduction in the AM and PM peak hour rates. Finally, university student trip generation rates were adjusted based on a 30% transit usage assumption with the rail transit system in operation (scheduled for 2019). Table 11 summarizes the trip generation for the proposed new development in the Ewa region by Year 2020.

New development by Year 2020 is expected to generate a total of 21,976 vehicle trips per hour (vph) during the morning peak hour and 35,893 vph during the evening peak hour. In general, PM peak hour trip generation is higher in the PM peak hour, especially for retail uses, where the trip rate is nearly four times higher than in the morning. In reality, trips will be linked between uses where Ewa region residents will commute to jobs or shopping in the same area, but showing both ends of each trip helps to distribute impact fees to both homes (i.e., productions) and jobs and retail uses (i.e., attractions).

UPDATED EWA REGION TRANSPORTATION IMPACT FEES

This impact fee update utilizes the same methodology as the original impact fee, outlined in ROH Section 33A-1.6 (h). Impact fees per land use category are calculated by determining the proportion of peak hour trips generated by each land use and distributing the new development's share of construction costs to each land use.

The increment of these land uses was computed and then multiplied by the trip rates. The actual trips calculated were added and then a proportional contribution was calculated for each land use. As indicated, the total cost to construct the improvements included in the 2020 Ewa Highway Master Plan program is \$204,612,500. Of this total, \$125,769,928 is the fair share amount that is the responsibility of the developers in the Ewa region. These costs were allocated to the various land use categories based on the proportionate number of average peak hour trips that each land use contributes to the total future traffic. The calculated impact fees without an escalation factor are summarized in Table 12.

The residential development fees vary from to \$2,086 per dwelling unit (du) for multi-family residential uses to \$3,825 per d.u. for a single family home. Non-residential uses range from a high of \$7,196 per 1,000 square feet of development for retail projects to a low of \$685 per student for University/College development.

These fees are calculated directly from the technical analysis and are higher than the existing ordinance fees. The difference is accounted for by the substantially higher share of improvements borne by new development (61.5% vs. 20% in the current ordinance), and the higher level of retail, office, and industrial development as compared to the previous impact fee ordinance. The non-residential land use (excluding University uses) expected to develop by 2020 according to developers and supported by DPP forecasts is nearly 2.5 times higher than the previous 10-year estimates.

As noted, an escalation factor was developed to account for changes in market conditions affecting materials and labor costs over the life of this program update. The analysis assumes a 4% compounded annual growth rate (CAGR) across all land uses. Table 13 presents the increased fee on a year-by-year basis through 2020 assuming it is first applied in 2011.

TABLE 11 - TRIP GENERATION ESTIMATES FOR NEW DEVELOPMENT

Land Use Category	Units (Increment 2009 to 2020)	Trip Generation Rates [a]		Trip Generation	
		A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Residential					
SF per Dwelling unit	5,314	0.75	1.01	3,986	5,367
MF per Dwelling unit	9,810	0.44	0.52	4,316	5,101
Non-residential					
Hotel - resort per Room	1,179	0.31	0.42	365	495
Hotel-timeshare [b] per Room	1,909	0.23	0.35	430	660
Retail [c] per KSF	5,808	0.70	2.61	4,066	15,165
Office per KSF	1,978	1.55	1.49	3,065	2,947
Other/Industrial per KSF	5,032	0.92	0.97	4,630	4,881
College/University [d] per Student	7,600	0.15	0.17	1,117	1,277
		Total		21,976	35,893

Notes:

[a] Trip Generation rates come from ITE 8th Edition.

[b] Hotel-timeshare trips rates were adjusted based on the travel demand model's "visitor" trip rate distinctions, so as to account for local differences.

[c] The ITE trip rates have been modified to account for pass-by trips. It has been assumed a reduction of 30% in both the AM and PM peak trip rates.

[d] The original ITE trips rates have been reduced by 30% to account for trips conducted via the new transit line proposed.

TABLE 12- EWA IMPACT FEE PROGRAM UPDATE

Land Use Category	Units (Increment 2009 to 2020)	Trip Generation Rates ++		Trip Generation		Average Trip	% of Total	Distributed	New Impact Fee	Current Impact Fee
		A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak					
Residential										
SF per Dwelling unit	5,314	0.75	1.01	3,986	5,367	4,676	16.2%	\$ 20,326,589	\$3,825	\$1,836
MF per Dwelling unit	9,810	0.44	0.52	4,316	5,101	4,709	16.3%	\$ 20,467,770	\$2,086	\$1,245
Non-residential										
Hotel - resort per Room	1,179	0.31	0.42	365	495	430	1.5%	\$ 1,870,540	\$1,587	\$1,003
Hotel-timeshare per Room	1,909	0.23	0.35	430	660	545	1.9%	\$ 2,370,437	\$1,242	\$501
Retail [a] per KSF	5,808	0.70	2.61	4,066	15,165	9,615	33.2%	\$ 41,795,052	\$7,196	\$4,053
Office per KSF	1,978	1.55	1.49	3,065	2,947	3,006	10.4%	\$ 13,065,884	\$6,607	\$3,403
Other/Industrial per KSF	5,032	0.92	0.97	4,630	4,881	4,755	16.4%	\$ 20,670,647	\$4,108	\$2,019
College/University [b] per Student	7,600	0.15	0.17	1,117	1,277	1,197	4.1%	\$ 5,203,007	\$685	NA
		Total		21,976	35,893	28,935	100.0%	\$ 125,769,928		

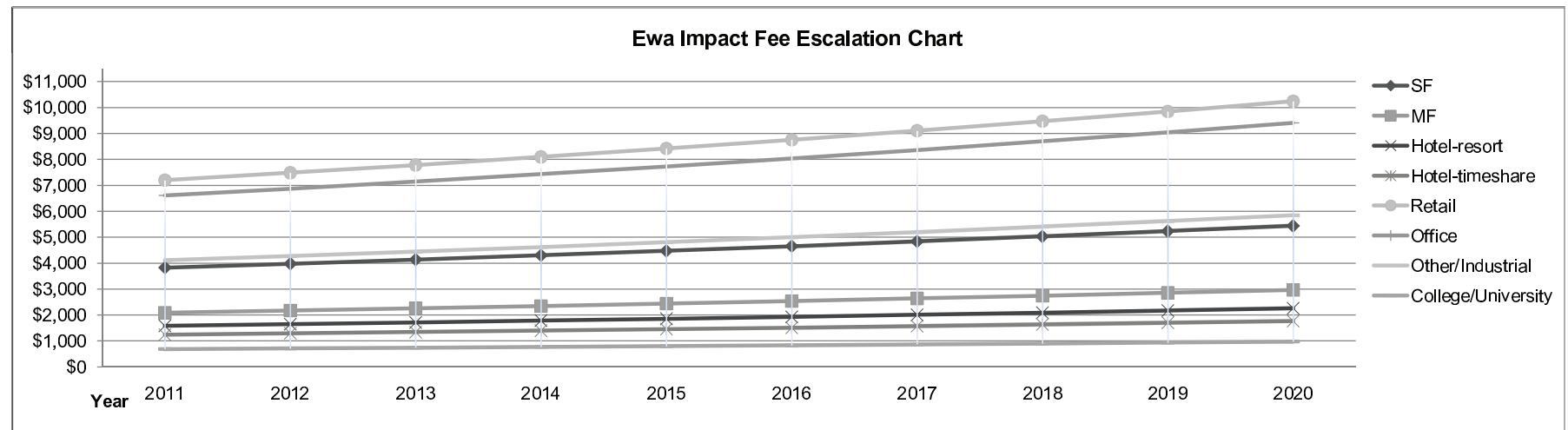
++ Trip Generation rates come from ITE 8th Edition, with the exception of timeshare trip rates.

[a] The ITE trip rates have been modified to account for pass-by trips. It has been assumed a reduction of 30% in both the AM and PM peak trip rates.

[b] The original ITE trips rates have been reduced by 30% to account for trips conducted via the new transit line proposed. A transit stop will be constructed adjacent to the University.

TABLE 13 - EWA IMPACT FEE (4% CAGR Escalation)

Land Use Category			Units (Increment 2009 to 2020)	Distributed Construction Costs	New Impact Fee (Escalated to 2020)								
					2011	2012	2013	2014	2015	2016	2017	2018	2019
Residential													
SF	per Dwelling unit	5,314	\$20,326,589	\$3,825	\$3,978	\$4,137	\$4,303	\$4,475	\$4,654	\$4,840	\$5,034	\$5,235	\$5,444
MF	per Dwelling unit	9,810	\$20,467,770	\$2,086	\$2,170	\$2,257	\$2,347	\$2,441	\$2,538	\$2,640	\$2,746	\$2,855	\$2,970
Non-residential													
Hotel-resort	per Room	1,179	\$1,870,540	\$1,587	\$1,650	\$1,716	\$1,785	\$1,856	\$1,930	\$2,007	\$2,088	\$2,171	\$2,258
Hotel-timeshare	per Room	1,909	\$2,370,437	\$1,242	\$1,291	\$1,343	\$1,397	\$1,453	\$1,511	\$1,571	\$1,634	\$1,699	\$1,767
Retail	per KSF	5,808	\$41,795,052	\$7,196	\$7,484	\$7,783	\$8,094	\$8,418	\$8,755	\$9,105	\$9,469	\$9,848	\$10,242
Office	per KSF	1,978	\$13,065,884	\$6,607	\$6,871	\$7,146	\$7,432	\$7,729	\$8,038	\$8,360	\$8,694	\$9,042	\$9,404
Other/Industrial	per KSF	5,032	\$20,670,647	\$4,108	\$4,272	\$4,443	\$4,621	\$4,805	\$4,998	\$5,197	\$5,405	\$5,622	\$5,846
College/University	per Student	7,600	\$5,203,007	\$685	\$712	\$740	\$770	\$801	\$833	\$866	\$901	\$937	\$974
				\$125,769,928									



FINAL FEE DETERMINATION

The impact fees presented in Table 13 were calculated based on a technical analysis without any adjustments for potential economic impact to developers. In some jurisdictions, decision-makers will modify the amount of the fee based on community needs, economic benefit, or a desire to shift the burden of responsibility to one or more land use types.

For example, some communities will discount the impact fee for retail commercial uses to incite development of that type to provide additional services for residents. While this action is permitted, it is not possible to increase the fee for a particular land use since that would deviate from establishing a nexus between a land use type and its proportional impact on the roadway system. In addition, discounting an impact fee simply reduces the overall funding for improvement projects and shifts additional burden to the government jurisdiction(s) responsible for project implementation.

Given the current fiscal situation faced by many local and state agencies in Hawaii and beyond, this course of action should be pursued with care and recognition of the potential issues associated with reducing developer contributions. Ultimately, the Honolulu City Council will have the purview to modify the rate structure at their discretion as part of this update and/or future studies.

FEE CREDITS

One of the key elements of the impact fee program is the award, amount, timing, and potential transfer of fee credit. In accordance with the ordinance, credit for completed projects was awarded up to the cost estimate identified in Table 33A-1.2 of the ROH. Credit for projects under construction was awarded based on projected construction cost only if the projects were bonded. In either case, the amount spent or bonded, far exceeded the amount identified in Table 33A-1.2. In the original fee program, the construction cost estimates for some of the improvements were substantially lower than the actual cost of construction. This affected the available balance in the fee account and, as such, it is important that fee credits issued to developers/project sponsors be reasonable and justified based on one of several potential scenarios. Credit can be awarded to a project sponsor under several scenarios:

1. A project sponsor completely constructs one or more of the improvement projects included in the 2020 fee update (shown in Table 9), or
2. A project sponsor is required by DPP to build a facility at its ultimate capacity when that capacity is only required beyond 2020 (for example, required to build six lanes when the 2020 Ewa Highway Master Plan only requires four lanes), or
3. A project sponsor builds a roadway that meets the criteria for inclusion in the fee program (i.e., is in the 2035 ORTP, serves more than one developer, etc.), but is not included in this update because it is needed after 2020.

In general, a roadway project that falls under one of the three scenarios listed above should be entitled to award of a fee credit, because it contributes to development of the overall regional roadway system in Ewa. The primary questions regarding credits relate to the amount of credit that should be awarded, the timing of that credit, and the potential transfer of credit to another project sponsor. These issues are described below, and all of these discussions assume that all land required for construction of all improvements is dedicated per the recommendation of the Executive Committee and concurrence by City & County of Honolulu staff.

Amount and Timing of Credit

Because the ultimate responsibility for designing and constructing an improvement in the fee program typically lies with a government agency (in this case the City & County of Honolulu or the State DOT), the normal course of action in Ewa is for developers to pay their impact fee and for the agency to construct the

improvement(s). If the construction of an improvement costs more than the amount estimated in Table 9, the agency is responsible for the additional cost, and there is no additional burden on new development. In the case of Kualaka'i Parkway, for example, the cost estimate from the current fee program (through 2010) was substantially lower than the actual construction costs borne by the State DOT due to environmental, cultural and materials cost considerations that were not originally anticipated.

In some cases, project sponsors request that they be able to construct the fee program roadway improvements to advance construction to provide or improve access to their development. Depending on efficiencies and other market and site-specific factors, the cost to a project sponsor may be more or less than the estimated cost in the fee program. Each of the scenarios is presented below, with examples illustrating the credit process.

Scenario 1

The amount of credit that could be awarded to a project sponsor would vary depending on the scenario, as described above. For a project included in the 2020 fee update (Scenario 1), the credit would simply be the difference between the calculated fee for a particular project sponsor and the total estimated cost of construction. For example, a 1,000-unit single-family residential development that pulled building permits in 2011 would be required to pay a transportation impact fee of \$3,825,000 according to the fee schedule shown in Table 12 (1,000 units x \$3,825 per unit). If the project sponsor chose to construct one of the improvements in the 2020 fee program that included an estimated total construction cost of \$8,000,000, the project sponsor would be entitled to a credit in the amount of the difference, which is \$4,175,000. Even if the project sponsor spent a total of \$8,500,000 to construct the improvement, the maximum credit awarded would be capped at \$4,175,000. Regarding timing, this credit could be applied for fee payments required in this 2020 update or under future fee programs. The specific process and timing of constructing the roadway improvements and providing credit to the project sponsor will be determined by DPP.

Scenario 2

In some cases, a project sponsor has agreed to construct a roadway to advance construction to benefit their project, but DPP has required that the developer build that roadway with a capacity greater than the capacity included in the fee program. For example, DPP has required a developer to build a six-lane facility in lieu of a four-lane roadway (included in the fee program) based on the results of a specific transportation impact analysis report (TIAR). In this situation, the maximum credit is assumed to be capped at the proportional increase in capacity required by DPP. Using the parameters from the example above, a 1,000-unit single-family residential development would pay an impact fee of \$3,825,000. The improvement they propose to construct costs \$8,000,000 and includes a four-lane roadway, but DPP requires a six-lane roadway based on the findings of a TIAR, potential construction staging issues or other considerations. Given that the required roadway provides 50% more capacity ($6/4 = 150\%$ of the capacity in the fee program), the maximum allowable construction cost is \$12,000,000. Once again, any additional costs above \$12,000,000 would be borne by the developer. Thus, the difference between the allowable cost and the required fee is the maximum credit, which totals \$7,817,000.

However, under this Scenario 2 example, only \$4,175,000 of this credit amount would be available for use during the 2020 fee program timeframe since the additional \$4,000,000 in allowable construction cost was not included in the fee calculations. The remainder of the credit could only be applied in a future update and would have to be included as an "improvement cost" in the calculation of future fees.

Note: One concern with this scenario is that DPP will often provide administrative approvals for an entire development project, and historically DPP has required construction of the ultimate improvement to serve the entire development. However, with a fee program in place, it is not necessary to build the ultimate improvements since fees will be collected for units as they are constructed. Accordingly, roadway improvements can be implemented in phases per the projections in this impact fee update. When the next

update is completed in approximately 2017, the fee program may be updated to address changes in development patterns, traffic patterns, and/or construction costs.

Scenario 3

Under Scenario 3, additional studies would have to be conducted at the developer's expense to determine the credit for a roadway improvement that is part of the long-range Ewa Highway Master Plan (beyond 2020) but constructed prior to its need. For example, a developer may propose to construct the east-west spine road through Kalaeloa, which will include segments of Saratoga Avenue. This connection is not expected to be needed until after 2020. For a developer to build this road and received a credit from the fee program, first, a cost estimate would have to be prepared for the proposed improvement and reviewed by City & County of Honolulu staff. It should generally be consistent with the cost-estimating approach used in this study but should account for any changes in market construction costs and other site-specific issues. The calculation of the associated credit would be similar to the scenarios described above (i.e., the difference between the required fee payment for any proposed land uses and the construction cost estimate). However, similar to Scenario 2, any credit would not be eligible until the next fee update and the credit would be included as a cost in the new program.

Summary

While somewhat complex, this approach helps to maintain the integrity of the fee program and does not award credit for costs not anticipated in the 2020 update to the fee program. The City & County does have the option of awarding credit towards future updates of the fee program, but the future updates should include the credit as an "improvement cost" when calculating future fees.

Transfer of Credits

The current fee program and ordinance allows for a transfer of credits between entities. Accordingly, one developer has the ability to transfer credits to another developer, and these entities can include the City & County of Honolulu or the State if they are acting as a developer for a particular project and are required to pay fees. Provided that appropriate limitations on credits are established as described above, transfer of credits should be permitted between any entities developing in the Ewa region.

8. YEAR 2017 REVISIONS TO ANALYSIS

During the course of this study, the Ewa Transportation Impact Fee project list has evolved with projects being added, removed, reinstated, and/or cost estimates being adjusted and/or updated. The final project list includes all projects originally identified in the original report (listed in Table 7), which have been reviewed and approved by the Executive Committee, as well as a couple of new projects developed by the City and County of Honolulu. Projects that may have already been funded and/or constructed are included in the final list to account for credits that may have been applied or need to be addressed as part of this effort.

Since the original *Draft Compilation Report: Ewa Transportation Impact Fee 2020 Update* was submitted in December 2011, several revisions to the project list were made including one new project and new construction cost estimates provided by HDOT, DDC, and DTS. As a result, the impact fees were re-evaluated to reflect the new project and latest cost estimates. This chapter presents the changes to the calculated Ewa Transportation Impact Fee based on revisions to technical analysis documented in the preceding chapters.

REVISIONS TO THE HIGHWAY IMPROVEMENT PROGRAM LISTS

Table 14 displays the final project list and a summary of what has occurred with each project. Of the final project list, three projects would remain the same, five projects have revised construction cost estimates, and two projects have been added to the list.

TABLE 14 – REVISIONS TO HIGHWAY IMPROVEMENT PROGRAM LIST

ID	Facility	Location	Improvement	Remained the Same	Revised Construction Cost	New Project
1	Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Phase 2A (Bridges) Phase 2B (Ramps)	X		
2	Interstate H-1	Palailai Interchange (Kapolei Interchange Complex)	Phase 3 (Ramps) Phase 4 (Ramps and Bridges)	X		
3	Kapolei Parkway	Between Kamaaha Ave to Kamokila Blvd	New 6-lane Segment		X	
4	Farrington Highway	Kapolei Golf Course to Fort Weaver Rd	Widen to 4-Lanes		X	
5	State Harbor Access Road Hanua St	From Farrington Highway to State Harbor Entrance	5B (4 lane)		X	
		From State Harbor Entrance to Malakole	5A (2 lane)	X		
6	Fort Barrette Road	Kamokila Blvd to Roosevelt Avenue	Widen to 4-Lanes	X		
7	Kapolei Parkway (Ali'i Nui Extension)	Ali'i nui Dr to State Harbor Access Rd	Construct 4-Lane Segment		X	
8	Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	New 4-Lane Segment		X	
9	Kapolei Parkway	Papipi Rd to Keoneula Blvd	New 6-Lane Segment			X

10	Various	Ewa Region	Bicycle, Pedestrian, and Transit Access Enhancements			X
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Revised Project Construction Costs

HDOT and DDC have developed new cost estimates for several of the impact fee projects, and these estimates were based on the dollar amount of the year they were developed (e.g. year 2012 or 2014). To provide a consistent analysis of what was prepared previously in this report, the new cost estimates were adjusted to represent year 2010 construction costs.

As discussed in Chapter 6, an escalation rate of 4% per year was applied to future year cost estimates to account for changes in market conditions. Accordingly, a 4% per year reduction factor was applied to all new 2012 or 2014 cost estimates to produce 2010 dollar cost estimates and provide a consistent analysis. Table 15 shows the projects with the old and revised cost estimates.

Additionally, based on discussions with City & County DTS staff and the Executive Committee, projects that have been built and “oversized” have been added into the total costs. Developers may have received partial credit and would now be eligible for additional credits. This will allow the credits to be proportionally distributed to all developers and the responsible agency(ies). Details on the credit and oversize fees are contained in Appendix F of this report.

**TABLE 15 - 2020 EWA REGION HIGHWAY IMPROVEMENT PROGRAM
REVISED PROJECT COST ESTIMATES**

ID	Facility	Location	Improvement	Responsible Agency	Roadway Construction Costs (2010 Dollar)	
					Old Cost	Revised Cost
3	Kapolei Parkway	Between Kamaaha Ave to Kamokila Blvd	New 6-lane Segment	C&C Honolulu	\$7,350,000	\$13,837,200**
4	Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen to 4-Lanes	C&C Honolulu	\$43,825,000	\$86,209,900*
5	State Harbor Access Road	From Farrington Highway to State Harbor Entrance	5B (4 lane)	Hawaii DOT	\$11,525,000	\$44,608,200*
7	Kapolei Parkway	Ali’nuui Dr to State Harbor Access Rd	Construct 4-Lane Segment	C&C Honolulu	\$14,350,000	\$21,029,200**
8	Kualaka’i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	New 4-Lane Segment	DHHL	\$5,725,000	\$30,000,000*

Notes:

*The costs presented here have been adjusted to represent the 2010 dollar. See text for details.

**The costs presented here includes the old cost plus the credit and oversize costs. See text for details.

Hawaii DOT = Hawaii Department of Transportation

C&C Honolulu = City and County of Honolulu

DHHL = Department of Hawaii Home Lands

New Project

9. Kapolei Parkway from Papipi Rd to Keoneula Blvd

The six-lane Kapolei Parkway segment between Papipi Road and Keoneula Boulevard has already been constructed and was oversized from 2-lanes to 6-lanes. Per the direction from the City & County DTS staff and the Executive Committee, the cost of the project has been added into the fee program list to account for the oversizing, which has been constructed.

10. Bicycle, Pedestrian, and Transit Access Enhancements

Consistent with State of Hawaii and City & County of Honolulu policies on Complete Streets (2012), the City and County of Honolulu identified the need for additional funds to be generated to design and construct bicycle, pedestrian, and transit access. These necessary facilities would provide more than the typical active and transit mode improvements included with standard roadway projects such as attached sidewalks and bicycle lanes. The intent of these improvements is to provide a robust, convenient and attractive network of non-auto facilities that would help to reduce overall traffic demand, minimize the environmental impact of automobile demand, and improve the health of residents, employees and visitors within the Ewa study area. Improvements implemented as part of this project would include, but are not limited to:

- new sidewalks or graded pedestrian only paths where they currently do not exist or are not currently planned/funded,
- new on-street bicycle facilities where they currently do not exist or are not planned/funded, including protected bikeways,
- new off-street shared-use paths for bicyclists and pedestrians
- new bus shelters, benches, lighting and other stop amenities

The details of this project have yet to be developed, such as location or construction cost; however, DTS is currently in the process of updating the 2012 O`ahu Bike Plan and is preparing a new Pedestrian Master Plan to identify and prioritize bicycle and pedestrian improvements including enhanced access to bus and rail transit stops. Some of these individual improvements will be located within the Ewa region.

Consequently, a proportion of the total roadway construction cost estimates was used to calculate a construction cost estimate for these active and transit mode improvements. The proportional percentage is based on the existing transportation mode split in the Ewa region. To be consistent with the technical approach used in the development of roadway improvements, the OahuMPO travel demand model was used to identify the percentage of existing bicycle and pedestrian residential trips in the Ewa region. The model estimates that approximately eight (8) percent of the peak hour trips in the Ewa region are made by bicycling or walking. Therefore, eight (8) percent of the total roadway cost estimate was calculated to be the construction cost estimate for the Bicycle, Pedestrian, and Transit Access Enhancements project, which equates to a \$26,355,600.

Updated Fair Share Estimates

The total cost to construct the highway improvements included in the revised program was updated based on the final project list and revised cost estimates. Table 16 displays the cost for all improvements in Year 2010 dollars. The total cost is \$355,800,800, of which \$214,762,585, or 60.4%, is the fair share amount required to be paid by land developers in the Ewa region. The government share is calculated to be \$141,038,235.

By incorporating all of the projects and adding the new multi-modal project, the total cost and fair share amounts increased by roughly 74% and 71%, respectively, compared to the original total cost estimate of \$204,612,500 and the developer's fair share of \$125,769,927 shown in Table 10 of this report.

TABLE 16 - 2020 EWA REGION HIGHWAY IMPROVEMENT PROGRAM UPDATE (REVISED 2017)
COST OF IMPROVEMENTS ATTRIBUTED TO NEW DEVELOPMENT

ID	Facility	Location	Improvement	Responsible Agency	Revised Dec 2015 Roadway Construction Costs (2010 dollars)	Government Share ¹		Developer Share	
						Percentage ²	Revised Dec 2015 Amount	Percentage ²	Revised Dec 2015 Amount
1	Interstate H-1	Kapolei Interchange at Mauka end of Wakea	Phase 2A (Bridges) Phase 2B (Ramps)	Hawaii DOT	\$29,600,000	66.2%	\$19,607,739	33.8%	\$9,992,261
2	Interstate H-1	Palailai Interchange (Kapolei Interchange Complex)	Phase 3 (Ramps) Phase 4 (Ramps and Bridges)	Hawaii DOT Hawaii DOT	\$19,250,000 \$45,000,000	23.3% 23.3%	\$4,485,468 \$10,485,509	76.7% 76.7%	\$14,764,532 \$34,514,491
3	Kapolei Parkway	Between Kamaaha Ave. to Kamokila Blvd	New 6-Lane Segment	C&C Honolulu	\$13,837,200	42.1%	\$5,824,089	57.9%	\$8,013,111
4	Farrington Highway	Kapolei Golf Course Rd to Fort Weaver Rd	Widen to 4-Lanes	C&C Honolulu	\$86,206,900	34.0%	\$29,305,123	66.0%	\$56,901,777
5	State Harbor Access Road	From Farrington Highway to State Harbor Entrance	5B (4 lane)	Hawaii DOT	\$44,608,200	20.1%	\$8,952,923	79.9%	\$35,655,277
	Hanua St	From State Harbor Entrance To Malakole	5A (2 lane)	C&C Honolulu	\$8,937,500	20.1%	\$1,793,768	79.9%	\$7,143,732
6	Fort Barrette Road	Kamokila Blvd to Roosevelt Ave	Widen to 4-Lanes	Hawaii DOT	\$19,050,000	74.5%	\$14,199,483	25.5%	\$4,850,517
7	Kapolei Parkway (Ali'i Nui Extension)	Ali'i Nui Drive to Kalaeloa Blvd	Construct 4-Lane Segment	C&C Honolulu	\$21,029,200	32.9%	\$6,917,106	67.1%	\$14,112,094
8	Kualaka'i Parkway (North-South Road)	From Kapolei Parkway to Roosevelt Avenue	New 4-Lane Segment	DHHL	\$30,000,000	80.0%	\$24,000,000	20.0%	\$6,000,000
9	Kapolei Parkway	Papipi Rd to Keoneula Blvd	New 6-Lane Segment	C&C Honolulu	\$11,926,200	42.1%	\$5,019,748	57.9%	\$6,906,452
<i>Total Roadway Improvement Project's Cost</i>					<u>\$329,445,200</u>	39.6%	<u>\$130,590,955</u>	60.4%	<u>\$198,854,245</u>
10	Various	Ewa regionwide	Bicycle, Pedestrian, and Transit Access Enhancements	C&C Honolulu	\$26,355,600	39.6%	\$10,447,280	60.4%	\$15,908,340
Totals					\$355,800,800		\$141,038,235		\$214,762,585
						Developers Percent of Total Cost:		60.4%	

Notes:

¹ While some projects will be eligible for Federal funding, this analysis does not assume any Federal funds are guaranteed or the historic split of 80% Federal and 20% local funding except for the Kualaka'i Parkway extension, which has government funding allocated at 80%.

² The percentages presented herein represent the level of existing traffic (Government Share) and traffic attributable to new development (Developer Share). The percentages were obtained by using the select link analysis tool in the Travel Demand Forecasting Model developed for this study with one exception as noted under Note 1: the Kualaka'i Parkway extension has government funding allocated at 80%. The calculated percentages based on traffic volumes are: 56.7% Government and 43.3% Developer.

Hawaii DOT = Hawaii Department of Transportation

C&C Honolulu = City and County of Honolulu

DHHL = Department of Hawaii Home Lands

UPDATED EWA REGION TRANSPORTATION IMPACT FEES (REVISED 2017)

This impact fee is based on the same methodology as the original impact fee, outlined in ROH Section 33A-1.6 (h). Impact fees per land use category are calculated by determining the proportion of peak hour trips generated by each land use and distributing the new development's share of construction costs to each land use.

The increment of these land uses was computed and then multiplied by the trip rates. The actual trips calculated were added and then a proportional contribution was calculated for each land use. As indicated, the total cost to construct the improvements included in the revised 2020 Ewa Highway Master Plan program, and identified in Table 16, is \$355,800,800. Of this total, \$214,762,585 is the fair share amount that is the responsibility of the developers in the Ewa region. These costs were allocated to the various land use categories based on the proportionate number of average peak hour trips that each land use categories based on the proportionate number of peak hour trips that each land use contributes to the total future traffic. The calculated impact fees in 2010 dollars without an escalation factor are summarized in Table 17.

The residential development fees vary from \$3,563 per dwelling unit (du) for multi-family residential uses to \$6,532 d.u. for single family home. Non-residential uses range from a high of \$12,288 per 1,000 square feet (or \$12.29/sf) of development for retail projects to \$1,169 per student for University/College development.

These fees are calculated directly from the technical analysis and higher than the existing ordinance fees. The difference is accounted for by the substantially higher share of improvements borne by new development (60.4% vs. 20% in the current ordinance), and the higher level of retail, office, and industrial development as compared to the previous impact fee ordinance. The non-residential land use (excluding University uses) expected to develop by 2020 according to developers and supported by DPP forecasts is nearly 2.5 times higher than the previous 10-year estimates.

As noted, an escalation factor was developed to account for changes in market conditions affecting materials and labor costs over the life of this program update. This analysis assumes a 4% compounded annual growth rate (CAGR) across all land uses. Table 18 presents the increased fee on a year-by-year basis through 2020 assuming it is first applied in 2011.

FINAL FEE DETERMINATION

The impact fees presented in Table 18 were calculated based on a technical analysis without any adjustments for potential economic impact to developers. In some jurisdictions, decision-makers will modify the amount of the fee based on community needs, economic benefit, or a desire to shift the burden of responsibility to one or more land use types.

For example, some communities will discount the impact fee for retail commercial uses to incite development of that type to provide additional services for residents. While this action is permitted, it is not possible to increase the fee for a particular land use since that would deviate from establishing a nexus between a land use type and its proportional impact on the roadway system. In addition, discounting an impact fee simply reduces the overall funding for improvement projects and shifts additional burden to the government jurisdiction(s) responsible for project implementation.

Given the current fiscal situation faced by many local and state agencies in Hawaii and beyond, this course of action should be pursued with care and recognition of the potential issues associated with reducing developer contributions. Ultimately, the Honolulu City Council will have the purview to modify the rate structure at their discretion as part of this update and/or future studies.

