

Honolulu International Airport Master Plan Update

State Project No. AO1011-08

DRAFT



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Department of Transportation
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SECTION 1.0

INTRODUCTION

This Master Plan Update of Honolulu International Airport (HNL) was completed for the State of Hawaii, Department of Transportation, Airports Division (HDOT-A). The project was funded by HDOT-A with State of Hawaii funds and through Federal Aviation Administration (FAA) grants, as State project number AO1011-08. The FAA grant numbers are for Phase I was AIP Number 3-15-0005-42 and for Phase II is AIP Number 3-15-0005-77. This Master Plan Update was developed in compliance with HDOT-A and the Federal Aviation Administration guidelines and requirements.

The Master Plan should be used to determine a logical development scenario of the Airport into the future. Given the age of the facility and increased growth around HNL, the facility has become landlocked and HDOT-A will have a difficult time in expanding its acreage within the planning horizon. This update of the Master Plan was undertaken due to the new security requirements, changes in the aviation demand (in 2001), and changes in various airline business plans. It should be noted that during the planning process, Aloha Airlines ceased operations and the cargo operation is now called "Aloha Cargo," and Mokulele Airlines started interisland jet service.

The planning process includes: an existing inventory of the facilities, aviation demand forecasting, analysis of facility requirements, development of alternatives, and a financial analysis. During the development of this Master Plan Update, it became apparent that the development of the terminal complex would be the major focus of the plan.

The overall objectives of this Master Plan were as follows:

- development of the airport to meet aviation demand in a phased and logical manner;
- maximize the use of the available land in an efficient manner;
- compliance with Federal and State aviation and environmental requirements;
- providing an airport facility for the safe and efficient processing of passengers, cargo and aircraft;
- providing a balanced facility for users, tenants and the State;

- balancing the terminal, landside and airside developments;
- maintaining Honolulu International Airport status as the gateway to Hawaii and the Pacific; and
- allowing Honolulu International Airport, the State, its stakeholders and tenants to compete in a global aviation economy.

1.1 HISTORY OF HONOLULU INTERNATIONAL AIRPORT

HNL was dedicated in 1927 as John Rodgers Airport on 885 acres at Keehi Lagoon. For the next 80 years HNL developed into the gateway of the Pacific and Hawaii on over 3,500 acres of land. The current Overseas Terminal was designed by one of Hawaii's premier architect Valdmir Ossipoff, and constructed in 1962. Ossipoff's style is referred to as a work reflecting a deliberate attempt to enact a concern for both the cultural and climatic specificity of Hawaii relative to the technical and aesthetic progress of western modernism.

The Diamond Head and Ewa concourses (gullwings) were constructed in the 1970s and the central concourse was constructed in 1980. The Ewa concourse was expanded by three gates in 1994. The Interisland Terminal started construction in 1989 and was operational in 1993. In 2009, a new parking structure for approximately 1,800 parking stalls was opened between the Overseas Terminal parking structure and the Interisland Terminal.

1.2 HAWAII AIRPORTS SYSTEM

The HDOT-A is one of three divisions within the State's Department of Transportation. Established on July 1, 1961, under the provisions of Act 1 of the Hawaii State Government Reorganization Act of 1959, it has jurisdiction over and control of all State of Hawaii airports and State-owned air navigation facilities. HDOT-A currently operates and maintains the 15 airports shown in Table 1-1. Every odd-numbered year, the HDOT-A prepares and submits to the Legislature of the State of Hawaii an estimated budget for the operation, maintenance and repair of the Airports System, for capital expenditures, and for any other planned expenditure for the next two (2) successive fiscal years (the Biennium Budget).

**Table 1-1
HAWAII AIRPORT SYSTEM**

Island	Large Hub (Primary)	Medium Hub (Primary)	Small Hubs (Primary)	Nonhubs and GAs (Secondary)
Oahu	Honolulu Int'l			Dillingham Airfield Kalaeloa Airport
Maui		Kahului Airport		Hana Airport Kapalua Airport
Hawaii			Kona Int'l Hilo Int'l	Upolu Airport Waimea-Kohala
Kauai			Lihue Airport	Port Allen Airfield
Lanai				Lanai Airport
Molokai				Molokai Airport Kalaupapa Airport

Note: The State refers to large, medium, and small-hub airports as primary airports. All other airports are referred to as secondary airports.

- a) A large hub is a facility that enplanes 1.0% or more of total U.S.
- b) A medium hub is a facility that enplanes between 0.25% and 0.99% of
- c) A small hub is a facility that enplanes between 0.05% and 0.24% of total
- d) GA - General Aviation

Source: State of Hawaii, Department of Transportation, Airports Division.

HNL is the largest of the five primary airports in the Hawaii Airports System, accommodating approximately 60 percent of the statewide total enplaned passengers. HNL is classified as a large hub by the Federal Aviation Administration, and in 2007 HNL was the 13th busiest international gateway airport in the United States in terms of international enplaned passengers, and the 25th busiest airport in terms of total enplaned passengers with 10.4 million. HNL serves as the gateway for international and domestic tourists, the major port-of-entry for Hawaii residents, air cargo and mail, a connecting hub for the Hawaiian archipelago, and a hub for Hawaiian Airlines. It is served by 24 passenger airlines, including 9 major U.S. airlines, 4 regional and commuter airlines that provide interisland service, and 11 foreign-flag carriers.

1.3 HISTORY OF THE CURRENT PLANNING EFFORT

The latest Honolulu International Airport Master Plan was completed in August 1994 and entitled "*Honolulu International Airport, Master Plan - 2010.*" This plan included a new International Terminal Building and an expansion of the current passenger concourses to accommodate future gate requirements for HNL.

In light of the changes in demand and airlines operational plans, HDOT-A began work on a new Master Plan in 2004. After the initial inventory and forecasts analysis was completed, HDOT-A delayed the completion of the master plan process for various reasons. One of the major reasons was the planning by Hawaiian Airlines to consolidate their interisland and overseas (domestic and international) operations in 2004¹. At that time Hawaiian Airlines was operating its fleet in two general areas, the Interisland Terminal for interisland flights and the Ewa Concourse for Overseas Domestic flights. Currently, Hawaiian Airlines is operating in three areas; the Interisland Terminal, Ewa concourse and Central concourse depending gate availability. Hawaiian Airlines felt that this spreading of aircraft operations throughout the terminal was not a cost-effective and efficient use of their staff or resources.

The Hawaiian Airlines Operations Consolidation study led to a terminal planning study by the HDOT Administration, the Airlines, and the Airline Committee of Hawaii (ACH) in 2005. The outcome of this planning study was the Honolulu International Airport Terminal Modernization Program², which led to the current "Baseline Alternative."

The Modernization program highlights include:

- an additional six (6) more gates to meet 2010 demand;
- considered Ticket Counter capacity adequate through 2010;
- that the Level of Service (LOS) of the ticket lobby was very good through 2010;

¹ HNTB, "*Final Report, Hawaiian Airlines, Operations Consolidation, Honolulu International Airport,*" March 2004.

² KFC Airport, Inc and AvAirPro, "*Honolulu International Airport, Passenger Terminal Complex Modernization Study,*" May 2005.

- an additional security lane to meet the 2010 demand at checkpoints 1, 2, 4, and 5;
- in 2010, 30% of the departure lounges will experience LOS D or worse for more than 15 consecutive minutes;
- international baggage claim provided LOS A throughout the day;
- in 2010, the number of occasions when bags must be removed from International Bag Claim devices to prevent backup will increase by 11%;
- current inspection agency facilities are considered adequate to meet the 2010 international passenger demand based on ICAO standard, however airline personnel will be required to remove an unacceptably large number of bags from the claim device;
- *"Stakeholders deem it infeasible to expand the baggage claim devices within the constraints of the existing FIS"*;
- all Domestic Bag Claim areas found to be at LOS A at all times; and
- WikiWiki bus system keeps walking distances within recommended guidelines.

In this study, previous planning studies were re-analyzed and discounted, and concerns from the airlines relating to the existing terminal were discussed. The major concerns of the airlines were: the age of the facility and deteriorating conditions of HDOT-A and airline facilities; and the use of single loaded concourses.

There were three alternatives reviewed by HDOT-A and the airlines, which are presented in Figures 1 and 3. The study focused on the redevelopment of the aircraft gates and did not necessarily provide any analysis of other facilities or relocation options for the displaced tenants.

Through the Airline and HDOT administration discussions, the parties agreed to recommend the third alternative "Alternative 3" as the recommended alternative. This "Alternative 3" (Figure 3) was presented to the public by the Governor in May 2006, and became the "Baseline Alternative" for the Master Plan analysis has shown in Figure 4. This "Baseline Alternative" developed a linear-pier terminal concept which was limited by the existing Runways 4R - 22L and 8L-26R, Hickam Air Force Base, and the existing circulation (frontal) roadway. The "Baseline Alternative" highlights includes:

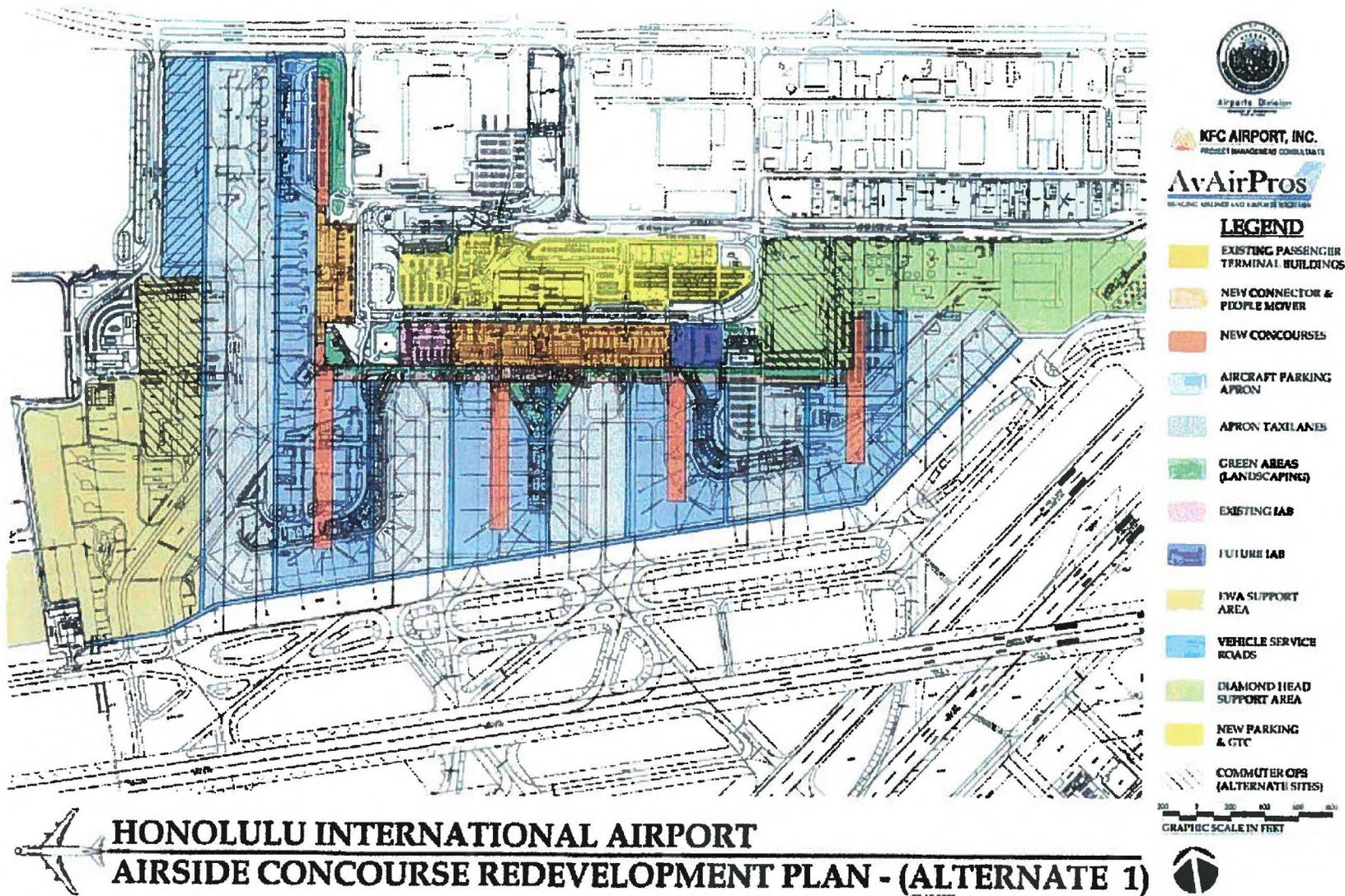


Figure 1 - HNL TERMINAL MODERNIZATION PROGRAM - ALTERNATIVE 1

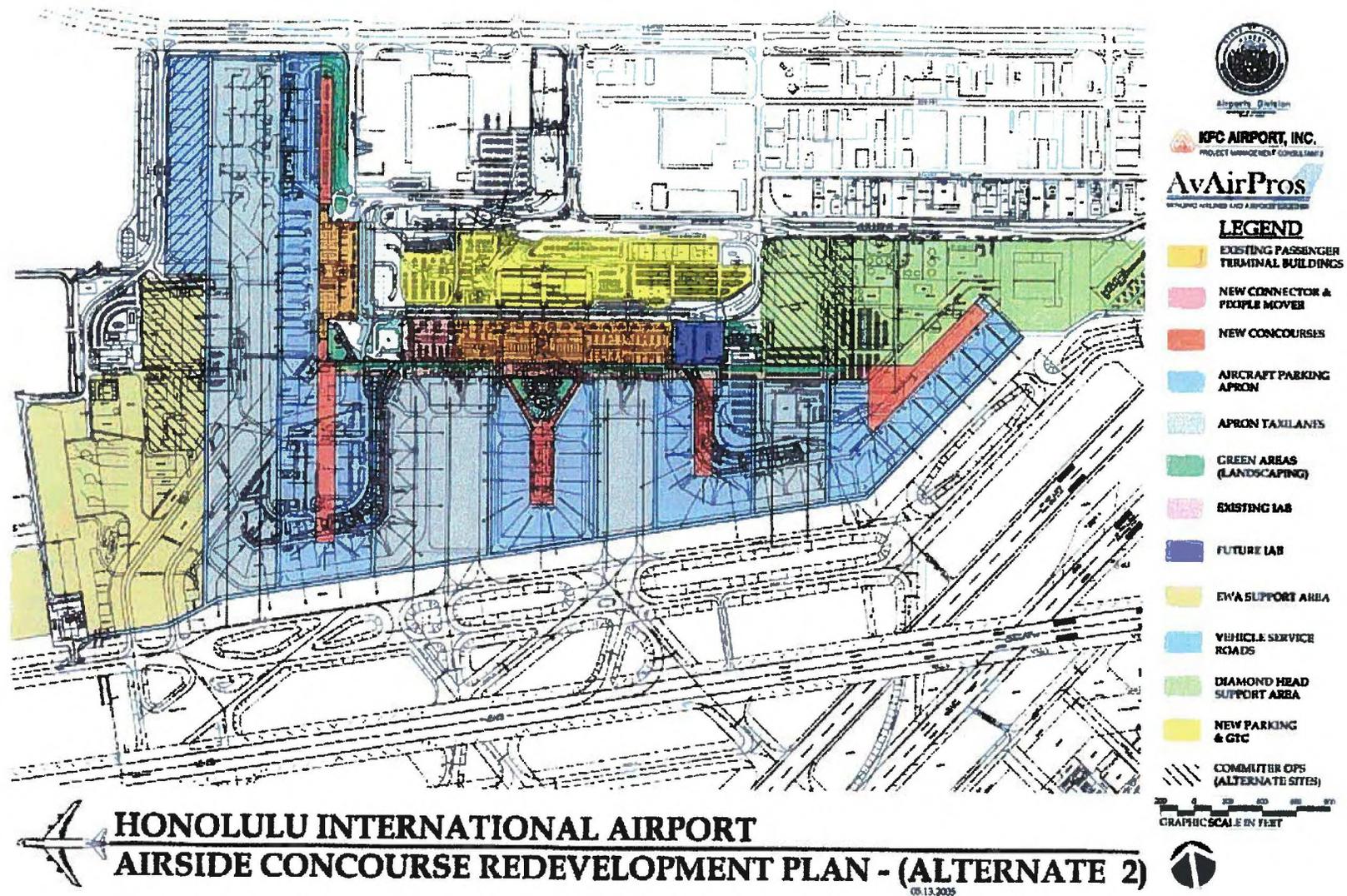


Figure 2 - HNL TERMINAL MODERNIZATION PROGRAM - ALTERNATIVE 2

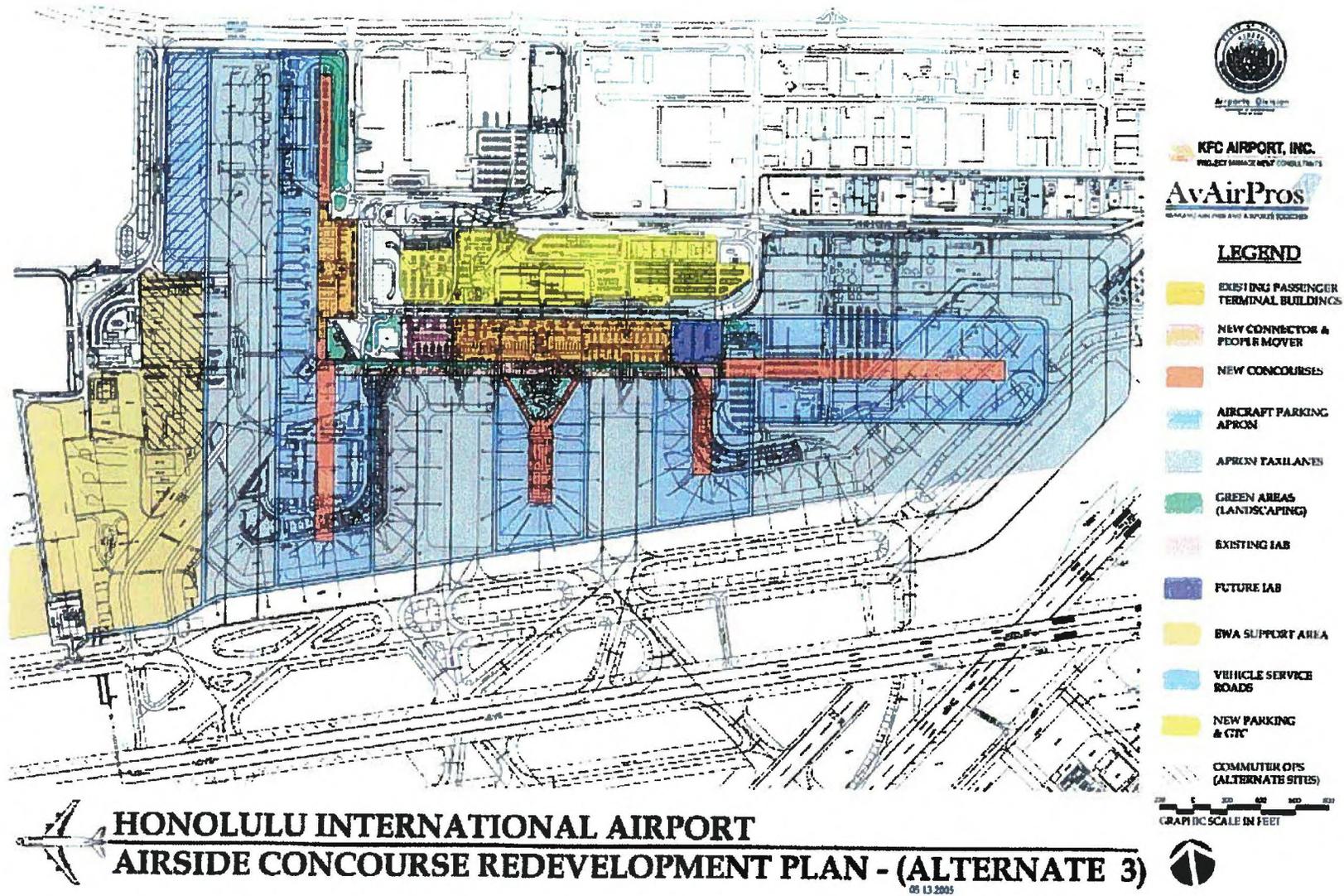


Figure 3 - HNL TERMINAL MODERNIZATION PROGRAM - ALTERNATIVE 3



Airports Division
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

KFC AIRPORT, INC.
PROJECT MANAGEMENT CONSULTANTS

AvAirPros
BRINGING AIRLINES AND AIRPORTS TOGETHER

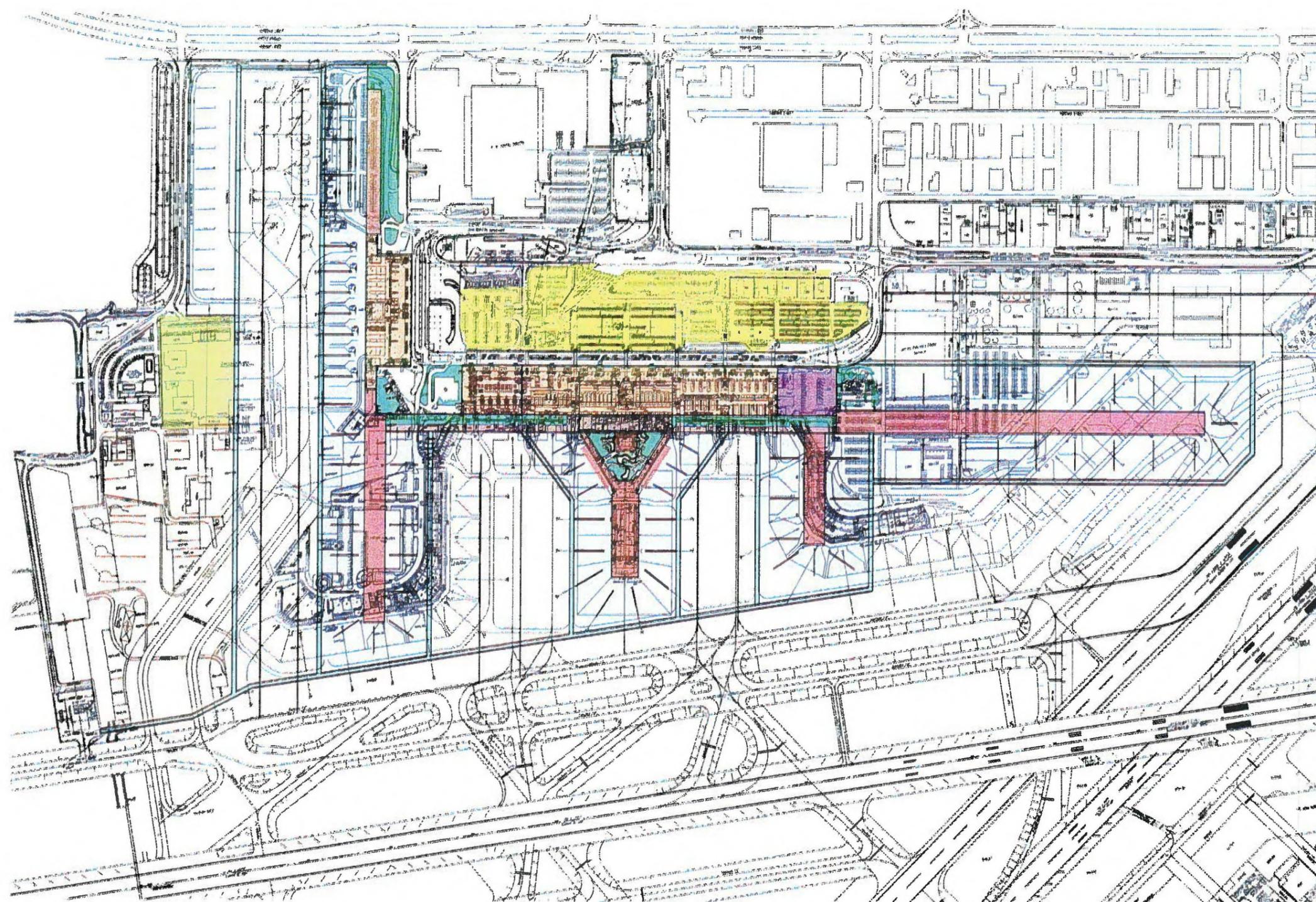
LEGEND

- PASSENGER TERMINAL BUILDINGS
- PROPOSED NEW CONNECTOR
- PROPOSED NEW CONCOURSES
- AIRCRAFT PARKING APRON
- APRON TAXILANES
- GREEN AREAS (LANDSCAPING)
- PROPOSED COMMUTER TERMINAL COMPLEX
- BWA SERVICE AREA
- VEHICLE SERVICE ROADS
- PROPOSED PARKING STRUCTURE
- NEW IAB BUILDING

0 200 400 600 800
GRAPHIC SCALE IN FEET



EXHIBIT II-1



**HONOLULU INTERNATIONAL AIRPORT
AIRSIDE CONCOURSE REDEVELOPMENT PLAN - (ALTERNATE 3 - ULTIMATE PLAN)
06.27.2005**

Figure 4 - BASELINE ALTERNATIVE

- a new linear double-loaded Diamond Head concourse for Group V aircraft (B747, B777, etc);
- a new double-loaded Ewa Makai (south) Concourse for Group IV aircraft (B767, etc);
- the relocation of the Interisland (Group III) aircraft to the Central Concourse;
- the relocation of the Commuter operations (Part 135) to the Elliot Street area;
- the consolidation of Hawaiian Airlines operation to the new Ewa Mauka (north) Concourse;
- two split International Arrivals facilities;
- the shortening of Runway 4R-22L;
- new aprons and fuel lines; and
- an Automated People Mover System.

The estimated costs for this gate redevelopment program was \$2.3 billion in 2005 dollars. The costs were developed into two separate major phases of \$1.4 billion and \$0.9 billion. The first phase of \$1.4 billion was to be completed by 2014 and part of the statewide airport twelve-year "Airport Modernization Program."

1.4 DESCRIPTION OF MASTER PLAN

The Master Plan documentation, follows a typical Master Planning process and therefore, the document is prepared in the following order:

- an inventory of the facilities and the airport environs;
- an aviation demand forecast;
- a demand / capacity analysis and development of facility requirements;
- an alternatives analysis to meet the facility requirements; and
- the recommended alternative(s).

1.4.1 Stakeholder and Public Participation

The input to the Master Plan was conducted using various forums, including person to person meetings, specialty group meetings, joint

meetings with the HNL Modernization team, Technical Advisory Committee (TAC) meetings, and Public Informational meetings. Due to the focus on the terminal, specific meetings were held with State and Federal agencies, tourism authorities, terminal tenants and users, including the airlines and concessionaires. In addition, three meetings were held with the Technical Advisory Committee and three Public Informational meetings were held. The Technical Advisory Committee is made up of agency and organization representatives which have technical knowledge and expertise of the Airport, and a list of members are provided in Appendix A. Input to the Master Plan from the general public is gathered through the Public Informational meeting process.

1.4.2 Specific Goals and Objectives

The refinement of specific goals and objectives to guide the formulation and evaluation of the alternatives were developed through meetings with tenants, users, airlines, government agencies and HDOT. In addition, commonalities observed from each of the previous studies for HNL provided further insight, these commonalities include the need to:

- recognize the importance of air travel and tourism to the economy of the state of Hawaii;
- enhance the experience of arriving to and departing from Honolulu International Airport by,
 - showcasing the unique culture and environment,
 - minimizing passenger wait times at processing points,
 - providing efficient connectivity through the terminals and concourses (WikiWiki busses have extended beyond their useful life), and
 - maximizing concession opportunities; and
- appropriately balancing the landside, terminal, and airside facilities to meet the existing and forecast aviation demand.

Therefore, the following are the specific goals and objectives by category, developed during the planning process and reflects the overall goals of the Master Plan.

LAND USE

- Ensure the prudent utilization of all available land and facilities.
- Achieve balance, such as not sacrificing apron space for terminal expansion or landside capacity to the benefit of airside facilities.
- Balance initial and future terminal development with airside and landside capacities.
- Identify potential future acquisitions that may benefit future landside, terminal, or airside functions.

AIRSIDE OPERATIONS

- Maximize airside operational efficiency for aircraft and support vehicles.
- Provide for efficient and safe taxiway and ramp operations.

LANDSIDE ACCESS

- Improve overall airport access consistent with anticipated passenger and vehicular demand.
- Provide direct, convenient access to terminal curbs, rental car and parking.
- Plan for a future rail transit connection in the TAMP.

TERMINAL AREA

- The Terminal Area portion of the Master Plan, or the TAMP³ needs to identify a "World Class" terminal, that fosters consensus amongst government, airport, airline and community stakeholders. The TAMP must:
 - address current level of service issues and plan for future long term demands while remaining adaptable to potential market changes;
 - promote efficient airline operations and convenient and intuitive passenger movements;
 - maximize where practical the use of current terminal infrastructure while preserving and promoting Hawaii's unique environment;

³ TAMP - Terminal Area Master Plan

- recognize the importance of air travel, and in particular the high-end international traveler, to the local economy;
 - embrace proven technological advances;
 - maximize commercial revenue opportunities; and
 - represent a level of quality befitting the destination and reflect the vibrant "Hawaiian" culture through its functional, aesthetic and architectural qualities.
- The TAMP must provide a positive passenger experience and serve as a technologically advanced transportation gateway to and from Honolulu and the other Hawaiian Islands.
 - The TAMP must accommodate the overall needs of the International, Domestic Overseas, and Interisland airline operations while maximizing gate utilization.
 - The TAMP must address specific requirements and concerns of the airlines who will operate from the HNL, such as:
 - Passenger Convenience and Comfort;
 - Maximizing passenger convenience and movement efficiency for International, Mainland, and Interisland origin/destination (O&D) and connecting passengers by minimizing delays in processing;
 - Providing protection from the elements of weather, noise and smoke;
 - Providing provisions for passenger comfort and convenience including disabled persons; and
 - Minimizing walking distances and times, provide clear intuitive orientation between gates, processing functions, arrivals and departures curbs, parking and future transit service.

COMMERCIAL REVENUES

- Maximize self-sustaining, revenue-producing space as justified by projections.
- Maximize revenue-generating capability through concessions, public parking, rental car, and collateral commercial development opportunities.

FLEXIBILITY

- Maximize flexibility for expansion, operational change, and airline growth.
- Provide flexible aircraft parking capability in the redeveloped facilities.
- Certain gates may need to be capable of both domestic and international operations (Swing Gates), or may need to function as both interisland and overseas.
- Emphasize flexibility for changing airline operational requirements such as changes of aircraft gauge from widebody to narrow-body and vice versa (interchangeability).

INTERNATIONAL FACILITIES

- Ensure that the Federal Inspection Services (FIS) plans are compatible with long-range and short-range terminal development.
- Provide FIS facilities which are operationally consistent with the existing facilities as well as long-range development goals for the terminal area.
- Adhere to current applicable federal guidelines and acceptable operating procedures in planning the FIS facilities.
- Provide upgraded or new international arrivals facilities that appropriately serve as a functional and aesthetic gateway to Hawaii and the United States.

ENVIRONMENTAL

- Carefully consider and exercise sensitivity to existing environmental resources.
- The TAMP must consider environmental feasibility.
- Interdiction of invasive species by the inspection agencies (CBP, USDA, FWS, FDA, PHS, CDC, HDOA, and HDOH) for passengers, baggage and cargo.
- Landscaping should not include invasive species pest hosts, invasive species or potential high priority pest habitats.

CONSTRUCTABILITY

- Ensure a practical and feasible approach to phasing and constructability of facilities.

- Maximize the use of existing facilities where practical
- Maintain full operational capability (no loss of gates, services or utilities) and minimize disruption during construction.

DESIGN

- Create a solution that consistently reflects the Native Hawaiian culture through the facilities functionality and architectural qualities.
- Provide a positive experience and imagery since the HNL TAMP serves as the gateway to and from Honolulu and the Hawaiian Islands.
- Create an attractive, pleasant experience for international, mainland and interisland arriving, departing and connecting passengers, visitors, and employees.
- Provide clear, uncomplicated terminal operations, functions, and systems.
- Utilize proven systems technology and provide flexibility for future state-of-the-art technology.
- Provide operationally uncomplicated, energy efficient, value-driven design.
- Optimize quality and minimize cost.

1.5 TERMINAL MODERNIZATION PLAN

In a concurrent effort, the HDOT-A undertook a "Terminal Modernization Program", which was led by the Project Management (PM) and Master Architect (MA) teams⁴. This plan adopted the "Baseline Alternative" with initial estimates of the program construction budget of approximately \$2.3 billion (2005 dollars) and expected to be carried out over several decades. The first phase of the program had an estimated construction budget of \$1.4 billion and was expected to be completed by 2020.

The primary objective of the "Terminal Modernization Program" is: *"To develop quantifiable and objective information to facilitate the ability of the State of*

⁴ The primary consultants for this "Modernization Plan" were Parsons, HOK, KYA and AvAirPro.

Hawaii Administration and [HDOT/HDOT-A] Officials, in consultation with the Airlines, to make informed decisions regarding various issues that the [HDOT/HDOT-A] and Airlines serving Honolulu International Airport continue to find themselves confronted with.... including the following:

- *Current state of repair and remaining useful life of the existing Overseas Passenger Terminal Building and utility/building system infrastructure in general and the existing Diamond Head Concourse (built in 1970) and Ewa Concourse (built in 1971 [to 1994]), as well as various Ancillary Support Facilities;*
- *Adequacy of key passenger terminal functional area components to accommodate current and future aircraft/passenger terminal capacity levels;*
- *Perceived imbalance in utilization of Passenger Terminal Complex;*
- *Hawaiian Airlines' expressed desire to consolidate their overseas and inter-island operations;*
- *Need for intra-terminal transportation system to replace the Wiki Wiki bus system/roadways and mitigate excessive passenger walking distances; and*
- *International Arrivals Building (IAB) is not befitting of the image and experience the State would like to provide to Honolulu's international passengers."*

The PM/MA teams also created a vision statement which stated: *"Create an airport that is modern in its response to the demands and rigors of air travel; is Hawaiian in its response to the unique cultural and natural environment; is an airport of which both residents and visitors alike are proud; is a place that embodies the Aloha spirit and creates a gateway to Hawaii."*

Since the inception of the "Baseline Alternative" in May 2005, several conditions have changed, such as:

- *FAA raised concerns about the shortening of Runway 4L-22R. Therefore, the HDOT-A decided that the runway and associated parallel runway would not be modified during Phase 1;*
- *that the fuel farm would not be relocated during Phase 1;*

- that Aloha Airlines [*now defunct*] will move their operations to the Diamond Head side of the terminal complex, and be co-located with United Airlines;
- the arrival of a new inter-island airline *go!* and introduction of interisland jet service by Mokulele Airlines, after the completion of the 2005 Terminal Modernization Study; and
- Hawaiian Airlines has plans to purchase Airbus 330-200 aircraft to replace the Boeing 767 in the current fleet. The Airbus 330-200 is a Design Group V aircraft and will change the taxiway/taxilane and aircraft hardstand dimensions for Hawaiian Airlines' aircraft.

SECTION 2.0

EXISTING CONDITIONS

2.1 OVERVIEW

The Honolulu International Airport is the largest airport in the State of Hawaii's system of fifteen airports and airfields under the administration of the HDOT-A. The FAA classifies HNL as a large air traffic hub, meaning that more than one percent of the nation's total passengers on certified route carriers in scheduled service are enplaned at the Airport. In 2007, the HNL was ranked 25th among U.S. airports in passenger enplanements, and 15th in landed cargo weight.

HNL lies on the southern (Leeward) side of Oahu, and encompasses approximately 5,211 acres, including Keehi Lagoon. Hickam Air Force Base (HAFB) bounds the Airport to the West, Sand Island to the East, Nimitz Highway on the North, and the Pacific Ocean to the South (See Figure 5). The HNL is a joint-use airport, serving civilian and military aviation. In 2008, the HNL served 18,809,103 passengers and accommodated 286,593 aircraft operations.

2.2 AIRPORT ENVIRONS

The HNL environs is generally defined as bounded by Kalaeloa Airport to the west, Diamond Head to the east, the Pacific Ocean to the south, and the H-1 freeway to the north. The study area had a resident population of approximately 99,000 people in 2000, representing 11% of the total population (876,156) of Oahu.

The U.S. Bureau of the Census projects that the population for Honolulu County (Oahu) will increase to 895,600 by 2005 (a 2.0% annual percentage change from 2000), 929,200 by 2010 (a 3.8% annual change), and to 999,400 by 2020 (a 3.6% annual change).

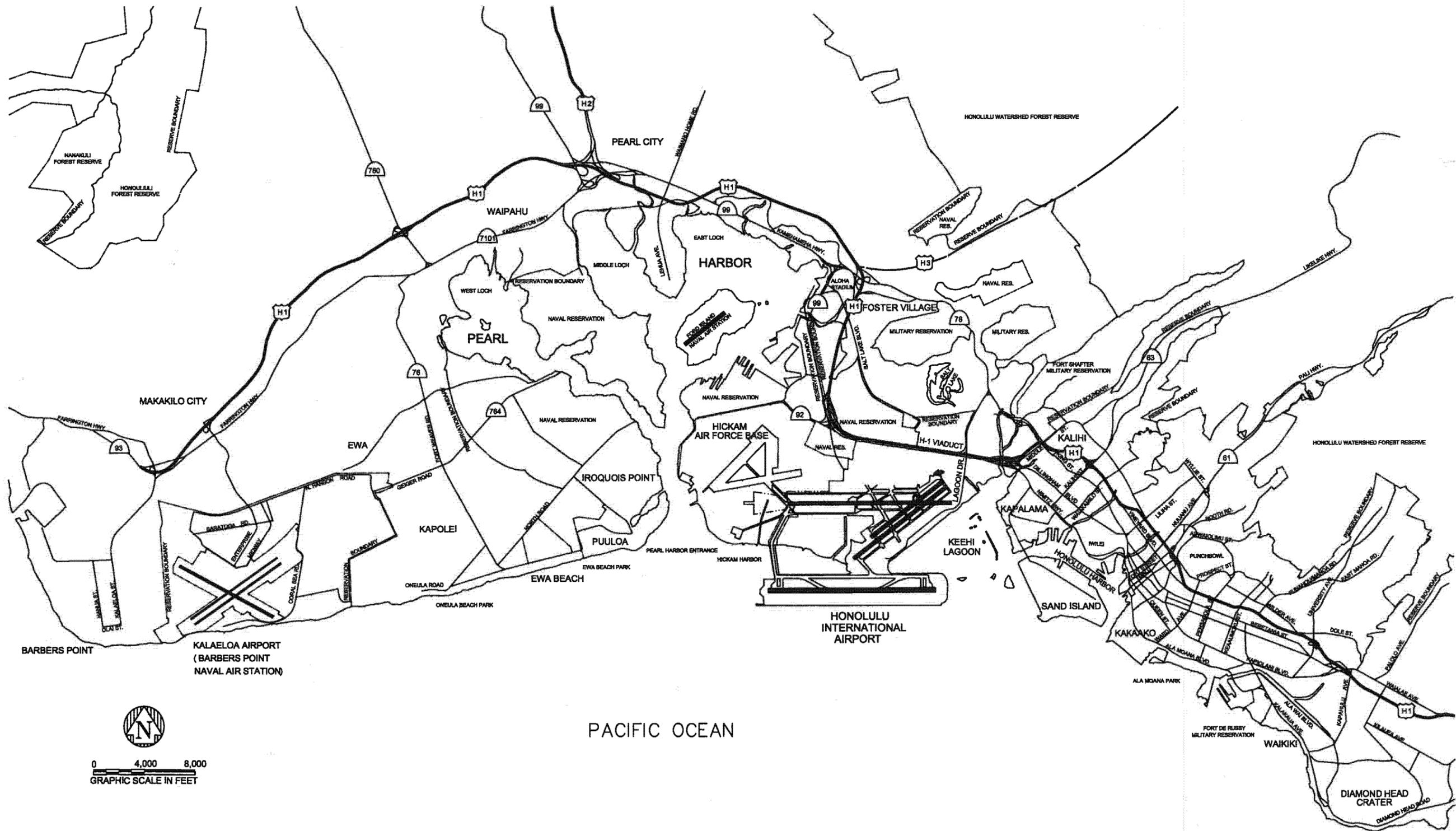


Figure 5 - VICINITY MAP

Table 2-1 provides a breakdown of population by race⁵ of the Airport's environs and island of Oahu.

**Table 2-1
POPULATION FOR OAHU BY RACE**

Race	Environs	Oahu
White	38%	35%
Black or African American	4%	3%
American Indian and Alaska Native	2%	2%
Asian	63%	62%
Native Hawaiian and Other Pacific Islander	18%	22%
Other Race	4%	4%

In 2000, the median household income in the Airport environs ranged from a high of \$76,000 in to a low of \$0, and the median family income ranged from a high of \$78,000 to a low of \$0. The median household income and median family income for Oahu in 2000 was \$52,000 and \$60,000, respectively. The per capita income in the Airport environs ranged from a high of \$25,000 to a low of \$6,000. The median per capita income islandwide in 2000 was \$22,000.

Within the various census tracts in the Airport Environs, the percentage of families below the poverty level in 1999 ranged from a high of 68% to a low of 0%. In 1999, the percentage of Oahu families which are below the poverty level was seven (7) percent, and the percentage of individuals below poverty level was 10%.

2.2.1 Land Use and Zoning

Land to the west of the Airport is Federal government property occupied by Hickam Air Force Base (HAFB). To the south, the Airport borders the

⁵ Percentages do not add up to 100% due to reporting in various racial categories in case of mixed race; for statistical purposes, this is maximum population, including race alone and in combination.

Pacific Ocean, and to the north, between the Airport boundary and the H-1 freeway, land is used for commercial and light industrial purposes. To the east, the Airport encompasses Keehi Lagoon, and is bounded by the Sand Island industrial area. Land uses in the immediate vicinity of the Airport are compatible with Airport activities.

The HNL is classified by the State Land Use Commission as Urban, except for Keehi Lagoon and the "Marine Pond", which is classified as Conservation land. In the environs, the majority of the State Land Use is Urban, with a few scattered areas designated for Conservation use; and lands designated for Agricultural use primarily concentrated in the Ewa plains. A small portion of the South Ramp is located in a Special Management Area (SMA) regulated by the City and County of Honolulu. The HNL has a City and County of Honolulu Zoning of Industrial use (I-2, Intensive).

2.2.2 County General Plan

The City and County of Honolulu's General Plan provides a plan for the development of Oahu to the year 2025. The Primary Urban Center Development Plan (PUCDP) and seven other regional plans covering the Island of Oahu are intended to guide zoning, land use, and public investment in support of the General Plan. The HNL is in the Primary Urban Center, and is designated for industrial use. Designated uses immediately surrounding the Airport include industrial, parks and open space, and lower-density residential.

The PUCDP specifically affects the HNL under three of its five key Vision elements. Towards the goal of protecting and enhancing Honolulu's natural, cultural and scenic resources: *"The Keehi Lagoon shoreline will receive greater visual exposure with the development of the proposed Sand Island Parkway as a new through route from the Airport to Waikiki. A State of Hawaii master plan envisions the development of Keehi Lagoon and its shoreline, including portions of Airport land, for recreational small-boat marinas and for viewing and competing in canoe and kayak paddling races."*

Towards the goal of promoting Honolulu as *"....the Pacific's leading city and travel destination"*: *"The airport vicinity attracts a wide range of uses, including hotel accommodations for transiting passengers and crew; businesses offering services related to air travel, and other businesses that prefer to locate their administrative offices near their operation centers and storage facilities rather than in the financial or retail districts. Thus a mix of commercial and industrial uses is appropriate in this area...*

"Allow a mix of industrial and commercial uses. Allow a broader mix of commercial uses in the Airport and Bougainville industrial districts. The Airport district should include office, hotel and retail uses that are compatible with airport operations, as well as existing light industrial uses."

Towards the goal of ensuring that *"a balanced transportation system provides excellent mobility"*: *"The multi-lane Nimitz Highway isolates the Downtown area from the Honolulu waterfront. Diverting through-traffic on Nimitz Highway to a new Sand Island by-pass route would enable the reconnection of Downtown Honolulu to the waterfront and more efficient travel between the Airport and Waikiki...*

"Commercial maritime activity is planned for both Ala Wai Boat Harbor and Keehi Lagoon...At Keehi, plans call for two marinas for recreational vessels, commercial fishing boats and mega-yachts, as well as other berths for commercial fishing boats and oil spill response vessels."

2.3 Airport Land Use

Within the Airport boundary, most of the land is used for airfield facilities, including runways, taxiways, aprons, and Air Traffic Control Tower and navigational aids. Figure 6 show the existing land uses within the airport.

The main passenger terminal area is located on the North side of the airfield, with roadway connections to the H-1 Freeway and Nimitz Highway. All of the air carrier operations and the majority of passenger-related activities occur on the North side, in an area known as the North Ramp.

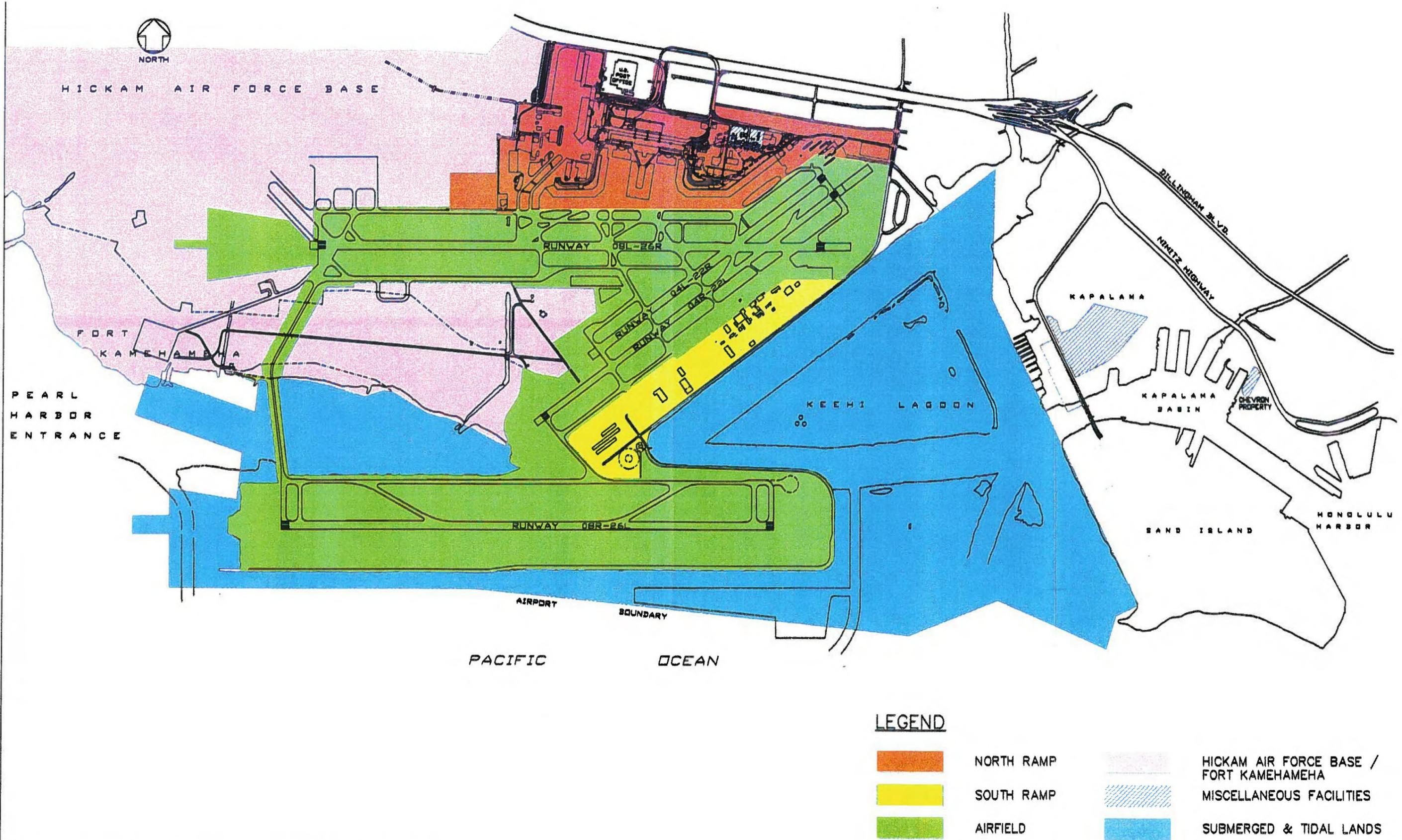


Figure 6 - EXISTING ON-AIRPORT LAND USE

There are two separate terminals in the North Ramp for overseas and interisland passengers. The Overseas Terminal is a multi-level facility made up of four distinct structures: a central terminal and three concourses, referred to as the Ewa Concourse, the Central Concourse, and the Diamond Head Concourse. The Overseas Terminal also contains the International Arrival facility.

The Interisland Terminal accommodates facilities for interisland passenger processing, airline operations, and aircraft boarding. The terminal includes an integral automobile parking garage, second level loading of passengers through aircraft loading bridges, and expanded apron parking for aircraft. Commuter airlines are served by facilities at Terminal 3 of the Interisland Terminal.

In addition, the uses within the North Ramp include: airline support functions (air cargo, flight kitchen, and aircraft maintenance), and Airport support functions (bulk fuel storage, intra-airport transportation, and airport base maintenance). An Aircraft Rescue and Fire Fighting (ARFF) station is also located on the North Ramp at the end of Hale Kinau Ahi Street.

The area between Runway 4R-22L and Keehi Lagoon, referred to as the South Ramp, is subdivided for the following uses: general aviation, air taxi/commuter facilities, helicopter facilities, aircraft maintenance, air cargo, and a variety of miscellaneous aeronautical compatible uses such as aircraft technical school. General aviation facilities include fixed base operators (FBOs), aircraft hangars and apron parking space. A second ARFF station is located at the end of Lagoon Drive, near the general aviation area.

2.4 Airfield

The airfield at HNL has two parallel east-west runways (8L-26R, 8R-26L), two parallel, crosswind runways (4L-22R, 4R-22L), and two seaplane runways (4W-22W, 8W-26W). The orientation and physical dimensions of the runways are as follows:

<u>Runway</u>	<u>Orientation</u>	<u>Physical Dimensions (feet)</u>
8L-26R	East-West	12,300 by 150
8R-26L	East-West	12,001 by 200

4L-22R	Northeast-southwest	6,952 by 200
4R-22L	Northeast-southwest	9,000 by 150
8W-26W	East-West	5,000 by 300
4W-22W	Northeast-southwest	3,000 by 150

The three principal runways used by air carrier aircraft are Runways 8L-26R, 8R-26L, and 4R-22L and have full length parallel taxiways. The major apron areas are located north of Runway 8L-26R (North Ramp) and south of Runway 4R-22L (South Ramp). Runways 8L and 4R are equipped with precision aircraft approaches using an Instrument Landing System (ILS) and Medium intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), and Runway 26L has a precision approach using a Localizer-Directional Approach system (LDA). All four runways are equipped with high intensity runway lights (HIRL), and landing aids such as Visual Approach Slope Indicators (VASI) and/or Precision Approach Path Indicators (PAPI). There are 30 taxiways connecting the ramp areas and HAFB to the major runways. In addition, there are two entrance/exit taxiways for the general aviation area and six entrance/exit taxilanes in the South Ramp subdivision. Figure 7 shows the layout of the runways and taxiways at HNL.

2.5 Passenger Terminals

There are three terminals at HNL located in the North Ramp, which were designed for different types of airline operations. The Overseas Terminal (OST) was envisioned to accommodate all air carrier operations, with the emphasis on the overseas airlines, using large and heavy aircraft, on domestic and international flights. The Interisland Terminal was designed for use by large aircraft for airlines performing interisland flights. Terminal 3 or the Commuter terminal was originally designed to accommodate the large interisland aircraft, and is currently used for the smaller interisland aircraft used by the air taxi and commuter operators. The terminal complex is shown on Figure 8 and Table 2-2 summarizes the existing areas and uses. A detailed breakdown of building uses and areas are presented in Appendix B. Over the years, various planning studies have been completed for the HNL terminal and the following are the major constraints and opportunities.



Figure 7 - AIRFIELD LAYOUT

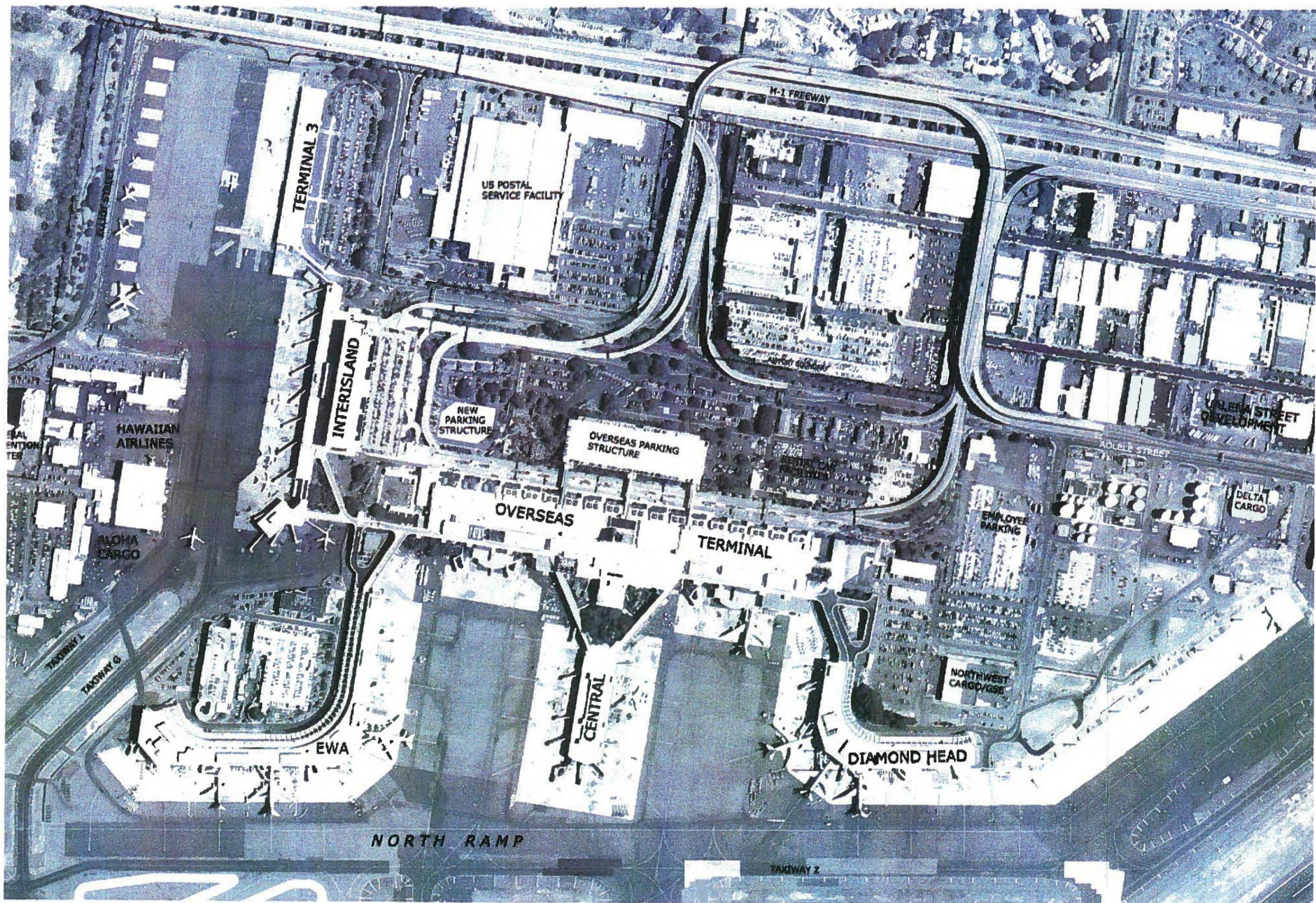


Figure 8 - TERMINAL COMPLEX

CONSTRAINTS

- **ARRIVING INTERNATIONAL PASSENGER MOVEMENTS**
 - cumbersome and uninviting international arrivals process
 - only two gates connected directly to international processing facilities
 - requires three level changes for international arrivals processing
 - inadequate baggage claim length required bags to be removed from devices
 - inbound baggage system not designed to accommodate oversize bags
- **TERMINAL**
 - single loaded concourses
 - diamond head concourse - FIS sterile passenger separation issues
 - outdated WikiWiki bus people mover system
 - baggage claim device lengths require multiple devices to accommodate widebody aircraft
 - minimum separation and clearances around claim devices
 - USDA screening causes confusion and queuing at terminal entrances
 - covered exterior walkways pose maintenance issues
 - limited expansion capability at various security checkpoints

OPPORTUNITIES

- **TERMINAL**
 - large open ticket lobbies
 - positive sense of place at terminal entrance
 - underground connection to terminal building to parking facility
 - connection to main parking structure requires walking across terminal roadway
 - positive sense of place in tropical gardens
 - renovated concourses more open, inviting and amenity friendly

**Table 2-2
SUMMARY OF EXISTING TERMINAL USE**

	OST (sq. ft.)	IIT (sq. ft.)	Commuter (sq. ft.)	Total (sq. ft.)
Gates	29	13	2	44
Airline Functions				
Domestic (overseas and interisland)	164,492	56,687	14,576	235,755
International	77,978			77,978
Other	622,584	106,953	18,643	748,180
Departure Lounges	135,107	49,068	7,781	191,956
Other Terminal Functions				
Security	28,046	15,246	4,234	47,526
USDA and HDOA Insp.	20,338	2,212	56	22,606
Circulation	530,774	128,620	10,485	669,879
Restrooms	41,887	13,391	1,411	56,689
Non-airline Tenants	106,147	22,682	--	128,829
Terminal functions	378,145	85,977	10,432	474,554
International Arrivals Functions				
Primary Inspection	19,851	--	--	19,851
Baggage claim	21,870	--	--	21,870
Secondary Inspection	11,812	--	--	11,812
Support Functions	32,253	--	--	32,253
Other Functions	179,340	--	--	179,340
Concessions				
Non-secure area	6,354	3,793	6,382	16,529
Secure area	144,054	13,104	--	157,158
TOTAL TERMINAL	2,521,032	497,733	74,000	3,092,765

2.5.1 Overseas Terminal And Concourses

The OST as a total floor area of 1.6 million square feet, with the three concourses having a total floor area of 800,000 square feet. The OST provides for all the airline services required by overseas passengers, both domestic and international. The operational model of the OST is that of a traditional centralized terminal with the primary passenger-processing functions located in the main terminal building and the aircraft-boarding functions located at the three adjacent concourses. Pedestrian walkways and roadways for the WikiWiki bus system connect the OST with the concourses. There are a total of 30 aircraft gate positions at the OST and concourses. Apron parking serving the Overseas Terminal provides 29 gates at the Ewa, Central, and Diamond Head Concourses. In addition, there are seven aircraft hardstands east of the Diamond Head Concourse.

The facilities in the OST, excluding the International Arrivals Facilities of the OST, include facilities for handling inbound, outbound, and connecting overseas baggage, Explosive Device Screening (EDS) space, building mechanical spaces, airport custodial and maintenance spaces, nominal parking for authorized airport and government vehicles, domestic baggage claim, tour group operations, facilities for airline ticketing and passenger check-in, airline offices, concessions and concession offices, security screening checkpoints, roadways and stations for the WikiWiki bus system, Airport administration and offices for federal agencies (e.g., Federal Aviation Administration, National Oceanic and Atmospheric Administration).

