CHAPTER 2
EXISTING CONDITIONS

2.1 OVERVIEW

This chapter presents the regional setting, inventory of existing facilities, land use controls and ownership, environmental considerations, and development trends associated with the OGG.

The existing OGG facilities, services, operations and programs are divided into the following categories:

- Airfield
- Terminal Area
- Air Cargo and Mail
- General Aviation (GA)
- Access/Ground Transportation
- Airport Support
- Airport Industrial
- Airspace, Airport Traffic Control (ATC) & Noise Abatement Procedures
- Airport Management

2.2 REGIONAL SETTING

The OGG occupies 1,540.51 acres of land located on the Central Maui isthmus, along the northeastern side of Kahului Town. The Central Maui isthmus, formed by the meeting of lava flows, connects the Haleakalā Volcano and West Maui Mountains by broad flat lands. See **Figure 1-1** on Page 2-2. The area within the OGG includes the 246.9 acre Kanahā Pond State Wildlife Sanctuary, managed by the State of Hawai'i Department of Land and Natural Resources (DLNR) via a Memorandum of Understanding (MOU).

Kahului Town is Maui's major commercial and industrial center and home to Maui's principal commercial harbor and the OGG. Kahului is also composed of residential neighborhoods with large suburban lots and wide curvilinear streets

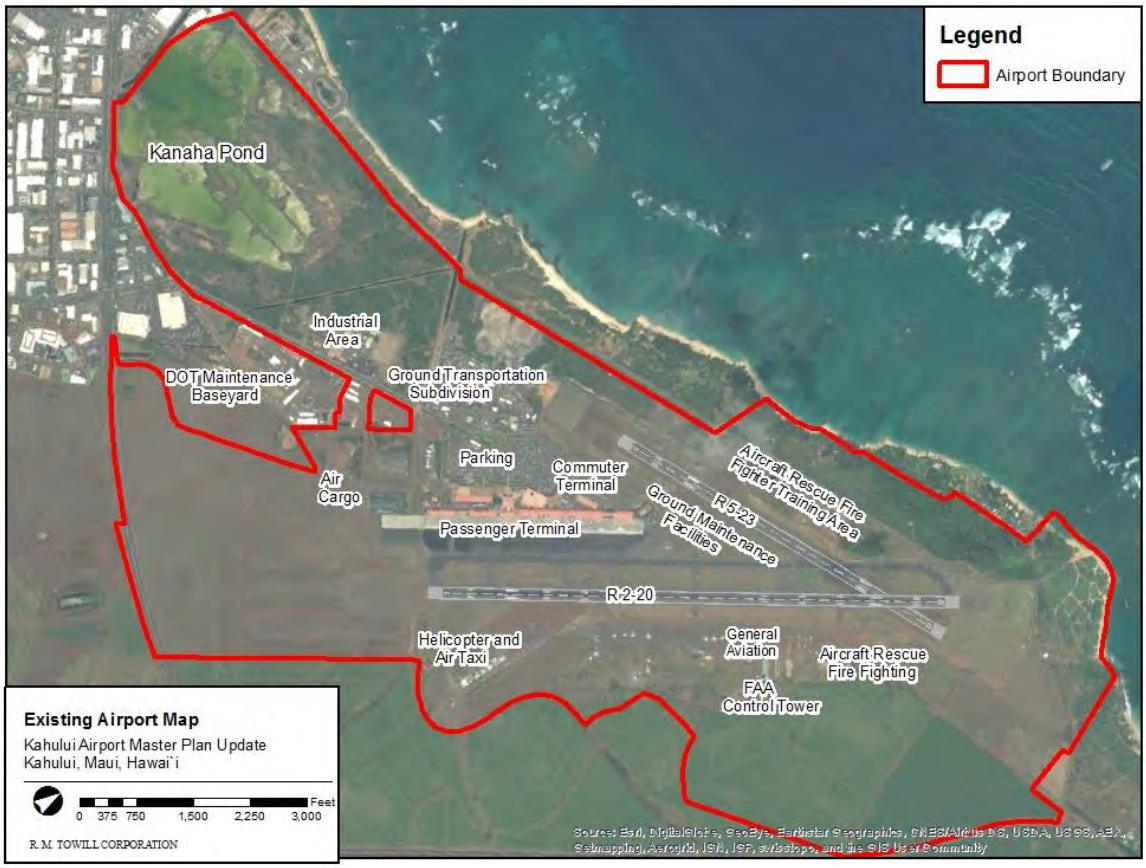

Figure 2-1 Location Map

Source: ESRI, Digital Globe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP swisstoppo, and GIS User Community

that are separated from the commercial and industrial uses in the area.

Land uses surrounding the OGG include single-family residences to the north; single-family residences and active agricultural lands to the east; the Hāna Highway, the Haleakalā Highway, and active agricultural lands to the south; and Kahului Harbor, Wailuku Wastewater Reclamation Facility, Kanahā Beach Park, and light industrial, commercial, and retail uses to the west.

2.3 INVENTORY OF EXISTING FACILITIES

Two (2) runways serve the airport: Runway 2-20 and Runway 5-23. See **Figure 2-1** and **Section 2.3.3** on Page 2-5 for a discussion on Runway 5-23.

The facilities located west of Runway 2-20 include:

- Main Passenger Terminal
- Commuter Airline Terminal
- Airline Offices
- Air Cargo Facilities
- Airline Ground Maintenance Facilities
- DOTA Maintenance Baseyard
- Ground Transportation Subdivision
- ARFF Training Facility
- Airport Industrial Area

The facilities located east of Runway 2-20 include:

- GA Area
- Aircraft Maintenance Facilities
- Hangars
- Based and Itinerant Aircraft Parking Apron
- Fixed Base Operator (FBO) Area
- Helicopter and Air Taxi Facilities Including Scenic Air Tour Operations
- Aircraft Rescue and Fire Fighting (ARFF) Facility
- FAA Airport Traffic Control Tower (ATCT)

The relationship of these facilities to each other is shown on **Figure 2-1** on Page 2-2.

2.3.1 AIRFIELD

According to the National Plan of Integrated Airport Systems (NPIAS) the OGG would be classified as a Primary, Medium Hub airport. A Primary airport is defined as having more than 10,000 passenger enplanements each year. A Medium Hub airport is defined as having between 0.25 and 1.0 percent (%) of the total annual passenger boardings within the U. S. in the current fiscal year.

Aircraft in use at the OGG are classified by the FAA in AC 150/5300-13A *Airport Design* (2014), as Aircraft Approach Categories (AAC) C or D (i.e., aircraft with approach speeds of 121 to 165 knots, inclusive). Examples of Category C and D aircraft include the B-737, B-747, B-757, B-767, B-777, A-330, and most business jet aircraft.

The OGG is primarily used by aircraft in the Aircraft Design Group (ADG) III with wingspans ranging from 79 feet (ft.) to 117 ft. (e.g., B-717 and B-737). It is also frequently used by aircraft such as the B-757 and B-767 that are in ADG IV. Aircraft in ADG V (i.e., B-747 and B-777) and ADG VI (i.e., C-5A) occasionally use the OGG but their operations account for an insignificant percentage of total operations. Between 2010 and 2015 the OGG had 118,896 and 123,587 aircraft operations respectively.

The OGG's two (2) runways, Runway 2-20 and Runway 5-23, intersect at the northern end of the airfield. Information on their physical characteristics is summarized in **Table 2-1** on Page 2-5.

2.3.2 RUNWAY 2-20

Runway 2-20 is 6,995 ft. long, 150 ft. wide, and constructed of grooved asphalt with 35 ft. wide stabilized asphalt concrete (AC) shoulders. The Runway Safety Area (RSA) is 500 ft. wide and extends 1,000 ft. in both directions beyond the ends of the runway. Elevations at Runway 2-20 ends are 54 and 12 ft., respectively, above Mean Sea Level (MSL). The average gradient from north to south is 0.59%.

Runway 2 has an Instrument Landing System (ILS), Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), and Visual Approach Slope Indicator (VASI-4), while Runway 20 has Precision Approach Path Indicator (PAPI-4) approach aids. In addition, Runway 2 has High-Intensity Runway Lights (HIRL), while Runway 20 has Medium Intensity Runway Lights (MIRL).

Runway 2-20 Reconstruction

Runway 2-20 serves as the OGG's primary runway. This runway is currently experiencing pavement distress and is in need of reconstruction.

Pavement distress results in increased AC deterioration in the form of cracks, joint deterioration, and other forms of pavement stresses. Although the runways at OGG are safe in their current condition, because of recent resurfacing, this has led to a slow but steady rise in the presence of foreign object debris (FOD). FOD has the ability to severely damage aircraft when there is an accidental intake of FOD into jet aircraft engines. The rise in FOD has led OGG staff to increase safety inspections prior to the departure of aircraft.

In 2008, the DOTA investigated this issue and commissioned two separate reports that had

similar findings concerning the cause of the pavement distress.

The first report, *Runway 2-20 and Taxiway Pavement Evaluation, Kahului, Maui, Hawai'i,* was prepared by MACTEC Engineering and Consulting, Inc. (MACTEC) in September 2008. The report investigated pavement conditions, potential problems, and recommended possible solutions to repair the runway while considering the runway's active use and importance to the economy of Maui.

MACTEC indicated that the existing pavement structure generally has about 17 inches of AC over four (4) to eight (8) inches of aggregate base, with some areas having 14 inches of AC over nine (9) inches of base, and 16 inches of AC over eight (8) inches of base. Shear testing of the pavement indicated weak to no bonding of the layers. The report concluded that the pavement problems resulted from slippage between the pavement layers caused principally by the braking and turning actions of heavy aircraft while slowing and exiting the runway after landing. The report hypothesized that "…the separation of the layers is due to a weak bond resulting from low or weak bond strength of the tack coat."

The second report, *Statewide Pavement Management System Update for Kahului Airport,* was prepared by URS Corporation, Inc., 2008, and similarly concluded "…pavement distress is from slippage between the existing AC layer which is placed over the aggregate base." A supplemental pavement evaluation, *Runway 2-20 & Taxiway Structural Improvements at OGG, State Project No. AM1022-14: Concrete Construction*, URS Corporation, Inc., 2010, further suggested that the runway surface be converted from asphalt to concrete.

The prevention of FOD caused by airfield pavement deterioration is among one of the DOTA and FAA's top safety priorities. Since 1942 when Runway 2-20 was originally constructed, there have been five (5) subsequent AC overlays constructed to maintain the use of the runway. These occurred in 1969, 1972, 1981, 1995, and 2000, at an overall approximate cost of $4.2 mil. Later, in 2006, a partial 3-inch AC mill and overlay project was constructed for approximately $3.4 mil.

The need for unscheduled intermittent pavement repairs to Runway 2-20 has been required since 2008. Funding for the pavement repair was from the airports special maintenance budget: 2008-2010, $1.3 mil. and 2011, $1 mil.

Pavement distress and proposed rehabilitation and/or reconstruction are a priority concern for both the DOTA and FAA. The intermediate repairs undertaken over the past several years have provided some relief but have not addressed the need for a permanent fix or remedy providing a durable, safe runway with a design life of not less than 20 years. The continued use of intermediate repairs constitutes an inefficient use of airport funds as recurring problems with FOD can be expected to result in aircraft delays and a higher potential for accidents when intermediate construction activities disrupt airfield operations.