TABLE 17 - EWA IMPACT FEE PROGRAM UPDATE (REVISED 2017)

Land Use Category	Units (Increment 2009 to 2020)	Trip Generation Rates **		Trip Generation		Average Trip	% of Total	Distributed	New 2010 Impact Fee	Current Impact Fee
		A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak					
Residential										
SF per Dwelling unit	5,314	0.75	1.01	3,986	5,367	4,676	16.2%	\$ 34,709,338	\$6,532	\$1,836
MF per Dwelling unit	9,810	0.44	0.52	4,316	5,101	4,709	16.3%	\$ 34,950,416	\$3,563	\$1,245
Non-residential										
Hotel - resort per Room	1,179	0.31	0.42	365	495	430	1.5%	\$ 3,194,102	\$2,709	\$1,003
Hotel-timeshare per Room	1,909	0.23	0.35	430	660	545	1.9%	\$ 4,047,719	\$2,120	\$501
Retail [a] per KSF	5,808	0.70	2.61	4,066	15,165	9,615	33.2%	\$ 71,368,519	\$12,288	\$4,053
Office per KSF	1,978	1.55	1.49	3,065	2,947	3,006	10.4%	\$ 22,311,080	\$11,282	\$3,403
Other/Industrial per KSF	5,032	0.92	0.97	4,630	4,881	4,755	16.4%	\$ 35,296,844	\$7,014	\$2,019
College/University [b] per Student	7,600	0.15	0.17	1,117	1,277	1,197	4.1%	\$ 8,884,567	\$1,169	NA
		Total		21,976	35,893	28,935	100.0%	\$ 214,762,585		

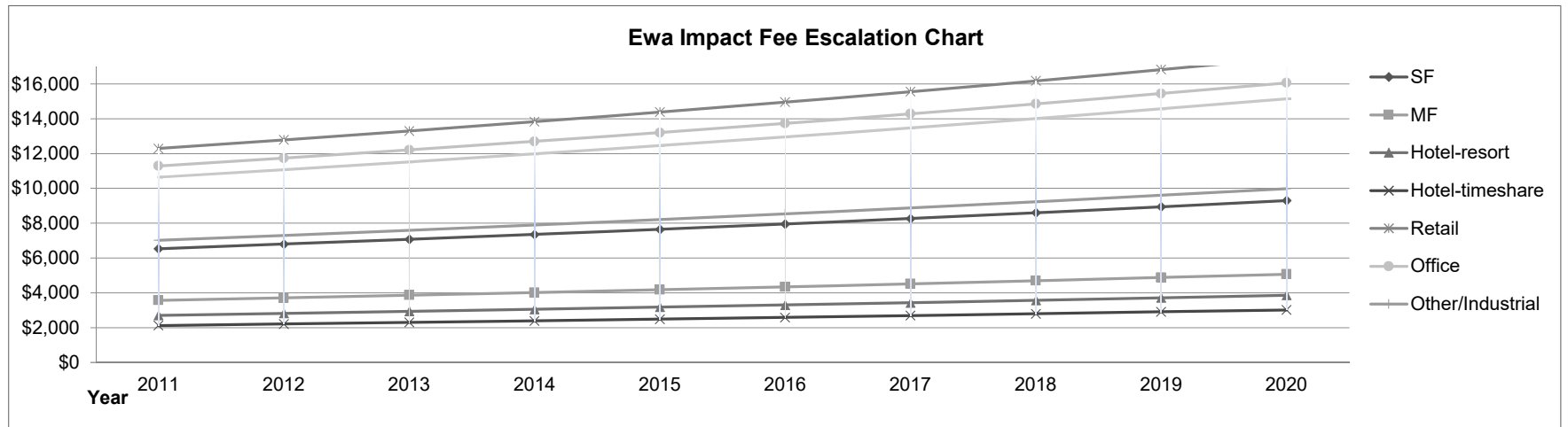
++ Trip Generation rates come from ITE 8th Edition, with the exception of timeshare trip rates.

[a] The ITE trip rates have been modified to account for pass-by trips by including a reduction of 30% in both the AM and PM peak trip rates.

[b] The original ITE trips rates have been reduced by 30% to account for trips conducted via the new transit line proposed. A transit stop will be constructed adjacent to the University.

TABLE 18 - EWA IMPACT FEE (4% CAGR Escalation) (REVISED 2017)

Land Use Category	Units (Increment 2009 to 2020)	Distributed Construction Costs	New Impact Fee (Escalated to 2020)									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Residential												
SF per Dwelling unit	5,314	\$34,709,338	\$6,532	\$6,793	\$7,065	\$7,347	\$7,641	\$7,947	\$8,265	\$8,595	\$8,939	\$9,297
MF per Dwelling unit	9,810	\$34,950,416	\$3,563	\$3,705	\$3,853	\$4,008	\$4,168	\$4,335	\$4,508	\$4,688	\$4,876	\$5,071
Non-residential												
Hotel-resort per Room	1,179	\$3,194,102	\$2,709	\$2,818	\$2,930	\$3,047	\$3,169	\$3,296	\$3,428	\$3,565	\$3,708	\$3,856
Hotel-timeshare per Room	1,909	\$4,047,719	\$2,120	\$2,205	\$2,293	\$2,385	\$2,480	\$2,580	\$2,683	\$2,790	\$2,902	\$3,018
Retail per KSF	5,808	\$71,368,519	\$12,288	\$12,779	\$13,290	\$13,822	\$14,375	\$14,950	\$15,548	\$16,170	\$16,817	\$17,489
Office per KSF	1,978	\$22,311,080	\$11,282	\$11,733	\$12,203	\$12,691	\$13,198	\$13,726	\$14,275	\$14,846	\$15,440	\$16,058
Other/Industrial per KSF	5,032	\$35,296,844	\$7,014	\$7,295	\$7,586	\$7,890	\$8,206	\$8,534	\$8,875	\$9,230	\$9,599	\$9,983
College/University per KSF	835	\$8,884,567	\$10,642	\$11,068	\$11,511	\$11,971	\$12,450	\$12,948	\$13,466	\$14,005	\$14,565	\$15,147
		\$214,762,585										



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- Trip Generation, 8th Edition*, Institute of Transportation Engineers, 2008.
- User's Guide for the OahuMPO Planning Model*, Parsons Brinkerhoff, June 2008.
- Waipahu Neighborhood Plan*, City and County of Honolulu, 2011.

APPENDIX A:
2020 SOCIOECONOMIC FORECAST BY TAZ

APPENDIX A TABLE - YEAR 2020 SOCIOECONOMIC FORECAST BY TAZ

TAZ	DEVELOPER	Population	Hotel Rooms	Resort Condos	Retail Employment	Service Employment	Other Employment	Total Employment	No. of Households	University Enrollment	K-12 Enrollment (Private School)	K-12 Enrollment (Public School)
586	Advertiser/Court	44	0	0	409	158	200	767	13	0	0	0
239	Campbell Ind Park	8	0	0	52	169	280	501	3	0	0	0
241	Campbell Ind Park	4	0	0	132	298	574	1004	1	0	0	0
575	Campbell Ind Park	4	0	0	161	366	705	1232	1	0	0	0
576	Campbell Ind Park	0	0	0	242	545	1,053	1839	0	0	0	0
577	Campbell Ind Park	11	0	0	74	241	399	715	4	0	0	0
184	City of Kapolei	1,286	0	0	76	2,623	619	3319	373	0	0	0
592	City of Kapolei	73	0	0	196	899	277	1372	21	0	0	0
593	City of Kapolei	1,022	0	0	61	2,084	492	2637	297	0	0	0
594	Costco	251	0	0	210	301	147	658	73	0	0	0
546	dhhl (EK II) + Kroc	4,043	0	0	0	485	222	707	1252	0	0	1750
556	Ewa Beach	2,714	0	0	8	291	45	344	596	0	0	1276
557	Ewa Beach	3,697	0	0	1	518	32	551	771	0	0	0
558	Ewa Beach	2,574	0	0	50	826	42	918	575	0	298	3533
559	Ewa Beach	21	0	0	72	269	29	370	5	0	0	0
562	Ewa Beach	1,983	0	0	6	81	17	104	573	0	0	0
563	Ewa Beach	3,064	0	0	310	632	97	1039	797	0	0	582
91	Ewa Gentry	1,163	0	0	0	57	25	82	322	0	0	121
551	Ewa Gentry	4,136	0	0	0	202	89	291	1145	0	0	429
553	Ewa Gentry	1,142	0	0	56	247	247	550	340	0	0	0
554	Ewa Gentry	4,201	0	0	86	126	62	274	1537	0	0	0
555	Ewa Gentry	3,610	0	0	52	519	355	925	1162	0	0	0
566	Ewa Gentry	1,412	0	0	404	212	226	843	454	0	0	1000
567	Ewa Gentry	636	0	0	82	441	253	776	205	0	0	0
552	Ewa Villages	4,773	0	0	0	66	15	81	1676	0	0	0
568	Ewa Villages	2,715	0	0	0	379	111	490	665	0	0	38
569	Ewa Villages	3,045	0	0	4	880	129	1013	919	0	166	677
591	Future Retail (VoK)	39	0	0	105	43	48	196	11	0	43	0
230	Harbor; Kenai; Khside	14	0	0	2	108	107	217	5	0	0	0
578	Harbor; Kenai; Khside	161	0	0	21	1,201	1,182	2403	51	0	0	0
589	Home Depot to Movies	168	0	0	708	970	443	2120	49	0	0	0
588	Honokai Hale	877	0	0	0	0	0	0	210	0	0	0
11	Hoopili	381	0	0	289	1,106	603	1998	115	0	0	0
61	Hoopili	591	0	0	27	386	120	533	183	0	0	0
82	Hoopili	141	0	0	7	92	28	127	44	0	0	0
88	Hoopili	876	0	0	11	121	45	178	272	0	0	0
545	Hoopili	639	0	0	485	1,857	1,012	3355	194	0	0	0
549	Hoopili	1,128	0	0	14	156	58	228	350	0	0	0
600	Hoopili	67	0	0	3	44	14	61	21	0	0	0
764	Hoopili	6,030	0	0	35	160	55	250	1855	0	0	0
605	Hoopili / Quarry	266	0	0	16	1,920	521	2456	73	0	0	1600
603	Hoopili/State	2,041	0	0	82	314	171	568	618	0	0	0
547	Hospital/ WL Golf	1,062	0	0	0	640	52	692	272	0	0	0
561	Iroquois Point	3,461	0	0	0	194	19	213	1298	0	194	1160
598	Ka Makana Alii	0	300	0	1,961	1,101	810	3873	0	0	0	0
608	Kahiwele	2,319	0	0	0	61	63	124	775	0	0	0
116	Kalaeloa	0	0	0	0	0	48	48	0	0	0	0
129	Kalaeloa	0	0	0	0	0	36	36	0	0	0	0
132	Kalaeloa	0	0	0	0	0	12	12	0	0	0	0
135	Kalaeloa	67	0	0	2	3	3	8	25	0	0	0
139	Kalaeloa	943	0	0	28	43	42	113	355	0	0	0
148	Kalaeloa	67	0	0	2	3	3	8	25	0	0	0
154	Kalaeloa	135	0	0	4	6	6	16	51	0	0	0
155	Kalaeloa	67	0	0	2	3	3	8	25	0	0	0
243	Kalaeloa	0	0	0	0	0	151	151	0	0	0	0
244	Kalaeloa	0	0	0	0	0	43	43	0	0	0	0
250	Kalaeloa	0	0	0	0	0	43	43	0	0	0	0
254	Kalaeloa	0	0	0	0	0	43	43	0	0	0	0
571	Kalaeloa	67	0	0	2	3	3	8	25	0	0	0
572	Kalaeloa	0	0	0	0	0	15	15	0	0	0	0
573	Kalaeloa	0	0	0	0	0	151	151	0	0	0	0
269	Kalaeloa: downtown	32	0	0	4	22	38	64	14	0	0	0
277	Kalaeloa: downtown	110	0	0	14	75	128	217	48	0	0	0
574	Kalaeloa: downtown	50	0	0	6	34	59	99	22	0	0	0
649	Kalaeloa: downtown	21	0	0	3	14	25	42	9	0	0	0
654	Kalaeloa: downtown	29	0	0	4	20	34	57	13	0	0	0
659	Kalaeloa: downtown	65	0	0	8	44	76	129	28	0	0	522
724	Kalaeloa: downtown	58	0	0	7	39	67	114	25	0	0	0
735	Kalaeloa: downtown	33	0	0	4	22	38	65	14	0	0	0
745	Kalaeloa: downtown	30	0	0	4	21	35	60	13	0	0	0
747	Kalaeloa: downtown	166	0	0	21	113	194	329	72	0	0	0
758	Kalaeloa: downtown	34	0	0	4	23	40	67	15	0	0	0
599	Kanehili	901	0	0	0	506	149	655	279	0	0	0
162	Kap Knolls, GC	834	0	0	29	64	29	122	229	0	0	0
606	Kap Knolls, GC	1,694	0	0	59	131	59	248	465	0	0	0
590	Kapolei Shop Center	47	0	0	1,597	612	500	2709	14	0	0	0
580	Kapolei Bus. Park	248	0	0	30	856	431	1317	78	0	0	0
587	Kapolei Commons	181	0	0	496	372	239	1107	53	0	0	0
579	Kapolei Harborside	80	0	0	1,843	706	841	3390	25	0	0	0
194	Kapolei West	1,128	0	0	66	54	70	190	411	0	0	0
195	Kapolei West	641	0	0	0	75	71	146	204	0	0	0
581	Kapolei West	1,147	1	1	0	103	76	179	657	0	0	750
584	Kapolei West	722	0	0	0	84	80	164	229	0	0	0
585	Kapolei West	591	0	0	35	29	37	100	215	0	0	0
582	Ko Olina	321	630	2,519	101	1,305	701	2107	103	0	0	0
583	Ko Olina	1,913	0	0	482	236	190	908	607	0	0	0
618	Kunia Ag/Mountain	10	0	0	20	122	62	204	5	0	0	0
173	Leihano, Foodland	416	0	0	80	99	74	253	121	0	0	0
596	Leihano, Foodland	438	0	0	84	104	78	266	127	0	0	0

APPENDIX A TABLE - YEAR 2020 SOCIOECONOMIC FORECAST BY TAZ

TAZ	DEVELOPER	Population	Hotel Rooms	Resort Condos	Retail Employment	Service Employment	Other Employment	Total Employment	No. of Households	University Enrollment	K-12 Enrollment (Private School)	K-12 Enrollment (Public School)
611	Makaiwa Hills	345	0	0	0	48	26	74	107	0	0	0
612	Makaiwa Hills	607	0	0	345	287	179	810	189	0	0	0
613	Makaiwa Hills	1,790	0	0	0	0	0	0	557	0	0	0
615	Makaiwa Hills	1,194	0	0	0	68	44	112	371	0	0	1000
616	Makaiwa Hills	0	0	0	0	0	0	0	0	0	0	0
607	Makakilo	792	0	0	93	166	98	357	246	0	0	0
609	Makakilo	3,645	0	0	42	254	90	387	1273	0	0	673
188	Makakolo (+Palailai)	4,085	0	0	72	322	159	554	1087	0	0	447
610	Makakolo (+Palailai)	1,315	0	0	23	104	51	178	350	0	0	144
177	Mehana	1,657	0	0	64	71	64	199	480	0	0	0
595	Mehana	605	0	0	23	26	23	72	175	0	0	750
95	Ocean Pointe	3,221	0	0	1	108	206	315	1127	0	0	0
564	Ocean Pointe	3,095	0	0	1	104	198	302	1083	0	0	0
113	OP: Hoakalei	1,696	0	0	495	744	494	1733	591	0	0	0
565	OP: Hoakalei	961	950	0	281	422	280	982	335	0	0	0
542	Royal Kunia I	3,313	0	0	544	484	119	1148	1101	0	0	0
543	Royal Kunia I	3,228	0	0	6	70	28	104	881	0	0	0
10	Royal Kunia II	4,350	0	0	47	687	388	1123	1348	0	0	0
541	Royal Kunia II	3,559	0	0	38	562	318	918	1103	0	0	750
604	UHWO	2,279	0	0	484	2,401	925	3810	706	5000	0	0
4	UHWO/Private	0	0	0	0	0	0	0	0	2600	0	0
763	UHWO/Private	0	0	0	0	0	0	0	0	0	0	750
614	Upper Makakilo	4,994	0	0	0	104	124	228	1638	0	0	0
560	US Navy: Magazine	205	0	0	0	0	0	0	94	0	0	0
570	Varona Village	202	0	0	0	41	11	52	55	0	0	0
544	Village Park	3,590	0	0	115	275	61	451	985	0	0	984
597	Villages Kap: HS	1,218	0	0	0	1,771	526	2297	343	0	0	700
167	Villages of Kapolei	1,832	0	0	0	33	18	51	502	0	0	0
601	Villages of Kapolei	5,919	0	0	0	308	175	483	1730	0	0	350
602	Villages of Kapolei	2,138	0	0	0	38	21	59	585	0	0	0
617	Waimanalo Gulch	71	0	0	35	160	94	289	21	0	0	0
548	West Loch Estates	2,099	0	0	10	516	31	558	551	0	0	0
550	West Loch Fairways	3,200	0	0	0	78	14	92	1005	0	0	0
Total		148,384	1,880	2,520	14,274	40,585	21,882	76,741	45,400	7,600	464	19,986

APPENDIX B:
2020 ROADWAY LINK LEVEL OF SERVICE ANALYSIS

APPENDIX B TABLE - 2020 ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Base 2020			Base 2020					
			No. Lanes	Capacity		AM Peak Hour			PM Peak Hour		
				Per Lane	Total	Vol	V/C	LOS	Vol	V/C	LOS
Franklin D Roosevelt	East of Kamokila Blvd	EB	1	850	850	319	0.38	A	328	0.39	A
Franklin D Roosevelt		WB	1	850	850	441	0.52	A	236	0.28	A
Franklin D Roosevelt	East of Hornet Ave	EB	1	1000	1000	176	0.18	A	415	0.42	A
Franklin D Roosevelt		WB	1	1000	1000	388	0.39	A	281	0.28	A
Franklin D Roosevelt	East of Enterprise St	EB	1	1000	1000	500	0.50	A	702	0.70	C
Franklin D Roosevelt		WB	1	1000	1000	656	0.66	B	614	0.61	B
Franklin D Roosevelt	West of Coral Sea St	EB	1	850	850	441	0.52	A	336	0.40	A
Franklin D Roosevelt		WB	1	850	850	430	0.51	A	572	0.67	B
Franklin D Roosevelt	East of Coral Sea St	EB	1	850	850	411	0.48	A	361	0.42	A
Franklin D Roosevelt		WB	1	850	850	319	0.38	A	508	0.60	A
Franklin D Roosevelt	East of Corregidor St	EB	1	850	850	491	0.58	A	1001	1.18	F
Franklin D Roosevelt		WB	1	850	850	902	1.06	F	311	0.37	A
Franklin D Roosevelt	East of Phillipine Sea St	EB	1	850	850	412	0.48	A	771	0.91	E
Franklin D Roosevelt		WB	1	850	850	461	0.54	A	792	0.93	E
Geiger Rd	East of Essex Rd	EB	1	850	850	401	0.47	A	813	0.96	E
Geiger Rd		WB	1	850	850	500	0.59	A	720	0.85	D
Geiger Rd	West of Kaplei Pkwy	EB	2	850	1700	378	0.22	A	484	0.28	A
Geiger Rd		WB	2	850	1700	359	0.21	A	686	0.40	A
Geiger Rd	East of Kaplei Pkwy	EB	2	900	1800	465	0.26	A	574	0.32	A
Geiger Rd		WB	2	900	1800	377	0.21	A	738	0.41	A
Geiger Rd	East of Fort Weaver Rd	EB	2	750	1500	191	0.13	A	499	0.33	A
Geiger Rd		WB	2	750	1500	528	0.35	A	296	0.20	A
Enterprise St	South of Franklin D Roosevelt	NB	2	700	1400	256	0.18	A	561	0.40	A
Enterprise St		SB	2	700	1400	220	0.16	A	401	0.29	A
Coral Sea Rd	South of Franklin D Roosevelt	NB	1	1050	1050	277	0.26	A	336	0.32	A
Coral Sea Rd		SB	1	1050	1050	196	0.19	A	247	0.24	A
Kamokila Blvd	North of Franklin D Roosevelt	NB	2	850	1700	283	0.17	A	416	0.24	A
Kamokila Blvd		SB	2	850	1700	469	0.28	A	203	0.12	A
Kamokila Blvd	North of Kapolei Pkwy	NB	2	1050	2100	118	0.06	A	1365	0.65	B
Kamokila Blvd		SB	2	1050	2100	1115	0.53	A	889	0.42	A
Kamokila Blvd	North of Uluohia St	NB	2	1050	2100	528	0.25	A	1509	0.72	C
Kamokila Blvd		SB	2	1050	2100	1547	0.74	C	987	0.47	A
Kamokila Blvd	South of Farrington Hwy	NB	2	1050	2100	910	0.43	A	1486	0.71	C
Kamokila Blvd		SB	2	1050	2100	2073	0.99	E	1347	0.64	B
Farrington Hwy	West of Kalaeloa Blvd	EB	2	2200	4400	1960	0.45	A	2983	0.68	B
Farrington Hwy		WB	2	2200	4400	2693	0.61	B	1432	0.33	A
Farrington Hwy	West of Kamokila Blvd	EB	1	1100	1100	913	0.83	D	297	0.27	A
Farrington Hwy	(across H-1)	WB	1	1100	1100	732	0.67	B	753	0.68	B
Farrington Hwy	East of Kamokila Blvd	EB	2	1100	2200	791	0.36	A	975	0.44	A
Farrington Hwy		WB	2	1100	2200	1773	0.81	D	1292	0.59	A
Farrington Hwy	East of Fort Barrette Rd	EB	2	850	1700	624	0.37	A	866	0.51	A
Farrington Hwy		WB	2	850	1700	754	0.44	A	769	0.45	A
Farrington Hwy	East of Kealanani Ave	EB	2	850	1700	430	0.25	A	344	0.20	A
Farrington Hwy		WB	2	850	1700	543	0.32	A	319	0.19	A
Farrington Hwy	E/O Kapolei Gold Course	EB	1	850	850	306	0.36	A	193	0.23	A
Farrington Hwy		WB	1	850	850	140	0.16	A	354	0.42	A
Farrington Hwy	E/O UH-West Oahu Rd	EB	1	850	850	726	0.85	D	349	0.41	A
Farrington Hwy		WB	1	850	850	231	0.27	A	669	0.79	C
Farrington Hwy	E/O UH-West Oahu Rd - 2	EB	1	850	850	396	0.47	A	864	1.02	F
Farrington Hwy		WB	1	850	850	1061	1.25	F	650	0.76	C
Farrington Hwy	E/O North South Rd	EB	1	900	900	773	0.86	D	662	0.74	C
Farrington Hwy		WB	1	900	900	291	0.32	A	688	0.76	C
Farrington Hwy	E/O Commercial Acces Rd	EB	1	900	900	812	0.90	D	581	0.65	B
Farrington Hwy		WB	1	900	900	209	0.23	A	661	0.73	C
Farrington Hwy	E/O Hoopili Mauka-Makai	EB	1	850	850	796	0.94	E	556	0.65	B
Farrington Hwy		WB	1	850	850	201	0.24	A	639	0.75	C
Farrington Hwy	West of Old Fort Weaver Rd	EB	1	850	850	1450	1.71	F	597	0.70	C
Farrington Hwy		WB	1	850	850	319	0.38	A	202	0.24	A
Farrington Hwy	East of Old Fort Weaver Rd	EB	1	850	850	1249	1.47	F	117	0.14	A
Farrington Hwy		WB	1	850	850	426	0.50	A	486	0.57	A
Farrington Hwy	East of Fort Weaver Rd	EB	3	1150	3450	875	0.25	A	720	0.21	A
Farrington Hwy		WB	3	1150	3450	933	0.27	A	1079	0.31	A
Renton Rd	East of Kaplei Pkwy	EB	1	1000	1000	561	0.56	A	490	0.49	A
Renton Rd		WB	1	1000	1000	541	0.54	A	608	0.61	B
Renton Rd	West of Fort Weaver Rd	EB	2	900	1800	817	0.45	A	857	0.48	A
Renton Rd		WB	2	900	1800	466	0.26	A	637	0.35	A
Renton Rd	East of Fort Weaver Rd	EB	1	900	900	120	0.13	A	96	0.11	A
Renton Rd		WB	1	900	900	134	0.15	A	60	0.07	A
Fort Weaver Rd	South of Keoneula Blvd	NB	2	1200	2400	916	0.38	A	1245	0.52	A
Fort Weaver Rd		SB	2	1200	2400	1105	0.46	A	938	0.39	A
Fort Weaver Rd	North of Keoneula Blvd	NB	2	1200	2400	983	0.41	A	1140	0.48	A
Fort Weaver Rd		SB	2	1200	2400	970	0.40	A	924	0.39	A

APPENDIX B TABLE - 2020 ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Base 2020			Base 2020					
			No. Lanes	Capacity		AM Peak Hour			PM Peak Hour		
				Per Lane	Total	Vol	V/C	LOS	Vol	V/C	LOS
Fort Weaver Rd	South of Geiger Rd	NB	2	1200	2400	890	0.37	A	1081	0.45	A
Fort Weaver Rd		SB	2	1200	2400	1238	0.52	A	1189	0.50	A
Fort Weaver Rd	North of Geiger Rd	NB	2	1200	2400	1464	0.61	B	1026	0.43	A
Fort Weaver Rd		SB	2	1200	2400	1101	0.46	A	1497	0.62	B
Fort Weaver Rd	South of Renton Rd	NB	2	1200	2400	2143	0.89	D	1322	0.55	A
Fort Weaver Rd		SB	2	1200	2400	1283	0.53	A	2014	0.84	D
Fort Weaver Rd	North of Renton Rd	NB	3	1200	3600	2755	0.77	C	1838	0.51	A
Fort Weaver Rd		SB	3	1200	3600	1634	0.45	A	2368	0.66	B
Fort Weaver Rd	S/O Laulaunui Ln	SB	2	1200	2400	970	0.40	A	1424	0.59	A
Fort Weaver Rd		NB	2	1200	2400	1483	0.62	B	1140	0.48	A
Fort Weaver Rd	S/O H-1 EB ramps	SB	2	1200	2400	1105	0.46	A	1438	0.60	A
Fort Weaver Rd		NB	2	1200	2400	1416	0.59	A	1245	0.52	A
Fort Barrette Rd	North of Farrington Hwy	NB	3	1050	3150	932	0.30	A	1906	0.61	B
Fort Barrette Rd		SB	4	1050	4200	1754	0.42	A	1635	0.39	A
Fort Barrette Rd	South of Farrington Hwy	NB	1	1150	1150	289	0.25	A	424	0.37	A
Fort Barrette Rd		SB	1	1150	1150	503	0.44	A	320	0.28	A
Fort Barrette Rd	S/O Kamaha	SB	1	1150	1150	567	0.49	A	681	0.59	A
Fort Barrette Rd		NB	1	1150	1150	844	0.73	C	671	0.58	A
Fort Barrette Rd	N/O Kapolei	SB	1	1200	1200	557	0.46	A	680	0.57	A
Fort Barrette Rd		NB	1	1200	1200	841	0.70	B	665	0.55	A
Fort Barrette Rd	S/O Kapolei	SB	1	1200	1200	415	0.35	A	248	0.21	A
Fort Barrette Rd		NB	1	1200	1200	383	0.32	A	441	0.37	A
Fort Barrette Rd	N/O Roosevelt Ave	SB	1	1200	1200	399	0.33	A	174	0.15	A
Fort Barrette Rd		NB	1	1200	1200	293	0.24	A	405	0.34	A
North-South Rd	S/O H-1	SB	3	1150	3450	2125	0.62	B	2666	0.77	C
North-South Rd		NB	3	1150	3450	1640	0.48	A	1848	0.54	A
North-South Rd	S/O Farrington Hwy	SB	2	1150	2300	710	0.31	A	1167	0.51	A
North-South Rd		NB	2	1150	2300	936	0.41	A	350	0.15	A
North-South Rd	S/O Ho'opili Main	SB	2	1200	2400	731	0.30	A	1235	0.51	A
North-South Rd		NB	2	1200	2400	1337	0.56	A	419	0.17	A
North-South Rd	S/O Ho'opili Main - 2	SB	2	1150	2300	798	0.35	A	1180	0.51	A
North-South Rd		NB	2	1150	2300	1214	0.53	A	546	0.24	A
North-South Rd	S/O East/West Arterial	SB	2	1200	2400	724	0.30	A	1188	0.50	A
North-South Rd		NB	2	1200	2400	1339	0.56	A	502	0.21	A
North-South Rd	S/O Kapolei Pkwy	SB									
North-South Rd		NB									
Old Fort Weaver	From Ft. Weaver	EB	1	700	700	588	0.84	D	86	0.12	A
Old Fort Weaver	To Farrington Hwy	WB	1	700	700	33	0.05	A	268	0.38	A
Geiger Rd	E/O Essex Rd	EB	1	850	850	246	0.29	A	1007	1.18	F
Geiger Rd		WB	1	850	850	842	0.99	E	519	0.61	B
Geiger Rd	E/O Essex Rd - 2	EB	1	850	850	226	0.27	A	908	1.07	F
Geiger Rd		WB	1	850	850	821	0.97	E	486	0.57	A
Kalaeloa Pkwy	North of Kapolei Pkwy	NB	3	1150	3450	1647	0.48	A	2045	0.59	A
Kalaeloa Pkwy		SB	3	1150	3450	2243	0.65	B	2327	0.67	B
Kalaeloa Pkwy	South of Kapolei Pkwy	NB	2	1150	2300	532	0.23	A	1519	0.66	B
Kalaeloa Pkwy		SB	2	1150	2300	1828	0.79	C	946	0.41	A
Kalaeloa Pkwy	South of Lauwiiwii St	NB	2	1150	2300	532	0.23	A	1519	0.66	B
Kalaeloa Pkwy		SB	2	1150	2300	1828	0.79	C	946	0.41	A
Kalaeloa Pkwy	North of Lauwiiwii St	SB	2	1150	2300	2808	1.22	F	1565	0.68	B
Kalaeloa Pkwy		NB	2	1150	2300	721	0.31	A	2571	1.12	F
Kapolei Pkwy	E/O Kalaeloa Blvd	EB	3	1050	3150	936	0.30	A	1744	0.55	A
Kapolei Pkwy		WB	3	1050	3150	1462	0.46	A	1241	0.39	A
Kapolei Pkwy	E/O Kamokila Blvd	EB									
Kapolei Pkwy		WB									
Kapolei Pkwy	E/O Ulu'Ohia St	EB									
Kapolei Pkwy		WB									
Kapolei Pkwy	E/O Wakea	EB									
Kapolei Pkwy		WB									
Kapolei Pkwy	E/O Ft. Barrette	EB	3	1100	3300	1017	0.31	A	421	0.13	A
Kapolei Pkwy		WB	3	1100	3300	473	0.14	A	727	0.22	A
Kapolei Pkwy	E/O Malu Oahi	EB	3	1100	3300	486	0.15	A	731	0.22	A
Kapolei Pkwy		WB	3	1100	3300	858	0.26	A	569	0.17	A
Kapolei Pkwy	E/O Painako St	EB	3	1100	3300	365	0.11	A	761	0.23	A
Kapolei Pkwy		WB	3	1100	3300	1038	0.31	A	449	0.14	A
Kapolei Pkwy	E/O Kamaaha Ave	EB	3	1100	3300	787	0.24	A	1175	0.36	A
Kapolei Pkwy		WB	3	1100	3300	1578	0.48	A	1018	0.31	A
Kapolei Pkwy	E/O North South Rd - 2	EB	3	1200	3600	531	0.15	A	2061	0.57	A
Kapolei Pkwy		WB	3	1200	3600	2500	0.69	B	690	0.19	A
Kapolei Pkwy	E/O Renton Rd	EB	3	1200	3600	401	0.11	A	1352	0.38	A
Kapolei Pkwy		WB	3	1200	3600	2482	0.69	B	530	0.15	A
Kapolei Pkwy	North of Kahiuka St	NB	3	1100	3300	1418	0.43	A	645	0.20	A
Kapolei Pkwy		SB	3	1100	3300	673	0.20	A	1019	0.31	A
Kapolei Pkwy	North of Geiger Rd	NB	2	1100	2200	1439	0.65	B	702	0.32	A
Kapolei Pkwy		SB	2	1100	2200	708	0.32	A	917	0.42	A
Kapolei Pkwy	South of Geiger Rd	NB	3	1100	3300	1399	0.42	A	806	0.24	A
Kapolei Pkwy		SB	3	1100	3300	599	0.18	A	982	0.30	A
Kapolei Pkwy	South of Puuloa Rd	NB	3	1100	3300	1507	0.46	A	897	0.27	A
Kapolei Pkwy		SB	3	1100	3300	743	0.23	A	1047	0.32	A