The Ewa and Diamond Head concourses are three-level structures; the Central Concourse is a two-level structure. The ground level of each concourse principally accommodates building mechanical systems, airline operational facilities, airline and agency offices, and service vehicle access of the aircraft apron from the service court areas. The second level of each concourse provides space for holdrooms, concessions, and passenger circulation. The second level of the Ewa and Diamond Head concourses includes a dedicated roadway for the WikiWiki bus system, and the vehicles authorized to service the holdroom areas (e.g., for delivery of duty free goods to departing international passengers). The Central Concourse is not served by the WikiWiki bus system. The third

level of the Ewa and Diamond Head concourses accommodates international passenger circulation and a WikiWiki roadway used for pickup of arriving international passengers.

2.5.1.1 International Arrivals Facility

The International Arrivals Facility (IAF) provides space for the Federal Inspection Services (FIS), and occupies the Ewa (western)-end portion of the OST. The IAF is dedicated to the inspection of arriving international passengers (except from Canada) and their baggage by the Federal Inspection Services: the U.S. Customs and Border Protection (CBP) and U.S. Public Health Service (PHS). To comply with federal regulations, the IAF is secured from the remainder of the OST.

The IAF occupies four building levels and encompasses approximately 260,000 square feet of floor area. About 27,000 square feet of this area is used for passenger-clearance-related functions. The facilities in the IAF include facilities for handling inbound and connection international baggage, building mechanical areas, storage spaces for the FIS agencies, International baggage claim, TSA and USDA inspection stations and offices, facilities for the handling of tour groups and their baggage by the tour operators, CBP and PHS inspection stations and offices, WikiWiki bus system roadways and station, and Aloha Lounge facilities for the temporary accommodation of passengers awaiting FIS inspections.

2.5.1.2 Public Space

Public space is provided throughout the OST and the concourses for passenger circulation and for queuing at the ticketing, baggage claim, security screening, or other similar areas. A total of approximately 440,000 square feet of public space is provided in the OST and the concourses.

Circulation Areas. At the ground and second levels of the OST, the principal circulation areas in the nonsecure portions of the building extend in the Ewa-Diamond Head direction along the length of the building. These circulation areas provide access to and egress from the ticketing lobbies, baggage claim lobbies, security screening checkpoints,

and the concession areas in the ticketing and baggage claim lobbies. In the secure portion of the second level, an additional circulation corridor extends the length of the building providing access to each of the three concourses, and the corridors from the ticketing lobbies and to baggage claim area.

Circulation areas in the Ewa and Diamond Head concourses are provided at both the second and third levels by parallel corridors and walkways. The interior corridors are enclosed and air-conditioned, extend the entire length of the concourses, and provide access to the various concourse facilities (e.g., holdrooms, concessions, restrooms). The open-air walkways extend along the exterior of the concourses and serve as passenger pickup and drop-off platforms for the WikiWiki bus system. These walkways are open-air venues which connect the concourses to the main terminal area of the OST. The third level of the concourses is largely restricted in use, as it provides sterile corridors to escort arriving international passengers to the third-level stations of the WikiWiki bus system for direct transfer to the IAF.

The circulation area in the Central Concourse consist of a central interior corridor with access to holdrooms, passenger facilities and concessions. Two exterior walkways on both sides of the central gardens connect the Central Concourse with the main building of the OST.

Queuing Areas. The principal passenger queuing areas in the OST and the concourses are at the (1) USDA baggage screening points, (2) airline check-in islands and ticket counters, (3) baggage claim devices, and (4) Transportation Security Administration (TSA) security screening checkpoints.

Passenger Security Screening Checkpoints. These checkpoints provide security screening for ticketed passengers entering the secure area of the terminal. There are three checkpoints, one in the middle of the OST, and one each at the Ewa and Diamond Head portions of the OST. Checkpoint 2 is in the Ewa portion of the OST between ticketing lobbies 4 and 5, and serves the passengers from those lobbies. Checkpoint 4 is at the middle of the OST between ticket lobbies 6 and 7, and due to airline gate assignments, mainly serves passengers from

Lobby 6 and half of Lobby 7. Checkpoint 5 is in the Diamond Head portion of the OST between ticket lobbies 7 and 8, and serves passengers from half of Lobby 7 and all of Lobby 8.

The passenger security screening checkpoints in the OST serve two functions: (1) screening of passengers by the TSA for hazardous materials and (2) screening of passengers by the USDA for agricultural goods carried in carry-on bags. As a result, the area allocated for security checkpoints in the OST is larger than typically found at other U.S. airports.

Tour Group Areas. The OST is served by two tour group areas. The domestic tour group area is at the Diamond Head end of the building and the international tour group area is at the Ewa end.

The domestic tour group area is on the ground level and serves both arriving and departing passengers. The area consists of a large bus/truck platform and curb area at which tour group passengers and their baggage are either picked up or dropped off. For the convenience of departing passengers, United and Northwest airlines have installed passenger and baggage check-in counters near the area. As a result, tour passengers traveling on these airlines need not check in at the ticketing lobbies. Adjacent to the above area, a secondary truck dock area is provided for the pickup of arriving tour group baggage that is delivered directly to the area from the airline baggage break-down areas in the OST.

The international tour group area is on the Ewa-end of both the first (ground) and second levels of the OST. The area on the ground level is used for check-in of baggage with the various tour operators. For the convenience of passengers who might wish to change their clothes before checking in their baggage, changing rooms are provided nearby. The area on the second level is used for briefing of passengers by the tour operators, lei greetings and photography, and boarding of tour buses. Minor concessions (snack bar, money exchange, and duty free shops) are available at the second-level area.

2.5.1.3 Nonexclusive Airline Space

Nonexclusive airline space encompasses space used in common by the airlines (i.e., space that is not leased to any individual airline for its exclusive use). Nonexclusive airline space in the OST and the three concourses includes holdrooms, baggage claim areas, and baggage break-down areas.

Holdroom Areas. There are 28 holdrooms in the OST, and are served by one or two loading bridges for loading and unloading of aircraft. Escalators and stairs adjacent to the loading bridge exits doors, permit relatively straightforward control of the flows of arriving international passengers directly to the third-level passenger pickup stations of the WikiWiki bus system.

Domestic Baggage Claim Areas. A series of five lobbies provides baggage claim facilities for domestic passengers at the lower level of the OST. Each of the lobbies is enclosed and air-conditioned. Entry into the lobbies, from the second level or from the third-level WikiWiki bus stations, is provided by banks of stairs and escalators at the makai side of each lobby. Airline baggage, lost and found, small package service offices, and oversized baggage pickup stations line the makai edge of the corridor.

The baggage claim lobbies have a total of 16 baggage claim devices. Each device is a high-capacity, inclined-plate type. In the Ewa and Diamond Head lobbies, the devices are arranged perpendicular to the axis of the terminal and are about 50 feet on center. Each device provides 180 linear feet of claim frontage. Because of building constraints, the baggage claim devices in the central lobbies (baggage claim areas D and E) are arranged parallel to the terminal axis. The four devices in these lobbies also provide about 180 linear feet of frontage. The devices in the Ewa and Diamond Head lobbies are served by conveyor feeds delivering baggage from beneath the floor. The devices in the central lobbies are served by overhead conveyor feeds.

Car rental companies, tour operator, and other concessions are at the mauka side of the circulation corridor providing egress from the baggage

claim lobbies to the lower level roadway and parking facilities. The Hawaii Department of Agriculture stations are located at each exit doorway to facilitate the inspection for prohibited and restricted items, and to respond to passengers declaring items on the Hawaii agricultural declaration form.

International Baggage Claim Areas. The international baggage claim lobby is at the ground level of the IAB. There are five flat-bed, carousel-type baggage claim devices in an area of 12,925 square feet. Each of the devices has a claim frontage of about 90 feet. This frontage does not provide the capacity needed to satisfactorily accommodate the baggage from arriving international flights. Thus, State and airline staff remove baggage from the devices and stack it on the adjacent floor surfaces for passenger claim.

To alleviate some of this lack of capacity and the resultant congestion, the adjacent domestic baggage claim area (D and E) has been modified to permit its use for international functions during peak periods. The resultant baggage claim area provides two high-capacity, inclined-plate devices and a separate set of FIS inspection stations. Typically, this area is used to inspect arriving international flights from high-risk origins.

Baggage Break-Down Areas. Baggage break-down areas for handling inbound baggage are provided primarily at the airside portion of the ground level, although some break-down areas are also provided at the basement level. Most of the areas consist of baggage-train roadways surrounding individual conveyors that serve the baggage claim devices in the baggage claim lobbies. The total floor area of the baggage break-down areas is approximately 75,000 square feet.

2.5.1.4 Exclusive Airline Space

Exclusive airline space encompasses space leased to an individual airline for its exclusive use. Exclusive airline space in the OST and the three concourses includes ticketing areas, ticket offices, airline operating areas, and airline lounges.

Ticketing Areas. Domestic and international airline ticketing and passenger check-in are conducted at the second level of the OST at either the passenger/baggage check-in islands along the center of each of the five ticketing lobbies or at the linear ticketing counters along the makai side of the lobbies. The naturally ventilated, high ceiling lobbies are completely open to the public plaza that extends along the entire mauka length of the OST. The open air plaza provides access to the individual lobbies from the pedestrian bridges connecting the second level of the OST with the second-level roadway. The ticketing areas have been recently renovated to include electronic ticketing areas, and to accommodate changes in the airline operations due to electronic ticketing.

Ticket Office Areas. Most airline ticket office areas are directly behind the ticket counters in the ticketing lobbies. Access to these office areas is provided both from the ticketing lobbies and from the service corridors that separate the office areas from the other tenant areas at the makai side.

Lounge Areas. With the exception of lounge areas used by United, Northwest, Continental, and Qantas, airline lounges and clubrooms are located at the ground level of the pedestrian walkways between the OST and the Central Concourse. These lounges front on the Japanese, Chinese, and Hawaiian gardens at the center of the OST and are reached from the second level by the stairs and elevators serving the gardens. The lounges used by United and Qantas are at the third level of the Diamond Head and Ewa Concourses, respectively. The lounges used by Northwest and Continental are on the second level of the OST, near Gate 13.

Baggage Make-Up Areas. Airline baggage make-up areas are provided at both the basement and ground levels of the OST. Most baggage make-up areas are at the basement level. However, some airlines have consolidated their baggage-handling operations (make-up and breakdown) at one or the other level (e.g., Delta Air Lines has consolidated its operations at the basement level). Most baggage make-up procedures and baggage-handling systems use conventional conveyor belts and components. The principal exception is the basement-level automated

baggage-sorting system installed by United Airlines at the Diamond Head end of the OST.

Airline Operations Areas. Airline operations areas are principally at the ground level of the three concourses. A total floor area of approximately 165,700 square feet is provided in the concourses. An area of approximately 3,400 square feet is also used by the airlines near the frontal gates at the OST. These operational areas provide space for internal airline administrative and flight-control affairs, flight crew staging, aircraft servicing functions, and air cargo handling functions.

2.5.1.5 Concession Space

The total floor area dedicated to concessions in the OST and the concourses is approximately 183,600 square feet. Of this total, approximately 103,000 square feet are dedicated to the retail space and the remainder of the space is used for concession-support functions (e.g., storage and staging of goods, food preparation).

The principal concession areas in the OST are in the Diamond Head and central concessions malls of the main terminal complex. The Diamond Head concessions mall includes a full complement of news, gifts, duty free, jewelry, and food and beverage facilities. The Central concessions mall duplicates many concessions in the Diamond Head concessions mall but also includes the primary restaurant/cocktail lounge facility for the Airport and the business center. The Ewa concessions mall provides only duty free, money exchange, and snackbar facilities.

With the exception of the Central Concourse, minor concession facilities are provide in the concourses and ticketing and baggage claim lobbies and at the Ewa end of the OST.

Concession-support facilities are located primarily at the ground level of the OST and the three concourses, although some support space is also available adjacent to the larger concessions on the second level. In the OST, the concession-support facilities are principally at the center of the terminal, providing support for the food service concessions directly above. In the Diamond Head and Ewa concourses, the concession-

support facilities are principally near Gates 6 and 29 and are primarily related to the storage and staging of duty free goods. The total floor area dedicated to concession-support functions is approximately 81,000 square feet.

2.5.1.6 Airport and Government Agency Space

Airport and government agencies occupy a total of approximately 124,900 square feet of space in the OST and the concourses. Airport management and government offices related to the day-to-day operations of the Airport are located primarily in the nine-level tower building of the OST, in a total area of approximately 34,700 square feet. Tenants in the upper levels in the OST tower include the HDOT-A District management and operations staff, the Federal Aviation Administration, the National Oceanic and Atmospheric Administration, and the Drug Enforcement Administration. The ground level of the tower is used primarily by Airport custodial and maintenance staffs. In addition, a Governor's lounge is provided at the ground level of the OST near the Japanese Garden. The lounge provides 3,300 square feet of space for entertaining visiting dignitaries.

Although the HDOT-A has moved to the 7th floor of the Interisland Terminal, it retains the space it once occupied at the third level of the Ewa Concourse near Gates 29 through 31. HDOT-A security and State Sheriffs' staff occupy space at the ground level of the Diamond Head Concourse, near Gate 11. Hawaii Department of Agriculture, Animal Quarantine Branch occupies the space beneath the lower ramp of the WikiWiki bus system between the OST and the Ewa Concourse. The Hawaii Department of Agriculture, Plant Quarantine branch Airport office is located on the ground floor of the Ewa Concourse, under gate 30, and has three (3) satellite offices, two in the baggage claim area of the Overseas terminal. Federal agencies concerned with the inspection of arriving international passengers occupy space in the International Arrivals Area. The USDA has plant inspection station, at far west portion of the OST, and the USDA administration offices are located across the frontal road from the International arrivals area, in the former Bank of Hawaii building.

2.5.1.7 WikiWiki Shuttle

The WikiWiki bus system operates two separate routes, the "Front Shuttle" and the "International Shuttle." The "Front Shuttle" connects the OST, Inter-island, and Commuter terminals on the non-secure side (i.e., curbside). The WikiWiki schedule is dependent on the airline flight schedules and therefore, don't have a fixed schedule. The Optimization Study⁶ measured the dwell times for both shuttle services to be approximately 15 minutes.

Front Shuttle stations are located at each of the second level lobbies. The Front Shuttle normally consists of two car buses with a capacity of approximately 50 passengers. The International Shuttle consists of two or three buses with a capacity of approximately 50-75 passengers.

The "International Shuttle" connects the Inter-island Terminal and the OST on the secure side of the terminal, and allows passengers to transfer between the terminals without having to go through additional security checkpoints. This shuttle runs on the second and third level of the OST. There are three stations at both the Diamond Head and Ewa Concourse and two stations at the OST. Diamond Head and Ewa Concourse stations are located at curbside on the second level. The remaining stations are located at the third level above the retail concession area at the OST and frontal gates (Gate 12/13 and 24/25).

2.5.2 Inter-island Terminal

The Inter-island Terminal (IIT) was built in 1992, and consists of seven levels. The uppermost four levels are dedicated to public parking, with vehicular access provided by ramps off the principal terminal loop roadway system. The three lower levels are dedicated to passenger-related functions, and was originally intended to accommodate an automated people mover system as well. There are 13 gate positions and 13 parking positions for large aircraft on the apron at the Inter-island Terminal.

⁶ KFC Airport, Inc. and nbbj, "Honolulu International Airport Optimization Study," May 2003.

The ground and second levels of the IIT provide facilities for handling deplaning and enplaning passengers, respectively, and is designed as two "modules" of functional space. Each module generally duplicates the facilities in the other and are separated, at the center of the IIT, by the security screening and vertical circulation lobbies. The modular design provided the two incumbent interisland airlines (Hawaiian and Aloha) with equal, but separate, facilities. However, with the demise of Aloha Airlines, Hawaiian Airlines currently dominates the ticketing and baggage claim areas, with Mokulele having a portion of the former Aloha Airlines ticketing and baggage claim areas.

The facilities provided in the IIT are: facilities for handling inbound, outbound, and connecting baggage, interisland baggage claim, a commuter airline holdroom, airline offices, tour group facilities, building mechanical spaces, airline ticketing, security screening, concessions, holdrooms, and general circulation to facilities in the mauka and makai concourses, WikiWiki bus system roadways and stations, public parking and HDOT-A offices on the uppermost level.

2.5.2.1 Public Space

Public space is principally in the nonsecure areas of the ticketing and baggage claim lobbies and at the third-level station for the WikiWiki bus system.

Circulation Areas. Circulation areas in the secure portions of the IIT are at the second level and consist of two major corridors. The principal corridor extends the entire landside length of the makai and mauka concourses and through the IIT. This 30-foot-long corridor provides for all public circulation between the various holdrooms and the ticketing, baggage claim, and concession facilities in the IIT. The secondary 20-foot-wide corridor extends along the airside of the IIT and the makai concourse only. This corridor is provided, in part, to accommodate the differential in floor levels between the holdrooms and the loading bridges serving each aircraft parking position. It also permits secondary circulation between the holdrooms and aircraft parking positions. Because the floor level of the holdrooms in the mauka concourse matches the level of the loading bridges, the secondary corridor is not required.

The circulation areas in the nonsecure portions of the IIT are primarily limited to those required for the ticketing and baggage claim lobbies and at the third-level bus system station. The width of these circulation areas vary but are a minimum of 20 feet in most instances.

Queuing Areas. As in the OST, the principal passenger queuing areas in the IIT are at the airline ticket counters, baggage claim devices, and security screening checkpoint. Queuing areas at the ticket counters extend along the entire length of the counter or device frontages. The depth of the queuing areas at the baggage claim devices vary but are 25 feet on average.

Security Screening Checkpoints. Three security screening checkpoints are provided in the IIT – at the center and at each end of the ticketing lobby. Each checkpoint accommodates two screening stations and each station consists of primary and secondary magnetometers, x-ray equipment, and USDA inspection counters.

Tour Group Areas. A tour group area is provided at each end of the IIT at the ground level. In contrast to the tour group areas at the OST, these tour group areas are minimal, providing only a sheltered curb/bus boarding area and parking facilities for the tour buses and baggage trucks.

Escalators and stairs near the makai and mauka ends of the ticketing lobbies and security checkpoints provide convenient circulation between the second level and the tour group facilities for both arriving and departing passengers.

Airline Space. The airline space in the IIT and its two concourses total 164,200 square feet of floor area. 69,800 square feet of this total area are considered to be nonexclusive airline space. It should be noted, however, that the modular design of the IIT lends itself to assignment of IIT space on an exclusive basis and that the HDOT-A may decide on such assignments in the future.

2.5.2.2 Nonexclusive Airline Space

Nonexclusive airline space in the IIT encompasses space used in common by the interisland airlines (i.e., space that is not leased to any individual airline for its exclusive use) and similar to the OST.

Holdroom Areas. Nine second-level holdroom areas and one ground-level holdroom area are provided in the IIT and its concourses. The holdroom areas at the second level are used by the interisland airlines, and the holdroom at the ground level is used by the commuter airline. The total floor area of the holdrooms is 41,500 square feet.

Because the aircraft used for interisland service vary in size and passenger capacity and the number and location of aircraft parking positions at the IIT vary accordingly, the holdroom areas are designed to function independently of the aircraft gates. Each holdroom is capable of accommodating multiple flights.

Baggage Claim Areas. Each of the two baggage claim lobbies include three "T-type" flat-bed claim devices. Each device provides a claim frontage of about 120 feet and are fed directly from the baggage breakdown areas adjacent to the baggage claim lobbies. Baggage service offices and oversized baggage stations are provided at the end of the lobbies.

Access to the baggage claim lobbies from the second level of the IIT is provided by banks of escalators, stairs, and elevators at the center and the ends of the IIT. Exit from each lobby is provided directly to the IIT roadway and to the elevator banks serving the upper levels of the building.

Baggage Break-Down Areas. Baggage break-down areas are provided directly behind the two baggage claim lobbies. Because the baggage claim devices are fed directly from the baggage carts from arriving flights, the baggage break-down areas consist of a baggage-offloading lane on the interior tug drive/service road serving the baggage-handling areas. The offload frontage provided at each claim device is about 50 feet, sufficient for off-loading three-cart baggage trains.

2.5.2.3 Exclusive Airline Space

Exclusive airline space in the IIT encompasses space leased to an individual interisland airline for its exclusive use.

Ticketing Areas. Two ticketing lobbies are provided, one at either side of a central bank of escalators and elevators serving all levels of the IIT, including the upper parking levels. In contrast to the ticket lobbies in the OST, the IIT ticketing lobbies provide linear ticket counters only. Each ticketing lobby provides 180 feet of ticket counter frontage.

Ticket Office Areas. The airline ticket office (ATO) areas are directly behind the ticket counters. The total floor area of these office areas are 21,100 square feet. The ATO space at each ticketing lobby is partially subdivided into two sections by a central conveyor chase leading from the adjacent ticket counters to the baggage make-up areas at the ground level. The partial subdivision permits future introduction of additional airlines in the IIT. The depth of the ATO spaces are a uniform 30 feet.

Lounge Areas. Two airline lounges are provided in the IIT, at the second level. The lounges are at the secure sides of the ATO spaces, one at the mauka end of the mauka ATO space and one at the makai end of the makai ATO space.

Baggage Make-Up Areas. Two baggage make-up areas occupy 44,500 square feet of floor area. The baggage make-up areas are served by the same tug drive/service roads serving the adjacent baggage break-down areas. Each make-up area is capable of accommodating up to three baggage carousels fed by conveyors from the ticket counter facilities. Space for the future addition of an additional carousel in each make-up area is also provided. Each carousel provides a frontage of 225 feet.

Airline Operations Areas. Airline operations space is provided at the center and ends of the ground level of the IIT and throughout the ground level of the makai and mauka concourses. A total floor area of 25,400 square feet is available.

Concession Space. The principal concessions (food, beverage, news, and gifts) are provided in three locations. The primary location is at the center of the IIT, near the central security screening checkpoint. This location accommodates a restaurant, a cocktail lounge, and four shops offering news and merchandise items. There are secondary concession kiosks which provide products to passengers in the adjacent holdroom areas. Concession-support spaces for the Interisland Terminal concession are provided directly below, at the ground level.

Secondary concessions (car rental, ground transportation, and tour services) are located at the landside of the two baggage claim lobbies in series of four alcoves in each lobby.

Airports Division Office Space. The upper level of the IIT is office space for Airports Division, public accessible conference rooms and leased office space. Total area for office space and conference rooms is 67,500 square feet.

WikiWiki Shuttle and Curb Space. The IIT is served by both the "Front Shuttle" and "International Shuttle" WikiWiki routes. The "Front Shuttle" route connects the IIT with the OST and the Commuter Terminal on the non-secure side, with stations located on the roadway median on the second level opposite the departures/ticketing lobbies. The "Front Shuttle" normally consists of two-car buses with a capacity of approximately 50 passengers. The "International Shuttle" route connects the IIT and the OST on the secure side of the terminal to allow passengers to transfer between terminals without having to clear additional security checkpoints, and stations are located on the third level of the IIT above the holdrooms.

2.5.3 Commuter Terminal (Terminal 3)

The Commuter Terminal (Terminal 3) is a single-level structure built in 1988 as the first increment of the new Inter-island Terminal. It was designed for ultimate use as a ground-level operations area beneath the future mauka concourse of the IIT but was outfitted as a fully functioning, single-level passenger terminal for interim use by Hawaiian Airlines and Aloha Island Air, the commuter airlines. Currently, Terminal 3 is

occupied by Island Air, Go! and Pacific Wings, and provides office space for the Airline Committee of Hawaii and the Hawaii Airline Liaison Office.

The Terminal 3 with ticketing lobby, holdroom, baggage claim, and airline office space. Three aircraft parking positions for commuter aircraft are provided adjacent to these commuter facilities. Mauka of the commuter airline spaces, a baggage claim lobby with two "T-type" flat-bed baggage claim devices, a ticketing lobby with 80 linear feet of ticket counter frontage, and a single holdroom serve the needs of the interisland passengers. Airline operations and office space is provided at the mauka end of Terminal 3 and in the partial second level. Eleven aircraft parking positions (for power-in, power-out aircraft operations) are provided along the Ewa side of Terminal 3 in two rows.

WikiWiki stations are located at the arrivals and departures curbs. Access to the outbound WikiWiki station is directly from the baggage claim area. The in-bound station is at curb-side in front of the ticket lobby. The stations are part of the "Front Shuttle" which connects the OST, IIT, and Commuter terminals on the non-secure side.

2.6 AIRLINE SUPPORT FACILITIES

Air cargo, flight kitchen, and aircraft maintenance facilities are not consolidated in any one area at HNL. They are airline-owned and operated, and located at various places on both the North and South Ramps. Many airlines are served by off-Airport facilities. United, Northwest, Continental and Delta Airlines have cargo facilities on the Diamond Head side of the North Ramp. Japan Airlines, Continental Airlines, Hawaiian Airlines and Aloha Cargo have cargo facilities located Ewa (west) of the North Ramp.

Aloha Cargo and Hawaiian Airlines also have aircraft maintenance facilities in Ewa side of the North Ramp. There are two flight kitchens and the United Airlines Consolidation Center in the Ewa Service Court.

There are all-cargo operators and a number of fixed-base operators (FBOs) located on the South Ramp. These FBOs provide a variety of aviation services, including: engine repair, airframe and electronic equipment repair, aviation fuel sales, and aircraft sales and rentals. There are ten aircraft parking positions on

the apron at the South Ramp. Approximately 200 general aviation aircraft are based at HNL.

The HNL fueling system is owned and operated by a consortium of all the airlines through the Honolulu Fueling Facility Corporation (HFFC), and consists of a bulk storage facility off the Airport at Sand Island, and a satellite fuel facility on the Airport at Aolele Street. The Sand Island storage facility and the Airport satellite facility combined have a total gross storage capacity of 1,231,000 barrels (bbls). and a total net storage capacity of 1,065,000 bbls. Of this total, a gross capacity of 181,000 bbls. and a net capacity of 152,000 bbls. is available on the Airport at the satellite fuel facility. A system of underground pipelines connects the two fuels storage facilities, and a hydrant fueling system that delivers fuel from the satellite facility to all the aircraft hardstands on both the North and South Ramps. All the land at Sand Island facility and the Airport is leased from the HDOT-A. HFFC contracts with Airports Group Inc. to operate and manage the entire fuel system.

2.7 AIRPORT SUPPORT FACILITIES

A HDOT-A base maintenance facility is located on the North Ramp just Diamond Head (east), near the intersection of Lagoon Drive and Aolele Street. The facility has a number of repair shops and storage areas.

Two Aircraft Rescue and Fire Fighting (ARFF) stations are located at the HNL, one on the North Ramp at the end of Hale Kinau Ahi Street, and one on the South Ramp at the end of Lagoon Drive near Runway 26L. They operate jointly with the Hickam Air Force Base Fire Department under the terms of a Joint Use and Emergency Services Agreement.

An FAA Air Traffic Control Tower (ATCT) is located south of Runway 8L-26R and northeast of Runway 4R-22L within the boundary of Hickam Air Force Base adjacent to the National Weather Service observation building. The height of the ATCT is 141 feet above mean sea level. An FAA Flight Service station, FAA Operations Building, and FAA Hangar are located on the South Ramp.

2.8 UTILITIES

Airport utilities include sanitary sewer, water, drainage, electricity, natural gas, aviation fuel, and telephone systems.

The Airport is connected to the sewerage system of the City and County of Honolulu by a 36-inch gravity flow line that runs beneath Aolele Street and all Airport generated sewage is treated at the Sand Island Sewage Treatment Plant. The two HNL collection systems (northern and southern) connect with the City and County trunk system at the intersection of Lagoon Drive and Aolele Street.

The Board of Water Supply of the City and County of Honolulu supplies water to the HNL from its 24-inch main running along Nimitz Highway, a 16-inch line beneath Ohohia Street, and a 16-inch line beneath Paiea Street. A non-potable water system is utilized for irrigation of HNL landscaping. The non-potable water system branches off from the Department of Transportation, Highways Division line that runs along Nimitz Highway.

Drainage at the HNL is collected in a system of drainlines, catchbasins, inlets, culverts, and ditches. Areas at and to the east of the Central and Ewa Concourses drain into the ocean through the Manuwai Canal. The remainder of the HNL drains either directly into Keehi Lagoon (South Ramp) or into the Keehi Lagoon through the Kaloaloe Canal and a system of other man-made ditches.

Hawaiian Electric Company (HECO) supplies electric power to the Airport through two 12.4 KV feeders from its substations at Keehi and Makalapa. In addition, HECO has constructed a switching station near the Navy-Marine Golf Course and two substations on the HNL. One substation is located in the Kalewa subdivision and the other is on Rodgers Boulevard. In addition, there are three emergency generators at the HNL, one rated at 500 KW/4,160V 3 Phase, another rated at 750 KW/4,160V 3 Phase, and a third rated at 1,250 KW/4,160V 3 Phase (portable). These generators provide power for critical operating functions such as airfield lighting during HECO power outages.

The Gas Company (GASCO) supplies synthetic natural gas to the HNL from feeder mains located on Rodgers Boulevard and Paiea Street. The source of the HNL's natural gas is GASCO's Barbers Point storage facility.

Hawaiian Telephone Company (HTCO) provides service to the Airport via underground lines entering the HNL at Rodgers Boulevard, coming from the Moanalua Electronic Common Control (ECC) switching station which is located at the junction of Moanalua and Jarrett White Roads (see Appendix D). The station has a capacity of 27,000 lines.

2.9 STATUS OF CEDED LAND AT HNL

The HNL encompasses approximately 3,519 acres of fast lands and 1,692 acres of submerged lands, a total area of approximately 5,211 acres. The land at the HNL is under the control and management of the Department of Transportation, Airports Division. The land is owned by the State of Hawaii, and is set aside for Airport use by the Governor's Executive Orders (GEO) through the Department of Land and Natural Resources. Executive orders are deemed approved by the State Legislature if the Legislature does not object to the order. The lands at HNL were acquired from: the State's inventory of ceded lands; through land exchanges with the U.S. military; no-cost federal land transfers through the Federal Aviation Administration; and by the purchase of private and governmental land.⁷

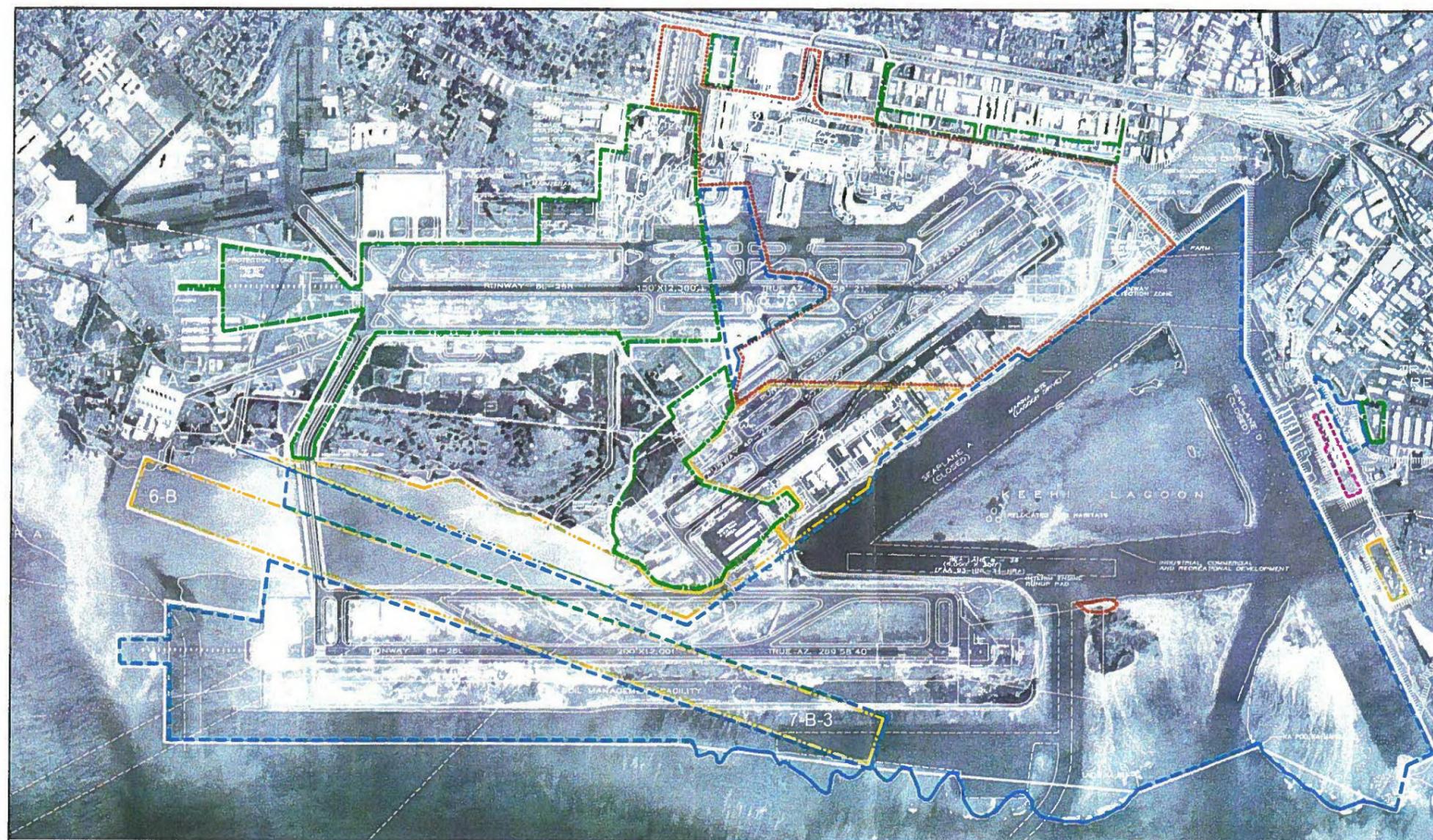
Ceded lands are subject to certain use restrictions and may potentially generate certain financial obligations. Therefore, it is important to determine the extent and status of ceded lands at the HNL.

The Final Report on the Public Land Trust, October 1986, prepared by the Legislative Auditor of the State of Hawaii ("Auditor's Report") concluded that the HNL is made up of ceded and non-ceded land. According to the Auditor's Report, there was 3,778 acres of ceded land at HNL in 1986. Figure 9 shows the ceded and non-ceded land at HNL.

⁷ For a more complete history of the various land acquisitions see the *History of Land Acquisition at Honolulu International Airport*, June 1999.

There have been three additions to the land at HNL that occurred after the publication of the Auditor's Report and are shown on Figure 9. The first is the inclusion of Hickam Air Force Base Airfield, an area of 352.511 acres, classified as non-ceded land. The second addition shows the pending transfer of 11.344 acres of ceded land and 5.5 acres of non-ceded land at Kapiolani Military Reservation to the HNL.

The third addition is the land gained at HNL as part of a land exchange between the HDOT-A and the U.S. Postal Service (USPS). In 1986, the HDOT-A and the USPS entered into a land exchange whereby the HDOT-A exchanged parcels of land at HNL, Lihue and Kahului Airports and Hilo and Kona International Airports for USPS land at HNL.



LEGEND

- AIRPORT BOUNDARY ———
- Admission Act Section 5(a) — Red ———
- (Ceded land) 5(b) — Blue - - -
- 5(e) — Magenta - - -
- Public Law 88-233 — Orange - - -
- (Non-Ceded land) Others — Light Green - - -

Figure 9 - CEDED LANDS

SECTION 3.0

AVIATION DEMAND FORECAST

3.1 AVIATION DEMAND FORECAST

The historical aviation demand for HNL is shown in Table 3-1. The passenger activity for HNL peaked in 1996 with 24,326,737 total passengers. The initial analysis for the Master Plan was based on the 2004 HDOT-A forecast⁸, and reflects the downturn in aviation demand due to the September 11, 2001 events. The forecasts predict rapid increase by 2005, then a modest growth rate to the end of the planning period 2025, and shown in Table 3-2.

The historical data shows that cargo tonnage varied from a high of 455,393 tons in 1997 to a low of 275,940 tons in 2001. The ten-year total tonnage average is 383,942 tons per year. The median tonnage occurred in 1998 at 387,481 tons. The average of the highest three year tonnage is 434,075 tons per year.

3.1.1 Passenger and Aircraft Operations

During the course of the Master Plan, these forecasts were reevaluated and the comparison of actual passengers and previous forecasts are shown in Table 3-3. Upon a careful review of the 2004 forecasts, the following was concluded:

- the actual "overseas domestic" passenger demand in 2005 was higher than the 2025 forecast demand in the "Statewide forecasts"; and
- the "Statewide forecasts" were computed to the 2025 planning horizon, and the Master Plan's planning horizon was extended to 2030.

⁸ Aries Consultants, Ltd., "Hawaii Aviation Demand Forecast Update," Prepared for the State of Hawaii, Department of Transportation, Airports Division, 2004.

**Table 3-1
HISTORICAL AVIATION ACTIVITY**

YEAR	TOTAL PASSENGERS	AIRCRAFT OPERATIONS	CARGO/MAIL (TONS)
1995	23,672,894	373,926	459,409
1996	24,326,737	372,268	480,358
1997	23,880,346	358,784	551,575
1998	22,636,354	334,046	488,945
1999	22,560,399	346,609	538,107
2000	23,027,674	345,771	496,841
2001	20,151,936	327,006	371,840
2002	19,749,905	323,726	456,989
2003	18,690,888	301,919	426,961
2004	19,334,674	320,520	419,973
2005	20,179,634	330,506	503,354
2006	20,268,378	317,317	483,999
2007	21,517,476	310,607	487,723
2008	18,809,103	286,593	452,839

Table 3-2
PASSENGER FORECASTS
(Enplaned and Deplaned)

	Actual 2000	Actual 2002	2005	2010	2025
Overseas					
Domestic	8,110,019	7,326,427	7,643,300	7,829,700	8,331,700
International	5,085,783	4,216,844	4,492,400	4,950,800	6,581,200
Interisland	9,424,513	7,973,828	8,412,600	9,051,900	10,940,600
TOTAL	22,620,315	19,517,099	20,548,300	21,832,400	25,853,500
Cargo (tons)	389,207	368,665	473,100	529,900	695,100
Mail(tons)	107,635	88,324	119,400	132,400	173,800
Aircraft Operations					
Air Carrier	206,870	176,755	174,900	186,000	223,300
Commuter/Air Taxi	31,539	47,057	50,800	53,900	63,100
General Aviation	91,484	84,099	77,000	60,600	49,900
Military	15,878	15,815	15,800	15,800	15,800
TOTAL	345,771	323,726	318,500	316,300	352,100
Based Aircraft					
Single Engine	-	118	86	52	18
Multi Engine	-	49	49	50	53
Helicopter	-	15	15	18	21
TOTAL	-	182	150	120	92

Therefore, based on the above, the aviation demand forecasts were updated using 2005 as the base year and for a planning horizon of 2030. The statewide forecasts were based on visitor information and forecasts from the Department of Business, Economic Development and Tourism (DBEDT). This methodology has historically held to be reasonable as the number of visitors to Hawaii increase, the various island destinations receive a consistent percentage of the statewide visitor total, independent of whether the visitor travels via direct overseas domestic flights or via interisland flights through Honolulu International Airport.

Table 3-4 and 3-5 shows the updated aviation demand forecasts and the 2005 base year activity levels. At the various planning horizons, the tables also reference the passenger demand levels in MAP or million annual passenger demand. The MAP are indicator of planning activity levels which are used as instead of years, as actual aviation demand varies from year to year. The planning years are use to allow HDOT to project when these MAP demand may occur and place the appropriate projects into the HDOT's Capital Improvement budget. Tables 3-4 and 3-5 also show a comparison of the forecasts to the FAA Terminal Area Forecasts (TAF) of 2007⁹.

The existing commuter terminal operations include the commuter airlines such as Island Air and Go! Airlines. However, for the purposes of this forecast analysis they are considered to be operating out of the Interisland terminal and referred to as the Interisland-Commuter carriers. This leaves only Group I type Part 135 operators in the Commuter category.

⁹ Forecasts were accepted in FAA letter, dated March 13, 2009, to Mr. Brian Sekiguchi from Richard P. Dyka, FAA

**Table 3-3
ACTUAL PASSENGER DEMAND VERSUS HDOT-A FORECASTS**

YEAR	ACTUAL	1994 Forecasts	2000 Forecasts	2004 Forecasts
2000	23,027,674	25,367,000		
2001	20,151,936			
2002	19,749,905			
2003	18,690,888			
2004	19,334,674			
2005	20,179,634	28,829,000	23,122,100	20,548,300
2006	20,268,378			
2007	21,517,476			
2008	18,809,103			
2010	--	32,291,000	25,424,700	21,832,400
2015	--	35,753,000	28,168,500	23,100,100
2020	--	39,216,000	31,186,600	24,439,200
2025		--	34,479,100	25,853,500

Table 3-4
UPDATED PASSENGER FORECASTS
(Enplaned and Deplaned, 000s)

	2004 Statewide Forecasts for 2025	Actual 2005	2010	2015	2020	2025	2030
Overseas							
Domestic	8,332	8,418	9,524	10,775	12,191	13,793	15,606
International	6,581	4,335	4,786	5,284	5,834	6,441	7,112
Interisland	10,941	7,326	7,854	8,419	9,025	9,675	10,372
TOTAL	25,854	20,079	22,164	24,478	27,051	29,910	33,089
Planning Guidelines		20 MAP	22 MAP	24 MAP	27 MAP	30 MAP	33 MAP
TAF		19,549	22,275	25,274	28,637	32,357	--

Table 3-5
UPDATED AIRCRAFT OPERATIONS FORECASTS

	Actual 2005	2010 (22 MAP)	2015 (24 MAP)	2020 (27 MAP)	2025 (30 MAP)	2030 (33 MAP)
Air Carrier	237,149	263,100	291,900	323,900	359,400	398,800
Domestic	72,566	83,267	95,512	109,512	125,460	143,693
International	25,609	28,719	32,112	35,930	40,174	44,892
Interisland	138,974	151,114	164,276	178,458	193,766	210,215
Commuter/ Air Taxi*	11,700	13,000	14,400	16,000	17,700	19,600
General Aviation	66,852	50,000	42,500	44,600	49,900	55,000
Military	14,805	15,800	15,800	15,800	15,800	15,800
TOTAL	330,506	341,900	364,600	400,300	442,800	489,200
TAF	334,660	362,394	393,922	427,315	463,973	--

* Includes PART 135 operations, only.

3.1.2 Air Cargo Forecasts

In the short-term, an airport-wide weighted average cargo tonnage of 400,000 tons per year was used as an initial loading for air cargo facilities. This average was based on the historical average yearly tonnage (383,942 tons), the median (388,344 tons) and average high three years (434,075 tons). The forecast enplaned/deplaned cargo within the planning period is shown on Table 3-6.

The North Ramp cargo operators handle approximately 57% of the total cargo tonnage at HNL, an based on historical data, the average cargo area throughput is 1.4 tons of cargo per square foot. Based on the forecast air cargo tons, the North Ramp air cargo building area requirement is approximately 157,500 square feet by 2030, and shown on Table 3-6. Obviously, different air cargo operations will have varying throughput and area requirements, and the annual cargo tonnage varies. Therefore, the existing acreage and area for cargo should suffice for the short-term, and the cargo buildings should be built in phases to meet demand, however, the total area would be reserved for cargo expansion.

**Table 3-6
FORECAST ENPLANED / DEPLANED CARGO
(U.S. Tons)**

	2005 actual	2007 actual	2010 forecast	2020 forecast	2030 forecast
2004 enplaned/deplaned cargo forecasts	399,537	389,054	529,900	639,300	695,100
Revised forecast (using 2004 growth rate of 2.2%)	399,537	389,054	443,000	534, 500	632,000
North Ramp Cargo		221,760	252,000	305,000	360,500
North Ramp Cargo building Space requirement (sq. ft.)	estimated 210,000		180,500	218,000	257,500
North Ramp Cargo area requirement (acres)			11	14	16

3.1.3 Peak Hour Demand

In addition to the overall aviation demand, the terminal and airfield analysis use the peak hour activity to determine capacity and facility requirements. The peak hour demand was formulated using the forecast traffic, HDOT-A's "design day" statistics, and additional gate surveys taken in 2006. HDOT-A's "design day" was August 18, 2006, and the data was used as a starting point to determine peak hour forecasts. Major data inputs into the space program include annual enplanements, and peak hour enplaning and deplaning passengers are shown on Table 3-7.

TABLE 3-7
 ANNUAL ENPLANEMENTS AND PEAK HOUR ENPLANING AND DEPLANING PASSENGERS
 (2006-2011)

Year	Annual Enplanements	Annual Deplanements	Peak Hour Enplanements	Peak Hour Deplanements
2006	1,000,000	1,000,000	100,000	100,000
2007	1,050,000	1,050,000	105,000	105,000
2008	1,100,000	1,100,000	110,000	110,000
2009	1,150,000	1,150,000	115,000	115,000
2010	1,200,000	1,200,000	120,000	120,000
2011	1,250,000	1,250,000	125,000	125,000

Table 3-7
PEAK HOUR ACTIVITY FORECAST

	Base Year	Forecast Planning Years			Growth Rate
	2005	2010	2020	2030	2005-2030
Total Annual Enplanements	10,039,731	11,082,000	13,525,500	11,358,750	2.0%
Overseas Terminal	<u>6,376,367</u>	<u>7,155,00</u>	<u>9,012,750</u>	<u>11,358,750</u>	<u>2.3%</u>
<i>Domestic</i>	4,208,809	4,761,900	6,095,550	7,802,750	2.5%
<i>International</i>	2,167,558	2,393,100	2,917,200	3,556,000	2.0%
Interisland Terminal	3,627,930	3,889,050	4,469,100	5,135,700	1.4%
Commuter Terminal	35,435	37,950	43,650	50,150	1.4%
Total Peak Month Enplanements	983,890	1,086,040	1,325,500	1,621,370	2.0%
Overseas Terminal	<u>624,880</u>	<u>701,190</u>	<u>883,250</u>	<u>1,113,160</u>	<u>2.3%</u>
<i>Domestic</i>	412,460	466,670	597,360	764,670	2.5%
<i>International</i>	212,420	234,520	285,890	348,490	2.0%
Interisland Terminal	355,540	381,130	437,970	503,300	1.4%
Commuter Terminal	3,470	3,720	4,280	4,910	1.4%
Total % of Annual Enplanements	9.8%	9.8%	9.8%	9.8%	
Total Peak Month Design Day¹	35,580	39,270	47,940	58,650	2.0%
Overseas Terminal	<u>22,600</u>	<u>25,360</u>	<u>31,940</u>	<u>40,260</u>	<u>2.3%</u>
<i>Domestic</i>	14,920	16,870	21,600	27,660	2.5%
<i>International</i>	7,680	8,490	10,340	12,600	2.0%
Interisland Terminal	12,860	13,780	15,840	18,210	1.4%
Commuter Terminal	120	130	160	180	1.6%

NOTE: Peak Month Enplanements divided by 31 days multiplied by factor of 1.121 above average day. The Total Peak Hour does not reflect the sum of the individual peak hour terminal components as each can occur in different hours.

Table 3-7 (continued)
PEAK HOUR ACTIVITY FORECAST

	Base Year	Forecast Planning Years			Growth Rate
Total Peak Hour Passengers²					
Total Enplaned (Departing)	5,340	5,890	7,190	8,800	2.0%
Overseas Terminal					
<i>Domestic</i>	3,370	3,810	4,880	6,250	2.5%
<i>International</i>	1,820	2,010	2,450	2,990	2.0%
Interisland Terminal	1,340	1,430	1,650	1,890	1.4%
Commuter Terminal	19	20	25	28	1.6%
Total Deplaned (Arriving)	4,660	5,140	6,280	7,380	2.0%
Overseas Terminal					
<i>Domestic</i>	3,220	3,640	4,670	5,970	2.5%
<i>International</i>	2,540	2,810	3,420	4,170	2.0%
Interisland Terminal	1,580	1,690	1,950	2,240	1.4%
Commuter Terminal	19	21	26	29	1.7%
% of Daily Activity in Peak Hour					
Total Enplaned (Departing)	15.0%	15.0%	15.0%	15.0%	
Overseas Terminal					
<i>Domestic</i>	22.6%	22.6%	22.6%	22.6%	
<i>International</i>	23.7%	23.7%	23.7%	23.7%	
Interisland Terminal	10.4%	10.4%	10.4%	10.4%	
Commuter Terminal	15.8%	15.4%	15.6%	15.6%	
Total Deplaned (Arriving)	13.1%	13.1%	13.1%	13.1%	
Overseas Terminal					
<i>Domestic</i>	21.6%	21.6%	21.6%	21.6%	
<i>International</i>	33.1%	33.1%	33.1%	33.1%	
Interisland Terminal	12.3%	12.3%	12.3%	12.3%	
Commuter Terminal	15.8%	16.2%	16.3%	16.1%	

SECTION 4.0

DEMAND CAPACITY ANALYSIS AND FACILITY REQUIREMENTS

The demand and capacity analysis and the facility requirements presented in this section is based on the aviation demand forecasts presented in Section 3.0. A demand / capacity analysis was performed for the various components of the airport, such as the airfield, ground transportation, terminal and utilities. The outcome of these analysis translates into the facility requirements which will be used to develop and evaluate the Master Plan alternatives.

4.1 AIRPORT LAND USE

Honolulu International Airport encompasses an area of approximately 5,211 acres, of which only 3,519 acres are considered "fast" lands, lands which are above the mean sea level. The Airport is "land-locked" as it is bounded by the Pacific Ocean and Keehi Lagoon, Hickam Air Force Base, and commercial and industrial subdivisions. Hickam Air Force Base (HAFB) is also expanding its facilities and are utilizing the vacant land near the Airport, thus limiting future property acquisition from HAFB. In fact, the recently constructed "Hot Cargo Pads" off of Taxiway "B," creates an expanded 1,000 foot blast zone, that further restricts useable land and potential development near this facility.

Similarly, the terminal area is constrained by HAFB, Runway 8L-26R and accompanying taxiways, Runway 4L-22R¹⁰ and the frontal roadway system. As this envelope is constrained the terminal alternative should maximize the use of the existing land for the terminal development. This was one of the intents of the "Baseline Alternative," and will be an objective for the terminal analysis in this Master Plan. Therefore, the terminal plan alternatives will study concepts which may have larger capacity than the 33 MAP (2030) planning horizon to investigate maximized use of the terminal envelope.

It is recommended that the alternatives analysis increase the use of multi-storied structures to minimize the footprint of the structure, given the limited land area. In addition, as the amount of Airport Operations Area (AOA)

¹⁰ The FAA-ADO-HNL letter objecting to the closure or shortening of Runway 4L-22R.

accessible lands are limited, the alternatives should look at increasing the AOA land area and available access.

As far as the development in Keehi Lagoon, the HDOT-A needs to coordinate the develop of the area with HDOT-Harbors Division and Department of Land and Natural Resources (DLNR), as shown in the Honolulu Harbor 2020 Master Plan¹¹. For this Master Plan, the alternatives will include the marina concept along Lagoon Drive as previously shown in past HNL Master Plans.

4.2 AIRFIELD CAPACITY

The capacity of the airfield are affected by the aircraft mix, weather conditions as it pertains to runway configuration and flight rules, frequency of flights and number of runways. There are four paved runways and two seaplane runways (sealane 4W-22W and 8W-26W) at HNL which are used in two configurations depending on wind conditions. During the trade-wind periods, winds from the northeast, the paved runways in use are 8L, 8R, 4L and 4R. The trade-wind configuration occurs approximately ninety percent of the time. During Kona winds, from the south or southeast, the aircraft traffic pattern switch and the paved runways in use are 26L, 26R, 22L and 22R. Most of the seaplane activities use sealane 4W-22W.

The other weather dependent factor is the type of flight rules which the aircraft follows within the HNL control airspace. Instrument Flight Rules (IFR) situations occur when visibility and ceilings are low, typically a ceiling less than 1,000 feet and visibility less than 3 miles. During IFR conditions, the aircraft is flown using instruments and radar, which increases the necessary separation for neighboring aircraft and decreases the capacity of the airport. In HNL, this situation occurs less than one percent of the time. Typically the aircraft are flown using Visual Flight Rules (VFR) due to Hawaii's high ceilings and good visibility.

There is an informal preferential runway use procedure to lessen the impact of aircraft noise in the Ewa plains and Downtown Honolulu areas during trade-wind operations. From 7:00 p.m to 7:00 a.m. large and heavy jet aircraft do not land on runway 8L to avoid overflight of the Ewa area. In addition, use of

¹¹ "Keehi Lagoon Future Could Include Adding an Industrial Island," Honolulu Advertiser, September 3, 2008.

the Reef Runway for departures by heavy and military jet aircraft minimizes aircraft noise in the Downtown Honolulu and Waikiki areas.

4.2.1 Aircraft Mix

There are four classes of aircraft which are used to estimate airfield capacity and are typically based on aircraft weights. Table 4-1 shows the different classes, examples of aircraft, and the takeoff weights for that class.

4.2.2 Airfield Capacity and Delay

In the previous 2010 Master Plan, the airfield delay analysis results are shown on Table 4-2 and was based on the 1992 fleet mix of; 40 percent class A and B, 40 percent class C, and 20 percent class D aircraft. It computed average delay to increase from 1 minute to 26 minutes as the operations exceed 566,000 operations per day. The peak hour delays increase from 4 minutes to greater than one-hour with 566,000 operations. Table 4-2 also shows that as the average delay exceeds 6 minutes, the rate of increase will be exponential as annual operations increases.

**Table 4-1
AIRCRAFT CLASSIFICATION**

Aircraft Class	Types of Aircraft	Aircraft examples	Takeoff Weights (Pounds)
A	Small single engine	Piper PA-23, Cessna C-180, Cessna C-207	12,500 or less
B	Small twin engine	Beechcraft 55, Super King Air, Learjet LR-25	12,500 or less
C	Large	B737, B717, CRJ900, DHC 8	More than 12,500 and up to 300,000
D	Heavy	B-747, B777, Airbus 380	More than 300,000

Table 4-2
FORECAST AIRFIELD DELAYS
 (2010 Master Plan)

	1992	1995	2000	2005	2010
Hourly Capacity	90	108	114	118	124
Annual Demand	403,628	486,500	515,000	537,000	566,000
Total Annual Delays (hours)	7,500	52,200	97,200	149,500	241,800
Average Delay per aircraft (minutes)	1	6	11	17	26
Peak Hour Delays per aircraft (minutes) Visual Flight Rules	4	19	32	44	60+

Note: Computed using the FAA Runway Capacity Model and FAA Annual Delay Aggregation Model

Currently, the aircraft mix for 2005 and 2006 was computed to be 25 percent class A & B, 57 percent class C, and 18 percent class D. This is partially due to the scheduling of overseas flights by Hawaiian Airlines and the addition of a third major interisland carrier (Go!) has increased the number of aircraft operations during the peak hour.

Therefore, a new airfield capacity analysis was performed to verify the airfield capacity and delay. It was based on the data collected during the HDOT-A design day collection in August 2006, which is typically the busiest month of the year. The analysis of the airfield capacity was performed using SIMMOD for the existing operations of 2006 and the future planning year 2030. The delay results were comparable to the previous analysis of airfield capacity for the corresponding annual aircraft operations. With approximately 320,000 operations modeled for 2006, the SIMMOD analysis showed an average delay of 4 minutes per operations and peak hour average delay of 7 minutes per operation. At 33 MAP and approximately 490,000 annual operations, the average delay

is 9 minutes per operation with a peak hour average delay of 13 minutes per operation. The current SIMMOD analysis confirms the previous analysis, which predicts large delays as the aircraft operations increases to approximately 480,000 operations per year.

An airfield improvement which would reduce ground delays is the construction of an engine run-up pad. The frequency of engine run-ups has increased with the number of jet aircraft maintenance increasing. During the engine runup tests, either taxiways or runways are closed for a period of time, which affects the overall capacity of the airfield. Therefore, a remote engine run-up pad should be included to eliminate runway and taxiway closures for this engine run-ups. This runup pad should be as remote from the neighboring residential areas as possible.

4.2.3 Taxiway Requirements

In discussions with FAA, HDOT-A and pilots, several taxiway issues were identified:

- taxiway layout should consolidate taxiways in certain areas;
- realign taxiways which have oblique angles to the runway;
- additional taxiways in strategic locations, especially on the west end of Runway 8L-26R and taxiways to access Runway 8R-26L for the terminal; and
- provide improvements which will potentially reduce pavement wear, and improve aircraft ground movement safety.

In addition, the proposed or new facilities along Taxiway A, the proposed aircraft maintenance hangars and new aircraft rinse facility at Hickam Air Force Base, will increase the taxiway congestion in this area. Therefore, the airfield facility should include a new parallel taxiway to Taxiway A, a cross-over taxiway from Taxiway A to taxiway B in the vicinity of the Hickam Air Force Base improvements.

4.2.4 Electronic, Visual and Satellite Aids to Navigation

As stated above, a recommendation to increase in airfield capacity would be to enhance HNL with higher precision navigational aids on the

approach on Runways 26R and 26L. A higher precision guidance system would allow for curved or multi-path approaches to both runways, thus allowing for greater capacity during Kona wind conditions. In the past, a microwave navigational system was proposed, however newer satellite global positioning systems and the future NEXTGEN air traffic system should be applied.

To allow for increased use of Runway 8R for arrivals, especially for high risk aircraft arrivals and possibly the A380, the runway should be equipped with an ILS CAT II navigational system, or similar. This navigational system would allow for instrument approaches during inclement weather conditions, and during night and evening hours.

4.3 TERMINAL AREA

4.3.1 DEMAND / CAPACITY ANALYSIS

Based on the updated aviation demand, the terminal facilities were analyzed to meet existing and future demands. In addition, the "Baseline Alternative" as adopted by HDOT-A was evaluated to meet existing and future demands. The terminal analysis used two types of peak passenger levels basis; 1) exclusive use, and 2) common use.

Exclusive use passenger levels refer to the peak activity for each carrier that occurs over a 60-minute period based on that airline's flight schedule. As a result these exclusive use peaks typically happen at slightly different times of the day and therefore do not typically coincide in the same clock hour. The assumption is that this peak demand is appropriate to use when determining the facility requirements for individual airlines that are operating under an exclusive or preferential use agreement with the airport. Exclusive use peak passenger activity levels are typically used for calculating requirements for airline specific functions and depending on the operating use agreement with the airport, such as baggage claim facilities, and ticketing counters.

Common use peak passenger levels refer to the cumulative peak passenger volume in a given "rolling" hour for all airlines at the airport.

These common use peak demand levels are typically used for calculating non-airline specific functions such as passenger security screening, public areas, and meeter-greeter lobbies.

Other functional area projections are typically determined by their relationship to the number and type of aircraft or the number of gates/seats serving the terminal area. The relationship of area projections per aircraft operations, or by gates/seats is also a typical way to compare airport building component requirements. These areas of the terminal can include airline operations space, inbound/outbound baggage operations, and secure public restrooms.

The complexities involved in understanding the aircraft capacity implications of the term "gate" has led to a methodology to standardize the capacity definition of a "gate". This standardization methodology is referred to as the Narrow-body Equivalent Gate (NBEG) index. This index converts the gate requirements of diverse aircraft, from commuters to new large aircraft, so that they are equivalent to the apron capacity of a narrow-body aircraft gate. The amount of space or linear frontage each aircraft requires is based on the maximum wingspan of the aircraft in its respective aircraft group. Aircraft are classified according to FAA Taxiway Design Groups as shown in Table 4-3, with the corresponding NBEG index.