During the OGG MP Update, the DOTA commissioned the *Kahului Airport Runway 2-20 Reconstruction Feasibility Study,* URS Corporation, Inc., 2012, to identify and evaluate reasonable and practical alternatives for Runway 2-20 reconstruction. Alternatives were evaluated using a three (3) step screening process that met the following purpose and need criteria:

- Reconstruct Runway 2-20 at its current length with a 20-year pavement life.
- Maintain airfield capability to adequately accommodate the current and projected levels of air carrier and cargo operations, as well as the current and potential fleet mix of transpacific flights.

Runway 2-20 Extension

Increasing the operational capacity of the OGG has been under consideration since 1993 when the last update of the OGG MP took place. Many

of the aircraft serving OGG in the 1990s are no longer being utilized and new markets are now being served. The aircraft now serving OGG are more efficient and larger. At its existing length of 6,995 ft., Runway 2-20 does not allow airlines to operate unrestricted at maximum takeoff weight (MTOW). See **Chapter 4**, **Section 4.3.6.8** *Runway Length* for details. Currently, the B-737-800 aircraft requires 8,400 ft. to takeoff at MTOW on a standard day + 27°C with zero wind and runway gradient. This is in contrast to the 6,995 ft. currently available. The B-767-300 requires on a similar standard day 10,600 ft. of runway to takeoff (Boeing, 2016).

2.3.3 RUNWAY 5-23

Runway 5-23 is 4,990 ft. long, 150 ft. wide, and constructed of grooved asphalt. The RSA is 500 ft. wide and extends 1,000 ft. in both directions from the ends of the runway. The average gradient from west to east is 0.08%. Runway 5 has VASI-4 approach aids.

Runway 5-23 primarily serves commuter and general aviation traffic. Occasionally the runway serves as a crosswind runway when there are "Kona" wind conditions from the south and southwest directions.

CHARACTERISTIC	RUNWAY 2-20	RUNWAY 5-23
Approach Category	C - D	A - C
Aircraft Design Group	IV-V	I-IV
Length (ft.)	6,995 ft.	4,990 ft.
Width (ft.)	150 ft.	150 ft.
Surface Type	ASPH-G	ASPH-G
Surface Treatment	Grooved	Grooved
Pavement Strength		
- Double Dual Tandem	750,000 lbs.	N/A
- Dual Tandem	360,000 lbs.	270,000 lbs.
- Dual Wheeled	170,000 lbs.	170,000 lbs.
- Single Wheeled	N/A	130,000 lbs.
Runway Protection Zone Dimensions (ft.)	1,000 ft. x 1,750 ft.	500 ft. x 1,010 ft.
Runway Safety Area Dimensions	500 ft. x 1,000 ft.	500 ft. x 1,000 ft.
Elevations (Above MSL) (ft.)	54/12 ft. MSL.	20/16 ft. MSL.
Stripping	Precision Approach	Non-Precision Approach

Table 2-1 Kahului Airport Runway 2-20 and Runway 5-23 Data

AIRCRAFT CLASS	PERCENT OF OPERATIONS BY YEAR		PERCENT CHANGE
	2010	2014	
Class A and B	65	62	-3
Class C and D	35	38	+3

Table 2-2 Percent of Total Aircraft Operations 2010 and 2014

RUNWAY	PERCENT OF OPERATIONS BY AIRCRAFT APPROACH CATEGORY	
	A and B	C and D
2	6.7	40.9
20	0.7	5.6
5	40.7	0.1
23	5.3	0.0

Table 2-3 Percent Aircraft Utilization by Runway

TAXIWAY	DESCRIPTION	WIDTH
A	Parallel taxiway to Runway 2-20 on west side of asphalt concrete pavement.	75 ft., with 25 ft. shoulders
B	Diagonal connecting taxiway from a point 2,000 ft. from the southern end of Runway 2-20 to the main passenger terminal apron and Runway 5-23.	50 - 75 ft.
C	Exit taxiway at the end of Runway 2 that connects to the helicopter operating area.	75 ft.
D	Exit taxiway that connects the passenger terminal apron with Runway 2-20 approximately 1,000 ft. from the southern end of the runway.	200 ft.
E	The portion northwest of Runway 2-20 is a diagonal exit taxiway connecting the passenger terminal apron with Runway 2-20 approximately 2,000 ft. from its southern end. This portion's pavement is approximately 125 ft. wide. The portion southeast of Runway 2-20 is a diagonal exit taxiway connecting the southern end of the air taxi apron with Runway 2-20. This portion's pavement is 75 ft. wide with 20 ft. wide asphalt concrete shoulders.	75 – 125 ft.
F	Exit taxiway connecting Runway 2-20 with Taxiway "B" and Taxiway "H" at the western end of Runway 5-23. A portion of the taxiway connects the general aviation apron with Runway 2-20. Pavement width is 75 ft. between Runway 2-20 and Taxiway "A," and between the GA apron and Runway 2-20; 50 ft. between Taxiway "A" and Taxiway "B"; and varies between Taxiway "B" and Runway 5-23.	50- 75 ft.
G	Exit taxiway connecting northern part of Runway 2-20 with Taxiway "A." Pavement width varies from 125 to 400 ft.	124 – 400 ft.
K	Exit taxiway connecting northern part of Runway 2-20.	Varies
L (Temporary)	Taxiway parallel and east of Runway 2-20 in front GA facilities, currently "apron-edge taxiway". This proposed taxiway will be the temporary runway during Runway 2-20 reconstruction.	Varies 50 ft. +

Table 2-4 Designated Taxiways at Kahului Airport

2.3.4 AIRCRAFT FLEET MIX

The aircraft fleet mix is the relative percentage of operations conducted by fixed wing aircraft within the following aircraft approach categories (AAC):

- Category A: Small single-engine aircraft with a maximum certificated takeoff weight of 12,500 lbs. or less and an approach speed of less than 91 knots.
- Category B: Small twin-engine aircraft (including small business jets) with a maximum certificated takeoff weight of 12,500 lbs. or less and an approach speed of 91 knots or more, but less than 121 knots.
- Category C: Large aircraft with a maximum certificated takeoff weight greater than 12,500 lbs. but less than 300,000 lbs. (includes B-717, B-737, CRJ passenger aircraft, C-130 military aircraft, and larger business jets) and an approach speed of 121 knots or more, but less than 141 knots.
- Category D: Heavy aircraft with a maximum certificated takeoff weight greater than 300,000 lbs. (includes B-757, B-767, B-777, A-330, B-747, and C-5A aircraft) and an approach speed of 141 knots or more, but less than 166 knots.
- Category E: Heavy and special military aircraft with an approach speed of 166 knots or more.

In 1990, Category A and B aircraft comprised 57.6% of operations while Category C and D aircraft comprised 42.7% of operations. In 2010,

Category A and B aircraft comprised 65%of operations while Category C and D aircraft comprised 35% of operations. A summary is provided in **Table 2-2** on Page 2-5, and example of aircraft types by AAC is provided in **Figure 2-3** on Page 2-8.

2.3.5 RUNWAY USE PATTERNS

An airport's runway use pattern is defined by the number, location, and orientation of active runways, and by the directions and types of operations on each runway. Runway 5-23 is utilized mainly by Category A and B aircraft. Runway 2-20 is utilized mainly by Category C and D aircraft. Runway use percentages by type of aircraft are summarized in **Table 2-3** on Page 2-5.

2.3.6 ARRIVAL/DEPARTURE AND TOUCH-AND-GO OPERATIONS

Hourly capacity is influenced by the split between arrivals and departures. As discussed in **Chapter 3**, peak-hour arrivals and departures are roughly equal at the OGG. They are forecasted to remain roughly equal throughout the planning period. Airfield capacity is also affected by touch-and-go operations by GA and military aircraft. Presently, touch-and-go operations (including low approaches) account for about 15% of the total operations based on FAA ATCT counts. The touch-and-go operations and low approaches at the OGG are forecast to remain constant throughout the planning period.

2.3.7 TAXIWAYS

The characteristics of the taxiways at OGG are summarized in **Table 2-4** on Page 2-6. Taxiways "B", "E", "F", "G", and "K" have variable widths ranging from 50 to 400 ft. Taxiways "A" and "C" are each 75 ft. wide, while Taxiway "D" is approximately 200 ft. wide. The apron edge taxiway that runs parallel and east of Runway 2-20 is 50+ ft. wide. The pavement strengths of Taxiways "A through K" are indicated on FAA Form 5335-1 for single-wheel, dual-wheel, and dual-tandem-wheel aircraft and are 130,000, 170,000, and 270,000 lbs, respectively. The corresponding values for portions of Taxiway "F" are 30,000 lbs., 40,000 lbs., and 65,000 lbs., respectively (1993).

2.3.8 AIRCRAFT PARKING APRONS

The OGG has several aircraft parking aprons including:

- Passenger
- Commuter
- East

The passenger terminal apron is the main apron and is located between the passenger terminal building and Taxiway "A." The commuter terminal aircraft parking apron is located northeast of the commuter terminal building on the inland side of Runway 5-23. The "East Ramp" apron (east of Runway 2-20) serves OGG based and itinerant GA aircraft, helicopters, and air taxi operations. The characteristics of these aprons are described below.

Aircraft	Pavement Strength Capacity	Main Landing Gear Configuration
B-777-200	450,000 lbs.	Triple Dual Tandem
B-767-300ER	520,000 lbs.	Single Tricycle
B-757-300	450,000 lbs.	Dual Tandem