APPENDIX B TABLE - 2020 ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Base 2020			Base 2020					
			No. Lanes	Capacity		AM Peak Hour			PM Peak Hour		
				Per Lane	Total	Vol	V/C	LOS	Vol	V/C	LOS
Farrington Hwy (SR-93)	S/O Ewa Region	EB	2	1200	2400	861	0.36	A	3457	1.44	F
Farrington Hwy (SR-93)		WB	2	1200	2400	4389	1.83	F	1596	0.67	B
Farrington Hwy (SR-93)	S/O Power Plan	EB	2	1650	3300	4396	1.33	F	1653	0.50	A
Farrington Hwy (SR-93)		WB	2	1650	3300	905	0.27	A	3493	1.06	F
Farrington Hwy (SR-93)	S/O Power Plan - 2	EB	3	1550	4650	4396	0.95	E	1653	0.36	A
Farrington Hwy (SR-93)		WB	2	1650	3300	905	0.27	A	3493	1.06	F
Farrington Hwy (SR-93)	At Alinui Dr.	EB	2	1550	3100	3930	1.27	F	1599	0.52	A
Farrington Hwy (SR-93)		WB	3	1850	5550	864	0.16	A	3251	0.59	A
Farrington Hwy (SR-93)	S/O Alinui Dr.	EB	3	1850	5550	1382	0.25	A	3982	0.72	C
Farrington Hwy (SR-93)		WB	2	1550	3100	4069	1.31	F	2031	0.66	B
Farrington Hwy (SR-93)	S/O Koio Dr	EB	3	1850	5550	1382	0.25	A	3982	0.72	C
Farrington Hwy (SR-93)		WB	2	1600	3200	4932	1.54	F	2491	0.78	C
Farrington Hwy (SR-93)	S/O Waiomea St	EB	3	1850	5550	1339	0.24	A	3909	0.70	C
Farrington Hwy (SR-93)		WB	2	1600	3200	4889	1.53	F	2418	0.76	C
Farrington Hwy (SR-93)	S/O Waiomea St - 2	EB	3	1750	5250	1333	0.25	A	3961	0.75	C
Farrington Hwy (SR-93)		WB	2	1600	3200	4963	1.55	F	2432	0.76	C
Farrington Hwy (SR-93)	S/O Laaloa St	EB	3	1750	5250	1416	0.27	A	4075	0.78	C
Farrington Hwy (SR-93)		WB	2	1750	3500	5083	1.45	F	2498	0.71	C
Farrington Hwy (SR-93)	S/O U-turn Dirt Road	EB	2	2200	4400	1387	0.32	A	2907	0.66	B
Farrington Hwy (SR-93)		WB	2	2200	4400	4087	0.93	E	2244	0.51	A
Interstate H-1	At NEW Hanua Interchange	EB	2	2200	4400	1387	0.32	A	2907	0.66	B
Interstate H-1		WB	2	2200	4400	4087	0.93	E	2244	0.51	A
Interstate H-1	At Kaleloa Interchange	EB	2	2200	4400	813	0.18	A	2331	0.53	A
Interstate H-1		WB	2	2200	4400	3514	0.80	C	1813	0.41	A
Interstate H-1	At NEW Wakea Interchange	EB	3	2200	6600	2288	0.35	A	3522	0.53	A
Interstate H-1		WB	3	2200	6600	3558	0.54	A	2473	0.37	A
Interstate H-1	At Makakilo Blvd Interchange	EB	3	2200	6600	2288	0.35	A	3522	0.53	A
Interstate H-1		WB	3	2200	6600	3558	0.54	A	2473	0.37	A
Interstate H-1 [Ex]	S/O Makakilo	SB	3	2200	6600	2288	0.35	A	3522	0.53	A
Interstate H-1 [Ex]		SB	3	2200	6600	3558	0.54	A	2473	0.37	A
Interstate H-1	At Palehua Rd	EB	3	2200	6600	2583	0.39	A	3694	0.56	A
Interstate H-1		WB	3	2200	6600	4806	0.73	C	3561	0.54	A
Interstate H-1 [Ex]	E/O Kunia Rd	WB	3	2200	6600	4737	0.72	C	5453	0.83	D
Interstate H-1 [Ex]		EB	3	2200	6600	4797	0.73	C	5526	0.84	D
Interstate H-1	At Route 76 (Kunia)	EB	3	2200	6600	2884	0.44	A	5575	0.84	D
Interstate H-1		WB	2	2200	4400	5473	1.24	F	4093	0.93	E
Kunia Rd	S/O of Ewa Border	SB	1	1250	1250	1092	0.87	D	1005	0.80	D
Kunia Rd		NB	1	1250	1250	958	0.77	C	913	0.73	C
Kunia Rd	S/O of Plantation Rd	SB	1	1400	1400	1097	0.78	C	1039	0.74	C
Kunia Rd		NB	1	1400	1400	995	0.71	C	929	0.66	B
Kunia Rd	S/O Anonui St	SB	2	1450	2900	1521	0.52	A	1234	0.43	A
Kunia Rd		NB	2	1450	2900	1137	0.39	A	1263	0.44	A
Kunia Rd	S/O Kapuna Loop -1	SB	3	1450	4350	2091	0.48	A	1583	0.36	A
Kunia Rd		NB	3	1450	4350	1377	0.32	A	1761	0.40	A
Kunia Rd	S/O Kapuna Loop -2	SB	3	1450	4350	2943	0.68	B	1924	0.44	A
Kunia Rd		NB	3	1450	4350	1582	0.36	A	2422	0.56	A
Hanua St	S/O H-1	SB									
Hanua St		NB									
Hanua St	S/O Kapoloai Pkwy	SB									
Hanua St		NB									
Hanua St	S/O Opakapaka St	SB									
Hanua St		NB									
Alinui Dr	E/O Kolina	EB	2	900	1800	246	0.14	A	485	0.27	A
Alinui Dr		WB	2	900	1800	555	0.31	A	312	0.17	A
Alinui Dr	E/O Koio	EB	2	900	1800	153	0.09	A	296	0.16	A
Alinui Dr		WB	2	900	1800	343	0.19	A	204	0.11	A
Alinui Dr	E/O New Development Access	EB									
Alinui Dr		WB									
Alinui Dr	W/O Hanua St	EB									
Alinui Dr		WB									
Alinui Dr	E/O Hanu St	EB									
Alinui Dr		WB									

Source: Fehr & Peers, March 2011

APPENDIX C:
2020 MASTER PLAN ROADWAY LINK LEVEL OF SERVICE ANALYSIS

APPENDIX C TABLE - 2020 EWA MASTER PLAN ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Master Plan Year 2020				Master Plan Year 2020					
			No. Lanes	Added Lanes	Capacity		AM Peak Hour			PM Peak Hour		
					Per Lane	Total	Vol	V/C	LOS	Adj Vol	V/C	LOS
Franklin D Roosevelt	East of Kamokila Blvd	EB	1	0	850	850	184	0.22	A	97	0.11	A
Franklin D Roosevelt		WB	1	0	850	850	66	0.08	A	83	0.10	A
Franklin D Roosevelt	East of Hornet Ave	EB	1	0	1000	1000	36	0.04	A	146	0.15	A
Franklin D Roosevelt		WB	1	0	1000	1000	105	0.11	A	63	0.06	A
Franklin D Roosevelt	East of Enterprise St	EB	1	0	1000	1000	355	0.36	A	254	0.25	A
Franklin D Roosevelt		WB	1	0	1000	1000	187	0.19	A	345	0.35	A
Franklin D Roosevelt	West of Coral Sea St	EB	1	0	850	850	312	0.37	A	126	0.15	A
Franklin D Roosevelt		WB	1	0	850	850	164	0.19	A	444	0.52	A
Franklin D Roosevelt	East of Coral Sea St	EB	1	0	850	850	326	0.38	A	260	0.31	A
Franklin D Roosevelt		WB	1	0	850	850	68	0.08	A	315	0.37	A
Franklin D Roosevelt	East of Corregidor St	EB	1	0	850	850	240	0.28	A	808	0.95	E
Franklin D Roosevelt		WB	1	0	850	850	817	0.96	E	133	0.16	A
Franklin D Roosevelt	East of Phillipine Sea St	EB	1	0	850	850	435	0.51	A	688	0.81	D
Franklin D Roosevelt		WB	1	0	850	850	470	0.55	A	706	0.83	D
Geiger Rd	East of Essex Rd	EB	1	0	850	850	424	0.50	A	730	0.86	D
Geiger Rd		WB	1	0	850	850	509	0.60	A	634	0.75	C
Geiger Rd	West of Kaplei Pkwy	EB	2	0	850	1700	312	0.18	A	361	0.21	A
Geiger Rd		WB	2	0	850	1700	173	0.10	A	560	0.33	A
Geiger Rd	East of Kaplei Pkwy	EB	2	0	900	1800	449	0.25	A	532	0.30	A
Geiger Rd		WB	2	0	900	1800	381	0.21	A	734	0.41	A
Geiger Rd	East of Fort Weaver Rd	EB	2	0	750	1500	187	0.12	A	501	0.33	A
Geiger Rd		WB	2	0	750	1500	541	0.36	A	304	0.20	A
Enterprise St	South of Franklin D Roosevelt	NB	2	0	700	1400	251	0.18	A	558	0.40	A
Enterprise St		SB	2	0	700	1400	210	0.15	A	365	0.26	A
Coral Sea Rd	South of Franklin D Roosevelt	NB	1	0	1050	1050	284	0.27	A	337	0.32	A
Coral Sea Rd		SB	1	0	1050	1050	173	0.16	A	320	0.30	A
Kamokila Blvd	North of Franklin D Roosevelt	NB	2	0	850	1700	166	0.10	A	160	0.09	A
Kamokila Blvd		SB	2	0	850	1700	338	0.20	A	194	0.11	A
Kamokila Blvd	North of Kapolei Pkwy	NB	2	0	1050	2100	160	0.08	A	1041	0.50	A
Kamokila Blvd		SB	2	0	1050	2100	925	0.44	A	913	0.43	A
Kamokila Blvd	North of Uluohia St	NB	2	0	1050	2100	569	0.27	A	1183	0.56	A
Kamokila Blvd		SB	2	0	1050	2100	1325	0.63	B	1156	0.55	A
Kamokila Blvd	South of Farrington Hwy	NB	2	0	1050	2100	631	0.30	A	849	0.40	A
Kamokila Blvd		SB	2	0	1050	2100	1225	0.58	A	1306	0.62	B
Farrington Hwy	West of Kalaeloa Blvd	EB	2	0	2200	4400	1415	0.32	A	2690	0.61	B
Farrington Hwy		WB	2	0	2200	4400	2384	0.54	A	1076	0.24	A
Farrington Hwy	West of Kamokila Blvd	EB	1	0	1100	1100	385	0.35	A	252	0.23	A
Farrington Hwy	(across H-1)	WB	1	0	1100	1100	441	0.40	A	286	0.26	A
Farrington Hwy	East of Kamokila Blvd	EB	2	0	1100	2200	474	0.22	A	628	0.29	A
Farrington Hwy		WB	2	0	1100	2200	1124	0.51	A	1119	0.51	A
Farrington Hwy	East of Fort Barrette Rd	EB	2	0	850	1700	497	0.29	A	877	0.52	A
Farrington Hwy		WB	2	0	850	1700	512	0.30	A	569	0.33	A
Farrington Hwy	East of Kealanani Ave	EB	2	0	850	1700	408	0.24	A	356	0.21	A
Farrington Hwy		WB	2	0	850	1700	459	0.27	A	315	0.19	A
Farrington Hwy	E/O Kapolei Gold Course	EB	2	1	850	1700	278	0.16	A	233	0.14	A
Farrington Hwy		WB	2	1	850	1700	90	0.05	A	368	0.22	A
Farrington Hwy	E/O UH-West Oahu Rd	EB	2	1	850	1700	639	0.38	A	375	0.22	A
Farrington Hwy		WB	2	1	850	1700	180	0.11	A	634	0.37	A
Farrington Hwy	E/O UH-West Oahu Rd - 2	EB	2	1	850	1700	487	0.29	A	917	0.54	A
Farrington Hwy		WB	2	1	850	1700	1188	0.70	B	642	0.38	A
Farrington Hwy	E/O North South Rd	EB	2	1	900	1800	1196	0.66	B	775	0.43	A
Farrington Hwy		WB	2	1	900	1800	324	0.18	A	847	0.47	A
Farrington Hwy	E/O Commercial Acces Rd	EB	2	1	900	1800	1229	0.68	B	694	0.39	A
Farrington Hwy		WB	2	1	900	1800	235	0.13	A	820	0.46	A
Farrington Hwy	E/O Hoopili Mauka-Makai	EB	2	1	850	1700	1214	0.71	C	674	0.40	A
Farrington Hwy		WB	2	1	850	1700	227	0.13	A	800	0.47	A
Farrington Hwy	West of Old Fort Weaver Rd	EB	2	1	850	1700	1718	1.01	F	672	0.40	A
Farrington Hwy		WB	2	1	850	1700	325	0.19	A	348	0.20	A
Farrington Hwy	East of Old Fort Weaver Rd	EB	2	1	850	1700	1490	0.88	D	338	0.20	A
Farrington Hwy		WB	2	1	850	1700	419	0.25	A	647	0.38	A
Farrington Hwy	East of Fort Weaver Rd	EB	3	0	1150	3450	896	0.26	A	758	0.22	A
Farrington Hwy		WB	3	0	1150	3450	903	0.26	A	1078	0.31	A
Renton Rd	East of Kaplei Pkwy	EB	1	0	1000	1000	448	0.45	A	443	0.44	A
Renton Rd		WB	1	0	1000	1000	486	0.49	A	357	0.36	A
Renton Rd	West of Fort Weaver Rd	EB	2	0	900	1800	734	0.41	A	820	0.46	A
Renton Rd		WB	2	0	900	1800	368	0.20	A	594	0.33	A
Renton Rd	East of Fort Weaver Rd	EB	1	0	900	900	120	0.13	A	96	0.11	A
Renton Rd		WB	1	0	900	900	134	0.15	A	60	0.07	A
Fort Weaver Rd	South of Keoneula Blvd	NB	2	0	1200	2400	912	0.38	A	1245	0.52	A
Fort Weaver Rd		SB	2	0	1200	2400	1105	0.46	A	926	0.39	A
Fort Weaver Rd	North of Keoneula Blvd	NB	2	0	1200	2400	978	0.41	A	1140	0.48	A
Fort Weaver Rd		SB	2	0	1200	2400	970	0.40	A	915	0.38	A

APPENDIX C TABLE - 2020 EWA MASTER PLAN ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Master Plan Year 2020				Master Plan Year 2020					
			No. Lanes	Added Lanes	Capacity		AM Peak Hour			PM Peak Hour		
					Per Lane	Total	Vol	V/C	LOS	Adj Vol	V/C	LOS
Fort Weaver Rd	South of Geiger Rd	NB	2	0	1200	2400	886	0.37	A	1081	0.45	A
Fort Weaver Rd		SB	2	0	1200	2400	1238	0.52	A	1177	0.49	A
Fort Weaver Rd	North of Geiger Rd	NB	2	0	1200	2400	1458	0.61	B	1019	0.42	A
Fort Weaver Rd		SB	2	0	1200	2400	1109	0.46	A	1498	0.62	B
Fort Weaver Rd	South of Renton Rd	NB	2	0	1200	2400	2126	0.89	D	1306	0.54	A
Fort Weaver Rd		SB	2	0	1200	2400	1297	0.54	A	1978	0.82	D
Fort Weaver Rd	North of Renton Rd	NB	3	0	1200	3600	2658	0.74	C	1779	0.49	A
Fort Weaver Rd		SB	3	0	1200	3600	1554	0.43	A	2284	0.63	B
Fort Weaver Rd	S/O Laulaunui Ln	SB	2	0	1200	2400	970	0.40	A	1415	0.59	A
Fort Weaver Rd		NB	2	0	1200	2400	1478	0.62	B	1140	0.48	A
Fort Weaver Rd	S/O H-1 EB ramps	SB	2	0	1200	2400	1105	0.46	A	1426	0.59	A
Fort Weaver Rd		NB	2	0	1200	2400	1412	0.59	A	1245	0.52	A
Fort Barrette Rd	North of Farrington Hwy	NB	3	0	1050	3150	645	0.20	A	1495	0.47	A
Fort Barrette Rd		SB	4	0	1050	4200	1471	0.35	A	1327	0.32	A
Fort Barrette Rd	South of Farrington Hwy	NB	2	1	1150	2300	402	0.17	A	213	0.09	A
Fort Barrette Rd		SB	2	1	1150	2300	396	0.17	A	392	0.17	A
Fort Barrette Rd	S/O Kamaha	SB	2	1	1150	2300	342	0.15	A	453	0.20	A
Fort Barrette Rd		NB	2	1	1150	2300	500	0.22	A	542	0.24	A
Fort Barrette Rd	N/O Kapolei	SB	2	1	1200	2400	345	0.14	A	467	0.19	A
Fort Barrette Rd		NB	2	1	1200	2400	516	0.22	A	529	0.22	A
Fort Barrette Rd	S/O Kapolei	SB	2	1	1200	2400	240	0.10	A	340	0.14	A
Fort Barrette Rd		NB	2	1	1200	2400	390	0.16	A	403	0.17	A
Fort Barrette Rd	N/O Roosevelt Ave	SB	2	1	1200	2400	191	0.08	A	235	0.10	A
Fort Barrette Rd		NB	2	1	1200	2400	266	0.11	A	335	0.14	A
North-South Rd	S/O H-1	SB	3	0	1150	3450	2125	0.62	B	2568	0.74	C
North-South Rd		NB	3	0	1150	3450	1710	0.50	A	1888	0.55	A
North-South Rd	S/O Farrington Hwy	SB	2	0	1150	2300	578	0.25	A	1127	0.49	A
North-South Rd		NB	2	0	1150	2300	1300	0.57	A	340	0.15	A
North-South Rd	S/O Ho'opili Main	SB	2	0	1200	2400	555	0.23	A	1127	0.47	A
North-South Rd		NB	2	0	1200	2400	1519	0.63	B	384	0.16	A
North-South Rd	S/O Ho'opili Main - 2	SB	2	0	1150	2300	521	0.23	A	1022	0.44	A
North-South Rd		NB	2	0	1150	2300	1254	0.55	A	461	0.20	A
North-South Rd	S/O East/West Arterial	SB	2	0	1200	2400	510	0.21	A	1069	0.45	A
North-South Rd		NB	2	0	1200	2400	1372	0.57	A	477	0.20	A
North-South Rd	S/O Kapolei Pkwy	SB	2	2	1150	2300	234	0.10	A	408	0.18	A
North-South Rd		NB	2	2	1150	2300	365	0.16	A	176	0.08	A
Old Fort Weaver	From Ft. Weaver	EB	1	0	700	700	490	0.70	B	62	0.09	A
Old Fort Weaver	To Farrington Hwy	WB	1	0	700	700	32	0.05	A	206	0.29	A
Geiger Rd	E/O Essex Rd	EB	1	0	850	850	257	0.30	A	886	1.04	F
Geiger Rd		WB	1	0	850	850	821	0.97	E	395	0.46	A
Geiger Rd	E/O Essex Rd - 2	EB	1	0	850	850	237	0.28	A	787	0.93	E
Geiger Rd		WB	1	0	850	850	712	0.84	D	361	0.42	A
Kalaeloa Pkwy	North of Kapolei Pkwy	NB	3	0	1150	3450	558	0.16	A	1403	0.41	A
Kalaeloa Pkwy		SB	3	0	1150	3450	2226	0.65	B	1506	0.44	A
Kalaeloa Pkwy	South of Kapolei Pkwy	NB	2	0	1150	2300	495	0.22	A	1308	0.57	A
Kalaeloa Pkwy		SB	2	0	1150	2300	1700	0.74	C	881	0.38	A
Kalaeloa Pkwy	South of Lauwiiwii St	NB	2	0	1150	2300	495	0.22	A	1308	0.57	A
Kalaeloa Pkwy		SB	2	0	1150	2300	1700	0.74	C	881	0.38	A
Kalaeloa Pkwy	North of Lauwiiwii St	SB	2	0	1150	2300	2147	0.93	E	1212	0.53	A
Kalaeloa Pkwy		NB	2	0	1150	2300	629	0.27	A	1845	0.80	D
Kapolei Pkwy	E/O Kalaeloa Blvd	EB	3	0	1050	3150	1084	0.34	A	1672	0.53	A
Kapolei Pkwy		WB	3	0	1050	3150	1560	0.50	A	1569	0.50	A
Kapolei Pkwy	E/O Kamokila Blvd	EB	3	3	1050	3150	566	0.18	A	1033	0.33	A
Kapolei Pkwy		WB	3	3	1050	3150	1085	0.34	A	714	0.23	A
Kapolei Pkwy	E/O Ulu'Ohia St	EB	3	3	1050	3150	572	0.18	A	1120	0.36	A
Kapolei Pkwy		WB	3	3	1050	3150	1216	0.39	A	750	0.24	A
Kapolei Pkwy	E/O Wakea	EB	3	3	1100	3300	572	0.17	A	1120	0.34	A
Kapolei Pkwy		WB	3	3	1100	3300	1216	0.37	A	750	0.23	A
Kapolei Pkwy	E/O Ft. Barrette	EB	3	0	1100	3300	1661	0.50	A	845	0.26	A
Kapolei Pkwy		WB	3	0	1100	3300	766	0.23	A	1313	0.40	A
Kapolei Pkwy	E/O Malu Oahi	EB	3	0	1100	3300	754	0.23	A	1132	0.34	A
Kapolei Pkwy		WB	3	0	1100	3300	1188	0.36	A	879	0.27	A
Kapolei Pkwy	E/O Painako St	EB	3	0	1100	3300	544	0.16	A	1159	0.35	A
Kapolei Pkwy		WB	3	0	1100	3300	1280	0.39	A	756	0.23	A
Kapolei Pkwy	E/O Kamaaha Ave	EB	3	0	1100	3300	875	0.27	A	1583	0.48	A
Kapolei Pkwy		WB	3	0	1100	3300	1643	0.50	A	1124	0.34	A
Kapolei Pkwy	E/O North South Rd - 2	EB	3	0	1200	3600	431	0.12	A	1866	0.52	A
Kapolei Pkwy		WB	3	0	1200	3600	2390	0.66	B	676	0.19	A
Kapolei Pkwy	E/O Renton Rd	EB	3	0	1200	3600	374	0.10	A	1476	0.41	A
Kapolei Pkwy		WB	3	0	1200	3600	2518	0.70	B	637	0.18	A
Kapolei Pkwy	North of Kahiuka St	NB	3	0	1100	3300	1541	0.47	A	747	0.23	A
Kapolei Pkwy		SB	3	0	1100	3300	646	0.20	A	1107	0.34	A
Kapolei Pkwy	North of Geiger Rd	NB	2	0	1100	2200	1562	0.71	C	804	0.37	A
Kapolei Pkwy		SB	2	0	1100	2200	681	0.31	A	1005	0.46	A
Kapolei Pkwy	South of Geiger Rd	NB	3	0	1100	3300	1411	0.43	A	806	0.24	A
Kapolei Pkwy		SB	3	0	1100	3300	599	0.18	A	1010	0.31	A
Kapolei Pkwy	South of Puuloa Rd	NB	3	0	1100	3300	1519	0.46	A	897	0.27	A
Kapolei Pkwy		SB	3	0	1100	3300	743	0.23	A	1075	0.33	A

APPENDIX C TABLE - 2020 EWA MASTER PLAN ROADWAY LEVEL OF SERVICE ANALYSIS

Street Name	Location	Direction	Master Plan Year 2020				Master Plan Year 2020					
			No. Lanes	Added Lanes	Capacity		AM Peak Hour			PM Peak Hour		
					Per Lane	Total	Vol	V/C	LOS	Adj Vol	V/C	LOS
Farrington Hwy (SR-93)	S/O Ewa Region	EB	2	0	1200	2400	861	0.36	A	3457	1.44	F
Farrington Hwy (SR-93)		WB	2	0	1200	2400	4389	1.83	F	1596	0.67	B
Farrington Hwy (SR-93)	S/O Power Plan	EB	2	0	1650	3300	4396	1.33	F	1635	0.50	A
Farrington Hwy (SR-93)		WB	2	0	1650	3300	905	0.27	A	3475	1.05	F
Farrington Hwy (SR-93)	S/O Power Plan - 2	EB	3	0	1550	4650	4396	0.95	E	1635	0.35	A
Farrington Hwy (SR-93)		WB	2	0	1650	3300	905	0.27	A	3475	1.05	F
Farrington Hwy (SR-93)	At Alinui Dr.	EB	2	0	1550	3100	3924	1.27	F	1580	0.51	A
Farrington Hwy (SR-93)		WB	3	0	1850	5550	886	0.16	A	3336	0.60	B
Farrington Hwy (SR-93)	S/O Alinui Dr.	EB	3	0	1850	5550	1137	0.20	A	3460	0.62	B
Farrington Hwy (SR-93)		WB	2	0	1550	3100	3949	1.27	F	1973	0.64	B
Farrington Hwy (SR-93)	S/O Koio Dr	EB	3	0	1850	5550	1137	0.20	A	3460	0.62	B
Farrington Hwy (SR-93)		WB	2	0	1600	3200	3603	1.13	F	2420	0.76	C
Farrington Hwy (SR-93)	S/O Waiomea St	EB	3	0	1850	5550	1078	0.19	A	3183	0.57	A
Farrington Hwy (SR-93)		WB	2	0	1600	3200	3543	1.11	F	2143	0.67	B
Farrington Hwy (SR-93)	S/O Waiomea St - 2	EB	3	0	1750	5250	1074	0.20	A	3235	0.62	B
Farrington Hwy (SR-93)		WB	2	0	1600	3200	3618	1.13	F	2157	0.67	B
Farrington Hwy (SR-93)	S/O Laaloa St	EB	3	0	1750	5250	1163	0.22	A	3355	0.64	B
Farrington Hwy (SR-93)		WB	2	0	1750	3500	3745	1.07	F	2229	0.64	B
Farrington Hwy (SR-93)	S/O U-turn Dirt Road	EB	2	0	2200	4400	1136	0.26	A	3014	0.69	B
Farrington Hwy (SR-93)		WB	2	0	2200	4400	3774	0.86	D	2226	0.51	A
Interstate H-1	At NEW Hanua Interchange	EB	2	0	2200	4400	1078	0.25	A	2551	0.58	A
Interstate H-1		WB	2	0	2200	4400	3542	0.81	D	1951	0.44	A
Interstate H-1	At Kaleloa Interchange	EB	2	0	2200	4400	978	0.22	A	2338	0.53	A
Interstate H-1		WB	2	0	2200	4400	3551	0.81	D	2081	0.47	A
Interstate H-1	At NEW Wakea Interchange	EB	3	0	2200	6600	2258	0.34	A	3512	0.53	A
Interstate H-1		WB	3	0	2200	6600	3534	0.54	A	2556	0.39	A
Interstate H-1	At Makakilo Blvd Interchange	EB	3	0	2200	6600	2872	0.44	A	4067	0.62	B
Interstate H-1		WB	3	0	2200	6600	3873	0.59	A	2960	0.45	A
Interstate H-1 [Ex]	S/O Makakilo	SB	3	0	2200	6600	2872	0.44	A	4067	0.62	B
Interstate H-1 [Ex]		SB	3	0	2200	6600	3873	0.59	A	2960	0.45	A
Interstate H-1	At Palehua Rd	EB	3	0	2200	6600	2741	0.42	A	3984	0.60	B
Interstate H-1		WB	3	0	2200	6600	4735	0.72	C	3625	0.55	A
Interstate H-1 [Ex]	E/O Kunia Rd	WB	3	0	2200	6600	4805	0.73	C	5463	0.83	D
Interstate H-1 [Ex]		EB	3	0	2200	6600	4662	0.71	C	5512	0.84	D
Interstate H-1	At Route 76 (Kunia)	EB	3	0	2200	6600	2941	0.45	A	5602	0.85	D
Interstate H-1		WB	2	0	2200	4400	5382	1.22	F	4086	0.93	E
Kunia Rd	S/O of Ewa Border	SB	1	0	1250	1250	1087	0.87	D	1010	0.81	D
Kunia Rd		NB	1	0	1250	1250	957	0.77	C	923	0.74	C
Kunia Rd	S/O of Plantation Rd	SB	1	0	1400	1400	1092	0.78	C	1044	0.75	C
Kunia Rd		NB	1	0	1400	1400	995	0.71	C	939	0.67	B
Kunia Rd	S/O Anonui St	SB	2	0	1450	2900	1516	0.52	A	1239	0.43	A
Kunia Rd		NB	2	0	1450	2900	1137	0.39	A	1273	0.44	A
Kunia Rd	S/O Kapuna Loop -1	SB	3	0	1450	4350	2079	0.48	A	1589	0.37	A
Kunia Rd		NB	3	0	1450	4350	1377	0.32	A	1771	0.41	A
Kunia Rd	S/O Kapuna Loop -2	SB	3	0	1450	4350	2939	0.68	B	1932	0.44	A
Kunia Rd		NB	3	0	1450	4350	1583	0.36	A	2434	0.56	A
Hanua St	S/O H-1	SB	2	2	1150	2300	567	0.25	A	614	0.27	A
Hanua St		NB	2	2	1150	2300	493	0.21	A	806	0.35	A
Hanua St	S/O Kapolei Pkwy	SB	1	1	1150	1150	699	0.61	B	362	0.31	A
Hanua St		NB	1	1	1150	1150	93	0.08	A	798	0.69	B
Hanua St	S/O Opakapaka St	SB	1	1	1150	1150	165	0.14	A	73	0.06	A
Hanua St		NB	1	1	1150	1150	39	0.03	A	282	0.25	A
Alinui Dr	E/O Kolina	EB	2	0	900	1800	990	0.55	A	178	0.10	A
Alinui Dr		WB	2	0	900	1800	214	0.12	A	457	0.25	A
Alinui Dr	E/O Koio	EB	2	0	900	1800	1145	0.64	B	223	0.12	A
Alinui Dr		WB	2	0	900	1800	250	0.14	A	582	0.32	A
Alinui Dr	E/O New Development Access	EB	2	2	1200	2400	1242	0.52	A	237	0.10	A
Alinui Dr		WB	2	2	1200	2400	239	0.10	A	648	0.27	A
Alinui Dr	W/O Hanua St	EB	2	2	1200	2400	1351	0.56	A	275	0.11	A
Alinui Dr		WB	2	2	1200	2400	266	0.11	A	726	0.30	A
Alinui Dr	E/O Hanu St	EB	2	2	1050	2100	751	0.36	A	303	0.14	A
Alinui Dr		WB	2	2	1050	2100	198	0.09	A	510	0.24	A

Source: Fehr & Peers, March 2011

APPENDIX D:
BELT COLLINS HAWAII MEMORANDUM



MEMORANDUM

TO:	FROM:
Brian Suzuki, Sohrab Rashid	John Kirkpatrick; Ben Rasa; Larry Agena
COMPANY:	DATE:
Dept of Transportation Services, City and County of Honolulu; Fehr & Peers	12/3/2010
SUBJECT:	JOB NUMBER/REFERENCE NUMBER:
Roadway and Land Costs for 'Ewa Transportation Impact Fee Program	2009.71.0100

This memo summarizes work to develop: (1) preliminary 2010 opinions of the cost of roadway construction for projects being considered for inclusion in the next increment of the 'Ewa Transportation Impact Fee Program; (2) land acquisition costs; and (3) a basis for adjusting costs in the future to account for cost escalation. The memo was drafted in August 2010; this version incorporates revisions made in the course of reviews with you and the advisory group to date.