Another methodology used for terminal facility program comparisons, similar to that of NBEG, is the Equivalent Aircraft (EQA) Index. This methodology looks at the passenger demand associated with gate usage. With EQA each gate is converted based on the seating capacity of the aircraft that can be accommodated. Originally developed in the 1970's, EQA was a technique for sizing terminal facilities when the majority of the aircraft in service had 80-110 seats with some larger narrow-bodied aircraft up to 150 seats. With new larger fleet mixes of regional and jet aircraft the basis for EQA has been revised. The base Equivalent Aircraft is still that of a Group III narrow-body; however, this group now typically has total seats in the range of 145-150. The new EQA of 1.0 has been established using 145 seats as the base. Smaller aircraft may use the gate but the EQA capacity should be based on the largest aircraft/seating typically in use. One example of where this methodology is used is ramp

equipment (bag carts/containers) required for aircraft arrivals and departures at the gate. Table 4-4 summarizes the EQA of each aircraft group.

**Table 4-3
AIRCRAFT DESIGN GROUP AND NARROWBODY EQUIVALENT
GATE (NBEG) INDEX**

FAA TAXIWAY DESIGN GROUP		MAXIMUM WINGSPAN	TYPICAL AIRCRAFT	NBEG INDEX
I	Small Commuter	49'	Cessna 172R	0.4
II	Medium Commuter	79'	EMB145, CRJ-200, CRJ-700, CRJ-900	0.7
III	Narrowbody/Large Commuter	113'	Dash 8, E175, B737, G650, A319, A320-100, A321-100	1.0
IIIa	B757	125'	B757	1.1
IV	Widebody	171'	A310-300, A300-600, B767-200, B767-300, B787-300	1.4
V	Jumbo	214'	B747-100, B787-800, A330-200, 340-200, B777-200, A340-600	1.8
VI	NLA	262'	A380-800	2.2

Source: FAA AC 150/5300-13, *Airport Design* and Hirsh & Associates

Table 4-4
EQUIVALENT AIRCRAFT (EQA) INDEX

FAA TAXIWAY DESIGN GROUP	TYPICAL SEATS	TYPICAL AIRCRAFT	EQA INDEX	
I	Small Commuter	25	Cessna	0.2
II	Medium Commuter	50	EMB145, CRJ-200	0.4
III	Large Commuter	75	Dash 8, E175, CRJ-700,900	0.5
III	Narrowbody	145	B737, G650, A319, A320-100, A321-100	1.0
IIIa	B757	185	B757	1.3
IV	Widebody	280	A310-300, A300-600, B767-200,300, B787-300	1.9
V	Jumbo	400	B747-100, B787-800, A330-200, 340-200, B777-200, A340-600	2.8
VI	NLA	525	A380-800	3.6

Source: *The Apron & Terminal Building Planning Manual* for US Department of Transportation, FAA by The Ralph M. Parsons Company: July 1975 and updated values based on Hirsh & Associates data.

4.3.2 TERMINAL FACILITY REQUIREMENTS

The facility requirements for the HNL terminals developed to meet the 33 Million Annual Passengers (MAP) planning horizon and also to maximize the use of the terminal envelope. In this analysis, the commuter terminal is slated for use only by the smaller commuter airlines or those airlines which have aircraft which seat 9 passengers or less. Currently, the medium commuter operators such as "Go!" and "Island Air" operate at the commuter terminal, and is proposed to relocate these airline operations to either the Interisland or Overseas terminals.

A typical method for comparing airport terminal programs with similar characteristics is Gross Terminal Area/NBEG. However, this should be done with careful thought and consideration as the terminal configuration

can greatly affect the area/gate calculation. Such factors include extensive basements associated with baggage handling, APM systems, and multiple unit terminals which all generate a higher area/NBEG ratio than airports with fewer terminals and similar gate capacity. A typical range for new individual terminal programs can be anywhere from 15,000 square feet/NBEG for smaller domestic terminals to 24,000 square feet/NBEG for larger domestic terminals.

International terminals can have as much as 35,000 square feet/NBEG. Mixed domestic/international terminals will typically fall within the large domestic terminal range. With HNL's unique operational characteristics it is somewhat difficult to compare each terminal to that of a typical domestic/international type range. The Commuter Terminal results in an average area/NBEG ratio of 15,100 square feet, the Interisland Terminal with an average area/NBEG ratio of 32,700 square feet, and the Overseas Terminal average area/NBEG ratio of 40,900 square feet.

4.3.2.1 Gates

The number of gates were evaluated in several different ways to ensure gate capacity for the planning period and beyond. As the Master Plan Update used the "Baseline Alternative" as a starting point, the number of gates accommodated by the "Baseline Alternative" for the forecast fleet mix is 87 gates, with a NBEG of 110.4, and a gate frontage of approximately 15,000 feet.

Therefore, several methodologies were used to compute the number of gates required for the planning period. The most conservative approach resulted in a gate count of 87 gates and a NBEG of approximately 110 by 2030, which matched the "Baseline Alternative" gate count. The results of the conservative analysis is presented in Table 4-5.

Other gate methodologies resulted in lower number of gates required during the planning period. Upon review of these results and further analysis by the Project Management and Master Architect Teams¹², the

¹² "Terminal Area Plan," Draft May 27, 2008. Prepared by Master Architect Hellmuth, Obata + Kassabaum, Inc. (HOK) in association with kya design group. The Project Management team includes Parsons and AvAirPro.

HDOT-A recommended that the number of gates to be required by 2020 to be 68 and by 2030 to be 78. Therefore, this number of gates and the facility requirements for the various terminals facilities, which are summarized below and shown on Tables 4-6 to 4-8, respectively.

4.3.2.2 Overseas Terminal

The terminal currently has a gross terminal area of approximately 2.5 million square feet. The existing recommended facilities require a gross terminal area of approximately 2.0 million square feet indicating the current facilities are, for the most part, oversized to meet the current level of peak hour activity. There are exceptions to this statement with certain areas of the terminals requiring additional area to meet demand such as the: operational layouts of the security areas, USDA agriculture inspection areas, non-secure public restrooms, international arrival functions, secure concessions, baggage claim queue area and circulation, integration of checked baggage screening into the baggage handling system, and some individual airline offices and support space.

The primary reasons this terminal is oversized includes: a large virtually unused third level on the Diamond Head and EWA Concourses, large inbound and outbound baggage facilities, large apron level support spaces, and substantial amounts of general circulation. The facility requirements are shown on Table 4-6 and more details are presented in Appendix B.

In some cases these deficiencies can be converted from excess space within the terminal program. Note that with any re-use of space within the terminal must always be studied and evaluated before making a simple subtraction of existing from future programmed gross terminal areas. Some types of conversions include:

- converting excess Operations space to Airline offices (station managers, accounting, etc.);
- expanding the baggage claim into circulation space provided adequate clearances and corridor widths are maintained;
- accommodating concessions support space by moving some of the Airport maintenance functions which are not directly

required in the terminal area to another on-airport location;
and

- converting operations space into baggage make-up and/or EDS screening which in turn may require the relocation of existing operation functions and lease changes.

4.3.2.3 Interisland Terminal

The terminal currently has a gross terminal area of approximately 497,700 square feet. The existing recommended facilities require a gross terminal area of 592,600 square feet indicating the current facilities are not adequately sized to meet the current level of peak hour activity. With the exception of the gate holdrooms (not including the Makai Pier) almost every component of the existing terminal, particularly the security and concessions areas, requires additional area to meet the current activity levels experienced by the Interisland Terminal. A summary of the facility requirements are shown in Table 4-7 and more details are presented in Appendix B.

4.3.2.4 Commuter Terminal

The terminal currently has a gross terminal area of approximately 74,000 square feet. The existing recommended facilities require a gross terminal area of approximately 18,850 square feet indicating the current facilities are oversized to meet the current level of peak hour activity. This is a result of limiting the types of airline operators in this terminal. The facility requirements are for the commuter terminal is shown on Table 4-8 and more details are presented in Appendix B.

**Table 4-5
FORECAST GATE REQUIREMENTS BASED ON FLEET MIX**

	2005		2010		2020		2030	
	Quantity	Frontage NBEG (feet)						
GROUP I Single Eng. Prop.	4	216 1.8	5	270 2.2	6	324 2.6	7	378 3.1
GROUP II Twin Engine Prop and Regional Jets	4	385 2.9	4	385 2.9	5	481 3.6	6	578 4.4
GROUP III (B737, B717, DHC8-Q400)	16	2,044 15.4	17	2,177 16.4	19	2,422 18.3	22	2,801 21.1
GROUP IV (B767)	17	3,236 24.4	19	3,616 27.3	22	4,187 31.6	26	4,949 37.3
GROUP V (B747, B777)	12	2,868 20.8	15	3,498 25.4	19	4,403 32.1	24	5,456 39.6
GROUP VI (A380-800)	0	0 0.0	1	292 2.0	2	583 4.1	2	583 4.1
TOTALS	53	8,749 65.3	61	10,237 76.3	73	12,401 92.2	87	14,744 109.6

NBEG - Narrow Body Equivalent Gates: used to normalize the gate size to a Narrow Body (standard Group III) aircraft for comparison purposes

Table 4-6
SUMMARY OF OVERSEAS TERMINAL FACILITY REQUIREMENTS

	Existing Space (sq. ft.)	Recommended Space 20 MAP (2005)	Recommended Space 22 MAP (2010)	Recommended Space 27 MAP (2020)	Recommended Space 33 MAP (2030)
Gates	29	29	34	40	46
Airline Function					
Domestic	164,492	115,230	117,260	139,490	145,800
International	77,978	43,420	44,640	50,160	52,190
Other	622,584	318,830	376,270	447,600	517,870
Departure Lounges	135,107	128,400	154,600	184,400	212,100
Other Terminal Functions					
Security	28,046	29,680	31,200	34,250	35,780
Agriculture Inspection (USDA and HDOA)	20,338	23,450	26,020	31,760	39,290
Circulation	530,774	472,850	560,276	660,546	765,010
Restrooms	41,887	43,030	47,480	54,050	58,780
Non-airline Tenants	106,147	107,220	120,070	151,420	190,730
Terminal functions	378,145	334,329	407,640	464,040	516,940
International Arrivals Functions					
Primary Inspection	19,851	39,145	39,145	51,404	64,677
Baggage claim	21,870	48,300	48,300	660,546	78,050
Secondary Inspection	11,812	11,577	11,577	15,357	17,572
Support Functions	32,253	14,715	14,715	17,505	20,395
Other Functions	179,340	144,235	153,395	186,445	217,625
Concessions					
Non-secure area	6,354	5,150	7,490	7,490	7,490
Secure area	144,054	167,500	190,000	238,750	272,500
TOTAL TERMINAL	2,521,032	2,045,061	2,350,078	2,794,867	3,212,799

Table 4-7
SUMMARY OF INTERISLAND TERMINAL FACILITY REQUIREMENTS

	Existing Space (sq. ft)	Recommended Space 20 MAP (2005)	Recommended Space 22 MAP (2010)	Recommended Space 27 MAP (2020)	Recommended Space 33 MAP (2030)
Gates	13	17	23	25	28
Airline Function					
Airline Functions	56,687	66,980	70,820	78,320	85,820
Other Functions	106,953	117,850	141,700	162,800	187,500
Departure Lounges	49,068	33,300	41,000	45,600	51,100
Other Terminal Functions					
Security	15,246	20,000	20,000	20,000	20,000
Agriculture Inspection (USDA and HDOA)	2,212	3,770	4,790	5,960	7,160
Circulation	128,620	184,290	232,680	257,410	289,050
Restrooms	13,391	13,840	15,350	16,830	19,560
Non-airline Tenants	22,682	21,770	23,330	26,810	30,810
Terminal functions	85,977	97,990	111,290	121,190	133,890
Concessions					
Non-secure area	3,793	1,560	2,500	2,500	2,500
Secure area	13,104	31,250	33,750	38,750	43,750
TOTAL TERMINAL	497,733	592,600	697,210	776,170	876,140

Table 4-8
SUMMARY OF COMMUTER TERMINAL FACILITY REQUIREMENTS

	Existing Space (sq. ft)	20 MAP (2005) Recommended Space	22 MAP (2010) Recommended Space	27 MAP (2020) Recommended Space	33 MAP (2030) Recommended Space
Gates/parking positions	2	2	5	6	6
Airline Function					
Commuter	14,576	3,200	3,200	3,800	3,800
Other	18,643	1,780	3,180	3,640	3,640
Departure Lounges	7,781	700	1,700	1,700	2,000
Other Terminal Functions					
Security	4,234	3,456	3,456	3,456	3,456
Agriculture Inspection	56	30	30	30	30
Circulation	10,485	4,260	5,850	6,120	6,710
Restrooms	1,411	2,400	2,400	2,400	2,400
Non-airline Tenants	--	--	--	--	--
Terminal functions	10,432	2,500	3,100	3,200	3,300
Concessions					
Non-secure area	6,382	520	830	830	830
Secure area	--	--	--	--	--
TOTAL TERMINAL	74,000	18,846	23,746	24,776	26,166

4.3.2.5 Intra-Terminal Passenger Conveyance

The current intra-terminal passenger conveyance is currently based on two basic modes, walking and the WikiWiki bus system. As the terminal expansion will create longer walking distances, and the WikiWiki system has become antiquated, there is a need for a new intra-terminal system(s). In addition, the WikiWiki system has been hampered by the lack of replacement busses, out-dated infrastructure, high operational costs and passenger displeasure. However, the WikiWiki system did provide for great flexibility in routes and capacity throughout the terminal complex, in general.

The requirements for a intra-terminal system will include the following guidelines in developing the alternatives:

- walking distance without moving walkways (10 minutes or less);
- technology;
- service proven;
- required capacity;
- potential ridership; and
- operational flexibility.

The following is a brief description of the assumptions that will be used in the passenger travel analysis. In addition, the following assumptions should be used to maintain compatibility with other passenger and passenger conveyance studies.

- Time for level change on escalator: 30 seconds
- Average walk speed: 210 feet/minutes
- Moving Walkway Speed: 120 feet/minutes

The assumptions for the Automated People Mover (APM) system evaluation are:

- a dwell time of 30 seconds;
- a wait time of 60 seconds;
- a maintenance facility would have a footprint of approximately 300 feet in length and 65 feet in width; and
- the APM alternatives will address both sterile and non-sterile passenger movements; and

- the sterile passenger movement will be for arriving international passengers, while the non-sterile passenger is for arriving domestic passengers, all departing passengers, and international passengers who have cleared the international arrivals processing and are transferring to the Interisland terminal.

4.3.2.6 Other Terminal Requirements

Concessions. As funding for airport projects have changed from traditional landing fees to use of other revenue generating sources, such as concessions and passenger facility charges, the Master Plan should maximize the capacity to generate funds from the concessions. The analysis had the objective to maximize concession revenues while minimizing construction costs, aircraft departure delays and impacting construction phasing.

In optimizing the location of the concessions for HNL, the analysis focused on maximizing the number of wide-body passenger-equivalent gates to each concession hub. The requirement of three (3) major hubs serving approximately 45 to 50 wide-body passenger equivalent gates would be the most advantageous to HNL, thus maximizing the sales per passenger. Table 4-9 shows potential sales revenue targets for various concessions.

Table 4-9
TARGETED SALES CONCESSION REVENUE PER ENPLANED PASSENGER (2006 dollars)

	2004 US Average	2005	2010	2020	2030
Food beverage	\$ 3.62	\$ 3.29	\$ 4.50	\$ 5.80	\$ 7.50
News/ gift	\$ 2.62	\$ 3.73	\$ 5.50	\$ 7.00	\$ 8.90
Duty free	n.a.	\$ 15.20	\$ 20.00	\$ 26.00	\$ 33.00
Total Concession area (sq. ft.)	n.a.	90,454	172,000	209,000	257,000

Cultural. In the terminal design, cultural sensitivity should be incorporated into the design of the new terminal building and several publications for HNL has recommendations toward that goal, including a cultural enhancement report and a landscape master plan. As far as the central Overseas terminal garden, these are major landscape features which were constructed in the 1970's. These gardens have three distinct cultural themes, Chinese, Japanese and Hawaiian. Due to the age of the gardens, and deteriorating infrastructure and equipments, it is proposed that these gardens be renovated. In the renovation, it is strongly recommended that the essential features and design themes of the original garden be retained. Consideration should be given to provide more interaction with the passengers, including improving access and providing a stronger visual statement.

Public Health. The Centers of Disease Control and Prevention have increased their efforts to mitigate the risks at the nations ports-of-entry, due to the consequences of globalization, the development of the U.S. homeland security infrastructure, and the rapid conveyance of diseased passengers, cargo, animals through transportation. Therefore, as the "Baseline Alternative" requires the demolition of the gates renovated for the isolation of quarantined passengers, the new facility should meet the requirements of the Centers of Disease Control and Prevention. HNL is currently a quarantine station and is also included as part of the expanded quarantine system.

4.3.2.7 Airport and Airline Support

As in the past and especially with the development of the "Baseline Alternative," the terminal area should accommodate; approximately the same number of hardstands for short- and long-term storage of aircraft, and adequate space for GSE equipment storage, maintenance and wash areas. The development of the Hale Kinai Ahi / Elliot Street area is a primary portion of the "Baseline Alternative." Table 4-10 presents a tabulation of existing support functions and the buildings or space provided by Hawaiian Airlines and Aloha Airlines.

**Table 4-10
ELLIOT STREET SUPPORT FACILITY
BUILDING SPACE / AREA REQUIREMENTS**

Function / Use	Building Size or Usable Area (sq. ft.)
Wash Rack	11,000
Storage	10,000
Administration	22,000
GSE	14,000
Tire Shop	9,000
Supply	32,000
Cold Storage Trailers	3,000
Engine Shop	10,000
Paint Booth	2,000
Fleet Support	10,000

4.3.3 GROUND TRANSPORTATION REQUIREMENTS

The ground transportation system for HNL considers the roadways from Elliot Street to Lagoon Drive. As the focus was the terminal complex, the majority of the analysis was performed for the Interisland, Overseas and Commuter Terminal. In addition, other elements such as public parking, employee parking, a consolidated rental car facility, and the City and County of Honolulu Rail system were studied.

4.3.3.1 Terminal Curb Requirements

The curb and service court requirements for the various planning levels are shown in Table 4-11 for the Interisland terminal and Table 4-12 for

the Overseas Terminal. Figures 10 and 11 show which curbs have adequate capacity within the planning period.

**Table 4-11
INTERISLAND TERMINAL CURB ANALYSIS**

CURB (length in feet)	Existing Length	Existing Demand	2010 Demand	2020 Demand	2030 Demand
Median Departure Curb	560	180	204	260	334
Terminal Departure Curb	560	260	294	377	481
Terminal Arrivals Curb	577	310	350	449	574
Hawaiian	289	210	238	304	389
Aloha	288	100	112	145	185
Arrivals - Median Curb	570	204	231	295	378
Arrivals - Service Courts	330	167	187	239	306
Hawaiian	60	52	57	72	93
Aloha	270	115	130	167	213
Staging Areas	330	165	187	239	306

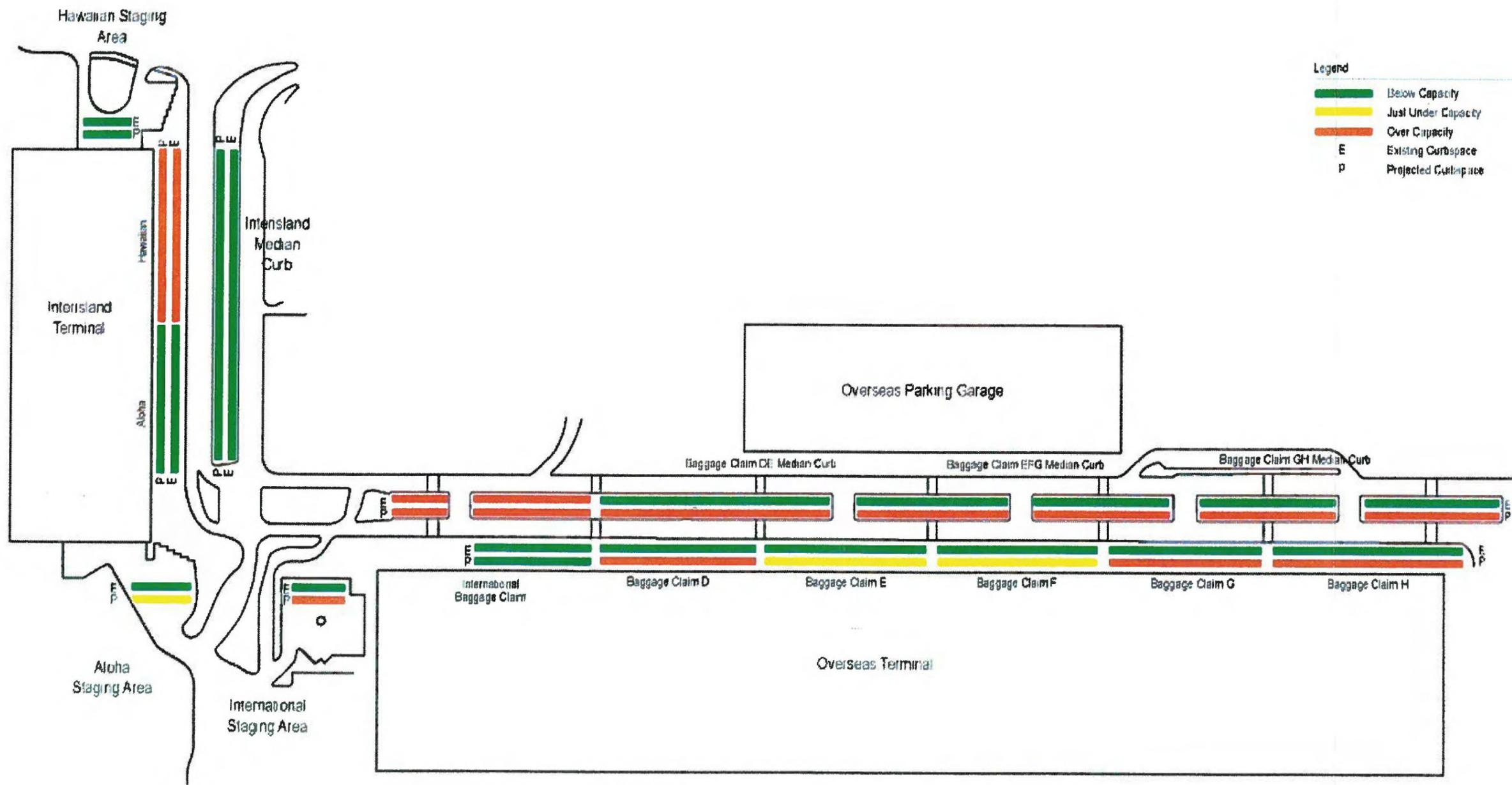


Figure 10 - EXISTING AND 2030 CURB CAPACITY - LOWER LEVEL ROADWAY

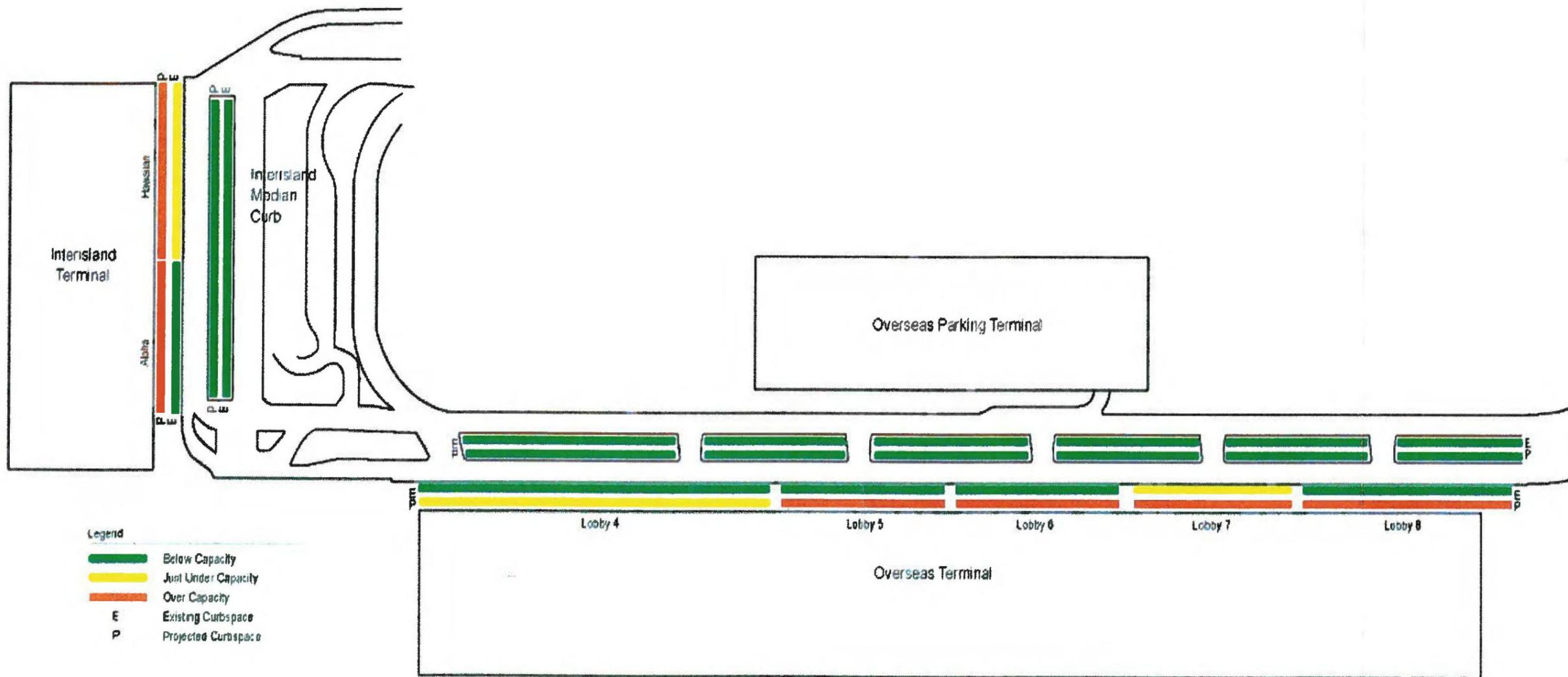


Figure 11 - EXISTING AND 2030CURB CAPACITY - UPPER LEVEL

**Table 4-12
OVERSEAS TERMINAL CURB ANALYSIS**

Curb (length in feet)	Existing Length	Existing Demand	2010 Demand	2020 Demand	2030 Demand
Median Departure Curb	940	432	481	604	770
Terminal Departure Curb	1749	820	918	1153	1464
Terminal Arrivals Curb					
International	362	125	138	168	205
Domestic	1427	925	1047	1340	1712
Arrivals - Median Curb					
International	274	285	314	384	467
Domestic	1270	845	957	1225	1565
International Arrivals - Ewa Service Court	210	175	193	236	287

4.3.3.2 Public Parking

The existing public parking areas account for 3,880 stalls with an existing demand for approximately 3,716 vehicles. The interisland parking garage reaches capacity during the week and during peak periods, has been filled to over capacity (prior to the closure of Aloha Airlines). The over capacity issue for the short-term has been resolved by:

- opening an overflow lot on the corner of Lagoon Drive and Aolele Street in 2007;
- instituting a valet service; and
- the construction of a new parking structure to accommodate approximately 1,800 parking stalls, which in the future will replace the existing parking stalls at the commuter terminal

parking lot, that is slated to be closed in the "Baseline Alternative."

The forecast public parking demand is shown on Table 4-13. A limited structural analysis was conducted on the Overseas terminal parking garage and indicated that the structure could be retrofitted to accommodate two more parking levels or similar loading.

4.3.3.3 Employee Parking

Currently there are approximately 2,792 employee parking stalls in the terminal area which are being used at approximately 80 percent occupancy. By 2030, the employee demand will reach 5,178 and will exceed the existing terminal employee parking demand by approximately 1,200 stalls. The forecast employee parking demand is shown on Table 4-14. The "Baseline Alternative," eliminates the employee parking within the terminal complex, including the parking on the United Airlines (UAL) multi-function building, Japan Airlines (JAL) - Continental Airlines (CO) cargo building, and in employee lots K and N. In addition, the airlines have requested air-side vehicle parking for their AOA vehicles. The "Baseline Alternative" also demolishes approximately 1,500 parking spaces in the old UA parking lot, and Lots Q, R and G, for the construction of the new Diamond Head concourse.

**Table 4-13
FORECAST PUBLIC PARKING DEMAND**

TERMINAL	EXISTING CAPACITY	EXISTING DEMAND	2010 DEMAND	2020 DEMAND	2030 DEMAND
Commuter	422	418	446	507	584
Interisland	3,637*	1,819	1,940	2,208	2,538
Overseas	1,621	1,479	1,665	2,111	2,677
TOTAL	5,680	3,716	4,051	4,826	5,799

NOTE: * assumes capacity of new parking structure to be 1,800 stalls.

**Table 4-14
FORECAST EMPLOYEE PARKING DEMAND**

TERMINAL	EXISTING CAPACITY	EXISTING DEMAND	2010 DEMAND	2020 DEMAND	2030 DEMAND
DH Concourse	1,921	1,540	1,692	2,042	2,475
Ewa Concourse	647	518	569	687	829
Lots C, H, J, D	871	695	764	922	1,120
Lot N	589	471	517	625	754
TOTAL	4,028	3,224	3,542	4,276	5,178

To accommodate this loss of employee parking on the Ewa side, a new parking complex was recommended in the Elliot Street redevelopment Project Definition Report (2006) (PDR) which would accommodate approximately 1,200 vehicles. In addition the PDR recommended ground level parking for 40 vehicles will be provided across from the Aircraft Maintenance Facility. Additional vehicle parking (40 spaces) will be provided adjacent to the two story Multi-agency Inspection Building and 80 parking spaces in front of the Multi-Purpose Building.

4.3.3.4 Rental Car Facilities

To accommodate the increase demand for space and the forecast aviation demand, a consolidated car rental facility or RAC should be considered. The RAC should provide easy access to and from the terminals and accommodate the rental car business that are requesting on-Airport presence. In addition, a consolidated RAC shuttle bus would ease congestion on the frontal roadway and terminal curbs.

4.3.3.5 Rail Transit

The City and County of Honolulu is proposing a rail transit system to link Kapolei to the Honolulu. The current proposed alignment shows a route between Pearl City and Downtown which goes along the H-1 freeway, enters the airport property along Aolele Street, continues east just north of the Overseas parking structure, and follows Aolele Street until the DAV park. The alignment and potential rail stations are shown in Figure 12. Two stations are currently proposed, one which connects to the Overseas parking structure and the other at the corner of Aolele Street and Lagoon Drive. Discussion are ongoing between the City and County of Honolulu, HDOT-A and the PM/MA teams, regarding airport impacts, and security concerns.

4.3.4 CARGO FACILITIES

On the north ramp, the cargo areas will be impacted by the expansion of the terminal complex as seen in the "Baseline Alternative." Based on the development for the "Baseline Alternative", Northwest air cargo facility and the Elliot Street cargo facilities will be the first to be relocated. Then the Ewa Service Court functions need to be relocated, including the: Japan Airlines/Continental Airlines air cargo facility, employee parking, flight kitchens, and Untied Airlines' multipurpose building.

As most of the cargo is flown in the cargo holds of passenger aircraft, the proximity of the respective cargo areas for each airline is important to maintain efficient use of equipment and manpower, and to minimize ground service vehicle movement on the aircraft apron and aircraft operations areas. In addition, as air cargo includes perishable items being imported and exported, the travel time should be minimized to maintain food quality and food safety. In previous studies, marshaling areas for perishable air cargo were proposed and should be considered in the alternative analysis to maintain food quality and food safety. This issue has been highlighted recently with the various contamination and spoilage of food in the United States, internationally and locally.

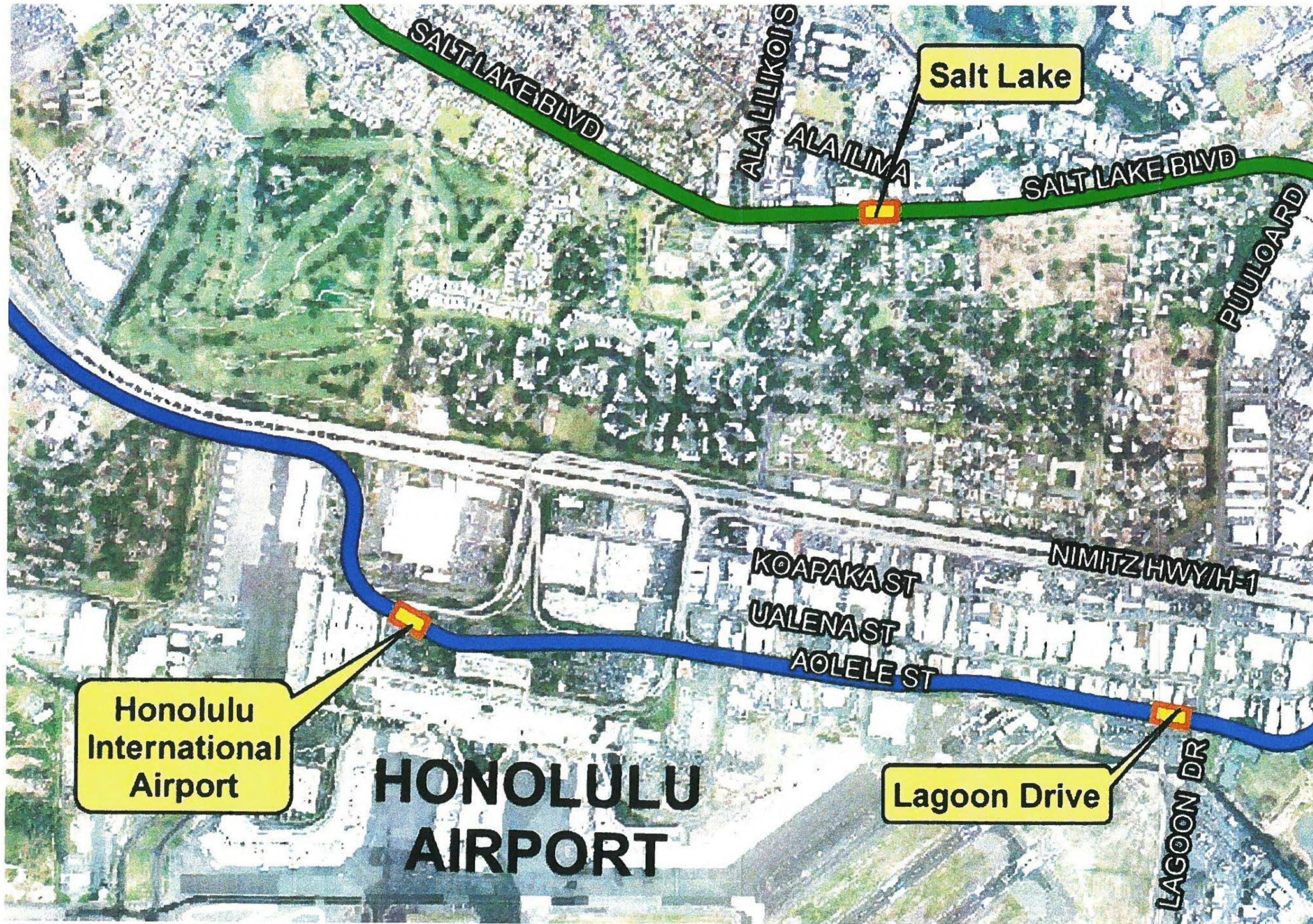


Figure 12 - CITY AND COUNTY OF HONOLULU RAIL ALIGNMENT

There are two cargo areas on the North Ramp, one on the Ewa side within the Elliot street complex and one on the Diamond Head side. The decision of where the air-cargo operators are located (Ewa versus Diamond Head) will be dependent on placement of the airlines gates, and discussions with the various airlines. Currently, the Ewa side air cargo facilities are for Aloha Cargo, Hawaiian Airlines, Japan Airlines and Continental Airlines. The short-term facility requirements are shown on Table 4-15 and were developed from the interviews and current leased spaces. On the Diamond Head side, the facilities are for United Airlines, Delta-American Airlines and Northwest Airlines.

By Hawaii State law [ACT 236 (08) (Senate Bill 2850)], the Hawaii Department of Agriculture (HDOA) has been mandated to provide joint-use inspection facilities at all Hawaii ports-of-entry. As Honolulu is the major port-of-entry for passenger and cargo, the plan will include space(s) for this type facility. However, pursuant to HDOT-A and FAA, these facilities will not be developed by the HDOT-A and are not eligible for Airport funds or revenue, therefore, HDOA must seek other funding sources to construct these facilities. The location of these facilities must be located to minimize the impact on the air cargo operations. The location of the facility will reduce the movement of cargo from one agency to another for various inspections and compliance documents, in that the new facility would be a "one-stop shop" for all inspection agencies. From an operational standpoint, all cargo will be "inspected" at the joint inspection facility before released to the importer or before leaving the airline's possession. Agencies which are planning to participate include the Hawaii Department of Agriculture (HDOA), U.S. Department of Agriculture (USDA), Customs and Border Protection (CBP), U.S. Food and Drug Administration (FDA) and U.S. Fish and Wildlife Service (FWS).

In addition to existing and forecast space requirements, it is expected in 2008 that the Transportation Security Administration (TSA) will be implementing a new screening protocol and requirements for outgoing air cargo. This will increase recommended cargo spatial requirements and is dependent on the type of screening required by the TSA. Spatial requirements could increase by 3,000 to 5,000 square feet per cargo operation.

Table 4-15
SHORT-TERM REQUIREMENTS FOR EWA CARGO OPERATORS

Airline	Existing area (square feet)	Projected Area (square feet)
Hawaiian	21,609	27,000
Aloha Airlines (prior to bankruptcy)*	25,600	32,000
Japan Airlines	24,300	30,500
Continental Airlines	18,750	23,500

* The former Aloha Airlines Cargo was bought and is known as "Aloha Cargo"

Therefore, the location the joint inspection facilities, one main facility and one satellite facility, will be co-located within the two cargo areas on the north ramp. The location of the main facility should be consolidated with the majority of international cargo. The satellite facility would be on the opposite end of the north ramp from the main facility. Given the spatial needs for the inspection bays, treatment facilities and office space, the main facility would need approximately 90,000 square feet. Inspection bays should be able to allow for the inspection of a multiple cargo trains, each with a maximum train of 5 to 6 ULDs at one time, as cargo must be separated by flight and preferably by importer. The satellite facility would occupy approximately 45,000 square feet, be a single storied structure that would accommodate inspection bays, satellite offices, and commodity holding areas

For outbound cargo, the inspection will be centralized for the exporters to more efficiently receive clearances and documentation. The new inspection facilities should also provide an area to prevent potential pest release, and treatment capacity for seize and/or destroy cargo and/or contraband. The facility will bring together plant quarantine expertise and jurisdictions to a central area to facilitate information sharing and to assure most effective rapid response and mobilization in the event of an emergency. In addition, large scale treatment facilities, such as an irradiator, would be used for both incoming and outgoing commodities.

4.3.5 UTILITIES

The analysis for the utilities were performed for the overall Airport use and focused on the major transmission or conveyance portions of that infrastructure. Therefore, the tenant and feeder systems were not analyzed.

4.3.5.1 Electrical Power

Normal/Commercial Power. Based on the analysis on the current system and projected loads, the HECO Airport substation has sufficient capacity to support the existing airport load and the forecast facility requirements. If necessary, HECO could add a third 50 MVA transformer to the Airport Substation.

The major exterior electrical utility construction and associated cost required to support any future terminal expansion would involve the relocation, modification, and extension of the 12.47 kV underground distribution system; plus the relocation, modification, or addition of new electrical transformer vaults. The potential relocation of existing underground lines and transformer vaults along with temporary utility connections could be a significant part of the exterior utility cost

In addition, recommended implementation of an electrical infrastructure study to assess the impact of the future terminal expansion, and proposed phasing plan, on the existing electrical infrastructure and to develop a systematic and logical approach for future modifications to the HNL electrical infrastructure, cabling, equipment and facilities.

As existing electrical transformer vaults are modified or relocated and additional transformer vaults are installed, one recommendation is to incorporate the totalizing feature in the existing and new HECO primary kilowatt-hour meters. Integration of HECO meters will reduce the number of different HECO electricity bills received by HNL and streamline the record keeping and payment of the bills. In addition, there is the possibility that totalizing the HECO meters may eliminate some of the monthly base customer charges associated with individual metering schemes and, hopefully, reduce the amount HNL pays for electricity each

month. A rate analysis can be prepared by HECO once a determination is made concerning the feasibility of totalizing the HECO meters.

Solar Power. To comply with Hawaii ACT 96, the HDOT-A is constructing solar photovoltaic (PV) generating system at four (4) sites at HNL include the parking structures and terminal buildings (see Table 4-16). Once installed, the HDOT-A will enter into a long term solar services or power purchase agreement (PPA) with the vendor to buy power produced by the PV systems for a period of not less than twenty years. If a site produces more power than its electrical usage, the excess power may be sold to the electric utility for its use. This revenue shall be used to offset the electrical rates charged to the State in the PPA. In addition, the PV system shall be designed to provide shade over building roofs and parking lots. Shading provided by the PV system and reduced exposure to the oxidizing effects of direct sunlight are expected to extend the life of the roofs and reduce maintenance and repair costs as well as provide covered parking for customers.

Table 4-16
PHOTOVOLTAIC GENERATING SYSTEMS

Location	Type of structure	Electricity Generated (12 hours/day) (kWh/day)	Electricity Generated (kWh/year)	Area covered with PV (sf)
Main Terminal Parking Structure	parking shade	10,440	3,810,600	57,740
Main Terminal Ticket Lobbies	roof	12,000	4,380,000	62,400
IIT Terminal	roof	6,000	2,190,000	34,700
IIT Parking Structure	parking shade	7,440	2,715,600	39,940

Note: Tentative date for the start of construction is August 2008, and complete all four sites by November 2008.

Generator Power - Emergency Power – Life Safety and Security Systems. The capacity of the existing 1.2 MW emergency power plant may have to be increased or smaller generators added to support the potential increase in terminal area and associated emergency power loads. The most effective scheme to support future loads can only be determined after the scope of the terminal modifications and/or expansion along with a phasing plan are identified. The electrical infrastructure study mentioned above should also assessment of the emergency power system

The 4.16 kV underground distribution system and modifications to existing or addition of new emergency power distribution centers will also be required.

Standby Power. The capacity of the standby power plant will probably also need to be increased by the addition of more 2.5 kW generator units. However, the increased standby power plant capacity still may not be sufficient to support the entire Airport complex. A load prioritization schedule and load shedding scheme will likely be required to support any future standby power loads.

4.3.5.2 Water

A water master plan¹³ was undertaken by HDOT-A and the summary and recommendations are as follows.

"Of the four scenarios modeled, the critical scenario is the Maximum Daily plus Fire scenario. This scenario demands a flow of 5,286 gpm [gallons per minute] throughout the airport's water system. Of the 5286 gpm, 4000 gpm is for fire flow. This fire flow is the highest BWS [City and County of Honolulu Board of Water Supply] fire flow requirement and is typically applied to land uses of airports, light industry, downtown business, large shopping centers and hospitals. This fire protection demand is a large fraction of the total demand on the water distribution system.

¹³ "Honolulu International Airport, Water Utilities Master Plan," Sato & Associates, Inc., March 2007.

Twenty-three percent of the on-site fire hydrants do not meet BWS' standard criteria of maintaining 20 psi residual pressure under Maximum Daily demand plus a fire demand. All other standard criteria under the Peak Hour scenario are satisfied.

To increase the distribution capacity of the water system to deliver 4,000 gpm while maintaining a residual pressure of 20 psi under Maximum Daily demands, existing pipes were upsized and new pipes were added. Existing 6 and 8-inch pipes were upsized to 12-inch. New 12-inch pipes were added to complete the loop to the existing system."

4.3.5.3 Communication Systems

Hawaiian Telecom needs to confirm the adequacy of the exterior communication utility service cables (fiber optic and copper) in the Airport area to support the future terminal expansion and modernization program. However, the primary cost would likely involve the communication infrastructure work to support the necessary communication cable system. The relocation, modification, and addition of new communication ductlines and manholes could involve a significant amount of work and associated cost.

Modification and/or addition of Hawaiian telephone and/or State telephone switch rooms can be most effectively established after the scope of the terminal modifications and/or expansion along with a phasing plan are identified. Similar to the electrical power systems, recommend implementation of communications system infrastructure study to assess the impact of the future terminal expansion, and proposed phasing plan, on the existing communications infrastructure and to develop a systematic and logical approach for future modifications to the HNL communications system infrastructure, cables and facilities.

4.3.5.4 Specialty Communication Systems

The work required for the specialty communication systems will be established after the scope of the terminal modifications and/or expansion along with a phasing plan is identified. This work will be

further complicated by the fact that there are multiple systems which are being used and controlled by different vendors and stakeholders.

One recommendation is to establish a common information transport (cabling) system to minimize the haphazard installations found on the existing terminal buildings. This common information transport system will also require the establishing core communication rooms in strategic portions of the terminal buildings. Issues concerning security and code requirements must also be addressed.

4.3.5.5 Drainage

An analysis of the major drainage structures at HNL, the Manuwai Canal and the Kaloaloe Canal (previously North Peripheral Ditch), were performed for this Master Plan. The tributary areas for both structures extend south and encompasses large land tracts off-of the airport boundary.

The Manuwai Canal has a tributary area includes off-airport areas such as the U.S. Navy housing, Navy Marine Golf Course, portions of Hickam Air Force Base, and portions of the H-1 Freeway / Nimitz Highway. The drainage analysis was performed and shows that the capacity of Manuwai Canal is restricted by the box culvert under taxiway B and the RCP/box culvert under Ruwnay 8L-26R. This analysis concluded that during a 24-hour 50 year storm event there is a potential for flooding of Taxiway A.

The tributary area for the Kaloaloe Canal includes the U.S. Navy hosing areas, portions of the H-1 Freeway/Nimitz Highway, portions of Keehi Lagoon Park and other developments to the south of HNL. The current Kaloaloe Canal has sufficient capacity for 24-hour 50 year storm event. A portion of the Kaloaloe Canal was in the Runway Protection Zone for Runway 4L-22R, and should be covered to allow maximum use of that runway.

SECTION 5.0

ALTERNATIVE ANALYSIS

The alternatives which meet the goals and objectives of the project, and the facility requirements are discussed in this section. The underlying assumption is that the alternatives are focused on modifications and comparisons to the "Baseline Alternative," as directed by HDOT-A.

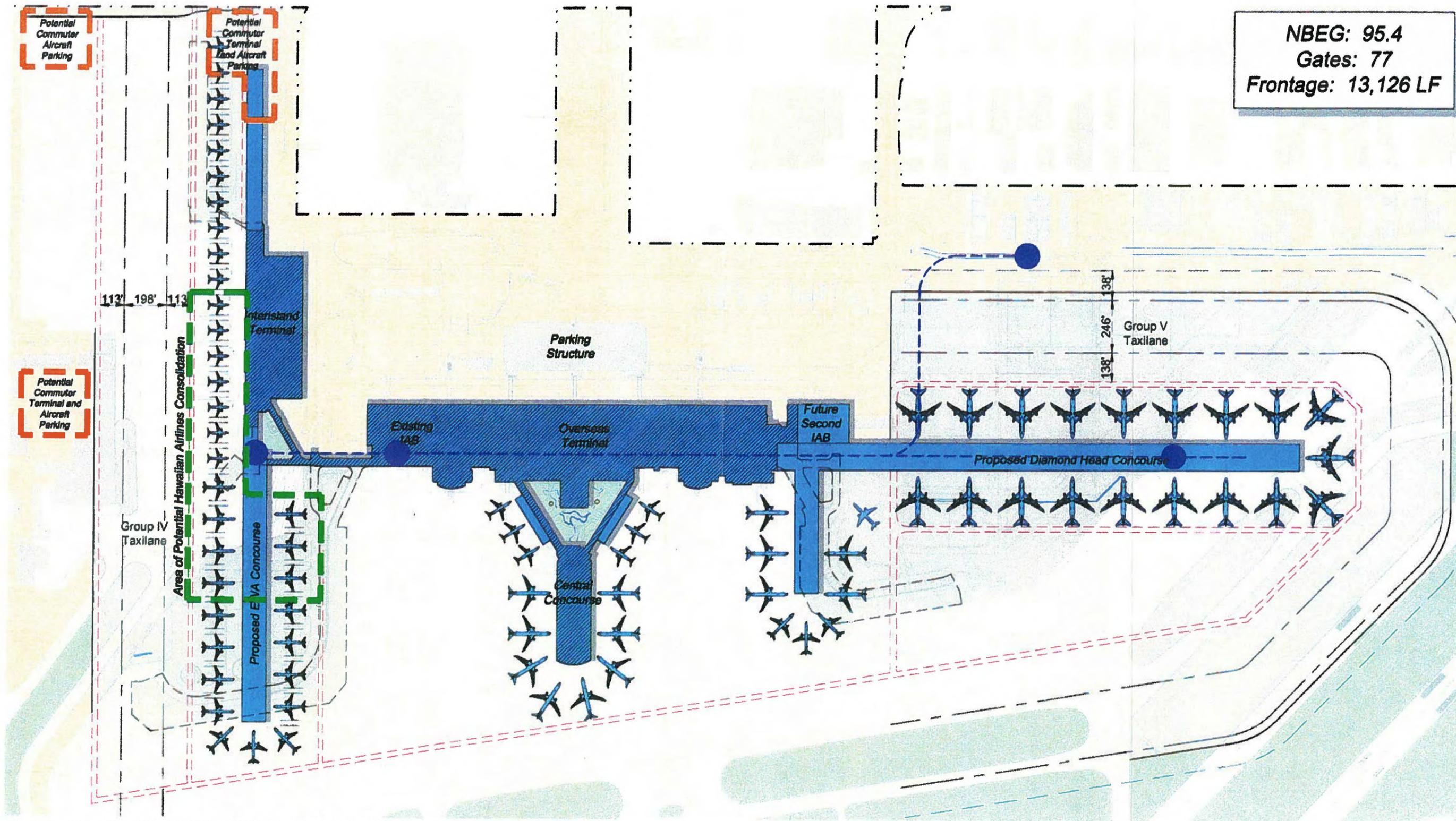
To provide an equivalent comparison to the "Baseline Alternative," and to maximize the terminal within the constrained terminal area envelope, the terminal area master plan analyzed the alternatives for the 2030 planning horizon and an ultimate build out concept. For this purpose, the terminal area envelope is bounded by Hickam Air Force Base, taxiway "A", the frontal roadway system and runway 4L-22R⁹.

The HDOT-A is worked on a parallel track with the HNL Modernization Program to study alternatives in the HNL Master Plan. The HNL Modernization Program is being developed for HDOT-A by the Project Management Team (PM) and the Master Architect Team (MA) were included. The PM and MA teams concentrated their effort on the Terminal Area Plan concepts.

5.1 Baseline Alternative

Pursuant to the HDOT-A Administration, the terminal alternative analysis was limited to a refinement of the "Baseline Alternative" developed by KFC Airport, Inc and AvAirPro¹. The "Baseline Alternative" from the Modernization Plan is depicted in Figure 4, however, in order to compare the aircraft frontage against the Master Plan alternatives, an interpretation of the original plan was developed to accommodate the forecasts aircraft requirements for the 2030 planning horizon and presented in Figure 13. The analysis of the "Baseline Alternative," identified additional considerations and concerns such as:

- the location of the Commuter Terminal;
- whether or not two International Arrival Facilities (IAF) are warranted along with their specific size and configuration;



NBEG: 95.4
 Gates: 77
 Frontage: 13,126 LF

Figure 13 - BASELINE ALTERNATIVE (ALTERNATIVE 3)

- the length of the new Diamond Head concourse as impacts Runway 4L/22R;
- balance of capacities between airside facilities;
- concessions opportunities in the terminal facilities both airside and landside;
- alignment of proposed Automated People Mover (APM);
- integration of Light Rail access;
- sequencing and location of the United States Department of Agriculture baggage inspection;
- relocation of support facilities which are displaced when the existing terminal is demolished; and
- relocation of airline and airport support facilities, cargo facilities, public parking and employee parking which are displaced with the new terminal concourses.

5.2 AIRFIELD ALTERNATIVES

The airfield alternatives were developed to relieve congestion and improve safety of aircraft and ground service vehicles within the Aircraft Operations Area (AOA).

5.2.1 New Taxiways for Runway 8L-26R - West End

One of the major concerns will be the taxiway capacity for the west end of Runway 8L/ 26R with the following issues:

- the increased congestion due to the new civilian and military facilities being accommodated by taxiway A;
- the increase pavement wear due to turns by large and heavy aircraft; and
- the inefficient access to and from the terminal to the proposed maintenance facility in the Hale Kinai Ahi subdivision and the new HAFB facilities to HAFB.

Taxiway A is the primary access taxiway to both Runways 8L and 8R during trade wind operations, which occur 90 percent of the time. The HAFB C17 Clear Water Rinse Facility off-of Taxiway A, will increase the

use of the taxiway by heavy military aircraft and will have a stub taxiway at a 90 degree angle to taxiway A. This will increase traffic and potential aircraft queuing, which will lead to increasing delays on taxiway A. In addition, the traffic will increase the pavement wear at the intersection of the C-17 Clear Water Rinse Facility stub taxiway and taxiway A. Similarly, the new maintenance facility proposed for the Interisland air carriers will increase use of taxiway A and will have 90 degree angle taxiways used by large and heavy aircraft (Design Group III, IV, V and VI).

Therefore, it is proposed that two new taxiways be constructed in the area as shown on Figure 14. The runway and taxiway separation should meet Aircraft Design Group V separation standards, and the taxiways would be adequate for simultaneous Aircraft Design Group V operations as the separation distance is 290 feet. The taxiway separation could allow for a limited simultaneous taxiing of certain Design Group VI aircraft (such as the C-5 Galaxy and B747-8) and Design Group V aircraft operations, but it would require a determination and potential waiver from the FAA. The location of the connecting taxiway should allow for:

- an alternate taxi routing for aircraft to Runways 8L and 8R;
- access to the new military and civilian facilities; and
- provides an adequate distance on Runway 8L for taxiway-intersection takeoffs, given the obstructions in Honolulu Harbor.

5.2.2 Reef Runway Taxiways

Two new angled taxiways (Figure 15) were proposed for Runway 8R-26L to minimize runway occupancy times, and provide increase runway capacity. However, these new taxiways are in the aircraft operation zones for the FAA Air Traffic Control (ATC) and will negatively affect the aircraft operational flow for Runways 4R and 4L. In addition, the taxiways would require the relocation of the VORTAC. Therefore, these taxiways will not be recommended for further consideration.

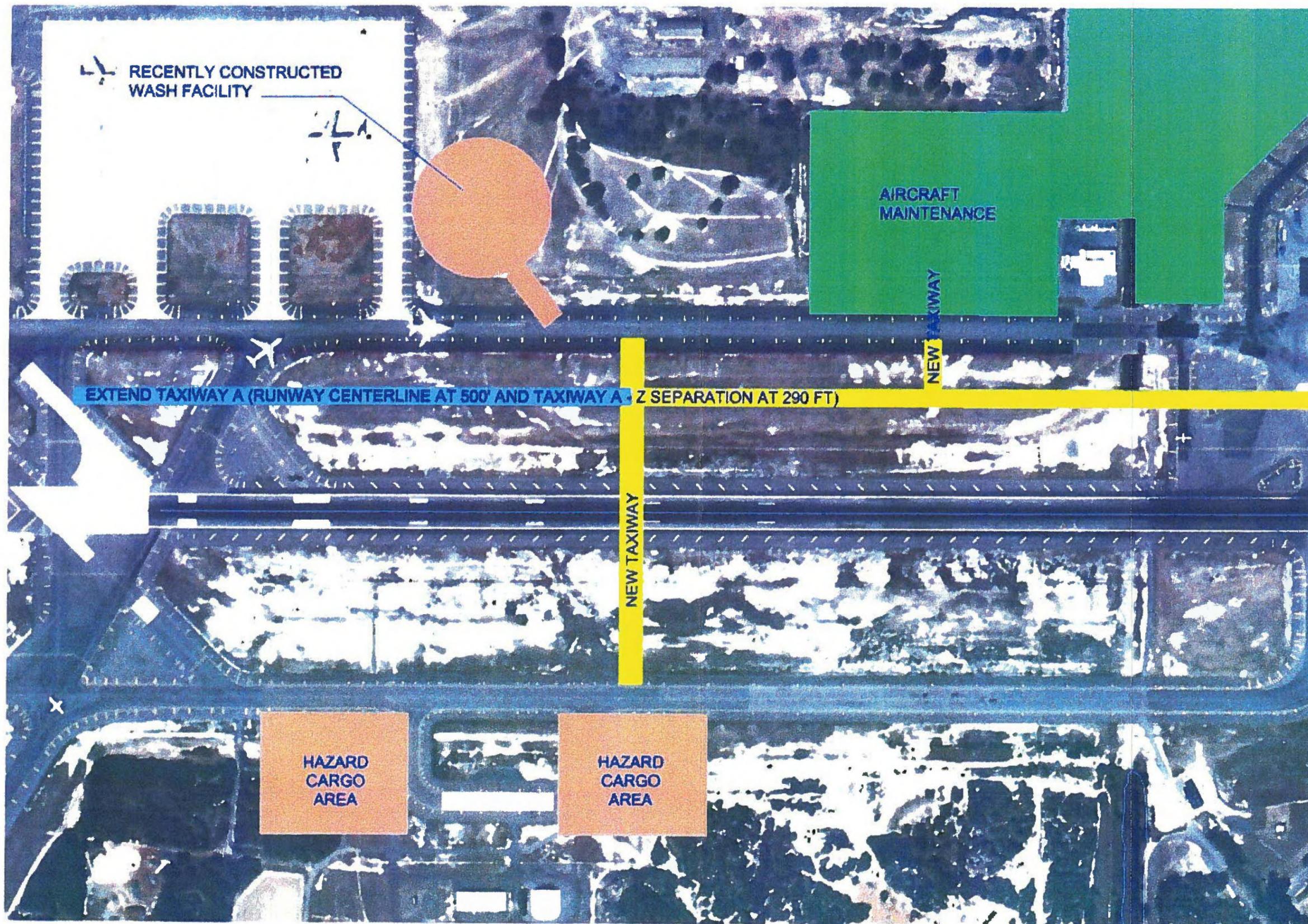


Figure 14 - PROPOSED TAXIWAYS FOR RUNWAY 8L COMPLEX

5.2.3 Taxiways G, N and L

To reduce confusion about the taxiways in the Taxiway G, L and N areas, the angled Taxiway N would be closed, or realigned to be a new perpendicular taxiway. For the Interisland Terminal Area, the use of taxiways G and L by large aircraft (Design Group IV and V) in the "Baseline Alternative" requires the realignment of both taxiways to meet the applicable FAA design standards. There are two alternatives being considered.

The "Baseline Alternative" shows the straightening of taxiways G and L along the new "Makai Pier." These new taxiways meet the Design Group V taxilane requirements until it reaches the existing Interisland Terminal, where it transitions to meet Aircraft Design Group IV requirements. With this alternative, Taxiway N is not required as taxiway G would replace taxiway N.