Table 2-5 Pavement Strength Capacity for Passenger Terminal Apron

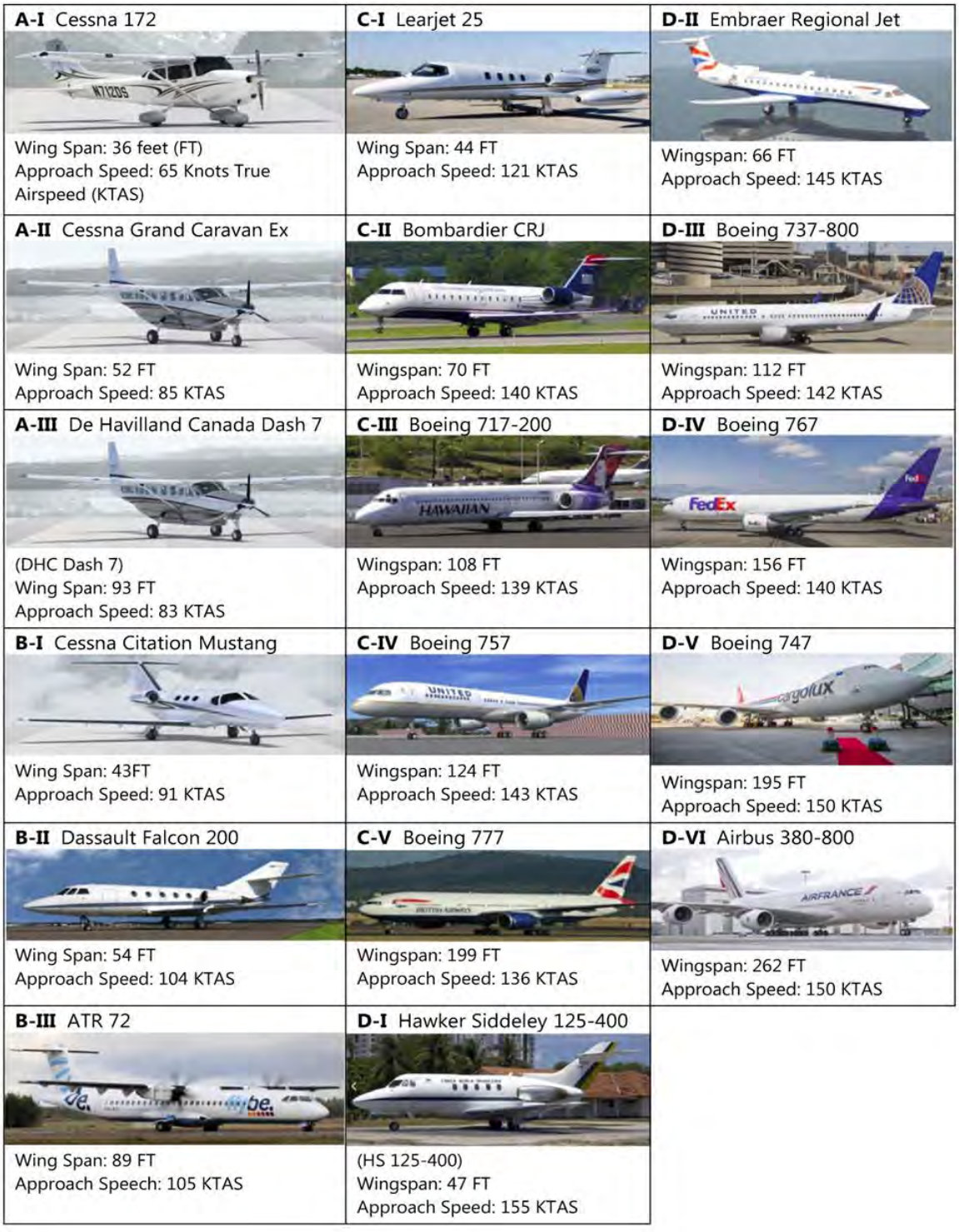

Figure 2-3 Aircraft Type Examples by Approach Category

2.3.8.1 PASSENGER TERMINAL APRON

The passenger terminal apron measures approximately 3,500 ft. long by 500 ft. wide. The concrete hardstand portion of the apron is approximately 3,450 ft. long and 150 ft. wide, and supports 13 aircraft parking positions as presently configured. The hardstand and apron were expanded to serve the Alien Species Inspection Facility (ASIF) and air cargo facilities. The DOTA has calculated pavement strengths based on aircraft types for the passenger terminal apron (*Hawai'i Airports and Flying Guide, 2012-2013)*. The DOTA identified the gross load capacities shown in **Table 2-5** on Page 2-7 for aircraft using the passenger terminal apron

2.3.8.2 COMMUTER TERMINAL APRON

The commuter terminal apron measures approximately 600 ft. long by 400 ft. wide. The OGG records indicate that the apron was designed to accommodate single-wheel aircraft with gross weights up to 75,000 lbs. and dual-wheel type landing gear aircraft with gross weights up to 145,000 lbs. This is more than adequate to accommodate the type of aircraft that currently use the commuter terminal.

2.3.8.3 EAST RAMP APRON

The "East Ramp" apron consists of two distinct areas. The first area consists of the southern end of an abandoned runway (formerly Runway 17-35). This area measures approximately 1,200 ft. long by 400 ft. wide and is now used for helicopter operations. The second area parallels Runway 2-20. It is approximately 3,400 ft. long by 200 ft. wide and is used for GA and air taxi aircraft parking. According to the latest information available from DOTA, the pavement strength for single-, dual-, and dual-tandem-landing gear aircraft for most of the East Ramp apron are 30,000, 40,000, and 65,000 lbs., respectively.

2.3.9 RUNWAY PROTECTION ZONES

Runway protection zones (RPZ) are determined by FAA Advisory Circular AC 150/5300-13A Airport Design (2014) and are approach surface dimensions out to the point at which the approach surface is 50 ft. above the runway threshold or 50 ft. above the underlying terrain, whichever is less. The width of the runway end of the RPZ is determined by the most precise approach standard applicable to the runway. For example, if an Instrument Flight Rules (IFR) approach is maintained at one end and a Visual Flight Rules (VFR) approach at the other, the IFR inner minimum is applicable at both ends.

Runway 2 has a precision instrument approach requiring an inner width of 1,000 ft. at both ends of the runway. Based on the most precise approach procedure, only a non-precision instrument RPZ with a 34:1 approach slope is required for Runway 20. However, DOTA maintains the more restrictive instrument RPZ for Runway 2-20. The approach surface slopes for Runways 2 and 20 are both 50:1 for the first 10,000 ft. from the runway threshold. The slope of the remaining 40,000 ft. of these approach surfaces is 40:1. This meets the FAA's standard for precision instrument approaches to runways.

Runway 5-23 has only visual approaches at both ends requiring an inner width of 500 ft. and outer width of 1,010 ft. Based on the most precise approach procedure, only a visual RPZ with a 20:1 approach slope is required for Runway 5-23. However, DOTA maintains a more restrictive non-precision RPZs with a 34:1 approach slope for Runways 5 and 23. This meets the FAA criteria for non-precision approaches for large aircraft with visibility minimums of more than three-quarters of a mile. Because Runway 5-23 is occasionally used by jet air carrier (inter-island) aircraft when Runway 2-20 is not available (e.g., when it is closed for maintenance or when crosswinds preclude its use), the more restrictive approach slope provides an added margin of safety.

Existing RPZ information for each runway (e.g., Runways 2, 20, 5, and 23) approach end is shown in **Table 2-6** on Page 2-10.

All of the RPZs lay entirely within the OGG property, except for portions of the RPZ over the

Figure 2-4 Existing Airport Airfield Facilities

RUNWAY	TYPE OF RPZ	LENGTH (FT.)	INNER WIDTH (FT.)	OUTER WIDTH (FT.)
2	Precision	2,500	1,000	1,750
20	Precision	2,500	1,000	1,750
5	Non-precision	1,700	500	1,010
23	Non-precision	1,700	500	1,010

Table 2-6 Runway Protection Zones

RUNWAY		APPROACH SLOPE		CONTROLLING OBSTACLE/OBSTRUCTION LOCATION FROM END OF RUNWAY PRIMARY SURFACE RELATED TO EXTENDED RUNWAY CENTERLINE		
No.	**Threshold Elevation (AMSL)**	**Standard**	**Actual**	**Type**	**Elevation (AMSL)**	**Location**
2	54 ft.	50:1	48:1	Stack	171	Approx. 9,646 ft. from end (linear distance)
20	12 ft.	50:1	15:1	Trees	Approx. 515 ft. from end (linear distance)	
5	20 ft.	34:1	50:1	Building	101	
23	15 ft.	34:1	50:1	None	NOTE: Actual slope 50:1 is along runway	

Table 2-7 Comparisons of FAR Part 77 Standards for Approach Slopes with Existing Obstructions

Pacific Ocean to the north and a small portion for Runway 23 to the northeast. See Figure 2-4.

2.3.10 ENCROACHMENTS ON THE BUILDING RESTRICTION LINE (BRL)

The existing building restriction lines (BRL) for Runway 2-20 are 1,000 ft. to the west and 750 ft. to the east of the runway centerline. Analysis of a recent aerial photograph of the OGG indicates there are a few existing intrusions into the BRL area. These include a fueling facility occupied by Bradley Pacific Aviation and a GA facility occupied by Air Service Hawai'i, (Dean Sakamoto Architects LLC, 2011).

The BRLs of Runway 5-23 are 553 ft. from the runway centerline. This is based on the centerline of the taxiway serving the runway set back 400 ft. from the runway centerline and the BRL being set back 153 ft. from the taxiway centerline.

No intrusions into the BRL have been identified within the length of Runway 5-23. However, FAA standards (FAA AC 150/5300 13A) call for the BRL to extend past the ends of the runway to the point at which they intersect the RPZs. Several relatively new buildings located in the ground transportation baseyard area, west of the Runway 5-23 threshold, do not meet these criteria. These eight (8) buildings include the Dollar, National, and Thrifty buildings, as well as one abandoned building. Additionally, the existing airline ground equipment maintenance building penetrates the object free area and the BRL for Taxiway "F."

2.3.11 OBSTRUCTIONS

A review of both the FAA Airport Master Record and the Airport Obstruction Chart published by the National Oceanic and Atmospheric Administration (NOAA) was conducted to identify obstructions as defined by Federal Aviation Regulations (FAR) Part 77: "Objects Affecting Navigable Airspace." FAR Part 77 establishes "imaginary surfaces" related to airports and their runways. These imaginary surfaces are used to identify obstructions. **Table 2-7** is a comparison of the standard FAR Part 77 approach slopes and existing obstacles-obstructions in the vicinity of the OGG. This table will be used to update the FAA Airport Master Record and Airport Obstruction Chart.

The Runway 2 imaginary approach surface is penetrated by Kealoloa Ridge of the West Maui Mountains. The ridge penetrates a portion of the 7:1 transitional surface between eight (8) and 10 miles south of the runway threshold. The Runway 20 imaginary approach surface is penetrated by some trees. These trees are approximately 515 ft. off the Runway 20 centerline and are subject to maintenance action

on a periodic basis. Runway 5-23 does not have obstructions.

2.3.12 NAVIGATIONAL FACILITIES AND LIGHTING

The OGG FAA ATCT operates between 6:00 AM and 11:00 PM. There is an Airport Surveillance Radar (ASR) located on the OGG property; it is controlled remotely from the Honolulu Air Route Traffic Control Center (ARTCC). The ARTCC also provides radar approach/departure control services. The FAA radio transmitter/receiver building for the ARTCC is located to the east of Runway 2-20 near the existing ASR facility. Additionally, the OGG is equipped with a lighted wind indicator, a segmented circle, wind cones, and a rotating beacon. A non-directional beacon is located at the middle marker (identification call sign letters "VYI").

The OGG is equipped with a Very High Frequency Omni-Directional Radio Range and Tactical Aircraft Control Navigation (VORTAC) system, designated Maui VORTAC, to assist pilots in determining bearing relative to the facility and azimuth. In July 1996, the Maui VORTAC was relocated adjacent to the intersection of Runway 5-23 and Runway 2-20.

Runway 2-20 has precision runway markings and HIRL. Both ends of the runway are equipped with VASI-4. Runway 2 has an ILS including middle and outer markers and a MALSR.

Runway 5-23 is painted with non-precision runway markings and is equipped with MIRL. Runway 5 has VASI approach aids.

All entry/exit taxiways and parallel taxiways to both runways are equipped with Medium Intensity Taxiway Lights (MITL).

2.3.13 METEOROLOGICAL CONDITIONS

The average annual temperature at the OGG is 74° Fahrenheit (°F). During the summer, the average monthly high is 82°F and the average low is 70°F. Winter temperatures are about ten degrees cooler. The highest temperature on record is 90°F and the lowest is 55°F. The average maximum daily temperature for the hottest month is 84°F.

Rainfall at the OGG is quite low, averaging less than 20 inches per year. The majority of this occurs during the winter as large-scale frontal systems move past the island. The Rainfall Frequency Atlas of the Hawaiian Islands, published by the U.S. Department of Commerce (1962), estimates that the average 24-hour rainfall having a recurrence interval of 50 years is approximately seven (7) inches.

Winds at OGG are influenced by a variety of factors. These include: strong prevailing trade winds; physical presence of large mountain masses to the east (Haleakalā) and west (West Maui Mountains) of the OGG; and nighttime drainage winds that carry cool air from the mountain slopes to the coastal areas of Kahului. These winds have a significant effect on the operations of the OGG.

Data collected at OGG between January 1970 and December 1979, shows that the wind coverage for 13 knots crosswinds is 96.1% for Runway 2-20 and 98.4% for Runway 5-23. The combined coverage for both runways is 99.8% for 13 knot crosswinds. Larger aircraft generally use Runway 2 during trade wind conditions and Runway 20 during Kona wind conditions. A similar use pattern is exhibited by the smaller aircraft that use Runway 5-23, with Runway 5 being used during trade wind conditions and Runway 23 being used when there are Kona winds. Wind direction and percentage of occurrence at OGG are summarized in **Table 2-8** on Page 2-13.