1. Roadway Construction Costs

The preliminary 2010 opinions of probable costs of roadway construction projects for the next increment of the Ewa Transportation Impact Fee program are summarized below for the seven road segments (with *references* for each):

1. Kapolei Parkway to Aliinui Drive (new four-lane segment) (ROW for six lanes): *City and County of Honolulu, Subdivision Street Standards, December 2000*
2. Hanua Street (2a) and State Harbor Access Road (2b) (new two-lane and four-lane segments) from Farrington Highway to Malekole St. (ROW for four lanes): *State Department of Transportation, Plans for North South Road, Federal Aid Project No. STP-0300(65)*. (Note that the State Harbor Access Road includes one section running from Farrington Highway, leading to a turn and a second section into the Harbor. Only the former section is included in this analysis.)
3. New Interchange at H-1: *Planning studies for State Department of Transportation and Campbell Companies: cost estimates developed in 2010 for federal funding applications. Project divided into phases by HDOT and Campbell.*
4. Kapolei Parkway (new six-lane segment) (ROW for six lanes): *North South Road and Kapolei Parkway Final Environmental Assessment, October 2004.*
5. Fort Barrette Road (widen to four lanes) (ROW for four lanes): *State Department of Transportation, Plans for Fort Barrette Road Widening, Federal Aid Project No. STP-0901(4).*
6. Farrington Highway (widen to four lanes) (ROW for four lanes): *City and County of Honolulu Farrington Highway Widening.*
7. Kualakai Parkway Extension (new four lane segment) (ROW for six lanes): *State Department of Transportation, Plans for North South Road, Federal Aid Project No. STP-0300(65).*

(Typical section sketches are available in the attachments)



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City and State standards for street design were used to determine the cost estimates which included curbs, gutters, sidewalks, bike lane accommodations, landscaping, street lights and traffic signals as commented by the City per memo dated 7/2/10. The typical sections for the seven road segments above were distributed to the City and County of Honolulu Department of Planning and Permitting and to Hawaii State Department of Transportation for review, input and comments on each section.

Preliminary 2010 Opinion, Roadway Construction Costs

No.	Road Segment	Improvement	Construction Cost	Design Cost	Construction Admin	TOTAL
1	Kapolei Parkway (Aliinui extension)	New 4-Lane Segment	\$11,480,000.00	\$1,148,000.00	\$1,722,000.00	\$14,350,000.00
2a	Hanua Street (from State Harbor Access Road to Malakole St.)	New 2-Lane Segment	\$7,150,000.00	\$715,000.00	\$1,072,500.00	\$8,937,500.00
2b	State Harbor Access Road (Farrington Hwy to turn to State Harbor entrance)	New 4-Lane Segment	\$9,220,000.00	\$922,000.00	\$1,383,000.00	\$11,525,000.00
3	Kapolei Interchange Complex					
3a	Phase 2 (Kapolei int.)	New Ramps and Bridges	\$27,500,000.00	\$2,100,000.00	included in construction	\$29,600,000.00
3b	Phase 3 (Palailai, to Hanua)	New Ramps	\$18,000,000.00	\$1,250,000.00	included in construction	\$19,250,000.00
3c	Phase 4 (Palailai, completion)	New Ramps and Bridges	\$42,000,000.00	\$3,000,000.00	included in construction	\$45,000,000.00
4	Kapolei Parkway (Kamaaha Ave to Kamokila Blvd)	New 6-Lane Segment	\$5,880,000.00	\$588,000.00	\$882,000.00	\$7,350,000.00
5	Fort Barrette Road	Widen to 4-Lane Segment	\$15,240,000.00	\$1,524,000.00	\$2,286,000.00	\$19,050,000.00
6	Farrington Highway	Widen to 4-Lane Segment	\$35,060,000.00	\$3,506,000.00	\$5,259,000.00	\$43,825,000.00
7	Kualakai Parkway	New 4-Lane Segment	\$4,580,000.00	\$458,000.00	\$687,000.00	\$5,725,000.00
sub-totals			\$176,110,000.00	\$15,211,000.00	\$13,291,500.00	\$204,612,500.00

Notes: Design cost estimated at 10% of segment construction costs; construction administration estimated at 15% of segment construction costs, except for 3, for which costs were developed by project sponsors.

2. Land Acquisition Costs for Rights of Way

Actual costs will depend on the specifics of each property. Our engagement does not cover appraisal of properties. Since these are major actual or planned roadways, much is already government property or set aside for road development, with surrounding properties appraised on the expectation that they will be served by a major roadway. This memo discusses steps taken to develop early estimates of land costs, leading to a recommended approach to those costs for the purpose of the Impact Fee Update. We stress that the recommended approach reaches a high figure. Landowners may well accept a more modest amount in order to benefit from road improvements.

- A. We checked the TMK database. It was not very helpful: public roadways are not included as parcels, since they are not taxable. Hence, with Farrington Highway and Fort Barrette Road, we did not determine whether existing rights of way are large enough for the proposed projects – i.e., no land acquisition would be needed – or whether additional land would be needed for project development. In other cases, future roads cut through existing parcels, and we assumed that the road right of way would be acquired. We can use the assessed value of the parcels to produce an average cost per square foot.

Please note that those assessed values take into account the likelihood of future use of land alongside a major collector or minor arterial: the future roadway contributes to the value of the rest of the property.



MEMORANDUM

Potential Cost of Land Acquisition, if based on Surrounding Property Assessments

Project Number	Name	Length	Width	TMKs	\$/sf	Share per TMK	Average	Total	Notes
1	Kapolei Pkwy. To Aliinui	5,240	128	1-9-1-15:4	\$2.29	100%		\$1,533,338	
2a	Hanua Ext	4,000	100	1-9-1-15:20	\$0.96	80%	\$0.97	\$386,488	
				1-9-1-14:33	\$1.01	20%			
2b	St. Harbor Road	5,100	100	1-9-1-15:4	\$2.29	100%		\$1,165,914	
3	Kapolei Int. Complex								
3a	Phase 2 (Kapolei Int.)							\$2,000,000	[1]
3b	Phase 3 (Pal, to Hanua)							\$800,000	[1]
3c	Phase 4 (Palailai Int.)							\$750,000	[1]
4	Kapolei Pkwy Ext	1,850	116				\$18.75	\$4,022,724	
				1-9-1-148:6	\$31.35	10%			
				1-9-1-148:10	\$20.88	57%			
				1-9-1-16:150	\$11.34	33%			
5	Fort Barrette Road	6,490	120	no TMK	NA	100%		NA	[2]
6	Farrington Hway	16,240	105	no TMK	NA	100%		NA	[2]
7	NS Ext to Roosevelt	1,380	106	1-9-1-16:142	\$1.40	100%		\$204,847	

NOTES: Hawaii Information Service reports of current assessments were used, along with TMK maps from the City and County. Estimates of the share of each roadway in particular parcels are based on TMK maps, not survey data.

- [1] Land price derived from cost estimate dated May 2010, shared by Aina Nui Corporation.
- [2] Not certain whether acquisition of some adjacent property would be needed.

B. Another approach to preliminary estimation of land acquisition costs would be to use recent sales data. An average (median or mean) cost per square foot for land to be acquired can be used here, based on market trends in the Leeward O‘ahu region. Data were downloaded for vacant land sales in the ‘Ewa District (including much of Central O‘ahu as well as the ‘Ewa Development Plan Area) from 2006 onwards.



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Price per Square Foot, Vacant Land Sold in Leeward O‘ahu

	Number of sales	Mean Price/sf	Median Price/sf
Sold 2006-May 2010			
All Properties	190	\$52.63	\$47.47
Residential	104	\$71.09	\$73.26
Commercial	17	\$26.63	\$21.00
Industrial	54	\$37.74	\$37.07
Agriculture	7	\$1.52	\$0.44
Conservation	4	\$0.57	\$0.54
Resort	1	\$68.67	\$68.67
Sold 2009-2010			
All Properties	114	\$63.63	\$59.83
Residential	79	\$77.26	\$83.71
Commercial	3	\$16.21	\$1.28
Industrial	23	\$43.41	\$47.47
Agriculture	3	\$0.98	\$0.44
Conservation	3	\$0.37	\$0.06
Resort	1	\$68.67	\$68.67

Notes: Calculations are of price per square foot of sales. Data set contained sales of 5,000 or more square feet, for \$5,000 or more, excluding sales of portions of Tax Map Keys or of multiple Tax Map Keys. Subcategories are “PITT” categories assigned by Real Property assessors to reflect current highest and best use.

Source: Download from Hawaii Information Service, Inc. by Belt Collins Hawaii, June 11, 2010.

The following trends are obvious:

- Agricultural and Conservation lands are valued at a much lower price than urban lands.
- Prices rose during the period, so prices before 2009 are not a strong indicator of current prices. However, the number of recent commercial sales is too low for the 2009-2010 data to be used as an indicator.

For land in agricultural or undeveloped acreage, the average price might be about \$0.44/square foot. For land in developed commercial areas, i.e., additions to existing rights-of-way through commercial precincts, the average price could climb to \$21.00/square foot. The following table indicates that the total land acquisition cost could exceed \$15 million, if these figures for acquisition of part of the right of way for existing roads.



MEMORANDUM

Potential Cost of Land Acquisition, Using Mixed Bases

Project Number	Name	ROW Area (sf)		Basis	Possible Value
		Total	Share [1]		
1	Kapolei Pkwy. To Aliinui	670,720	100%	TMK	\$1,533,338
2a	Hanua Ext	400,000	100%	TMK	\$386,488
2b	St. Harbor Road	510,000	100%	TMK	\$1,165,914
3a	KIC, Phase 2		100%	Owner	\$2,000,000
3b	KIC, Phase 3		100%	Owner	\$800,000
3c	KIC, Phase 4		100%	Owner	\$750,000
4	Kapolei Pkwy Ext	214,600	100%	TMK	\$4,022,724
5	Fort Barrette Road	778,800	25%	Sales	\$4,088,700
6	Farrington Hway	1,705,200	20%	Sales	\$150,058
7	NS Ext to Roosevelt	146,280	100%	TMK	\$204,847
					<u>\$15,102,069</u>

NOTES: Preliminary estimates for discussion only

[1] Share of ROW to be acquired not based on survey.

3. Escalation

To avoid the problems experienced with the first version of the 'Ewa Transportation Impact Fee Program, we want to include in the amended ordinance not only new construction costs and impact fees, but also an escalation factor, so that fees estimated in 2010 will bear a reasonable relationship to fees and costs later in the lifetime of the program. The aim is to identify an independently-produced indicator that can be used regularly to adjust anticipated costs and hence to adjust impact fees during the period from 2011 to the next revision of the program.

Two methodological problems need to be addressed: (a) Do we have a good indicator of changing prices of highway construction? And (b) What is the period for which escalation is calculated?

A. Choice of Indicator

Several cost series were reviewed. All have limitations:

- The Federal Highway Administration's price trend series (FHWA-45) was discontinued in 2006, and has not been replaced.
- The Consumer Price Index for Honolulu is calculated by the Federal Bureau of Labor Statistics. It deals with consumer items, not highway construction.
- The State Department of Business, Economic Development and Tourism (DBEDT) has continued Honolulu construction cost series originated by First Hawaiian Bank. The series deal with single family and high-rise building construction, not highway construction.

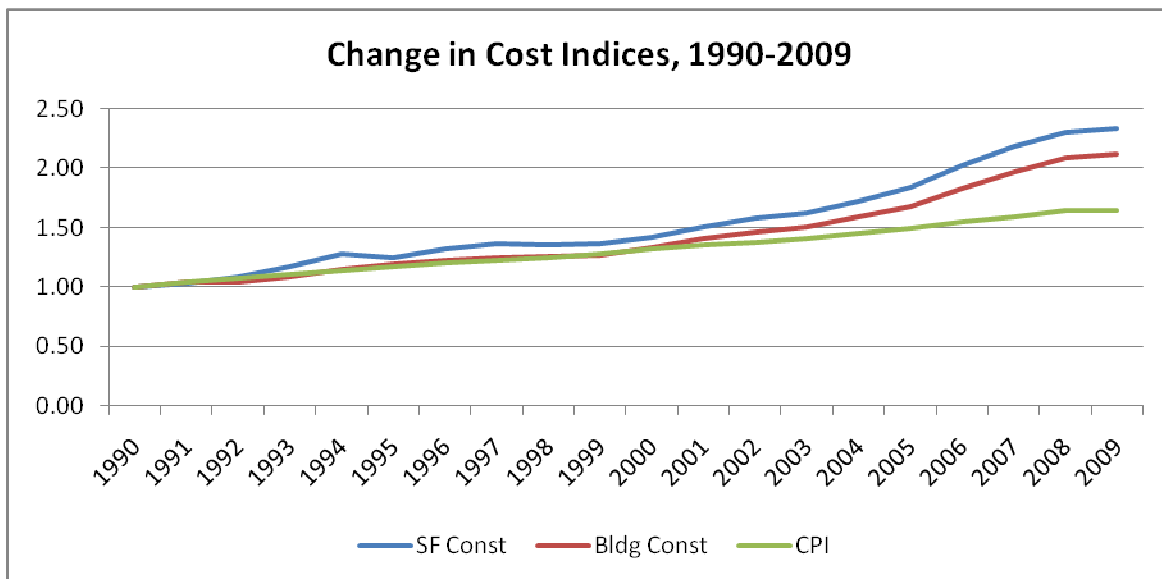


MEMORANDUM

- Engineering News-Record (ENR) construction cost index and building cost index, for 20 US cities and for Los Angeles (as the closest city to Honolulu in their sample). These series are for mainland construction.

Presumably, an index that is local and deals with large-scale construction is more appropriate than others, so the obvious index to use in the DBEDT index for high-rise buildings.

The three local indices show much the same trends, but slightly different escalation rates:



Note: For ease of comparison, 1990 value for each index converted to 1.0; later annual values hence expressed in relation to the 1990 value.

Source: DBEDT, Quarterly Statistical and Economic Report, 2010 Quarter 2 (May 2010) posted at http://hawaii.gov/dbedt/info/economic/data_reports/qser.

The high-rise building index turns out to be the middle one in terms of growth rate. Its growth averaged 4.0% annually from 1990 to 2009 (vs. 4.6% for single-family construction, and 2.6% for the Consumer Price Index). Both the correlation among the indices and the mid-range position of the high-rise trend makes it seem reasonable to use this for our purposes.

The national ENR cost index rose during the period shown by 81%, while the Los Angeles index rose by 63%. These indices' long term rates of change are then closer to the Honolulu CPI (which rose by 67%) than to Honolulu construction cost indices. Accordingly, the local high-rise building index appears more useful than these indicators.

Land Use Research Foundation members have expressed some concern about the use of a *building cost* indicator to estimate changes in *roadway costs*. That's a good point. The building cost indices include the cost of items (e.g., roofing shingles, plasterers' wages) that are not part of roadway costs. The high rise index includes some important categories for roadways (reinforcing steel, heavy equipment



MEMORANDUM

operators' wages) that are absent in the single-family index. Still, a building cost indicator will miss some factors important in roadway costs, such as asphalt prices.

We do not have a database of costs for Honolulu roadway construction that could be used to track historical changes and anticipate future ones. To create such a database and a new index, we could (a) develop a list of components for roadway construction costs, (b) use some of the historical data that DBEDT has included in the construction cost indices, (c) request bid sheets from DOT for at least a ten-year period, and (d) draw on them for the other components. To use the indicator, someone would have to compile the data regularly and update the indicator annually. This would be a whole new research project. We suggest that the high-rise construction cost index be used for now, and that the next update of the Impact Fee include, as one of its tasks, a review of the index as compared to roadway construction cost changes.

B. Escalation period

The obvious approach is to update the fees annually, using a standard index. The indices shown above are posted on a quarterly basis, so they can be updated on a quarterly or annual basis. The annual index is posted in the first quarter report, published in February. It could be used in a recalculated fee as of March 1 if no legislative action is needed. If we want to apply the factor as of January 1 each year, we would simply use change over a year's time for the most recently reported quarter (e.g., q3 2009 vs. q3 2008).

This procedure assures that escalation will be out of date, lagging by about a year when it is applied. If we expect construction costs to rise, this means that escalation will underestimate future costs. If construction costs are falling, the escalation factor, based on earlier trends, will increase fees at first, and decrease later. It seems reasonable to expect costs to rise more often than they fall. In that case, the lag between the calculated escalation rate and actual price trends can spur agencies to spend fees quickly.

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APPENDIX E:
YEAR 2015 REVISED COST ESTIMATES

Kapolei Interchange Complex

Makakilo

Phase 1

Total Cost=\$26.6 million
Federal Share=\$20.5 million
Total Appropriated=\$20.5 million

Phase 2B

Total Cost=\$17.26 million
Federal Share=\$14.2 million
Total Appropriated=\$0.6 million

Phase 4A

Total Cost=\$XX.X million
Federal Share=\$XX.X million

Phase 4B

Total Cost=\$XX.X million
Federal Share=\$XX.X million

Phase 3

Total Cost=\$XX.X million
Federal Share=\$XX.X million

Phase 4C

Total Cost=\$XX.X million
Federal Share=\$XX.X million

Phase 2A

Total Cost=\$14.0 million
Federal Share=\$11.2 million
Total Appropriated=\$11.2 million

The City of Kapolei

Kapolei Parkway

Kalaeloa Harbor

Kalaeloa Boulevard

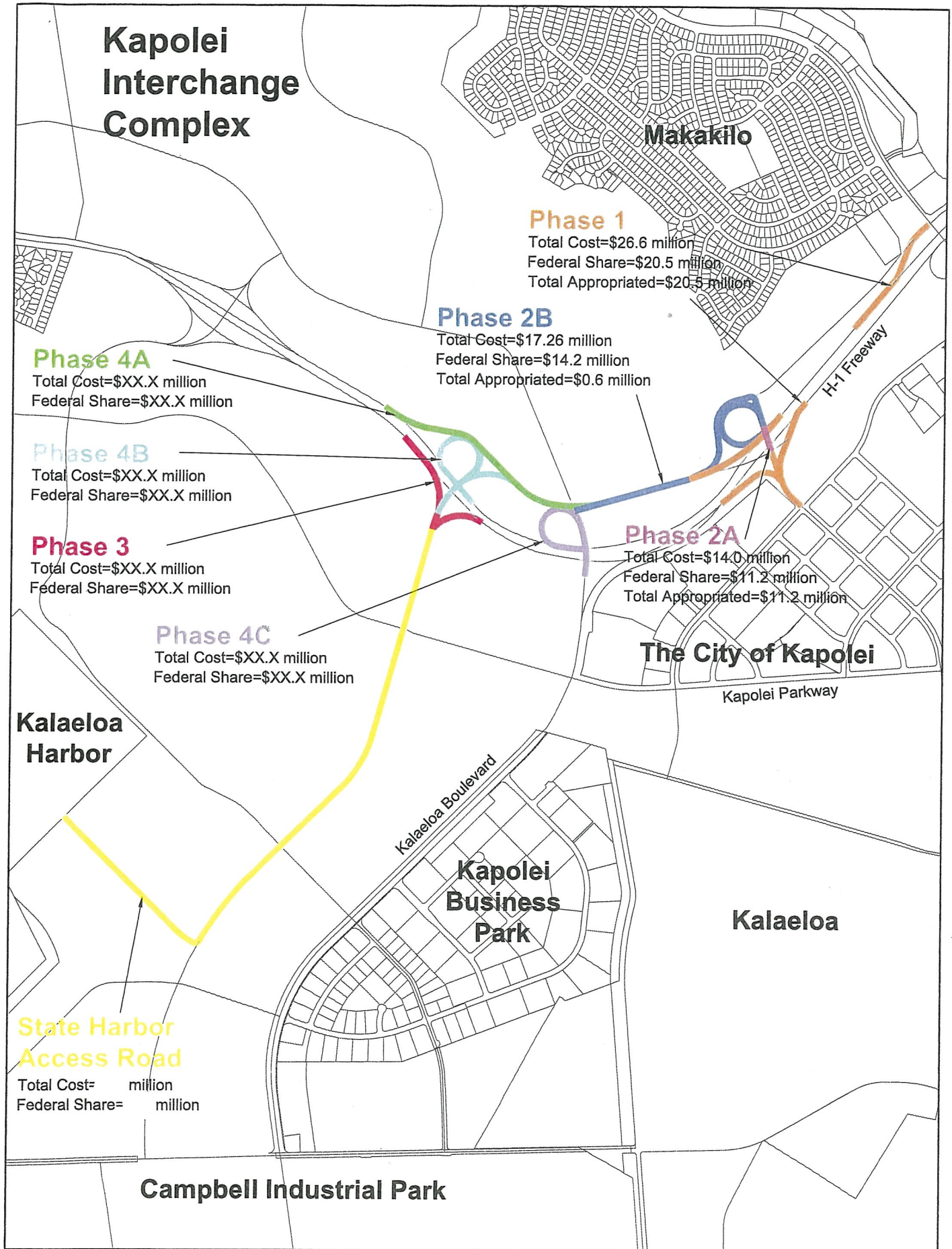
Kapolei Business Park

Kalaeloa

State Harbor Access Road

Total Cost= million
Federal Share= million

Campbell Industrial Park



KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
PRELIMINARY COST ESTIMATES
BACKBONE INFRASTRUCTURE
SUMMARY

September 19, 2014

STATE HARBOR ACCESS ROAD - BACKBONE INFRASTRUCTURE		
	AREA (AC)	AMOUNT
KAPOLEI PARKWAY TO OR&L R/W SEGMENT	1.4	\$ 3,947,537.00
OR&L R/W SEGMENT	0.1	\$ 911,982.00
OR&L R/W TO HANUA ST. EXTENSION SEGMENT	11.1	\$ 37,376,950.00
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT	3.7	\$ 20,368,140.00
TOTAL	16.3	\$ 62,604,609.00

Notes:

1. Subtotal amount of the State Harbor Access Road segment between Kapolei Parkway and the OR&L R/W obtained from Mitsunaga & Associates, Inc., dated June 2012. A 10% cost escalation is applied to the subtotal to obtain Year 2014 total amount.
2. Cost estimates excludes all electrical relocation/reconnection improvements.
3. Roadway earthwork quantities measured up to subgrades.
4. Cost estimates of the Kapolei Harborside East-West Segment include 1 backbone roadway culvert crossing through Harborside Channel.

State Harbor Access Road
Kapolei, Oahu, Hawaii
MAI Project No. 1358-01-C

Mitsunaga & Associates, Inc.
Date: June 2012

Civil Engineering

Item No.	Item	Qty	Unit	Unit Price	Labor Cost	Total Price
DEMOLITION						
1	Clearing & Grubbing	1.38	AC	\$ 2,500.00		\$ 3,450.00
2	Demolition and Removal	0	LS	\$ -		\$ -
3	Removal Asphalt Concrete	0	SY	\$ 15.00		\$ -
4	Removal Chainlink Fence	0	LF	\$ 6.00		\$ -
SUBTOTAL DEMOLITION						\$ 3,450.00
SITE IMPROVEMENTS						
5	Temporary Erosion Control Measures, In Place Complete	1	LS	\$ 7,500.00		\$ 7,500.00
6	Roadway Excavation	7,600	CY	\$ 40.00		\$ 304,000.00
7	Site Grading	60,480	SF	\$ 1.50		\$ 90,720.00
8	Concrete Sidewalk/Slab, 4-Inches Thick, In Place Complete	10,050	SF	\$ 12.00		\$ 120,600.00
9	Concrete Curb	985	LF	\$ 25.00		\$ 24,625.00
10	Concrete Curb & Gutter	1,000	LF	\$ 40.00		\$ 40,000.00
11	12" PCC Pavement	1,350	CY	\$ 450.00		\$ 607,500.00
12	6" Untreated Permeable Base	650	CY	\$ 100.00		\$ 65,000.00
13	18" Aggregate Subbase	2,400	CY	\$ 60.00		\$ 144,000.00
14	Permeable Separator	3,500	SY	\$ 5.00		\$ 17,500.00
15	6" Perforated Sub-drain	1,000	LF	\$ 30.00		\$ 30,000.00
16	Cleanout	4	EA	\$ 650.00		\$ 2,600.00
17	Pavement Markings & Striping	1	LS	\$ 15,000.00		\$ 15,000.00
SUBTOTAL SITE IMPROVEMENTS						\$ 1,469,045.00
DRAINAGE SYSTEM						
18	18-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	186	LF	\$ 150.00		\$ 27,900.00
19	30-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	475	LF	\$ 210.00		\$ 99,750.00
20	Catch Basin	4	EA	\$ 9,500.00		\$ 38,000.00
	Connect to Exist. 84-inch Drainline	1	LS	\$ 14,500.00		\$ 14,500.00
21	Drain Manhole, In Place Complete	1	EA	\$ 6,500.00		\$ 6,500.00
SUBTOTAL DRAINAGE SYSTEM						\$ 186,650.00
WATER SYSTEM						
22	12-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete		LF	\$ 115.00		\$ -
23	16-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	502	LF	\$ 140.00		\$ 70,280.00
24	6-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	120	LF	\$ 90.00		\$ 10,800.00
25	Fire Hydrant Assembly	2	EA	\$ 7,500.00		\$ 15,000.00
26	ARV/Box	2	EA	\$ 4,500.00		\$ 9,000.00
27	16-inch Butterfly Valve/Box	1	EA	\$ 25,000.00		\$ 25,000.00
28	12-inch Gate Valve/Box		EA	\$ 8,500.00		\$ -
29	6-inch Gate Valve/Box	2	EA	\$ 6,200.00		\$ 12,400.00
30	Chlorination & Testing	1	LS	\$ 8,000.00		\$ 8,000.00
SUBTOTAL WATER SYSTEM						\$ 150,480.00

State Harbor Access Road
Kapolei, Oahu, Hawaii
MAI Project No. 1358-01-C

Mitsunaga & Associates, Inc.
Date: June 2012

Civil Engineering

Item No.	Item	Qty	Unit	Unit Price	Labor Cost	Total Price
NON-POTABLE WATER SYSTEM						
31	12-Inch Water Line, Including Trench Excavation and Backfill,	502	LF	\$ 115.00		\$ 57,730.00
32	16-Inch Water Line, Including Trench Excavation and Backfill,		LF	\$ 140.00		\$ -
33	24-Inch Water Line, Including Trench Excavation and Backfill,		LF	\$ 190.00		\$ -
34	ARV/Box	2	EA	\$ 4,500.00		\$ 9,000.00
35	24-inch Butterfly Valve/Box		EA	\$ 32,000.00		\$ -
36	16-inch Butterfly Valve/Box		EA	\$ 26,000.00		\$ -
37	12-inch Gate Valve/Box	1	EA	\$ 8,500.00		\$ 8,500.00
38	Chlorination & Testing	1	LS	\$ 8,000.00		\$ 8,000.00
SUBTOTAL NON-POTABLE WATER SYSTEM						\$ 83,230.00
WASTEWATER SYSTEM						
39	12-Inch Sewer Line, Including Trench Excavation and Backfill,	502	LF	\$ 105.00		\$ 52,710.00
40	24-Inch Sewer Line, Including Trench Excavation and Backfill,		LF	\$ 160.00		\$ -
41	Sewer Manhole	6	EA	\$ 6,800.00		\$ 40,800.00
SUBTOTAL WASTEWATER SYSTEM						\$ 93,510.00
SITE WORK SUBTOTAL						\$ 1,986,365.00

LANDSCAPING						
1	Irrigation	7,000	SF	\$ 1.50		\$ 10,500.00
2	Centipede Grass	7,000	SF	\$ 0.65		\$ 4,550.00
3	2" Layer Soil Amendment	7,000	SF	\$ 0.50		\$ 3,500.00
4	4" Layer Imported Top Soil	90	CY	\$ 45.00		\$ 4,050.00
5	1 Year Maintenance	1	LS	\$ 2,000.00		\$ 2,000.00
LANDSCAPING SUBTOTAL						\$ 9,550.00

ELECTRICAL IMPROVEMENTS						
1	Electrical Infrastructure	1	LS	\$ 1,592,755.00		\$ 1,592,755.00
SUBTOTAL ELECTRICAL IMPROVEMENTS						\$ 1,592,755.00
SUBTOTAL KAPOLEI PARKWAY TO OR&L R/W SEGMENT						\$ 3,588,670.00
COST ESCALATION PERCENTAGE (10%)						\$ 358,867.00
TOTAL (2014 AMOUNT)						\$ 3,947,537.00

RMTC Remarks & Cost Revisions

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
<p>The prices herein for the following items shall include all materials, labor, tools, equipment, machinery, and all incidentals necessary to install or construct these items, in place complete, all in accordance with the plans and specifications.</p> <p>A. GRADING AND ROADWAY CONSTRUCTION</p>				
1	0.1 Acres,	Clearing and grubbing, in place complete.	\$ 5,500.00	\$ 550.00
2	1,000 Cu. Yds.,	Excavation, in place complete.	\$ 10.00	\$ 10,000.00
3	1 Lump Sum,	Grading permit fee	\$ 612.00	\$ 612.00
4	Ea., Construction Road Ingress/Egress including crushed rock and 1 geotextile fabric,	in place complete.	\$ 6,500.00	\$ 6,500.00
5	350 Lin. Ft.,	Compose filter sock, in place complete.	\$ 6.50	\$ 2,275.00
6	0.1 Acres,	Dust Control, in place complete.	\$ 3,000.00	\$ 300.00
7	110 Cu. Yds.,	PCC pavement, 12" thick, in place complete.	\$ 660.00	\$ 72,600.00
8	Cu. Yds., Untreated permeable base, 6" thick, in place 60 complete.		\$ 140.00	\$ 8,400.00
9	Cu. Yds., Aggregate subbase course, 18" thick, in place 170 complete.		\$ 125.00	\$ 21,250.00
10	330 Sq. Yds.,	Permeable separator, 6" thick, in place complete.	\$ 5.00	\$ 1,650.00
11	70 Lin. Ft.,	6" perforated sub-drain, in place complete.	\$ 32.00	\$ 2,240.00
12	64 Lin. Ft.,	Concrete curb & gutter, in place complete.	\$ 50.00	\$ 3,200.00
13	64 Lin. Ft.,	Concrete curb, in place complete.	\$ 30.00	\$ 1,920.00
14	1,100 Sq. Ft.,	Concrete sidewalk, 4" thick, in place complete.	\$ 11.00	\$ 12,100.00
15	Ea., Traffic regulatory sign, including post or bracket, in place 4 complete.		\$ 400.00	\$ 1,600.00
16	Lin. Ft., 4" Wide White Lane Lines w/ Type "C" markers, in place 130 complete.		\$ 1.50	\$ 195.00
17	Lin. Ft., 4" Wide Yellow Lines w/ Type "H" Markers, in place 260 complete.		\$ 1.50	\$ 390.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
18	1	Lump Sum, Railroad precast reinforced concrete crossing unit with new inner rails and asphalt filler, inclusive of concrete, rebar, bedding, and geotextile fabric, in place complete.	\$ 180,000.00	\$ 180,000.00
19	1	Lump Sum, Reconstruct railroad tracks, inclusive of new rails, geotextile fabric, geogrid, screened coral, and aggregate base, in place complete.	\$ 100,000.00	\$ 100,000.00
20	1	Lump Sum, Railroad grade crossing system, including metering equipment, electrical equipment, and mounting hardware, in place complete and operational.	\$ 200,000.00	\$ 200,000.00
21	1	Lump Sum, Railroad operation down time.	\$ 30,000.00	\$ 30,000.00
22	1	Lump Sum, Construction stakeout for mass grading, in place complete.	\$ 500.00	\$ 500.00
23	1	Lump Sum, Construction stakeout for roadway and utilities, in place complete.	\$ 2,000.00	\$ 2,000.00
24	1	Lump Sum, Mobilization, demobilization, and field office.	\$ 10,000.00	\$ 10,000.00
TOTAL FOR ROADWAY CONSTRUCTION (Items 1 to 24, inclusive)				\$ 668,282.00