Another alternative proposes three taxilanes (taxiways) serving the Interisland area to reduce the potential for taxiway queues and delays (see Figure 16). The configuration would realign Taxiways G and L to meet Aircraft Design Group V requirements in an angled configuration, and would extend Taxiway N into the Interisland terminal complex to compliment the Taxiways G and L, and would be a parallel taxiway along the proposed "Makai Pier" apron. It is anticipated that the increase in aircraft size, number of gates and number of hardstands will increase the amount of taxiway congestion in the area. The current terminal and cargo layout have Group IV and V aircraft on both sides of the taxiway complex. As these aircraft push out to depart, the traffic on one of the taxiways will stop for approximately 8 to 10 minutes per aircraft push out. Currently, the use of the Taxiway G and L for Design Group IV aircraft has caused taxiway queue of two or three aircraft depending on the time of day and aircraft operation levels.

5.2.4 Taxiways E, F and C

On the Diamond Head side, it is recommended that taxiway E, which is oblique to Runway 8L, be closed and a new perpendicular Taxiway E be constructed approximately 8,000 feet from the Runway 8L threshold to

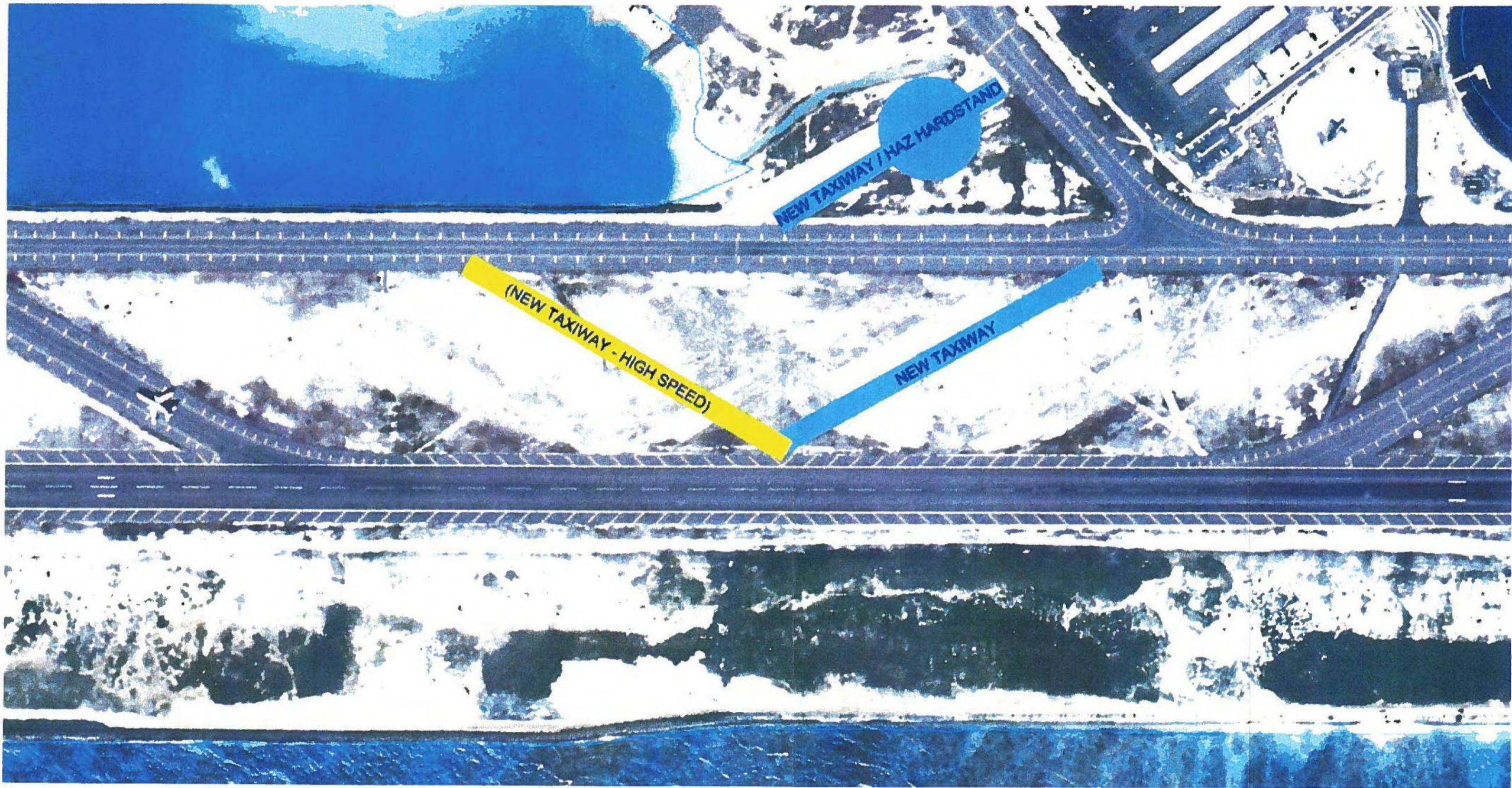


Figure 15 - PROPOSED REEF RUNWAY TAXIWAYS

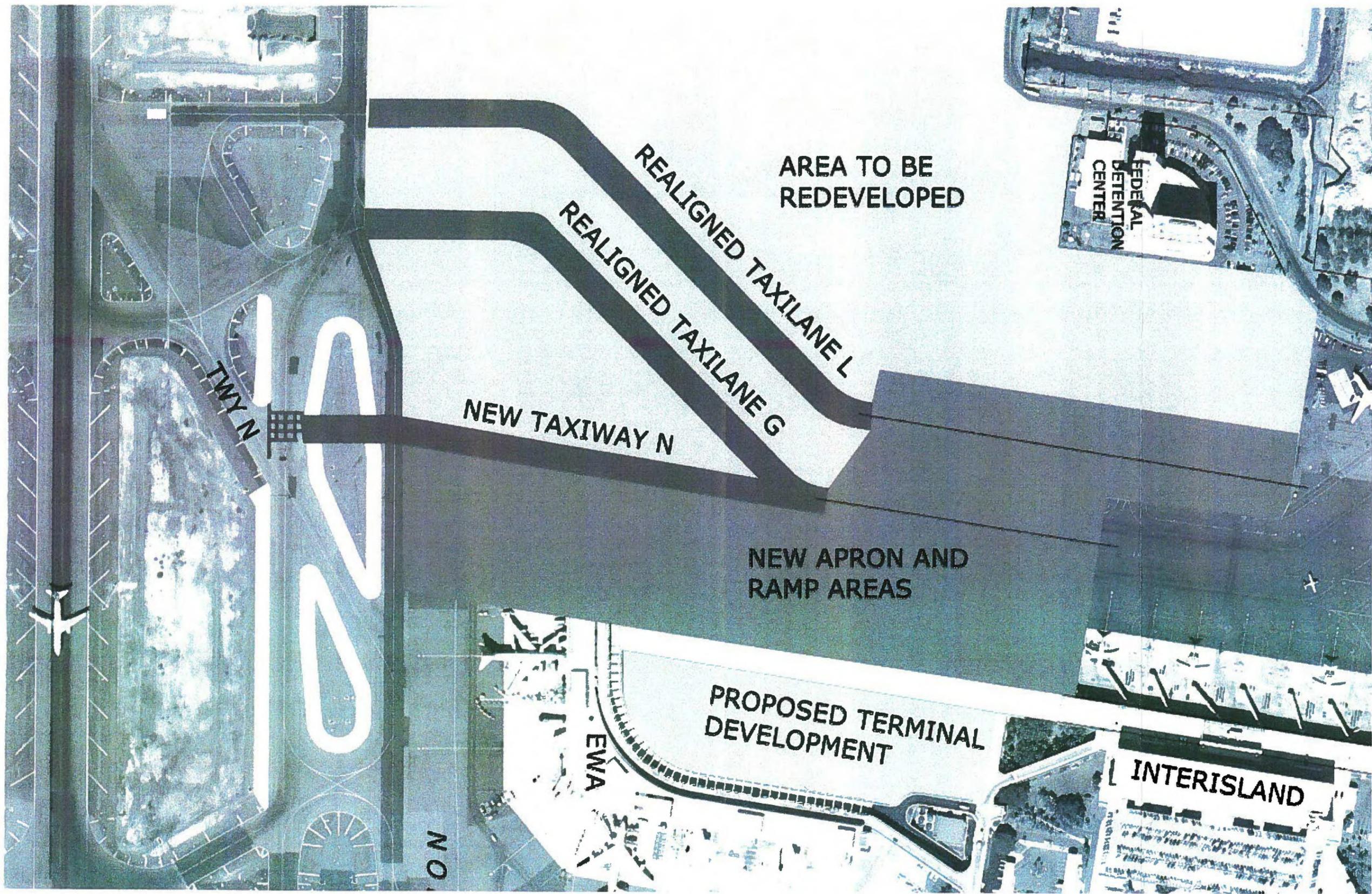


Figure 16 - PROPOSED THREE TAXILANE SYSTEM

allow for intersection takeoffs in the Kona wind airfield operations (see Figure 17. The new Taxiway E, would then connect to the proposed extension of Taxiway F (to northeast) and connect to the existing Taxiway B. This new taxiway would provide a route to Runway 8R-26L and relieve congestion on Taxiway C, which is the primary taxiway for the South Ramp.

5.2.5 Aircraft Hardstands

The "Baseline Alternative" demolishes the existing aircrafts seven (7) hardstands on the North Ramp-Diamond Head and three (3) aircraft hardstands on the North Ramp - Ewa, that are used by Aloha Cargo. In addition, during certain aviation downturns, strikes and bankruptcies, long-term large and heavy aircraft parking is lacking at HNL.

In the redevelopment of the areas surrounding Hale Kinai Ahi Road and Elliot Street, the development should include hardstands for Design Group V aircraft, along taxiway G & L on the cargo apron and on the apron fronting the maintenance hangars. Fuel hydrants should be provided on these aprons.

Additional land area, that was recently acquired from HAFB, is available adjacent taxiway F to provide long-term aircraft parking for larger aircraft. As taxiway F is slated for Design Group VI aircraft taxiing, the area can accommodate approximately 6.9 acres of aircraft parking, which is adequate for four Design Group V hardstands as shown in Figure 17.

As shown in previous Master Plans, the development of a new taxiway and a high-risk aircraft hardstand, is shown on Figure 17, at the southwest end or south ramp. This hardstand allows for secured public access and has high visibility, yet remote from the main terminal area.

5.2.6 Engine Run-up Pad

Currently, large aircraft engine run-ups are being conducted on taxiways F and RA (north of taxiway RT) and for heavy aircraft on Runway 8R. These operations close a taxiway or runway during the engine maintenance run-up. Therefore, an engine run-up pad is proposed to be

located on the east end of taxiway RA. The facility should be designed to accommodate a Design Group V aircraft and should have lighting, jet blast protection, and paved shoulders to prevent erosion of the surrounding areas. This location was selected in the previous Master Plan, as it is of comparable distance to the areas where engine run-ups are currently occurring and away from residential areas in HAFB. The previous Master Plan discounted the use of a aircraft run-up facility and an engine run-up pad in close proximity to the HAFB housing, due to potential noise impacts.

5.2.7 Runways

As the airfield reaches approximately 450,000 operations, the HDOT-A should initiate a detailed airfield capacity study to analyze alternatives to relieve delays at the airport. As shown on current and past airfield capacity analysis as the operations reach 500,000 operations the average aircraft delay will increase substantially. Typically, as the average delays gets greater than 6 or 7 minutes, the delays will start to increase exponentially. The cost of aircraft delay can be equated to fuel consumption which translates to a cost in the order of millions of dollars per year to the airlines, and increase jet emissions which impact air quality. Airfield solutions which would enhance capacity with low capital improvement costs are phased into short-term and long-term improvements. The short-term airfield enhancements should include:

- installation of a CAT II Instrument Landing System (ILS) or similar for Runway 8R; and
- installation of new Global Positioning System or similar approaches to Runways 26L and 26R.

The alternatives for long-term capacity enhancements is:

- Increasing the length of Runway 4L by 1,000 feet to provide increase use by large aircraft and Taxiway F (Figure 17);
- lengthening Runway 8L-26R;
- increasing the use of Runway 8R for arrivals during trade-wind operations; and

- for peak delays HDOT-A could manage or reduce the peaking of aircraft operation by spreading the peak over a longer time window; or
- encouraging overseas airlines to use other statewide airports especially during peak times.

5.3 AIRPORT OPERATIONS AREA EXPANSION

The Airport Operations Area (AOA), is currently limited and bordered by Aolele Street, Lagoon Drive, the Pacific Ocean, HAFB and the passenger terminals. As the aviation demand increases, so does the need for land parcels that have access to the AOA. The two areas that can be converted to AOA accessible lands are Kalewa subdivision along Lagoon Drive, and the Ualena Street land parcels. Another consideration is that the "Baseline Alternative" requires the relocation of all of the facilities on the southside of Aolele Street and would require AOA access.

To increase the amount of AOA lands in the Kalewa subdivision, it requires the relocation of Lagoon Drive closer to Keehi Lagoon, and would provide approximately 20 acres of AOA accessible lands. The area on the East side of the relocated Lagoon Drive would be used for the relocation of the fuel farm, and other airport and airline support facilities. Some of the existing functions in the Kalewa subdivision are not considered airport related and other airport related functions can be relocated. The area west of the Airport Center, on Ualena Street, could be developed for those uses which do not require AOA access.

Another portion of HNL that should be converted to have AOA access are the properties between Ualena Street and Aolele Street, Diamond Head (east) of Airport Center. This land was slated for air cargo facilities in the previous Master Plan. This is the last portion of HNL that can be changed to AOA lands with ground side access for non-AOA vehicles. To create the AOA, Aolele Street has to be closed and a new roadway connector constructed between the Aolele and Ualena Streets. The new connector roadway is located east of the H-1 Freeway ramps and west of the Airport Center. The closure of Aolele Street will allow access by ground service equipment (GSE) and would provide an additional 18 acres of AOA accessible land. The three options studied included,

an overpass, underpass and diverting the Aolele Street vehicles to Ualena Street. The overpass and underpass were considered cost prohibitive and would have security concerns given the HDOT-A and Federal requirements.

A traffic impact assessment report was completed in 2008 for the closure and re-routing vehicle traffic on Aolele Street. The level-of-service (LOS) for certain turning movements at adjacent intersections are impacted, but remains at an acceptable level-of-service.

The connection to Ualena Street would be Ewa (west) of the Airport Center and would allow access to the H-1 freeway ramps. The following mitigation measures are recommended:

- investigate signaling the Ualena Street / connector road intersection due to safety concerns and monitor the intersection for peak hour signal warrant;
- investigate allowing movement on to the H-1 Freeway on-ramp;
- reconfigure the intersection geometry at the Lagoon Drive / Ualena Street intersection;
- reconfigure the geometry at Ohohia Street/Ualena Street intersection to separate the individual movements;
- remove on-street parking on the makai (south) side of Ualena Street between Ohohia Street and Lagoon Drive; and
- consider relocating the parking to the Ewa side of Lagoon Drive between Ualena Street and the current Lagoon Drive/Aolele Street Intersection.

5.4 RAIL TRANSIT

Similarly, the City and County of Honolulu Rail system routing is along Aolele Street as shown on Figure 12. The HDOT-A should reroute this alignment to be over Ualena Street. The Ualena Street route, would be farther away from the Runway 4 complex and provide increased separation from the aircraft operations. The current alignment is not be considered an obstruction under FAA Part 77, as the closest point to Runway 22R is at the intersection of the HDOT-A Baseyard driveway and Aolele Street, at a distance of 1,200 feet. The computed Part 77 surface elevation at that point is 58 feet MSL, compared to the top of the proposed rail at 42 feet MSL. This assumes the train height is less than 16 feet over the top of the rail.

The current plan is to put a transit station at the new HNL Parking Garage approximately 40' in the air. Regardless of whether the HNL Parking Garage is turned into a GTC, the passages to and from the transit station must be clearly labeled and lit to easily allow transfers to public buses and also the airport terminal buildings.

5.5 LAGOON DRIVE MARINA

The marina will be located along Lagoon Drive and is sized to accommodate approximately 680 boats with an average slip length of 42 feet. The development will have a length of approximately 4,000 feet of shoreline along the western side of the Lagoon Drive and will require a width of about 350 feet to accommodate related marina facilities. To obtain the necessary width, the development will extend into the lagoon. The facility will be designed to avoid impact to the adjacent Seaplane Runway. The conceptual development of the marina includes space for automobile parking, comfort stations, restaurant/snack bar, marine supply store, launching facilities, fuel dock/sewage pump-out, and miscellaneous concessions. Also, included in the plan is a ferry terminal that would support the proposed Oahu water transit system, which would accommodate airport employees and passengers. The developer will need to obtain approvals and permits from various agencies including the: Hawaii Department of Transportation, Harbors and Airports Division, Federal Aviation Administration, and U.S. Army Corps of Engineers.

5.6 TERMINAL ALTERNATIVES

This section investigates alternatives for providing increased capacity to future terminal facilities and their associated landside access, people mover systems and terminal support facilities within the context of the overall land use plan for the Airport. The alternatives in this section depict the Airport's twenty-five year terminal area requirements for new and/or renovated terminal facilities based on the Demand/Capacity and Facility Requirements analysis.

Generally, master plans strive to maximize efficiency and improve user convenience for future facilities by increasing capacity and providing operational enhancements for airside, terminal and landside components of the plan. Additionally, a Terminal Area Master Plan (TAMP or TAP) endeavors to be flexible and responsive to changing operational scenarios that may emerge over

time. As such, it is important that the plan be financially viable and user friendly and must satisfy the current needs of its stakeholders, yet be sufficiently flexible to meet the needs of an unknown future. Because of the Airport's already constrained existing land area, the alternatives explored aimed to maximize the use of the current terminal envelope. Additionally when an initial alternative was underperforming for a particular criterion it may have led to refinements of the alternative and, in some cases, the development of new alternatives.

The goals and objectives, which were presented to HDOT-A, other key airport stakeholders and agencies, became the basis for developing and defining the evaluation criteria. The goals and objectives also formed the basis from which the proposed "Baseline Alternative" was reviewed and additional options explored. The criteria also formed the basis for the development of a series of pros and cons for the performance of each short-listed alternative and provides a guide to the selection of the preferred alternative(s).

5.6.1 Terminal Site Envelope Analysis

Along with the TAMP goals and objectives, other important factors were considering during the alternative development within the existing terminal core. These factors are:

- achieving a balanced capacity between airside, terminal, and landside facilities;
- assessing impacts on existing facilities during phased construction while maintaining full operational capabilities;
- minimizing passenger walking distances;
- providing sufficient walk-in gates from International flights to the IAB;
- access for utilities and existing infrastructure;
- addressing ground transportation issues of connecting to existing roadway infrastructures;
- incorporating a planned light rail connection; and
- reserving land area for future terminal expansion possibilities.

Taking into consideration these factors, various terminal complex alternatives were developed and analyzed in the existing terminal core envelope.

5.6.1.1 Initial Terminal Alternatives

Throughout the terminal planning process, a common set of parameters was used in developing the terminal complex alternatives. All were developed using industry accepted planning criteria such as FAA's Advisory Circular 150/5300-13 relative to taxiway and taxilane design criteria, aircraft parking depth, wing-tip spacing, aircraft dimensional criteria, and concourse and terminal dimensioning. In addition to the previously described goals, objectives and factors, the following were also taken into consideration in the development of the terminal complex alternatives.

Overall facility issues

- poor signage
- difficult wayfinding
- long walks and poor connectivity with WikiWiki bus system

General condition of facilities

- passengers say it's a poor facility
- water problems (leaking roofs)
- poor working environment (heat and dust)

Aging facilities

- Aging or lack of infrastructure (electrical systems, preconditioned air)

Ticket lobbies

- EDS equipment
- Condition of ticket counters (termites and aging)
- Configuration of ticket counters ("herringbone")
- Poor utilization of space, lack of space for queuing passengers
- Poor flow of passengers from USDA inspection and EDS to counters and through lobby

International Arrivals Facilities

- Inadequate throughput capacity, requires holding passengers on aircraft
- Substantial issue with baggage claim
- Lack of true sterile facilities to isolate arriving passengers from departing passengers and to prevent arrivals from wandering
- WikiWiki connection to international arrival processing facilities is unreliable and ineffective

Other general comments and questions

- Few carriers had concerns about domestic baggage claim lobbies
- Restroom facilities are poorly located and inadequately sized
- Commercial landside facilities are lacking
- Departure lounges are undersized in many locations
- Baggage systems are aging and lack ability to accommodate oversized baggage
- Signage is not "International passenger friendly"
- The possibility of common use ticketing lobbies
- Interest in off-site check-in to ease ticket lobby congestion (hotel, cruise ship)

During the initial efforts of the study, a total of twelve (12) terminal options (Alternative 3a to 3k) in addition to the "Baseline Alternative" were investigated. These initial alternatives are shown in Figures 18 and 19. The major characteristics of each are summarized in Table 5-1 and the positive and negative attributes of each option is shown in Table 5-2.

Alternative 3 (Baseline Alternative). The "Baseline Alternative" represents the 2005 Modernization Plan preferred Terminal Alternative. This alternative serves as the baseline from which all other alternatives were evaluated against.

In this alternative the existing Commuter Terminal or "Mauka Pier" is demolished and a new single-loaded widebody capable "Mauka Pier" is extended off the end of the Interisland Terminal. The existing "Makai Pier" is also demolished in order to create a new linear Ewa double-

loaded concourse extending from the south (makai) side of the Interisland Terminal. Taxilanes "G" and "L" are realigned enabling unrestricted use by Group IV and V aircraft to the new Ewa Concourse and Mauka Pier.

The existing Diamond Head single-loaded concourse is also reconfigured into a new linear double-loaded "Waikiki Pier". Extending towards Diamond Head is also a new double-loaded linear Jumbo (Group V) capable concourse which requires a threshold displacement for Runway 22R. Six new narrowbody capable gates are created adjacent to the central concourse garden courtyard.

The existing International Arrivals Building (IAB) is renovated and a second IAB is developed at the Diamond Head end of the Overseas Terminal. A new inter-terminal/concourse passenger connector is constructed between the Overseas and Interisland Terminals. The initial version of this alternative also eliminated the four international Overseas Terminal frontal gates. A new third level Automated People Mover (APM) system links the new Ewa and Diamond Head Concourse gates to the Overseas Terminal and IAB facilities.

**Table 5-1
INITIAL TERMINAL ALTERNATIVE COMPARISONS**

CHARACTERISTICS	ALTERNATIVES												
	3	3a	3b	3c	3d	3e	3f	3c/f	3g	3h	3i	3j	3k
Linear Ewa Conc.	•	•	•	•		•			•	•			•
Linear DH Conc.	•	•	•		•		•		•	•	•		•
Ewa "X" Hybrid Conc.							•	•					
DH Curvilinear Conc.	•			•				•				•	
Ewa Courtyard Conc.		•			•						•	•	
DH Courtyard Conc.						•							
Maintains Ex. Ewa Conc.					•						•	•	
Maintains Ex. DH Conc.						•				•			
DH Satellite Conc.													
Ewa Satellite Conc.													

**Table 5-2
POSITIVE AND NEGATIVE ATTRIBUTES**

	3	3a	3b	3c	3d	3e	3f	3c/f	3g	3h	3i	3j	3k
Positive Attributes													
Meets 2030 Frontage Req.		•	•		•			•	•		•	•	
Potential Consolidated IAB													
Ewa		•	•		•1						•1	•	
Diamond Head				•				•					
Central													
Single Level Capable			•	•				•			•	•	
Double-Loaded Conc.													
Ewa	•		•	•		•	•	•		•			•
Diamond Head	•	•	•	•2	•		•	•2	•	•2	•	•2	•
Maintains OST Frontal Gates													
Ewa		•	•										
Diamond Head				•				•				•	
Maximizes Conc. Envelope													
Ewa							•	•					
Central									•				
Diamond Head				•				•				•	
Negative Attributes	3	3a	3b	3c	3d	3e	3f	3c/f	3g	3h	3i	3j	3k
Split IAB	x				x1	x	•x		x	x	x1		x
Single-Loaded Conc.													
Ewa					x						x	x	
Diamond Head				x2		x		• x2		• x2		• x2	
Eliminates OST Frontal Gates													
Ewa	x			x	x	x	x	x	x	x	x	x	x
Diamond Head	x	x	x		x	x	x		x	x	x		x
Impacts RW 4L/22R	x	x	x		x				x		x		x

Notes for Table 5-2:

- 1 Alternatives as shown represent either a split IAB or the potential for a single consolidated Ewa IAB
- 2 The Diamond Head concourse layout is only partially double and single-loaded.

5.6.1.2 Short-listed Terminal Alternatives

The initial terminal development alternatives were created to cover a variety of terminal area expansion options. These thirteen (13) alternatives, which included the "Baseline Alternative," were assessed against the initial planning criteria previously described and alternatives were eliminated that were considered less desirable or significantly deficient in their ability to meet the initial assessment criteria. The results of this initial assessment led to the initial selection of four short-listed terminal alternatives (Alternatives 3c, 3d, 3c/f) along with the "Baseline Alternative." These alternatives all provided the greatest potential to meet the programmed 2030 gate and linear frontage requirement of 78-80 gates or beyond along with an aircraft flightline frontage of approximately 13,200 to 13,800 linear feet.

After an initial review of the four short-listed terminal alternatives by the Airports District Office (ADO) of the Federal Aviation Administration (FAA) it was determined that any alternative which resulted in a reduction in runway capability (specifically the shortening of Runway 22R) would need to be eliminated or refined to mitigate any such impacts. The FAA requirement to not impact Runway 4L-22R, eliminates the original "Baseline Alternative" as well as Alternative 3d from further consideration. In subsequent discussions between the HDOT-A and the Master Plan Team it was determined that the original Alternative 3 should be modified to shorten the Diamond Head concourse in order to avoid any impacts to Runway 22R while striving to meet the ultimate Master Plan gate requirement of 78 gates. This reduced the number of short-listed alternatives down to three: revised Alternative 3, Alternative 3c and Alternative 3 c/f.

5.6.1.3 Refined Alternatives

All of these alternatives were further refined and sized appropriately based on the building program demand and future gate requirements paying special attention to: feasible phasing potential, number of operational gates, concession location opportunities, locations of APM stations and associated maintenance facility, size requirements for consolidated and split IAB scenarios, airfield safety related issues, and the location and size of the new Commuter Terminal.

Alternative 3 (Maximized). This alternative was originally named "Baseline Alternative," this was refined to maximize the site by realigning the service road running parallel to Taxiway "Z" a distance of 160 feet from the centerline and maintaining dual Group V capability allowing for the extensions of the Ewa and Diamond Head concourses along with the Mauka Pier. In order to stay in compliance with FAR Part 77¹⁴ regulations the original "Baseline Alternative's" Diamond Head concourse alignment was shortened in order for the parked aircraft tail heights to clear the safety clearance surfaces from Runway 22L. The Central Concourse was expanded to allow for a larger central concessions core and associated holdroom space for the addition of the six narrowbody gates adjacent to the garden courtyard area.

Additional major concessions nodes were created at the midpoint of the Diamond Head concourse and the base of the Ewa concourse along with a minor node in the Mauka Pier. The Diamond Head IAB was sized from the program for a split international arrivals processing operation which would keep the existing IAB in operation. As a result the remaining Federal Inspection Services (FIS) future facility requirements were contained within a single floor on the departures level along with an associated GTC adjacent to the IAB within the existing rental car facility (RAC) footprint. The Commuter Terminal was sited at a remote location

¹⁴ FAR Part 77 Obstruction Standards contained in FAA Advisory Circular 150/5360 states: A number of imaginary surfaces relating to each runway have been established in order to provide a basis of judging whether an object or building presents an obstruction to air navigation. The size of the surface is determined by the category of each runway and by the approach system used.

Ewa of the realigned Taxiway "L" and within the area of the Aloha Cargo and Hawaiian Maintenance facilities.

This alternative included five (5) APM station locations situated at key points within the terminal area complex along with APM maintenance facilities. The original "Baseline Alternative" eliminated the Overseas Terminal frontal gates resulting from the APM alignment support structures falling outside the inter-terminal concourse connector. As a result a wider concourse connector was developed which contained the APM support structures allowing the Overseas Ewa frontal gates to be retained. This wider concourse allowed for the implementation of moving walkways, garden areas, and the vertical circulation cores needed for the APM platforms.

Alternative 3 - Diamond Head "3 Pier" Concourse Option. This alternative was originally named "*Alternative 3c*" maximizes the site by realigning the service road running parallel to Taxiway "Z" a distance of 160 feet from the centerline and maintaining dual Group V capability allowing for the extensions of the Ewa and Diamond Head concourses along with the Mauka Pier. In order to maintain the effective runway length of 4L/22R this alternative maximized the land available for the Diamond Head Concourse near term and future expansion by creating a curvilinear three finger pier concourse option while maintaining dual Group V taxiway capability.

To meet the 2030 gate requirement initially only two of the three piers would be required, the Waikiki Pier and the middle concourse. If increased future air passenger demand dictated the need for an additional concourse beyond the 2030 planning horizon, the third single-loaded concourse capable of an additional eight to nine Jumbo (Group V) gates would be created.

Additionally this Diamond Head expansion creates a consolidated two level IAB connected by third level sterile corridors with moving walkways creating reasonable walking distances to the IAB from the international arrival gates. An associated GTC adjacent to the IAB is located within the existing RAC footprint. This alternative also allows for the option of a

single level consolidated IAB at the third level of the Overseas Terminal complex located at the site of the proposed two level IAB concept.

The existing Ewa IAB would have the potential to be reconfigured for Hawaiian ticketing facilities and associated offices (ATO), and airside concessions. The Central Concourse increased in program to allow for a larger central concessions core and associated holdroom space for the addition of the three Ewa narrowbody gates adjacent to the garden courtyard area. Additional major concessions nodes were created at the midpoint of the Diamond Head Concourse adjacent to the IAB and the base of the Ewa concourse along with a minor node in the Mauka Pier.

The Commuter Terminal was sited at a remote location Ewa of the realigned Taxiway "L" and within the area of the Aloha Cargo and Hawaiian Maintenance facilities. This alternative included four (4) APM station locations situated at key points within the terminal area complex along with APM maintenance facilities. The original Alternative 3 eliminated the Overseas Terminal frontal gates resulting from the APM alignment support structures falling outside the inter-terminal concourse connector. This alternative included a wider concourse connector that incorporates the APM support structures thereby allowing the Overseas frontal gates to be retained. This wider concourse allowed for the implementation of moving walkways, garden areas, and the vertical circulation cores need for the APM platforms.

Alternative 3 - Ewa "X" Concourse Option. This alternative was originally named "*Alternative 3c/f*" attempts to maximize the available terminal area land envelopes of both the Ewa and Diamond Head areas by combining the curvilinear Diamond Concourse layout with the Ewa "X" concourse configuration. The double-loaded "X" configuration and garden courtyard area replaces the existing single-loaded Ewa concourse and associated landside area in a phased approach. This alternative placed a two level consolidated IAB option Ewa of the existing IAB within the area of the existing tour group staging and parking area and extends into the Interisland garden courtyard. The existing IAB could then potentially be reconfigured for Hawaiian ticketing, ATO, and airside concessions. An associated GTC adjacent to the IAB is located within the area of the then proposed additional Interisland terminal parking garage.

Conclusion. The three alternatives were presented to the various stakeholders and to the Master Plan Technical Advisory Committee (TAC). Additional concerns were presented at the conclusion of the meetings regarding the:

- allocation of airlines;
- Agriculture re-check locations;
- feasibility of renovating and expanding the existing IAB into the current tour group staging area;
- phasing ability of the Ewa "X" concourse option;
- connectivity to a proposed remote Commuter Terminal;
- adequate parking for customers at Interisland Terminal with new Mauka Pier extension; and
- concerns of demolishing the existing central concourse concessions building.

Following the conclusion of the TAC meeting the Team re-evaluated the revised short-listed alternatives. This included eliminating the Ewa "X" concourse option due to the complexity of phasing the "X" configuration, expanding the concessions program while keeping the existing Central Concourse concessions building, analyzing new Commuter Terminal options which placed the building in the area of its current location, updating the building plans and creating phasing plans for the final short-listed alternatives which were carried forward for evaluation.

5.6.1.4 Mauka Pier / Commuter Terminal Alternatives

The "Baseline Alternative" shows a future Interisland Terminal Mauka Pier extension with a new single-loaded widebody capable four-gate concourse. This alignment displaced the existing Commuter Terminal and its associated surface parking lot. This alignment poses concerns such as:

- wayfinding issues;
- ground transportation service; and
- aircraft hardstand availability.

Three alternative concepts were developed; redeveloping the current terminal, a Y-concourse and a L-concourse.

Current Alignment. This alternative investigated the ability to develop the Mauka Pier using the alignment of the existing Commuter Terminal facility and replacing the building with a new split-level concourse capable of servicing both widebody and regional jet type aircraft. The resulting layout depicted in Figure 20 consisted of seven (7) regional ground loaded jet aircraft and a dual Group II taxilane system which replaced the existing Commuter Terminal surface parking lot and four (4) upper level loaded widebody type aircraft Ewa. The alternative did not require the realignment of any existing public roadways Diamond Head or Ewa of the facility and only required the relocation of a portion of the North Ramp hardstands.

Y-concourse. This alternative investigated the ability to incorporate the Commuter facility into the new Mauka Pier alignment by creating a "Y" layout configuration shown in Figure 21. The Ewa side of the "Y" would function as a split-level facility able to accommodate four (4) widebody capable aircraft on the outer gates and two to three narrowbody capable aircraft on the inner gates. The Diamond Head portion of the "Y" would serve the commuter operators through a ground loaded operation with its associated ticketing functions occurring in the base of the "Y". This alternative would displace the existing Commuter public parking surface lot. In order to accommodate a single Group II/III taxilane system on the inner portion of the "Y", the U.S. Postal Service Road and Elliott Street would need to be realigned. A portion of the North Ramp hardstands would also need to be relocated.

A second Mauka "Y" Pier alternative depicted in Figure 21 reconfigured the taxilane system to include dual Group III taxilanes on the Makai side of the pier with dual Group II taxilanes around the end and Mauka side of the pier. This eliminated the need to relocate the U.S. Postal Service Road and Elliott Street. The widebody type aircraft could still be accommodated by taxiing down the middle of the dual Group III taxilane system. This layout also made more efficient use of the apron area on the inner portion of the "Y" pier by creating a power-in and power-out movement area for the small commuter aircraft.

The Mauka "Y" configuration made the most efficient use of the site given the fleet mix requirements while also providing the flexibility to adapt to

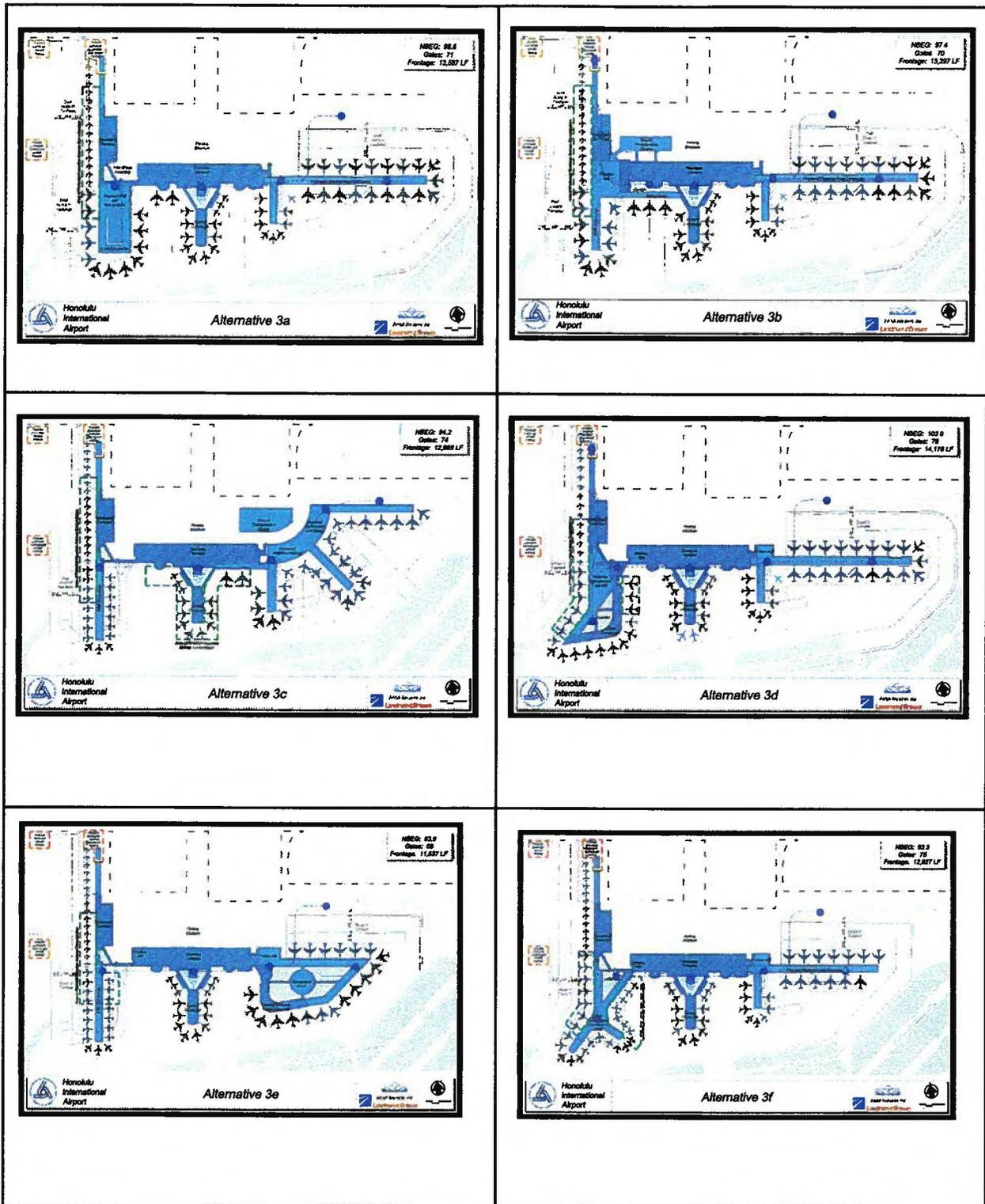


Figure 18 - TERMINAL ALTERNATIVES

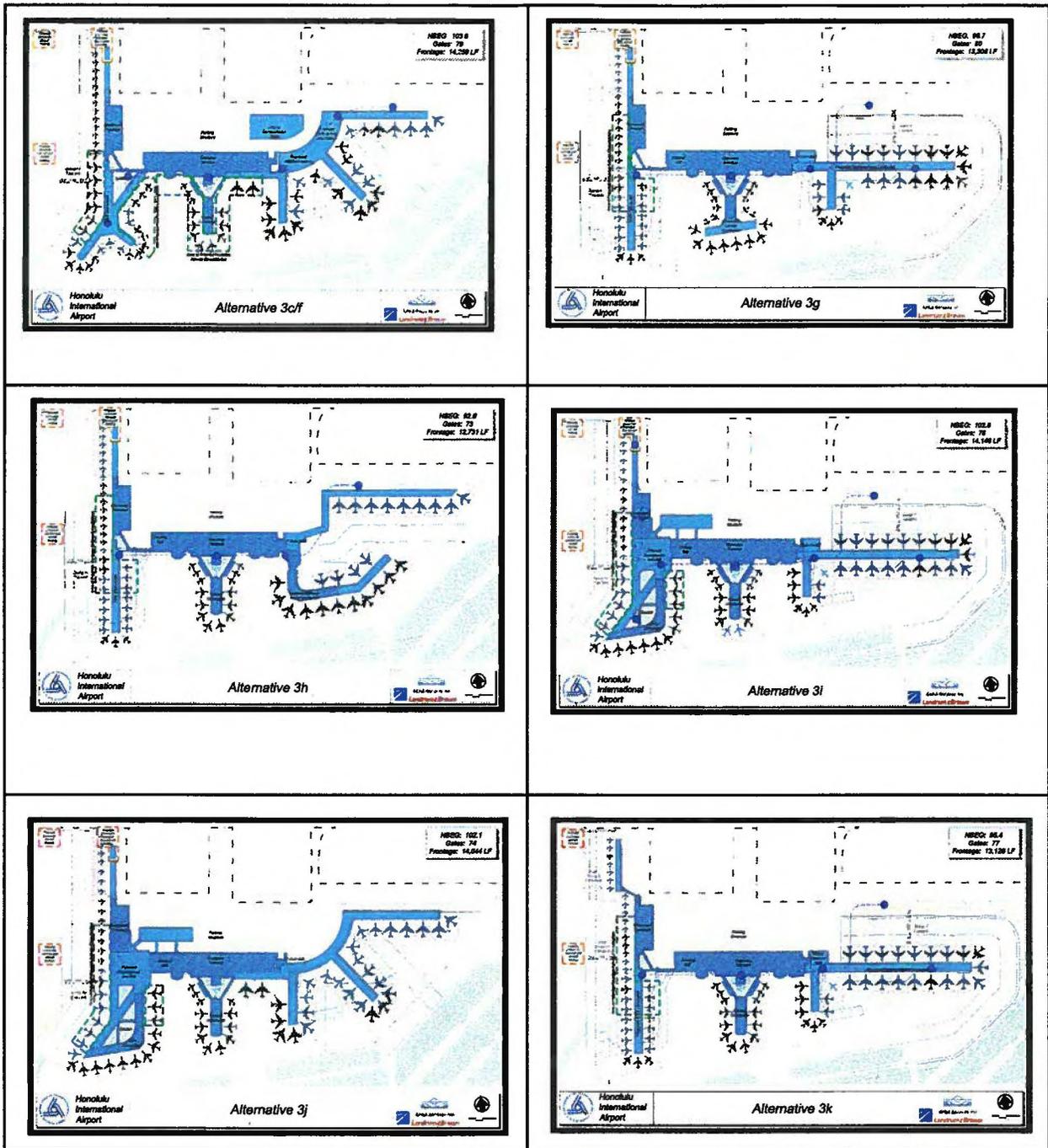


Figure 19 - TERMINAL ALTERNATIVES

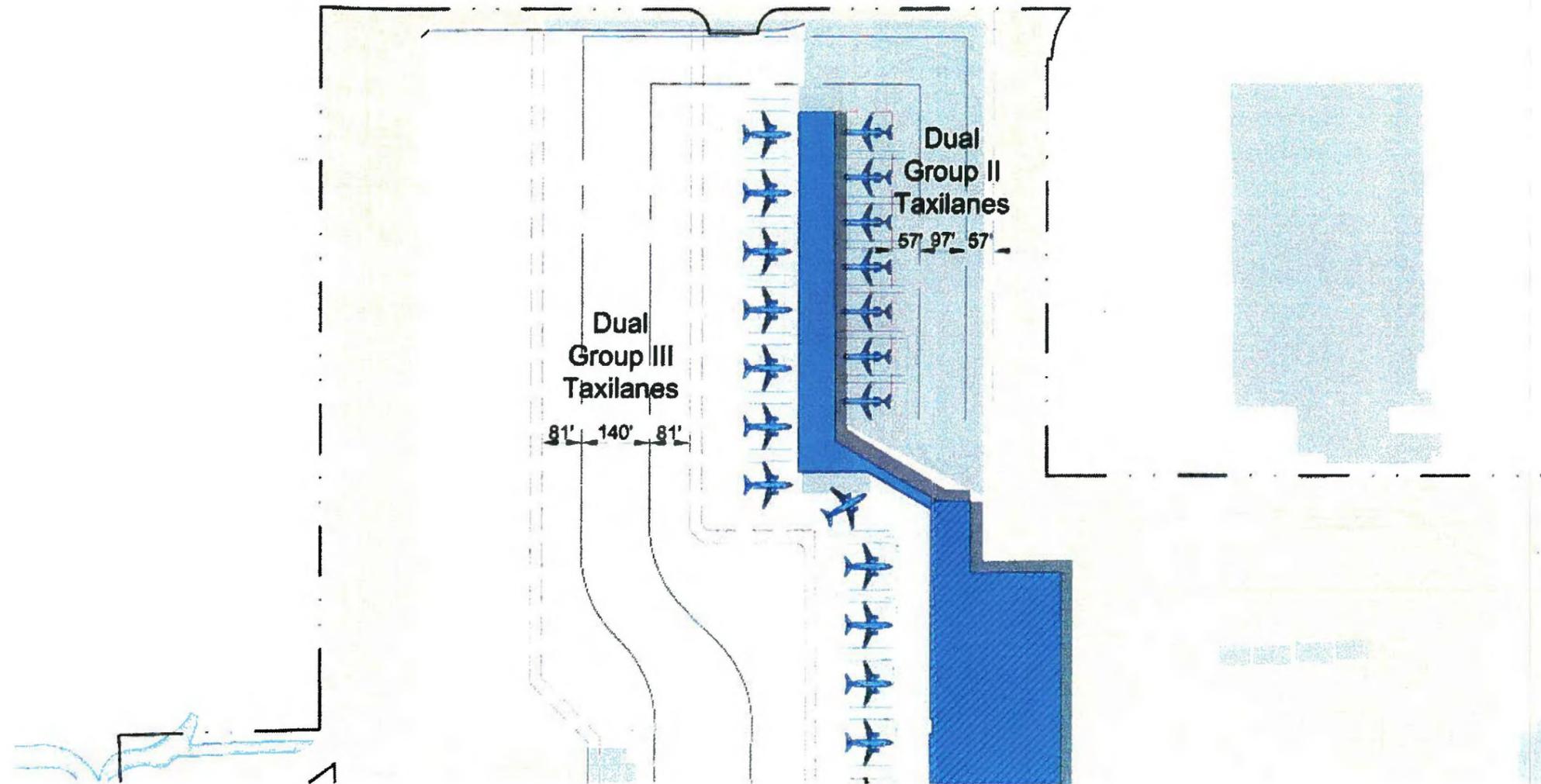


Figure 20 - DOUBLE LOADED LINEAR MAUKA PIER

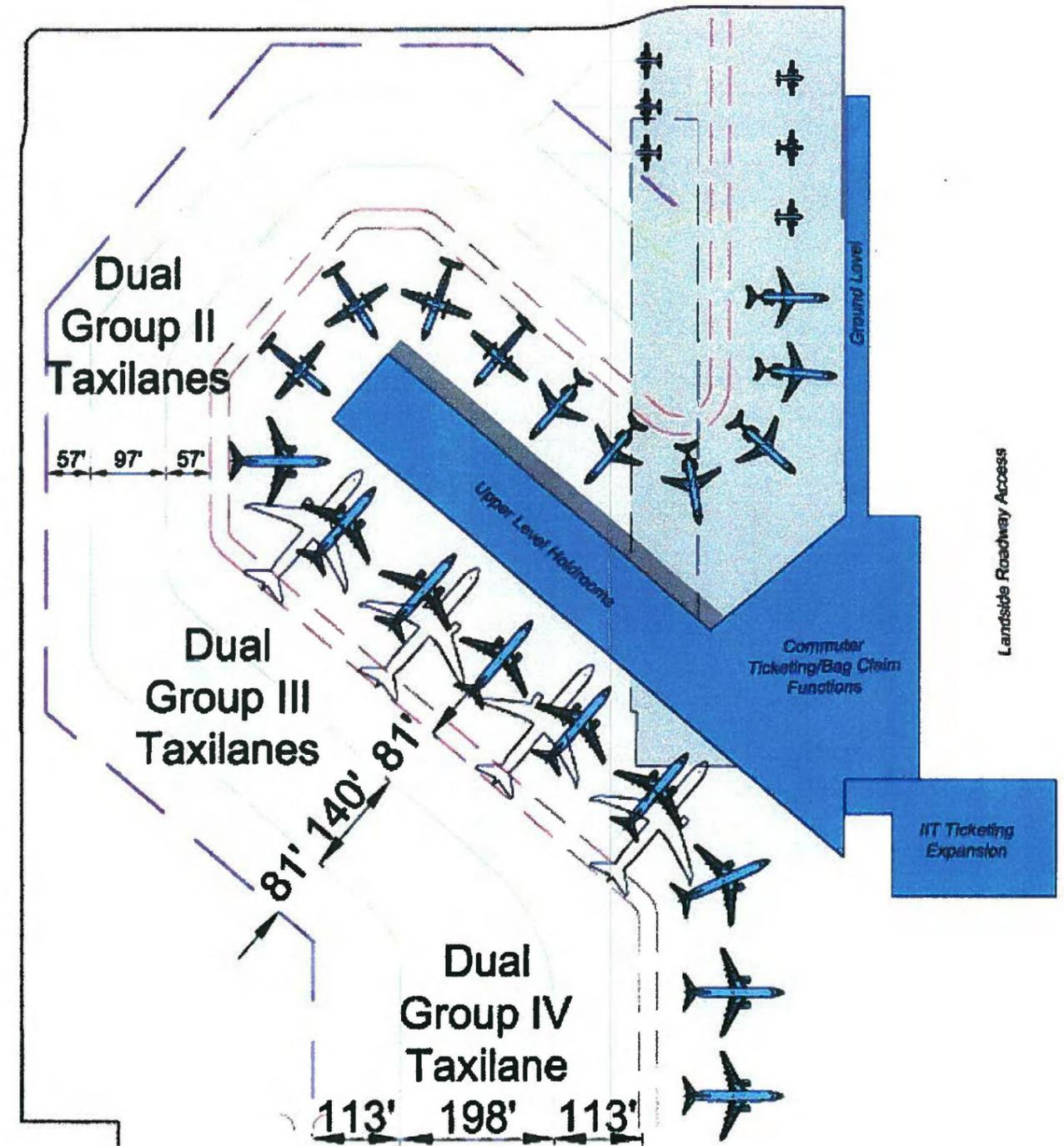
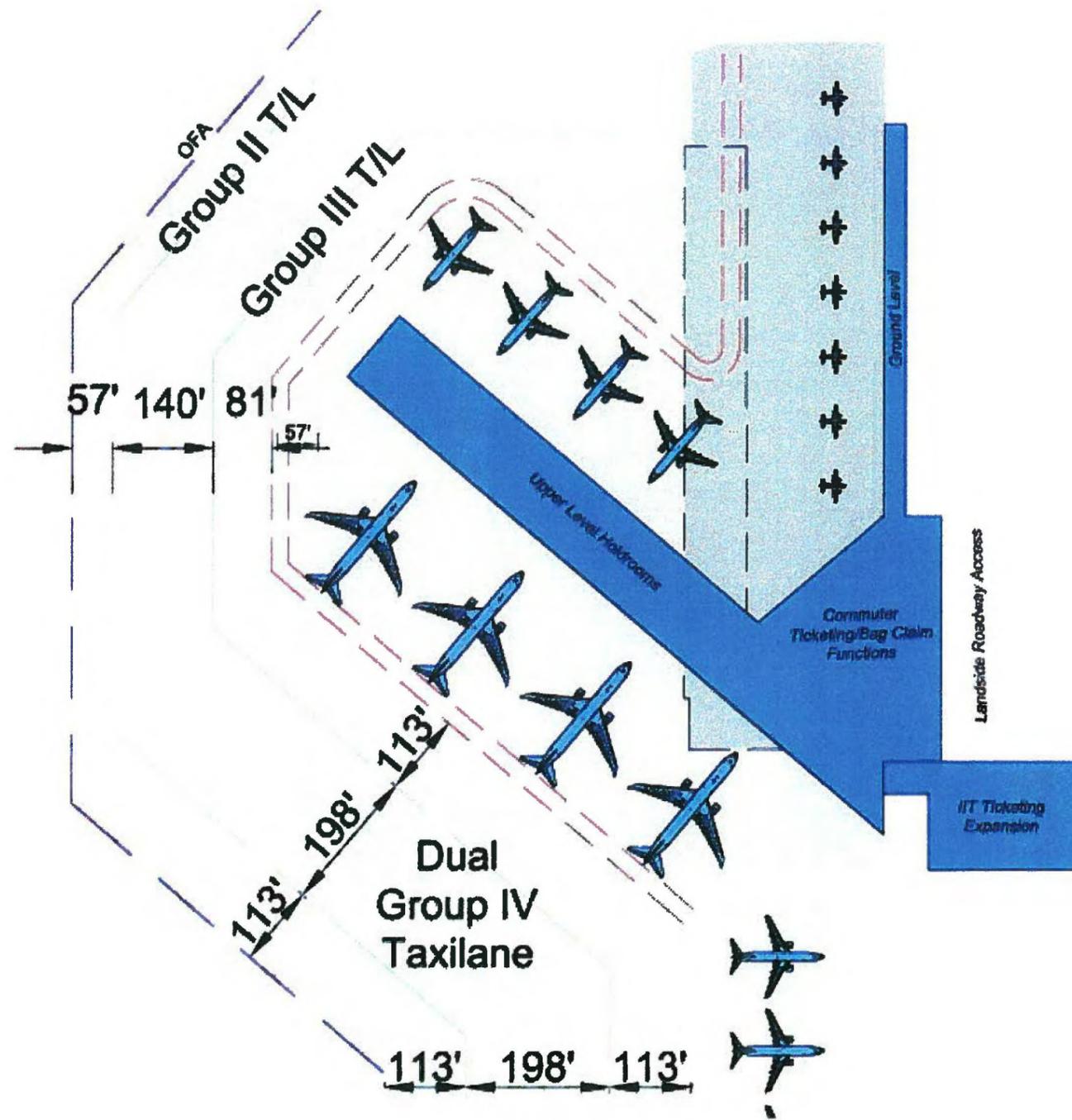


Figure 21 - MAUKA PIER Y-CONCEPTS

changing airline operations and aircraft types. The area allotted in the "Baseline Alternative" for the remote commuter terminal would be now used for replacement aircraft hardstands.

L-Concourse. This alternative was developed by the PM/MA teams as a refinement of the Y-Concourse and presented in Figure 22. The L-Concourse allows for five widebody or 10 narrowbody aircraft gates on the Mauka Pier. The dual taxilanes would demolish the aircraft hardstands along Elliot Street, and would require the remote commuter terminal on Elliot Street.

5.6.1.5 Alternative Alignment

To simplify the naming convention, the final two alternatives were renamed to:

- **Terminal Redevelopment Concept A**, which is the revised "Baseline Alternative," or the "Alternative 3 (Maximized)," and further refined by the PM/MA teams; and
- **Terminal Redevelopment Concept – B** and "Alternative 3c" or the "Diamond Head three pier concourse option."

Additional refinements were also made to the building floor plans including:

- adjustments to the location and area for concessions in order to maximize future revenue potential;
- the Ewa concourse was reconfigured as a split concourse allowing for the possible consolidation of the Hawaiian Airlines' operation, which,
 - allowed for the segregation of arriving interisland passengers transferring to Overseas flights within the same concourse, and
 - would force all arriving passengers requiring agriculture inspection to be screened at the Ewa end of the inter-terminal concourse connector before traveling onto their Overseas gate locations; and

- the security screening checkpoints were also consolidated into three major areas within the Overseas Terminal located at the Ewa, central, and Diamond Head areas of the terminal.

5.6.1.6 Short-term and Long-term Development

As the HDOT-A's Modernization Plan is being developed to meet the 2020 requirements in the short-term and then to meet long-term and ultimate development in the future. The concepts are shown in the two phases to meet the forecast gate requirements for 27 MAP (2020) and 33 MAP (2030). It should be noted that these alternative phasing plan analyses along with their pros and cons were conducted before the closing of Aloha Airlines and as such, any reference to "Aloha" may change as a result of this action. General phasing objectives were identified to guide the phasing processing and are listed below:

- Represent a Master Planning level of phasing through to ultimate configuration (2030 and ultimate gate capacities)
- Primarily focus on achieving the 2020 facility requirements as the first build capacity target
- Strive for sufficient gate and fleet mix capacity during phasing while maintaining ongoing operations for 29 widebody and 12 narrowbody aircraft
- Attempt to consolidate Hawaiian and Aloha's individual operations as early on as possible through a single relocation that expands over time
- Bring on new and improved concessions program early in building phasing process
- Attempt to maintain an appropriate balance between existing facility infrastructure capabilities and demand (i.e. keeping the Interisland Terminal as a dedicated interisland operation and limiting aircraft size to no larger than narrowbody jets in order to minimize impacts to the Interisland Terminal curbs and roadways)
- Maintain a single contiguous area for Interisland Terminal activity to assist in simplifying the agricultural inspection process

- Timing of future APM linked to construction of pieces of the connector core for its rail supports and stations
- Strive to maintain frontal gates and walk-to-gates

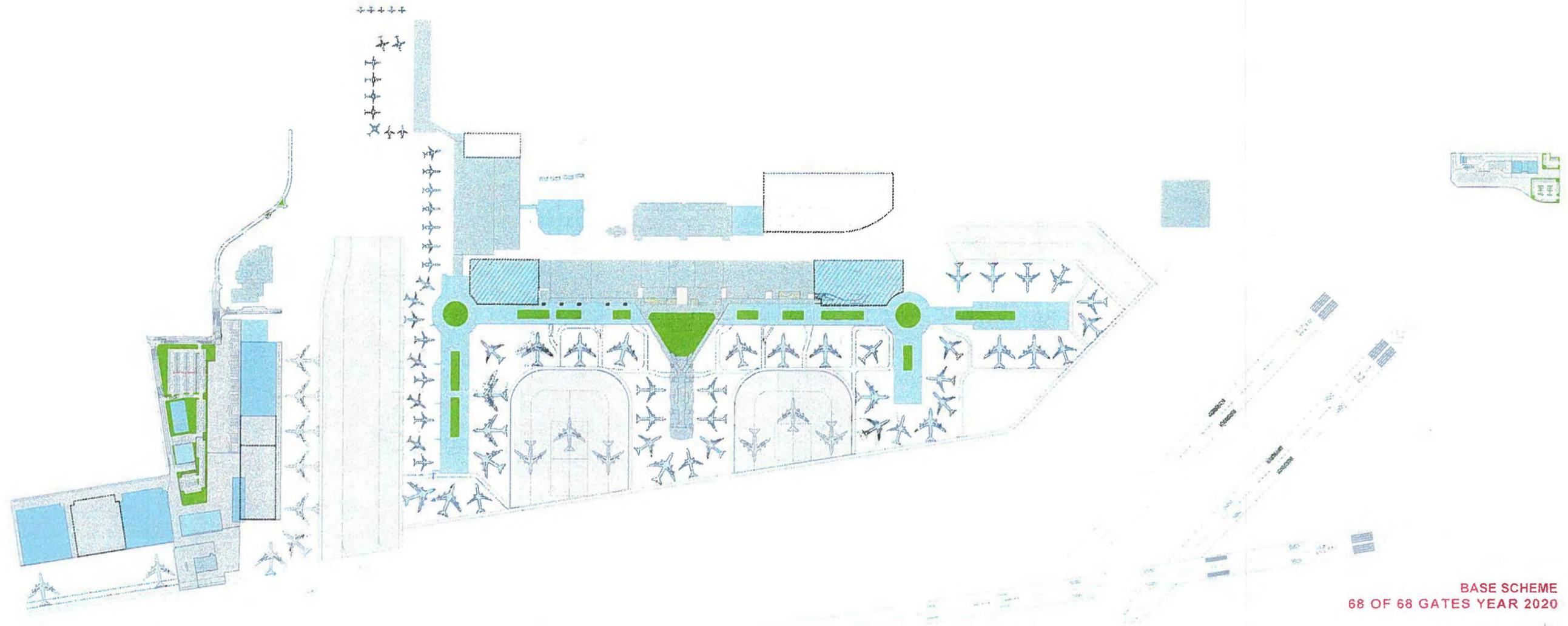
The initial construction cost estimates on the Master Plan versions of the "Baseline," Concept A and Concept B, are summarized Table 5-3, for the short-term and long term improvements. The methodology used in preparing the costs are the same as that used in the Terminal Modernization Plan (2005)¹ for each alternatives, and the cost is based on 2005 dollars. The construction estimates are similar for the three alternatives.