Data collected by the National Weather Service at the OGG between 1949 and 1967 indicates that IFR ceiling and visibility conditions below 1,000 ft. and/or three miles at the OGG occur less than 1% of the time. This value was used in calculating the airfield's annual service volume.

Daytime Wind Direction/Speed	Calm	1-6 knots	7-10 knots	>10 knots
Trade wind	2.0%	8.9%	12.2%	65.2%
Kona	-	6.3%	1.8%	3.8%
Nighttime Wind Direction/Speed	Calm	1-6 knots	7-10 knots	>10 knots
Trade wind	5.4%	17.1%	18.8%	30.7%
Kona	-	25.4%	1.6%	0.9%

Table 2-8 Wind Characteristics at Kahului Airport

2.4 TERMINALS (SEE FIGURE 2-5)

2.4.1 PASSENGER TERMINAL COMPLEX

Major passenger terminal improvements since the completion of the 1993 MP include a renovated ticket lobby, new passenger check-in counter spaces with 24 computerized kiosks, new baggage claim carousels, security screening, and a new generator building.

Terminal improvements currently under construction (2014-2015) through the Hawai'i Airports Modernization program are Phase 1 reroofing and upgrades to security access control and closed circuit TV system. Additional improvements anticipated to commence within 1-6 years under the Hawai'i Airports Modernization program include new flight and baggage information display systems, re-roofing of terminal building Phases 2 and 3, remodeling of passenger holdrooms, and a new family restroom. Most recently, four (4) moving walkways have been constructed on the 2nd floor along the concourses between Gates 22 through 34. Act 158, Session Laws of Hawai'i (SLH) 2008 designated $12.9 mil. for terminal improvements.

The passenger terminal apron can accommodate up to 20 inter-island size (B-717, B-737, and CRJ) aircraft in a single row with power-in/push back operation. According to the Competition Plan Kahului Airport, fiscal year (FY) 2011, there are currently nine (9) gates designated for overseas (B-737, B-757, B-767, and B-777) aircraft. These are gates 1, 5, 7, 23, 27, 29, 33, 35, and 39. Seven (7) gates are currently used for inter-island operations. These are gates 9, 11, 13, 15, 17, 19, 21 (see **Figure 2-5** on Page 2-14). Only gates 17 through 21 are configured to accommodate wide-bodied aircraft such as B-767. When wide-bodied aircraft are parked on the apron, they often occupy two (2) to four (4) gates. Thus, Gates 3, 25, 31, and 37 are rarely used. All aircraft parking (gate) positions have direct access to Taxiway A. Some U.S. Customs operations occur in the terminal side nearest to the older air cargo building and General Service Equipment (GSE) building.

Aircraft are currently and will continue to be fueled from trucks. Though the apron contains provisions for fueling from below-grade hydrants, the fuel storage and supply lines for them have not yet been installed.

2.4.2 COMMUTER TERMINAL

Located northwest of the passenger terminal, the commuter terminal building, opened in 1987, includes space for ticketing, check-in, baggage claim, holding, airline offices, and restrooms. See **Figure 2-5** on Page 2-14. The facilities of the commuter terminal are in good condition. Maui Air, Makani Kai Air, Mokulele Airlines, Island Air, and Paragon Air Tours, use the terminal for ticketing and holding. The commuter aircraft parking apron can accommodate up to 12 commuter-type aircraft. The apron connected to the southern end of Runway 5-23 by Taxiways "F" and "H" and also to Taxiway "B" via Taxiway "F", approximately 1,500 ft. from the approach end of Runway 5. Aircraft are refueled from trucks.

Figure 2-5 Existing Terminal Facilities

2.5 AIR CARGO AND MAIL FACILITIES

A 31,000 square feet (s.f.) air cargo facility is located southwest of the passenger terminal and along the existing apron and concrete hardstand. Currently Hawaiian Air Cargo, Pacific Air Cargo, Trans Air, United Air Cargo, Aloha Air Cargo, American, and Alaska Air Cargo conduct operations at this facility. Next to the air cargo facility is the 7,400 s.f. ASIF operated by the Hawai'i State Department of Agriculture (DOA). United States Postal Service (USPS) operations are presently being conducted from two (2) steel frame buildings along Hemaloa Street, next to Bodell Construction and the cell phone waiting area.

2.6 GENERAL AVIATION FACILITIES

GA facilities are located east of Runway 2-20. These facilities include three (3) T-hangar buildings, with 30 spaces, owned by the State and leased to individual aircraft owners. There are 34 tie downs presently situated on the East Ramp that occupy an 800 ft. by 200 ft. area immediately adjacent to the T-hangars. The tie downs are used by based and itinerant aircraft. See **Figure 2-6** on Page 2-15. Because of the absence of other suitable on-site airport space, the State's guidelines for use of the T-hangars have been broadly interpreted. The tie-down area, however, is not large enough to accommodate larger private jets. These aircraft are accommodated on a first-come first-served basis and are allowed to park along the paved portion of the East Ramp.

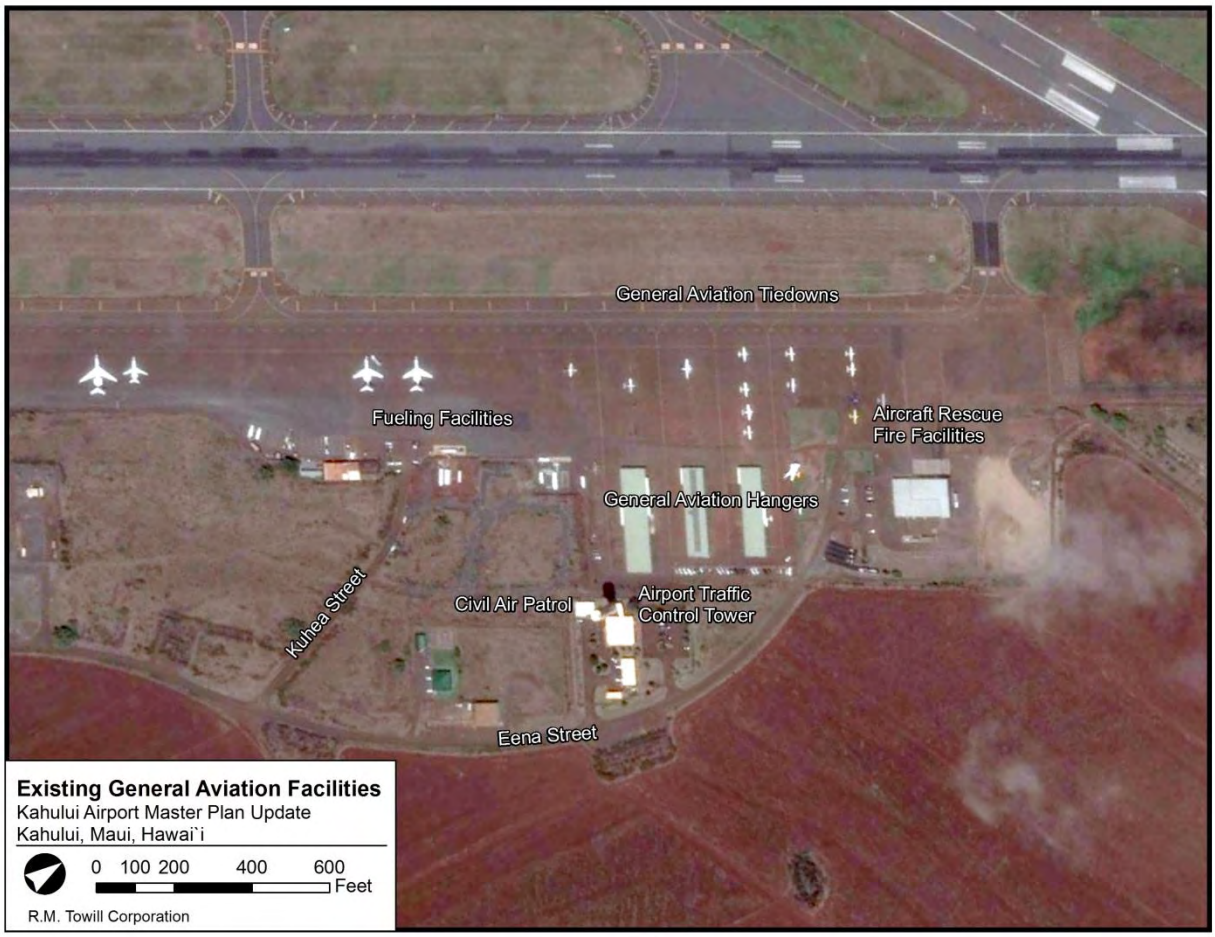

Figure 2-6 Existing General Aviation Facilities

Bradley Pacific Aviation operates a number of facilities on the East Ramp. It is currently the primary fuel vendor at the OGG along with Air Service Hawai'i. In addition to fueling services, Bradley Pacific Aviation also provides a full range of services for corporate (executive) aircraft that visit Kahului. Their facilities consist of a reception office, employee areas, a maintenance shop, a storage shed, and fuel storage tanks.

2.7 AIR TAXI

The scenic air taxi aircraft that visit the OGG park on the East Ramp apron. Aircraft are fueled on the apron by Bradley Pacific Aviation. Parking space is provided adjacent to the apron for tour buses and vans that carry passengers around Maui. A small terminal building, with only basic amenities for passengers, is located on the site and used by Air Service Hawai'i.

2.8 HELICOPTERS

Commercial helicopter operations at the OGG are concentrated at the southeastern corner of the OGG. According to conversations with the DOTA, there are 36 helicopters based at the OGG. Nearly all of these are used for sightseeing/air tour operations. This area includes a landing and takeoff helipad, as well as an apron area for helicopter parking and passenger loading and unloading. See **Figure 2-7** on Page 2-16. However, some helicopters land and takeoff from the passenger loading and unloading positions. Small plots along the edge of the apron are leased to the helicopter operators who have erected buildings containing reception areas, offices, and aircraft storage space. Helicopters are fueled on the apron by Bradley Pacific Aviation or, in some cases, from operator-owned fuel trucks or from the two (2)

underground fueling tanks maintained by Hawai'i Helicopters.

The FAA Maui ATCT, in cooperation with the helicopter air taxi operators regularly fly from the OGG using VFR helicopter arrival/departure procedures. They provide separation between helicopters and fixed-wing aircraft during daylight hours and facilitate the movement of aircraft in and out of OGG's ATCT airspace.

These procedures are primarily for departures and arrivals from the east. They have been established for use when either Runways 2 or 5 are being used in trade wind conditions, or Runways 20 or 23 are being used in Kona wind conditions. For air traffic to and from the west, the departure and arrival instructions, headings, and altitudes are assigned by the FAA Maui Tower controllers to ensure separation between the helicopters and fixed-wing aircraft as the helicopters cross from one side of the OGG to the other.

2.9 AIRPORT ACCESS/GROUND TRANSPORTATION

2.9.1 EXISTING ROADWAYS

Hāna Highway is a State-maintained roadway that carries local traffic within Central Maui, and connects Central Maui with eastern communities along the coast to Hāna. See **Figure 2-8** on Page 2-17. Between Ka'ahumanu Avenue and Dairy Road, Hāna Highway is a four (4) lane facility with a posted speed limit of 30 miles per hour (mph). From its intersection with Dairy Road, Hāna Highway continues as a four (4) lane facility to the signalized intersection with Haleakalā Highway. During peak traffic periods, Hāna Highway has three (3) travel lanes open with the center lane used for contra-flow traffic during the afternoon peak periods.