B. POTABLE WATER SYSTEM

25	40	Lin. Ft., 16" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 160.00	\$ 6,400.00
26	1	LS., Short body cast iron fittings, in place complete.	\$ 1,500.00	\$ 1,500.00
27	2	Ea., Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 64,800.00
TOTAL FOR POTABLE WATER SYSTEM (Items 25 to 27, inclusive)				\$ 72,700.00

KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W SEGMENT
PRELIMINARY COST ESTIMATES

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
C. NON-POTABLE WATER SYSTEM				
28	40	Lin. Ft., 12" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 130.00	\$ 5,200.00
29	1	LS., Short body cast iron fittings, in place complete.	\$ 1,000.00	\$ 1,000.00
30	2	Ea., Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 64,800.00
TOTAL FOR NON-POTABLE WATER SYSTEM (Items 28 to 30, inclusive)				\$ 71,000.00
D. ELECTRICAL IMPROVEMENTS				
31	1	LS., Infrastructure improvements	\$ 100,000.00	\$ 100,000.00
TOTAL FOR ELECTRICAL IMPROVEMENTS (Item 31, inclusive)				\$ 100,000.00
SUMMARY				
STATE HARBOR ACCESS ROAD OR&L R/W SEGMENT PRELIMINARY COST ESTIMATES				
A. GRADING AND ROADWAY CONSTRUCTION (Items 1 to 24, inclusive)				\$ 668,282.00
B. POTABLE WATER SYSTEM (Items 25 to 27, inclusive)				\$ 72,700.00
C. NON-POTABLE WATER SYSTEM (Items 28 to 30, inclusive)				\$ 71,000.00
D. ELECTRICAL IMPROVEMENTS (Item 31, inclusive)				\$ 100,000.00
TOTAL (A TO D inclusive)				\$ 911,982.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
<p>The prices herein for the following items shall include all materials, labor, tools, equipment, machinery, and all incidentals necessary to install or construct these items, in place complete, all in accordance with the plans and specifications.</p> <p>A. GRADING AND ROADWAY CONSTRUCTION</p>				
1	11.1 Acres,	Clearing and grubbing, in place complete.	\$ 5,500.00	\$ 61,050.00
2	97,000 Cu. Yds.,	Excavation, in place complete.	\$ 10.00	\$ 970,000.00
3	3,000 Cu. Yds.,	Embankment, in place complete. On-site processing and hauling of excavated material.	\$ 4.00	\$ 12,000.00
4	1 Lump Sum,	Grading permit fee	\$ 3,300.00	\$ 3,300.00
5	1 Ea.,	Construction Road Ingress/Egress including crushed rock and geotextile fabric, in place complete.	\$ 6,500.00	\$ 6,500.00
6	70 Ea.,	Sediment control filter at catch basin, in place complete.	\$ 700.00	\$ 49,000.00
7	6,000 Lin. Ft.,	Compose filter sock, in place complete.	\$ 6.50	\$ 39,000.00
8	11.1 Acres,	Dust Control, in place complete.	\$ 3,000.00	\$ 33,300.00
9	13,200 Cu. Yds.,	PCC pavement, 12" thick, in place complete.	\$ 660.00	\$ 8,712,000.00
10	6,600 Cu. Yds.,	Untreated permeable base, 6" thick, in place complete.	\$ 140.00	\$ 924,000.00
11	20,000 Cu. Yds.,	Aggregate subbase course, 18" thick, in place complete.	\$ 125.00	\$ 2,500,000.00
12	40,000 Sq. Yds.,	Permeable separator, 6" thick, in place complete.	\$ 5.00	\$ 200,000.00
13	7,800 Lin. Ft.,	6" perforated sub-drain, in place complete.	\$ 32.00	\$ 249,600.00
14	7,800 Lin. Ft.,	Concrete curb & gutter, in place complete.	\$ 50.00	\$ 390,000.00
15	7,300 Lin. Ft.,	Concrete curb, in place complete.	\$ 30.00	\$ 219,000.00
16	125,000 Sq. Ft.,	Concrete sidewalk, 4" thick, in place complete.	\$ 11.00	\$ 1,375,000.00
17	120 Ea.,	Traffic regulatory sign, including post or bracket, in place complete.	\$ 400.00	\$ 48,000.00
18	31,000 Lin. Ft.,	4" Wide White Lane Lines w/ Type "C" markers, in place complete.	\$ 1.50	\$ 46,500.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
19	41,000	Lin. Ft., 4" Wide Yellow Lines w/ Type "H" Markers, in place complete.	\$ 1.50	\$ 61,500.00
20	1	Lump Sum, Construction stakeout for mass grading, in place complete.	\$ 15,000.00	\$ 15,000.00
21	1	Lump Sum, Construction stakeout for roadway and utilities, in place complete.	\$ 200,000.00	\$ 200,000.00
22	1	Lump Sum, Mobilization, demobilization, and field office.	\$ 600,000.00	\$ 600,000.00
TOTAL FOR ROADWAY CONSTRUCTION (Items 1 to 22, inclusive)				\$ 16,714,750.00
<u>B. STORM DRAIN SYSTEM</u>				
23	130	Lin. Ft., 10' X 4' Box drain, including excavation, backfill and cushion, in place complete.	\$ 1,200.00	\$ 156,000.00
24	300	Lin. Ft., 10' X 4' Box drain, including excavation, backfill and cushion, in place complete.	\$ 850.00	\$ 255,000.00
25	1,000	Lin. Ft., 36" Standard reinforced concrete drain pipe within Public System, Class III, 10.00' to 11.99' deep, including excavation, backfill and pipe cushion, in place complete.	\$ 250.00	\$ 250,000.00
26	1,000	Lin. Ft., 30" Standard reinforced concrete drain pipe within Public System, Class III, 10.00' to 11.99' deep, including excavation, backfill and pipe cushion, in place complete.	\$ 220.00	\$ 220,000.00
27	8,300	Lin. Ft., 24" Standard reinforced concrete drain pipe within Public System, Class III, 8.00' to 9.99' deep, including excavation, backfill and pipe cushion, in place complete.	\$ 180.00	\$ 1,494,000.00
28	12	Ea., Standard state catch basin within DOT system, from top to invert 6.00' to 7.99' deep, including excavation and backfill, in place complete	\$ 10,000.00	\$ 120,000.00
29	30	Ea., Standard state catch basin within DOT system, from top to invert 8.00' to 9.99' deep, including excavation and backfill, in place complete	\$ 12,000.00	\$ 360,000.00
30	28	Ea., Standard state catch basin within DOT system, from top to invert 10.00' to 11.99' deep, including excavation and backfill, in place complete	\$ 14,000.00	\$ 392,000.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
31	Ea., Standard state drain manhole within DOT System, from top to invert 8.00' to 9.99' deep, including excavation and backfill, in 5 place complete		\$ 13,000.00	\$ 65,000.00
32	Ea., Standard state drain manhole within DOT System, from top to invert 10.00' to 11.99' deep, including excavation and backfill, in 6 place complete		\$ 15,000.00	\$ 90,000.00
33	Ea., Special drain manhole, from top to invert 10.00' to 11.99' 3 deep, including excavation and backfill, in place complete		\$ 22,000.00	\$ 66,000.00
TOTAL FOR STORM DRAIN SYSTEM (Items 23 to 33, inclusive)				\$ 3,468,000.00

C. POTABLE WATER SYSTEM

34	Lin. Ft., 16" PVC class 150 water pipe, including trenching, pipe 4,000 cushion, backfill, and other incidentals, in place complete.		\$ 160.00	\$ 640,000.00
35	Lin. Ft., 12" PVC class 150 water pipe, including trenching, pipe 400 cushion, backfill, and other incidentals, in place complete.		\$ 130.00	\$ 52,000.00
36	Ea., Valve box for 3/4" ARV, including cast iron frame and cover, in 6 place complete.		\$ 1,800.00	\$ 10,800.00
37	15 Ea., 16" BGGV W/3" by-pass, in place complete.		\$ 22,000.00	\$ 330,000.00
38	10 Ea., 12" Gate valve, in place complete.		\$ 2,500.00	\$ 25,000.00
39	Ea. 3/4" Air relief valve, including appurtenances, in place 6 complete.		\$ 1,400.00	\$ 8,400.00
40	Ea., Type "A" MH for 16" BGGV, including 2 capping collars, 15 frame, cover and concrete mh, in place complete.		\$ 21,900.00	\$ 328,500.00
41	Ea., Valve box for 12" gate valve, including cast iron frame and 10 cover, pipe chimney and concrete anchor block, in place complete.		\$ 1,300.00	\$ 13,000.00
42	15 Ea., 16" DI adaptors, FxB, 3'-0" long, in place complete.		\$ 1,130.00	\$ 16,950.00
43	15 Ea., 16" Flanged Dismantling joint, in place complete.		\$ 1,960.00	\$ 29,400.00
44	12 Ea., Concrete Beam with Reverse Bell, in place complete.		\$ 7,500.00	\$ 90,000.00
45	15 Ea., 16" Cap w/4" IPT, in place complete.		\$ 1,650.00	\$ 24,750.00
46	1 LS., Short body cast iron fittings, in place complete.		\$ 150,000.00	\$ 150,000.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
47	Ea., 6	Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 194,400.00
TOTAL FOR POTABLE WATER SYSTEM (Items 34 to 47, inclusive)				\$ 1,913,200.00
<u>D. NON-POTABLE WATER SYSTEM</u>				
48	4,200	Lin. Ft., 12" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 130.00	\$ 546,000.00
49	200	Lin. Ft., 8" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 90.00	\$ 18,000.00
50	Ea., 8	Type "D" water lateral with Type "III" meter box, in place complete.	\$ 5,200.00	\$ 41,600.00
51	12 Ea.,	12" Gate valve, Class 150, in place complete.	\$ 2,500.00	\$ 30,000.00
52	6 Ea.,	8" Gate valve, Class 150, in place complete.	\$ 1,800.00	\$ 10,800.00
53	Ea., 12	Valve box for 12" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 1,300.00	\$ 15,600.00
54	Ea., 6	Valve box for 8" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 700.00	\$ 4,200.00
55	12 Ea.,	Concrete Beam with Reverse Bell, in place complete.	\$ 7,500.00	\$ 90,000.00
56	1	LS., Short body cast iron fittings, in place complete.	\$ 120,000.00	\$ 120,000.00
57	Ea., 4	Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 129,600.00
TOTAL FOR NON-POTABLE WATER SYSTEM (Items 48 to 57, inclusive)				\$ 1,005,800.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
<u>E. SANITARY SEWER SYSTEM</u>				
58	200	Lin. Ft., 8" VCP sewer pipe, from finish grade to invert, 8.00' to 9.99' deep, including fittings, excavation and backfill, in place complete.	\$ 90.00	\$ 18,000.00
59	1	Ea., Standard City and County plain sewer manhole, from top to invert 8.00' to 9.99' deep, including excavation and backfill, in place complete.	\$ 13,000.00	\$ 13,000.00
60	250	Lin. Ft., 24" HOBAS (Fiberglass Reinforced Polymer Mortar Pipe) for off-site sewer pipe, from finish grade to invert, 32.00' to 33.99' deep, including fittings, excavation and backfill, in place complete.	\$ 460.00	\$ 115,000.00
61	1	Ea., Special sewer manhole for off-site sewer, from top to invert 32.00' to 33.99' deep, including excavation and backfill, in place complete.	\$ 36,000.00	\$ 36,000.00
62	450	Lf., Crushed rock sewer cradle	\$ 46.00	\$ 20,700.00
TOTAL FOR SANITARY SEWER SYSTEM (Items 58 to 62, inclusive)				\$ 202,700.00
<u>F. ELECTRICAL IMPROVEMENTS</u>				
63	1	LS., Infrastructure improvements	\$ 13,500,000.00	\$ 13,500,000.00
TOTAL FOR ELECTRICAL IMPROVEMENTS (Item 63, inclusive)				\$ 13,500,000.00
<u>G. LANDSCAPE AND IRRIGATION SYSTEM</u>				
64	65,000	Sq. Ft., Zoysia "El Toro", stolons, 10 bushels per 1,000 sf w/ hydromulch cover	\$ 1.00	\$ 65,000.00
65	21,000	Lin. Ft., "Tygar" biobarrier, 19-1/2" Min. width	\$ 10.00	\$ 210,000.00
66	1	LS., 90 Day Maintenance Period, includes watering for grass & trees.	\$ 70,000.00	\$ 70,000.00
67	65,000	Sq. Ft., Automatic irrigation system, includes pipes, heads, backflow preventer, control valves, irrigation controller, wires & incidentals, in place complete.	\$ 3.50	\$ 227,500.00
TOTAL FOR LANDSCAPE AND IRRIGATION SYSTEM (Items 64 to 67, inclusive)				\$ 572,500.00

KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
OR&L R/W TO HANUA ST. EXTENSION SEGMENT
PRELIMINARY COST ESTIMATES

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
SUMMARY				
STATE HARBOR ACCESS ROAD OR&L R/W TO HANUA ST. EXTENSION SEGMENT PRELIMINARY COST ESTIMATES				
A. GRADING AND ROADWAY CONSTRUCTION (Items 1 to 22, inclusive)				<u>\$ 16,714,750.00</u>
B. STORM WATER SYSTEM (Items 23 to 33, inclusive)				<u>\$ 3,468,000.00</u>
C. POTABLE WATER SYSTEM (Items 34 to 47, inclusive)				<u>\$ 1,913,200.00</u>
D. NON-POTABLE WATER SYSTEM (Items 48 to 57, inclusive)				<u>\$ 1,005,800.00</u>
E. SANITARY SEWER SYSTEM (Items 58 to 62, inclusive)				<u>\$ 202,700.00</u>
F. ELECTRICAL IMPROVEMENTS (Item 63, inclusive)				<u>\$ 13,500,000.00</u>
G. LANDSCAPE AND IRRIGATION SYSTEM (Items 64 to 67, inclusive)				<u>\$ 572,500.00</u>
TOTAL (A TO G inclusive)				<u>\$ 37,376,950.00</u>

KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
<p>The prices herein for the following items shall include all materials, labor, tools, equipment, machinery, and all incidentals necessary to install or construct these items, in place complete, all in accordance with the plans and specifications.</p> <p>A. GRADING AND ROADWAY CONSTRUCTION</p>				
1	3.7 Acres,	Clearing and grubbing, in place complete.	\$ 5,500.00	\$ 20,350.00
2	31,000 Cu. Yds.,	Excavation, in place complete.	\$ 10.00	\$ 310,000.00
3	5,000 Cu. Yds.,	Embankment, in place complete. On-site processing and hauling of excavated material.	\$ 4.00	\$ 20,000.00
4	1 Lump Sum,	Grading permit fee	\$ 1,500.00	\$ 1,500.00
5	1 Ea.,	Construction Road Ingress/Egress including crushed rock and geotextile fabric, in place complete.	\$ 6,500.00	\$ 6,500.00
6	36 Ea.,	Sediment control filter at catch basin, in place complete.	\$ 700.00	\$ 25,200.00
7	3,500 Lin. Ft.,	Compose filter sock, in place complete.	\$ 6.50	\$ 22,750.00
8	3.7 Acres,	Dust Control, in place complete.	\$ 3,000.00	\$ 11,100.00
9	3,200 Cu. Yds.,	PCC pavement, 12" thick, in place complete.	\$ 660.00	\$ 2,112,000.00
10	1,600 Cu. Yds.,	Untreated permeable base, 6" thick, in place complete.	\$ 140.00	\$ 224,000.00
11	4,800 Cu. Yds.,	Aggregate subbase course, 18" thick, in place complete.	\$ 125.00	\$ 600,000.00
12	10,000 Sq. Yds.,	Permeable separator, 6" thick, in place complete.	\$ 5.00	\$ 50,000.00
13	3,700 Lin. Ft.,	6" perforated sub-drain, in place complete.	\$ 32.00	\$ 118,400.00
14	3,700 Lin. Ft.,	Concrete curb & gutter, in place complete.	\$ 50.00	\$ 185,000.00
15	20,000 Sq. Ft.,	Concrete sidewalk, 4" thick, in place complete.	\$ 11.00	\$ 220,000.00
16	60 Ea.,	Traffic regulatory sign, including post or bracket, in place complete.	\$ 400.00	\$ 24,000.00
17	3,700 Lin. Ft.,	4" Wide White Lane Lines w/ Type "C" markers, in place complete.	\$ 1.50	\$ 5,550.00
18	7,300 Lin. Ft.,	4" Wide Yellow Lines w/ Type "H" Markers, in place complete.	\$ 1.50	\$ 10,950.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
19	1	Lump Sum, Construction stakeout for mass grading, in place complete.	\$ 5,000.00	\$ 5,000.00
20	1	Lump Sum, Construction stakeout for roadway and utilities, in place complete.	\$ 100,000.00	\$ 100,000.00
21	1	Lump Sum, Mobilization, demobilization, and field office.	\$ 300,000.00	\$ 300,000.00
TOTAL FOR ROADWAY CONSTRUCTION (Items 1 to 21, inclusive)				\$ 4,372,300.00
B. STORM DRAIN SYSTEM				
22	600	Lin. Ft., 25' X 10' Box culvert, including excavation, backfill and culvert cushion, in place complete.	\$ 8,900.00	\$ 5,340,000.00
23	2	Ea., Concrete inlet and outlet headwall, including excavation, backfill and pipe cushion, in place complete.	\$ 300,000.00	\$ 600,000.00
24	120	Lin. Ft., 10' X 6' Box drain, including excavation, backfill and cushion, in place complete.	\$ 1,400.00	\$ 168,000.00
25	600	Lin. Ft., 6' X 4' Box drain, including excavation, backfill and cushion, in place complete.	\$ 850.00	\$ 510,000.00
26	460	Lin. Ft., 60" Standard reinforced concrete drain pipe within Public System, Class III, 12.00' to 13.99' deep, including excavation, backfill and pipe cushion, in place complete.	\$ 530.00	\$ 243,800.00
27	1,400	Lin. Ft., 24" Standard reinforced concrete drain pipe within Public System, Class III, 6.00' to 7.99' deep, including excavation, backfill and pipe cushion, in place complete.	\$ 170.00	\$ 238,000.00
28	36	Ea., Standard state catch basin within DOT system, from top to invert 8.00' to 9.99' deep, including excavation and backfill, in place complete	\$ 12,000.00	\$ 432,000.00
29	4	Ea., Special drain manhole, from top to invert 12.00' to 13.99' deep, including excavation and backfill, in place complete	\$ 25,000.00	\$ 100,000.00
30	1	Ea., Drain Outlet, Concrete Headwall, in place complete	\$ 50,000.00	\$ 50,000.00
TOTAL FOR STORM DRAIN SYSTEM (Items 22 to 30, inclusive)				\$ 7,681,800.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
C. POTABLE WATER SYSTEM				
31	2,000	Lin. Ft., 12" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 130.00	\$ 260,000.00
32	3	Ea., Valve box for 3/4" ARV, including cast iron frame and cover, in place complete.	\$ 1,800.00	\$ 5,400.00
33	8 Ea.,	12" Gate valve, in place complete.	\$ 2,500.00	\$ 20,000.00
34	3	Ea. 3/4" Air relief valve, including appurtenances, in place complete.	\$ 1,400.00	\$ 4,200.00
35	8	Ea., Valve box for 12" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 1,300.00	\$ 10,400.00
36	4 Ea.,	Concrete Beam with Reverse Bell, in place complete.	\$ 7,500.00	\$ 30,000.00
37	1 LS.,	Short body cast iron fittings, in place complete.	\$ 60,000.00	\$ 60,000.00
38	3	Ea., Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 97,200.00
TOTAL FOR POTABLE WATER SYSTEM (Items 31 to 38, inclusive)				\$ 487,200.00
D. NON-POTABLE WATER SYSTEM				
39	1,100	Lin. Ft., 12" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 130.00	\$ 143,000.00
40	300	Lin. Ft., 8" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 90.00	\$ 27,000.00
41	500	Lin. Ft., 6" PVC class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	\$ 60.00	\$ 30,000.00
42	4	Ea., Type "D" water lateral with Type "III" meter box, in place complete.	\$ 5,200.00	\$ 20,800.00
43	4 Ea.,	12" Gate valve, Class 150, in place complete.	\$ 2,500.00	\$ 10,000.00
44	6 Ea.,	8" Gate valve, Class 150, in place complete.	\$ 1,800.00	\$ 10,800.00
45	4 Ea.,	6" Gate valve, Class 150, in place complete.	\$ 1,800.00	\$ 7,200.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES**

September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
46	4	Ea., Valve box for 12" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 1,300.00	\$ 5,200.00
47	6	Ea., Valve box for 8" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 700.00	\$ 4,200.00
48	4	Ea., Valve box for 6" gate valve, including cast iron frame and cover, pipe chimney and concrete anchor block, in place complete.	\$ 700.00	\$ 2,800.00
49	4	Ea., Concrete Beam with Reverse Bell, in place complete.	\$ 7,500.00	\$ 30,000.00
50	1	LS., Short body cast iron fittings, in place complete.	\$ 40,000.00	\$ 40,000.00
51	3	Ea., Connection and chlorination of new main to existing main, including all appurtenances, in place complete.	\$ 32,400.00	\$ 97,200.00
TOTAL FOR NON-POTABLE WATER SYSTEM (Items 39 to 51, inclusive)				\$ 428,200.00

E. SANITARY SEWER SYSTEM

52	120	Lin. Ft., 15" VCP sewer pipe, from finish grade to invert, 14.00' to 15.99' deep, including fittings, excavation and backfill, in place complete.	\$ 230.00	\$ 27,600.00
53	40	Lin. Ft., 10" VCP sewer pipe, from finish grade to invert, 10.00' to 11.99' deep, including fittings, excavation and backfill, in place complete.	\$ 100.00	\$ 4,000.00
54	2	Ea., Standard City and County plain sewer manhole, from top to invert 14.00' to 15.99' deep, including excavation and backfill, in place complete.	\$ 16,000.00	\$ 32,000.00
55	850	Lin. Ft., 20" HOBAS (Fiberglass Reinforces Polymer Mortar Pipe) for off-site sewer pipe, from finish grade to invert, 24.00' to 25.99' deep, including fittings, excavation and backfill, in place complete.	\$ 380.00	\$ 323,000.00
56	400	Lin. Ft., 20" HOBAS (Fiberglass Reinforces Polymer Mortar Pipe) for off-site sewer pipe, from finish grade to invert, 26.00' to 27.99' deep, including fittings, excavation and backfill, in place complete.	\$ 420.00	\$ 168,000.00

**KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES**

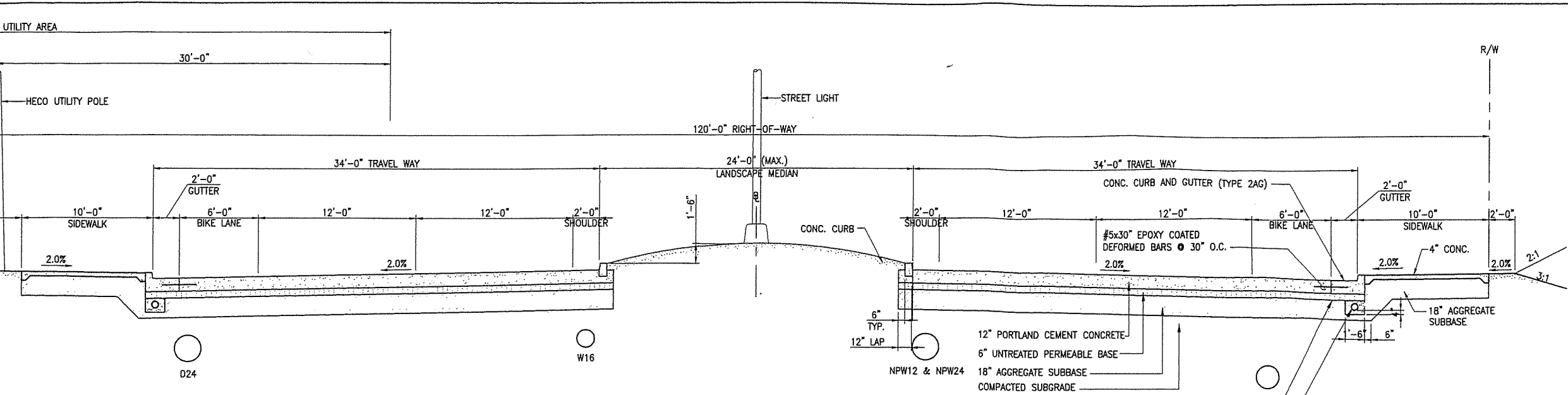
September 19, 2014

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
57	250	Lin. Ft., 24" HOBAS (Fiberglass Reinforces Polymer Mortar Pipe) for off-site sewer pipe, from finish grade to invert, 32.00' to 33.99' deep, including fittings, excavation and backfill, in place complete.	\$ 460.00	\$ 115,000.00
58	80	Lin. Ft., 18" HOBAS (Fiberglass Reinforces Polymer Mortar Pipe) for off-site sewer pipe, from finish grade to invert, 18.00' to 19.99' deep, including fittings, excavation and backfill, in place complete.	\$ 350.00	\$ 28,000.00
59	1	Ea., Special sewer manhole for off-site sewer, from top to invert 32.00' to 33.99' deep, including excavation and backfill, in place complete.	\$ 36,000.00	\$ 36,000.00
60	1,740 Lf.	Crushed rock sewer cradle	\$ 46.00	\$ 80,040.00
TOTAL FOR SANITARY SEWER SYSTEM (Items 52 to 60, inclusive)				\$ 813,640.00
F. ELECTRICAL IMPROVEMENTS				
61	1	LS., Infrastructure improvements	\$ 6,400,000.00	\$ 6,400,000.00
TOTAL FOR ELECTRICAL IMPROVEMENTS (Item 61, inclusive)				\$ 6,400,000.00
G. LANDSCAPE AND IRRIGATION SYSTEM				
62	20,000	Sq. Ft., Zoysia "El Toro", stolons, 10 bushels per 1,000 sf w/ hydromulch cover	\$ 1.00	\$ 20,000.00
63	7,500 Lin. Ft.	"Typar" biobarrier, 19-1/2" Min. width	\$ 10.00	\$ 75,000.00
64	1	LS., 90 Day Maintenance Period, includes watering for grass & trees.	\$ 20,000.00	\$ 20,000.00
65	20,000	Sq. Ft., Automatic irrigation system, includes pipes, heads, backflow preventer, control valves, irrigation controller, wires & incidentals, in place complete.	\$ 3.50	\$ 70,000.00
TOTAL FOR LANDSCAPE AND IRRIGATION SYSTEM (Items 62 to 65, inclusive)				\$ 185,000.00

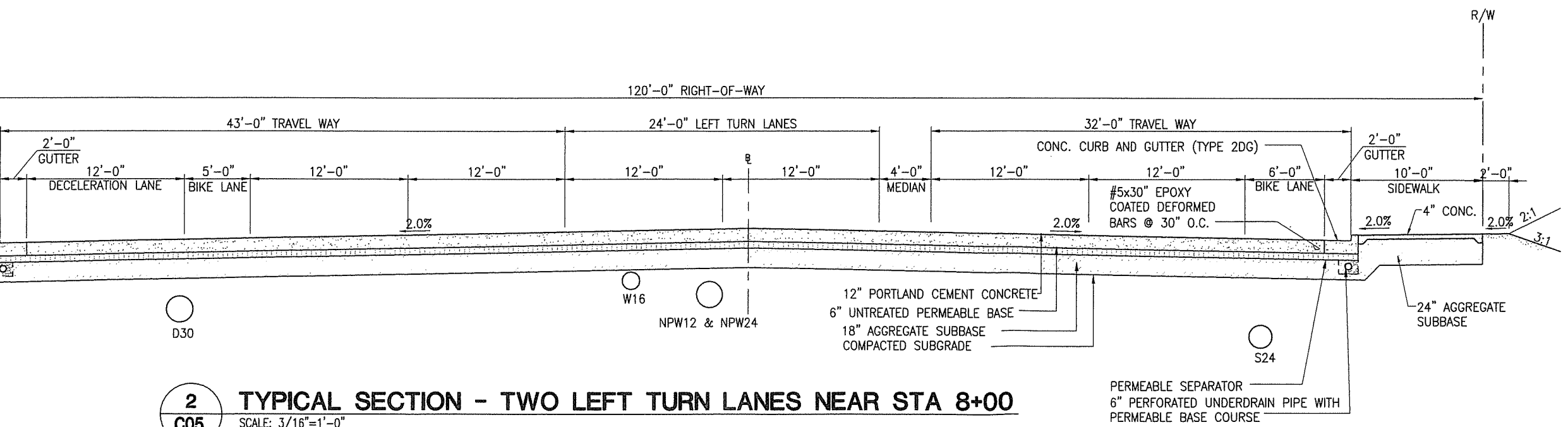
KAPOLEI PROPERTY DEVELOPMENT LLC
STATE HARBOR ACCESS ROAD
HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT
PRELIMINARY COST ESTIMATES

September 19, 2014

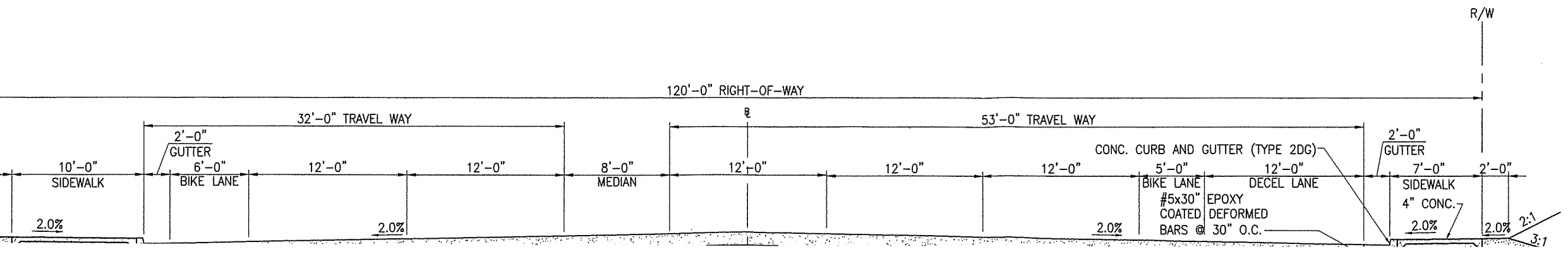
ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
<p style="text-align: center;"> SUMMARY STATE HARBOR ACCESS ROAD HANUA ST. EXTENSION TO KALAELOA HARBOR SEGMENT PRELIMINARY COST ESTIMATES </p>				
A. GRADING AND ROADWAY CONSTRUCTION (Items 1 to 21, inclusive)				<u>\$ 4,372,300.00</u>
B. STORM WATER SYSTEM (Items 22 to 30, inclusive)				<u>\$ 7,681,800.00</u>
C. POTABLE WATER SYSTEM (Items 31 to 38, inclusive)				<u>\$ 487,200.00</u>
D. NON-POTABLE WATER SYSTEM (Items 39 to 51, inclusive)				<u>\$ 428,200.00</u>
E. SANITARY SEWER SYSTEM (Items 52 to 60, inclusive)				<u>\$ 813,640.00</u>
F. ELECTRICAL IMPROVEMENTS (Item 61, inclusive)				<u>\$ 6,400,000.00</u>
G. LANDSCAPE AND IRRIGATION SYSTEM (Items 62 to 65, inclusive)				<u>\$ 185,000.00</u>
TOTAL (A TO G inclusive)				<u>\$ 20,368,140.00</u>



1
C05 **TYPICAL SECTION - WITH MEDIAN NEAR STA 14+00**
SCALE: 3/16"=1'-0"



2
C05 **TYPICAL SECTION - TWO LEFT TURN LANES NEAR STA 8+00**
SCALE: 3/16"=1'-0"



REVISIONS	BY

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.
EXPIRATION DATE: 4/30/2016
Chad M. McDonald
MITSUNAGA & ASSOCIATES, INC.