Table 5-3
COST COMPARISON OF THREE SHORT-LISTED ALTERNATIVES

Alternative Concept	Ultimate Gate Count	Total Cost (\$ millions)	Initial Phase Cost (\$ millions)	Later Phase Cost (\$ millions)
"Baseline"	87	2,407	1,643	764
Concept A	79	2,313	1,653	661
Concept B	87	2,568	1,694	873

Terminal Redevelopment Concept A. The Terminal Redevelopment Concept A, was further refined by the Master Architect team, as the Terminal Area Plan. The initial Phase 1 development plan depicted in Figure 23, constructs a portion of the new Ewa concourse consisting of four Jumbo capable gates while maintaining the operational use of the existing Ewa concourse gates. A new garden and concessions node is included in this first phase of the new Ewa concourse.

The Central Concourse and apron area are planned to be renovated to serve 7 widebody and 1 jumbo aircraft. The demolition and construction of the new Diamond Head concourse and associated Waikiki Pier has the capacity fo 17 gates, 13 widebodies to 4 jumbo capable.



BASE SCHEME
68 OF 68 GATES YEAR 2020

Figure 23 - CONCEPT A - PHASE 1 (27 MAP)

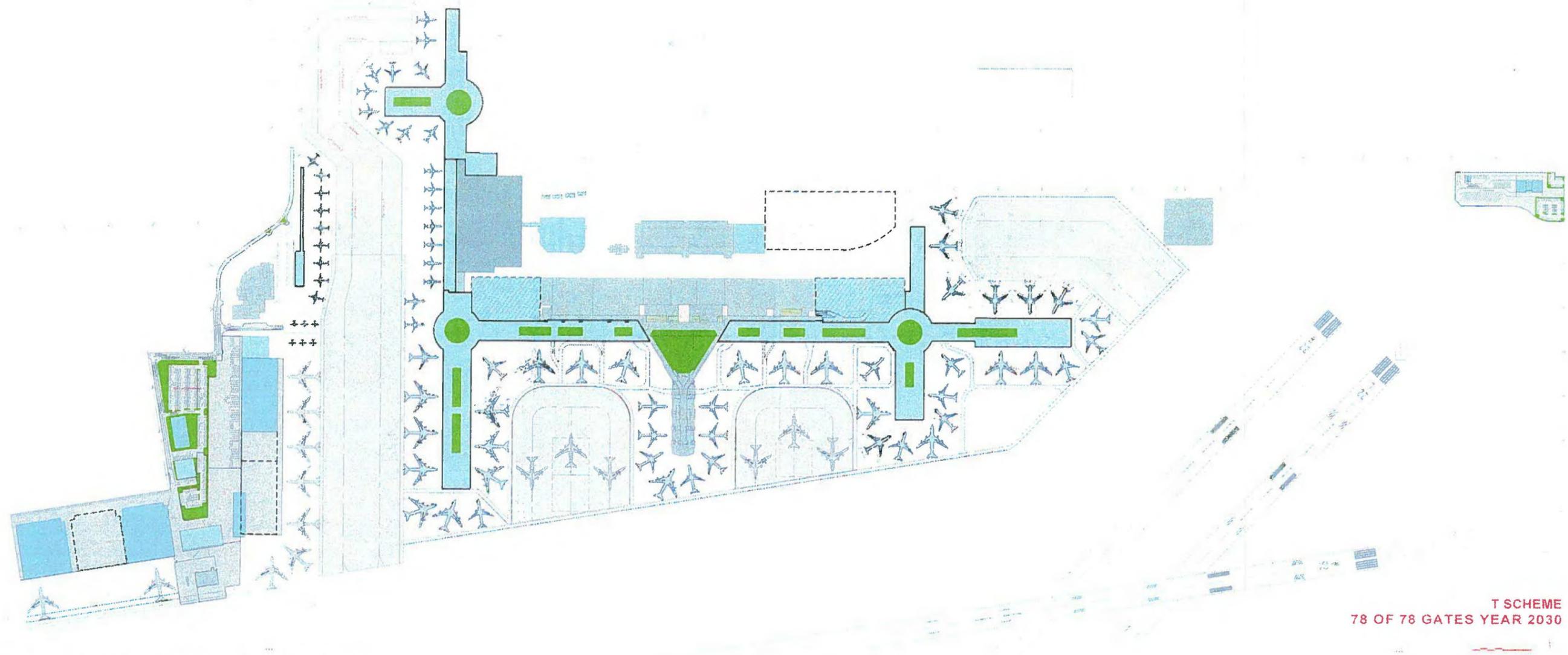


Figure 24 - CONCEPT A - FINAL (33 MAP)

A single Group IV or dual Group III taxilane structure north (mauka) the new Diamond Head concourse would serve 4 to 5 Design Group IV aircraft gates. The construction includes a new central node consisting of a garden area and concessions core along with additional garden areas along the central spine of both the Diamond Head concourse and Waikiki Pier. A triple taxilane between the new Waikiki Pier and newly renovated Central concourse is capable of simultaneous Group V aircraft operations. This taxilane structure under this plan would allow for the center taxilane to be used for all arriving aircraft with the outer taxilanes utilized for the pushback of departing aircraft increasing operational efficiency and minimizing any potential aircraft taxiing delays. An Overseas Terminal (OST) Parking garage expansion onto Lot F would also be included in this initial development plan of projects to accommodate additional public and employee parking capacity. The existing Commuter Terminal apron area would be capable of serving 5 small commuter and 8 medium to large commuter type aircraft.

A new triple Group V taxilane structure Diamond Head the new Ewa concourse places the Central Concourse equidistant from the Ewa and Diamond Head Concourse nodes. This taxilane structure increases operational efficiency and minimizes any potential aircraft taxiing delays. Construction of the new inter-terminal connector and frontal gates between the Interisland Terminal (IIT) and OST consisting of 2 jumbo Ewa frontal gates along with 1 jumbo/A380 flex gate and 3 jumbo DH frontal gates would be completed along with the construction of the new Automated People Mover (APM) system. The straightening of Taxilanes "G" & "L" would allow dual Group IV capability.

The TAP Phase 2 plan depicted in Figure 24 consists of a new Elliott Street Commuter Terminal providing 15 gates consisting of 6 small commuter and 9 medium to large commuter type ground loaded aircraft parking positions with the ability to load passengers via fixed bridges to the regional jet type aircraft. A new "L" shaped two level "Mauka 1" Concourse and concessions/garden node consisting of 10 narrowbody type aircraft would be constructed for use by IIT flights while allowing the flexibility for regional jet type aircraft to park at the concourse.

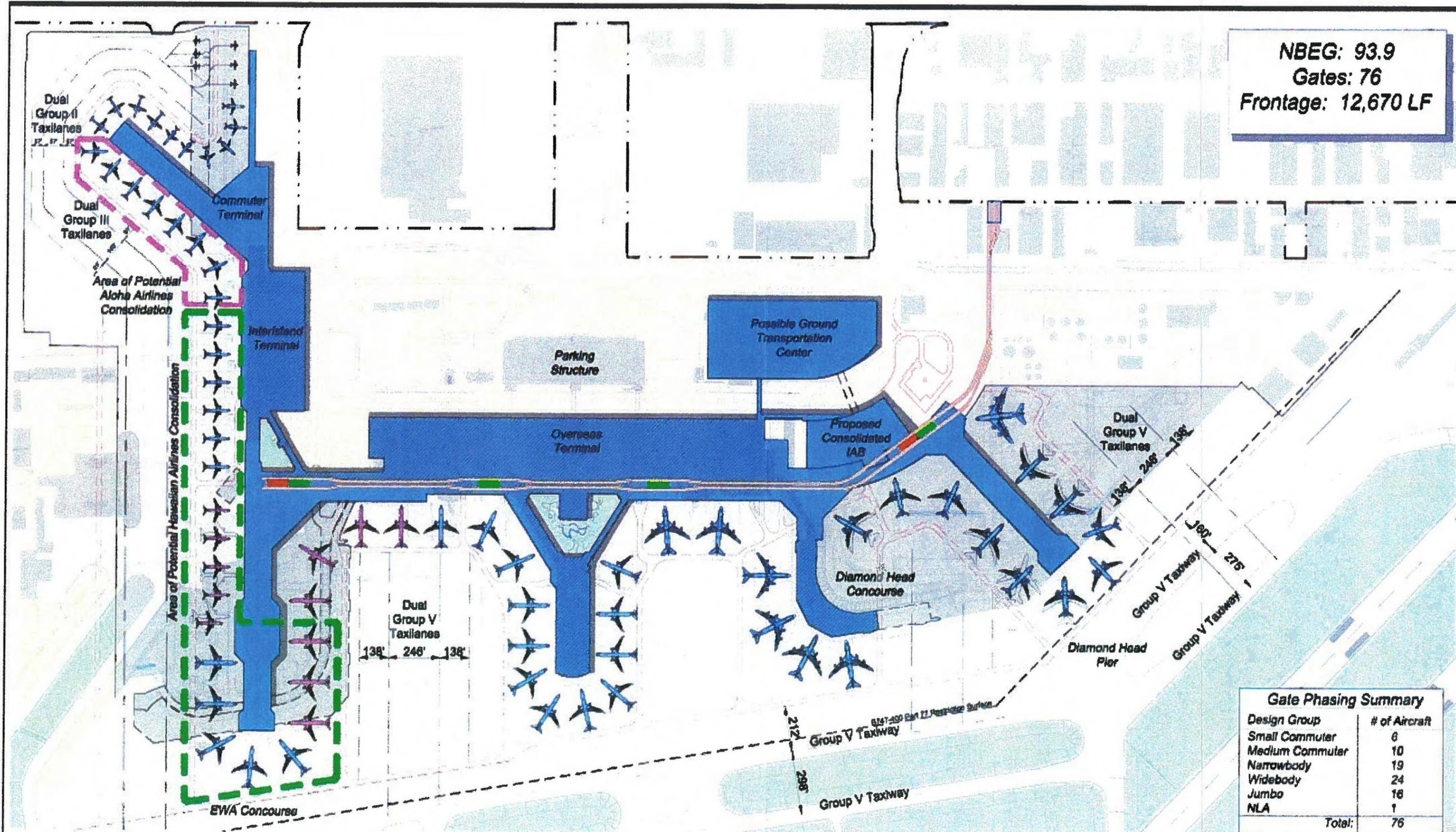


Figure 25 - CONCEPT B - OPTION A (27 MAP)

The IIT is proposed to be renovated and expanded to include additional check-in and baggage claim area on the north (mauka) side of the terminal to accommodate the additional gates included in the new Mauka "L" concourse. The existing holdrooms are proposed to be widened westward (Ewa) to allow for more generous area to accommodate the flexibility of the gates to be used by widebody type aircraft. The associated "G" and "L" taxiways would be modified to allow for dual Group IV aircraft maneuverability.

A single loaded Diamond Head "Mauka 2" extension placed at the central node would allow for 2 additional widebody type aircraft totaling 19 available gates. The existing fuel farm would be relocated to allow for the reconfiguration of the single Group IV to dual Group V taxiway capability to serve the widebody and jumbo capable gates.

Because of HDOT-A policy to maintain the operation of the existing Ewa International Arrivals Building (IAB) into the foreseeable future with no construction or expansion of facilities until Phase 2 the TAP reserves sites on both sides of the OST for IAB use in order to maintain the flexibility for future planning alternatives. The MA recommends a future planning study be conducted to analyze the program requirements at the 27 and 33 MAP levels and evaluate the advantages and disadvantages for each alternative in order for HDOT-A to meet a consensus for the most appropriate location for the expanded or new IAB locations.

The APM stations and guideway structure in the TAP includes a series of domestic and international stations to be located along the spine of the new "Connector Building," and located on a third level. The "Connector Building" would place four (4) center platform Domestic stations located above the garden spaces along with an additional platform located east (Diamond Head) of the Waikiki Pier. Also included are three sterile International platforms with one located at the existing Ewa IAF entrance, one Diamond Head of the Waikiki Pier, and one at the Diamond Head node. This configuration also allows for the potential construction of a DH IAB location. The system could also be extended to serve the IIT and Mauka 1 Concourse in future phases.

Terminal Redevelopment Concept B. Two phasing options were prepared for Concept B. Option A would allow for the consolidation of the Aloha Airlines' and the Hawaiian Airlines' operations early in the process and defers the construction of a new consolidated IAB until the end of the 12-year plan (2018/2020) and shown in Figure 25. Option B builds the new consolidated IAB early in the process and also tries to provide for the consolidation of Aloha Airlines and Hawaiian Airlines operations. Option B is shown in Figure 26. The 2030 development is shown in Figure 27.

Concept B allows for further expansion of the Diamond Head Concourse and International Arrivals Facility for future (beyond 33 MAP) capacity. This maximizes the use of the terminal envelope on the Diamond Head side and relocates the fuel farm, and the Delta and United Airlines cargo facilities. The ultimate (beyond 2030) terminal development is shown on Figure 28 and a 3-dimensional rendering is shown on Figure 29.

Both options preserve the existing Runway 4L/22R. Both options build the new IIT Mauka Pier and Commuter Terminal in the first phase. Both options would then relocate the IIT Makai Pier gates to the new IIT Mauka Pier, demolish the Makai Pier, and build part of the new Ewa Concourse. Under both options, the Ewa Concourse gates 31-34 would then be demolished, and the rest of the new Ewa Concourse built.

5.6.1.7 Evaluation of Final Two Alternatives

An initial step in the Master Plan evaluation of the final short-listed alternatives included identifying the pros and cons for each of the three remaining terminal alternatives. These pros and cons were presented to HDOT-A and other key stakeholders in July of 2007. Additionally, as part of the Airport Master Plan study, a more detailed evaluation assessment was performed that included the identification of criterion and the utilization of a weighted evaluation matrix. Both of these performance assessment techniques were used by the Master Plan Team to determine its preferred terminal alternative. The following presents the pros and cons, for the short-listed alternatives.

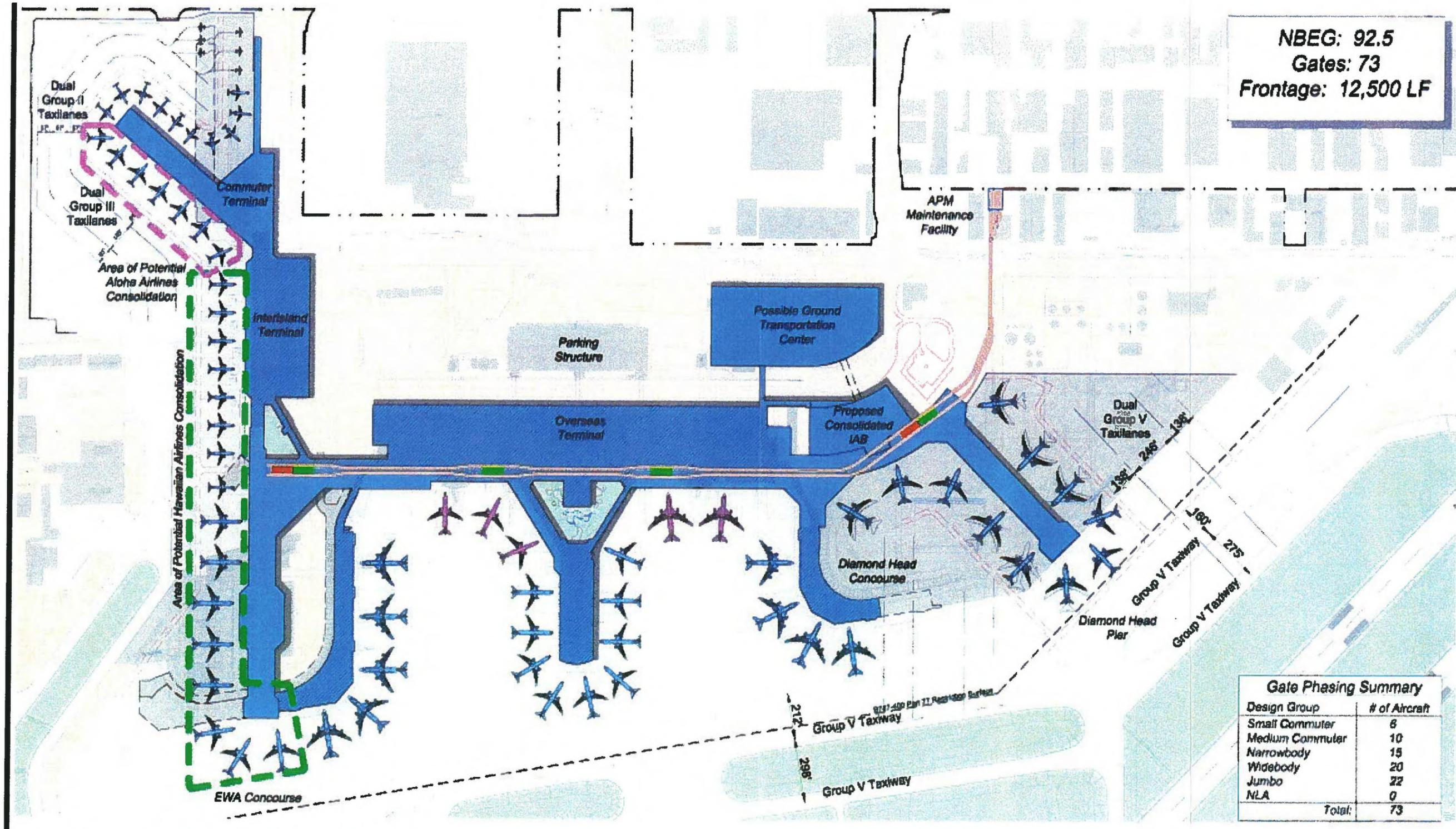


Figure 26 - CONCEPT B - OPTION B (27 MAP)

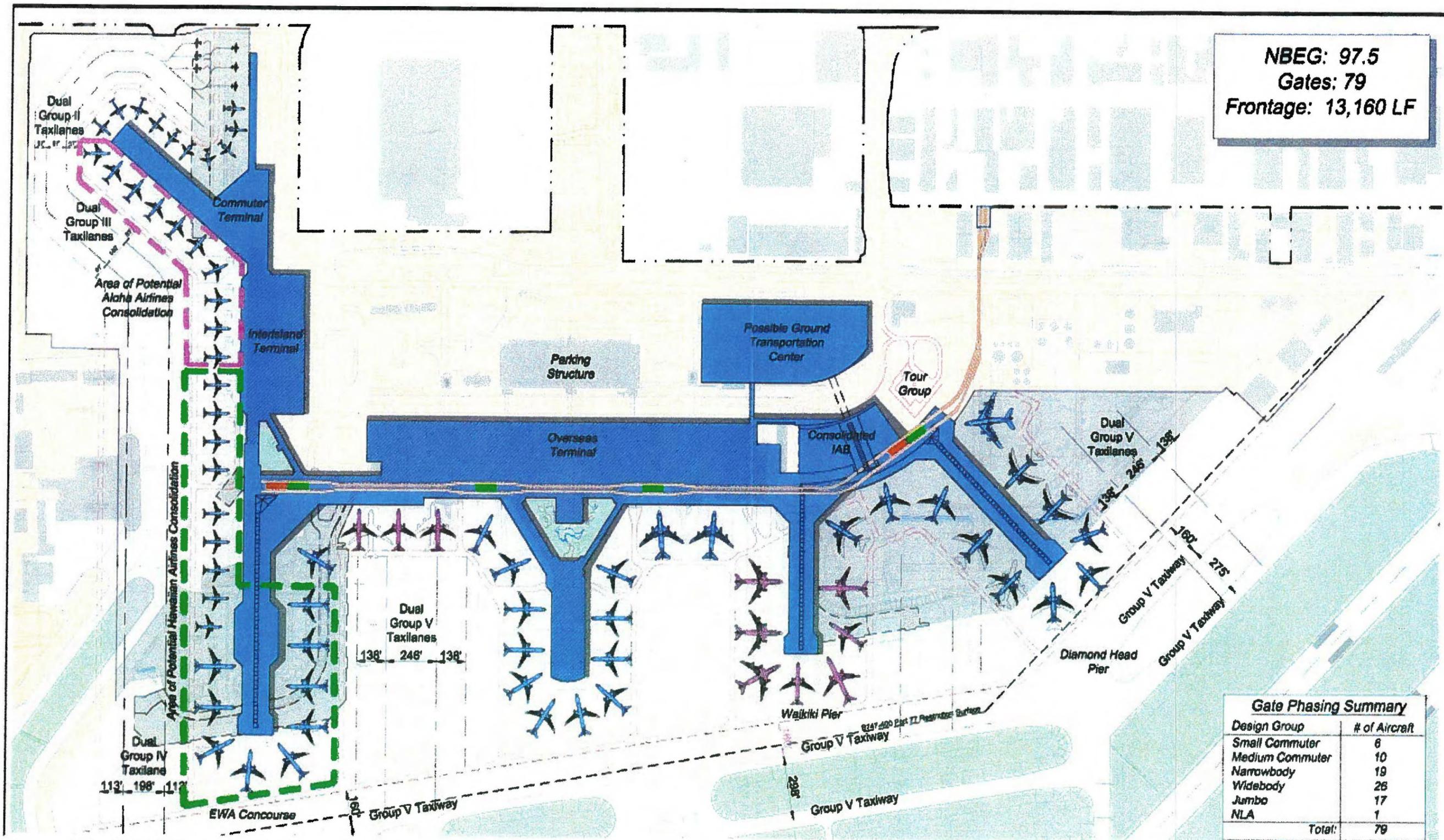
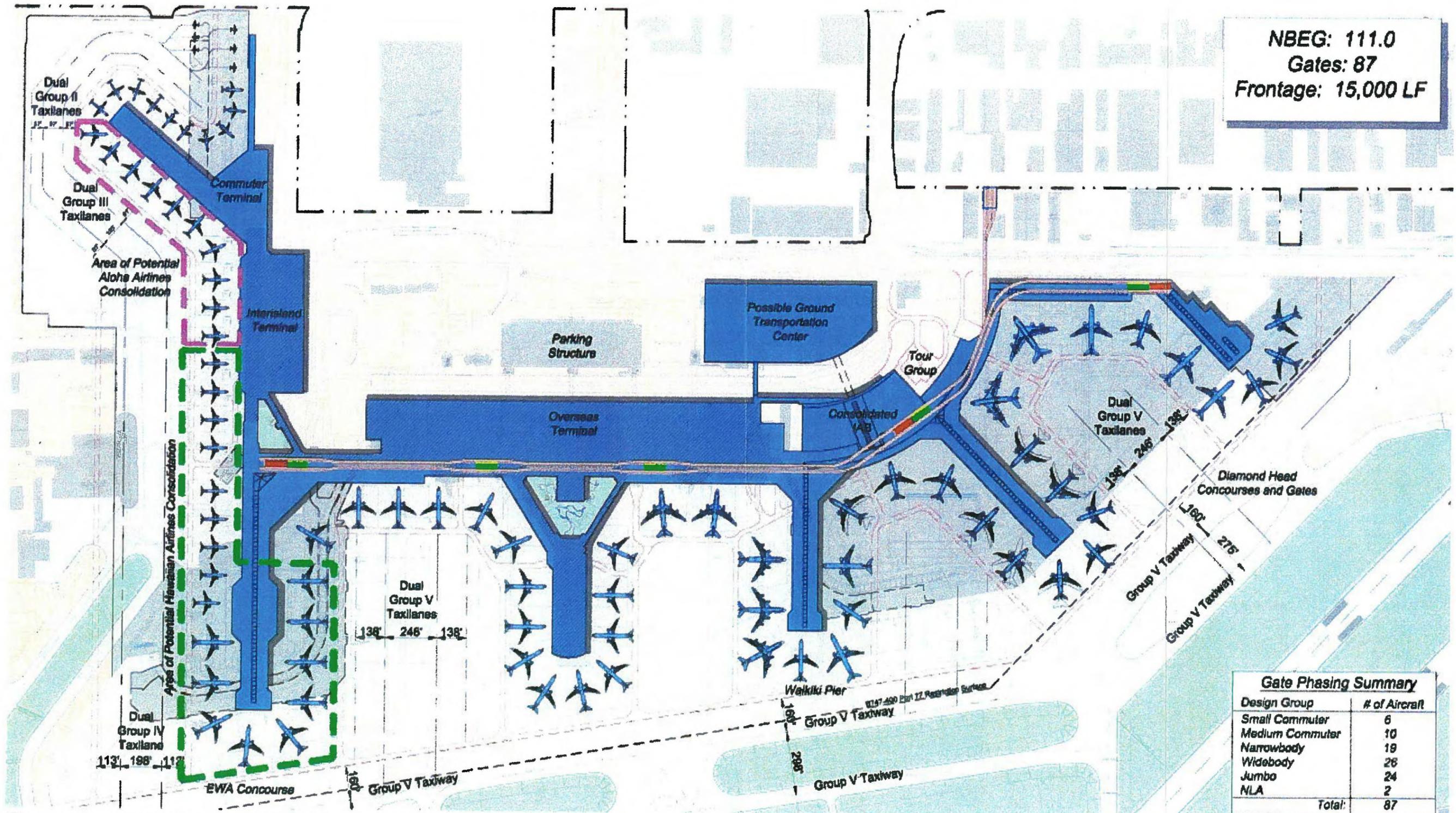


Figure 27 - CONCEPT B - 33 MAP



NBEG: 111.0
 Gates: 87
 Frontage: 15,000 LF

Gate Phasing Summary	
Design Group	# of Aircraft
Small Commuter	6
Medium Commuter	10
Narrowbody	19
Widebody	26
Jumbo	24
NLA	2
Total:	87

Figure 28 - CONCEPT B ULTIMATE (BEYOND 2030)



Figure 29 - CONCEPT B ULTIMATE (BEYOND 2030) - RENDERING

Terminal Redevelopment Concept A (Shortened Diamond Head Concourse)

Pros:

- Existing Runway 4L/22R remains
- Creates mostly double-loaded concourses
- Primarily straight building façade may provide slight reduction in cost
- Initial phases avoid impacting fuel farm
- Revised alternative retains Terminal frontal gates

Cons:

- Calls for split IAB in the long-term or additional studies
 - Problematic with CBP agencies
 - Wayfinding issues for meeters and greeters – which facility will their passengers be arriving
 - Arriving passengers may get confused over which APM platform to use – recovery will be difficult if passengers realize their error once they pass primary inspection
 - Any longer term expansion of 2nd IAB towards Diamond Head side will cause the loss of gate capacity
- Difficulty maintaining a sufficient number of gates during phased construction
- If Aloha is located to gates in the central concourse arriving destination passengers will need to be segregated to landside
- Long term Diamond Head concourse may not provide best arrangement to maximize concessions revenues
- Less overall gates during phased construction and in ultimate buildout
- Requires the demolition of the fuel farm and Delta Air Cargo to meet the 78 (2030) gate requirement.

Terminal Redevelopment Concept B

Pros:

- Existing Runway 4L/22R remains

- Provides direct walking to/from all large aircraft gates to a single IAB facility
- Appears to maintain a higher number of gates during phased construction
- Diamond Head IAB site has ability to expand in longer term without negatively impacting gate capacity
- Single, consolidated IAB provides better utilization of staff and ability to meet peaks
- Does not require mitigation of asbestos on current IAB during on-going ops
- New IAB on Diamond Head side opens up current existing IAB for potential domestic Overseas operation – possibly Hawaiian
- Retains Overseas Terminal frontal gates
- Does not require the relocation of Delta Cargo and the Fuel Farm to meet the 2020 requirement

Cons:

- Diamond Head IAB locations puts a greater distance between connections to/from IIT
- New IAB construction will add more costs to program whenever undertaken
- Curved APM maybe more expensive, but may not be needed for 78 gates
- Concourse cul-de-sac may create some pushback conflicts

5.6.2 Landscaping

5.6.2.1 Cultural Gardens

Due to the age and to increase passenger interaction, a major renovation to the Cultural Garden, which are located in the Y-portion of the Central concourse, is planned with the following concept:

- Demolition of the existing building (Garden Conference Rooms) at Main Concourse.

- Improves visual and user access to the gardens from the concourse level.
- Creates stronger visual statement and observation of the gardens below.
- Allows for more natural light and air.
- Major renovation of the cultural gardens.
 - Retain the essential features and design themes of the original plan.
 - Renovate soil.
 - Replace irrigation systems
 - Selective removal or replacement of existing trees.
 - New plantings.
- Create a central Gathering Place or Great Lawn area.
 - Large grassed area to create a sense of green open space.
 - Enclosed by Coconut planting (Coconut Grove).
- Develop a performance venue.
 - Serves as an activity node or focal point.
- New/Expanded Restaurant.
 - A new or expanded restaurant is proposed at the Central Concourse facing the gardens.
- Major renovation of the existing water feature system.
 - Convert existing well system to re-circulating water feature.
 - Provide for living systems to allow for fish and plants.
 - Replace equipment, e.g. pumps, filters, etc.

Two variations of the cultural gardens renovation are proposed and described as **Concept A** and **Concept B**.

Concept A is shown in Figure 30 and includes an observation area immediately off the main concourse level where travelers can enjoy a full view of the gardens. A Hawaiian culture-inspired artwork feature acts as

a focal feature to gather around. The water feature element is brought up to the concourse level as another feature element that then cascades dramatically to the lower level and ties into the ponds below.

Similar to the original garden plan, the lower ponds are connected and form a unifying feature for all of the cultural gardens. At the restaurant, outdoor dining areas, possibly terracing down to the garden level, are proposed to enhance user enjoyment of the gardens.

Concept B is shown in Figure 31 and proposes using the area directly off the main concourse as an observation area, but also allows for a more direct access to the gardens via a grand stairway. Artwork is also incorporated as visual focal points.

A water feature/waterfall at the restaurant across the gardens provide a distant focal feature and attraction to entice users to enter the lower garden space. While water continues to be used as a unifying element, this concept proposes three separate water features, each tied to its respective design theme. A water feature is proposed at the main level in conjunction with the new/expanded restaurant at the central concourse. A dramatic waterfall serves as a focal feature from the main concourse.

5.6.2.2 Other Significant Gardens

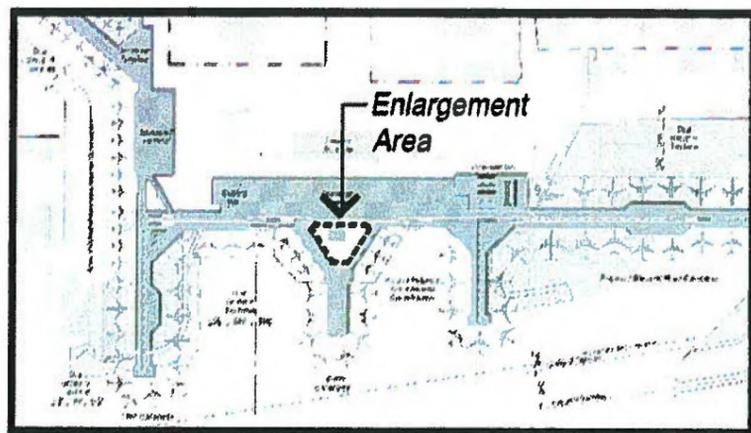
In addition to the Central Gardens, there are other gardens located throughout the HNL that require renovation as well. The largest of these gardens is the Memorial Garden, located at the Inter-Island Terminal, which serves as a pleasant outdoor venue for travelers. Numerous smaller gardens occur at other arrival and departure areas and add significantly to the HNL experience.

5.6.2.3 Master Architect Terminal Landscaping Concept

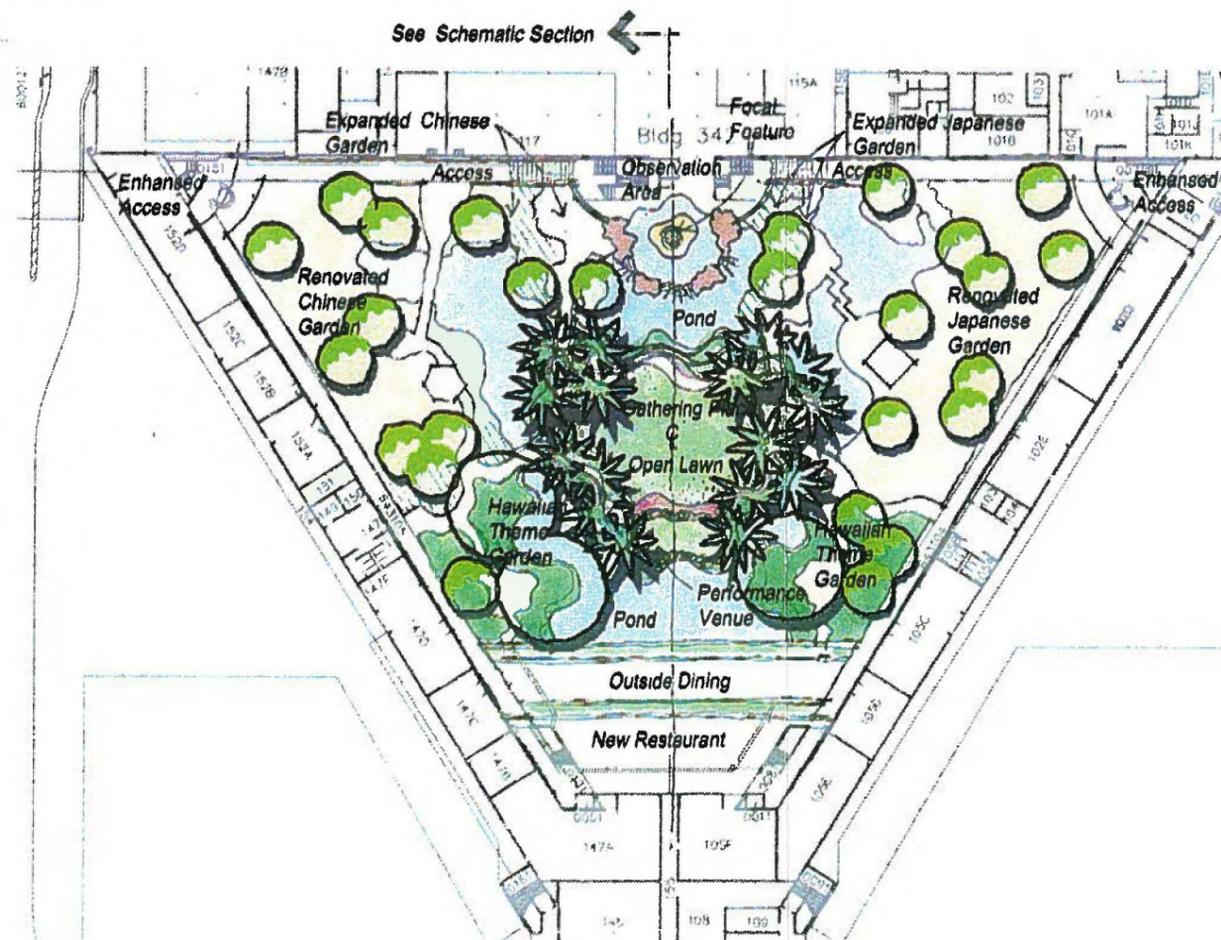
The internal concourse circular nodes of the "Baseline Alternative" are described by the Master Architect as the "crossroads" or "meeting places" located at the intersection of the new concourses. These areas are



Schematic Section
not to scale

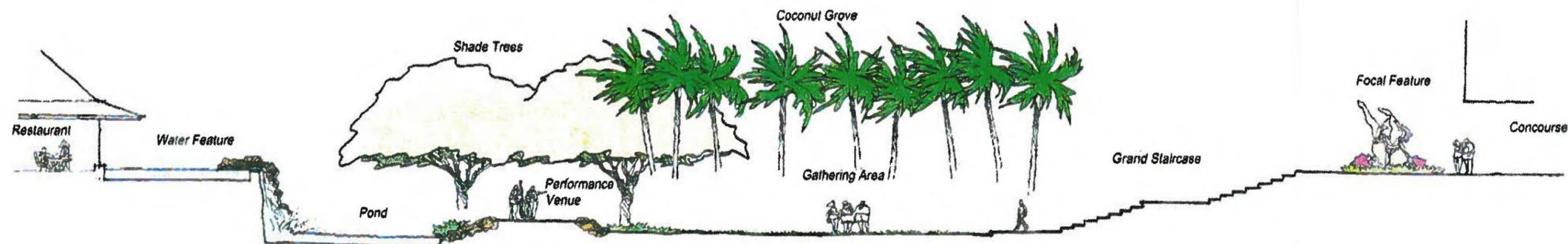


Key Map
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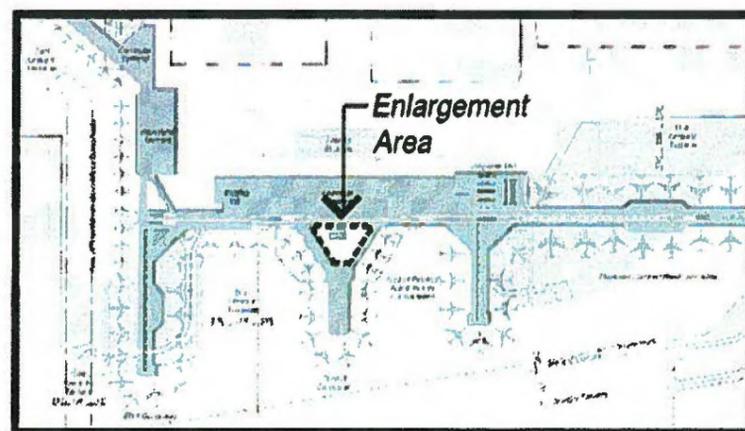


Schematic Section
not to scale

Figure 30 - CULTURAL GARDEN RENOVATION CONCEPT A



Schematic Section
not to scale



Key Map
not to scale



Schematic Section
not to scale

Figure 31 - CULTURAL GARDEN RENOVATION CONCEPT B

envisioned to tell the history of the Hawaii story of "voyaging" and "settlement" through a combination of new ground level garden areas, interpretive displays, and signage. Located on the departures level, the concession areas, gate holdrooms, and passenger circulation areas that are located along the perimeter of these nodes overlook the new large ground level garden areas. Passengers would also be able to walk down into these garden areas from the departures level.

5.7 GROUND TRANSPORTATION

The traffic demand forecasts shows that within the planning period additional public and employee parking will be needed, and the "Baseline Alternative" removes all employee parking within the terminal area. In addition, other ground transportation concepts are being proposed such as the City and County's light rail system, a consolidated rental car facility, and international arrivals ground transportation service court.

For the most part the public parking, rental cars, rail transit station and ground transportation service court would be with the area bounded by the frontal roadway on the Ewa (West), Diamond Head (East) and Makai (south) sides and Aolele Street on the Mauka side (North). The HDOT-A should consider this as a Ground Transportation Complex as it currently and in the future will accommodate the various ground transportation alternatives. The following presents specific alternatives to the various uses or facilities within the Ground Transportation Complex.

5.7.1 Public Parking

The public parking demand in the terminal area is forecast to increase from 3,880 to 5,799 within the planning period. Currently, the HDOT-A is constructing a 1,800 stall parking structure, to provide a total of 5,335 parking stalls. This total includes the closure of LOT B, fronting the commuter terminal, as slated in the "Baseline Alternative."

One alternative is to construct additional parking floors on the existing Overseas Terminal parking structure. A limited structure analysis was conducted on the Overseas Terminal parking structure which showed that

it can accommodate additional floors or additional loading. If two additional floors of parking is added and the existing 417 employee parking stalls removed, the total available public parking would be 6,782 and would exceed the forecast public parking demand in the planning period. This additional parking is not required until approximately 2025.

An alternative use of the additional floors on the parking structure is being considered in the Master Plan, which is the potential location of the City and County of Honolulu rail station. If this is the case, additional parking may be needed to meet the future demand. However, the proposed City and County of Honolulu rail system links the Airport to the Downtown and Kapolei. The rail system has the potential to reduce the demand on public parking, especially for day-trippers taking interisland flights. The use of the rail system by the flying public for longer trips will be dependent on the baggage policies of the rail system. HDOT-A should monitor the use of the parking situation once the rail system is operational to see if the parking demand changes.

A second alternative is to construct a new structure to house the rental car consolidation (RAC) facility with public parking on the Diamond Head side of the existing Overseas parking structure. The lower floors would be used for the rental car consolidation, while the upper floors would be public parking to meet the expected 2030 public parking demand.

A third alternative in the terminal area converts the use of the Overseas Terminal parking garage to a consolidated rental car facility. Therefore, a new parking garage for the public is proposed on the Diamond Head side of the Overseas Terminal parking structure. It is possible that the rental car fees could be used to construct this new parking structure if the consolidated rental car facility is put in the existing Overseas Parking structure. This structure would accommodate approximately 3,500 parking stalls to meet the 2030 forecast demand, and should also accommodate a Diamond Head transportation service court for the Diamond Head IAB. Therefore, the first two floors will need to be designed to accommodate the ground transportation vehicles servicing the Diamond Head IAB, such as egress, ingress and a higher ceiling height.

5.7.2 Employee Parking

The "Baseline Alternative" requires the relocation of all of the employee parking in the North Ramp, which amounts to approximately 2,090 parking stalls, of which approximately 1,500 parking stalls are in the area for the new Diamond Head Concourse. All of the displaced stalls need to be relocated in Phase I of the "Baseline Alternative." The parking demand by 2030 will be approximately 3,600 parking stalls. Similar to the public parking, the future parking demand may be lower depending on the use of the City and County of Honolulu rail system, and therefore, HDOT-A should monitor the parking situation once the rail system is operational.

The Hale Kinai Ahi development should include the construction of a parking structure to accommodate approximately 1,800 employee parking stalls. This will allow for the relocation of the employee parking in the Interisland cargo and maintenance area, and for the relocated cargo and airline support staff from the Ewa end of the Overseas Terminal. The footprint of the structure would be similar to the new parking structure constructed between the Interisland Terminal and Overseas Terminal.

One alternative for employee parking, is to reopen the employee surface lots on the South Ramp and use the existing rental car sales lots in the Kalewa subdivision as employee parking lots. The surface parking lots are inexpensive compared to parking structures. However, the surface parking lots: will relocation of existing uses; will require a shuttle service, that was not well-received in the past; and will be utilized in the future to meet other aviation demands, and thus the employee parking would need to be relocated.

The other alternative would be to construct an employee parking structure for 2,000 stalls on Ualena Street, Ewa of the Airport Center. This would be within the similar walking distance from the current employee parking lot on Aolewa Place. This new structure would: consolidated parking in one area; maximizes use of land; and would have similar walking distance to terminal from current employee lot on Aolewa Place. As it is a structure, it will have a cost which is greater per square foot than surface lots.

5.7.3 Ground Transportation Facilities

Several variations for the ground transportation facilities were developed to work with the various terminal alternatives being developed. These alternatives are discussed, in general, and associated with the specific terminal alternatives. The alternatives that were contemplated for the general terminal development scenarios are:

- Dual International Arrivals areas, one on the Ewa side and one on the Diamondhead side ("Baseline Alternative");
- Expanded Ewa side International Arrivals area; and
- Single Diamond Head side International Arrivals area.

5.7.3.1 Dual International Arrivals Area

The "Baseline Alternative" shows two International Arrivals areas, one on the Ewa side and one on the Diamond Head side. The existing Ewa international arrivals areas will remain as is. The Diamond Head side international arrivals facility would use the existing curb space on the frontal road for the international passengers. The new Diamond Head ground transportation service court is shown on Figure 32 and would:

- use the arrival level median curb to load courtesy shuttles;
- use the existing tertiary median curb adjacent to the rental car booths just Diamond Head of the Overseas parking garage by approximately 100';
- use the curb area to load international buses, tour shuttles, and limos; and
- continue using the arrival level median curb to load overseas taxi traffic.

5.7.3.2 Expanded Ewa Ground Transportation Concept

This alternative would complement an expansion of the Ewa International Arrivals area. The proposed Ewa ground transportation concept is shown in Figure 33 would include the:

- construction of a new international arrivals bus/shuttle loading area adjacent to the new parking garage where Lot J and the old Bank of Hawaii (USDA Administrative Offices);
- construction of an additional public bus staging area adjacent to the new parking structure to interface with City and County rail system;
- use arrival level median curb to load courtesy shuttles;
- continue using arrival level median curb to load overseas taxi traffic;
- use the proposed bus/shuttle loading area to load limos;
- use the upper (departure) level curb to load luggage trucks

5.7.3.3 Single Diamond Head International Arrivals Area

There are two concepts explored for a single Diamond Head IAF, one is a ground transportation center, and the other is a surface lot connected to Aolele Street. The ground transportation center concept being considered is a new international arrivals area to accommodate all arrivals on the Diamond Head side of the Oversea Terminal.

The following recommendations were proposed for a **ground transportation center** shown in Figure 34.

- Construct a multi-level ground transportation center in the area currently occupied by the on-site rental car companies.
- International tour buses, courtesy shuttles, taxis and limos can use the ground level to load. In addition, domestic tour buses can also be loaded on the ground level while upper levels can be used for rental car storage and maintenance.
- The site would be accessed from the main lower level terminal road and from Kalaiwa Aku Street.
- Provide a ground transportation center shuttle to provide access from the various terminals.
- Use the arrival level median to load arriving passengers.
- The ground transportation center shuttle would replace the existing independent rental car shuttles.
- Expand the overseas parking garage an additional 2 levels and remove the employee parking from the structure.

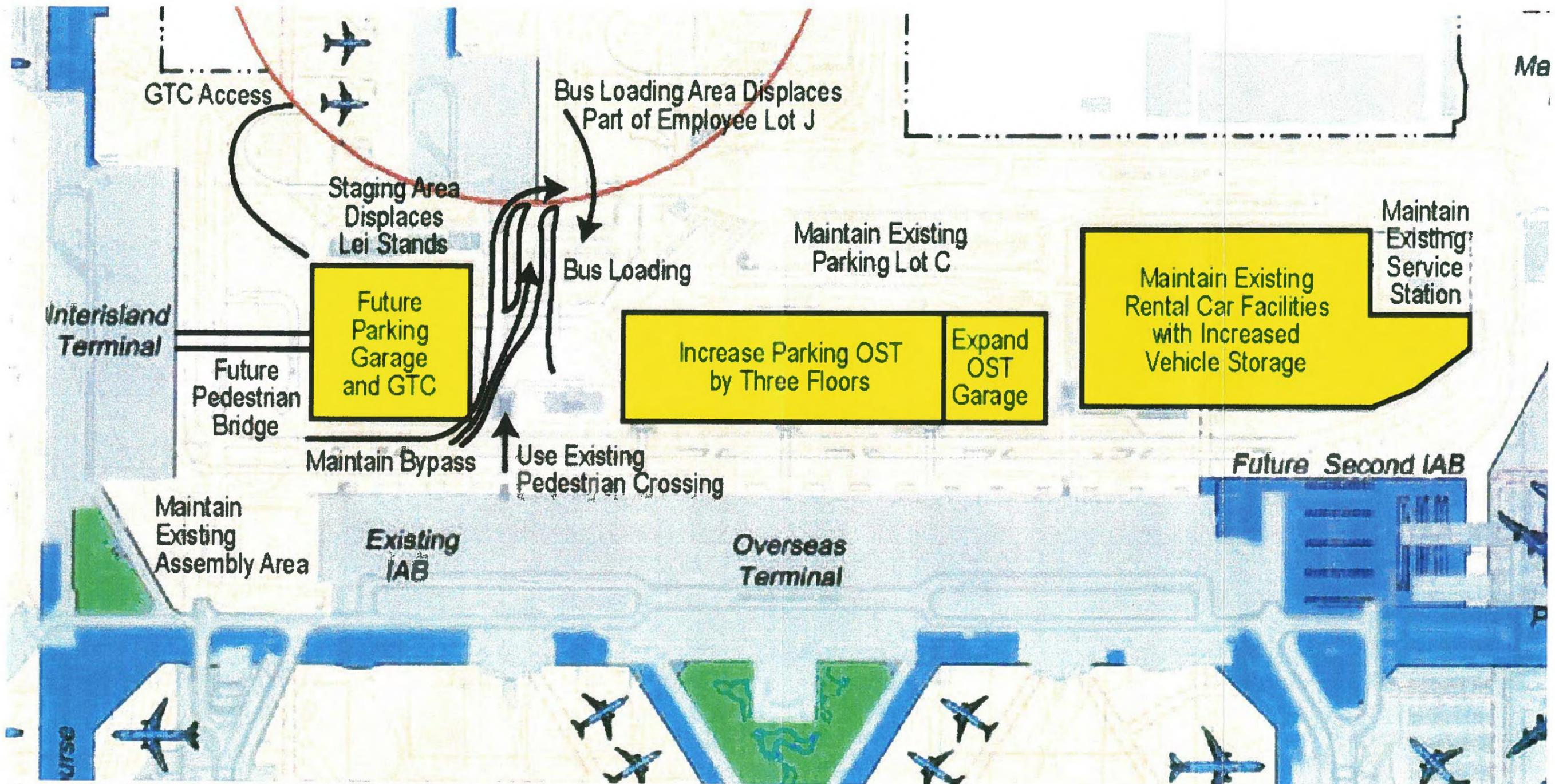


Figure 32 - GROUND TRANSPORTATION COMPLEX WITH DUAL INTERNATIONAL ARRIVAL FACILITIES

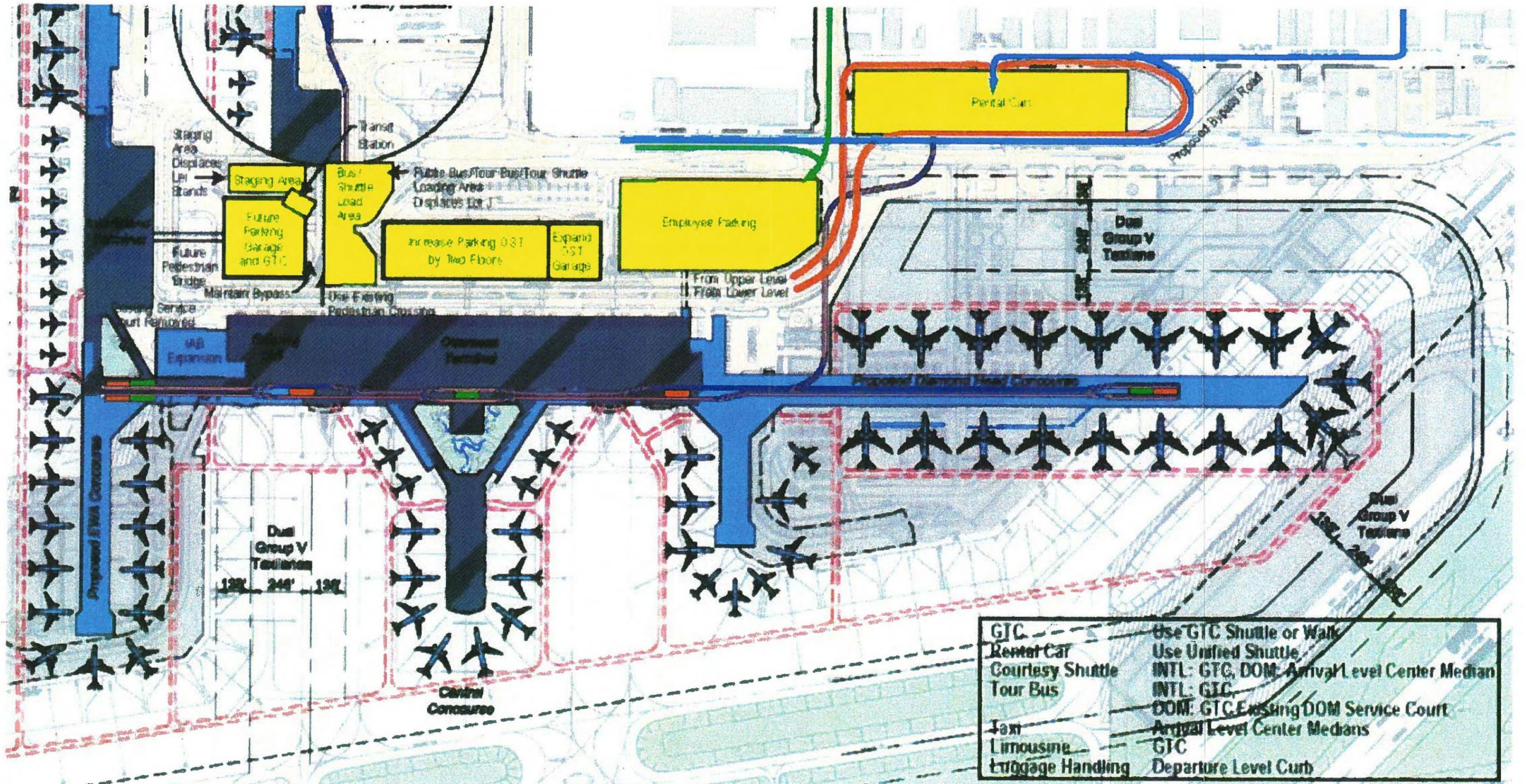


Figure 33 - GROUND TRANSPORTATION COMPLEX WITH SINGLE EWA INTERNATIONAL ARRIVALS FACILITY

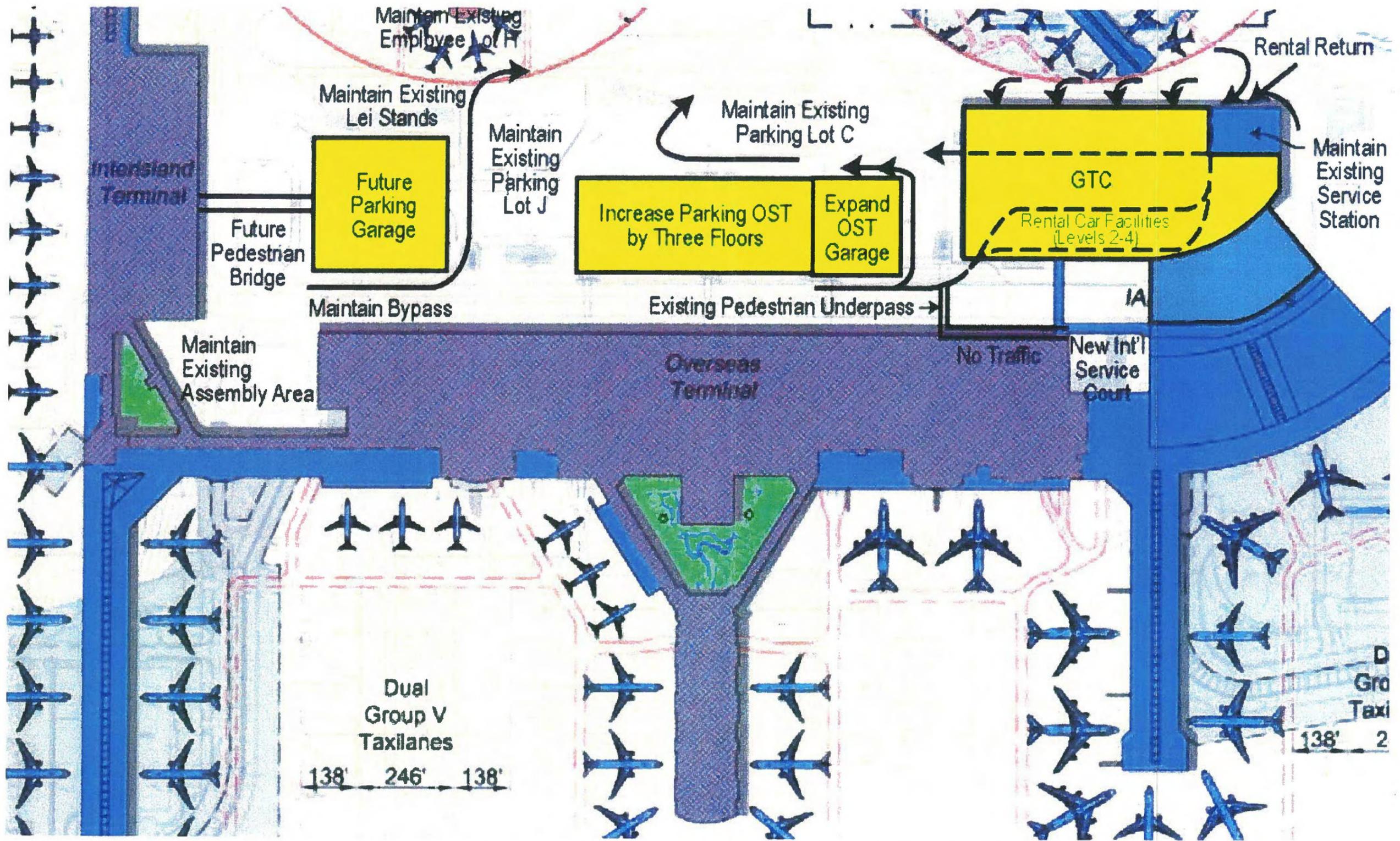


Figure 34 - GROUND TRANSPORTATION COMPLEX WITH SINGLE DIAMOND HEAD INTERNATIONAL ARRIVAL FACILITY

- Continue using arrival level median curb to load overseas taxi traffic.
- Load limos within the ground transportation complex
- Construct a new ground transportation service court adjacent to the proposed Diamond Head International Arrivals Facility and use this area to load baggage trucks.

As stated earlier, the ground level of the ground transportation center could be accessed via the lower level terminal road just Diamond Head of the overseas parking garage. Another access point could be provided from the intersection of Paiea Street and Aolele Street, which is currently used by rental car shuttles and for rental car return. However, the intersection of Paiea and Aolele Streets is at a very poor level-of-service and therefore, access to the ground transportation center should avoid this intersection if possible, however, Kalaiwa Aku Street could be used to exit the facility.

The ground level of the Ground Transportation Center (GTC) would be divided into separate loading areas depending on vehicle type. During the international peak, the ground transportation center would service international arrivals almost exclusively. Separate curb areas would be provided for international tour buses, courtesy shuttles, taxis, and limos. When the domestic arrivals begin to pick up around mid-day, the ground level could be used to load domestic buses, sharing the load with the existing international staging area rather than shifting the entirety of domestic tour bus operations to the ground transportation center. Domestic courtesy shuttles and taxis would continue to use the center median on the arrival level to load rather than shifting to the ground transportation center.

To provide convenient service to the rental cars and other ground transportation options, a shuttle service is proposed. The shuttle would primarily service rental car patrons and international arrivals who need to transit to the other terminals. Based on the forecast arrival data and assumed 80% shuttle occupancy, a peak hour ridership of 1,060 is projected, which would necessitate the operation and circulation of 106 shuttle trips.

A surface **ground transportation service court** is proposed to be linked to the International Arrivals Facility. This service court is similar to existing international tour arrival service court on the Ewa (west) end Overseas Terminal. The new service court would include a pickup area and a parking area for various ground transportation vehicles, landscaping and picture opportunities. A conceptual layout of this new ground transportation service court is shown on Figure 35. The landscaping should be low maintenance and drought tolerant.

5.7.4 Rental Car Facilities

The planning effort considered consolidating rental cars in the terminal area due to the increasing number of companies that want to be in the terminal area, the increasing number of cars, and improving ground transportation congestion. Three areas were considered as alternative locations; off-of Ualena Street; the existing rental car area; and the existing overseas parking structure.