Figure 2-7 Existing Helicopter Facilities Terminal Complex

Figure 2-8 Airport Access General Aviation

Source: ESRI, Digital Globe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstoppo, and GIS User Community

The posted speed limit is 55 miles per hour (mph). Beyond its intersection with Haleakalā Highway, Hāna Highway is reduced to two (2) lanes with one (1) travel lane in each direction.

Haleakalā Highway is a four (4) lane State roadway linking Central Maui with the upcountry areas of Maui. Within the section surrounding the OGG, Haleakalā Highway has a posted speed limit of 45 mph that increases to 55 mph after the intersection with North Firebreak Road.

Keolani Place, a four (4) lane facility, serves as the primary access to the OGG's terminal facility and has a posted speed limit of 30 mph. It provides vehicular access to the OGG and its facilities. It also provides a direct connection with Hāna Highway for vehicles traveling between the OGG, Wailuku, and Kahului.

Dairy Road is a four (4) lane roadway with a posted speed limit of 30 mph. After Hukilike Street, Dairy Road becomes Kūihelani Highway. The posted speed limit on Kūihelani Highway increases to 55 mph south of its intersection with Pu'unēnē Avenue. Presently, most of the OGG traffic utilizes Dairy Road, Keolani Place, and Haleakalā Highway. Some OGG traffic may use Alahao Street, but this roadway is used primarily by Kanahā Beach Park users.

The facilities adjacent to the East Ramp are accessed from Hāna Highway via Kala Road and Haleakalā Highway. At present, Haleakalā Highway continues around the southern end of

Runway 2-20, terminating at the intersection of Keolani Place and Dairy Road. Therefore, these facilities can also be readily accessed from the west side of the OGG.

While not intended as a major access route, Koeheke Street, which extends to Alahao Street, intersects Keolani Place opposite the main passenger terminal parking area and provides access to rental car baseyards and airport industrial area. Alahao Street is a narrow, two (2) lane roadway that runs along the west side of the OGG and serves the Kanahā recreational areas and other facilities located along the shoreline adjacent to the OGG. At one time Alahao Street crossed what is now OGG property into West Spreckelsville; however, it now ends at a fence along the OGG boundary.

Traffic studies in the area were conducted by Julian Ng, Inc. for the Environmental Assessment of the Kahului Airport Access Road (currently under construction with planned completion in 2016), Phase I project. A summary of this report is provided below.

Historical traffic counts from September 2007 for Hāna Highway and March 2003 for Keolani Place were used to aid the study. These intersections were used because they represent major sources of OGG traffic. The traffic counts found that the morning peak hour for Hāna Highway to be between 7:15 AM and 8:15 AM. The evening peak hour for Hāna Highway was from 4:15 PM to 5:15 PM. The morning peak hour for Keolani Place was from 8:00 AM to 9:00 AM. Two peaks were observed during the afternoon hours for Keolani Place, one between 2:30 PM and 3:30 PM and another between 3:15 PM and 4:15 PM.

The historical data was adjusted for traffic movement changes that will occur when the new access road is constructed. Ultimately, the Airport Access Road would intersect with Dairy Road, Hāna Highway, and Pakaula Road. Future conceptual changes reflecting intersections with the new access road were used for the traffic analysis. The design years for the forecast were 2015 and 2035. A LOS analysis was conducted to identify traffic operating conditions. This methodology represents traffic delays ranging from "A" to "F," with "A" representing free flow with little delay and "F" representing congested, over capacity conditions. LOS conditions "E" and "F" are generally regarded as unacceptable. The 2015 forecast for the intersection of the access road and Hāna Highway indicated an AM and PM peak hour LOS of "D." For this intersection, the 2035 LOS forecast was also "D." For the 2015 forecast for the Dairy Road and Pakaula Road intersection, the AM peak hour LOS was "C" and the PM LOS was "D." For the 2035 forecast, the LOS for this intersection was also "C" and "D," respectively.

2.9.2 TSUNAMI EVACUATION ROUTE

The low-lying land between the west side of Runway 5-23 and the ocean lies within the tsunami hazard area. Residences in West Spreckelsville to the north of the OGG boundary are also located in this area. The current emergency evacuation route for this community is via Old Stable Road to Hāna Highway.

2.9.3 VEHICULAR PARKING

The main parking area is located northwest of the passenger terminal. See **Figure 2-5** on Page 2-14. There are a total of 2,232 parking stalls with 1,437 stalls leased to a concessionaire that are available for use by the public and 742 stalls for use by employees of Federal and State agencies, tenants, concessionaires, and airlines. Nine (9) stalls are reserved for airport administration, while 44 stalls are for handicap parking.

There are additional parking stalls for public use situated away from the main parking area. This includes parking adjacent to the air cargo facility, rental car facilities, commuter terminal, northwest of the passenger terminal, general aviation facilities, and helicopter facilities. Recently, parking immediately in front of the commuter terminal has been prohibited with stalls being painted over with black paint. There are cones guiding traffic for passenger and cargo drop-off directly in front of the commuter terminal.

A paved cell phone waiting area is located adjacent to Hemaloa Street that intersects Keolani Place. It is approximately one (1) acre in size and allows vehicles that are waiting to pick up passengers to temporarily park. This contributes to better traffic circulation on Lanui Circle.

2.9.4 GROUND TRANSPORTATION

Approximately 23 acres of land along the western side of Keolani Place is available for lease by rental car operators. See **Figure 2-5** on Page 2-14. These parcels range in size from one-quarter of an acre to four (4) acres. The State provides improved streets, level lots, and utilities. The operators are responsible for constructing and maintaining their own facilities. Access to the lease sites is provided from Keolani Place and Koeheke Street. Other ground transportation activities are interspersed with rental car activities in this area.

Currently, there are eight (8) rental car companies on the airport property: Alamo, Avis, Budget, Dollar, Enterprise, Hertz, National, and Thrifty. Enterprise and Roberts Hawai'i are located across the bridge over Kalialinui Gulch on Keolani Place. The rental car counters (except for Enterprise) are situated in a State-owned building constructed for that purpose opposite the northern end of the main passenger terminal parking area. A bus and car rental registration area is located adjacent to the terminal and next to the tour group pick-up area on Lanui Circle. There are three (3) unpaved graded lots for rental car overflow parking immediately northwest of the existing rent-a-car (RAC) subdivision. These three (3) lots total about 33.5 acres of open space. A fourth area that is used for overflow parking is off Alahao Street and across the street of the Kanahā Beach Park entrance. This area is about two (2) acres in size. At the time of observation about 700 cars total were observed in these four (4) overflow areas. However, the number of cars present is seasonally dependent and based on traveler demand. Long-term efforts under the Hawai'i Airports Modernization Program will later construct a rental car storage lot at the existing overflow area.

2.10 AIRPORT SUPPORT FACILITIES

2.10.1 FAA AIRPORT TRAFFIC CONTROL TOWER (ATCT)

The FAA ATCT complex is located to the east of the GA T-hangars. It was completed in 1988 and houses the FAA and the National Weather Service offices. Underground communication lines link the FAA's ATCT with the ASR, new Radio Transmitter/Receiver Building, and new Airfield Lighting Vault. See **Figure 2-6** on Page 2-15.

The ATCT has adequate view of all runway ends with a cab height estimated at 187 ft. above msl. However, due to the ATCT's location relative to the East Ramp, controllers cannot see portions of the apron designated for helicopter operations. This complicates the task of controlling the ground movement of these aircraft. Additionally, the northernmost portion of the passenger terminal obstructs the controllers' views of Taxiway "H," portions of Taxiway "F," and the commuter terminal aircraft ramp.

2.10.2 AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

The ARFF facility is located on the East Ramp. There are a total of seven (7) vehicles of which five (5) are used for firefighting. There are two (2) 3,000 gallon capacity trucks, and two (2) 1,500 gallon capacity trucks. A smaller auxiliary vehicle is also used for rescue and firefighting. Two (2) trucks are used as command vehicles with one (1) exclusively used by the ARFF Chief.

The ARFF training area is located west of Runway 5-23. It is a remote area and well-screened from public view by vegetation. Access to the training area is from the aircraft operating area, as well as from Alahao Street. The prevailing winds blow smoke generated by practice operations away from the passenger terminal. There is also an

off-site training area located on Keolani Place used for structural firefighting training.

2.10.3 STATE DEPARTMENT OF TRANSPORTATION (HDOT) MAINTENANCE BASEYARD FACILITY

The State of Hawai'i Department of Transportation (HDOT) maintenance baseyard and associated buildings are located in the industrial area on the east side of Keolani Place. This industrial area has a number of other tenants. These include the HDOT Highways Division, Hawai'i Air National Guard, DLNR, Maui County Water Department, Department of Accounting and General Services, DOA with a vector lab, and various private businesses.

2.10.4 AIRLINE GROUND EQUIPMENT MAINTENANCE

The airlines use a portion of the ramp located to the east of the intersection of Taxiway "B" and Taxiway "F," leading to the commuter aircraft parking apron, to maintain ground support equipment. Maintenance shelters are constructed of wood to minimize electromagnetic interference with navigation aids.

2.10.5 U.S. POSTAL SERVICE

The USPS has title to a 5.1-acre site located along Keolani Place, southwest of the passenger terminal. This facility utilizes about 21,300 s.f. of space for its metal frame tent and loading zones. Currently, the facility has direct road access to the apron via Hemaloa Street and paved roads between the south end of the passenger terminal and the new ASIF building. The office handles all mail processing for the Island of Maui. Mail carrier operations might be relocated to the new industrial lease lots along the new access road currently under construction.

2.10.6 NATIONAL WEATHER SERVICE

The National Weather Service has an office in the lower level of the FAA's ATCT. Weather balloons are launched three times daily from the roof of a small structure located near the control tower.

2.10.7 FUEL STORAGE AND LOADING FACILITIES

Fuel storage and loading at the OGG is currently decentralized. Bradley Pacific Aviation has four (4) storage tanks. The two (2) largest tanks, 23,000-gallon and 28,000-gallon capacity, are used to store jet fuel. The third tank, with a 10,000-gallon capacity, is used for Avgas. The fourth tank, with a capacity of approximately 8,000 gallons, is unused at the present time.

Fuel is brought to these tanks by the company's tanker trucks. Trucks resupplying the tanks travel between the large oil company fuel storage tanks located at Kahului Harbor and the OGG via Hāna Highway, Haleakalā Highway, Kala Road, and E'ena Street. Currently, the tanker trucks used for aircraft refueling are based on the East Ramp. Due to a lack of a suitable airport service road, they must cross Runway 2-20 to reach the aircraft parking apron adjacent to the passenger terminal. This route requires clearance from the FAA's ATCT. The FAA has requested that the practice be terminated at the earliest possible date. However, the only available alternate route would take the tanker trucks out of the OGG along Hāna Highway. This is problematic as the equipment now in service exceeds the load ratings of the roads that would have to be used; this alternative is neither feasible nor permitted.

Presently there is one (1) other large fuel tank on the OGG; a 50,000-gallon capacity tank that Hawaiian Airlines constructed to store fuel for its aircraft. The tank is located at the intersection of A'alele Street and Old Haleakalā Highway and is not currently in use. When the tank was in use, it was resupplied by trucks that followed an A'alele Street/Keolani Place/Hāna Highway route between the harbor storage facilities and the OGG. Hawaiian Airlines refueling trucks traveled via A'alele Street and Keolani Place past the passenger terminal to Gate 1, whereby entering the airport operating area.