CHAD M. McDONALD
LICENSED PROFESSIONAL ENGINEER
No. 9793-C
HAWAII

HARBOR ACCESS ROAD
HAWAII
KAPOLEI
OAHU
TAX MAP KEY: 9-1-15:26(por.)

Mitsunaga & Associates, Inc.
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7716-07
October 15, 2015

Mr. Steve Kelly
1001 Kamokila Blvd.
Campbell Building, Suite 250
Kapolei, HI 96707

Subject: Kapolei Interchange Phases 3 and 4 (Updated)

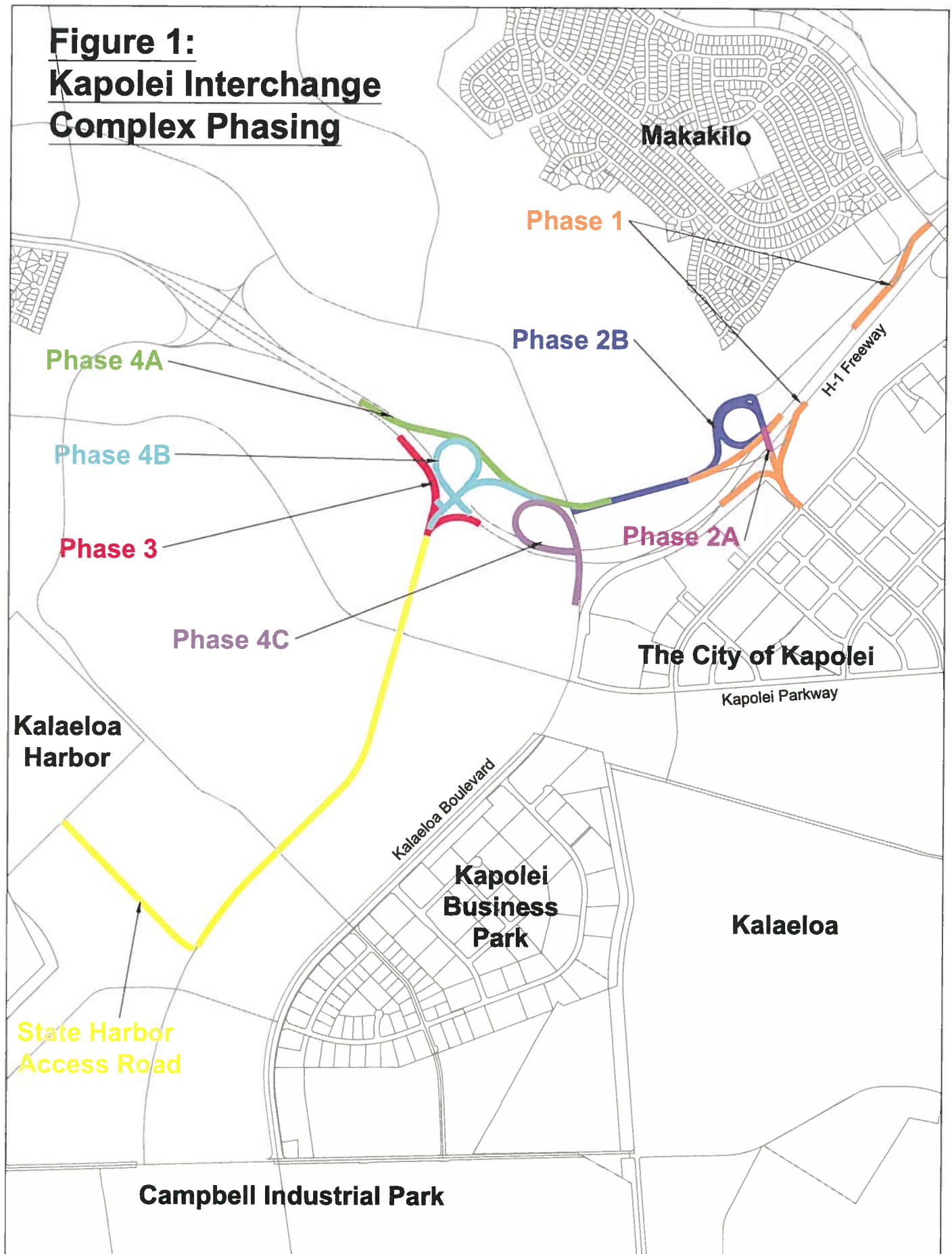
Dear Mr. Kelly:

As requested, we have prepared updated conceptual layouts for the remaining phases of the Kapolei Interchange based on available topographic and GIS information. Phase 1 of the interchange complex has already been constructed and Phase 2 is expected to start construction later this year. Phase 3 of the interchange complex is currently under design by Mitsunaga & Associates Inc. and this report reflects their design as of August 2015. The conceptual layout prepared in May 2011 for Phase 4 of the interchange was updated to incorporate changes in AASHTO design standards and State of Hawaii Department of Transportation (DOT) requirements. These layouts were utilized to verify that the proposed phasing scheme for the interchange improvements was still appropriate based on the interface and feasibility of transitions between the phases (see Figure 1). In addition, the concept level cost estimate for Phase 3 was updated based on the preliminary estimate prepared for Phase 3 while the concept level cost estimate for Phase 4 was updated based on the revised layout and the anticipated costs associated with Phase 2 of the interchange. The following is a brief description of the proposed phases.

Phase 3

Phase 3 of the Kapolei Interchange includes the at-grade ramps from the Interstate H-1 Freeway at the Harbor Access roadway. The off-ramp from the Interstate H-1 Freeway is expected to provide an adequate taper and deceleration length along the freeway until the construction of the Road D Interchange and the eastbound auxiliary lane that is expected to extend between the two interchanges. The on-ramp to the freeway is expected to have an adequate taper and acceleration length, and terminate near the Kalaeloa Boulevard overpass. In conjunction with Phase 3 of the interchange, the existing Kalaeloa Boulevard eastbound off-ramp is expected to be closed due to the close proximity of the new Phase 3 ramps. The construction for this phase of the interchange is estimated to cost approximately \$23.2 million. See Figure 2 in Appendix A for the preliminary layout for Phase 3 and Appendix B for the preliminary cost estimate.

Figure 1:
Kapolei Interchange Complex Phasing





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Letter to Mr. Steve Kelly

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Phase 4A

Phase 4A includes the relocation of the Kalaeloa Boulevard and Farrington Highway intersection further north, as well as, the Farrington Highway westbound on-ramp to the Interstate H-1 Freeway. The on-ramp is expected to provide an adequate taper and acceleration length along the freeway until the construction of the Road D Interchange and the westbound auxiliary lane that is expected to extend between the two interchanges. The updated conceptual layout for Phase 4A incorporates a 35 mile per hour (mph) design speed near Kalaeloa Boulevard that transitions to a 45 mph design speed west of Harbor Access. The construction for this phase of the interchange is estimated to cost approximately \$10.9 million. See Figure 3 in Appendix A for the conceptual layout for Phase 4A and Appendix B for the preliminary cost estimate.

Phase 4B

Phase 4B includes construction of the new Harbor Access off-ramp from the westbound direction of traffic along the Interstate H-1 Freeway, the Harbor Access overpass and connections to the relocated Farrington Highway westbound on-ramp to the freeway, as well as the connection to the eastbound off-ramp included in Phase 3 of the interchange. The updated conceptual layout for Phase 4B incorporates a 35 mph design speed on the westbound off-ramp that transitions to a 30 mph design speed near the Harbor Access overpass, while the Harbor Access overpass and connections to Farrington Highway incorporate a 35 mph design speed. The higher design speed incorporated into the updated layout results in a larger footprint for the westbound off-ramp. In addition, the Harbor Access overpass incorporates a wider cross section to provide smoother transitions to and from the bridge structure. The construction and administration for this phase of the interchange is estimated to cost approximately \$37.6 million. See Figure 4 in Appendix A for the conceptual layout for Phase 4B and Appendix B for the preliminary cost estimate.

Phase 4C

Phase 4C includes reconstruction of the existing westbound off-ramp from the Interstate H-1 Freeway at Kalaeloa Boulevard, as well as, modifications to Kalaeloa Boulevard to provide two lanes in each direction on the overpass to the freeway. The updated conceptual layout for Phase 4C incorporates a 35 mph design speed on the westbound off-ramp. The higher design speed incorporated into the updated layout results in a larger footprint for the westbound off-ramp. The construction and administration for this phase of the interchange is estimated to cost approximately \$9.3 million. See Figure 5 in



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Appendix A for the conceptual layout for Phase 4C and Appendix B for the preliminary cost estimate.

Should you have any questions or require additional information, please contact Mr. Pete Pascua or myself at 946-2277.

Sincerely,

Cathy Leong, P.E.

APPENDIX A
CONCEPTUAL LAYOUTS

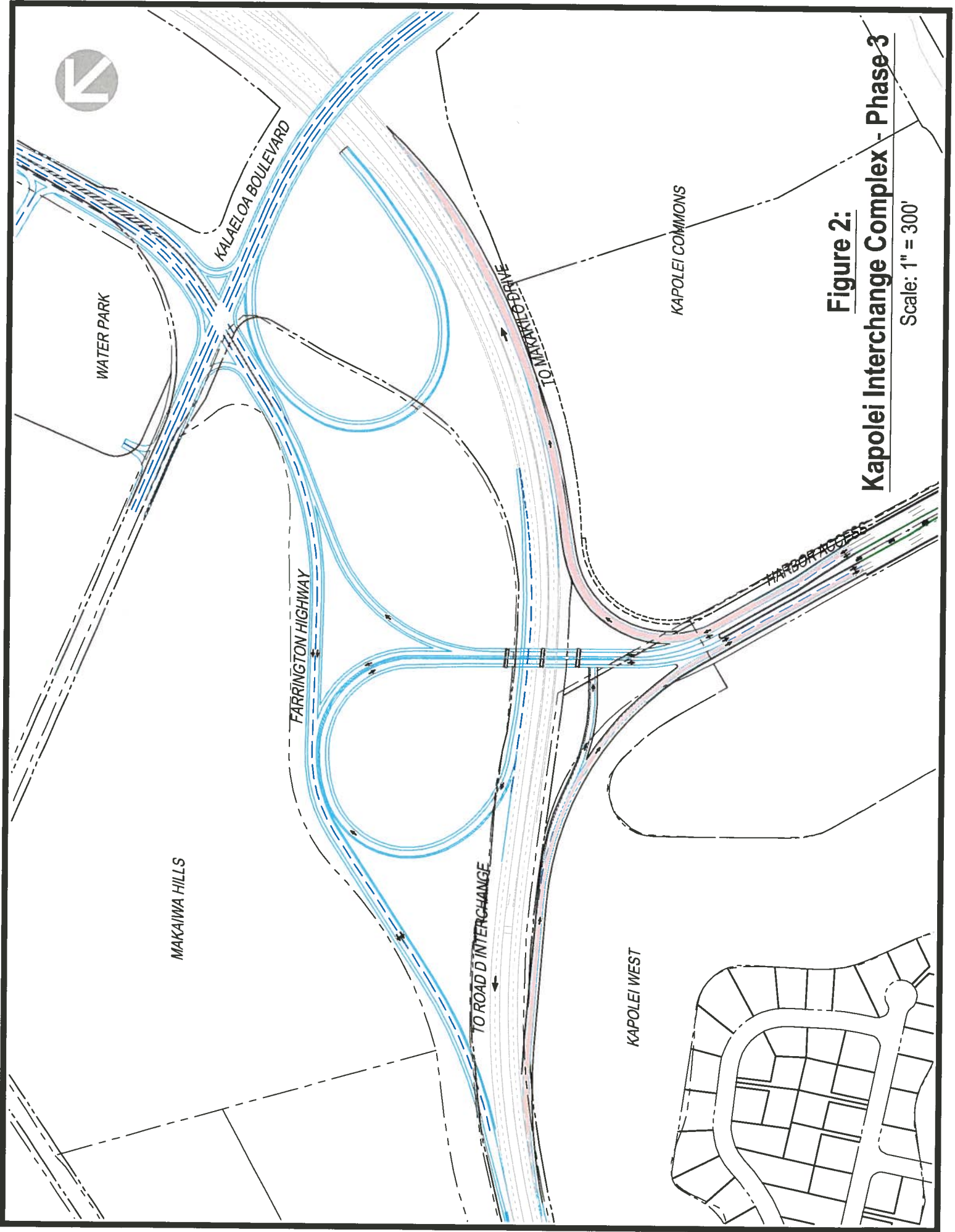
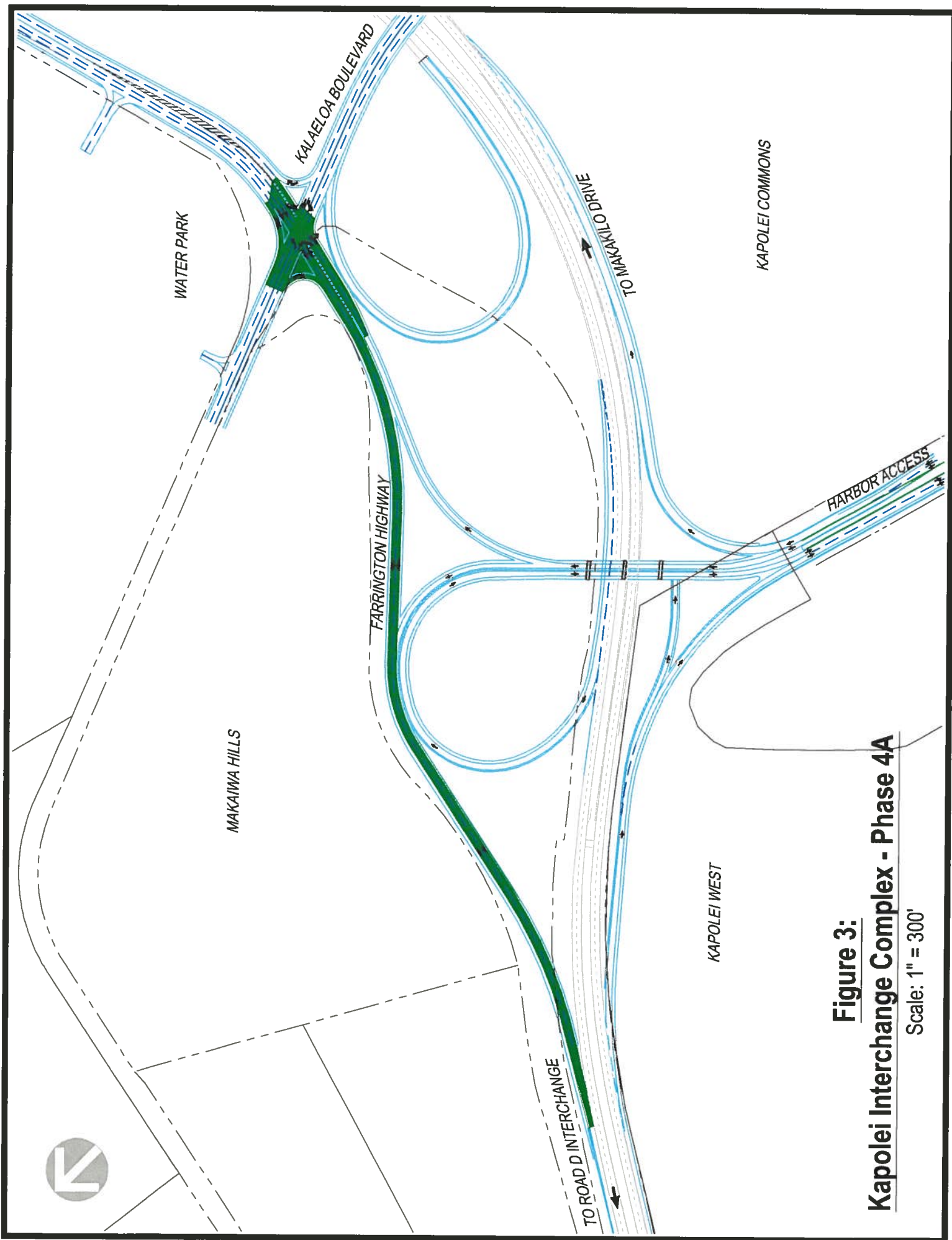
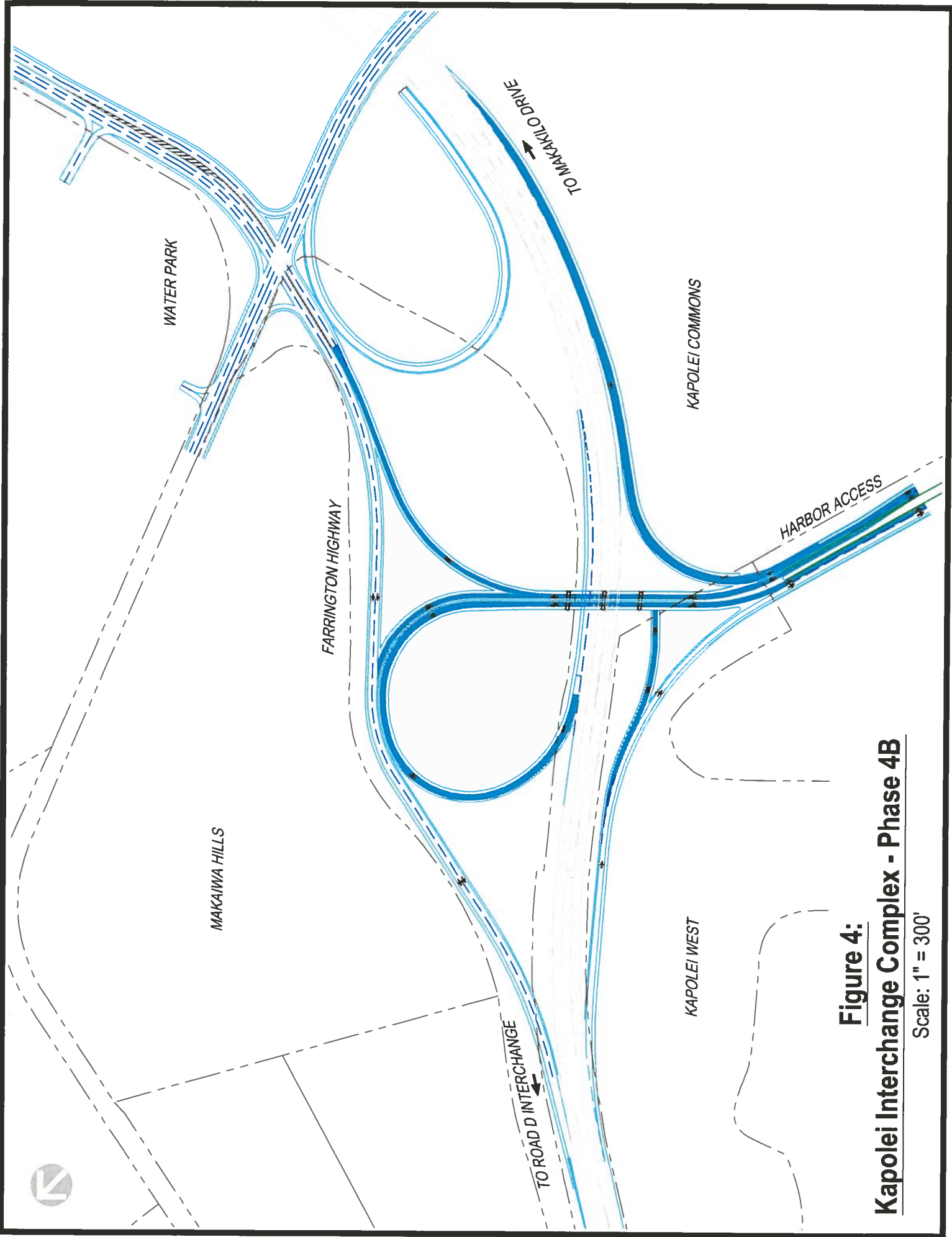


Figure 2:
Kapolei Interchange Complex - Phase 3

Scale: 1" = 300'





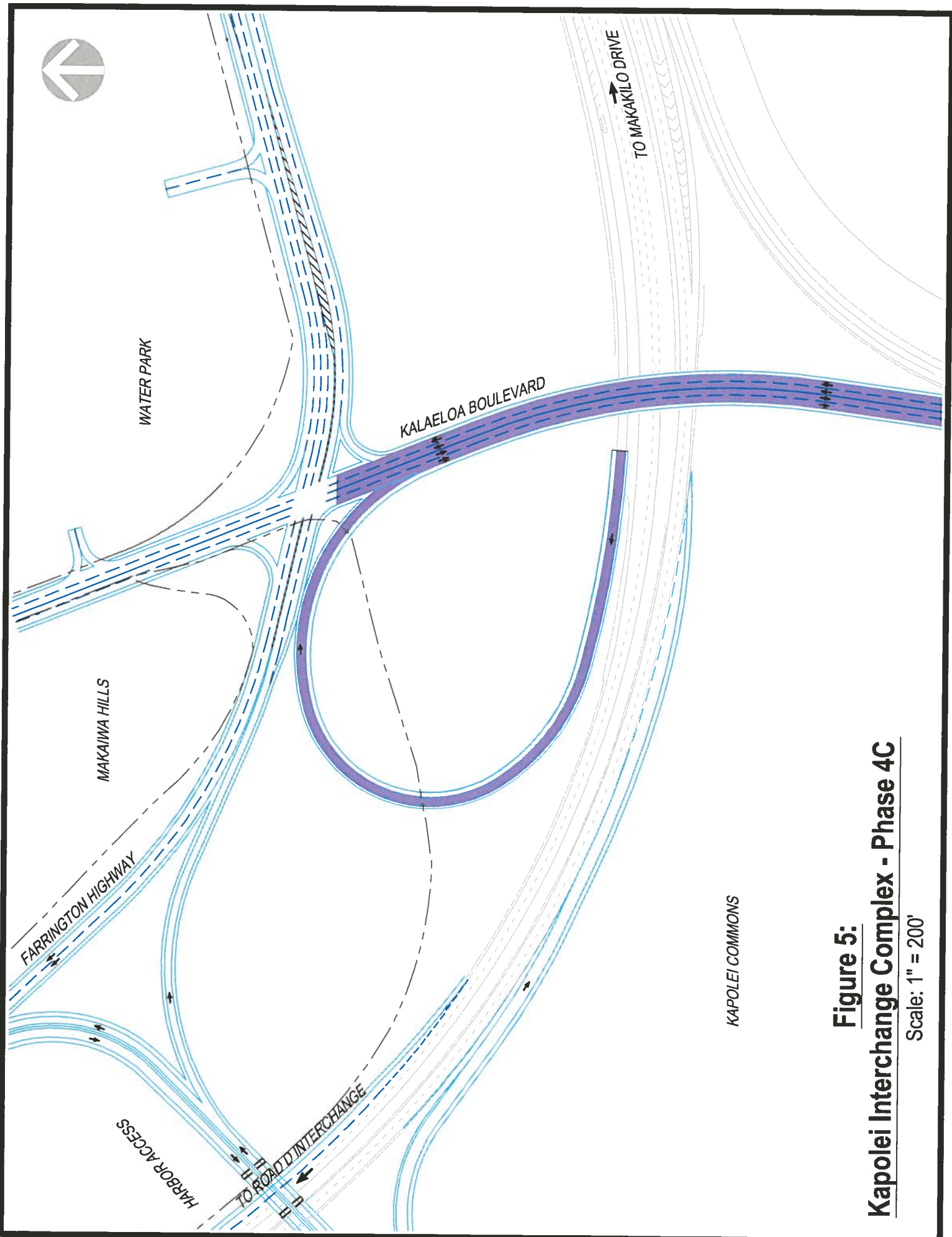


Figure 5:
Kapolei Interchange Complex - Phase 4C
Scale: 1" = 200'

APPENDIX B

PRELIMINARY COST ESTIMATES

Kapolei Interchange Phase 3
ENGINEER'S PRELIMINARY DETAIL ESTIMATE
FEDERAL-AID PROJECT NO. XX-XXX-XXX
AUGUST 2015

SUMMARY

TYPE CODE	CONTRACT ITEMS	CONTIN-GENCIES	CONSTRUCTION ENGINEERING	INDIRECT COSTS	WORK BY OTHERS	TOTAL PROJ. COST	COST TO OTHERS	PAR. COST	FEDERAL SHARE (80%)	STATE SHARE (20%)
ROADWAY TYPE CODE - I000	\$13,645,233.57	\$682,261.68	\$2,149,124.29	\$1,115,395.51	\$0.00	\$14,327,495.25	\$0.00	\$14,327,495.25	\$11,461,996.20	\$2,865,499.05
UTILITY ADJUSTMENT TYPE CODE - Y060	\$1,592,215.00	\$79,610.75	\$250,773.86	\$130,151.63	\$0.00	\$1,671,825.75	\$0.00	\$1,671,825.75	\$1,337,460.60	\$334,365.15
HAWAIIAN ELECTRIC CO. TYPE CODE - Y060	\$320,500.00	\$16,025.00	\$50,478.75	\$26,198.47	\$600,000.00	\$936,525.00	\$600,000.00	\$336,525.00	\$269,220.00	\$67,305.00
HAWAIIAN TELCOM TYPE CODE - Y060	\$250,700.00	\$12,535.00	\$39,485.25	\$20,492.84	\$300,000.00	\$563,235.00	\$300,000.00	\$263,235.00	\$210,588.00	\$52,647.00
OCEANIC CABLE TYPE CODE - Y060	\$51,400.00	\$2,570.00	\$8,095.50	\$4,201.56	\$600,000.00	\$653,970.00	\$600,000.00	\$53,970.00	\$43,176.00	\$10,794.00
HIGHWAY LIGHTING TYPE CODE - Y030	\$926,400.00	\$46,320.00	\$145,908.00	\$75,726.25	\$0.00	\$972,720.00	\$0.00	\$972,720.00	\$778,176.00	\$194,544.00
TRAFFIC SIGNAL TYPE CODE - Y030	\$130,500.00	\$6,525.00	\$20,553.75	\$10,667.40	\$0.00	\$137,025.00	\$0.00	\$137,025.00		
CONSTRUCTION ENGINEERING - CENG			\$2,664,419.40			\$2,664,419.40	\$0.00	\$2,664,419.40	\$2,131,535.52	\$532,883.88
INDIRECT COSTS				\$1,382,833.67		\$1,382,833.67	\$0.00	\$1,382,833.67	\$1,106,266.93	\$276,566.73
TOTAL CONSTRUCTION COST	\$16,916,948.57	\$845,847.43	\$2,664,419.40	\$1,382,833.67	\$1,500,000.00	\$23,310,049.07	\$1,500,000.00	\$21,810,049.07	\$17,338,419.26	\$4,334,604.81

FEDERAL FUNDS REQUIRED: \$17,338,419.26

STATE FUNDS REQUIRED: \$4,334,604.81

COST TO OTHERS: \$1,500,000.00

KAPOLEI INTERCHANGE PHASE 4

CONCEPT LEVEL COST ESTIMATE

Item	Cost (PCC)	Cost (AC)
PHASE 4A - WB ON-RAMP	\$9,524,538	\$10,878,138
PHASE 4B - WB HARBOR ACCESS OFF-RAMP & FARR HWY CONN.	\$36,415,800	\$37,571,400
PHASE 4C - WB OFF-RAMP - KALAELOA BLVD	\$8,717,760	\$9,251,160
TOTAL	<u>\$54,658,098</u>	<u>\$57,700,698</u>

COST ESTIMATE - PHASE 4A
WESTBOUND ON-RAMP - FARRINGTON HIGHWAY

DESCRIPTION	PCC	AC
Earthwork	\$ 2,352,000	
Roadway	\$ 3,539,450	\$ 4,667,450
Utilities	\$ 600,000	
Landscaping	\$ 65,665	
Traffic	\$ 750,000	
Erosion Control	\$ 250,000	
Electrical	\$ 380,000	
	<hr/>	<hr/>
	\$7,937,115	\$9,065,115
	<hr/>	<hr/>
	contingency (20%) \$1,587,423	\$1,813,023
	<hr/>	<hr/>
	SUM \$9,524,538	\$10,878,138
	<hr/>	<hr/>

DETAILED COST ESTIMATE - PHASE 4A
WESTBOUND ON-RAMP - FARRINGTON HIGHWAY
PCC PAVMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
<u>EARTHWORK</u>				
Embankment	56000	CY	\$ 40.00	\$ 2,240,000
Excavation	5600	CY	\$ 20.00	\$ 112,000
			subtotal	\$ 2,352,000
<u>ROADWAY</u>				
9.5" PCC Pavement	3450	CY	\$ 600.00	\$ 2,070,000
6" UPB	2170	CY	\$ 150.00	\$ 325,500
12" ASB	4340	CY	\$ 150.00	\$ 651,000
Guardrail	5000	LF	\$ 80.00	\$ 400,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	0	LF	\$ 1,000.00	\$ -
Pavement Striping	10250	LF	\$ 3.00	\$ 30,750
RPM	520	EA	\$ 10.00	\$ 5,200
Regulatory Signs	10	EA	\$ 500.00	\$ 5,000
Warning Signs	2	EA	\$ 500.00	\$ 1,000
Ground Mounted Destination Signs	1	EA	\$ 11,000.00	\$ 11,000
Ground Mounted Expressway Sign	0	EA	\$ 11,000.00	\$ -
			subtotal	\$ 3,539,450
<u>UTILITIES</u>				
Drainage Structures	10	EA	\$ 10,000.00	\$ 100,000
Drain Pipe	2500	LF	\$ 200.00	\$ 500,000
			subtotal	\$ 600,000
<u>LANDSCAPING</u>				
	13133	SY	\$ 5.00	\$ 65,665
<u>TRAFFIC</u>				
Traffic Signal System	LS	LS	LS	\$ 500,000
Traffic Control	LS	LS	LS	\$ 250,000
			subtotal	\$ 750,000
<u>EROSION CONTROL</u>				
	LS	LS	LS	\$ 250,000
<u>ELECTRICAL</u>				
Street Lights	LS	LS	LS	\$ 280,000
Electrical Relocation	LS	LS	LS	\$ 100,000
			subtotal	\$ 380,000
				\$7,937,115
				contingency (20%) \$1,587,423
				SUM \$9,524,538