The consolidated rental car facility would be a multi-storied structure that would be financed using user fees. The current on-site rental car compound houses the Avis, Hertz, National, Dollar, and Budget rental car companies while Enterprise, Thrifty, Alamo, and Advantage are dispersed throughout the adjacent industrial area. The potential advantages are:

- streamlining the process for both arriving and departing passengers;
- more convenient rental car return;
- fewer rental car shuttles; and
- potential for consolidated fueling, washing, maintenance, and staging areas.

The rental car companies are open to the possibility of consolidated facilities as long as all the companies are housed within the structure. The facility's convenience is closely linked to its accessibility. For this reason, the Ualena Street site was dropped from consideration.

In addition, the rental companies are open to the concept of a unified rental car shuttle. There would be a cost saving on fuel and shuttle

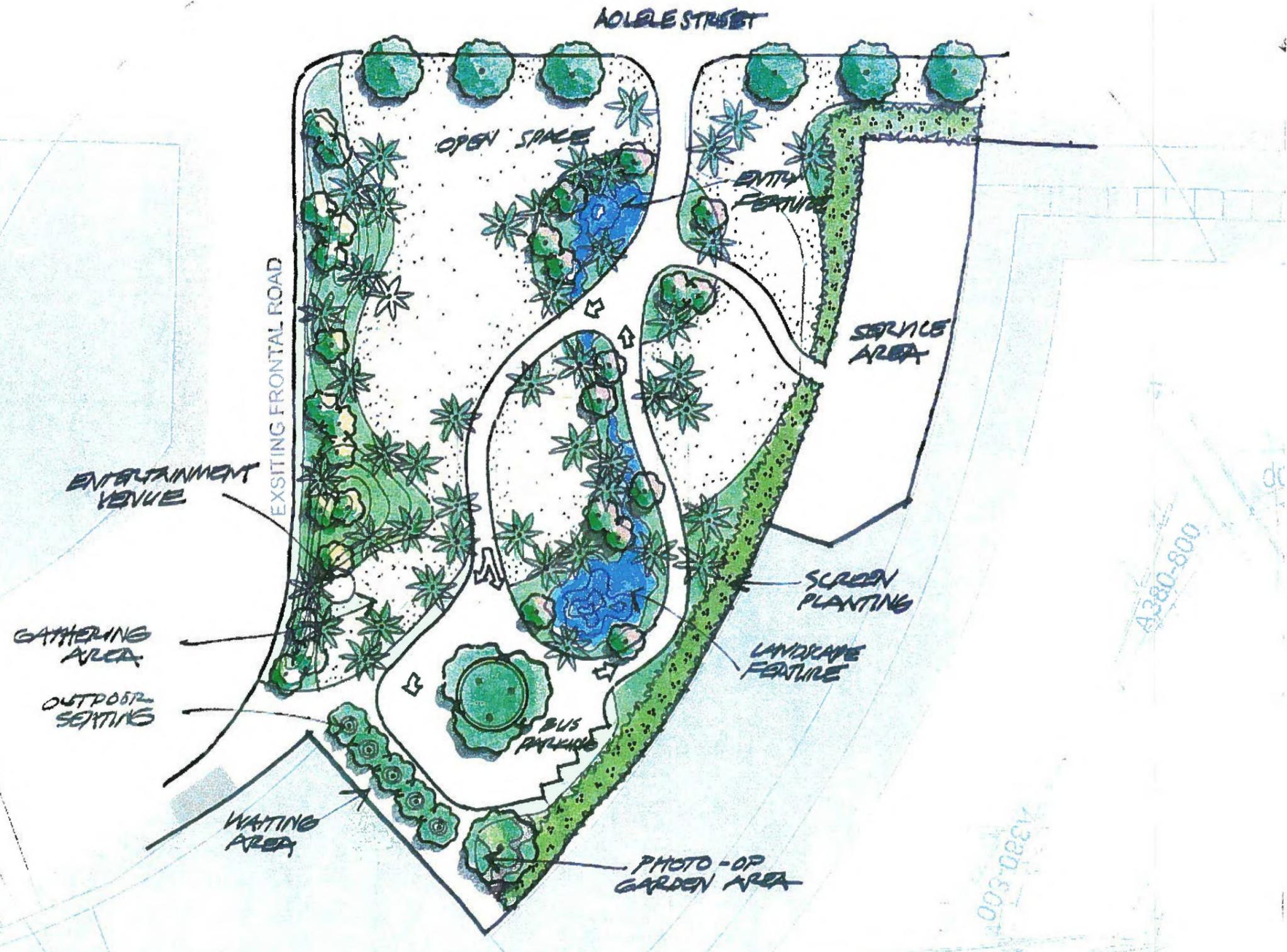


Figure 35 - GROUND TRANSPORTATION SERVICE COURT - DIAMOND HEAD INTERNATIONAL ARRIVALS FACILITY

maintenance. Implementing a unified shuttle would spread passenger load more evenly, allowing for a more efficient distribution of shuttles and a smaller fleet size overall. The arrival level median curb area is projected to be able to accommodate the future rental car shuttle demand. The unified shuttle would decrease the number of rental-car shuttle trips and relieve some of the traffic and curbside congestion, and traffic in the Paiea Street/Aolele Street/frontage road intersection.

The existing car rental location parking lot holds over 300 cars for immediate use and allows for the return of over 100. Rental car demand is expected to increase proportionally with the projected airside growth. The existing rental car surface lot would not be sufficient to accommodate the five current on-site companies, much less all nine.

Therefore, a multi-story structure would have to be constructed to house the company offices, washing/maintenance facility, and several floors worth of cars for immediate rental. Additional vehicular storage lots would be located off-site; size and location would vary from company to company.

The second location under consideration would be the overseas parking garage. This location would provide better access to the entirety of the overseas terminal, allowing more arriving passengers to access the facility on foot. The site would be accessed by foot via existing subterranean walkways in addition to existing at-grade crosswalks. Rental car shuttles would also be provided and would use the arrival level median curb to load. The site could be accessed via the rental car road from the Paiea Street/Aolele Street intersection or possibly from the lower level bypass road.

The overseas parking garage currently provides approximately four levels of parking. It is likely that the structure would have to be expanded to properly accommodate the demand for on-call vehicles. In addition, major renovations would be necessary for the lower levels to provide on-site maintenance, fueling, and washing.

5.8 FUEL FARM

Two alternatives were considered during the planning process, one on Ualena Street and one on Kalewa Subdivision, as in the previous master plan. The alternatives were chosen based on their close proximity to the fuel supply lines from the refineries and the Sand Island fuel farm. Upon closer inspection, the Ualena Street site did not have adequate land area and was too close to existing industrial activities and was dropped from consideration. The only alternative location considered is on Kalewa Subdivision (see Figure 36). The new fuel farm will be required to meet all codes and regulations, and will need containment to avoid impacting the water quality of Keehi Lagoon.

5.9 CARGO

Similar to the existing cargo locations and as stated in previous master plans, there are three areas that would be dedicated to air cargo. The South Ramp which typically accommodates the air cargo operators which use freighter-type or all-cargo aircraft, and two north ramp areas for air cargo carried in the underside (belly) of passenger aircraft. The use of passenger aircraft to carry air cargo allows the airlines to offer lower rates on air cargo transport. Therefore for airside efficiencies, the air cargo facilities should be in close proximity to the respective airline gates. For example, if an airline is typically using gates on the Diamond Head concourse, their cargo facility should be on the Diamond Head side, to avoid long travel distances and reducing apron congestion.

The two north ramp areas are on the Ewa (west) side and on Diamond Head (east) side of the passenger terminal complex. The development and phasing of the air cargo sites on the north ramp is dependent on the phasing and development of the passenger terminal.

Therefore, two areas have been set aside for cargo development. On the Ewa side the Hale Kinai Ahi development will have a cargo component as which will occupy approximately 162,000 square feet for air cargo and another 86,400 square feet for a joint inspection facility (two stories). The two-story structure for the joint inspection facility will house the Hawaii Department of Agriculture, U.S. Department of Agriculture, U.S. Customs and Border Protection, U.S. Fish



Figure 36 - KALEWA STREET REDEVELOPMENT AREA

and Wildlife Service and U.S. Food and Drug Administration inspection areas and offices, and treatment facilities. This location assumes that Japan Airlines and Continental Airlines are located in this cargo complex. The proposed Joint Inspection Facility needs to provide for an efficient movement of incoming and outgoing commodities which need to be inspected prior to departure or prior to release from the airlines to the public. To provide equal, unimpeded and enhanced access to cargo carriers in the air cargo facility, the inspection structure will be located at the center of the cargo building.

The air cargo operations will be housed in two wings constructed outwards from the central inspection facility. Although a 172,800 square foot (180 feet by 960 feet) air cargo facility is planned and sited for a projected long-term plan, construction of this facility may be phased to initially construct a basic facility of 129,600 square feet (twenty, 30 foot x 180 foot bays of a future total of thirty bays) to provide for current needs and near-term expansion. Additional bays could be constructed as the need arises. A 300 feet x 1,250 feet transient aircraft concrete apron will be sited airside of the Air Cargo Building and parallel to Taxiway L.

A similar air cargo facility will be located on the Ualena Street, with the closure of Aolele Street. The facility would have a similar square footage to meet the forecast demand and a satellite inspection facility on one level approximately 46,000 square feet. Similar to above, this assumes that it would house the Delta airlines, Northwest and United Airline cargo facilities. Potentially, a irradiation or other large scale agricultural treatment facility would be co-located on Ualena street for the treatment and/or destruction of inbound and outbound commodities.

Given the concerns about food quality and safety, and the export of outgoing Hawaii agricultural products, it is recommended that all perishable commodities would be under a covered area, at a minimum, or in a temperature controlled environment. Especially of concern are food products which start to spoil as temperatures get warm, e.g. seafoods, leafy greens, etc.

5.10 FINANCIAL ANALYSIS

The HDOT-A has various revenue sources to fund the Capital Improvement Projects (CIP) for the statewide airport system. This section presents a brief

description of each funding sources and an analysis of the potential cost impact of the improvements for the Terminal Area Master Plan PM/MA alternative to the Airport System. The cost impacts for the other terminal concepts would be similar for a similar construction phasing schedule.

5.10.1 Funding Sources

The improvements for the Statewide Airport System are funded through the following sources:

- Airport Improvement Program (AIP) Entitlement Grants;
- AIP Discretionary Grants;
- Transportation Security Administration ("TSA") Funds;
- Passenger Facility Charges (PFC) Pay-as-you-go;
- PFC Backed Bonds;
- Airport Equity – Discretionary Revenues Applied to CIP; and
- General Airport Revenue Bonds (GARBs)

5.10.1.1 Airport Improvement Program Entitlement Grants

Federal Aviation Administration grants from the Airport Improvement Program ("AIP") are funded through the Airport and Airways Trust Fund with revenues from federal aviation user fees and taxes. These FAA grants are for airport infrastructure projects that enhance safety, security, capacity, and access. At large hub airports, such as HNL, AIP grants cover 75 percent of eligible costs.

Under the AIP, the State of Hawaii receives entitlement grants of approximately \$20 million per year, based on the (1) levels of funding authorized and appropriated by Congress, (2) the number of passengers and the amount of cargo accommodated at the Airports System, and (3) a 75 percent reduction in funding for HNL and Kahului Airport as required for large and medium hub airports where a \$4.50 PFC is collected (the reduction is 50 percent if the PFC is \$3.00).

Since the expiration of the Century of Aviation Reauthorization Act (Vision 100) on September 30, 2007, the FAA has continued to operate under a

series of resolutions, some of which have allowed the FAA to continue the disbursement of grants.

5.10.1.2 AIP Discretionary Grants

The FAA selectively awards AIP discretionary grants on the basis of the competitiveness of proposed projects within the national priority system.

In FY 2005 the Division received \$5.1 million, in FY 2006 it was awarded \$4.2 million and in FY 2008 \$8.2 million.

5.10.1.3 Transportation Security Administration ("TSA") Funds

After the events of September 11, Congress passed the Aviation Transportation Security Act, creating the TSA and mandating the implementation of Explosives Detection Systems ("EDS") at U.S. airports. In FY 2005, the Division received \$9.5 million in TSA grants to fund the infrastructure costs to accommodate in-line EDS at Lihue Airport.

5.10.1.4 PFC Pay-as-you-go

In 1990, Congress authorized the Secretary of Transportation to give airport operators the authority to impose a PFC of up to \$3.00 per eligible enplaned passenger to be used for projects that preserve or enhance airport capacity, safety, or security, relieve aircraft noise or to enhance airline competition. In 2000, Congress increased the maximum PFC to \$4.50 per enplaned passenger.

5.10.1.5 PFC Backed Bonds

HDOT-A could leverage its PFC revenue stream by issuing bonds partly backed by PFCs to fund eligible project costs.

5.10.1.6 Airport Equity – Discretionary Revenues Applied to CIP.

Annual discretionary revenue may be estimated by subtracting from revenues: (1) operating expenses; (2) debt service requirements; (3) deposit to major maintenance, renewal and replacement account; and (4) deposit to operating reserve. In FY 2007, estimated discretionary

revenue of \$5.6 million was realized from Revenues of \$286.8 million less Operating Expenses of \$211.1 million (including deposit to major maintenance, renewal and replacement account) and debt service requirements of \$70.1 million. Over the years, HDOT-A has accumulated substantial unrestricted cash balances from system operations. The HDOT-A's auditors point out, in the FY 2007 audit management discussion and analysis, that such balances provide substantial financial flexibility in meeting ongoing operating expenses, address emergencies, or fund construction projects. As of June 30, 2008, cash balances available to fund the CIP amounted to \$326.1 million

5.10.1.7 General Airport Revenue Bonds

The General Airport Revenue Bonds (GARBs) are bonds which are supported by airport revenue. HDOT-A issues Airports System Revenue Bonds to finance certain capital improvement projects (CIP) under provisions of State laws and the *Certificate of the Director of Transportation Providing for the Issuance of State of Hawaii Airports System Revenue Bonds* ("Certificate"). The issuance of Bonds to fund capital improvement projects must be authorized by the Legislature.

The term "revenues" is defined in the Certificate as "all income, revenues, and moneys derived by the State from the ownership or operation and management of the Airports System by the Department of Transportation, or the furnishing and supply of the services, facilities, and commodities thereof, including all income, revenues and moneys derived from rates, rentals, fees, and charges, fixed, imposed and collected by the Department." Revenues also include investment earnings and federal grants. In 2007, revenues amounted to \$286.8 million, Duty free concessions amounted to \$37.4 million (13.0 percent), other concession amounted to \$83.3 million (29 percent), and nonairline revenue – not including interest earnings and federal grants - amounted to \$138.0 million (48.1 percent).

5.10.2 Financial Framework

The major components of the Airports System financial framework are: (1) the Airport-Airline Lease Agreement; (2) the Rate Setting approach; and (3) the Rate Covenant.

5.10.2.1 Airport Airline Lease Agreement

In June 1994, HDOT-A and the Signatory Airlines executed an agreement to extend the airport-airline lease agreement to June, 1997 (the "Extension"). The Extension continued the residual rate setting approach that had been in effect since 1962, with non-airline revenues, including duty free revenue, credited against the airline rate base. It discontinued the concept of a not-to-exceed rates and charges threshold of \$84.2 million that had been mandated in the preceding agreement. The Extension also introduced the Airports System Support Charge (ASSC) to recoup system-wide residual costs not recovered through landing fees and terminal rents. Finally, the Extension defined end-year adjustment procedures for airline payments.

From July 1, 1997 to October, 2007, HDOT-A and the Signatory Airlines continued to operate under the terms of the Extension, which provided for an automatic extension on a quarterly basis unless either party submitted a 60-days written notice of termination. On October 2007, HDOT-A and 30 airlines executed the First Amended Lease Extension Agreement ("Amended Lease Extension"), effective January 1, 2008.

The key provisions of the "Amended Lease Extension" include:

- Hybrid methodology to recover full costs in the airfield cost center and a portion of the costs in primary airport terminal cost centers;
- Recovery of costs associated with nonairline operation from nonairline revenues;
- Airports System Support Charge (ASSC) as a safety net to ensure compliance to the Rate Covenant, to the extent nonairline revenues are insufficient to cover related costs;
- Provision for midyear rate adjustments, if necessary; and
- establishes the following cost centers,

- Airfield Cost Center,
- Terminal Cost Center, and
- Airports System Support Charge (ASSC) Cost Center.

The "Amended Lease Extension" includes elements of a Capital Improvement Program that have been approved by the Signatory Airlines, such as:

- Ancillary support facilities at Elliott Street to include cargo facilities, maintenance facilities, flight kitchen facilities, administrative offices, and employee parking;
- Taxilanes G and L realignment;
- New Mauka Concourse;
- New Commuter Terminal;
- New Ewa Concourse;
- People mover system to replace the existing Wiki Wiki system;
- New Central Concourse;
- New Diamond Head Concourse; and
- New HNL Parking structure.

The Amended Lease Extension states that the list of approved projects "shall be reviewed from time to time and may be amended if necessary" and that "additional capital projects shall be subject to an airline review process" Signatory Airlines have a Majority-In-Interest ("MII") right to defer projects one year. Projects funded from the major maintenance, renewal and replacement account, mandated projects, and projects required to ensure safety and security are exempt from "MII" oversight.

5.10.2.2 Aeronautical Rate Setting Approach

The Amended Lease Extension modifies the methodology for calculating Signatory Airline rates and charges in at least two significant ways: 1) discontinued appraisal-based landside pricing, and 2) Gradual phase-out of differential airside pricing.

Discontinued appraisal-based landside pricing. Prior to the Amended Lease Extension, HDOT-A based terminal rental rates on

surveys of comparable office, retail, and industrial properties in the service area of Primary airports. At its discretion, HDOT-A updated comparable appraisals and adjusted rental rates accordingly. Under the Amended Lease Extension, HDOT-A sets terminal rental rates on the basis of a cost center residual methodology, a standard pricing approach similar to that found at many U.S. airports. A terminal residual rates setting provides a solid financial foundation in that, unlike a market based approach, it ensures the cost recovery of future terminal capital costs.

Gradual phase-out of differential airside pricing. Prior to the Amended Lease Extension, HDOT-A's policy had been to discount interisland landing fee rates relative to overseas rates. HDOT-A maintained that the practice was not discriminatory because different rates were being applied to distinct categories of aeronautical users. This position is supported by Section 3.1 of the *FAA's Policy Regarding Airport Rates and Charges*, which states that assessing higher fees on distinct categories of aeronautical users is permissible. Under the Amended Lease Extension, the discounts are gradually eliminated by increasing the intersisland rate by 1 percent a year from 36 percent of the overseas rate in FY 2008 to 100 percent in FY 2072. Phasing out the interisland landing fee, albeit over 64 years, means that overseas and international carriers will pay a decreasing share of airfield costs.

The Amended Lease Extension retains a cost center residual approach to setting landing fee rates and the Airports System Support Charge designed to recover system-wide residual costs, if any, that may be required to meet the Rate Covenant. Table 5-4 shows the rates and charges and note that there are no Airports System Support Charge (ASSC) charge required for FY 2009. Implicit in the absence of an ASSC is that (1) budget system revenues exceed budget system operating and capital expenses, and (2) that the Rate Covenant is met. The following briefly describes the fees and charges in the Amended Lease Extension.

- **Landing Fees.** Landing Fee rates are set to recover the costs associated with the Airfield Cost Center. The landing fees are based on the landed weight of the aircraft and is the Net Airfield Requirement costs.

- **Terminal Rentals.** The Amended Lease Extension provides for a separate Terminal Cost Center for each of the five primary airports in the Airports System: (1) Honolulu International Airport, (2) Kahului Airport, (3) Kona International Airport, (4) Lihue Airport, and (5) Hilo International Airport. The terminal rental rate is based on the leased area, and itemized by; joint use holdroom charge, common use baggage system charge, common use ticketing position charge, international arrivals building charge, and commuter terminal joint use charge.
- **Airports System Support Charge ("ASSC").** This charge recovers all remaining residual costs of the Airports System required to meet the Rate Covenant. It is set by dividing the residual costs (difference between system expenses and revenues) by the total Airports System Landed Weight.

**Table 5-4
FY 2009 RATES AND CHARGES**

Signatory Landing Fee Rates per thousand pounds	
Overseas Landing Fee Rate	\$ 3.347
Interisland Landing Fee	\$ 1.248
Nonsignatory Landing Fee Rate per thousand pounds	
Overseas Landing Fee Rate	\$2.98 (soon to be amended)
Interisland Landing Fee	\$0.954 (soon to be amended)
Terminal Rental Rates and ASSC	
Terminal Rental Rate	\$29.698 per square foot
Joint Use Holdroom Rate	\$0.935 per enplaning

5.10.2.3 Rate Covenant

The Rate Covenant of the Certificate requires the HDOT-A to annually impose rates and charges that produce revenues that, together with the proceeds of the Aviation Fuel tax, will at least sufficient to:

- pay all indebtedness payable from or secured by Revenues and Aviation Fuel tax proceeds and to fund all reserves;
- pay the costs of operation, maintenance and repair of the Airports System including reserves;
- reimburse the State General Fund for any and all debt service requirements for general obligation bonds; and
- Any other amount to make the payments required under the Certificate¹⁵.

5.10.3 Potential Financial Impact of TAMP

The following is a funding analysis for the TAMP, given the proposed Phase 1 and Phase 2 improvements of the preliminary alternative for the PM/MA Terminal Modernization Plan. This shows the potential costs impacts of the Capital Improvement Program ("Program") which includes the Terminal Modernization Program at Honolulu International and other projects which are being or planned to be undertaken at other Primary and Secondary airports. The estimated costs, phasing and projects for Phase 1 (current to 2019) of the TAMP and the Phase 2 Program projects (FY 2019 to FY 2028) estimated costs (2008 dollars) were provided by the PM/MA team.

The financial plan for the Phase 1 Program would apply available sources of funds to estimated annual project costs and shown in Table 5-5. The strategic objective underlying the plan is to mitigate the impact of the Program on projected airline rates and charges. Key elements of the plan that further this objective are: leveraging the PFC revenue stream; and applying significant available cash balances as a source of funds

The funding for the Phase 2 CIP program requires estimated funding (2008 dollars) of \$2,851,400,000 from FY 2019 to 2028 and shown in Table 5-6. It is important to stress the uncertainty of the implementation of the Phase 2 Program projects. Although presently programmed (forecast to occur) in the period from FY 2019 to 2028, it is equally likely that implementation will be deferred, until such time that aviation demand requires implementation. The Phase 2 Program includes

¹⁵ The Certificate also requires that Debt Service Coverage be 1.25 times the Debt Service Requirement.

construction of: the Diamond Head Concourse, the Concourse Connector and Automated People Mover; and the Central Concourse Renovation. In Phase 2, a higher portion of revenue bonds (82.2 percent) is required, given the commitment of unrestricted cash and the larger portion of the PFC revenue stream to fund the Phase 1 Program costs.

As shown on Table 5-7, this level of bond funding and the resulting additional debt service would have a significant impact on the aeronautical rate base, and is partially mitigated by the scheduled amortization of existing debt service by FY 2022. The Programs impact on Rates and Charges is summarized in Table 5-7. Projected costs per enplanement ratios are partly based on the aviation demand forecast for annual enplanement growth within the planning period. For the Phase 1 and Phase 2 fiscal years, projected annual airline payments used to estimate future airlines' cost per enplanement ratios suffice to meet the Rate Covenant.

**Table 5-5
FUNDING SOURCES AND AMOUNTS FOR PHASE 1**

SOURCE	AMOUNT	PERCENT OF TOTAL
<i>Airport Improvement Program Entitlement Grants</i>	\$ 196,000,000	8.6
<i>AIP Discretionary Grants</i>	\$ 40,000,000	1.8
<i>Transportation Security Administration ("TSA") Funds</i>	\$ 71,000,000	3.1
<i>PFC Pay-as-you-go</i>	\$ 148,000,000	6.5
<i>PFC Backed Bond</i>	\$ 390,000,000	17.1
<i>Airport Equity - Discretionary Revenues Applied)</i>	\$ 371,100,000	16.3
<i>General Airport Revenue Bonds (GARBs)</i>	\$ 1,100,000,000	46.6

**Table 5-6
FUNDING SOURCES AND AMOUNTS FOR PHASE 2**

SOURCE	AMOUNT	PERCENT OF TOTAL
<i>Airport Improvement Program Entitlement Grants</i>	\$ 202,000,000	7.1
<i>AIP Discretionary Grants</i>	\$ 80,000,000	2.8
<i>Transportation Security Administration ("TSA") Funds</i>	\$ 70,000,000	2.5
<i>PFC Pay-as-you-go</i>	\$ 56,200,000	2.0
<i>PFC Backed Bond</i>	\$ 0	0.0
<i>Airport Equity - Discretionary Revenues Applied)</i>	\$ 100,000,000	3.5
<i>General Airport Revenue Bonds (GARBs)</i>	\$ 2,342,900,000	82.2

To provide a comparison the airlines' cost-per-enplanment (CPE) for HNL was estimated for the current and post Phase 1 Program. The CPE is shown in Table 5-8 and also compares the the airlines' cost-per-enplanment to airlines' cost-per-enplanment at other large U.S. hub airports.

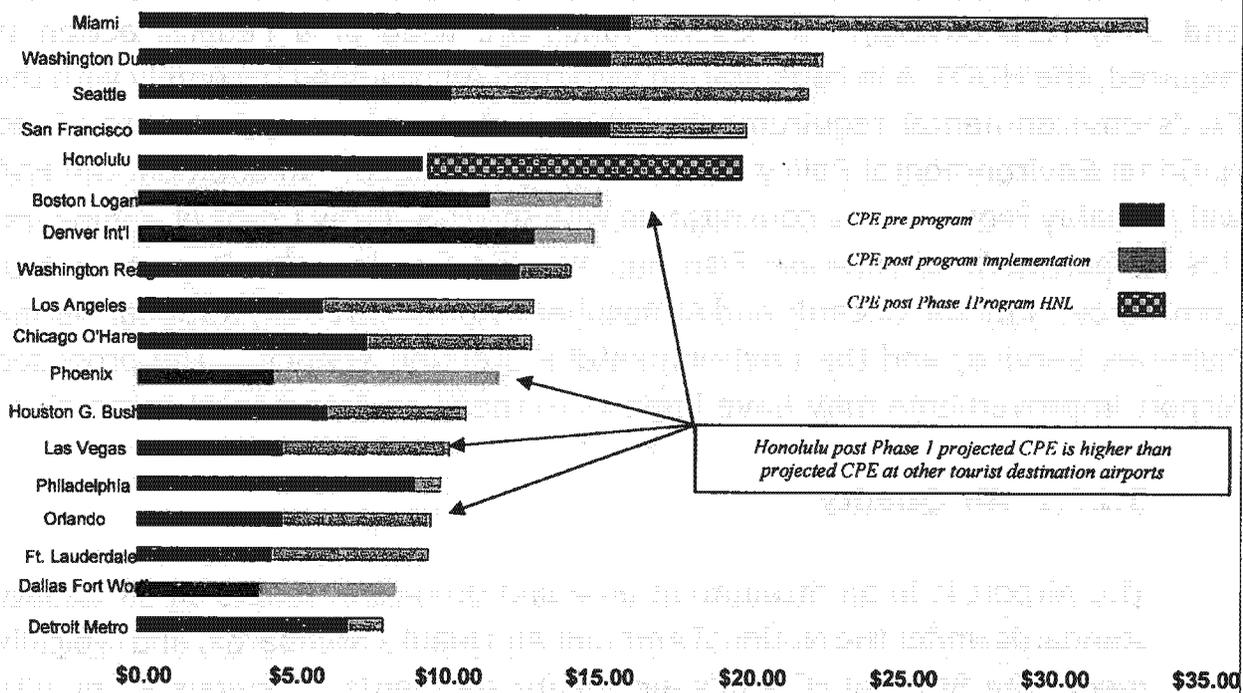
As shown, Honolulu post Phase 1 Program airlines' CPE is projected to be \$19.50. This cost level is higher than available projected airlines' CPE at other tourist destination airports (Ft. Lauderdale, \$9.58; Las Vegas, \$10.24; Orlando, \$9.65; Phoenix, \$11.88). It is worth noting that the cost impact of Honolulu's Program, which extends to 2018, is being compared to programs, such as at Ft. Lauderdale, that will be completed by 2012. For much of the anticipated duration of Phase 1, HNL's CPE is projected to remain below \$15.00. The rate impact of Phase 1 Program costs is significant but likely to be well within the industry's comparative range of reasonableness for large hubs in FY 2018.

**Table 5-7
DEBT SERVICE AND COST PER ENPLANMENT**

Estimated Comparative Metrics	FY 2010 (a)	Phase 1	Phase 2
AIRPORTS SYSTEM			
Existing Annual Debt Service (millions)	\$57.2	\$75.2	None (b)
Additional Required GARBS Debt Service (c) (millions)	n.a.	\$91.7	\$202.2
Total GARBS Debt Service (millions)	\$57.2	\$166.9	\$293.9
Overseas Airlines' Cost per Enplanement	\$9.35	\$18.50-\$19.00	\$29.50-\$30.00
Interisland Airlines' Cost per Enplanement	\$5.37	\$11.00-\$11.50	\$19.50-\$20.00
Average Cost per Enplanement	\$7.46	\$15.00-\$15.50	\$25.00-\$25.50
HONOLULU INTERNATIONAL AIRPORT			
Overseas Airlines' Cost per Enplanement	\$10.65	\$21.50 - \$22.00	\$36.50-\$37.00
Interisland Airlines' Cost per Enplanement	\$6.76	\$14.00-\$14.50	\$26.50-\$27.00
Average Airlines' Cost per Enplanement	\$9.29	\$19.00-\$19.50	\$33.00-\$33.50

- a) Reflects the methodology in Amended Lease Extensions.
- b) Existing debt service is amortized by FY 2022
- c) Reflects the annual debt service required to fund Phase 1 and Phase 2 Program costs. Does not include PFC supported bonds

Table 5-8
Projected Post- Program Airlines' Cost per Enplanement (CPE)
 Selected Large Hub U.S. Airports



5.11 ENVIRONMENTAL CONSIDERATIONS

As the proposed projects will use State of Hawaii funds and/or State of Hawaii lands, the HDOT-A is required to complete environmental documents in accordance with the Hawaii Revised Statutes, Chapters 343 and 344 (HRS 343 and 344, respectively). If Federal funds are used or a Federal action is required, the HDOT-A in consultation with the FAA will need to comply with the FAA's environmental requirements, which includes the requirements of the National Environmental Policy Act (NEPA), as amended. In addition, the FAA will probably require early consultation with the U.S. Army Corps of Engineers, U.S. Department of Interior, Fish and Wildlife Service, the Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service; and the Environmental Protection Agency. The proposed Airport improvements may have impacts to these environmental categories.

5.11.1 Air Quality

The Airport is in an attainment area and therefore, meets all air quality standards under the National Ambient Air Quality Standards, and typically meets the State of Hawaii's air quality standards. Previous air quality studies have shown the existence of "hotspots," usually at roadway intersections and frontal road curbs, where CO_x levels may exceed the Hawaii air quality standards. In addition, the previous analysis did not account for taxiways or aircraft gates on the north (mauka) side of the Diamond Head Concourse.

5.11.2 Water Quality

The Airport has a National Pollutant Discharge Elimination System (NPDES) permit, and has implemented various controls, monitoring and best management practices. The improvements will be required to comply with NPDES, and Section 401/404 of the Clean Water Act. The proposed new fuel farm and the private marina should be required to meet all applicable state and federal standards and minimize impact to Keehi Lagoon.

5.11.3 Biota

There are migratory and endangered birds which have been known to forage at the Airport with the majority being the golden plover and the Hawaiian Stilt. In addition, there are several bird islets in Keehi Lagoon which were created as a mitigation measure to the Reef Runway project. There are no-known endangered land mammals or plants on the Airport.

It is recommended that landscaping be coordinated with the Hawaii Department of Agriculture, Plant Quarantine Branch, and the U.S. Department of Agriculture, APHIS. The Hawaii Department of Agriculture requires that landscaping does not create increased habitat for high priority invasive species which may have a significant impact on public health, agriculture, natural resources, cultural resources and the economy. Examples would include; mosquito-habitat plants such as bromeliads, culturally significant plants such as taro, and quarantined plants such as those in the myrtaceae family.

The U.S. Department of Agriculture, APHIS is concerned about plants, including plant parts, which cannot be transported to the continental U.S., due to the quarantine placed on the State of Hawaii. Therefore, these restricted plants cannot be placed in the USDA sterile area, such as within the terminals and cargo buildings.

In the past decade, there has been public concerns on the interdiction of invasive pest species into Hawaii, which have led to several lawsuits and recent modifications to the Hawaii Revised Statutes. In addition, new invasive species has increased the number of Hawaii agricultural products quarantined by USDA, and therefore, has impacted the volume of Hawaii's agricultural exports. These recent concerns have been highlighted in the Kahului Airport Environmental Impact Statement and the Hawaii Superferry lawsuit. In 2008, the Hawaii Revised Statutes, Chapter 150, was amended by the Legislature and became law as ACT 236.

HNL does lack proper facilities to inspect, treat and destroy cargo commodities which are infested with disease or insects entering from overseas or interisland destinations. Therefore, joint inspection facilities are proposed in the north ramp cargo areas, one main facility and one

satellite facility for the inspection, holding and treatment of incoming and outgoing cargo commodities. However, HDOT-A has stated that it will not construct these facilities. This facility would include treatment facilities for incoming commodities which are infested with insects or disease, for destruction and/or resale. In addition, to meet domestic and foreign quarantines on Hawaii grown products being exported, the treatment can be used. Without this treatment, certain Hawaii agricultural products cannot be exported out of Hawaii.

5.11.4 Historic, Architectural, Archaeological, and Cultural Resources

There are no known archaeological or cultural resources expected to be impacted by the proposed improvements. The environmental document should analyze any impact on historical or architectural resources on the Airport as the Diamond Head and Ewa Concourses are slated to be demolished, in later years of the proposed project phasing.

5.11.5 Noise Impacts

The Noise Compatibility Study will be completed and will propose mitigation and abatement measures to achieve land use compatibility in the Airport environs, but does not address single event or specific noise events. It should be noted that the proposed aircraft fleet changes may affect the noise impacts, specifically the addition of F-22 aircraft to the military fleet. In addition, localized impacts on businesses and neighbors may occur with the proposed new aircraft parking, engine run-up, taxiways, gates and construction.

5.11.6 Public Health

In recent years, there has been an increased concern about food safety and food quality. These concerns should be analyzed as the Airport improvements may affect the storage and transport of perishable items.

In recent years, the HDOT-A has constructed a sterile holdroom for passengers which may need to be quarantined upon arrival at HNL. This facility is at Gate 34, and should be relocated during the "Terminal Modernization Program"

5.11.7 Socio-economic and Cumulative Impacts

The social, economic, cumulative and growth impacts of the proposed improvements should be addressed as required under HRS 343 and / or NEPA. The proposed improvements do increase the capacity of the Airport within the planning period to meet the forecast aviation demand.

SECTION 6.0 RECOMMENDED MASTER PLAN

The recommended Master Plan presented in this section is based on meeting the goals and objectives, the aviation demand forecasts, facility requirements and discussions with airport users, tenants and stakeholders. The Master Plan will provide general land use classifications for the Airport, and the proposed improvements for the Airport to meet the existing and forecast aviation demand.

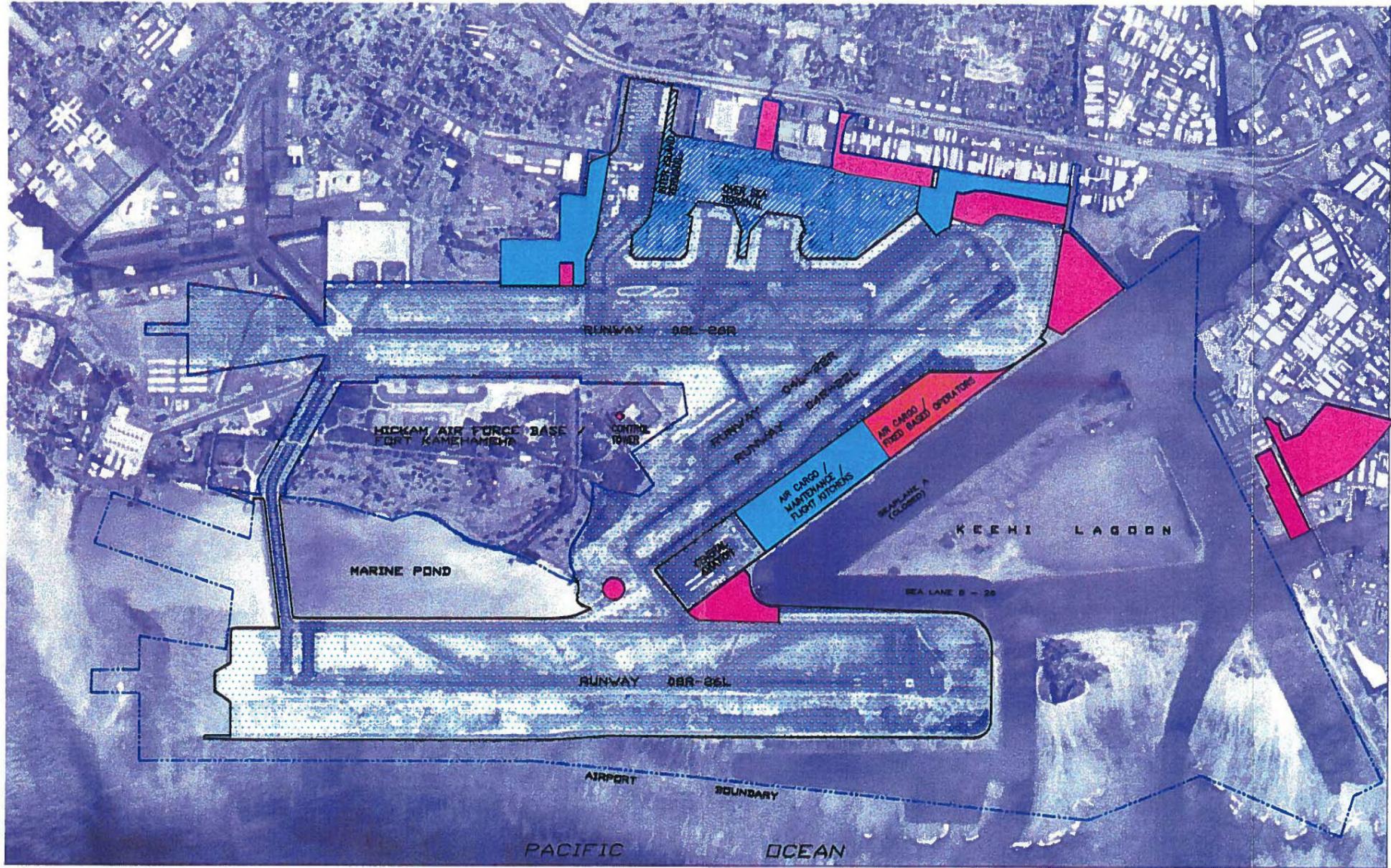
As the purposes of the Master Plan is to; provide guidance for the long term development of the Airport, provide flexibility to meet changes given the dynamics of aviation demand, and minimize the over-development of facilities. This Master Plan will be described in two general phases: the short-term which meets the 27 MAP requirements, which was forecast to occur in 2020; and the long-term which would meet the 33 MAP requirements, which is forecast to occur by 2030. The Airport Layout Plan is shown in Appendix F.

6.1 AIRPORT LAND USE

Figure 37 shows the recommended 2030 land use plan, which represents the major land uses within the Airport property. The land use categories shown are airfield, terminal area, airport and airline support, and fixed based operator (FBO) and general aviation facilities.

The airfield land use encompasses the areas used for the aircraft movement, safety areas, navigational aids, and aircraft parking, known as the AOA. At HNL, the AOA encompasses two parallel runway pairs and two major aircraft ramp areas, known as "North Ramp" and "South Ramp." There are two designated sea plane operating areas in Keehi Lagoon as depicted on the Figure 37.

The terminal area is located to the north of the runways in the area known as North Ramp. This encompasses the majority of air carrier operations and support facilities including passenger terminals, ground side transportation, passenger and baggage processing, airline support facilities, airline cargo facilities and some airport support facilities. To the west side of the terminal



LEGEND

-  AIRPORT BOUNDARY
-  AIRFIELD
-  PASSENGER FACILITIES
-  AIR CARRIER SUPPORT FACILITIES
-  AIRPORT SUPPORT FACILITIES
-  FIXED BASED OPERATORS

Figure 37 - RECOMMENDED LAND USE 2030

area, is the Hale Kinau Ahi Street and Elliot Street area which houses the Aloha Cargo, and Hawaiian Airlines maintenance, cargo and airline support facilities. The terminal complex includes the commuter terminal to the far north; the interisland terminal, and the overseas terminal. The overseas terminal comprises of the passenger ticketing and baggage processing area in the main complex and has three concourses, the Ewa and Diamond Head gull wings, and the central concourse. Other airport and airline support facilities which are dispersed throughout the terminal area include; flight kitchens, ground service equipment maintenance, automobile parking, and rental-car facilities.

The airport and airline support facilities include; the airport baseyard, fuel facilities, employee parking, aircraft rescue and firefighting, and FAA facilities. These facilities are scattered around the Airport depending on their role and required proximity to the airfield and the terminal.

Fixed based operator and general aviation facilities are typically located in the area known as South Ramp, along Lagoon Drive. FBOs provide aircraft services, such as repair and maintenance, aircraft sales, and flight training. In the future, as more general aviation is relocated to Kalaeloa Airport (JRF), this area will be transformed to air cargo, or aircraft maintenance and support facilities.

6.2 AIRFIELD PLAN

The proposed improvements to the airfield are recommended to increase airfield capacity, minimize delays, and improve safety. In order to improve safety, the taxiway system was studied to minimize confusion by reducing the number of taxiways and oblique entrance angles.

6.2.1 Short Term Airfield Improvements

The short term airfield improvements (current to 27 MAP (2020)) are proposed to support the terminal modernization plan, reduce taxiway congestion, and improve airfield safety, and include the following:

- new taxiways;
- Runway 8R-26L instrument landing system and related navigational and lighting equipment;
- an engine runup pad;

- lining and covering of Kaloaloe Ditch; and
- pavement improvements¹⁶.

The **new taxiways** would create a new network located on the western end (Ewa portion) of Runway 8L - 26R. These new taxiways, shown in Figure 38, will provide alternative routes to the runways and will ease congestion, especially with the increase of traffic from the aircraft support facilities, such as the HAFB clear water rinse facility, HAFB hot cargo pad expansion, and HNL's airline maintenance facilities. The taxiway network includes the following components.

- A **parallel taxiway to Taxiway "A"** to service the new aircraft maintenance area in the Hale Kinau Ahi Street area. This parallel taxiway would have a runway centerline to taxiway centerline separation distance to allow for Aircraft Design Group V use of Runway 8L - 26R.
- A new **cross-taxiway between taxiway "A" and taxiway "B"** which would be located across the entrance to the HAFB clear water rinse facility. This cross-taxiway could allow for intersection takeoffs in Trade Wind conditions which will increase the airfield departure capacity.
- The **realignment of taxiways "G," "N," and "L"** to service Group V/IV aircraft in the Interisland terminal area, and to provide access to the new air cargo facility. Along with the Taxiway "G" and "L" realignment, taxiway "N" should be realigned or closed to reduce the confusion with the taxiways "G," "L" and "N", as safety issues may arise with the current taxiway arrangements.

An **Instrument Landing System (ILS)** is proposed for Runway 8R to allow for the increase use of this runway for arriving hazardous or high risk aircraft. The remoteness of Runway 8R makes it suitable for these aircraft arrivals. Therefore to accommodate these aircraft at night or

¹⁶ Applied Pavement Technology, Inc., "Statewide Pavement Management System Update, For Medium and Large Hub Airports, State Project Number, AS1120-04, Honolulu International Airport, Oahu, Hawaii," April 2007

during inclement weather conditions, an ILS approach should be installed with an appropriate lighting system and navigational aids. The project would be funded by the FAA.

An **engine runup pad** is proposed at this remote location to alleviate aircraft noise concerns from the surrounding communities. An engine run-up pad is needed to replace the current practice of performing engine run-ups on the taxiways and runways, depending on the aircraft size. When these run-ups occur the runway or taxiway is closed to other traffic, and causes increased traffic and congestion on the other runways and taxiways.

The **Kaloaloe Canal** (North Peripheral Ditch) should be covered and lined to remove the displaced threshold for Runway 22R. The covering of Kaloaloe Canal will allow the Runway Safety Area to be extended to its original position (prior to the displaced threshold) for Runway 22R. The covering of the canal will also allow better access and utility of the Ualena Street properties by the HDOT-A.

The **pavement improvements** recommended in the April 2007, Pavement Management Update should be implemented. HDOT-A should prioritize the pavement repair and replacement, and to continue their efforts in monitoring the airfield pavement at HNL.

6.2.2 Long Term Airfield Improvements

As the aircraft demand approaches 90 percent of 480,000 aircraft operations (430,000 to 440,000 aircraft operations), the HDOT-A should undertake a airfield capacity development plan. The following long term airfield improvements (27 MAP (2020) to 33 MAP (2030)) to increase the airfield capacity and runway use, as well as to provide alternate taxi routes for various aircraft (shown in Figure 39):

- the realignment of taxiways "E" and "F";
- extension of taxiway "F";
- Runway 4L-22R extension by 1,000 feet;
- new aircraft hardstands for long-term parking along taxiway F;
- new taxiway RS and hazardous aircraft hardstand; and

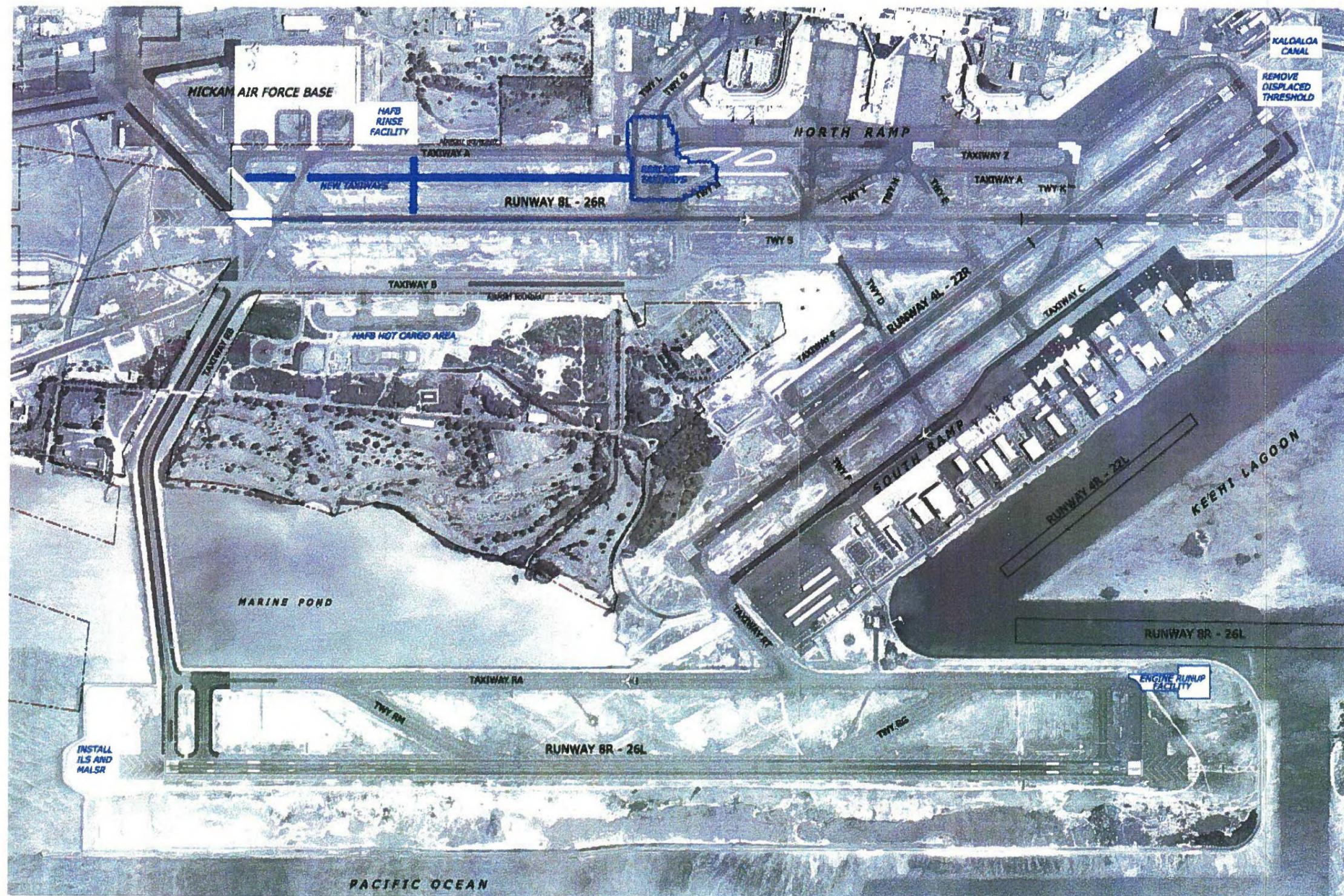


Figure 38 - SHORT TERM AIRFIELD IMPROVEMENTS

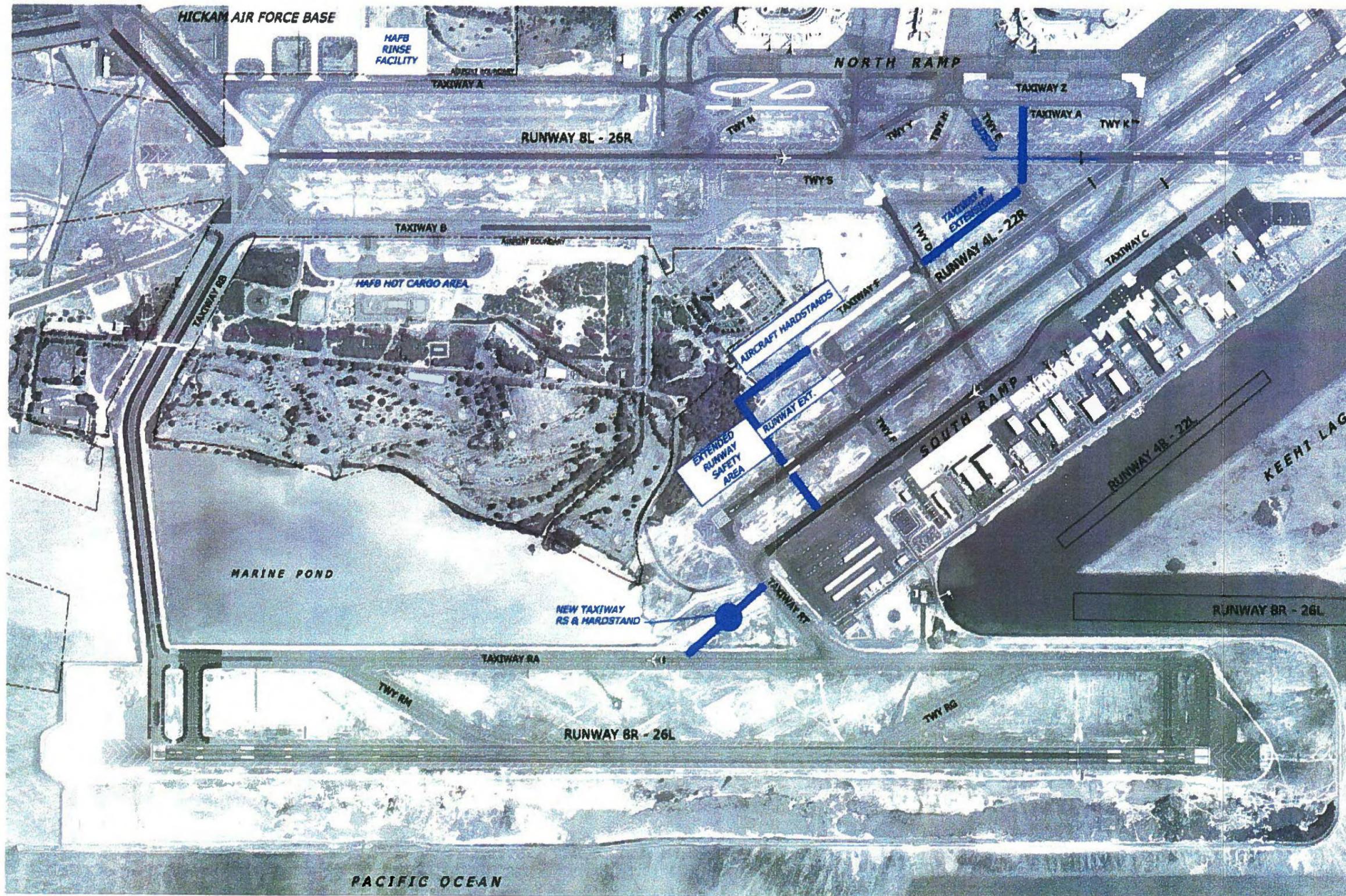


Figure 39 - LONG TERM AIRFIELD IMPROVEMENTS

- a new precision approach system to Runway 26L.

The **realignment of taxiway "E" and "F"** in the Runway 8L-26R vicinity to minimize confusion and to remove the oblique angles between the runway and taxiways. The current taxiway "E" is also used for intersection takeoffs, thus the new configuration should maintain that capability.

Taxiway "F" is extended in both directions. The northeast extension is to provide an alternate taxi route from the terminal area to Runway 8R-26L which will alleviate congestion along taxiway "C" and the South Ramp. The extension to the southwest would be in concert with the extension of Runway 4R-22L to the southwest.

Runway 4L-22R is extended 1,000 feet to the southwest to increase the length of the runway to accommodate a larger mix of aircraft. This extension will increase capacity as it allows for larger aircraft to use this runway for departures and arrivals.

New aircraft hardstands are proposed along Taxiway F to provide for Design Group V and smaller aircraft to be parked.

A new taxiway "RS" and hazardous aircraft hardstand is proposed to increase aircraft access from the south ramp to Runway 8R-22L. The location of the hazardous cargo pad was due to quick access from ARFF Station No. 2 and accessibility for other enforcement personnel from Lagoon Drive via South Ramp. This location is also remote from most of the inhabited facilities and the airfield to minimize impact on Airport operations.

A new **precision approach system for Runway 26L** should be investigated, such as Global Positioning System (GPS) or other newer guidance systems which become available in the future. The majority of delays at the Airport occur during Kona weather runway patterns, as the majority of large and all heavy aircraft arrivals are on Runway 26L, using a curved Localizer Directional Aid (LDA) approach. In previous master plans, the use of a microwave landing system was considered. However, with the advent of GPS technologies different approach scenarios may be possible to increase arrival capacity during Kona wind conditions.

6.3 TERMINAL DEVELOPMENT

The terminal development followed two tracks during the planning period, 1) the project management/master architect (PM/MA) team (**Concept A**)¹⁷, while 2) the master plan team (**Concept B**). What transpired was two different concepts for several elements in the terminal modernization plan. Due to the ever-changing dynamics of the aviation industry, compounded by tourism dynamics, it was determined that these different concepts be presented for HDOT-A as recommended, thus allowing HDOT-A the flexibility when the implementation of these facilities are required based on demand.

The components typically represent the construction of the new concourses for both the Interisland terminal and the Overseas terminal. The main portion of the Interisland terminal and the main portion of the Overseas terminal is widened toward the airfield to provide for larger passenger corridors and holdrooms. The following description of the terminal development highlights the major improvements, and the associated airport and airline support facilities. These improvements are shown in Figure 40 as the non-hatch areas.

6.3.1 Short-term Improvements

The proposed improvements in the terminal facilities are to meet the 27 MAP (current to 2020) aviation demand and to replace the aging terminal infrastructure. The short-term improvements include:

- the realignment of taxiways G, L & N to accommodate larger aircraft at the interisland terminal, including the redevelopment of the Hale Kinau Ahi Street and Elliot Street area;
- redevelopment of the mauka pier of the Interisland terminal;
- development of the Ewa concourse;
- development of the Diamond Head concourse;
- renovation of the main terminal and central concourse of the Overseas terminal; and
- international arrival facilities.

¹⁷ "Terminal Area Plan, Honolulu International Airport, Terminal Modernization Program," Master Architect HOK in associations with kya design group, FINAL December 2008.

6.3.1.1 Mauka Pier

The mauka pier of the Interisland Terminal will be redeveloped to accommodate either larger aircraft and/or the current interisland aircraft fleet, depending on the gate spacing. There are two concepts presented for HDOT-A, one which has a remote commuter terminal, and one with an integrated commuter terminal. The taxiways would need to be realigned to allow for the movement of the larger aircraft.

Concept A shown in Figure 41 has a L-shaped mauka pier for design group III aircraft and dictates a remote commuter terminal for the air taxi / commuter airlines on the Ewa side of Taxiways G & L. The L-shaped concourse will accommodate ten design group III aircraft and has improved taxiway movement over the Y-shaped concourse. A new commuter/air taxi terminal is constructed on the airside of the Federal Detention Center, which will accommodate five design group I and eight design group II aircraft. This remote commuter terminal will require ground transportation shuttle(s) for transiting passengers to and from the Overseas and Interisland terminals, and highway signage modifications. Taxiways G & L are relocated and realigned to be parallel to the proposed Makai Pier/Ewa concourse development discussed later. The cargo building and aircraft aprons are aligned with the future taxiway alignment.

Concept B shown in Figure 41 has a Y-shaped mauka pier which integrates the commuter/air taxi terminal into the Interisland Terminal.

As proposed, this layout creates seven design group III aircraft gates, ten design group II gates, and six design group I aircraft parking positions. This alternative eliminated the need to relocate the U.S. Postal Service Road. In addition, design group IV aircraft can be accommodated, if necessary, on the southern (makai) face of the new concourse. The concept allows the design group III or larger aircraft to be enplaned and deplaned from the upper (second) level gates and holdrooms, with the lower (first) level, north face used for the commuter and air taxi gates. The smaller commuter aircraft (design group I and II) are boarded using an enclosed walkway from the terminal to the aircraft parking positions. The passenger functions for the air taxi and commuter airlines are conducted in a new single level structure at the

apex of the Y, with a frontal roadway system for passenger drop-off and pickup.

In **Concept B**, taxiway "L" is slightly realigned from its present alignment to increase separation from taxiway "G", and taxiway N is realigned to be parallel to the new Ewa concourse. This configuration provides a slight increase in taxiway capacity as the number of aircraft and mix of aircraft increases in this cul-de-sac. The cargo facility and aircraft apron alignments are constructed to be parallel taxiway "L." The ramp area east of the Federal Detention Building is slated for airport/airline support facilities and replacement hardstands for those displaced with the development of the Y-shaped concourse. In addition, the Y-shaped terminal would provide increased separation from the major terminal structure, from the City and County of Honolulu's rail alignment. This may be advantageous if security requirements dictate a stand-off distance for the rail system and the AOA.

6.3.1.2 Ewa Concourse

The development of the Ewa concourse/IIT makai pier is shown in Figure 42, and is similar in both **Concepts A and B**. The makai (southern) pier of the IIT is realigned and extended to meet the Ewa concourse. This is the initial phase for constructing a double-loaded Ewa concourse. A concession node is placed at the juncture of the Interisland terminal and Overseas terminal, and the walkway is widened to increase passenger circulation. A smaller concessions node could be placed near the intersection of the Ewa concourse and new makai pier.