In addition to these on-site fuel tanks, two (2) of the helicopter operators based on the East Ramp have their own small fuel storage tanks. These tanks are refilled by trucks that follow essentially the same route used by the Bradley Pacific Aviation tanker trucks to and from the OGG.

Currently, a bulk fuel storage facility east of Keolani Place and adjacent to Kalialinui Gulch has been constructed. A pipeline between the fuel facility and the airfield has also been installed. The connection point is north of the cargo facilities.

2.10.8 AIRPORT INDUSTRIAL AREA

There are two (2) industrial areas within the OGG boundary. The largest area is west of A'alele Street including structures accessed via Haleakalā Highway, Kaonawai Place, and Halai Street. The other area is west of the ground transportation subdivision. This area contains a mixture of activities, many of which are not directly related to airport operations.

2.11 EXISTING LAND USE, CONTROLS, AND OWNERSHIP

2.11.1 EXISTING LAND USES

The lands immediately south and east of the OGG are in agricultural use. This area also includes a built-up area around the Pu'unēnē Sugar Mill. Pu'unēnē once contained many plantation homes for Hawaiian Commercial & Sugar Company (HC&S) workers and their families. The HC&S has finished relocating the families that rented these dwellings and demolished them. Pu'unēnē is now utilized for heavy industry which is compatible with relatively high noise levels. Moderately dense residential development is located southwest of Kūihelani Highway/Dairy Road.

Kanahā Pond State Wildlife Sanctuary and the light industrial area on the OGG's western side separate the OGG from the industrial and commercial uses around Kahului Harbor. The majority of the shoreline northwest of the OGG is located in the Kanahā Beach Park or designated for other public uses. However, a development of single-family homes, known as West Spreckelsville, occupies a narrow strip of privately owned land between the northern boundary of the OGG and the ocean. Additional single family homes, located in East Spreckelsville, are separated from the OGG by a buffer of open space.

The policy of the DOTA has been to allow tenants to lease OGG land when it is not in conflict with aviation use requirements or airport operations. As a result, there are a number of tenants whose activities are classified as non-aviation related.

2.11.2 OWNERSHIP

The DOTA owns and manages all OGG lands with the following exceptions:

- Kanahā Pond State Wildlife Sanctuary. The 246.9 acre sanctuary is managed by DLNR, through a MOU, to provide habitat for native water birds.
- USPS. 5.1 acres of land were exchanged.

Additionally, the DOTA has acquired the following easements for lands located outside of OGG to support airport operation:

- Easement W-3. Waterline easement comprised of 533 s.f.
- Easement W-4. Waterline easement comprised of 4,782 s.f.
- Easement 1. Kahului Airport RPZ comprised of 13.665 acres.

2.11.3 STATE LAND USE LAW

The State Land Use Commission (LUC) regulates land use throughout the State of Hawai'i under the provisions of Chapter 205, LUC, Hawai'i Revised Statutes (HRS). All lands within the State are classified as Urban, Rural, Agricultural, or Conservation in accordance with objectives and policies stated in the HRS, Chapter 266, Hawai'i State Plan. Approximately 840 acres of the OGG lie within the State Urban District, 473 acres lie within the State Agricultural District, and 290

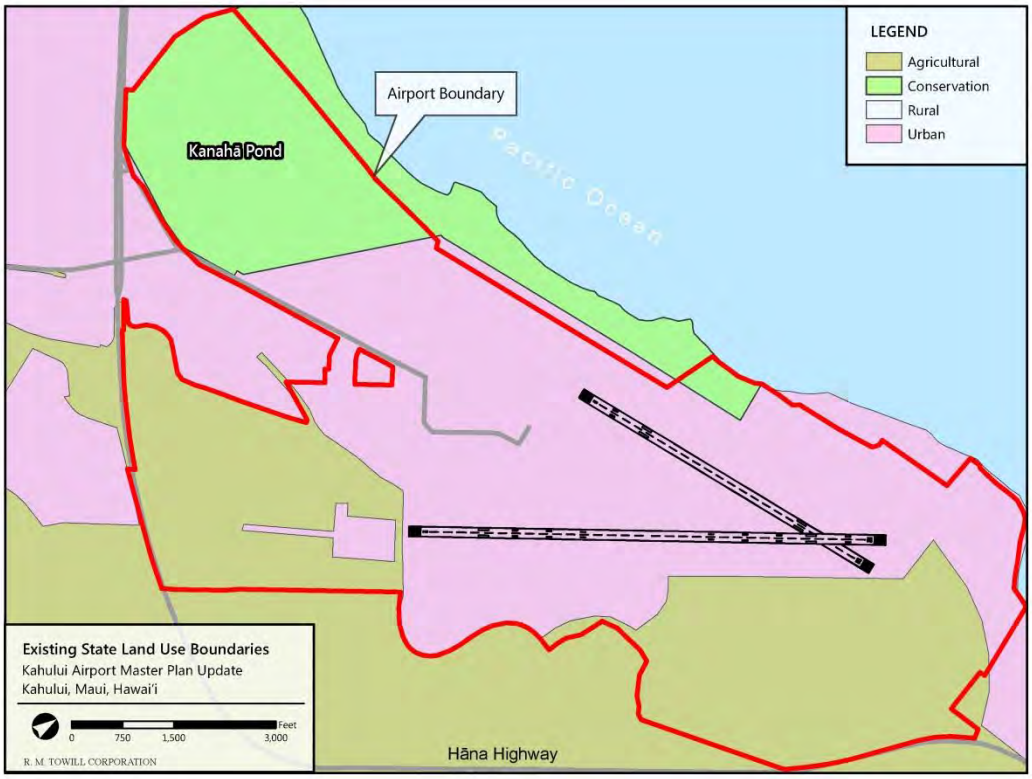

Figure 2-9 State Land Use Boundaries

acres within the State Conservation District. See Figure 2-9.

2.11.4 COUNTY ZONING

Zoning at OGG is regulated by Zoning, Title 19, of the Maui County Code. The majority of the OGG is located in an Airport zone. See **Figure 2-10** on Page 2-23. Areas to the east and the southwest that lie within the OGG boundary and are zoned agricultural and open space. The Kanahā Pond State Wildlife Sanctuary located to the east is zoned as Open Space by the County. In addition to local zoning, the County of Maui regulates lands within their "Special Management Area (SMA)." (see **Figure 2-11** on Page 2-23) The SMA is an overlay regulatory-management zone that manages uses within the County's coastal zone.

2.12 ENVIRONMENT CONSIDERATIONS

2.12.1 CLIMATE CHANGE

Climate change is defined by the United States Environmental Protection Agency (EPA) as "…any significant change in measures of climate lasting for an extended period of time." This includes major changes in temperature, precipitation, or wind patterns that occur over several decades or longer. Both natural and human causes can change Earth's climate. Natural causes of climate change include changes in the sun's intensity, the Earth's rotation around the sun, ocean circulation, and volcanic eruptions. Human activities affecting the Earth's climate is tied to the generation of greenhouse gases from activities such as the burning of fossil fuels. The burning of fossil fuels such as oil and coal generate greenhouse gases that include carbon