DETAILED COST ESTIMATE - PHASE 4A
WESTBOUND ON-RAMP - FARRINGTON HIGHWAY
AC PAVEMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
<u>EARTHWORK</u>				
Embankment	56000	CY	\$ 40.00	\$ 2,240,000
Excavation	5600	CY	\$ 20.00	\$ 112,000
			subtotal	\$ 2,352,000
<u>ROADWAY</u>				
4" HMA	3270	TON	\$ 350.00	\$ 1,144,500
8" HMA BC	5770	TON	\$ 300.00	\$ 1,731,000
6" UPB	2170	CY	\$ 150.00	\$ 325,500
18" ASB	6490	CY	\$ 150.00	\$ 973,500
Guardrail	5000	LF	\$ 80.00	\$ 400,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	0	LF	\$ 1,000.00	\$ -
Pavement Striping	10250	LF	\$ 3.00	\$ 30,750
RPM	520	EA	\$ 10.00	\$ 5,200
Regulatory Signs	10	EA	\$ 500.00	\$ 5,000
Warning Signs	2	EA	\$ 500.00	\$ 1,000
Ground Mounted Destination Signs	1	EA	\$ 11,000.00	\$ 11,000
Ground Mounted Expressway Sign	0	EA	\$ 11,000.00	\$ -
			subtotal	\$ 4,667,450
<u>UTILITIES</u>				
Drainage Structures	10	EA	\$ 10,000.00	\$ 100,000
Drain Pipe	2500	LF	\$ 200.00	\$ 500,000
			subtotal	\$ 600,000
<u>LANDSCAPING</u>	13133	SY	\$ 5.00	\$ 65,665
<u>TRAFFIC</u>				
Traffic Signal System	LS	LS	LS	\$ 500,000
Traffic Control	LS	LS	LS	\$ 250,000
			subtotal	\$ 750,000
<u>EROSION CONTROL</u>	LS	LS	LS	\$ 250,000
<u>ELECTRICAL</u>				
Street Lights	LS	LS	LS	\$ 280,000
Electrical Relocation	LS	LS	LS	\$ 100,000
			subtotal	\$ 380,000
				\$9,065,115
				contingency (20%) \$1,813,023
				SUM \$10,878,138

COST ESTIMATE - PHASE 4B**WESTBOUND HARBOR ACCESS OFF-RAMP - FARRINGTON HWY CONNECTION**

DESCRIPTION	PCC	AC
EARTHWORK	\$ 5,236,000	
ROADWAY	\$ 3,535,500	\$ 4,498,500
DRAINAGE	\$ 800,000	
STRUCTURAL	\$ 18,000,000	
LANDSCAPING	\$ 45,000	
TRAFFIC	\$ 2,000,000	
EROSION CONTROL	\$ 250,000	
ELECTRICAL	\$ 480,000	
	<hr/>	<hr/>
	\$30,346,500	\$31,309,500
	contingency (20%) \$6,069,300	\$6,261,900
	<hr/>	<hr/>
	SUM \$36,415,800	\$37,571,400

DETAILED COST ESTIMATE - PHASE 4B

WESTBOUND HARBOR ACCESS OFF-RAMP - FARRINGTON HWY CONNECTION

PCC PAVEMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
EARTHWORK				
Embankment	124000	CY	\$ 40.00	\$ 4,960,000
Excavation - Road	10000	CY	\$ 20.00	\$ 200,000
Excavation - Drainage Basin	3800	CY	\$ 20.00	\$ 76,000
			subtotal	\$ 5,236,000
ROADWAY				
9.5" PCC Pavement	2890	CY	\$ 600.00	\$ 1,734,000
6" UPB	1830	CY	\$ 150.00	\$ 274,500
12" ASB	3650	CY	\$ 150.00	\$ 547,500
Guardrail	4000	LF	\$ 80.00	\$ 320,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	550	LF	\$ 1,000.00	\$ 550,000
Pavement Striping	9000	LF	\$ 3.00	\$ 27,000
RPM	450	EA	\$ 10.00	\$ 4,500
Regulatory Signs	5	EA	\$ 500.00	\$ 2,500
Warning Signs	5	EA	\$ 500.00	\$ 2,500
Ground Mounted Destination Signs	2	EA	\$ 11,000.00	\$ 22,000
Ground Mounted Expressway Sign	1	EA	\$ 11,000.00	\$ 11,000
			subtotal	\$ 3,535,500
UTILITIES				
Drainage Structures	13	EA	\$ 10,000.00	\$ 130,000
Drain Pipe	3350	LF	\$ 200.00	\$ 670,000
			subtotal	\$ 800,000
STRUCTURAL				
Structural - Bridge	LS	LS	LS	\$ 18,000,000
LANDSCAPING	9000	SY	\$ 5.00	\$ 45,000
Traffic Control	LS	LS	LS	\$ 2,000,000
EROSION CONTROL	LS	LS	LS	\$ 250,000
ELECTRICAL				
Street Lights	LS	LS	LS	\$ 380,000
Electrical Relocation	LS	LS	LS	\$ 100,000
				\$ 480,000

\$30,346,500

contingency (20%) \$6,069,300

SUM \$36,415,800

DETAILED COST ESTIMATE - PHASE 4B

WESTBOUND HARBOR ACCESS OFF-RAMP - FARRINGTON HWY CONNECTION

AC PAVEMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
EARTHWORK				
Embankment	124000	CY	\$ 40.00	\$ 4,960,000
Excavation - Road	10000	CY	\$ 20.00	\$ 200,000
Excavation - Drainage Basin	3800	CY	\$ 20.00	\$ 76,000
			subtotal	\$ 5,236,000
ROADWAY				
4" HMA	2760	TON	\$ 350.00	\$ 966,000
8" HMA BC	4860	TON	\$ 300.00	\$ 1,458,000
6" UPB	1830	CY	\$ 150.00	\$ 274,500
18" ASB	5470	CY	\$ 150.00	\$ 820,500
Guardrail	4000	LF	\$ 80.00	\$ 320,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	550	LF	\$ 1,000.00	\$ 550,000
Pavement Striping	9000	LF	\$ 3.00	\$ 27,000
RPM	450	EA	\$ 10.00	\$ 4,500
Regulatory Signs	5	EA	\$ 500.00	\$ 2,500
Warning Signs	5	EA	\$ 500.00	\$ 2,500
Ground Mounted Destination Signs	2	EA	\$ 11,000.00	\$ 22,000
Ground Mounted Expressway Sign	1	EA	\$ 11,000.00	\$ 11,000
			subtotal	\$ 4,498,500
UTILITIES				
Drainage Structures	13	EA	\$ 10,000.00	\$ 130,000
Drain Pipe	3350	LF	\$ 200.00	\$ 670,000
			subtotal	\$ 800,000
STRUCTURAL				
Structural - Bridge	LS	LS	LS	\$ 18,000,000
LANDSCAPING				
	9000	SY	\$ 5.00	\$ 45,000
Traffic Control	LS	LS	LS	\$ 2,000,000
EROSION CONTROL				
	LS	LS	LS	\$ 250,000
ELECTRICAL				
Street Lights	LS	LS	LS	\$ 380,000
Electrical Relocation	LS	LS	LS	\$ 100,000
				\$ 480,000

\$31,309,500

contingency (20%) \$6,261,900

SUM \$37,571,400

COST ESTIMATE - PHASE 4CWESTBOUND OFF-RAMP - KALAELOA BLVD

DESCRIPTION	PCC	AC
DEMOLITION OF EXISTING RAMPS	\$ 460,000	
EARTHWORK	\$ 998,000	
ROADWAY	\$ 2,437,550	\$ 2,882,050
DRAINAGE	\$ 660,000	
STRUCTURAL	\$ -	
LANDSCAPING	\$ 47,250	
TRAFFIC	\$ 2,000,000	
EROSION CONTROL	\$ 250,000	
ELECTRICAL	\$ 412,000	
	<hr/>	<hr/>
	\$7,264,800	\$7,709,300
	<hr/>	<hr/>
	contingency (20%) \$1,452,960	\$1,541,860
	<hr/>	<hr/>
	SUM \$8,717,760	\$9,251,160
	<hr/>	<hr/>

DETAILED COST ESTIMATE - PHASE 4C

WESTBOUND OFF-RAMP - KALAELOA BLVD

PCC PAVEMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
DEMOLITION OF EXISTING OFFRAMP	61000	SF	\$ 5.00	\$ 305,000
DEMOLITION OF EXISTING ONRAMP	31000	SF	\$ 5.00	\$ 155,000
EARTHWORK				
Embankment	23000	CY	\$ 40.00	\$ 920,000
Excavation - Roadway	2000	CY	\$ 20.00	\$ 40,000
Excavation - Drainage Basin	1900	CY	\$ 20.00	\$ 38,000
			subtotal	\$ 998,000
ROADWAY				
9.5" PCC Pavement	1330	CY	\$ 600.00	\$ 798,000
6" UPB	840	CY	\$ 150.00	\$ 126,000
12" ASB	1680	CY	\$ 150.00	\$ 252,000
Guardrail	3500	LF	\$ 80.00	\$ 280,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	850	LF	\$ 1,000.00	\$ 850,000
Pavement Striping	11300	LF	\$ 3.00	\$ 33,900
RPM	565	EA	\$ 10.00	\$ 5,650
Regulatory Signs	8	EA	\$ 500.00	\$ 4,000
Warning Signs	8	EA	\$ 500.00	\$ 4,000
Ground Mounted Destination Signs	2	EA	\$ 11,000.00	\$ 22,000
Ground Mounted Expressway Sign	2	EA	\$ 11,000.00	\$ 22,000
			subtotal	\$ 2,437,550
UTILITIES				
Drainage Structures	10	EA	\$ 10,000.00	\$ 100,000
Drain Pipe	2800	LF	\$ 200.00	\$ 560,000
			subtotal	\$ 660,000
STRUCTURAL				
Structural - Bridge	LS	LS	LS	\$ -
LANDSCAPING	9450	SY	\$ 5.00	\$ 47,250
Traffic Control	LS	LS	LS	\$ 2,000,000
EROSION CONTROL	LS	LS	LS	\$ 250,000
ELECTRICAL				
Street Lights	LS	LS	LS	\$ 312,000
Electrical Relocation	LS	LS	LS	\$ 100,000
				\$ 412,000

	\$7,264,800
contingency (20%)	\$1,452,960
SUM	\$8,717,760

DETAILED COST ESTIMATE - PHASE 4C

WESTBOUND OFF-RAMP - KALAELOA BLVD

AC PAVEMENT

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
<u>DEMOLITION OF EXISTING OFFRAMP</u>	61000	SF	\$ 5.00	\$ 305,000
<u>DEMOLITION OF EXISTING ONRAMP</u>	31000	SF	\$ 5.00	\$ 155,000
<u>EARTHWORK</u>				
Embankment	23000	CY	\$ 40.00	\$ 920,000
Excavation - Roadway	2000	CY	\$ 20.00	\$ 40,000
Excavation - Drainage Basin	1900	CY	\$ 20.00	\$ 38,000
		subtotal		\$ 998,000
<u>ROADWAY</u>				
4" HMA	1270	TON	\$ 350.00	\$ 444,500
8" HMA BC	2240	TON	\$ 300.00	\$ 672,000
6" UPB	840	CY	\$ 150.00	\$ 126,000
18" ASB	2520	CY	\$ 150.00	\$ 378,000
Guardrail	3500	LF	\$ 80.00	\$ 280,000
End Treatment	4	EA	\$ 10,000.00	\$ 40,000
Median Barrier	850	LF	\$ 1,000.00	\$ 850,000
Pavement Striping	11300	LF	\$ 3.00	\$ 33,900
RPM	565	EA	\$ 10.00	\$ 5,650
Regulatory Signs	8	EA	\$ 500.00	\$ 4,000
Warning Signs	8	EA	\$ 500.00	\$ 4,000
Ground Mounted Destination Signs	2	EA	\$ 11,000.00	\$ 22,000
Ground Mounted Expressway Sign	2	EA	\$ 11,000.00	\$ 22,000
		subtotal		\$ 2,882,050
<u>UTILITIES</u>				
Drainage Structures	10	EA	\$ 10,000.00	\$ 100,000
Drain Pipe	2800	LF	\$ 200.00	\$ 560,000
		subtotal		\$ 660,000
<u>STRUCTURAL</u>				
Structural - Bridge	LS	LS	LS	\$ -
<u>LANDSCAPING</u>	9450	SY	\$ 5.00	\$ 47,250
Traffic Control	LS	LS	LS	\$ 2,000,000
<u>EROSION CONTROL</u>	LS	LS	LS	\$ 250,000
<u>ELECTRICAL</u>				
Street Lights	LS	LS	LS	\$ 312,000
Electrical Relocation	LS	LS	LS	\$ 100,000
				\$ 412,000

\$7,709,300

contingency (20%) \$1,541,860

SUM \$9,251,160

Mitsunaga & Associates, Inc.
Date: April 2014

Civil Engineering

Item No.	Item	Qty	Unit	Unit Price	Labor Cost	Total Price
DEMOLITION						
1	Clearing & Grubbing	1.00	AC	\$ 7,500.00		\$ 7,500.00
2	Demolition and Removal	1	LS	\$ 10,000.00		\$ 10,000.00
3	Removal Asphalt Concrete	0	SY	\$ 15.00		\$ -
4	Removal Chainlink Fence	0	LF	\$ 6.00		\$ -
SUBTOTAL DEMOLITION						\$ 17,500.00
SITE IMPROVEMENTS						
5	Temporary Erosion Control Measures, In Place Complete	1	LS	\$ 15,000.00		\$ 15,000.00
6	Roadway Excavation	100	CY	\$ 55.00		\$ 5,500.00
7	Site Grading	40,000	SF	\$ 3.00		\$ 120,000.00
8	Concrete Sidewalk/Slab, 4-Inches Thick, In Place Complete	6,500	SF	\$ 24.00		\$ 156,000.00
9	Concrete Curb	300	LF	\$ 25.00		\$ 7,500.00
10	Concrete Curb & Gutter	415	LF	\$ 40.00		\$ 16,600.00
11	12" PCC Pavement	1,440	CY	\$ 520.00		\$ 748,800.00
12	6" Untreated Permeable Base	740	CY	\$ 100.00		\$ 74,000.00
13	18" Aggregate Subbase	2,425	CY	\$ 65.00		\$ 157,625.00
14	Permeable Separator	4,400	SY	\$ 6.50		\$ 28,600.00
15	6" Perforated Sub-drain	415	LF	\$ 35.00		\$ 14,525.00
16	Cleanout	4	EA	\$ 650.00		\$ 2,600.00
17	Pavement Markings & Striping	1	LS	\$ 15,000.00		\$ 15,000.00
SUBTOTAL SITE IMPROVEMENTS						\$ 1,361,750.00
DRAINAGE SYSTEM						
18	24-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	260	LF	\$ 225.00		\$ -
19	30-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete		EA	\$ 12,000.00		\$ 65,000.00
20	Catch Basin		LS	\$ 15,000.00		\$ -
21	Connect to Exist. 84-inch Drainline		EA	\$ 8,500.00		\$ -
	Drain Manhole, In Place Complete	2	EA	\$ 8,500.00		\$ 17,000.00
SUBTOTAL DRAINAGE SYSTEM						\$ 82,000.00
WATER SYSTEM						
22	12-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	100	LF	\$ 160.00		\$ 16,000.00
23	16-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	380	LF	\$ 180.00		\$ 68,400.00
24	6-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete		LF	\$ 120.00		\$ -
25	Fire Hydrant Assembly		EA	\$ 7,500.00		\$ -
26	ARV/Box	1	EA	\$ 5,000.00		\$ 5,000.00
27	16-inch Butterfly Valve/Box	3	EA	\$ 25,000.00		\$ 75,000.00
28	12-inch Gate Valve/Box	1	EA	\$ 8,500.00		\$ 8,500.00
29	6-inch Gate Valve/Box		EA	\$ 6,200.00		\$ -
30	Chlorination & Testing	1	LS	\$ 8,000.00		\$ 8,000.00
SUBTOTAL WATER SYSTEM						\$ 180,900.00
NON-POTABLE WATER SYSTEM						
31	12-Inch Water Line, Including Trench Excavation and	145	LF	\$ 160.00		\$ 23,200.00
32	16-Inch Water Line, Including Trench Excavation and	100	LF	\$ 180.00		\$ 18,000.00
33	24-Inch Water Line, Including Trench Excavation and	235	LF	\$ 250.00		\$ 58,750.00
34	ARV/Box	2	EA	\$ 5,000.00		\$ 10,000.00
35	24-inch Butterfly Valve/Box	2	EA	\$ 32,000.00		\$ 64,000.00
36	16-inch Butterfly Valve/Box	1	EA	\$ 26,000.00		\$ 26,000.00
37	12-inch Gate Valve/Box	1	EA	\$ 8,500.00		\$ 8,500.00
38	Chlorination & Testing	1	LS	\$ 8,000.00		\$ 8,000.00
SUBTOTAL NON-POTABLE WATER SYSTEM						\$ 216,450.00
WASTEWATER SYSTEM						
39	12-Inch Sewer Line, Including Trench Excavation and	150	LF	\$ 150.00		\$ 22,500.00
40	24-Inch Sewer Line, Including Trench Excavation and	260	LF	\$ 210.00		\$ 54,600.00
41	Sewer Manhole	2	EA	\$ 7,500.00		\$ 15,000.00
SUBTOTAL WASTEWATER SYSTEM						\$ 92,100.00

	SITE WORK SUBTOTAL	\$ 1,950,700.00
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LANDSCAPING						
1	Irrigation		SF	\$ 1.50		\$ -
2	Centipede Grass		SF	\$ 0.65		\$ -
3	2" Layer Soil Amendment		SF	\$ 0.50		\$ -
4	4" Layer Imported Top Soil		CY	\$ 45.00		\$ -
5	1 Year Maintenance		LS	\$ 2,000.00		\$ -
	LANDSCAPING SUBTOTAL					\$ -

ELECTRICAL IMPROVEMENTS						
1	Electrical Infrastructure	1	LS	\$ 862,002.00		\$ 862,002.00
	SUBTOTAL ELECTRICAL IMPROVEMENTS					\$ 862,002.00
	SUBTOTAL INTERSECTION SEGMENT					\$ 2,812,702.00
	CONTINGENCY (15%)					\$ 421,905.30
	TOTAL INTERSECTION SEGMENT					\$ 3,234,607.30

**Harbor Access Road
Kapolei, Oahu, Hawaii
MAI Project No. 1358-01-C**

Mitsunaga & Associates, Inc.
Date: October 2015

Civil Engineering

Item No.	Item	Qty	Unit	Unit Price	Labor Cost	Total Price
DEMOLITION						
1	Clearing & Grubbing	1.90	AC	\$ 2,500.00		\$ 4,750.00
2	Removal Asphalt Concrete & Concrete Curbs	520	SY	\$ 15.00		\$ 7,800.00
SUBTOTAL DEMOLITION						\$ 12,550.00
SITE IMPROVEMENTS						
3	Temporary Erosion Control Measures, In Place Complete	1	LS	\$ 15,000.00		\$ 15,000.00
4	Roadway Excavation	1,300	CY	\$ 55.00		\$ 71,500.00
5	Site Grading	125,000	SF	\$ 1.50		\$ 187,500.00
6	Concrete Sidewalk/Slab, 4-Inches Thick, In Place Complete	11,200	SF	\$ 12.00		\$ 134,400.00
7	Concrete Curb	630	LF	\$ 25.00		\$ 15,750.00
8	Concrete Curb & Gutter	1,360	LF	\$ 40.00		\$ 54,400.00
9	Driveway Apron	1	EA	\$ 7,500.00		\$ 7,500.00
10	12" PCC Pavement	3,033	CY	\$ 520.00		\$ 1,577,160.00
11	Tempoary AC Pavement 2-1/2" Thick	450	SY	\$ 45.00		\$ 20,250.00
12	6" Untreated Permeable Base	1,516	CY	\$ 100.00		\$ 151,600.00
13	18" Aggregate Subbase	4,667	CY	\$ 60.00		\$ 280,020.00
14	Permeable Separator	800	SY	\$ 8.00		\$ 6,400.00
15	6" Perforated Sub-drain	1,360	LF	\$ 30.00		\$ 40,800.00
16	4" High Chain Link Fence	800	LF	\$ 40.00		\$ 32,000.00
17	CMU Retaining Walls (1-ft to 3-ft ht.), In Place Complete	865	LF	\$ 100.00		\$ 86,500.00
18	Pavement Markings & Striping	1	LS	\$ 22,000.00		\$ 22,000.00
SUBTOTAL SITE IMPROVEMENTS						\$ 2,702,780.00

DRAINAGE SYSTEM						
19	24-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	450	LF	\$ 175.00		\$ 78,750.00
20	30-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	1040	LF	\$ 210.00		\$ 218,400.00
21	36-Inch Drain Line, Including Trench Excavation and Backfill, In Place Complete	106	LF	\$ 250.00		\$ 26,500.00
22	Catch Basin	7	EA	\$ 9,500.00		\$ 66,500.00
23	Drain Manhole, In Place Complete	2	EA	\$ 6,500.00		\$ 13,000.00
24	6' Hydrodynamic Separator	1	EA	\$ 40,000.00		\$ 40,000.00
25	Detention Pond Riser	1	EA	\$ 40,000.00		\$ 40,000.00
26	Conc. Headwall	1	EA	\$ 5,000.00		\$ 5,000.00
27	Detention Basin Excavation	10,000	CY	\$ 40.00		\$ 400,000.00
28	Vmax 3000 Turf Reinforcement Mat	2700	SY	\$ 8.00		\$ 21,600.00
SUBTOTAL DRAINAGE SYSTEM						\$ 831,000.00
WATER SYSTEM						
29	16-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	650	LF	\$ 140.00		\$ 91,000.00
30	6-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	150	LF	\$ 90.00		\$ 13,500.00
31	Fire Hydrant Assembly	3	EA	\$ 7,500.00		\$ 22,500.00
32	16" BGGV & Vault	1	EA	\$ 56,000.00		\$ 56,000.00
33	Concrete Blocks	7	EA	\$ 20,000.00		\$ 140,000.00
34	16" Cap	1	EA	\$ 30,000.00		\$ 30,000.00
35	Chlorination & Testing	1	LS	\$ 12,000.00		\$ 12,000.00
SUBTOTAL WATER SYSTEM						\$ 365,000.00
NON-POTABLE WATER SYSTEM						
36	24-Inch Water Line, Including Trench Excavation and Backfill, In Place Complete	650	LF	\$ 190.00		\$ 123,500.00
37	24" BGGV & Vault	1	EA	\$ 65,000.00		\$ 65,000.00
38	Concrete Blocks	1	EA	\$ 50,000.00		\$ 50,000.00
39	24" Cap	1	EA	\$ 65,000.00		\$ 65,000.00
40	Chlorination & Testing	1	LS	\$ 12,000.00		\$ 12,000.00
SUBTOTAL NON-POTABLE WATER SYSTEM						\$ 315,500.00
WASTEWATER SYSTEM						
41	30-Inch Sewer Line, Including Trench Excavation and Backfill, In Place Complete	650	LF	\$ 210.00		\$ 136,500.00
42	Sewer Manhole	1	EA	\$ 28,000.00		\$ 28,000.00
43	Sewer Drop Manhole	1	EA	\$ 35,000.00		\$ 35,000.00
44	Reinforced Concrete Jacket	23	LF	\$ 2,500.00		\$ 57,500.00
45	Steel Sleeve	12	LF	\$ 2,500.00		\$ 30,000.00
SUBTOTAL WASTEWATER SYSTEM						\$ 287,000.00
	SITE WORK SUBTOTAL					\$ 4,513,830.00

LANDSCAPING						
1	Coral Boulders	8,200	SF	\$	3.00	\$ 24,600.00
2	Landscape Fabric	950	SY	\$	8.00	\$ 7,600.00
	LANDSCAPING SUBTOTAL					\$ 32,200.00
ELECTRICAL IMPROVEMENTS						
1	Electrical Infrastructure	1	LS	\$	1,181,880.00	\$ 1,181,880.00
SUBTOTAL ELECTRICAL IMPROVEMENTS						\$ 1,181,880.00
SUBTOTAL NORTH SEGMENT						\$ 5,727,910.00
CONTINGENCY (15%)						\$ 859,186.50
TOTAL NORTH SEGMENT						\$ 6,587,096.50

APPENDIX F:
KAPOLEI PARKWAY OVERSIZING CREDITS

**Ewa Highway Transportation Impact Fee Credit Oversizing Summary
Pursuant to Sec. 33A-1.10 Exemptions and Credits, Subsection (b)(1)**

Transportation Impact Fee Credit Awardee	Kapolei Parkway Segment Constructed	Transportation Impact Fee Credit Awarded to Date	Kapolei Parkway Upsizing from Ch. 33A, Table 33A-1.2	Total Oversizing Transportation Impact Fee Credit to be Awarded
Haseko Development, Inc.	Puuloa Rd. to Keoneula Blvd.	\$4,421,176.28	2 lanes to 6 lanes	\$1,124,641.49
Gentry Homes, Ltd.	Puuloa Rd. to Keoneula Blvd.	\$2,463,223.72	2 lanes to 6 lanes	\$3,917,192.17
D.R. Horton, Schuler Division	Ft. Barrette Rd. to Kunehi St.	\$1,190,800	4 lanes to 6 lanes	\$534,522.25
Kapolei Properties LLC/ Aina Nui Corporation	Kunehi St. to Alohikea St. (Urban Core 4)	\$3,428,033	4 lanes to 6 lanes	\$1,333,806
	Kalaeloa Blvd. to Harbor Access Rd. (Kapolei Parkway West)	\$3,600,000	4 lanes to 6 lanes	\$3,079,170

Haseko Development, Inc. Backup Sheets

Haseko Development, Inc. - Kapolei Parkway Cost & Impact Fee Credit

Kapolei Pkwy Segments	Area	Site Work Cost	Landscaping	Total Cost	Credit Received	Oversize Cost	Factor	³ Additional Credit Requested
¹ Mauka Boundary to Keoneula Blvd	Area 2D	1,799,444	97,604	1,897,048	1,136,776.28	760,272.11	2/3	506,848.07
¹ Keoneula Blvd to Kaileolea Dr	Area 2	2,390,882	57,291	2,448,173	2,424,000.00	24,173.12	2/3	16,115.41
¹ Kaimalie St to Papipi Rd	Area 3	1,240,720	63,628	1,304,348	860,400.00	443,948.00	2/3	295,965.33
² Kapolei Parkway and Keoneula Blvd	Traffic Light	458,569		458,569	-	458,569.00	2/3	305,712.67
	Total	5,889,615	218,523	6,108,139	4,421,176.28	1,686,962.23		1,124,641.49

NOTE

- ¹ Pending credit represents the oversize portions of the segments that did not receive credit as of 1/31/06.
- ² Amount represents the soft and hard cost to install a traffic light at the Kapolei Parkway and Keoneula Blvd intersection.
- ³ Amount is calculated based on the actual cost for the 6 lane, less credit received and multiplied with the 2/3 factor.

Haseko Development, Inc. - Kapolei Parkway Cost & Impact Fee Credit

Kapolei Pkwy Segments		Area	Site Work Cost	Landscaping	Total Cost	Credit Received	Oversize Cost	Factor	³ Additional Credit Requested
¹	Mauka Boundary to Keoneula Blvd	Area 2D	1,799,444	97,604	1,897,048	1,136,776.28	760,272.11	2/3	506,848.07
		Delta	1,799,444	97,604					
¹	Keoneula Blvd to Kaileolea Dr	Area 2	2,390,882	57,291	2,448,173	2,424,000.00	24,173.12	2/3	16,115.41
		Delta	2,390,882	57,291					
¹	Kaimalie St to Papipi Rd	Area 3	1,240,720	63,628	1,304,348	860,400.00	443,948.00	2/3	295,965.33
		Delta	1,185,720	63,628					
²	Kapolei Parkway and Keoneula Blvd	Gary Hong Nojima	55,000						
		Traffic Light	458,569		458,569	-	458,569.00	2/3	305,712.67
		Wilson Okamoto	122,600						
		Millers Paving LLC	5,600						
		Delta	25,000						
		Endo Electric	305,369						
		Total	11,779,231	437,046	6,108,139	4,421,176.28	1,686,962.23		1,124,641.49

NOTE

- ¹ Pending credit represents the oversize portions of the segments that did not receive credit as of 1/31/06.
² Amount represents the soft and hard cost to install a traffic light at the Kapolei Parkway and Keoneula Blvd intersection.
³ Amount is calculated based on the actual cost for the 6 lane, less credit received and multiplied with the 2/3 factor.

Gentry Homes, LTD. Backup Sheets

Subcontractor.....: 03035 ROYAL CONTRACTING CO., LTD.
 Subcontract number...: 05S-064 Kapolei Parkway Ext 48+8.29-70+92.8
 Contract total.....: 9,467,334.97 Original Contract...: 8,133,449.75
 Total Change Orders: 1,333,885.22
 Sort criteria.....: 2 BY CHANGE NUMBER 9,467,334.97

Begin list with change number: _____

Action: C=Internal Comments I=Inquiry N=Printable Notes S=Staging

A	Lin	Chg D	Job	Ca	CCod	Sub	CT	Quantity	Unit price	UOM	Amount
		No	Ty	Number				Description			
1	1	S	200202	11	0120	120	10	CLEAR & GRUBB			94870.00
2	2	S	200202	11	0120	600	10	EROSION CONTROL			69800.00
3	3	S	200202	11	0120	100	10	MASS EXCAVATION/EMBANKMENT			188755.00
4	4	S	200204	11	0190	520	10	KEYSTONE WALLS			99900.00
5	5	S	200204	11	0130	100	10	ROADS			2461229.75
6	6	S	200204	11	0140	100	10	DRAINAGE			1735050.00
7	7	S	200204	11	0160	100	10	BWS SYSTEM			545970.00
8	8	S	200204	11	0150	100	10	SEWER			1047245.00

More...