In **Concept B**, the "C.B. Lansing Memorial Garden" is retained and renovated to integrate into the passenger experience. This concept is discussed in the landscape portion of this section.

6.3.1.3 Diamond Head Concourse

The development of the Diamond Head concourse included increasing the number of gates and replacing the aging concourse with double-load piers. One of the major concerns about the Baseline Alternative was the impact of this terminal structure on the Runway 4-22 complex. To avoid this impact the following concepts were developed.

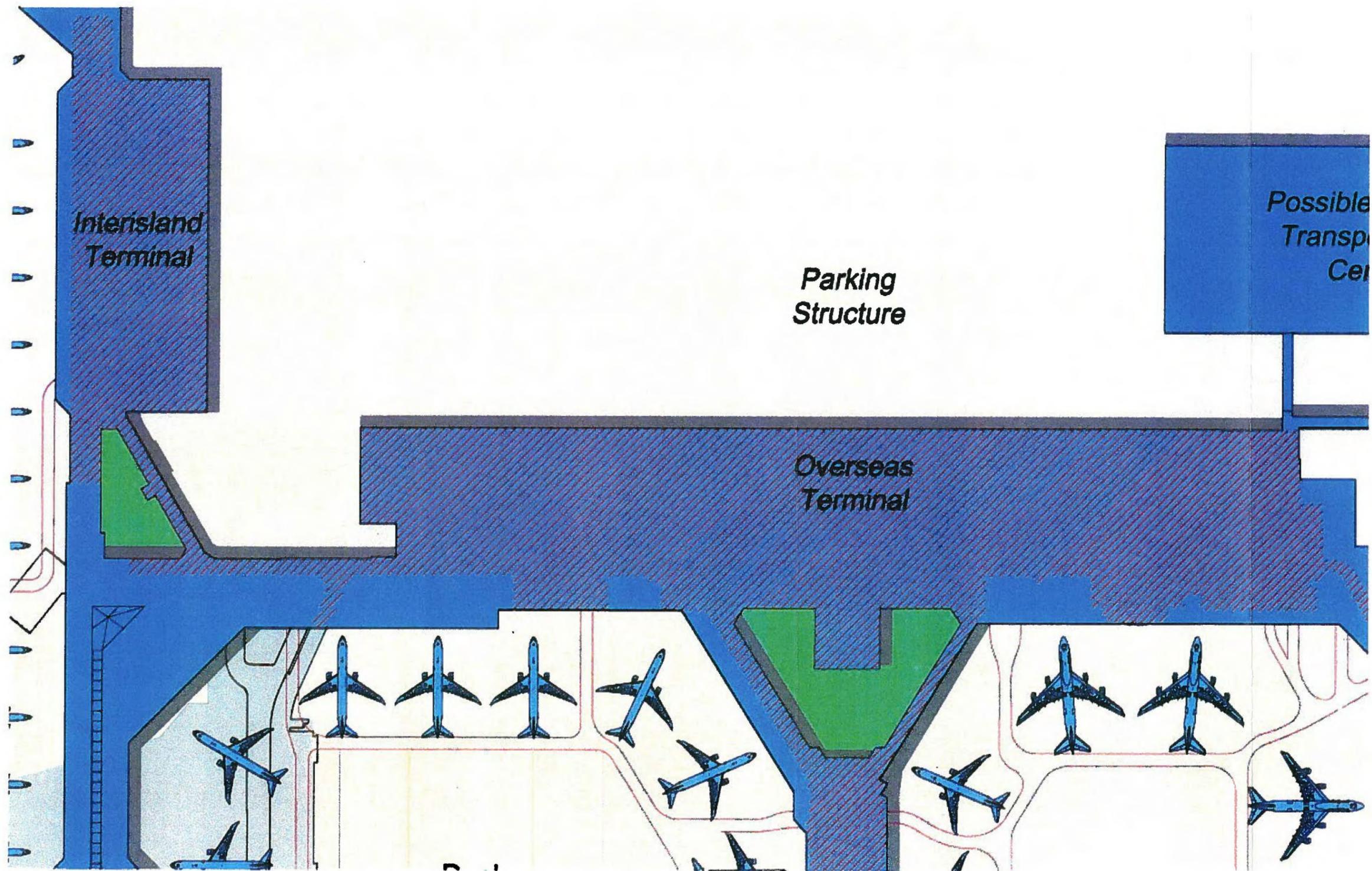
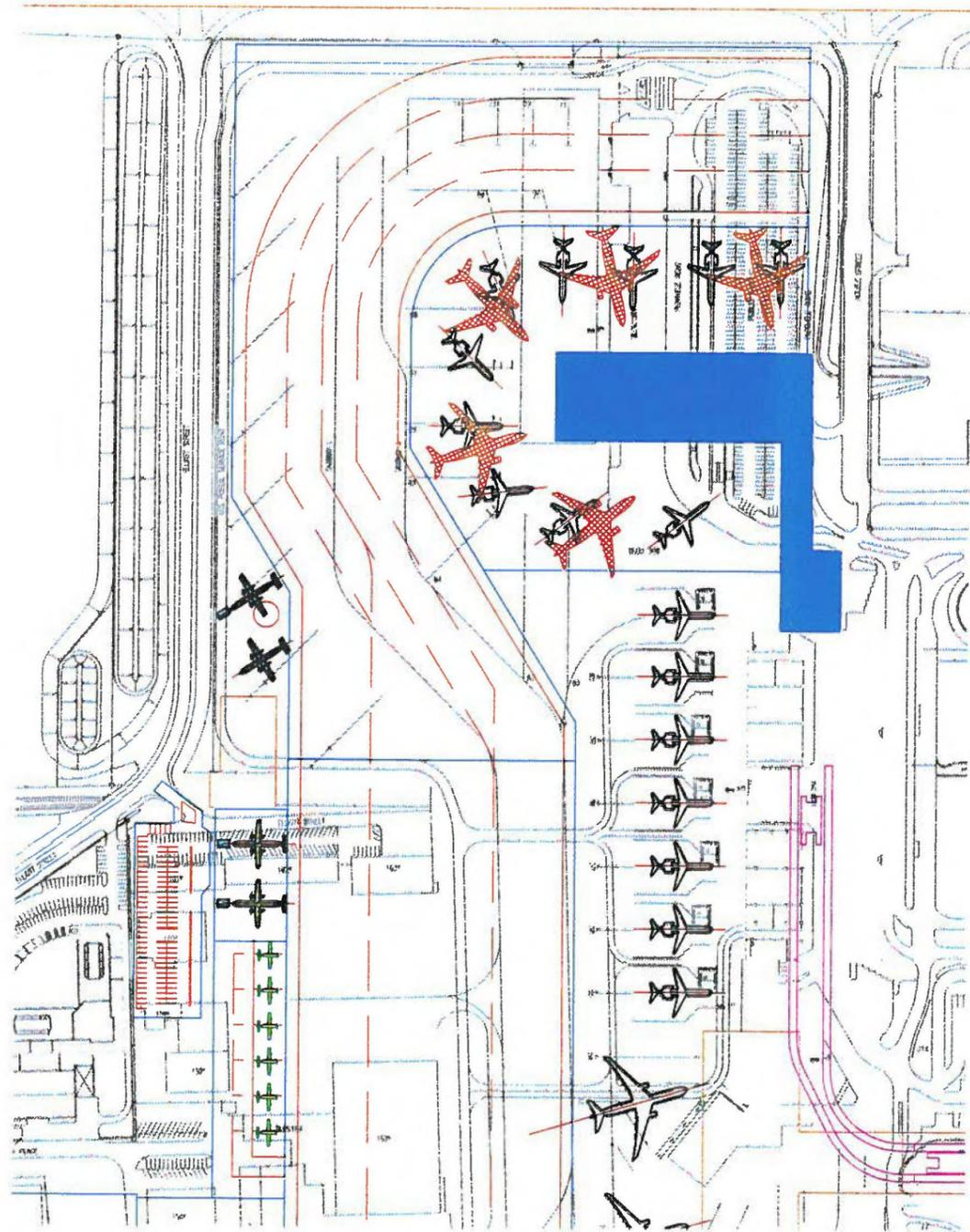
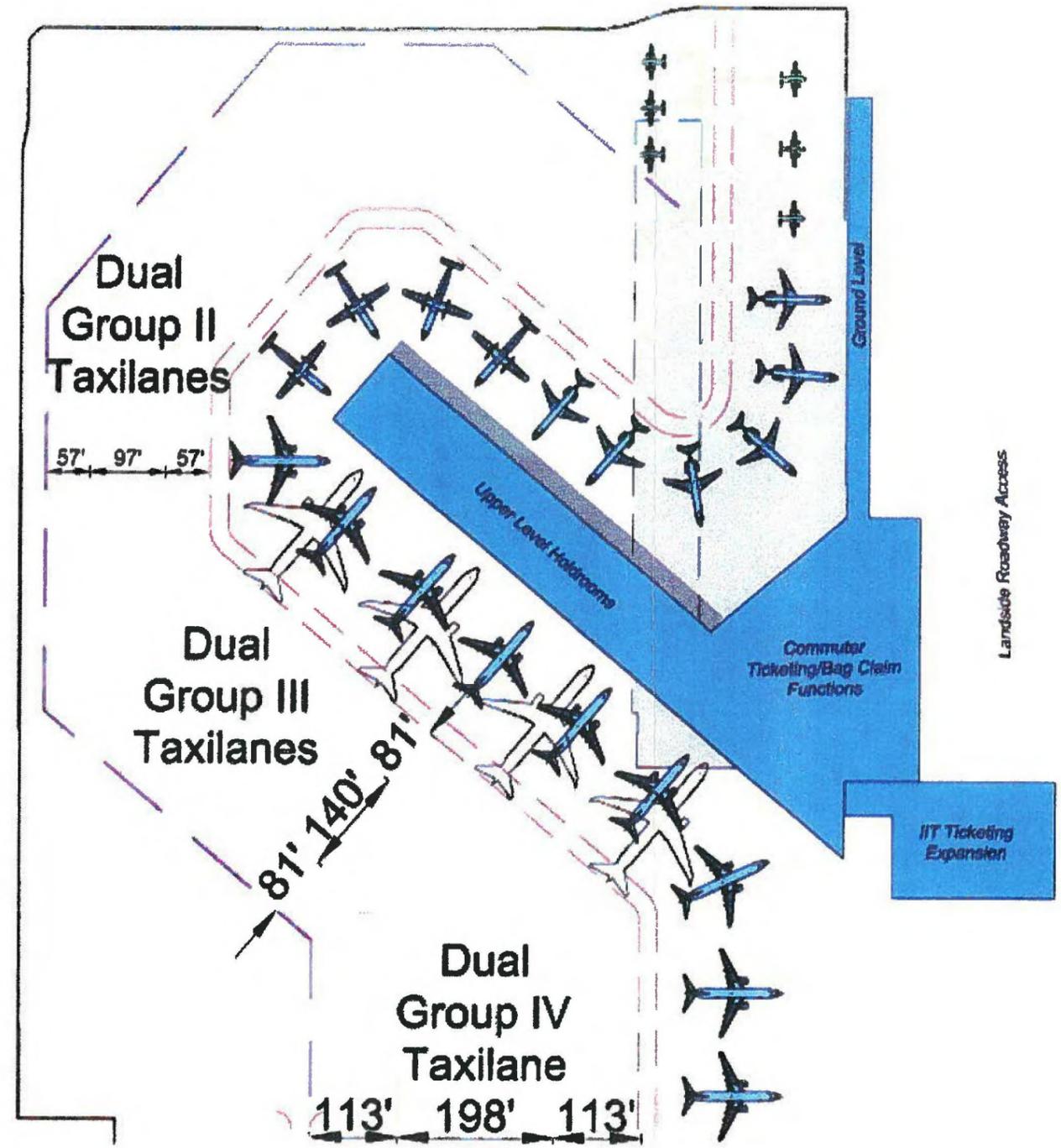


Figure 40 - MAIN TERMINAL BUILDING EXPANSION (NON HATCHED AREAS)

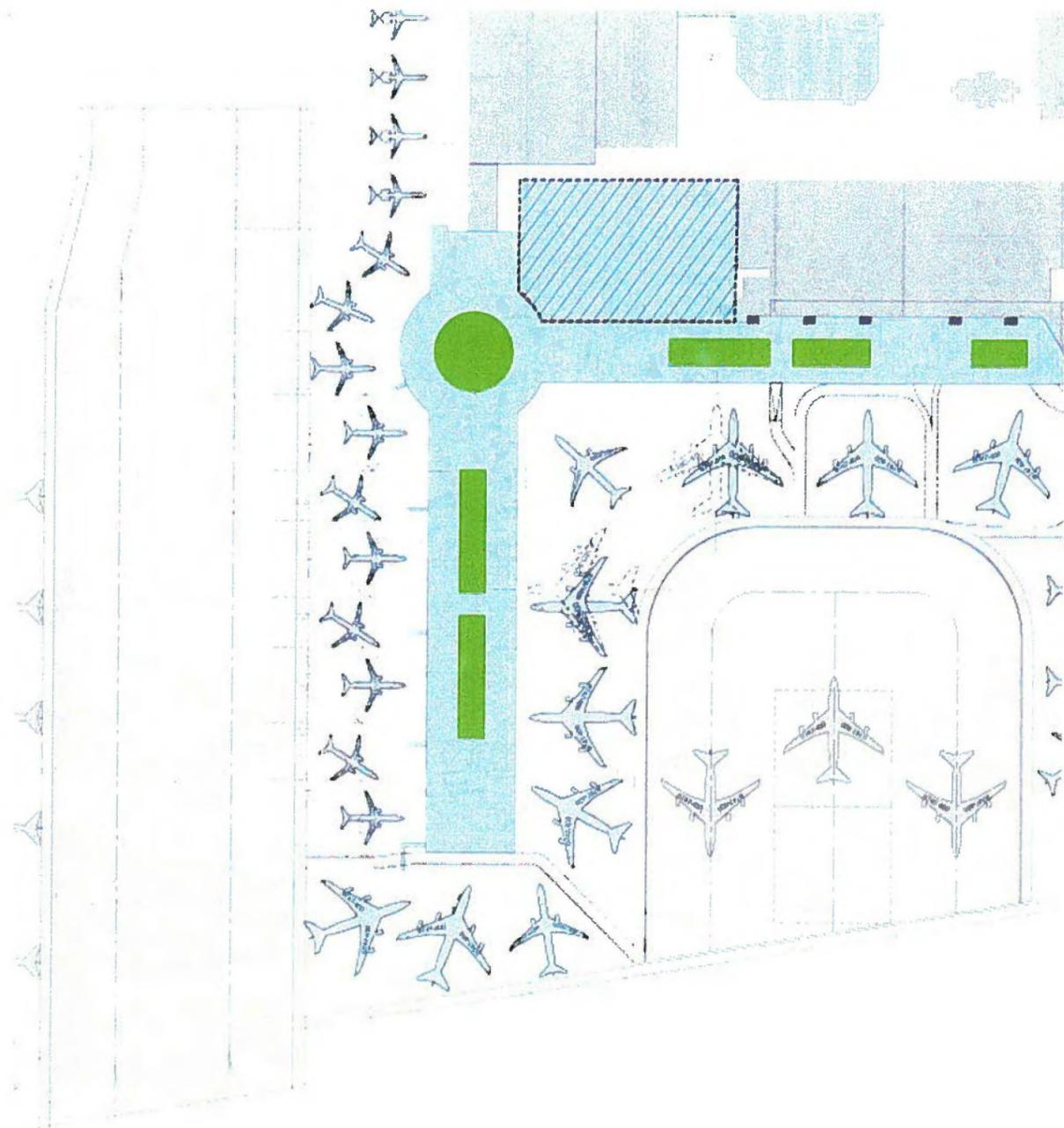


L-CONCEPT

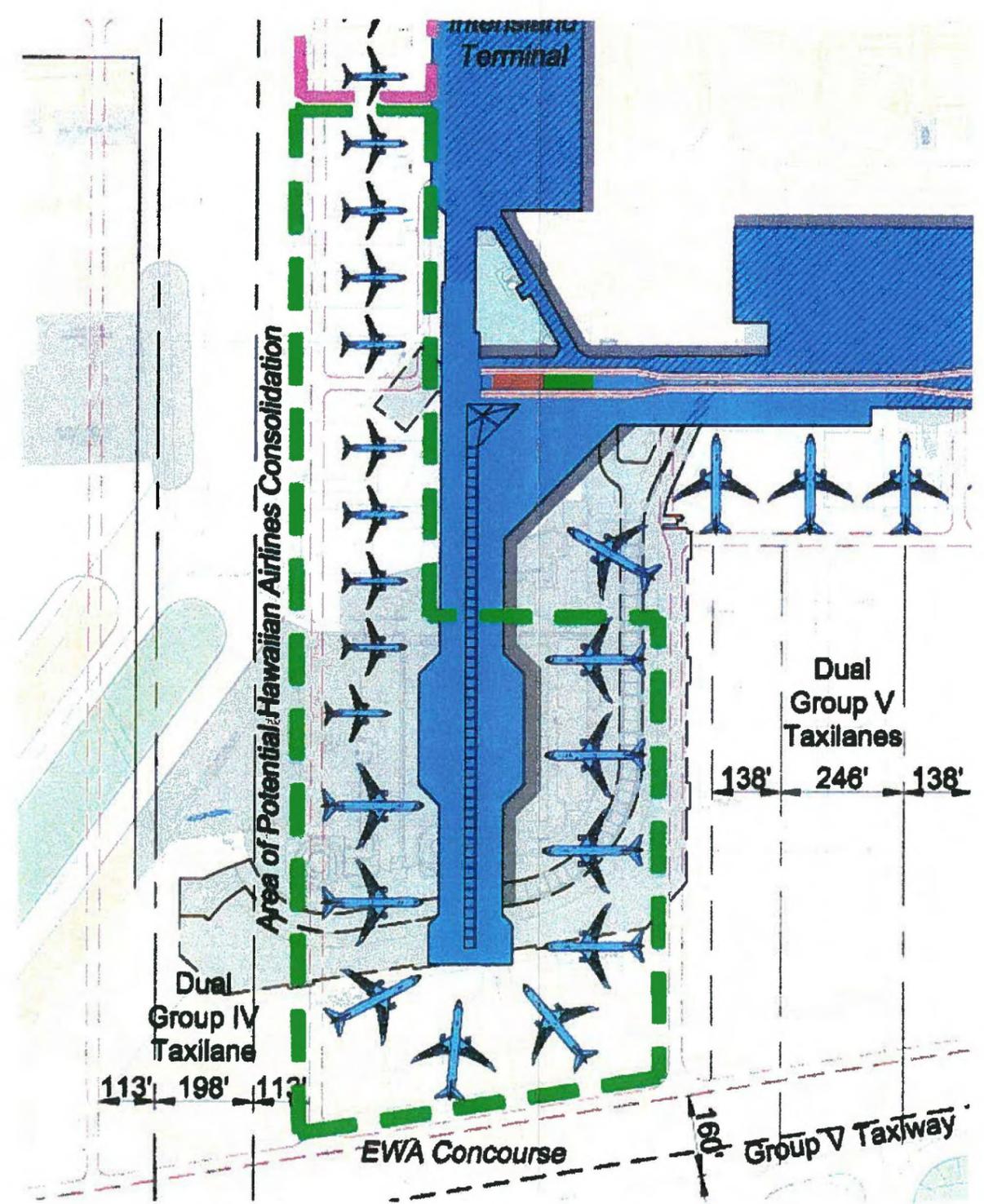


Y-CONCEPT

FIGURE 41 - DEVELOPMENT CONCEPTS FOR INTERISLAND TERMINAL MAUKA PIER



CONCEPT A



CONCEPT B

FIGURE 42 - EWA CONCOUSE DEVELOPMENT OPTIONS

Concept A is shown in Figure 43 and is a shortened version of the Baseline Alternative which avoids impacting the Runway 4-22 complex. By the end of the short-term phase, the concourse will have 17 gates, 13 design group IV and 3 design group V aircraft. The mauka (north) gates will be serviced by a single taxiway. This alignment shows the new "Waikiki" concourse being constructed and a concession node at that juncture. The location of the "Waikiki" Concourse provides for an additional taxilane between the Central and "Waikiki" concourses.

Concept B is shown in Figure 43 with a new curved-two pier concourse which allows for 15 gates for design group V aircraft. The majority of the existing Diamond Head concourse remains, and a concession node is created at the juncture of the Diamond Head concourse and the Overseas terminal.

6.3.1.4 Central Concourse

In **Concept A**, the central concourse is renovated to including sterile holdrooms and corridors for the deplaning of international passengers to transit to the international arrivals area.

In **Concept B**, the main terminal and central concourse are renovated to include additional Design Group III gates along the Y-portion of the central concourse, sterile holdrooms and corridors for deplaning international arrivals, and widening of the Overseas Terminal for passenger conveyance. The widened Overseas terminal will allow for passenger conveyance devices, such as moving walkways, to assist in the passenger mobility and allows passengers to view the various concessions. In addition, **Concept B** the central garden is proposed to be renovated and rejuvenated to enhance the passenger experience as discussed in the landscape subsection.

6.3.1.5 International Arrivals Facility

The international arrivals facility has been an issue at the Airport for over several decade. In past years, when international passenger demand was higher, there were long queues and gate holds for arriving international passengers. In current years, the levels of international passengers have dropped but capacity deficiencies still exist. The

aviation forecasts indicate that international arrivals will increase, and past capacity issues will come to light again.

In both terminal concepts, the current WikiWiki shuttle service is discontinued. It is recommended in both alternatives, that other passenger conveyance options, such as moving walkways, be implemented to reduce the assist the passenger's mobility throughout the terminals.

In **Concept A** there are no plans to modernize or increase the capacity of the international arrivals facility in the short-term. However, the sterile corridor in the central concourse and the recently constructed sterile corridor for the Ewa concourse will allow for more "walk-in" gates to the international arrivals facility.

In **Concept A**, as the international arrivals facility remains in the existing location, two intra-terminal bus systems are proposed; one system for the sterile international passengers on the aircraft apron, and one system for non-sterile passengers on the landside. The sterile bus system is proposed to use busses, with a 100 passenger capacity, to shuttle passengers from the aircraft to the international arrivals facility, until such time the Automated People Mover system is operational, which is beyond the 2020 planning period. The proposed landside bus system will use 26 passenger busses to transport passenger between terminals.

In **Concept B** a new international arrivals facility was proposed adjoining the curved Diamond Head Concourse. The new facility would be constructed in phases to meet the existing and forecast demand, with the first phase of the inspection level shown in Figure 44. The first phase would encompass approximately 425,000 square feet on two levels and is sized to meet current Department of Homeland Security, Customs and Border Protection requirements. The new international arrivals facility would access the roadway system off-of Aolele Street. The change in traffic will reduce congestion on the frontal road and at the Aolele Street and Paiea Street intersection, which is operating at a poor level-of-service. Combined with the new curved-Diamond Head concourse, the arriving international passengers will be able to "walk" to the international arrivals facility.

In **Concept B** the need for the APM system is not needed in the short-term, if a new international arrivals facility is constructed on the Diamond Head side. The international gates would be located at the Diamond Head and central concourses, therefore, allowing the international passengers to "walk" to the international arrivals processing area. For the longer walking distances, moving walkways will be used to shorten the actual distances walked.

For arriving international passengers, which need to transit to the interisland terminal, two options are proposed; 1) a landside bus system, or 2) a remote check-in for interisland terminal airlines, located prior to leaving the international arrivals facility. The volume of arriving international passengers transiting to the Interisland terminal was an approximation of 13 percent per flight, with it ranging from 0 to 20 percent depending on the flight's origin.

6.3.2 Long Term Development

The long term development of the terminal area is described below for **Concept A** and **Concept B**. The 33 MAP (to 2030) plan for **Concept A** is shown on Figure 45 and includes the following elements:

- the remainder of the Ewa Concourse;
- remainder of new connector building;
- new Automated People Mover System (APM);
- new Mauka 2 Concourse (Diamond Head side); and
- expanded or New International Arrivals Building.

The 33 MAP (2030) plan for **Concept B**, is shown on Figure 46 and includes:

- the remainder of the Ewa Concourse;
- new "Waikiki" concourse; and
- expansion of IAB.

As stated earlier, the terminal analysis went beyond the 33 MAP planning horizon to show an ultimate concept within the constraints of the terminal envelope. Using **Concept B**, the terminal could be further expanded to

meet a ultimate configuration which is shown on Figure 47 and includes the:

- expansion of the IAB;
- construction of third pier on the Diamond Head side for an additional nine widebody gates; and
- construction of APM, if required.

6.4 AIRPORT AND AIRLINE SUPPORT

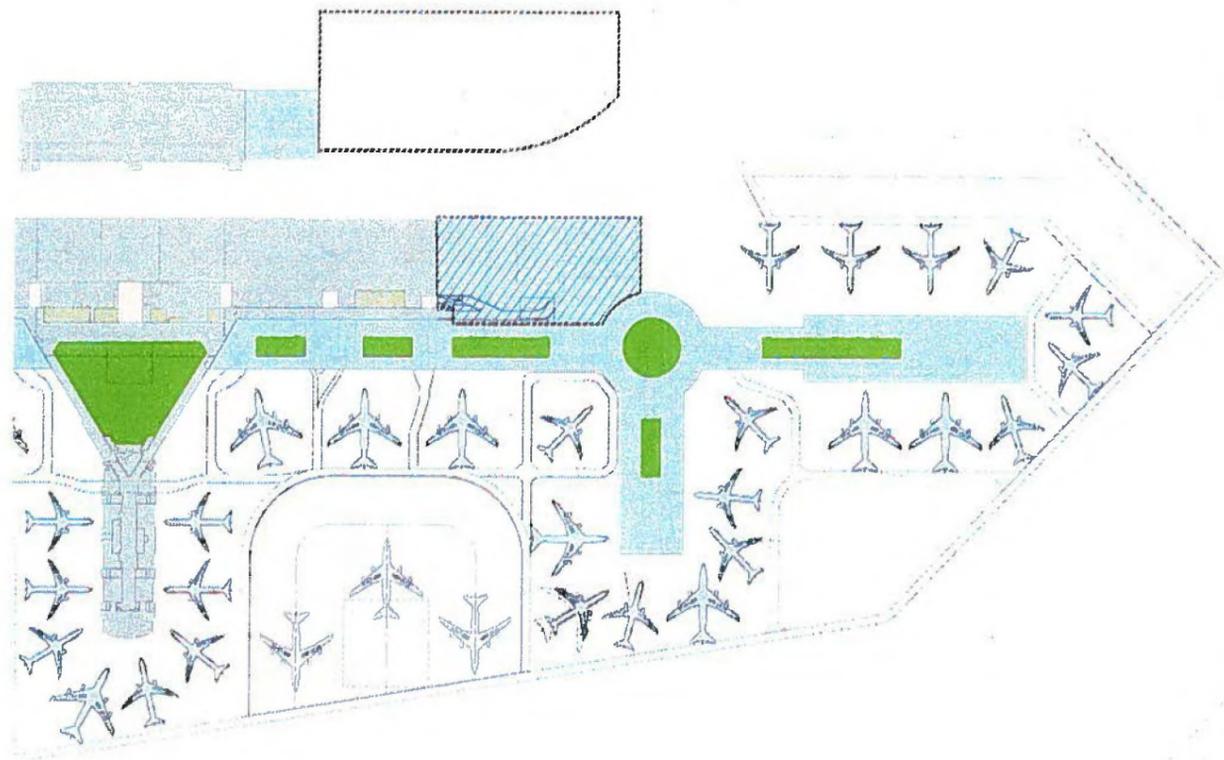
To support the modernization effort, various airline and airport support facilities will need to be relocated. As the Airport is landlocked, there will be a shortage of AOA accessible lands in the future, to support airline and airport facilities. The area slated for airport and airline support is the Hale Kinai Ahi/Elliot Street areas, the south ramp area, Kalewa Street subdivision and Ualena Street Areas.

6.4.1 Hale Kinai Hale and Elliot Street Redevelopment

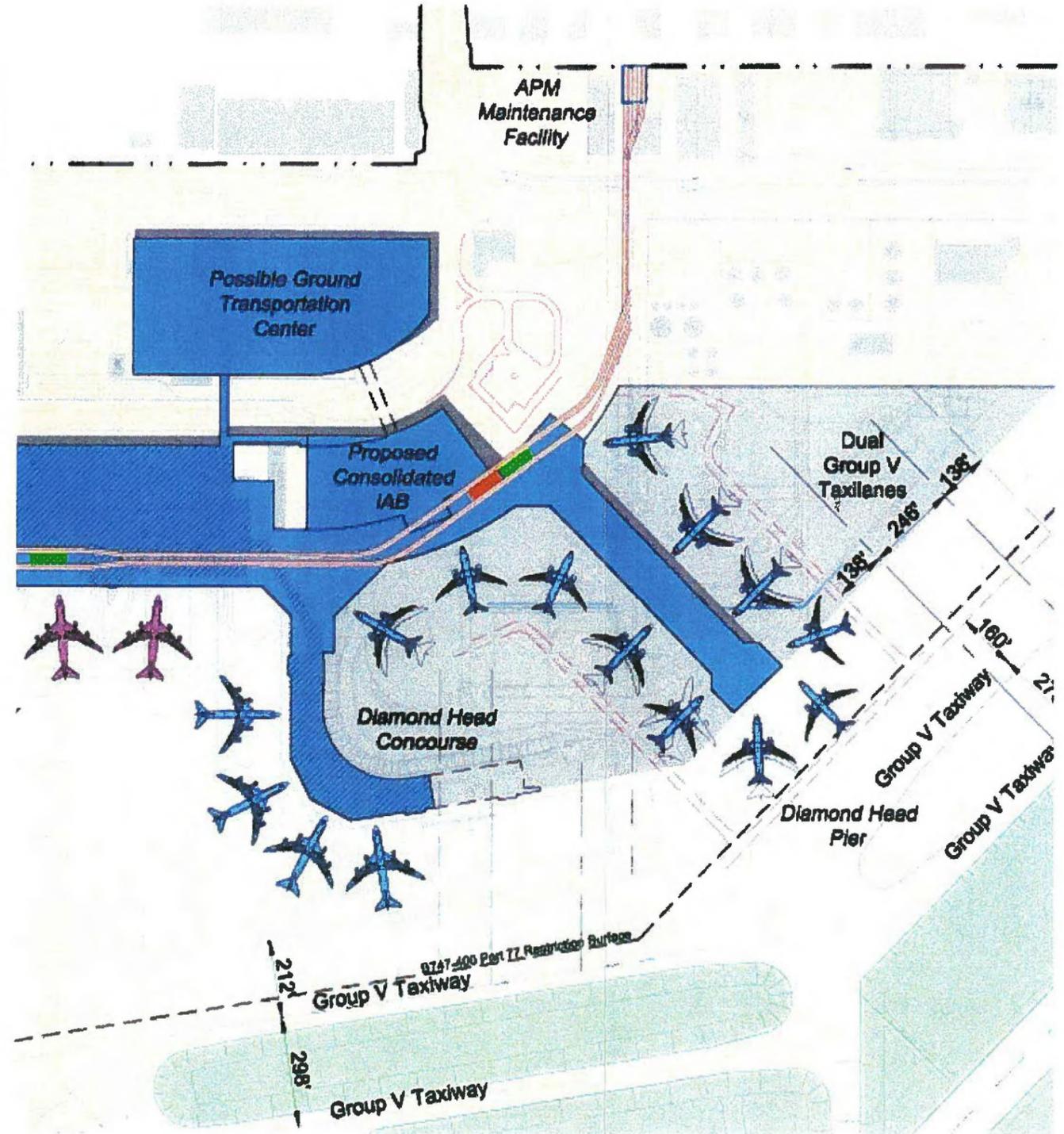
The realignment of taxiways G & L is to accommodate simultaneous taxiing of larger aircraft (Design Group V/IV) to and from the Interisland terminal. However, to realign the taxiways the existing facilities and functions in the Hale Kinai Ahi Street and Elliot Street area need to be redeveloped. In addition to relocation of current uses, the redevelopment must include the uses from the Ewa Service Court which is slated for demolition.

The redevelopment should include the following uses: new air cargo facility with an integrated joint inspection facility, a new aircraft maintenance facility, GSE facility, employee parking, and airport and airline support facilities. In both concepts, the existing parking lot for the commuter terminal and the existing mauka pier are demolished.

The joint inspection facility is to be used by the various state and federal agencies, such as the Hawaii Department of Agriculture-Plant Quarantine Branch, U.S. Department of Agriculture, et.al. to comply with Hawaii's Biosecurity law (ACT 236 (08)). This facility would service the Ewa-side cargo operators, and would be either the main facility or satellite facility depending on which air cargo operators are placed on the Ewa side.



CONCEPT A



CONCEPT B

FIGURE 43 - DIAMOND HEAD CONCOURSE DEVELOPMENT OPTIONS

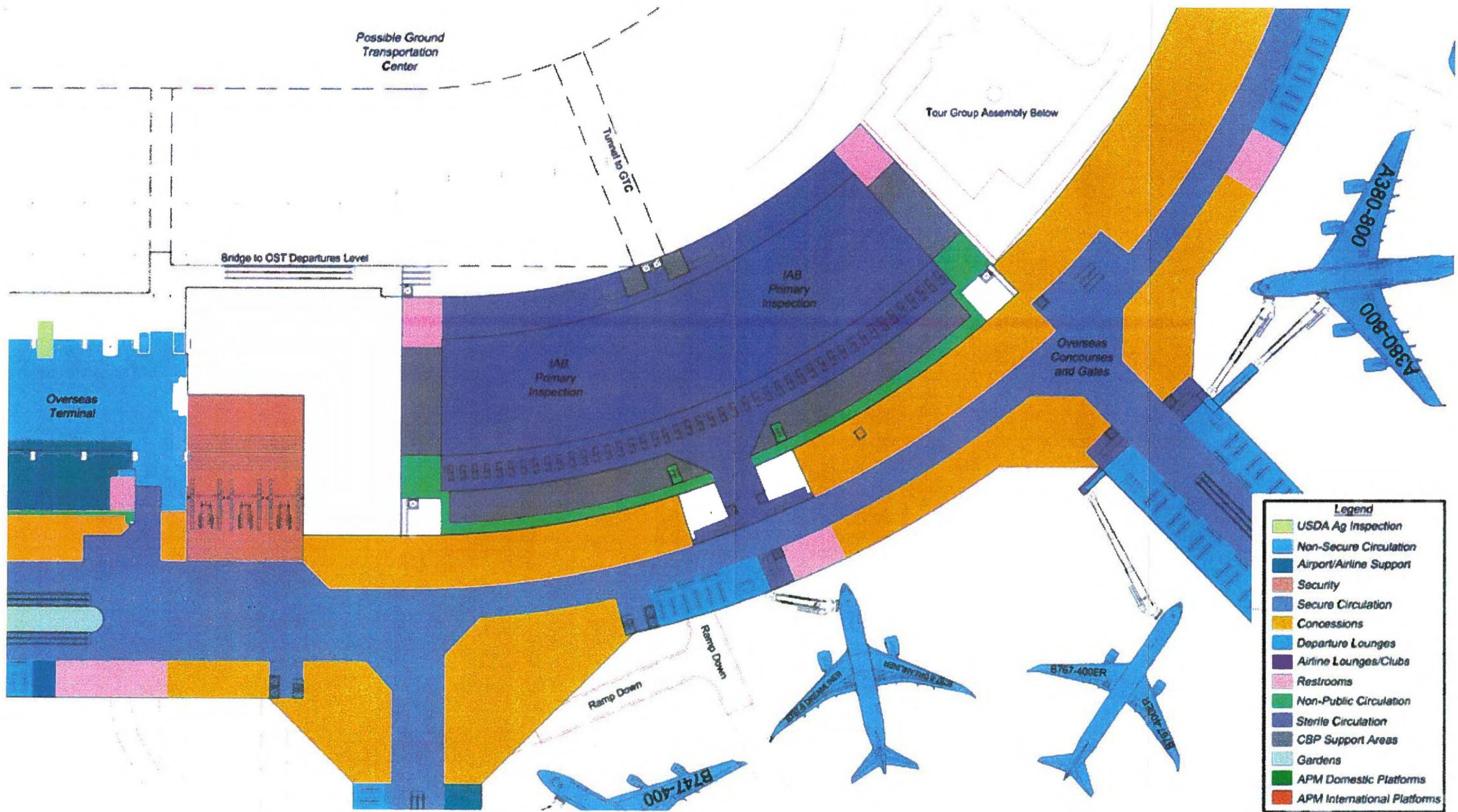


FIGURE 44 - DIAMOND HEAD INTERNATIONAL ARRIVALS FACILITY INSPECTION LEVEL (GROUND FLOOR)

33 MAP

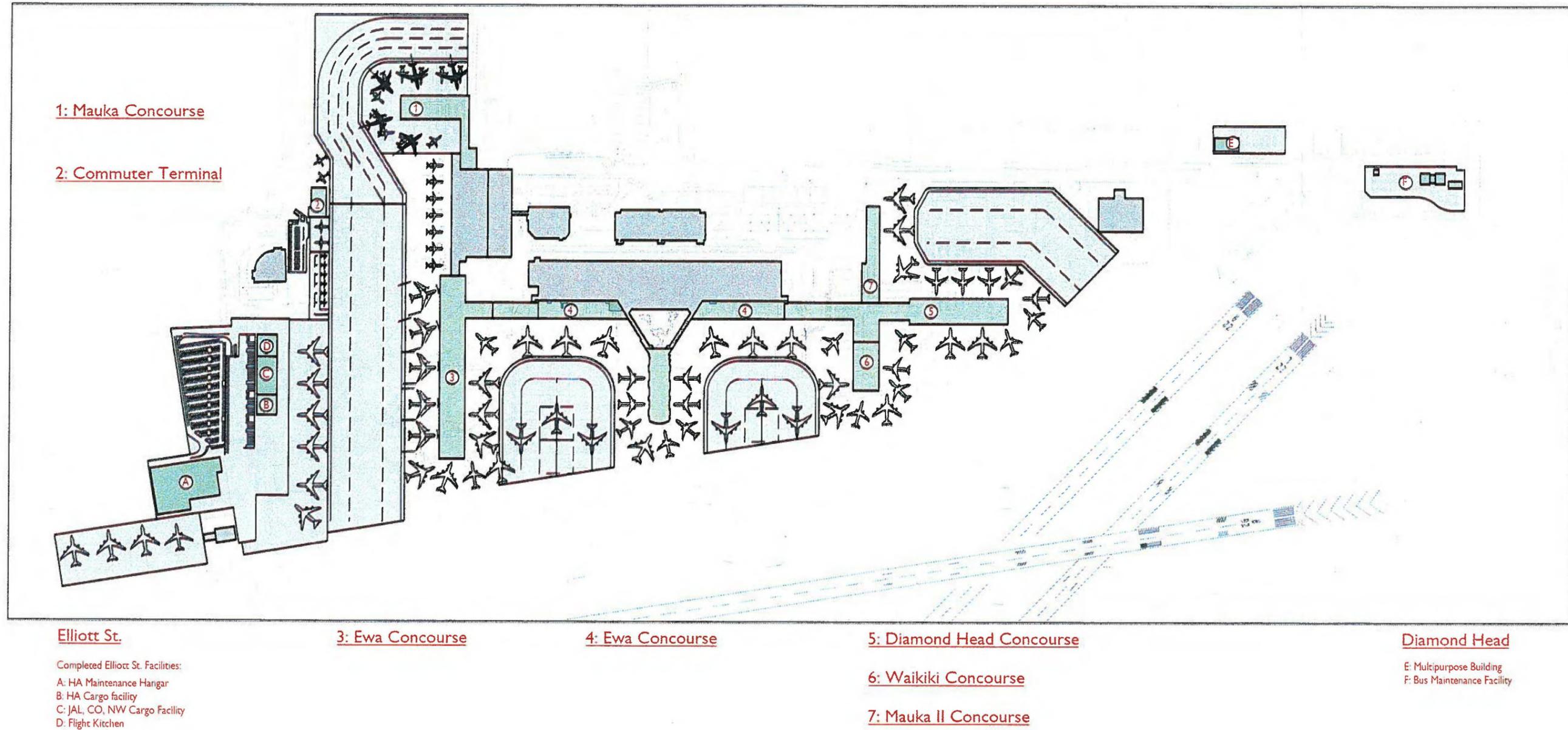


FIGURE 45 - CONCEPT A 2030 DEVELOPMENT

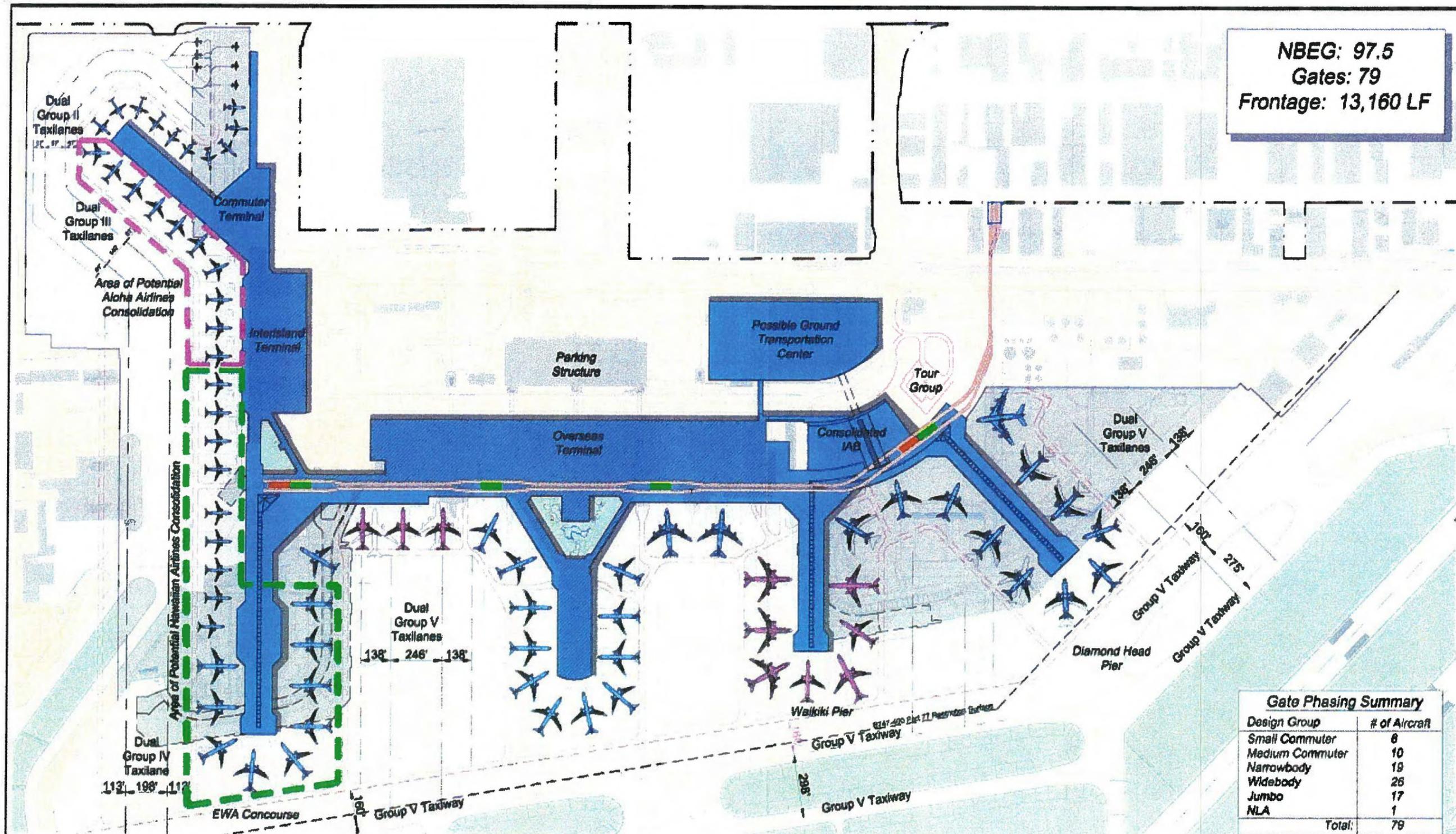


FIGURE 46 - CONCEPT B 2030 DEVELOPMENT

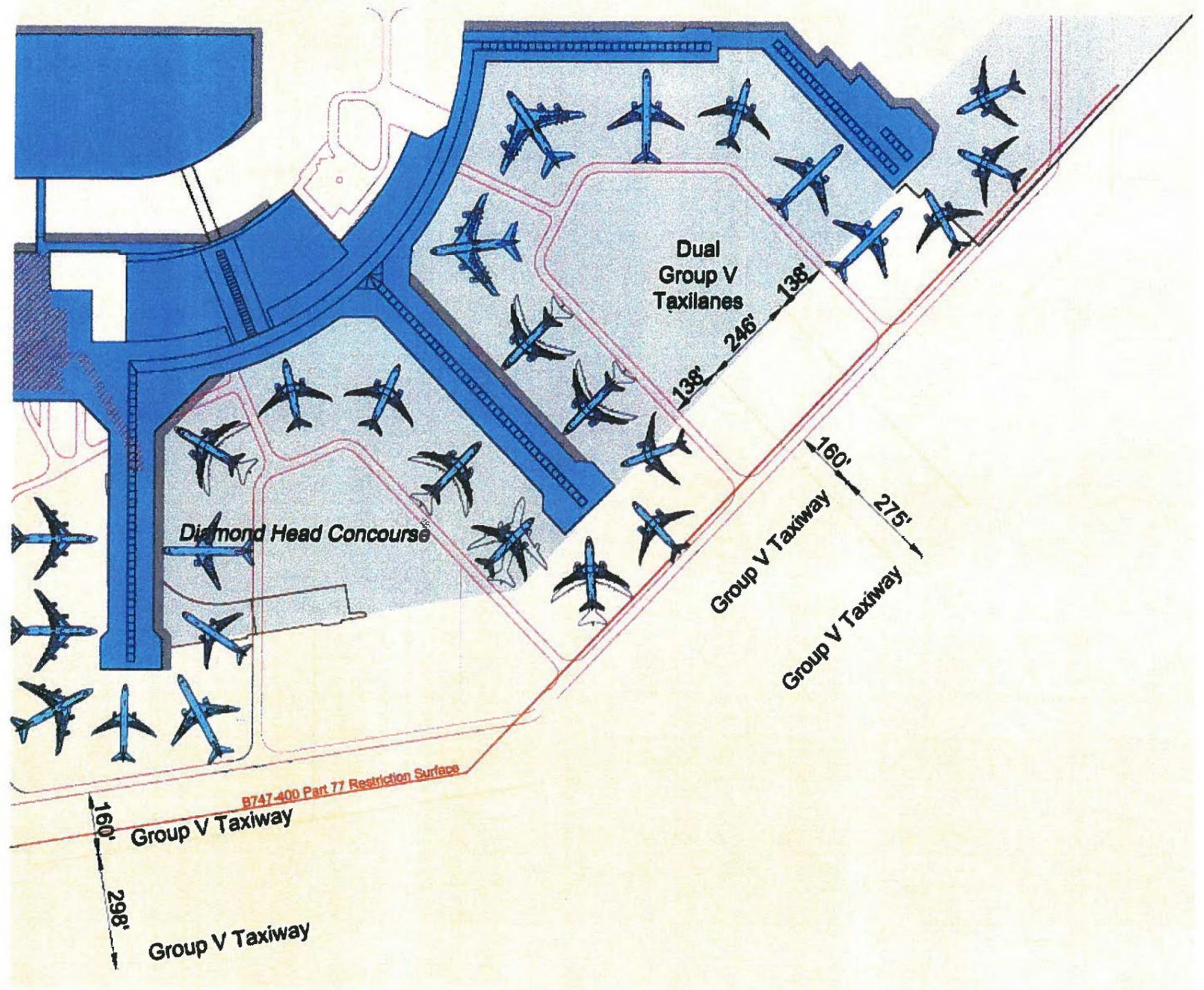


FIGURE 47 - CONCEPT B, DIAMOND HEAD CONCOURSE ULTIMATE

6.4.2 Ualena Street

On the Diamond Head side, the use of the Ualena Street properties are the only available land. To increase the AOA accessible lands, it is proposed that Aolele Street be closed from Diamond Head of the freeway ramps to the Airport Baseyard driveway. The traffic will be rerouted to Ualena Street with a cross- street east of the freeway on- and off-ramps. The covering of the Kaloaloe Canal would increase the usable land area and also provide better access to the Ualena Street parcels. The Baseyard will maintain access to Lagoon Drive on the remaining section of Aolele Street.

The development in Figure 48 present a initial concept for the Ualena street areas, encompassing various uses including a City and County of Honolulu Rail Station, air cargo, joint inspection facility¹⁸, aircraft hardstand, employee parking and airline and airport support facilities. The HDOT-A should continue the planning effort, by pursuing a development plan concept to maximize the use of the lands and maintain the flexibility for the long-term expansion capacity for the terminal complex.

6.4.3 South Ramp and Kalewa Subdivision

In the short-term, the uses of the South Ramp of the airport will continue as planned and shown in the HNL 2010 Master Plan. The uses will continue to develop with tenant improvements for uses such as air taxi, helicopter companies, fixed base operators (FBO), air cargo, aircraft maintenance and general aviation. In the future, as general aviation continues to relocate to Kalaeloa Airport and the demand for the general aviation T-hangars reduces, the general aviation area should be redeveloped to support the expansion of the land uses in the south ramp area.

¹⁸ It should be noted that if the majority of international air cargo is being processed through the air carrier cargo facilities on the Diamond Head side, then the main joint inspection facility should be located on the Diamond Head side.

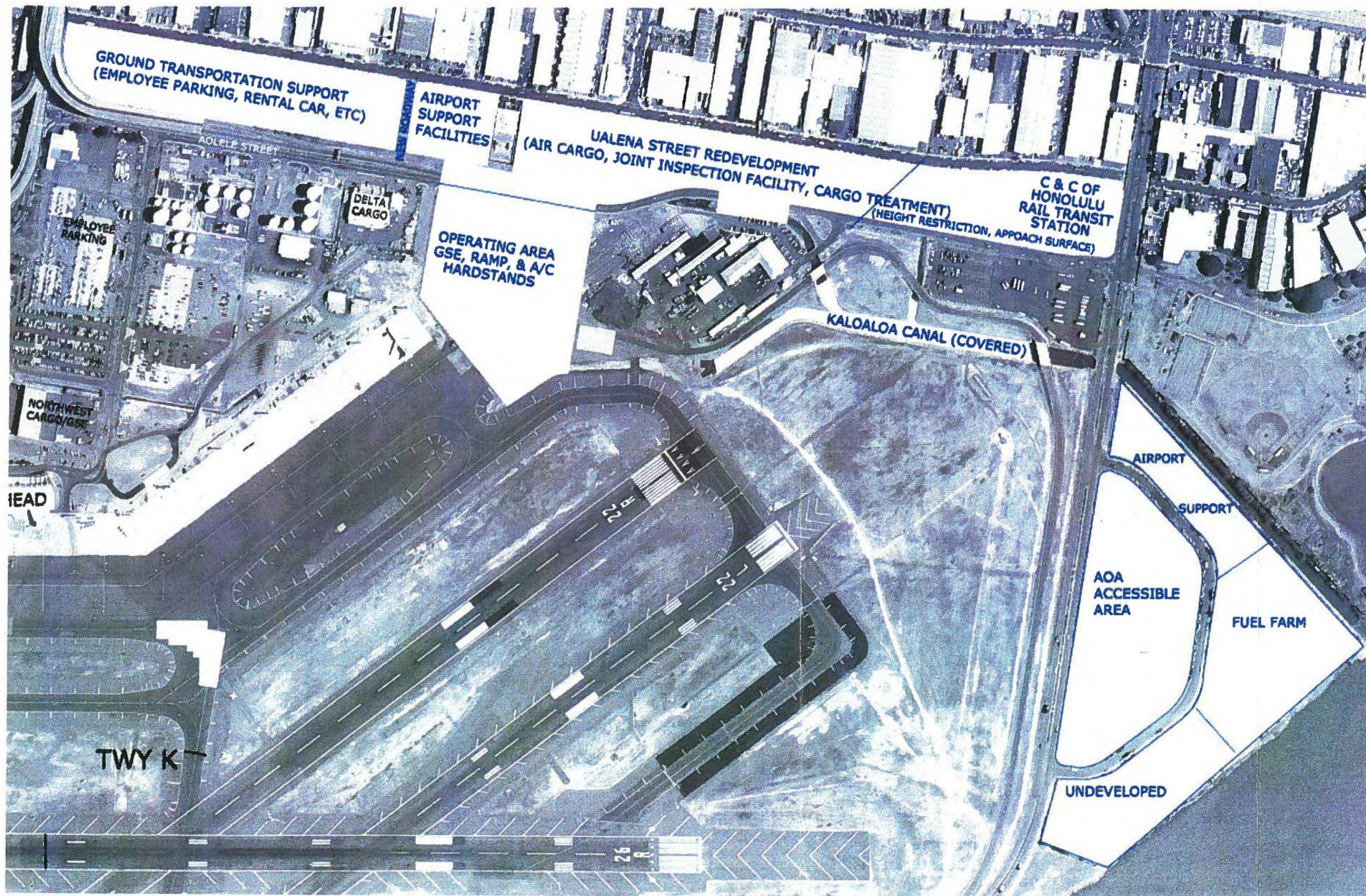


FIGURE 48 - UALENA AND KALEWA STREET DEVELOPMENTS

In the long-term, the Kalewa subdivision should be redeveloped to provide additional AOA lands. One possibility is to reroute Lagoon Drive to increase the land area which has accessibility to the AOA, as shown on Figure 48, or provide an underpass for GSE vehicles similar to the Postal Road near the existing Commuter Terminal. The additional AOA accessible lands would be used for airport and airline support functions, such as the baseyard, aircraft hardstands, and GSE support and facilities. The current uses such as the car sales should be relocated off-of the airport and the existing car rental maintenance areas relocated to areas without AOA access. The fuel farm is proposed to be relocated to the Kalewa Subdivision as it is in close proximity to the existing supply lines. The new fuel farm and new transmission lines to the AOA are required to meet all federal and state rules, regulations and building standards at the time of design and construction.

6.4.4 Access and Parking Plan

The access roadways to the Airport will remain the same, with the majority of vehicles using the H-1 freeway on- and off-ramps. The other access points will be Lagoon Drive for South Ramp, Rodgers Boulevard for vehicles coming to and from Nimitz Highway, and Elliot Street to access the Ewa airport and airline support area. The significant change will be the addition of the City and County of Honolulu's Light Metro rail system, which is scheduled to be in service to the Airport by 2018. The current proposed alignment from the City and County of Honolulu is shown on Figure 12, and may cause constraints to the future development of the airport, by imposing increased security clear areas between the rail, and the AOA and the passenger terminals.

6.4.4.1 Short-term Developments (To 27 MAP, to 2020)

Ground Transportation Complex. HDOT-A will be required to develop the area bounded by Aolele Street and the frontal roadway system. This area currently housing two public parking structures, the car rental parking and operations facilities, and will serve as the main ground transportation area for the Airport. The development of this area should correspond to the HDOT-A choice of the location of the international arrivals facility. If the international arrivals facility is located on the Diamond Head side of the Main terminal building, it will require a ground

transportation service court to incoming international tour groups, passengers and baggage, similar to the current Ewa ground transportation area. The area will need to accommodate buses, baggage vehicles, vans, limosines and taxis.

Given the compact space and complexities of the movement of people, baggage and various mix of vehicles, it is recommended that the HDOT-A initiate a detail development plan for this area. The plan should consider the traffic movements and facilities to serve vehicles and pedestrian traffic, requirements such as:

- an additional 500 public parking spaces;
- a consolidated rental car facility;
- potential ground transportation service court for international arrivals on the Diamond Head side of the Overseas Terminal;
- various vehicle queuing and heights;
- light rail station and track;
- existing uses such as the lei stands, solar panels and USDA; and
- covered walkways for pedestrian safety and comfort¹⁹.

Employee Parking. The Hale Kinai Ahi Street / Elliot Street development should include the construction of a parking structure to accommodate approximately 1,800 employee parking stalls. This will accommodate the displaced employee parking stalls in the interisland cargo and maintenance area, and the Ewa concourse service court. The footprint of the structure would be similar to the new 1,800 stall parking structure constructed between the Interisland and Overseas terminals.

Another employee parking structure for 2,000 stalls is proposed on Ualena Street, Ewa of the Airport Center, to accommodate the employee parking demolished by the new Diamond Head concourse. The walking distance to the terminals would be slightly longer than from the current employee parking lot on Aolewa Place.

¹⁹ If the rail station is placed on the mauka side of the OST parking structure, at about 600 feet from the OST terminal, it would be an approximate 3 minute walk.

6.4.4.2 Long-term Developments (27 to 33 MAP, 2020 to 2030)

The long-term terminal parking demand will increase and will require an additional 3,500 public parking stalls by 2030. The long-term development should be dictated by the Ground Transportation Complex development plan recommended in the Short-term and also dependent on the HDOT-A international arrivals facilities development.

6.5 AIR CARGO

The development of the air cargo facilities on the North Ramp will be dependent on the phasing and relocation of the terminal development. The realignment of taxiways G & L requires the relocation of Aloha Cargo, and Hawaiian Airlines Cargo. The development of the Ewa Concourse relocates the Japan Airlines and Continental Airlines cargo facilities, the Hawaii Department of Agriculture offices for Plant Quarantine and Animal Quarantine.

The initial development of the Diamond Head concourse will relocate the Northwest cargo and GSE facility in both concepts. In Terminal **Concept A**, the Delta cargo facility is impacted when the north gates and north "Mauka Pier 2" is constructed. In Terminal **Concept B**, the Delta and United Cargo facilities are not impacted by 2030, but will be if the ultimate configuration is developed.

As stated earlier, the recommended plan would be to have two cargo areas on the north ramp, to avoid the excess ramp and apron congestion. Therefore, there will be a cargo developed next to Taxiway L on the west (Ewa) side and a cargo development along Ualena Street on the east (Diamond Head) side. Both facilities should be designed to accommodate the storage of perishable commodities and to house the joint inspection facilities for State and Federal agencies, for both enplaned and deplaned cargo. In addition, commodity treatment facilities should be allowed to be developed to minimize cargo handling and transport.

6.6 LANDSCAPE PLAN

The landscape theme at HNL should be distinct and unmistakably associated with Hawaii, her people and their culture. At the core of Hawaiian culture is the

spirituality of the Hawaiian people as exhibited through religion, legend, mythology, and traditional practices. Hawaiian landscape elements further enhance the essence of Hawaii as a unique place. These elements include plants and water.

Other important theme elements that can be used or demonstrated at the HNL are the geographic isolation of the islands, its fragile environment and ecosystem, and its history of voyaging and discovery.

Following the axiom of "less is more", the overall landscape at the HNL should be simplified for both aesthetic and management reasons. It is more desirable and easier to appreciate the exterior environment when composed of few visually strong elements than many disparate components. A cohesive landscape will also result in a more memorable experience. Some specific guidelines include:

- simplifying the plant palette by reducing the number of plant types used;
- arranging plantings in masses rather than single plants; and
- minimize the use of plants requiring excessive maintenance, such as shrubs pruned into hedges or topiary-like shapes.

One of the most important aspects of the Hawaiian culture and lifestyle is the relationship between the indoors and outdoors. The mild climate allow for the free flow from the inside to the outside and vice versa. This quality should be utilized and enhanced wherever possible throughout the HNL. Several concepts are presented in Appendix E.