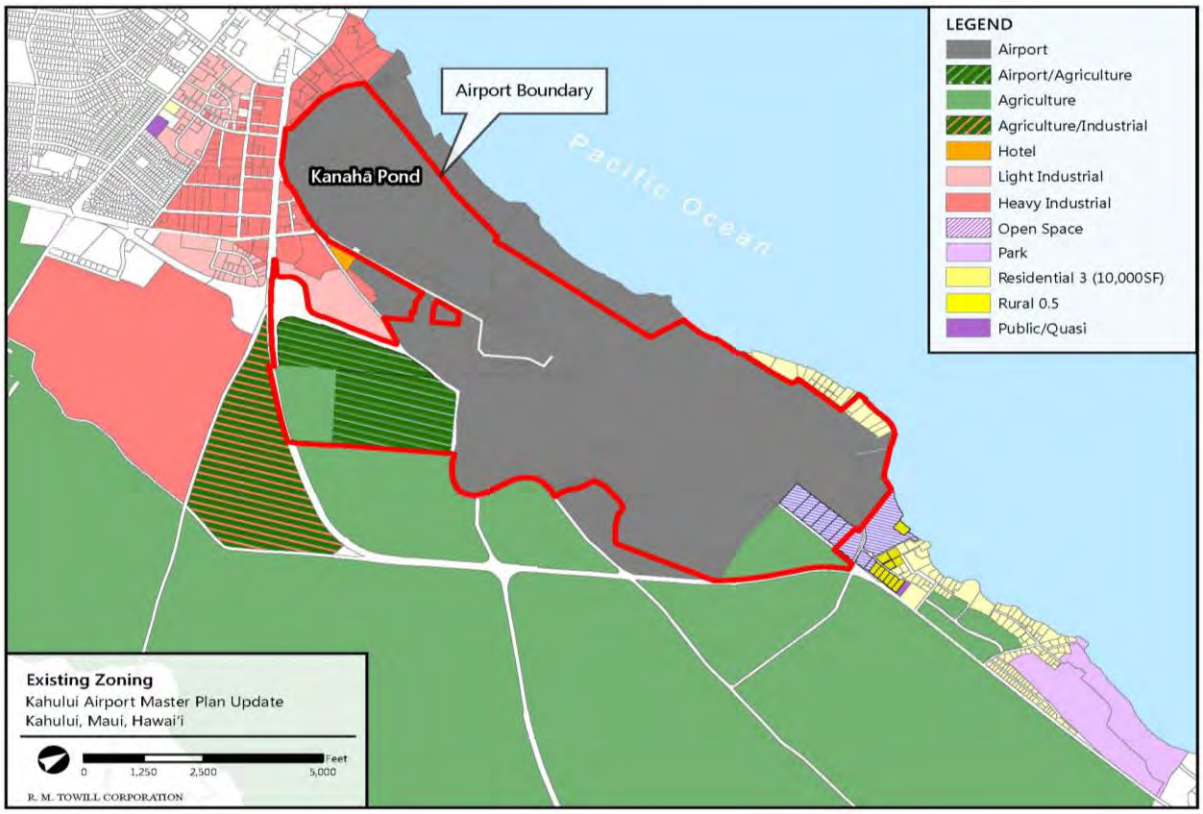

Figure 2-10 Existing Zoning Map

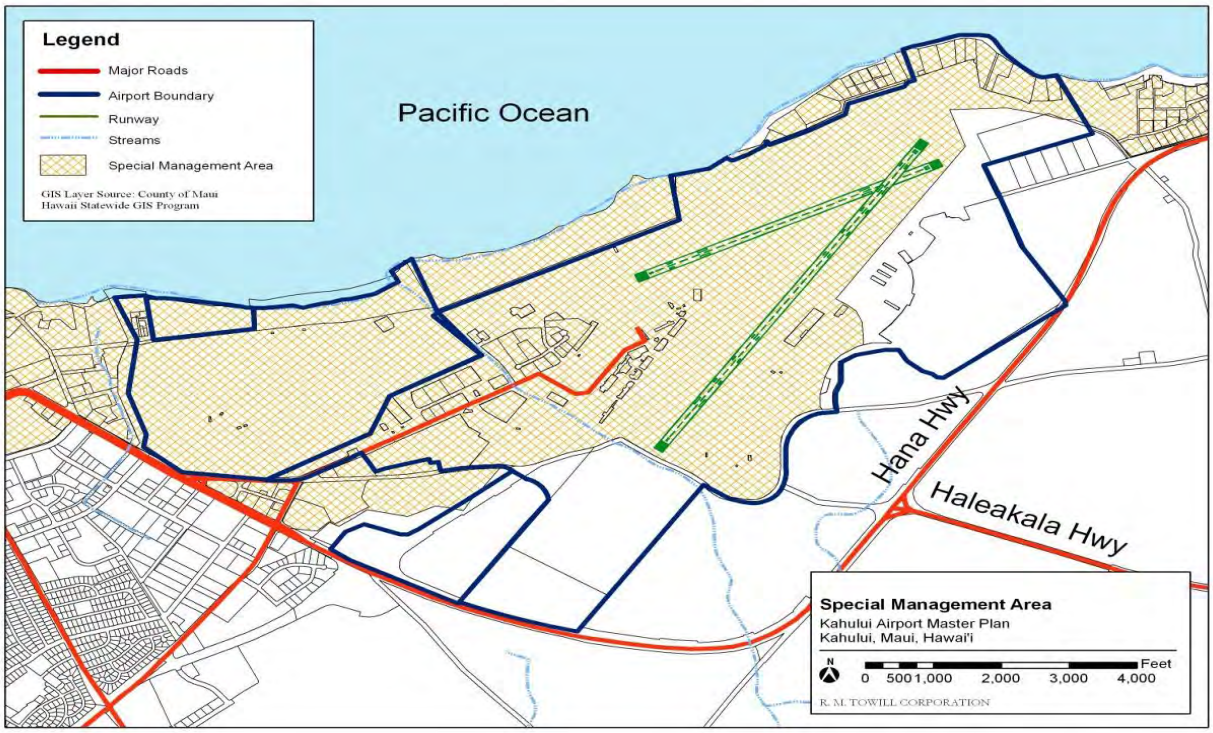

Figure 2-11. SMA Boundary Map

dioxide (CO2), methane (CH4), nitrous oxide (N2O), and ozone (O3). These greenhouse gases absorb incoming sunlight and interfere with the release of heat into space. This heat stays trapped, as it would in a greenhouse, and continues to accumulate in the earth's atmosphere.

Transportation systems in the United States are designed to withstand local weather and climate impacts based on historical records. However, due to climate change, these historical records are no longer a reliable indicator of future impacts.

Climate change is projected to increase the frequency and intensity of extreme weather events. These changes can increase the risk of delays, disruption, damage, and failure across land, air, and marine based transportation systems. Transportation infrastructure under construction today is expected to last 50 years or longer. It is important to understand how changes in climate may affect these investments in the coming decades.

Climate change may affect airplanes, airports, and airstrips, affecting air travel and infrastructure.

Periods of extreme heat may cause airplanes to face cargo restrictions, flight delays, and cancellations. Any increase in rain and flooding may also disrupt air travel. Depending on its size and severity, storms can force entire airports to close. Climate change may increase the frequency of these events and the number of airports that are affected. In addition to causing closures and or delays, flooding may damage existing facilities including the airfield.

In 2012, the State of Hawai'i updated the Hawai'i State Plan with the passage of Act 286 establishing the priority guidelines for climate change adaptation. The guidelines are intended to prepare the State to address impacts associated with climate change that includes the built environment. Guidelines specific to the OGG MP Update included:

- Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies.
- Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environment. This includes future OGG development within the context of the current and anticipated environment.
- Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessing the potential consequences, and evaluating adaptation options.

The University of Hawai'i Coastal Geology Group has predicted that the sea level will rise throughout the coming decades. Estimates prepared by the University suggest the sea level may rise up to one meter by 2100. Projected sea-level rise over the next 20 years would increase at an exponential rate and would impact all coastlines, most severely affecting Mā'alaea, North Kīhei, Lahaina, Kā'anapali, and Kahului on the island of Maui. According to the County of Maui General Plan, prudent planning should consider projected sea-level rise as a variable in planning for each island of the county (Maui County General Plan 2030, 2010). Because the OGG is located on the northeast end of the town of Kahului and located adjacent to the ocean, an increase in sea level rise by one meter would affect portions of the OGG. See **Figure 2-12** on Page 2-26. Because of this effect, public airport facilities should not be located in areas that may be affected. Currently, no facilities accessible to the public are within the area susceptible to the one (1) meter sea level rise.

2.12.2 SUSTAINABILITY

According to the EPA, "sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either

directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which human and nature can exist in productive harmony, which permits fulfilling the social, economic, and other requirements of present and future generations" (http://www.epa.gov/sustainability/learn-about-sustainability#what). Sustainability is an important aspect in ensuring that we have and will continue to have the water and materials necessary to protect human health and the environment. Sustainability has emerged as a result of significant concerns about the unintended social, environmental, and economic consequences of rapid population and economic growth, and consumption of our natural resources. In its early years, the EPA acted primarily as the nation's environmental watchdog, striving to ensure that industries meet legal requirements to control pollution. In subsequent years, the EPA began to develop theory, tools, and practices that enabled it to move from controlling pollution to preventing it.

Today, the EPA aims to make sustainability the next level of environmental protection by drawing on advances in science and technology to protect human health and the environment, and promote innovative green business practices.

Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management (2007), set forth policy and specific goals for federal agencies to "…conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner."

EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (October 5, 2009), enhances EO 13423 by noting the intent, "…to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions (GHG) a priority for Federal agencies. It defines "…sustainability and sustainable: to create and maintain conditions, under which human and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans."

2.12.3 WETLANDS

Wetlands play an integral role in the environment. They prevent erosion in the surrounding area through the presence of wetland-associated plants with root systems that hold soil in place. The plants also serve as a physical barrier and absorb energy from waves. Wetlands also provide a natural filtration system for runoff. Nutrients swept into the wetland from runoff are absorbed by plant roots and microorganisms that live in the soil or stick to the soil particles themselves. Through this process, most of the nutrients and pollution in the water are absorbed, retained, and are prevented from entering the ocean (EPA, 2010). According to the Maui Island General Plan 2030, completed in 2010, a specific policy objective regarding wetlands includes Objective 2.3.3 of the Heritage Resources Element. It states, "No net loss of wetlands, and preserve and restore degraded wetlands." Policies include: "…prohibiting the destruction and degradation of existing upland, mid-elevation, and coastal wetlands." In addition, it states to "… support regulations that require developers to provide a wetland protection buffer around and between development and wetland resources."

There are wetlands to the west of the project site. See **Figure 2-13** on Page 2-26. Kanahā Pond State Wildlife Sanctuary, the largest of the wetlands in the area, is a preserve that provides a nesting site for endangered and migratory birds. The pond is approximately 235 acres and is bounded by Amala Place to the north, A&B Properties ditch to the east, Keolani Place and Hāna Highway to the south, and an old drainage ditch to the west. The FAA, DOTA, and DLNR prepared a MOU for the management of the refuge, dated October 1, 1996, whereby the

Figure 2-12 Sea Level Rise Map

Source: ESRI, Digital Globe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstoppo, and GIS User Community

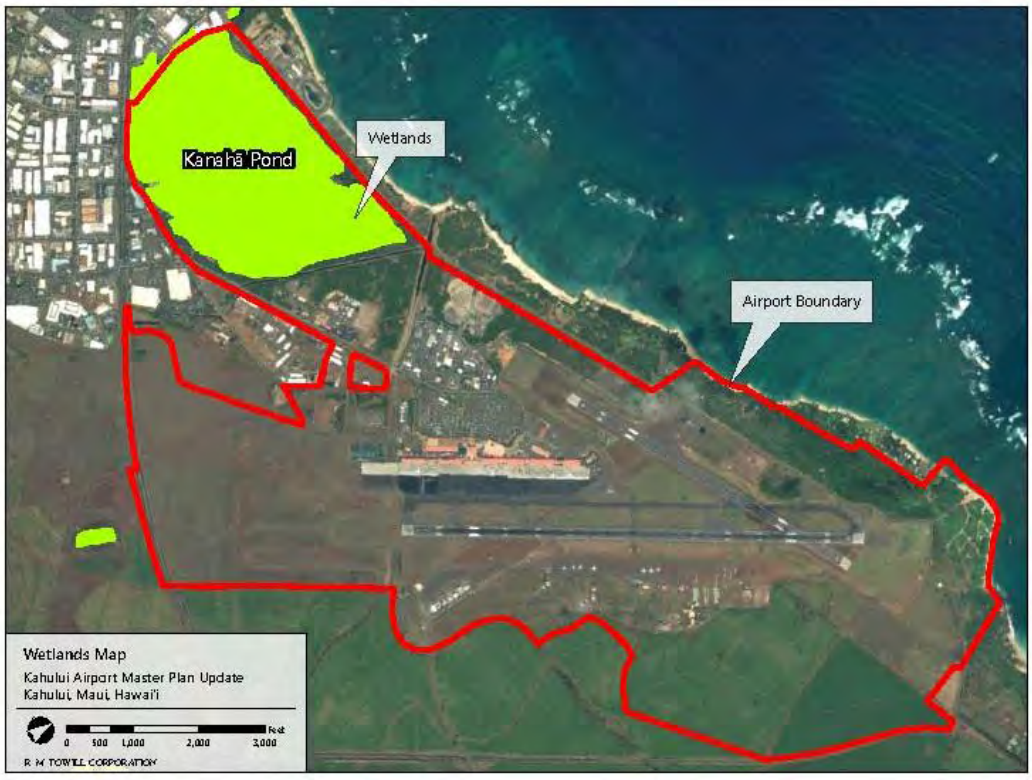

Figure 2-13 Wetlands Map

DLNR shall manage the refuge and its resources, and the DOTA shall be responsible for the primary objective of aeronautical safety. Wildlife surveys are to be conducted along with management efforts to protect endangered avifauna (bird) species. All annual surveys are to be reported to the FAA.

2.12.4 VISUAL RESOURCES

The Maui County 2030 General Plan and Countywide Policy Plan of 2010 identifies the major policy objective of protecting Maui's scenic resources, focusing on the protection of views along coastal lands. Mountain, agricultural, and island-wide panoramas are also significant scenic resources identified in the General Plan.

Throughout the County of Maui, large-lot residential, commercial, industrial, and other land use development sectors have dramatically affected the County's scenic resources. The many view planes that remain, like other valuable natural resources, continue to help define the islands of Hawai'i and require on-going management to protect them from unnecessary degradation or depletion as land that is rich in scenic-resource value is often the same land that is in high demand for recreational, resort, residential and other uses.

The protection of valued scenic and natural resources is a priority for the planning period of this MP Update. The planned runway extension and airport improvements are not anticipated or expected to have an adverse effect on surrounding scenic resources. Airfield improvements may require some conversion of agricultural lands, but should not degrade or deplete coastal, mountain or agricultural views currently seen from the existing terminal building. Terminal and airport improvements should continue to allow scenic coastal, mountain, agricultural, and island-wide views from inside and outside the terminal building, and from aircraft transiting the island of Maui.

2.12.5 ALIEN/INVASIVE SPECIES

Airports can be a point source for the introduction of invasive and/or introduced species. These potential pests can be transported in passenger luggage or cargo. The OGG has the potential for expanding its markets and destinations thus increasing the risk for the introduction of alien species. Maui and all Hawaiian Islands are ecologically vulnerable and many native species have already been lost due to invasive and/or introduced species. The recent addition of the ASIF at the OGG allows for the inspection of incoming cargo and passenger baggage at the OGG terminal.

2.13 DEVELOPMENT TRENDS

Urbanization is occurring on lands surrounding the OGG. The Courtyard by Marriott, a 138 room hotel, recently opened in June 2012 at the intersection of Haleakalā Highway and Keolani Place. A proposed six-story medical building is under environmental review because it is within the SMA and adjacent to the Kanahā Pond State Wildlife Sanctuary. Maui Business Park Phase 2 will be developed south of and adjacent to Hāna Highway as well as the future OGG Access Road. The Phase 2 subdivision will have 65 light industrial zoned lots ranging in size from 0.5 acres to 5.5 acres. This project would also include off-site improvements such as roads, drainage, and landscaping.