F4=List

F13=Unit Price

F14=Retention

TOTAL INCL CHANGE ORDERS = \$9,467,334.97
 LESS 190,896.00 (HASEKO R-1 LINE)
 LESS 937,433.00 (OFFSITE SEWER & DRAIN LINE)
 LESS \$2,463,223.72 (CREDITS PREVIOUSLY RECEIVED)
 \$5,875,788.25
 X 2/3
 \$3,917,192.17

D.R. Horton Schuler Division Backup Sheets

KAPOLEI PARKWAY COST

A. GRADING AND ROADWAY IMPROVEMENTS

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
1.	Clearing and grubbing.	1.9 ac of 10.1 ac in lump sum bid	\$ 7,600.00
2.	Unclassified Excavation (Estimated Embankment = 12,962 cy), including import of suitable fill material, hauling and disposal of excess and unsuitable material, over-excavation of areas partially in cut and fill, in place complete.	1,460 cy of 4,564 cy in lump sum bid	\$ 17,520.00
3.	Erosion control grassing for exposed areas, including temporary irrigation, in place complete.	50,181 sf of 156,816 in lump sum bid	\$ 7,527.15
4.	Maintain existing gravel ingresses and egresses (3 locations), in place complete.	32% of lump sum bid	\$ 1,984.00
5.	Catch basin filter, in place complete.	5 of 20 ea in lump sum bid	\$ 2,750.00
6.	Streamguard, model 3002 (or equal catch basin filter, in place complete.	all	\$ 1,520.00
8.	Sediment basins and temporary swales, in place complete (does not include Ditch "N" and Ditch "M" which are paid for under Excavation).	32% of lump sum bid	\$ 2,240.00
9.	Silt fence, in place complete.	477 lf of 1,490 lf in lump sum bid	\$ 3,625.20
10.	Dust control.		\$ 12,000.00
12.	Asphaltic concrete pavement, 4" thick, in place	all	\$ 343,920.00
15.	Asphaltic Concrete Base, 8.5" thick, in place complete.	all	\$ 660,434.00
16.	Aggregate Subbase, 6" thick, in place complete.	7,185 sy of 16,330 sy in lump sum	\$ 95,560.50
18.	4" thick concrete sidewalk, in place complete.	12,189 sf of 44,841 sf in lump sum	\$ 90,198.60
19.	Standard cast-in-place concrete curb, including drop curb blocks and driveway curbs, in place complete.	all	\$ 3,782.00
20.	Standard cast-in-place concrete curb and gutter including drop curb blocks and driveway curbs, in place complete.	1,167 lf of 5,541 lf in lump sum bid	\$ 50,181.00
21.	Concrete median, in place complete.	all	\$ 2,828.20
23.	Curb Ramp (Type A), including detectable warning mat, in place complete.	3 of 17 ea in lump sum bid	\$ 9,900.00
24.	Curb Ramp (Type B), including detectable warning mat, in place complete.	all	\$ 3,500.00
25.	Curb Ramp (DOT Type C), including detectable warning mat, in place complete.	all	\$ 3,600.00
26.	Curb Ramp (Special), including detectable warning mat, in place complete.	all	\$ 3,600.00
28.	Saw cutting and removal of existing driveway, curb, curb and gutter and sidewalk, in place complete.	all	\$ 1.00
29.	Saw cutting and removal of existing asphalt concrete pavement, in place complete.	all	\$ 16,000.00
30.	Fort Barrette Road pavement replacement, in place complete.	all	\$ 45,000.00
31.	Permeable base course outlet (Ft. Barrette Road), in place complete.	all	\$ 2,100.00
32.	Pavement markings, in place complete.	32% of lump sum bid	\$ 13,120.00
33.	Signage, including post or bracket, in place complete.	32% of lump sum bid	\$ 8,000.00
34.	Traffic control, in palce complete.	all	\$ 15,000.00
35.	Installation of street monumentation, in place complete.	32% of lump sum bid	\$ 1,536.00

SUBTOTAL

(Items 1 to 35, inclusive)

\$ 1,425,027.65

KAPOLEI PARKWAY COST

B. DRAINAGE SYSTEM

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
37.	18" RCP drain pipe, Class III, including excavation, backfill, and pipe cushion, in place complete.	164 lf of 546 lf in lump sum bid	\$ 18,040.00
38.	24" RCP drain pipe, Class III, including excavation, backfill, and pipe cushion, in place complete.	179 lf of 948 lf in lump sum bid	\$ 23,270.00
40.	36" RCP drain pipe, Class III, including excavation, backfill, and pipe cushion, in place complete.	44 lf of 175 lf in lump sum bid	\$ 7,480.00
42.	54" RCP drain pipe, Class III, including excavation, backfill, and pipe cushion, in place complete.	all	\$ 172,840.00
46.	Pipe inlet or outlet (18"-24" pipe), including angled cut pipe end and rip rap, in place complete.	2 of 3 ea in lump sum bid	\$ 36,000.00
47.	Pipe inlet or outlet (30"-48" pipe), including angled cut pipe end and rip rap, in place complete.	1 of 2 ea in lump sum bid	\$ 19,000.00
48.	Pipe inlet or outlet (54"-60" pipe), including angled cut pipe end and rip rap, in place complete.	1 of 2 ea in lump sum bid	\$ 19,000.00
52.	City & County Standard (Det. D-18) shallow drain manhole for pavement area, from top to invert 6.00' to 7.99' deep, including excavation and backfill, in place complete.	all	\$ 20,000.00
54.	Special drain manhole (pipes 54"-60") for pavement area, from top to invert 8.00' to 10.99' deep, including excavation and backfill, in place complete.	2 of 8 ea in lump sum bid	\$ 28,000.00
56.	City & County Standard (Det. D-5) Type "B" catch basin, from top to invert 5.00' to 7.99' deep, including excavation and backfill, and deflector inlet, in place complete.	2 of 5 ea in lump sum bid	\$ 22,000.00
60.	Modified Type "F" catch basin, from top to invert 9.00' to 10.99' deep, including excavation and backfill, and deflector inlet, in place complete.	all	\$ 21,000.00
61.	Type "G1" drain inlet, from top to invert up to 4' deep, including excavation and backfill, and deflector inlet, in place complete.	all	\$ 17,400.00
DRAINAGE SYSTEM SUBTOTAL (Items 36 to 63, inclusive)			<u>\$ 404,030.00</u>

C. SANITARY SEWER SYSTEM

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
65.	10" PVC C900 sewer pipe, including fittings, excavation and backfill, in place complete.	144 lf of 389 lf in lump sum bid	\$ 10,080.00
69.	Crushed rock cradle for 10" sewer pipe, in place	144 lf of 389 lf in lump sum bid	\$ 3,024.00
75.	Reinforced concrete jacket for ex. 24" sewer pipe, in place complete.	all	\$ 3,240.00
77.	Standard City & County sewer manhole, with epoxy lining, from top to invert 8.00' to 9.99' deep, including excavation and backfill, in place complete.	1 of 13 ea in lump sum bid	\$ 15,000.00
SANITARY SEWER SYSTEM (Items 64 to 78, inclusive)			<u>\$ 31,344.00</u>

KAPOLEI PARKWAY COST

D. POTABLE WATER SYSTEM

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
80.	6" PVC Class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	108 lf of 448 lf in lump sum bid	\$ 5,292.00
82.	12" PVC Class 150 water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	843 lf of 3,920 lf in lump sum bid	\$ 84,300.00
84.	6" Gate valve, Class 150, including valve box and appurtenances, in place complete.	2 of 16 ea in lump sum bid	\$ 2,200.00
86.	12" Gate valve, Class 150, including valve box and appurtenances, in place complete.	5 of 22 ea in lump sum bid	\$ 13,000.00
87.	3/4" Air relief valve and box, including appurtenances, in place complete.	1 of 7 ea in lump sum bid	\$ 2,700.00
88.	Fire hydrant, including extension, concrete pad, and marker, in place complete.	2 of 12 ea in lump sum bid	\$ 9,200.00
89.	Class "B" concrete for reaction blocks, including anchor blocks and thrust blocks, and thrust beams, in place complete.	14.96 cy of 68 cy in lump sum bid	\$ 8,078.40
93.	Reinforced concrete jacket for 12" water main, in place complete.	62 lf of 452 lf in lump sum bid	\$ 11,780.00
94.	Temporary for testing, 12" MJ Cap with 4" cleanout, in place complete.	all	\$ 1,100.00
97.	Short body cast iron and PVC fittings, for 250 psi water pressure plus water hammer, unless otherwise specified.	9,219.2 lbs of 28,810 lbs in lump sum bid	\$ 34,111.04
98.	Connection and chlorination of of new main to existing main, including all appurtenances, in place complete.	all	\$ 34,000.00
POTABLE WATER SYSTEM (Items 79 to 98, inclusive)			<u>\$ 205,761.44</u>

E. RECYCLED WATER SYSTEM

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
99.	6" PVC Class 150 purple water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	71 lf of 420 lf in lump sum bid	\$ 3,763.00
100.	16" PVC Class 150 purple water pipe, including trenching, pipe cushion, backfill, and other incidentals, in place complete.	all	\$ 83,300.00
101.	6" Gate valve, Class 150, including valve box (purple) and appurtenances, in place complete.	all	\$ 1,100.00
102.	16" BGGV, Class 150, including flanged dismantling joint, capping collars, Type "A" manhole (purple) and appurtenances, in place complete.	all	\$ 34,000.00
103.	3/4" Air relief valve and box (purple), including appurtenances, in place complete.	all	\$ 6,700.00
104.	Class "B" concrete for reaction blocks, including anchor blocks and thrust beams, in place complete.	all	\$ 5,940.00
106.	Reinforced concrete jacket for 16" water main, in place complete.	all	\$ 5,060.00

KAPOLEI PARKWAY COST

E. RECYCLED WATER SYSTEM (cont.)

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
108.	Short body cast iron and PVC fittings, for 250 psi water pressure plus water hammer, unless otherwise specified.	4,200 lbs of 4,420 lbs in lump sum bid	\$ 18,480.00
109.	Connection(s) and chlorination of of new main to existing main, including all appurtenances, in place complete.	all	\$ 17,000.00
RECYCLED WATER SYSTEM (Items 99 to 109, inclusive)			<u>\$ 175,343.00</u>

F. UNDERGROUND ELECTRIC, TELEPHONE, CATV, AND STREET LIGHTING SYSTEMS

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
110.	Trenching & Backfilling for Utility Ductlines, in place complete	1,500 lf of 7,465 lf in lump sum bid	\$ 69,000.00
111.	Trenching & Backfilling for Traffic Signal & Street Light Conduits, in place complete	2,600 lf of 6,880 lf in lump sum bid	\$ 54,600.00
112.	Concrete Jacket for Ducts, complete in place	225.5 cy of 902 cy in lump sum bid	\$ 36,080.00
113.	HECO 6' x 14' Manhole, in place complete	2 of 3 ea in lump sum bid	\$ 36,000.00
117.	HECO 3' X 5' Handhole, in place complete	1 of 13 ea in lump sum bid	\$ 5,500.00
118.	HTCO 5' x 10' Manhole, in place complete	2 or 4 ea in lump sum bid	\$ 24,000.00
122.	CATV 2' x 6' Pullbox, in place complete	2 of 10 ea in lump sum bid	\$ 3,000.00
123.	CATV 2' x 4' Pullbox, in place complete	1 of 11 ea in lump sum bid	\$ 1,000.00
129.	Street Light Standard, 150W, Ground Rod, Concrete Base, in place complete	all	\$ 30,000.00
131.	Street Light Pullbox, Type SLD-4, in place complete	12 of 41 ea in lump sum bid	\$ 9,600.00
132.	Traffic Signal Pullbox , Type C, in place complete	9 of 28 ea in lump sum bid	\$ 8,100.00
134.	No. 1 Conductors, in place complete	3,690 lf of 15,000 in lump sum bid	\$ 7,380.00
135.	No. 6 Conductors, in place complete	1,230 lf of 6,000 lf in lump sum bid	\$ 1,230.00
136.	No. 10 Conductors, Waterproof Splices, in place	1,320 lf of 6,000 lf in lump sum bid	\$ 1,320.00
137.	5" HECO Conduit PVC 40, in place complete	4,235 lf of 9,890 lf in lump sum bid	\$ 21,175.00
138.	4" HECO Conduit PVC 40, in place complete	2,180 lf of 6,130 lf in lump sum bid	\$ 8,720.00
140.	2" HECO Conduit PVC 40, in place complete	1,845 lf of 15,605 lf in lump sum bid	\$ 3,690.00
141.	4" HTCO Conduit PVC 40, in place complete	4,130 lf of 18,000 in lump sum bid	\$ 16,520.00
142.	4" CATV Conduit PVC 40, in place complete	1,655 lf of 6,940 lf in lump sum bid	\$ 6,620.00
144.	2" Street Light Conduit PVC 80, in place complete	1,230 lf of 4,900 lf in lump sum bid	\$ 3,690.00
145.	2" Traffic Signal Conduit PVC 80, in place complete	1,275 lf of 9,920 lf in lump sum bid	\$ 3,825.00
UNDERGROUND ELECTRIC, TELEPHONE, CATV, AND STREET LIGHTING SYSTEMS (Items 110 to 148, inclusive)			<u>\$ 351,050.00</u>

G. TRAFFIC SIGNAL AT KAPOLEI PARKWAY AND FORT BARRETTE ROAD

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
149.	Regulatory Warning Sign (10 sq. ft or less)	all	\$ 1,000.00
150.	Furnish and Install Controller Assembly (Model 170 Traffic Signal Controller Unit, Type 332 Cabinet and Zuxiliary Equipment)	all	\$ 18,000.00
151.	Type I Traffic Signal Standard, H=10 ft.	all	\$ 2,100.00

KAPOLEI PARKWAY COST

G. TRAFFIC SIGNAL AT KAPOLEI PARKWAY AND FORT BARRETTE ROAD (cont.)

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
152.	Type II Traffic Signal Standard with 21-Foot Mast Arm	all	\$ 5,000.00
153.	Type II Traffic Signal Standard with 26-Foot Mast Arm	all	\$ 5,000.00
154.	Type II Traffic Signal Standard with 40-Foot Mast Arm	all	\$ 5,000.00
155.	Type III Traffic Signal Standard with 19-Foot Mast Arm	all	\$ 5,000.00
156.	Foundation for Type I Signal Standard	all	\$ 3,600.00
157.	Foundation for Type II Signal Standard	all	\$ 12,000.00
158.	Foundation for Type III Signal Standard	all	\$ 12,000.00
159.	Foundation for Controller Cabinet	all	\$ 500.00
160.	Traffic Signal Assembly, (1-way, 12-inch, 1-3 Section Vertical with Type TP-1W Mounting)	all	\$ 2,100.00
161.	Traffic Signal Assembly, (1-way, 12-inch, 1-3 Section Vertical with Type B-1W Mounting)	all	\$ 2,100.00
162.	Traffic Signal Assembly, (2-way, 12-inch, 2-3 Section Vertical with Type B-2W Mounting)	all	\$ 1,400.00
163.	Traffic Signal Assembly, (1-way, 12-inch, 2-3 Section Vertical with Type MA-1W(1) Mounting)	all	\$ 4,200.00
164.	Traffic Signal Assembly, (1-way, 12-inch, 2-3 Section Vertical, Programmable Visibility Head with Type MA-1W(1) Mounting)	all	\$ 5,960.00
165.	EVP Optical Receiver with Mast Arm Mounting	all	\$ 2,800.00
166.	Pedestrian Signal Assembly, (1-way, 12-inch, One Vertical with Type B-1W Mounting)	all	\$ 1,000.00
167.	Pedestrian Signal Assembly, (1-way, 12-inch, One Vertical with Type C-1W Mounting)	all	\$ 1,000.00
168.	Pedestrian Push Button with Instruction Sign	all	\$ 1,600.00
169.	Traffic Signal Ductline, One 2-inch Conduit, SCH 40 PVC, Concrete Encased	all	\$ 2,960.00
170.	Traffic Signal Ductline, Two 2-inch Conduit, SCH 40 PVC, Concrete Encased	all	\$ 2,730.00
171.	Traffic Signal Ductline, Three 2-inch Conduit, SCH 40 PVC, Concrete Encased	all	\$ 3,690.00
172.	Traffic Signal Ductline, Seven 2-inch Conduit, SCH 40 PVC, Concrete Encased	all	\$ 1,000.00
173.	Traffic Signal Ductline, Two 3-inch Conduit, and Five 2-inch Conduit, SCH 40 PVC, Concrete Encased	all	\$ 1,050.00
174.	Type A Pullbox	all	\$ 500.00
175.	Replace Type B Pullbox	all	\$ 3,600.00
176.	New Type B Pullbox	all	\$ 1,200.00
177.	Replace Type C Pullbox	all	\$ 700.00
178.	No. 14, 2-Conductor Loop Detector Lead-in Cable	all	\$ 4,600.00
179.	No. 14, 26-Conductor Traffic Control Cable	all	\$ 2,440.00
180.	No. 19, 24-Conductor (12-Pair) Traffic Control Interconnect Cable	all	\$ 8,160.00
181.	No. 4, 3-Conductor Power Cable	all	\$ 100.00
182.	EVP Cable	all	\$ 730.00
183.	Loop Detector Sensing Unit (6 ft. x 6 ft.) Two Loops	all	\$ 2,700.00
184.	Loop Detector Sensing Unit (6 ft. x 6 ft.) Four Loops	all	\$ 3,600.00
185.	Loop Detector Sensing Unit (6 ft. x 6 ft.) Six Loops	all	\$ 10,800.00
TRAFFIC SIGNAL AT KAPOLEI PARKWAY AND FORT BARRETTE ROAD			\$ 141,920.00
(Items 149 to 185, inclusive)			

KAPOLEI PARKWAY COST

CO1. CHANGE ORDER 1

Ph 1 Bid Item No.	Item	Portion of Ph 1 Bid Qty	Contract Value
f	Additional Air Relief Valve at Road KP	all	\$ 9,400.00
h	Re-Striping Work at Fort Barrette Road	all	\$ 6,115.00
i	Re-Striping of Pedestrian Crossings at Fort Barrette Rd	all	\$ 3,260.00
j	Street Name Sign on Mast Arm of Traffic Signals	all	\$ 7,483.07
m	Relocations of TS Pole B	all	\$ 5,332.54
n	Relocation of TS Pole F	all	\$ 957.91
o	Ductline Across Kapolei Parkway	all	\$ 15,482.45
p	Relocation of SL to TS Pole A	all	\$ 10,895.84
q	Relocation of SL to TS Pole A	all	\$ 599.15
t	Change Existing State TS Cover to State SL Cover	all	\$ 364.69
CHANGE ORDER 1			\$ 59,890.65
(Items a to u, inclusive)			

TOTAL CONSTRUCTION COST FOR KAPOLEI PARKWAY **\$ 2,794,366.74**

Total Cost for Kapolei Parkway less Credits already awarded (\$2,794,366.74 - \$1,190,800) = \$ 1,603,566.74
1/3 of Total Cost less Credits = \$ 534,522.25

Kapolei Properties LLC/Aina Nui Corporation Backup Sheets

Additional Traffic Impact Fees for Upsizing from 4 to 6 Lanes

	Kapolei Properties LLC (formerly Kapolei Property Development LLC)	Aina Nui Corporation
	Kapolei Parkway - Urban Core 4	Kapolei Parkway West
Total Contract Price	14,713,424	19,480,290
		65.9%
Costs Allocable to Parkway ¹	7,429,452	12,837,511
- Credits Previously Awarded	3,428,033	3,600,000
	4,001,419	9,237,511
2 additional lanes	1/3	1/3
Additional Credits	1,333,806	3,079,170
		4,412,976

¹ Urban Core 4 contract specifically identified costs whereas Kapolei Parkway West was determined based on length of roadway constructed.

PAYMENT APPLICATION

Page 1

TO: Aina Nui Corporation 1001 Kaniokila Boulevard Kapolei, Hawaii 96707 Attn: Brad Myers	PROJECT NAME AND LOCATION: Kalaheoa-Kapolei Parkway West Kapolei, Hawaii 96707	APPLICATION # 14 PERIOD THRU: 12/04/2009 PROJECT #s: DATE OF CONTRACT: 08/17/2008	Distribution to: <input type="checkbox"/> OWNER <input type="checkbox"/> ARCHITECT <input type="checkbox"/> CONTRACTOR
FROM: Delta Construction Corp 91-255 Oihana Street Kapolei, HI 96707	ARCHITECT: Engineering Concepts Inc. 1150 South King Street, Suite 700 Honolulu/HI/96814		
FOR:			

CONTRACTOR'S SUMMARY OF WORK

Application is made for payment as shown below.
Continuation Page is attached.

1. CONTRACT AMOUNT	\$15,778,665.13
2. SUM OF ALL CHANGE ORDERS	\$3,701,624.51
3. CURRENT CONTRACT AMOUNT (Line 1 +/- 2)	\$19,480,289.64
4. TOTAL COMPLETED AND STORED (Column G on Continuation Page)	\$19,480,289.64
5. RETAINAGE:	
a. 0.00% of Completed Work (Columns D + E on Continuation Page)	\$0.00
b. 0.00% of Material Stored (Column F on Continuation Page)	\$0.00
Total Retainage (Line 5a + 5b or Column I on Continuation Page)	\$0.00
6. TOTAL COMPLETED AND STORED LESS RETAINAGE (Line 4 minus Line 5 Total)	\$19,480,289.64
7. LESS PREVIOUS PAYMENT APPLICATIONS	\$17,532,260.68
8. PAYMENT DUE	\$1,948,028.96
9. BALANCE TO COMPLETION (Line 3 minus Line 6)	\$0.00

SUMMARY OF CHANGE ORDERS	ADDITIONS	DEDUCTIONS
Total changes approved in previous months	\$3,846,913.29	(\$145,288.78)
Total approved this month:	\$0.00	\$0.00
TOTALS	\$3,846,913.29	(\$145,288.78)
NET CHANGES	\$3,701,624.51	

Contractor's signature below is his assurance to Owner, concerning the payment herein applied for, that: (1) the Work has been performed as required in the Contract Documents, (2) all sums previously paid to Contractor under the Contract have been used to pay Contractor's costs for labor, materials and other obligations under the Contract for Work previously paid for, and (3) Contractor is legally entitled to this payment.

CONTRACTOR: Delta Construction Corp

By:

Date:

State of: Hawaii

County of: Honolulu

Subscribed and sworn to before

me this

day of

December, 2009

Notary Public

My Commission Expires:

11/10/2010

Doc. Date: 12/11/09

Name: Lynne M.K. Milani

Doc. Description: Payment Application

Signature

Signature

Signature

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ARCHITECT'S CERTIFICATION

Architect's signature below is his assurance to Owner, concerning the payment herein applied for, that: (1) Architect has inspected the Work represented by this Application, (2) such Work has been completed to the extent indicated in this Application, and the quality of workmanship and materials conforms with the Contract Documents, (3) this Application for Payment accurately states the amount of Work completed and payment due therefor, and (4) Architect knows of no reason why payment should not be made.

CERTIFIED AMOUNT

(If the certified amount is different from the payment due, you should attach an explanation. Initial all the figures that are changed to match the certified amount.)

ARCHITECT:

By:

Date:

Neither this Application nor payment applied for herein is assignable or negotiable. Payment shall be made only to Contractor, and is without prejudice to any rights of Owner or Contractor under the Contract Documents or otherwise.

PAYMENT APPLICATION

Final Inspection was completed on 2/5/2010.

Authorize payment of the remaining 20% (\$389,605.79)

Quantum Software Solutions, Inc. Document

Signature

PAYMENT APPLICATION

AIA DOCUMENT G702

Page 1

TO: **Kapolei Property Development, LLC**
 900 Kamokila Blvd. Suite 250
 Kapolei HI 96707
 Attn: Chuck Hill

NAME & LOCATION **Urban Core 4 Roads**
 900 Kamokila Blvd. Suite 250
 Kapolei HI 96707

FROM: **Delta Construction Corporation**
 91-255 Oihana Street
 Kapolei, Hawaii 96707

ARCHITECT **Engineering Concepts Inc.**
 1150 South King Street, Suite 700
 Honolulu, HI 96814

FOR: Urban Core 4 Roads

APPLICATION # 40
Release of Retention
PERIOD THRU: 9/17/2012

PROJECT NOS. 2804

CONTRACT DATE: June 17, 2008

DISTRIBUTION TO:
 OWNER
 ARCHITECT
 CONTRACTOR

CONTRACTOR'S SUMMARY OF WORK

Application is made for Payment, as shown below, in connection with the Contract Continuation Sheet, AIA Document G703, is attached

Contractor's signature below is his assurance to Owner, concerning the payment herein applied for that: (1) the work has been performed as required in the Contract Documents, (2) all sums previously paid to Contractor under the Contract have been used to pay Contractor's costs for labor, materials and other obligations under the contract for work previously paid for, and (3) Contractor is legally entitled to this payment.

CONTRACTOR: DELTA CONSTRUCTION CORPORATION

BY: [Signature] 9/18/2012

Alfonso A. Legaspi, Project Engineer

STATE OF HAWAII

CITY AND COUNTY OF HONOLULU

Subscribed and sworn to before me this 18th day of September, 2012

Lynne M. K. Mitani

Notary Public, State of Hawaii:

My Commission expires: 11/10/2014

ARCHITECT'S CERTIFICATION

Architect's signature below is his assurance to Owner, concerning the payment herein applied for that: (1) Architect has inspected the work represented by this application, (2) such work has been completed to the extent indicated in this application, and the quality of workmanship and materials conforms with the contract documents, (3) this application for payment accurately states the amount of work completed and payment due therefore, and (4) Architect knows of no reason why payment should not be made.

CERTIFIED AMOUNT: \$ 735,671.20

(If the certified amount is different from the payment due, you should attach an explanation. Initial all the figures that are changed to match the certified amount)

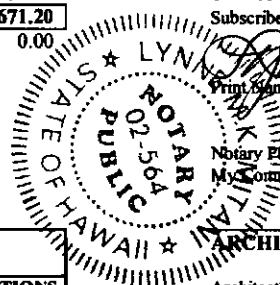
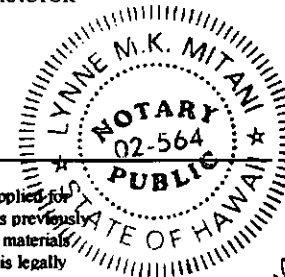
ARCHITECT

By: Craig Arakaki Date: 10/4/12
 Craig Arakaki

Neither this application nor payment applied for herein is assignable or negotiable. Payment shall be made only to Contractor, and is without prejudice to any rights of Owner or Contractor under the Contract Documents or otherwise.


1. CONTRACT AMOUNT	13,426,560.05
2. SUM OF ALL CHANGE ORDERS	1,286,863.86
3. CURRENT CONTRACT AMOUNT	14,713,423.91
4. TOTAL COMPLETED & STORED	14,713,423.91
5. RETAINAGE:	
a. 5% OF COMPLETED WORK	0.00
b. 5% OF STORED MATERIAL	0.00
TOTAL RETAINAGE	0.00
6. TOTAL COMPLETED AND STORED LESS RETAINAGE	14,713,423.91
7. LESS PREVIOUS PAYMENT APPLICATION	13,977,752.71
8. PAYMENT DUE	<u>735,671.20</u>
9. BALANCE TO COMPLETION	0.00

SUMMARY OF CHANGE ORDERS		
	ADDITIONS	DEDUCTIONS
TOTAL CHANGES APPROVED IN PREVIOUS MONTHS	1,433,202.36	(146,338.50)
TOTAL APPROVED THIS MONTH		
TOTALS	1,433,202.36	(146,338.50)
NET CHANGES	1,286,863.86	



Doc. Date: 9/18/12 # Pages: 25
 Notary Name: Lynne M. K. Mitani First Circuit
 Doc. Description: Payment Application
 Date: 9/18/12
 Notary Signature: [Signature]

ITEM No. (A)	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	SCHEDULED AMOUNT (C)	(GROSS) PREVIOUS WORK COMPLETED (D)	(GROSS) PREVIOUS MATERIALS STORED (E)	(GROSS) PREVIOUS COMPLETED & STORED (F=D+E)	WORK COMPLETED THIS APPLICATION (G)	LESS STORED MAT'L'S USED THIS APPLICATION (H)	(GROSS) Completed & Stored this Pay Application (I=G+H)	TOTAL COMPLETED & STORED TO DATE (J=F+I)	% COMPLETED & STORED	GROSS BALANCE TO COMPLETE	NET PAYMENT THIS APPLICATION
	CCO#5 PS - TIME EXTENSION	2	LS												
	CCO#6 PS - MISCELLANEOUS WORK	1	LS												
	Manawai	0.000		83,047.15	-	-	-	-	-	-	0.00	0.00		0.00	-
	Wakea	0.000		83,047.15	-	-	-	-	-	-	0.00	0.00		0.00	-
	Alohikea	0.000		83,047.15	-	-	-	-	-	-	0.00	0.00		0.00	-
	Kapolei Parkway	0.000		83,047.15	-	-	-	-	-	-	0.00	0.00		0.00	-
	East Kapolei Parkway	1.000		83,047.15	83,047.15	83,047.15		83,047.15			0.00	83,047.15	100.00	0.00	-
	Offsite Sewer	0.000		83,047.15	-	-	-	-	-	-	0.00	0.00		0.00	-
	CCO#7 PS - REVISED OFFSITE SEWER	1	LS												
	Manawai	0.000		(124,118.30)	-	-	-	-	-	-	0.00	0.00		0.00	-
	Wakea	0.000		(124,118.30)	-	-	-	-	-	-	0.00	0.00		0.00	-
	Alohikea	0.000		(124,118.30)	-	-	-	-	-	-	0.00	0.00		0.00	-
	Kapolei Parkway	0.000		(124,118.30)	-	-	-	-	-	-	0.00	0.00		0.00	-
	East Kapolei Parkway	0.000		(124,118.30)	-	-	-	-	-	-	0.00	0.00		0.00	-
	Offsite Sewer	1.000		(124,118.30)	(124,118.30)	(124,118.30)		(124,118.30)			0.00	(124,118.30)	100.00	0.00	-
	CCO#8 PS - MISCELLANEOUS WORK	1	LS												
	Manawai	0.000		18,640.60	-	-	-	-	-	-	0.00	0.00		0.00	-
	Wakea	0.000		18,640.60	-	-	-	-	-	-	0.00	0.00		0.00	-
	Alohikea	0.000		18,640.60	-	-	-	-	-	-	0.00	0.00		0.00	-
	Kapolei Parkway	1.000		18,640.60	18,640.60	18,640.60		18,640.60			0.00	18,640.60	100.00	0.00	-
	East Kapolei Parkway	0.000		18,640.60	-	-	-	-	-	-	0.00	0.00		0.00	-
	Offsite Sewer	0.000		18,640.60	-	-	-	-	-	-	0.00	0.00		0.00	-
	Sub-Total for Manawai				75,543.13	75,543.13	-	75,543.13	-	-	-	75,543.13	100.00	0.01	-
	Sub-Total for Wakea				110,971.52	110,971.52	-	110,971.52	-	-	-	110,971.52	100.00	0.01	-
	Sub-Total for Alohikea				90,657.08	90,657.08	-	90,657.08	-	-	-	90,657.08	100.00	0.00	-
	Sub-Total for Kapolei Parkway				(126,503.77)	(126,503.77)	-	(126,503.77)	-	-	-	(126,503.77)	100.00	0.00	-
	Sub-Total for East Kapolei Parkway				246,291.18	246,291.18	-	246,291.18	-	-	-	246,291.18	100.00	0.01	-
	Sub-Total for Offsite Sewer				889,904.70	889,904.70	-	889,904.70	-	-	-	889,904.70	100.00	-	-
	SUBTOTAL CHANGE ORDERS				1,286,863.86	1,286,863.83	-	1,286,863.83	-	-	-	1,286,863.83	100.00	0.03	0.00
	Total for Manawai				3,694,443.53	3,694,443.53	-	3,694,443.53	-	-	-	3,694,443.53	100.00	0.01	-
	Total for Wakea				2,074,567.47	2,074,567.47	-	2,074,567.47	-	-	-	2,074,567.47	100.00	0.01	-
	Total for Alohikea				625,056.68	625,056.68	-	625,056.68	-	-	-	625,056.68	100.00	0.00	-
	Total for Kapolei Parkway				4,031,806.33	4,031,806.36	-	4,031,806.36	-	-	-	4,031,806.36	100.00	0.00	-
	Total for East Kapolei Parkway				3,397,645.18	3,397,645.18	-	3,397,645.18	-	-	-	3,397,645.18	100.00	0.01	-
	Total for Offsite Sewer				889,904.70	889,904.70	-	889,904.70	-	-	-	889,904.70	100.00	-	-
	REVISED CONTRACT AMOUNT				14,713,423.91	14,713,423.91	-	14,713,423.91	-	-	-	14,713,423.91	100.00	0.03	-



= 7,429,452