2.14 AIRSPACE, AIR TRAFFIC CONTROL, AND NOISE ABATEMENT PROCEDURES

This section describes the airspace and air traffic control facilities, procedures, and operations at OGG. It describes navigational aids at the OGG and identifies existing obstructions within the airport approach and departure areas. The discussion below covers operations under both IFR and VFR conditions.

2.14.1 AIRSPACE AND AIR TRAFFIC CONTROL

The OGG's "terminal area airspace" is within the jurisdiction of the Honolulu Control Facility (HCF). The HCF provides air traffic control for enroute IFR aircraft and the approach and departure of IFR aircraft at the OGG. The OGG ATCT, called the Maui Tower, provides air traffic control for all aircraft within the Airport Traffic Area. OGG's ATCT frequency is designated as the Common Traffic Advisory Frequency for use when the control tower is not operating. Pilots are encouraged to use this frequency to advise each other of their intentions and position while operating in the vicinity of the OGG when the tower is not operating.

"Terminal area airspace" refers to the area around an individual airport that is designated for maneuvering of IFR aircraft. The HCF may exercise control over the approach and departure of IFR aircraft within terminal area airspace, or the HCF may delegate responsibility for control of terminal area airspace to a local ATCT facility. The HCF had delegated airspace to the OGG ATCT for approach and departure control in the past; however, in a program of centralization, the HCF has recently resumed the activities of approach and departure control for the OGG. This program of centralization is on a national scale.

An "Airport Traffic Area" is the portion of the airspace within a terminal area that is under the jurisdiction of the ATCT. The OGG is classified as Class C by the FAA. Airport Traffic Areas are generally defined as the airspace that extends five (5) statute miles outward from an airport with an operating control tower and up to 2,999 ft. above the airport elevation (FAA FAR Part 77).

A "Control Zone" is controlled airspace generally including the area within five (5) statute miles of the airport (plus extensions as necessary for approach and departure paths) and extending upward from the surface of the earth. The OGG control zone includes extensions to the south and to the north to accommodate approach and departure paths from Runway 2-20.

To operate under VFR within a Control Zone, the ceiling must be at least 1,000 ft. above ground level and visibility must be three (3) miles or more, except as provided for Special VFR flights in FAR, Part 91, "General Operating and Flight Rules," Paragraph 155, "Basic VFR Weather Minimums," and Paragraph 157, "Special VFR Weather Minimums." A pilot must receive an appropriate air traffic control clearance, have one (1) mile of visibility, and stay clear of clouds in order to use the provisions of Special VFRs.

2.14.2 EXISTING NOISE ABATEMENT PROCEDURES

Existing noise abatement procedures for the OGG are published in the "Area Notices" section of the FAA's Pacific Chart Supplement (PCS). Under the existing informal Preferential Runway Use Program, Runway 2 is the recommended noise abatement departure runway for large propeller-driven and jet-powered aircraft (*http://www.boeing.com/resources/boeingdotcom/commercial/noise/kahului.html*). These aircraft are over 12,500 lbs. gross weight. Upon departure from Runway 2, the noise abatement procedure is for the aircraft to maintain course while climbing until it is one (1) mile beyond the shoreline before commencing a turn. This is intended to ensure that departing aircraft do not overfly the residential areas in East and West Spreckelsville. However, because the homes are so close to the runway, they experience single event noise levels as a result of jet aircraft departures even when these procedures are followed.

Runway 5 is used primarily by small, propeller-driven aircraft. These types of aircraft are requested to turn left as soon as possible after take-off if they are eastbound or westbound, and remain at least one (1) mile clear of the shoreline. If they are southbound, and traffic permits, the procedures call for them to turn right as soon as possible, otherwise they are requested to turn left. Aircraft overflying existing residences in West Spreckelsville have been the

source of noise complaints from residents of that area, particularly regarding morning cargo flights.

Large aircraft landing at the OGG under Kona (southerly winds) conditions are instructed to use Runway 20. Small propeller aircraft often land on Runway 23 under such conditions. Historically, these south-flow operations have generated some complaints from Spreckelsville residents living near the approach tracks. The same residents, whose homes are only about 1,500 ft. from the northern end of Runway 20, also complain about the noise and odor from jet aircraft waiting at the end of the runway for permission to take off to the south.

Aircraft arriving from Honolulu under trade wind conditions are routed down the windward side of West Maui, turning to fly their downwind leg over Wailuku before turning onto the final approach. This pattern has been replaced with a route that takes aircraft from O'ahu south of Maui, allowing them to make a straight-in approach to Runway 2 under trade wind conditions.

Maui Tower discourages large aircraft from using Runway 5. This is to limit overflights of the residential and other noise-sensitive areas along the shoreline west of the OGG. The noise abatement approach to Runway 5 used by small planes takes them over Kahului Harbor, avoiding adverse noise impacts on residential areas.

2.15 AIRPORT MANAGEMENT, FINANCIAL, AND POLICY & REGULATION

The OGG is part of the Statewide Airport System operated by the DOTA. The system includes all of the major airports in the islands. Administratively, the OGG is part of the Maui District. In addition to the OGG, the District includes Hāna, Kapalua, Lāna'i, Moloka'i, and Kalaupapa Airports. A chart showing the organization of the Maui District airports is shown on **Figure 2-14**.

2.15.1 AIRPORT MANAGEMENT

The OGG currently has 150 authorized positions. They are distributed as follows:

- Administration: 17
- Aircraft Rescue and Firefighting: 25
- Maintenance: 47
- Janitorial: 11
- Vacant/Unclassified: 50

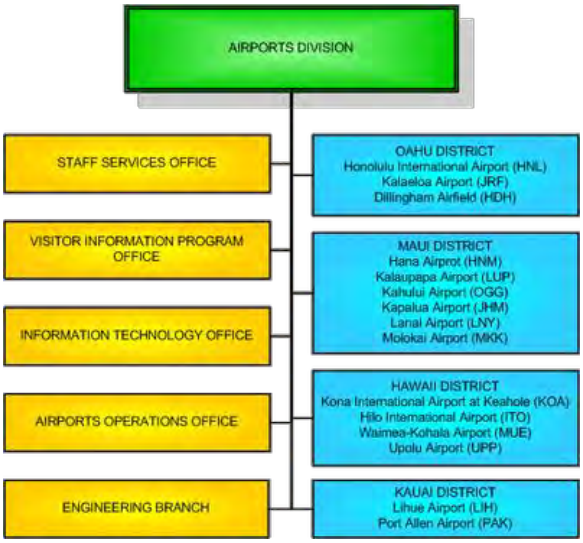

Figure 2-14 Organization Chart - DOTA

2.15.2 AIRPORT OPERATIONS

The Maui District Manager is responsible for the overall administration of all the airports in the Maui District, including day-to-day operations. Day-to-day operations for the airports are administered through four (4) assistants. Three (3) assistant airport superintendents report to the Maui District Manager for operations. The head of the general construction and maintenance section oversees maintenance, janitorial, and grounds keeping operations at the OGG. The Fire Commander oversees the aircraft rescue and firefighting operations there, and the Chief of Operations is responsible for maintaining the security of the OGG.

2.15.3 FINANCIAL OPERATIONS

This section presents operating revenues and expenses for the OGG during the 2010 FY. It also outlines the OGG's leasing policy.

2.15.3.1 OPERATING REVENUES AND EXPENDITURES

Airport revenue is generated by the leasing of land and building space, charges to airport concessionaires and permittees, user fees, and other miscellaneous fees and charges. In FY 2010, net revenues totaled $51.9 mil. See **Table 2-9** on Page 2-31. The OGG's operating expenses during FY 2010 totaled $27.5 mil. It is important to note that expense items do not include the allocated statewide expenses, depreciation, and changes in net assets. Thus, they do not reflect the full cost of maintaining the OGG. If these additional costs were included, it is likely that total expenses would exceed the revenues the OGG generated in 2010.

DOTA guidelines encourage each facility to generate revenues sufficient to meet operating expenses. The updated Airport-Airline leases provide for compensating fees for use of terminal spaces and the airports system support charges. Landing fees will be charged to help recover the cost of operating the airfield.

2.15.3.2 LEASE SPACE

Space at the OGG is leased to corporations and individuals on both a short-term (i.e., month-to-month) and long-term bases. Short-term leases are given for hangar space, aircraft tiedowns, and other temporary airport uses. They are also given for spaces that are planned for some future use or that are available for only a short time. The lease fee is typically based on the type and amount of space that is covered and on other terms of the agreement.

Long-term leases, for five (5) or more years, are generally awarded to lessees who expect to make permanent improvements at the OGG. Tenants in this class include the airlines and car rental companies. The rent for this type of lease is fixed for the term of the agreement and is based on the type and amount of space involved and on the other conditions of the agreement of space involved and on the other conditions of the agreement.

Leases for certain spaces at the OGG, such as those used by concessionaires and airport permittees, are granted through a competitive bidding process. The State establishes the terms of the lease and the criteria, such as the highest minimum guaranteed rent plus a percentage of the gross sales that would be used to evaluate proposals. The lease is then awarded to the offeror who promises the greatest returns to the State. The lengths of leases awarded in this fashion vary, but they generally do not exceed five (5) years.

2.15.3.3 POLICY AND REGULATIONS

The operation of the OGG and other State airports is governed by the provisions of HRS, Chapter 261, Aeronautics; HRS, Chapter 262 Airport Zoning Act; HRS, 263 Uniform Aeronautics Act, and by the Uniform Code, Title 19 of the HAR. In addition to establishing general rules governing the practice and procedures of the DOTA, Title 19 contains specific regulations for airport site approval and licensing, airport zoning, aircraft operations at public airports, airport public areas, airport landing fees, and small aircraft hangars at public airports.

2.15.4 EXISTING AIRPORT DEVELOPMENT PROPOSALS

The State has already planned and budgeted for certain improvements to be made at the OGG. Act 158, SLH 2008, designates $12.9 mil. for terminal improvements; $35.3 mil. for construction of a new access road from Hāna Highway; $250,000 for program management support; $17.1 mil. for parking lot expansion; $5.1 mil. for storm water permit compliance; $1 mil. for elevator and escalator improvements; $3.9 mil. for security access control and close circuit television system; and $5.9 mil. to reconstruct runways and taxiways. (Hawai'i Aviation, 2011).

OPERATING REVENUES	
Fees	$26,434,108
Airport Landing Fees	$9,532,948
Aeronautical Rentals	$11,284,365
Aviation Fuel Tax	$1,129,873
Non-aeronautical Rentals	$2,846,196
Airport system support charges	$40,444
Miscellaneous	$537,716
Allocation of statewide misc. revenue	$58,606
Net Operating Revenues	$51,864,256
OPERATING EXPENSES	
Salaries and Wages	$8,391,364
Other Personal Services	$5,254,223
Utilities	$5,032,760
Special Maintenance	$204,764
Repairs and Maintenance	$1,437,390
Materials and Supplies	$739,960
Insurance	$1,625
Claims and benefits	$207,434
Travel	$49,121
Rent	$31,497
Communication	$53,652
Dues and Subscriptions	$165
Freight and Delivery	$10,067
Miscellaneous	$8,503
Total Operating Expenses	$27,511,332
BALANCE (Revenue-Expenditures)	$24,352,924
Source: State of Hawai'i, Department of Source: Transportation, Financial Statements and Supplemental Schedules, June 30, 2012 and 2011	

Table 2-9 Kahului Airport Operating Revenues and Expenses

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