Equal in importance to a sound landscape master plan is the establishment of an integrated landscape management program. First and foremost is a commitment to managing the entire landscape as an integral part of the HNL facility and not viewed as a long-term maintenance concern and budget issue.

6.6.1 Rejuvenation of Terminal Gardens

The cultural gardens within the Central Concourse are aging, and the proposed improvements will improve and redevelop the garden. The proposed plan calls for the demolition of the existing building, which houses the restaurant and "Garden Conference rooms," to improve the

visual and passenger access to the gardens from the concourse level. This will create a stronger visual statement and observation of the gardens below and allow more natural light and air to the garden. It is recommended that a major renovation be completed that retains the essential features and design themes of the original plan. The renovations should include the soil, irrigation and water feature equipment, selective removal or replacement of existing trees, and incorporate selected new plants. In addition, central Gathering Place or Great Lawn area should be included into the renovation, to create a sense of green open space and enclosed by Coconut planting (Coconut Grove), which could be a performance venue. It is proposed that a new restaurant be constructed at the apex of the "Y" in the central concourse with viewing or opened to the gardens.

The "C.B. Lansing" garden in the Interisland terminal is newer, however similar to the central gardens, it should be integrated with the terminal. Enhancements such as a large water feature or a focal feature should be considered.

6.6.2 Roads and Parking

The goal is to have a well-maintained and attractive landscape to make this experience as pleasant as possible. Signage and sight clearances are also important characteristics with respect to the landscape treatment. The key elements are:

- simplify plantings and avoid numerous types of species planted together;
- add accent plants, plants with color or unusual foliage, where visually important, such as key intersections;
- retain coconut as major plantings; and
- retain shade trees, particularly in open parking areas and add additional shade trees on major roads.

6.6.2.1 Ground Level Terminal Frontage Road

The main hurdles in creating an attractive and sustainable landscape are the harsh conditions encountered along the frontage road. These areas

are typically narrow spaces, and with limited sunlight. It is recommended that:

- the soil be rejuvenated as the areas have been compacted and depleted of nutrients;
- install accent plants, preferably native or tropical (non-invasive) species which will provide interest; and
- enhance bare areas with plantings or other materials such as mulch, decorative rocks or large stones.

6.6.3 Screen Structures

Screen plantings should be used to visually screen the terminal and parking structures from roadways and highways. Some possible techniques include:

- "green walls," which are light weight structures which allow plants to grow onto them;
- large screen plantings, such as large clumping palms or accent plants; or
- planters which could be installed along visually important walls to soften the impact of the structure.

6.6.4 Focal Feature

In the 1960s and 1970s there was a large lava rock fountain in the Arthur Godfrey Circle, which was demolished for the construction of the freeway ramps. As HNL serves as the most important entry and departure point of Hawaii, it is important that HNL possess a memorable image.

One option is to use the most iconic feature at the airport, which is the "old" control tower, primarily because it is the highest vertical structure within the terminal area. Possible improvements are to:

- repaint the terminal in new colors or patterns;
- redesign the tower, by adding a new roof structure which is unique to the Hawaiian style; or
- change or improve the signage by the addition of graphic images associated with Hawaii.

A second option would be to create a entirely new focal feature with the key considerations being:

- visibility from the freeway ramps and ground level roadways;
- incorporating artwork with a distinct and identifiable Hawaiian theme; or
- integrate water at both the upper and lower sections of this feature.

6.7 ADJACENT LAND USE

6.7.1 Hickam Air Force Base

As HNL is a civilian and military joint use airport with Hickam Air Force Base, there is constant coordination between the users. However, as Hickam Air Force Base operations and facilities increase, there will be added aviation demand, lack of available land area for expansion, and potential environmental issues, such as with aircraft noise. Therefore, HDOT-A and HAFB should maintain close coordination on the various developments and operational and maintenance concerns.

6.7.2 Keehi Lagoon and Lagoon Drive Marinas

The HDOT-A should continue coordination with HDOT-Harbors Division and of Hawaii, Department of Land and Natural Resources, Boating Division as plans and concepts are developed for the Keehi Lagoon area. If the expanded use of Keehi Lagoon becomes feasible and a reality, HDOT-A should be a tenant in the area as it provides opportunity to expand or relocate certain airport users off-of the Airport proper. HDOT-A should monitor these plans as it may impact the traffic, sealanes and the mitigative bird islets. These developments would need to be approved by both Federal and State of Hawaii agencies.

6.8 AIRPORT UTILITY PLAN

The airport utilities such as electrical, communication, water, sewer and drainage are discussed below.

6.8.1 Electrical Power

Based on the analysis on the current power system and projected loads, the HECO Airport substation has sufficient capacity to support the existing airport load and the forecast facility requirements. If necessary, HECO could add a third 50 MVA transformer to the Airport Substation.

Although the HECO system has adequate capacity, it is recommended that HDOT-A implement an electrical infrastructure study to assess the impact of the future terminal expansion, and proposed phasing plan, on the existing electrical infrastructure and to develop a systematic and logical approach for future modifications to the HNL electrical infrastructure, cabling, equipment and facilities. This study would also address emergency power for life safety and security systems, as the new terminal expansion plans are phased in, including additional of new emergency power distribution centers will also be required.

HDOT-A should continue its effort to develop alternate energy sources when practical, such as the solar photovoltaic (PV) generating system. In addition, the capacity of the standby power plant will probably also need to be increased with more 2.5 kW generator units.

6.8.2 Water

The HDOT-A should follow the recommendations for the water master plan²⁰ which states: *"to increase the distribution capacity of the water system to deliver 4,000 gpm while maintaining a residual pressure of 20 psi under Maximum Daily demands, existing pipes were upsized and new pipes were added. Existing 6 and 8-inch pipes were upsized to 12-inch. New 12-inch pipes were added to complete the loop to the existing system."*

6.8.3 Communication

The systems for the Hawaiian telephone, State telephone switch rooms, and the specialty communications systems should be upgraded and

²⁰ Sato & Associates, Inc., "Honolulu International Airport, Water Utilities Master Plan," March 2007.

increased in capacity. It is recommended that an communications system infrastructure study to assess the impact of the future terminal expansion, and proposed phasing plan, on the existing communications infrastructure and to develop a systematic and logical approach for future modifications to the HNL communications system infrastructure, cables and facilities. This study should include a common information transport (cabling) system to minimize the haphazard installations found on the existing terminal buildings. This common information transport system will also require the establishing core communication rooms in strategic portions of the terminal buildings. Issues concerning security and code requirements must also be addressed.

6.8.4 Drainage

Based on the analysis of the two major structures, the Manuwai Canal and the Kaloaloe Canal. The analysis shows that the Manuwai Canal may flood Taxiway A during a 24-hour 50 year storm event. The Kaloaloe Canal has sufficient capacity for a 24-hour 50 year storm event. HDOT-A should initiate a more detailed study of both canals to ensure adequate drainage capacity for HNL, and to analyze alternatives which would be feasible and operationally acceptable to improve drainage capacity, especially for the Manuwai Canal.

6.8.5 Aviation Fuel

The development of the terminal area and the aging infrastructure will require the replacement and rerouting of the fuel lines and relocation of the fuel hydrants on the hardstands. The fuel farm may need to be relocated due to the development of the terminal or due to the age of the fuel farm. The Master Plan has the fuel farm relocated to the Kalewa subdivision next to Keehi Lagoon. These new facilities including any associated pipelines will need to meet all Federal and State requirements, including containment and spill prevention measures to prevent impacts Keehi Lagoon.

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APPENDIX A

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APPENDIX B

TERMINAL FACILITY REQUIREMENTS

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Space (sq. ft.)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Overall Airport Statistics					
Annual Domestic Overseas Passengers	8,417,617	8,417,617	9,523,800	12,191,100	15,605,500
Annual International Overseas Passengers	4,335,115	4,335,115	4,761,900	5,834,400	7,112,000
Annual Interisland Passengers	7,255,859	7,255,859	7,778,100	8,938,200	10,271,400
Annual Commuter Passengers	70,870	70,870	75,900	87,300	100,300
Peak Hour Passenger Statistics					
Peak Hour Enplaned - Overseas Domestic	3,370	3,370	3,810	4,880	6,250
Peak Hour Enplaned - Overseas International	1,820	1,820	2,010	2,450	2,990
Peak Hour Enplaned - Interisland	1,340	1,340	1,430	1,650	1,890
Peak Hour Enplaned - Commuter	19	19	20	25	28
Total Peak Hour Enplaned	5,340	5,340	5,890	7,190	8,800
Peak Hour Deplaned - Overseas Domestic	3,220	3,220	3,640	4,670	5,970
Peak Hour Deplaned - Overseas International	2,540	2,540	2,810	3,420	4,170
Peak Hour Deplaned - Interisland	1,580	1,580	1,690	1,950	2,240
Peak Hour Deplaned - Commuter	19	19	21	26	29
Total Peak Hour Deplaned	4,660	4,660	5,140	6,280	7,680
Aircraft Parking Positions (International in Parenthesis)					
Small Commuter (Cessna)	-	-	-	-	-
Medium Commuter (CRJ200/DH8)	-	-	-	-	-
Large Commuter (CRJ700/Q400)	-	-	-	-	-
Narrowbody (B737/A320)	-	-	-	-	-
B-757	-	-	-	-	-
Widebody (B767)	8	17(7)	19(8)	22(9)	25(10)
Jumbo (B777/A340/B747)	21(19)	12(11)	14(12)	16(15)	19(18)
NLA (A380)	-	-	1(1)	2(2)	2(2)
Total Gates:	29	29	34	40	46

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Space (sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Terminal A (100,000 sq ft)					
Ticket Counter					
Number Check-in Positions	130	66	71	77	79
Total Length Counter (Lif)	730	330	355	385	395
Area	9,692	3,900	3,950	3,850	3,950
Ticketing Queue	24,802	11,550	12,430	13,480	13,830
Airline Ticket Offices	34,434	11,880	12,780	13,560	14,220
Baggage Claim					
Claim Devices Required	16	11	11	13	14
Linear Frontage Required	2,828	2,260	2,260	2,790	2,960
Baggage Claim Hall	73,262	67,800	67,800	83,700	88,800
Baggage Services	6,751	3,200	3,200	3,600	4,000
Clubs/VIP Lounge	15,551	17,500	17,500	21,000	21,000
SubTotal:	164,492	115,230	117,260	139,490	145,800
Terminal B (100,000 sq ft)					
Ticket Counter					
Number Check-in Positions	90	64	67	72	77
Total Length Counter (Lif)	540	320	335	360	385
Area	8,922	3,200	3,350	3,600	3,850
Ticketing Queue	17,781	11,200	11,730	12,600	13,480
Airline Ticket Offices	29,041	11,520	12,060	12,960	13,860
Clubs/VIP Lounge	22,234	17,500	17,500	21,000	21,000
SubTotal:	77,978	43,420	44,640	50,160	52,190
Terminal C (100,000 sq ft)					
Outbound Bag Make-Up					
Inbound Bag Delivery	422,774	175,030	211,470	252,700	290,470
Checked Baggage Screening	inc abv	20,000	20,000	23,750	27,500
Airline Operations	196,192	96,900	115,200	136,500	156,900
Other Airline Offices and Support	3,618	6,500	6,900	7,450	7,800
SubTotal:	622,684	318,830	376,270	447,600	517,870
Terminal D (100,000 sq ft)					
Air Carrier Gates					
Small Commuter	-	-	-	-	-
Large Commuter	-	-	-	-	-
Regional Jet	-	-	-	-	-
Narrowbody (B737/A320)	-	-	-	-	-
B-757	-	-	-	-	-
Widebody (B767)	-	59,500	66,500	77,000	87,500
Jumbo (B777/A340/B747)	135,107	68,900	80,400	91,900	109,100
NLA (A380)	-	-	7,700	15,500	15,500
SubTotal:	135,107	128,400	154,600	184,400	212,100

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Space (sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Number of Lanes	15	17	18	20	21
Checkpoint Area	16,024	15,230	15,900	17,250	17,930
Queueing Area	7,221	7,650	8,100	9,000	9,450
TSA Offices	4,801	6,800	7,200	8,000	8,400
SubTotal:	28,046	29,680	31,200	34,250	35,780
United States Department of Agriculture					
Number of X-Ray Units	8	8	9	11	14
Area X-Ray Units	4,200	4,200	4,730	5,780	7,350
Area Queue:	exterior of bldg	3,110	3,500	4,280	5,450
Offices/Support:	6,042	6,020	6,650	8,120	9,930
Hawaiian Department of Agriculture					
Number Positions in Claim Area	9	11	11	13	14
Area Positions	315	280	280	330	350
Offices/Support:	9,781	9,840	10,860	13,250	16,210
SubTotal:	20,338	23,450	26,020	31,760	39,290
Other Terminal Functions					
Ticket Lobby Circulation	54,442	8,250	8,880	9,630	9,880
Baggage Claim Circulation	12,706	16,500	16,500	19,500	21,000
Secure Circulation	309,380	290,710	345,500	409,380	470,710
General Circulation	108,099	74,700	79,900	96,000	110,800
Public Seating	inc in circ	13,440	15,060	18,900	23,760
Domestic Meeter/Greeter Lobby	inc in circ/claim area	10,450	11,836	15,136	19,360
APM/Wiki Wiki Bus Station(s)	exterior of bldg	17,000	34,000	34,000	42,500
Non-Public Circulation	46,147	41,800	48,600	58,000	67,000
SubTotal:	530,774	472,950	560,276	660,546	765,010

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

Existing Terminal Space (sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Restrooms				
Public Restrooms - Secure	26,982	25,200	28,800	32,400
Public Restrooms - Non-Secure	9,552	16,200	18,000	18,000
Non-Public Restrooms	5,353	6,080	7,250	8,380
SubTotal:	41,887	47,480	54,050	58,780
Other Terminal Functions (cont.)				
Non-Public Terminal Spaces				
Airport Administration				
Offices/Support	19,467	22,140	27,940	35,210
Airport Police	2,363	2,220	2,710	3,310
SubTotal:	21,830	24,360	30,650	38,520
Other Terminal Functions				
Misc Tenant	84,317	95,710	120,770	152,210
SubTotal:	106,147	120,070	151,420	190,730
Other Terminal Functions				
Maintenance/Janitorial/Storage/Shops	20,482	29,100	35,000	40,400
Mechanical/Electrical/Telephone/Plumbing	117,439	155,400	186,500	215,700
Building Systems (Structure/Non-net/Void)	156,195	97,100	116,500	134,800
Exterior Public Gardens	84,029	126,040	126,040	126,040
SubTotal:	378,145	407,640	464,040	516,940

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Spaces (sq)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Primary Inspection Booths (Double Counters)					
Area Primary Inspection Booths	5,930	6,930	6,930	9,009	10,857
Primary Inspection Queue	13,951	31,625	31,625	41,745	53,130
Primary Inspection Support	inc below	590	590	650	690
SubTotal:	19,851	39,145	39,145	51,404	64,677
Claim Devices Required					
Linear Frontage Required	890	1,380	1,380	1,720	2,230
Baggage Claim Hall	21,870	48,300	48,300	60,200	78,050
SubTotal:	21,870	48,300	48,300	60,200	78,050
Passport Control Check Positions					
Area Passport Control Check	inc in circ	245	245	315	315
Area Secondary Waiting	1,860	1,250	1,250	1,600	1,950
Pairs Secondary Inspection X-Rays	11	7	7	10	12
Area Secondary Inspection	11,801	4,725	4,725	6,750	8,100
Agriculture Inspection Stations	inc in sec inspection	2	2	3	3
Area Agriculture Inspection	inc in sec inspection	1,380	1,380	2,070	2,070
Secondary Inspection Support	inc below	3,977	3,977	4,622	5,137
SubTotal:	11,812	11,577	11,577	15,357	17,572
CBP Administration					
CBP Administration	32,253	9,665	9,665	11,445	13,305
CBP Administration Support	inc abv	5,050	5,050	6,060	7,090
SubTotal:	32,253	14,715	14,715	17,505	20,395
Sterile Circulation					
Sterile Circulation	66,509	42,320	49,680	52,670	52,670
In-Transit/Sterile Holding Areas	45,244	45,240	45,240	60,330	75,410
Public Restrooms	10,068	14,400	16,200	18,000	19,800
General Circulation	39,638	18,910	18,910	24,350	30,910
Greeter Lobby					
Greeter Waiting Area	9,217	3,590	3,590	4,770	5,960
Tour Group Assembly	7,359	18,150	18,150	24,200	30,250
Baggage Recheck					
Number Recheck Positions	4	13	13	17	21
Area Recheck Positions	1,301	650	650	850	1,050
Queue Baggage Recheck	inc abv	975	975	1,275	1,575
SubTotal:	179,340	144,235	153,395	186,445	217,625

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Space (Sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Non-Secure Concessions Space					
Rental Car					
Number Counters	14	25	40	40	40
Counter Area	2,407	2,400	3,840	3,840	3,840
Queue	1,715	1,500	2,400	2,400	2,400
Non-Secure Concessions	1,337	1,000	1,000	1,000	1,000
Non-Secure Storage	895	250	250	250	250
SubTotal:	6,354	5,150	7,490	7,490	7,490
Secure Concessions Space					
Secure Concessions	92,542	134,000	152,000	191,000	218,000
Secure Storage	51,512	33,500	38,000	47,750	54,500
SubTotal:	144,054	167,500	190,000	238,750	272,500

EXISTING FACILITY INVENTORY AND FUTURE OVERSEAS TERMINAL REQUIREMENTS

	Existing Terminal Space (\$f)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Overseas					
Annual Enplanements - Overseas	12,752,732	12,752,732	14,285,700	18,025,500	22,717,500
Peak Hour Enplaned - Overseas Domestic	3,370	3,370	3,810	4,880	6,250
Peak Hour Enplaned - Overseas International	1,820	1,820	2,010	2,450	2,930
Peak Hour Deplaned - Overseas Domestic	3,220	3,220	3,640	4,670	5,970
Peak Hour Deplaned - Overseas International	2,540	2,540	2,810	3,420	4,170
Air Carrier Gates	29	29	34	40	46
Domestic					
Domestic Airline Functions	164,492	115,230	117,260	139,490	145,800
International Airline Functions	77,978	43,420	44,640	50,160	52,190
Other Airline Functions	622,584	318,830	376,270	447,600	517,870
Departure Lounges	135,107	128,400	154,600	184,400	212,100
Other					
Security	28,046	29,680	31,200	34,250	35,780
Aggriculture Inspection	20,338	23,450	26,070	31,760	39,290
Circulation	530,774	472,860	560,276	660,546	765,010
Restrooms	41,887	43,030	47,480	54,050	58,780
Non-Airline Tenant Space	106,147	107,220	120,070	151,420	190,730
Terminal Functions	378,145	332,329	407,640	464,040	516,940
Other					
Primary Inspection	19,851	39,145	39,145	51,404	64,677
Baggage Claim	21,870	48,300	48,300	60,200	78,050
Secondary Inspection	11,812	11,577	11,577	15,357	17,572
Support Functions	32,253	14,715	14,715	17,505	20,395
Other Functions	179,340	144,235	153,395	186,445	217,625
Other					
Non-Secure Concessions Space	6,354	5,150	7,490	7,490	7,490
Secure Concessions Space	144,054	167,500	190,000	238,750	272,500
Total Terminal Space:	2,521,032	2,045,061	2,350,078	2,794,867	3,212,799

EXISTING FACILITY INVENTORY AND FUTURE INTERISLAND TERMINAL REQUIREMENTS

	Existing Terminal Space (sq)	Recommended Facilities (2009)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Overall Airport Statistics					
Annual Domestic Overseas Passengers	8,417,618	8,417,618	9,523,800	12,191,100	15,605,500
Annual International Overseas Passengers	4,335,115	4,335,115	4,761,900	5,834,400	7,112,000
Annual Interisland Passengers	7,255,859	7,255,859	7,778,100	8,938,200	10,271,400
Annual Commuter Passengers	70,870	70,870	75,900	87,300	93,600
Peak Hour Passenger Statistics					
Peak Hour Enplaned - Overseas Domestic	3,370	3,370	3,810	4,880	6,250
Peak Hour Enplaned - Overseas International	1,820	1,820	2,010	2,450	2,990
Peak Hour Enplaned - Interisland	1,340	1,340	1,430	1,650	1,890
Peak Hour Enplaned - Commuter	19	19	20	25	28
Total Peak Hour Enplaned	5,340	5,340	5,890	7,190	8,800
Peak Hour Deplaned - Overseas Domestic	3,220	3,220	3,640	4,670	5,970
Peak Hour Deplaned - Overseas International	2,540	2,540	2,810	3,420	4,170
Peak Hour Deplaned - Interisland	1,580	1,580	1,690	1,950	2,240
Peak Hour Deplaned - Commuter	19	19	21	26	29
Total Peak Hour Deplaned	4,660	4,660	5,140	6,280	7,680
Aircraft Parking Positions					
Small Commuter (Cessna)	-	-	-	-	-
Medium Commuter (CRJ200/DH8)	-	4	8	8	9
Large Commuter (CRJ700/Q400)	-	-	-	-	-
Narrowbody (B737/A320)	13	13	15	17	19
B-757	-	-	-	-	-
Widebody (B767)	-	-	-	-	-
Jumbo (B777/A340/B747)	-	-	-	-	-
NLA (A380)	-	-	-	-	-
Total Gates:	13	17	23	25	28

General

EXISTING FACILITY INVENTORY AND FUTURE INTERISLAND TERMINAL REQUIREMENTS

	Existing Terminal Space (sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Ticket Counter					
Number Check-in Positions	55	64	66	66	66
Total Length Counter (L.f)	360	320	330	330	330
Area	4,252	3,200	3,300	3,300	3,300
Ticketing Queue	10,780	9,600	9,900	9,900	9,900
Airline Ticket Offices	16,566	14,080	14,520	14,520	14,520
Baggage Claim					
Claim Devices Required	5	9	10	12	14
Linear Frontage Required	800	1,050	1,150	1,400	1,650
Baggage Claim Hall	20,797	31,500	34,500	42,000	49,500
Baggage Services	839	1,600	1,600	1,600	1,600
Clubs/VIP Lounge	3,453	7,000	7,000	7,000	7,000
SubTotal:	56,687	66,980	70,820	78,320	85,820
Airline Functions					
Outbound Bag Make-Up	70,266	60,100	71,900	84,100	97,100
Inbound Bag Delivery	inc abv	11,250	12,500	15,000	17,500
Checked Baggage Screening	inc abv	10,600	10,700	13,100	16,600
Airline Operations	24,614	32,700	43,300	47,300	53,000
Other Airline Offices and Support	12,053	3,200	3,300	3,300	3,300
SubTotal:	106,953	117,850	141,700	162,800	187,500
Air Carrier Gates					
Small Commuter	-	-	-	-	-
Large Commuter	-	3,000	6,000	6,000	6,800
Regional Jet	-	-	-	-	-
Narrowbody (B737/A320)	49,088	30,300	35,000	39,600	44,300
B-757	-	-	-	-	-
Widebody (B767)	-	-	-	-	-
Jumbo (B777/A340/B747)	-	-	-	-	-
NLA (A380)	-	-	-	-	-
SubTotal:	49,088	33,300	41,000	45,600	51,100

EXISTING FACILITY INVENTORY AND FUTURE INTERISLAND TERMINAL REQUIREMENTS

	Existing Terminal Space (sq ft)	Recommended Facilities (2009)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Number of Lanes	6	8	8	8	8
Checkpoint Area	5,414	8,400	8,400	8,400	8,400
Queuing Area	3,830	3,600	3,600	3,600	3,600
TSA Offices/Support	6,002	8,000	8,000	8,000	8,000
SubTotal:	15,246	20,000	20,000	20,000	20,000
United States Department of Agriculture					
Number of X-Ray Units	2	3	4	5	6
Area X-Ray Units	1,046	1,580	2,100	2,630	3,150
Area Queue:	294	1,160	1,550	1,950	2,340
Offices/Support:	-	-	-	-	-
Hawaiian Department of Agriculture					
Number Positions in Claim Area	4	9	10	12	14
Area Positions	144	230	250	300	350
Offices/Support:	728	800	890	1,080	1,320
SubTotal:	2,212	3,770	4,790	5,960	7,160
Other Terminal Functions					
Ticket Lobby Circulation	5,215	8,000	8,250	8,250	8,250
Baggage Claim Circulation	12,362	13,500	15,000	18,000	21,000
Secure Circulation	65,796	98,000	129,900	141,900	158,900
General Circulation	19,998	23,000	24,800	27,800	31,100
Public Seating	5,259	7,880	8,690	10,580	12,920
Domestic Meater/Greeter Lobby	inc in circ	10,710	11,840	14,480	17,780
APM/Wiki Wiki Bus Station(s)	10,364	8,500	17,000	17,000	17,000
Non-Public Circulation	9,826	14,700	17,200	19,400	22,100
SubTotal:	128,620	194,290	232,680	257,410	289,050

EXISTING FACILITY INVENTORY AND FUTURE INTERISLAND TERMINAL REQUIREMENTS

Category	Existing Terminal Space (sq)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Restrooms					
Public Restrooms - Secure	7,388	6,000	6,000	7,200	8,400
Public Restrooms - Non-Secure	5,688	6,000	7,200	7,200	8,400
Non-Public Restrooms	315	1,840	2,150	2,430	2,760
Sub Total:	13,391	13,840	15,350	16,830	19,560
Non-Terminal Space					
Other Terminal Functions (cont.)					
Other Terminal Functions					
Airport Administration Offices/Support					
Misc. Tenant	22,682	21,770	23,330	26,810	30,810
Sub Total:	22,682	21,770	23,330	26,810	30,810
Other Terminal Functions					
Maintenance/Janitorial/Storage/Shops	3,893	7,400	8,800	9,800	11,100
Mechanical/Electrical/Telephone/Plumbing	30,189	39,600	46,900	52,400	59,400
Building Systems (Structure/Non-net/Void)	25,606	24,700	29,300	32,700	37,100
Exterior Public Gardens	26,289	26,290	26,290	26,290	26,290
Sub Total:	85,977	97,990	111,290	121,190	133,890
Other Terminal Functions					
Concessions Space					
Rental Car					
Number Counters	8	10	16	16	16
Counter Area	1,880	960	1,540	1,540	1,540
Queue	1,913	600	960	960	960
Non-Secure Concessions	-	-	-	-	-
Non-Secure Storage	-	-	-	-	-
Sub Total:	3,793	1,560	2,500	2,500	2,500
Secure Concessions					
Secure Concessions	12,105	25,000	27,000	31,000	39,000
Secure Storage	998	6,250	6,750	7,750	9,750
Sub Total:	13,104	31,250	33,750	38,750	48,750

EXISTING FACILITY INVENTORY AND FUTURE INTERISLAND TERMINAL REQUIREMENTS

	Existing Terminal Space (sq ft)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Annual Enplanements - Interisland	7,255,859	7,778,100	8,938,200	10,271,400
Peak Hour Enplaned - Interisland	1,340	1,430	1,650	1,890
Peak Hour Deplaned - Interisland	1,580	1,690	1,950	2,240
Air Carrier Gates - Interisland	13	17	23	28
Domestic Airline Functions				
Domestic Airline Functions	56,687	70,820	78,320	85,820
Other Airline Functions	106,953	141,700	162,800	187,500
Departure Lounges	49,068	41,000	45,600	51,100
Security				
Security	15,246	20,000	20,000	20,000
Agriculture Inspection	2,212	4,790	5,960	7,160
Circulation	128,620	184,290	232,680	289,050
Restrooms	13,391	13,840	15,350	19,560
Non-Airline Terminal Space	22,682	21,770	23,350	30,810
Terminal Functions	85,977	97,990	121,190	133,890
Non-Secure Concessions				
Non-Secure Concessions	3,793	2,500	2,500	2,500
Secure Concessions	13,104	33,750	38,750	48,750
Total Terminal Space:	497,733	697,210	776,170	876,140

EXISTING FACILITY INVENTORY AND FUTURE COMMUTER TERMINAL REQUIREMENTS

	Existing Terminal Statistics (A34)	Recommended Facilities (2009)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Overall Airport Statistics					
Annual Domestic Overseas Passengers	8,417,618	8,417,618	9,523,800	12,191,100	15,605,500
Annual International Overseas Passengers	4,335,115	4,335,115	4,761,900	5,834,400	7,112,000
Annual Interisland Passengers	7,255,859	7,255,859	7,778,100	8,938,200	10,271,400
Annual Commuter Passengers	70,870	70,870	75,900	87,300	93,600
Peak Hour Passenger Statistics					
Peak Hour Enplaned - Overseas Domestic	3,370	3,370	3,810	4,880	6,250
Peak Hour Enplaned - Overseas International	1,820	1,820	2,010	2,450	2,990
Peak Hour Enplaned - Interisland	1,340	1,340	1,430	1,650	1,890
Peak Hour Enplaned - Commuter	19	19	20	25	28
Total Peak Hour Enplaned	5,340	5,340	5,890	7,190	8,800
Peak Hour Deplaned - Overseas Domestic	3,220	3,220	3,640	4,670	5,970
Peak Hour Deplaned - Overseas International	2,540	2,540	2,810	3,420	4,170
Peak Hour Deplaned - Interisland	1,580	1,580	1,690	1,950	2,240
Peak Hour Deplaned - Commuter	19	19	21	26	29
Total Peak Hour Deplaned	4,660	4,660	5,140	6,280	7,680
Aircraft Parking Positions					
Small Commuter (Cessna)	2	2	5	5	6
Medium Commuter (CRJ200/DH8)	-	-	-	-	-
Large Commuter (CRJ700/Q400)	-	-	-	-	-
Narrowbody (B737/A320)	-	-	-	-	-
B-757	-	-	-	-	-
Widebody (B767)	-	-	-	-	-
Jumbo (B777/A340/B747)	-	-	-	-	-
NLA (A380)	-	-	-	-	-
Total Gates:	2	2	5	5	6

EXISTING FACILITY INVENTORY AND FUTURE COMMUTER TERMINAL REQUIREMENTS

	Existing Terminal Space (sq)	Recommended Facilities (2600s)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Ticket Counter					
Number Check-in Positions	21	6	6	6	8
Total Length Counter (L.F)	128	30	30	30	40
Area	1,288	300	300	300	400
Ticketing Queue	1,972	600	600	600	800
Airline Ticket Offices	5,066	600	600	600	800
Baggage Claim					
Claim Devices Required	2	1	1	1	1
Linear Frontage Required	236	50	50	50	50
Baggage Claim Hall	5,763	1,500	1,500	1,500	1,500
Baggage Services	487	200	200	200	300
Clubs/VIP Lounge	-	-	-	-	-
SubTotal:	14,576	3,200	3,200	3,200	3,800
Outbound Bag Make-Up					
Outbound Bag Make-Up	6,463	400	1,000	1,000	1,100
Inbound Bag Delivery	3,180	600	600	600	600
Checked Baggage Screening	-	-	-	-	-
Airline Operations	7,634	600	1,400	1,400	1,700
Other Airline Offices and Support	1,366	180	180	240	240
SubTotal:	18,643	1,780	3,180	3,240	3,640
Air Carrier Gates					
Small Commuter	7,781	700	1,700	1,700	2,000
Large Commuter	-	-	-	-	-
Regional Jet	-	-	-	-	-
Narrowbody (B737/A320)	-	-	-	-	-
B-757	-	-	-	-	-
Widebody (B767)	-	-	-	-	-
Jumbo (B777/A340/B747)	-	-	-	-	-
NLA (A380)	-	-	-	-	-
SubTotal:	7,781	700	1,700	1,700	2,000

EXISTING FACILITY INVENTORY AND FUTURE COMMUTER TERMINAL REQUIREMENTS

	Existing Terminal Space (sf)	Recommended Facilities (2009)	Recommended Facilities (2020)	Recommended Facilities (2030)
Number of Lanes	1	1	1	1
Checkpoint Area	1,111	680	680	680
Queuing Area	797	450	450	450
TSA Offices	2,326	2,326	2,326	2,326
SubTotal:	4,234	3,456	3,456	3,456
United States Department of Agriculture				
Number of X-Ray Units	-	-	-	-
Area X-Ray Units	-	-	-	-
Area Queue:	-	-	-	-
Offices/Support:	-	-	-	-
Hawaii Department of Agriculture				
Number Positions in Claim Area	1	1	1	1
Area Positions	56	30	30	30
Offices/Support:	-	-	-	-
SubTotal:	56	30	30	30
Ticket Lobby Circulation				
Baggage Claim Circulation	2,254	450	600	600
Secure Circulation	2,155	900	900	900
General Circulation	3,707	970	2,410	2,900
Public Seating	2,021	1,300	1,460	1,460
Domestic Meeter/Greeter Lobby	inc in circ	50	60	60
APM/Wiki Wiki Bus Station(s)	inc in circ	90	90	90
Non-Public Circulation	-	-	-	-
SubTotal:	10,485	4,260	6,120	6,710

Other Terminal Functions

EXISTING FACILITY INVENTORY AND FUTURE COMMUTER TERMINAL REQUIREMENTS

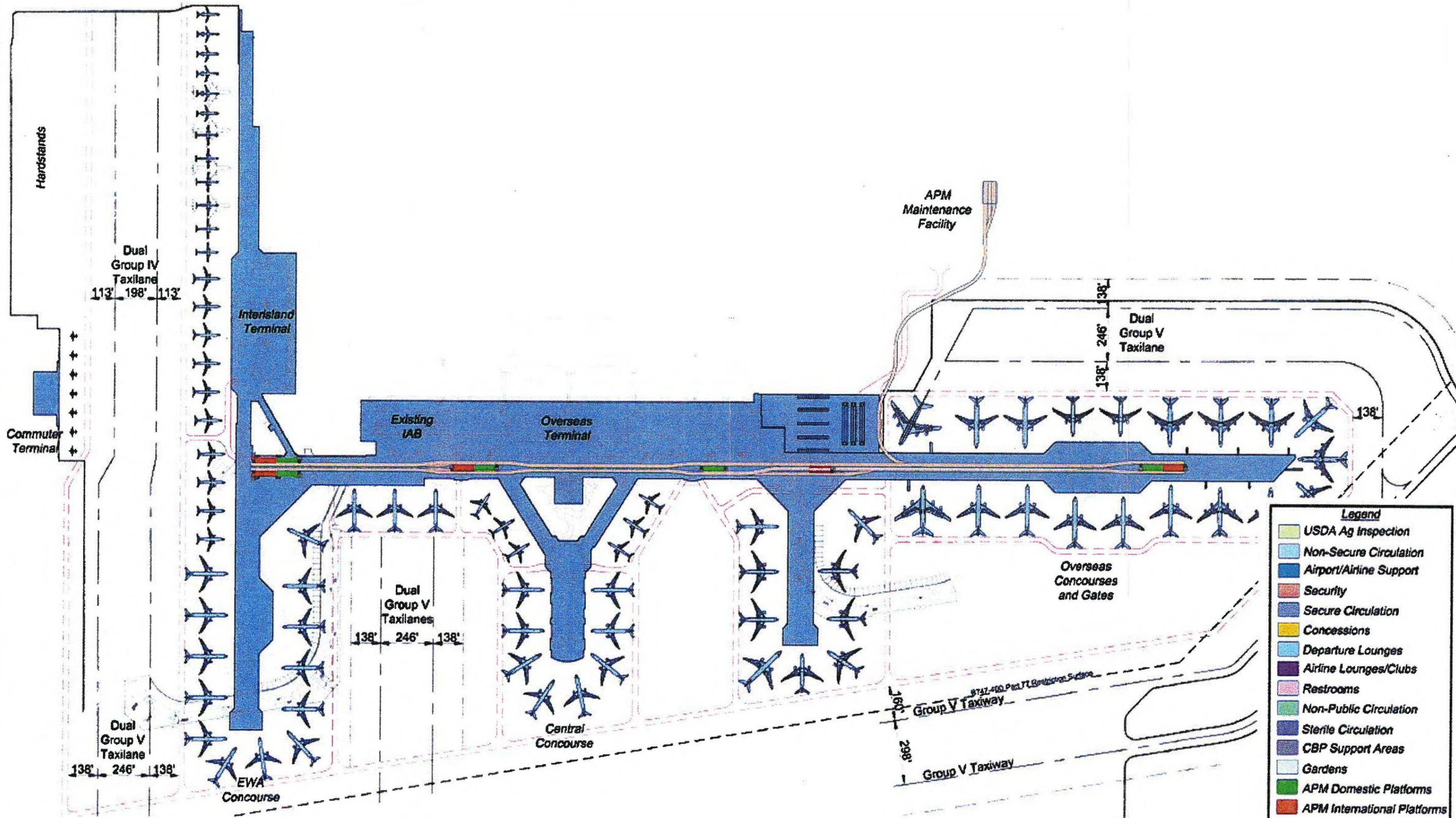
	Existing Terminal Space (sf)	Recommended Facilities (2005)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Other Terminal Functions (cont.)					
Public Restrooms - Secure	910	800	800	800	800
Public Restrooms - Non-Secure	501	1,600	1,600	1,600	1,600
Public Restrooms - Non-Secure	-	-	-	-	-
SubTotal:	1,411	2,400	2,400	2,400	2,400
Non-Secure Concessions Space					
Airport Administration Offices/Support	-	-	-	-	-
Other Terminal Functions	-	-	-	-	-
Misc Tenant	-	-	-	-	-
SubTotal:	-	-	-	-	-
Other Terminal Functions					
Maintenance/Janitorial/Storage/Shops	866	200	200	300	300
Mechanical/Electrical/Telephone/Plumbing	6,523	1,000	1,300	1,400	1,500
Building Systems (Structure/Non-net/Void)	3,043	500	700	700	700
Exterior Public Garden	-	300	300	300	300
SubTotal:	10,432	2,000	2,500	2,700	2,800
Non-Secure Concessions Space					
Rental Car	-	-	-	-	-
Number Counters	5	5	8	8	8
Counter Area	368	320	510	510	510
Queue	-	200	320	320	320
Non-Secure Concessions	-	-	-	-	-
Non-Secure Storage	6,014	-	-	-	-
SubTotal:	6,382	520	830	830	830
Secure Concessions Space					
Secure Concessions	-	-	-	-	-
Secure Storage	-	-	-	-	-
SubTotal:	-	-	-	-	-

EXISTING FACILITY INVENTORY AND FUTURE COMMUTER TERMINAL REQUIREMENTS

	Existing Terminal Space (sq. ft.)	Recommended Facilities (2009)	Recommended Facilities (2010)	Recommended Facilities (2020)	Recommended Facilities (2030)
Annual Enplanements - Commuter					
Peak Hour Enplaned - Commuter	70,870	70,870	75,900	87,300	93,600
Peak Hour Deplaned - Commuter	19	19	20	25	28
Air Carrier Gates - Commuter	2	2	5	5	6
Commuter Airline Functions					
Other Functions	14,576	3,200	3,200	3,800	3,800
Departure Lounges	18,643	1,780	3,180	3,240	3,640
	7,781	700	1,700	1,700	2,000
Security					
Agriculture Inspection	4,234	3,456	3,456	3,456	3,456
Circulation	56	30	30	30	30
Restrooms	10,485	4,260	5,850	6,120	6,710
Non-Airline Tenant Space	1,411	2,400	2,400	2,400	2,400
Terminal Functions	-	-	-	-	-
	10,432	2,500	3,100	3,200	3,300
Non-Secure Concessions					
Secure Concessions	6,382	520	830	830	830
Total Terminal Space:	74,000	18,846	23,746	24,776	26,166

APPENDIX C

TERMINAL CONCEPT A - SPACE UTILIZATION



Legend

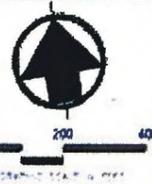
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	Non-Secure Circulation
	Airport/Airline Support
	Security
	Secure Circulation
	Concessions
	Departure Lounges
	Airline Lounges/Clubs
	Restrooms
	Non-Public Circulation
	Sterile Circulation
	CBP Support Areas
	Gardens
	APM Domestic Platforms
	APM International Platforms

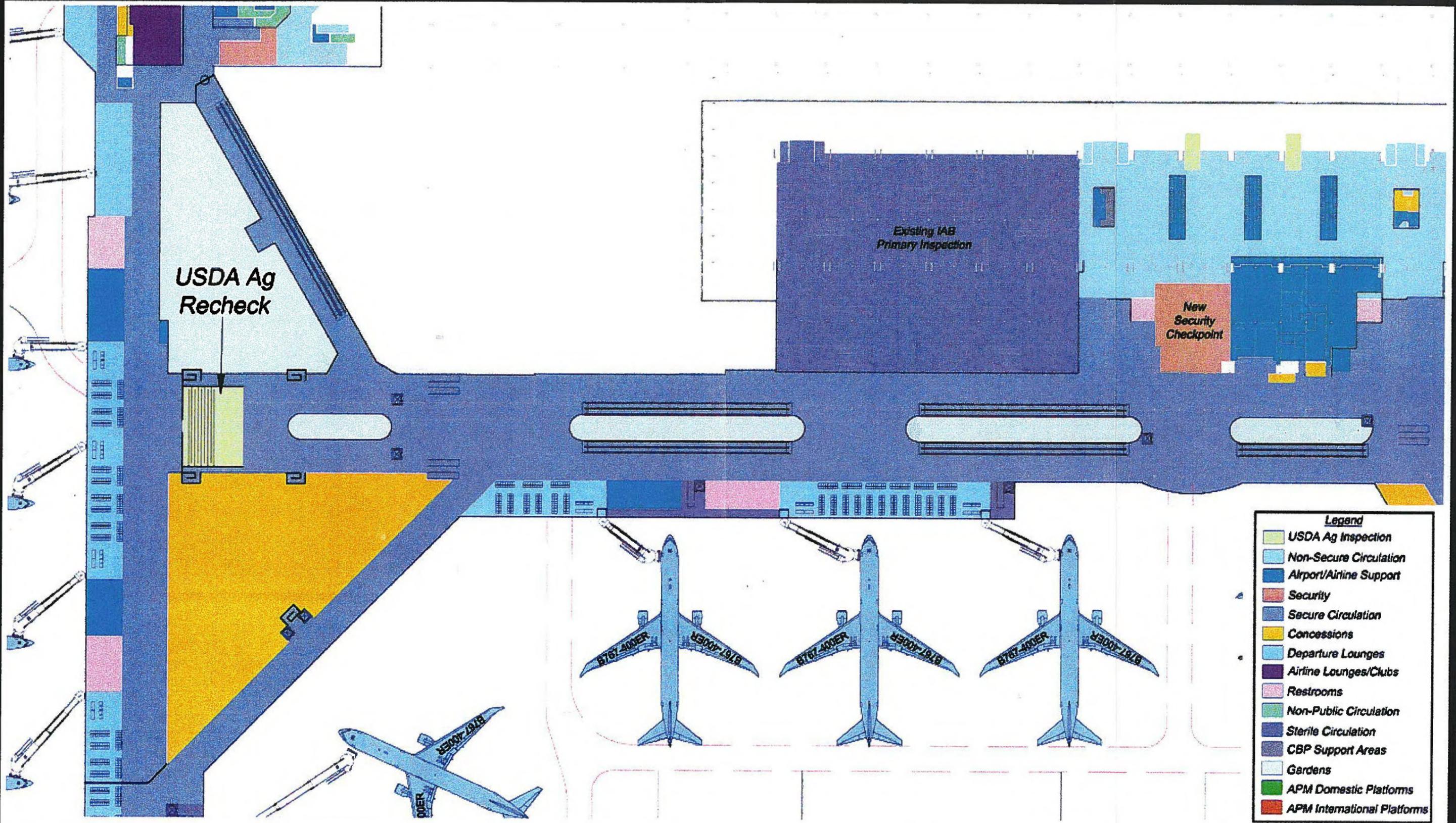

Honolulu International Airport

Terminal Redevelopment Concept - A

4th Level APM Platforms







Honolulu
International
Airport

Terminal Redevelopment Concept - A

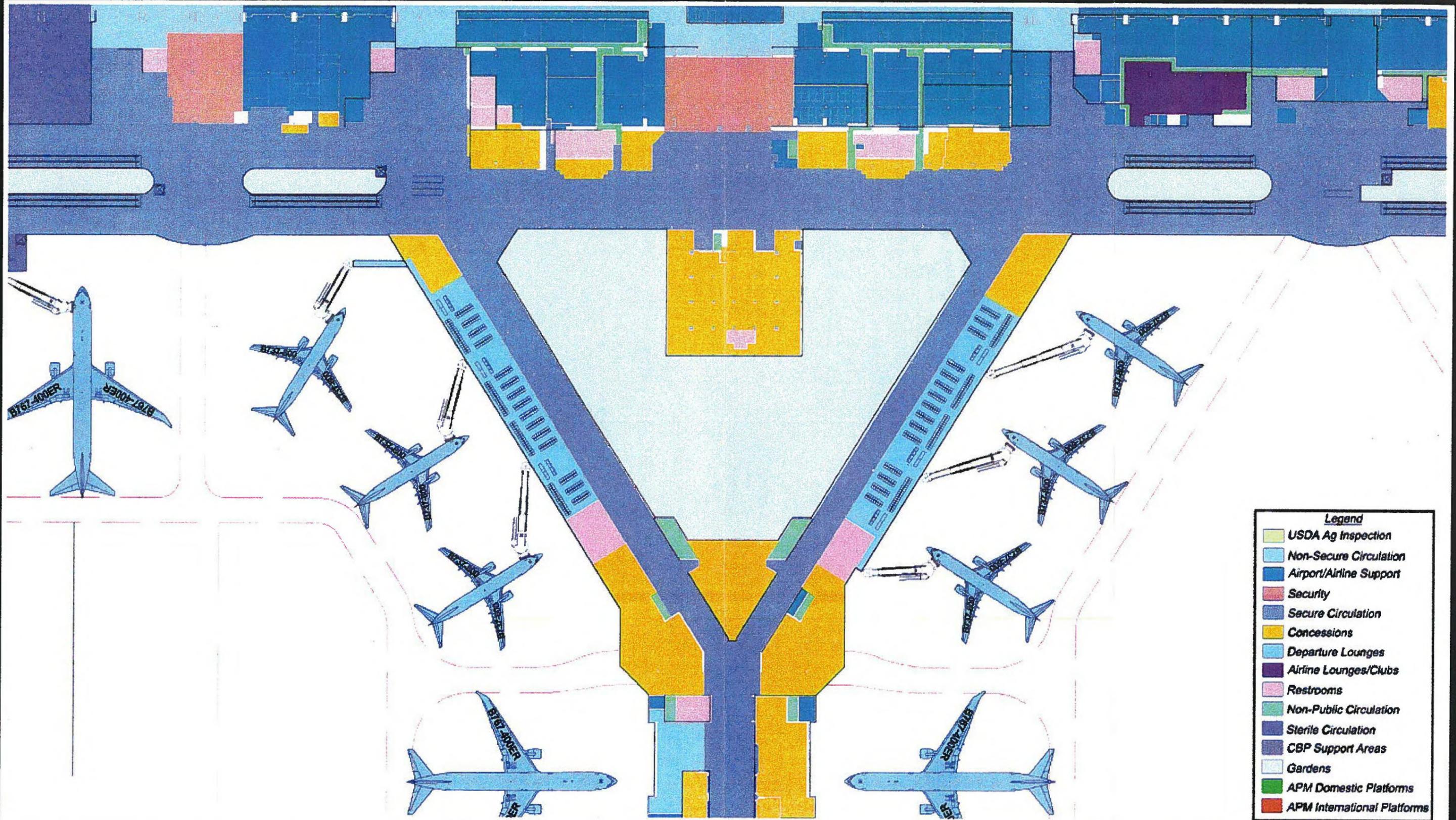
Upper Level OST Connector & EWA Concessions



EKNA Services, Inc.



0 40 80



- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

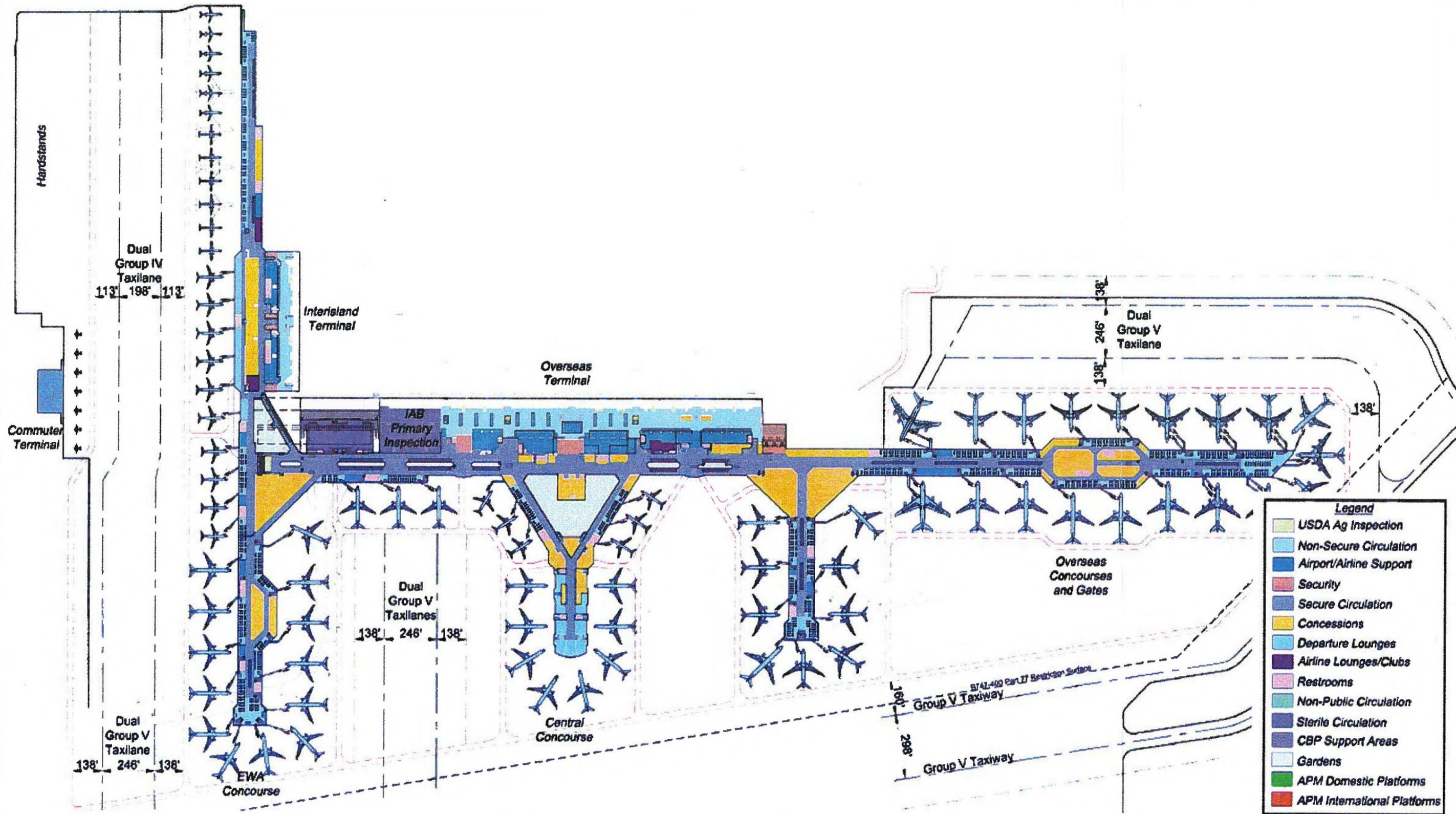


Honolulu
International
Airport

Terminal Redevelopment Concept - A

Upper Level OST & Central Concourse Concessions





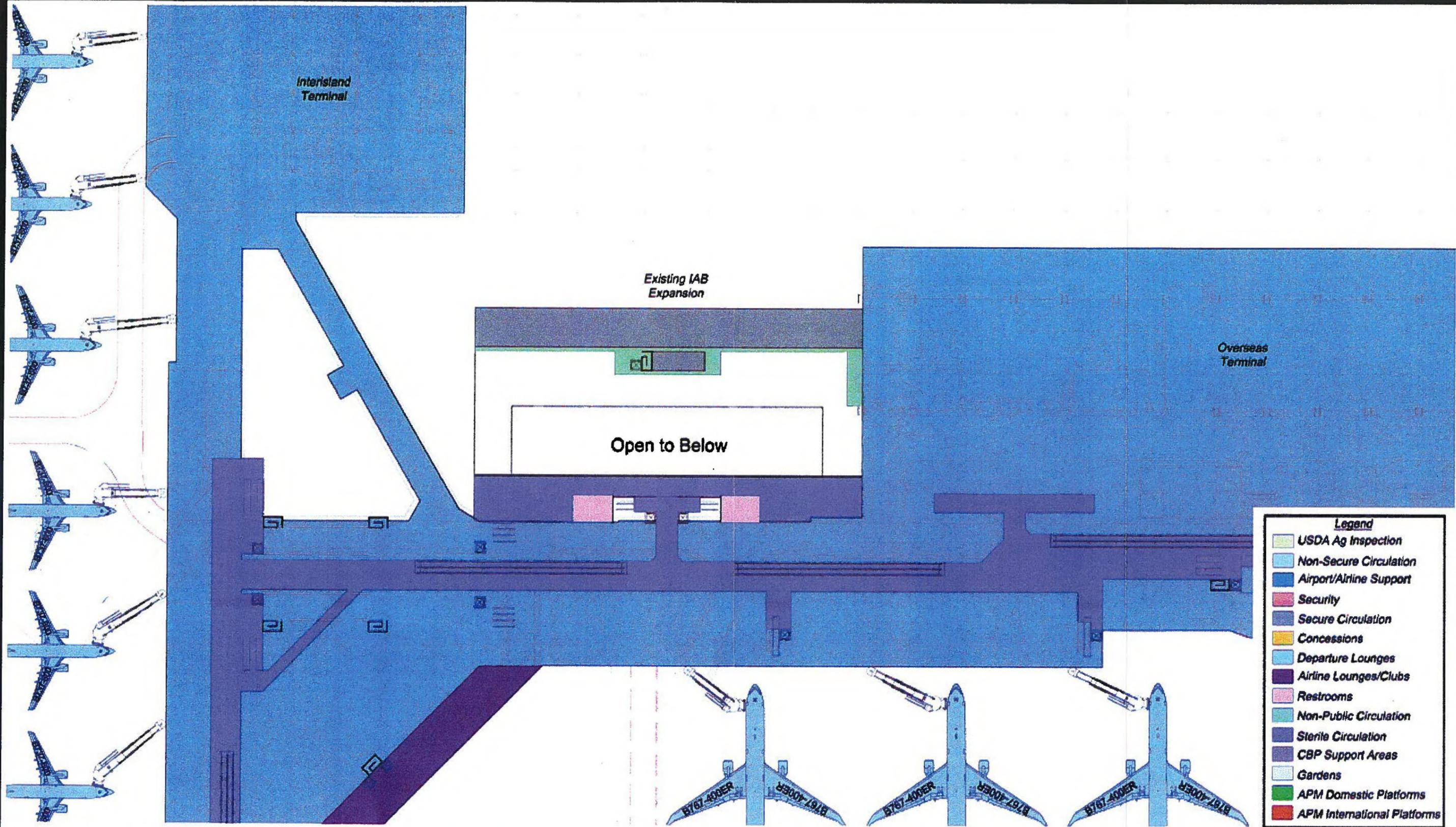

Honolulu International Airport

Terminal Redevelopment Concept - A

Upper Level Floor Plan & Expanded EWA IAB Arrivals







- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms



Honolulu
International
Airport

Terminal Redevelopment Concept - A

3rd Level EWA IAB Mezzanine Floor Plan



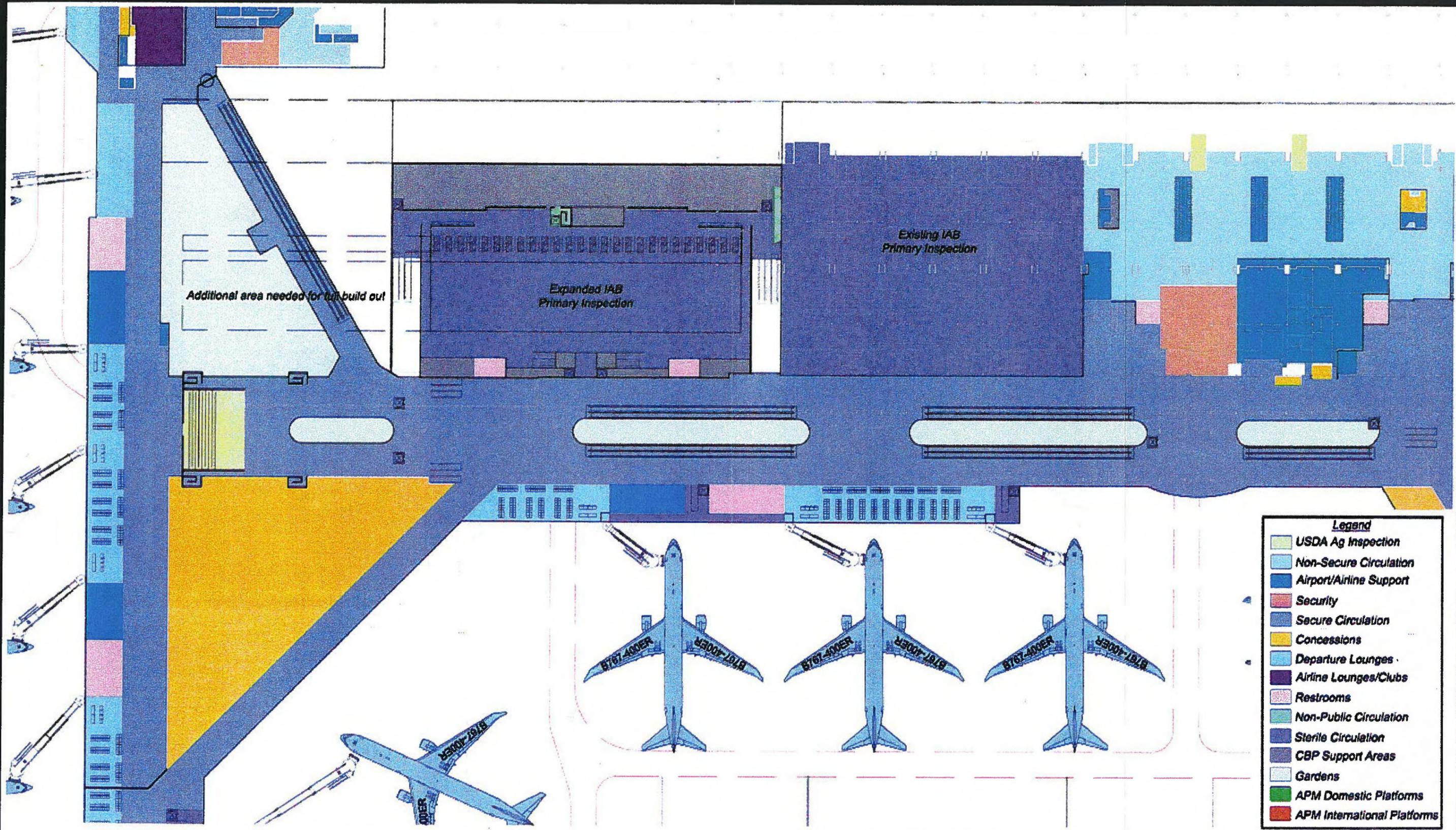
EKNA Services, Inc.



LeB Elliott



Scale: 1" = 40'



- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

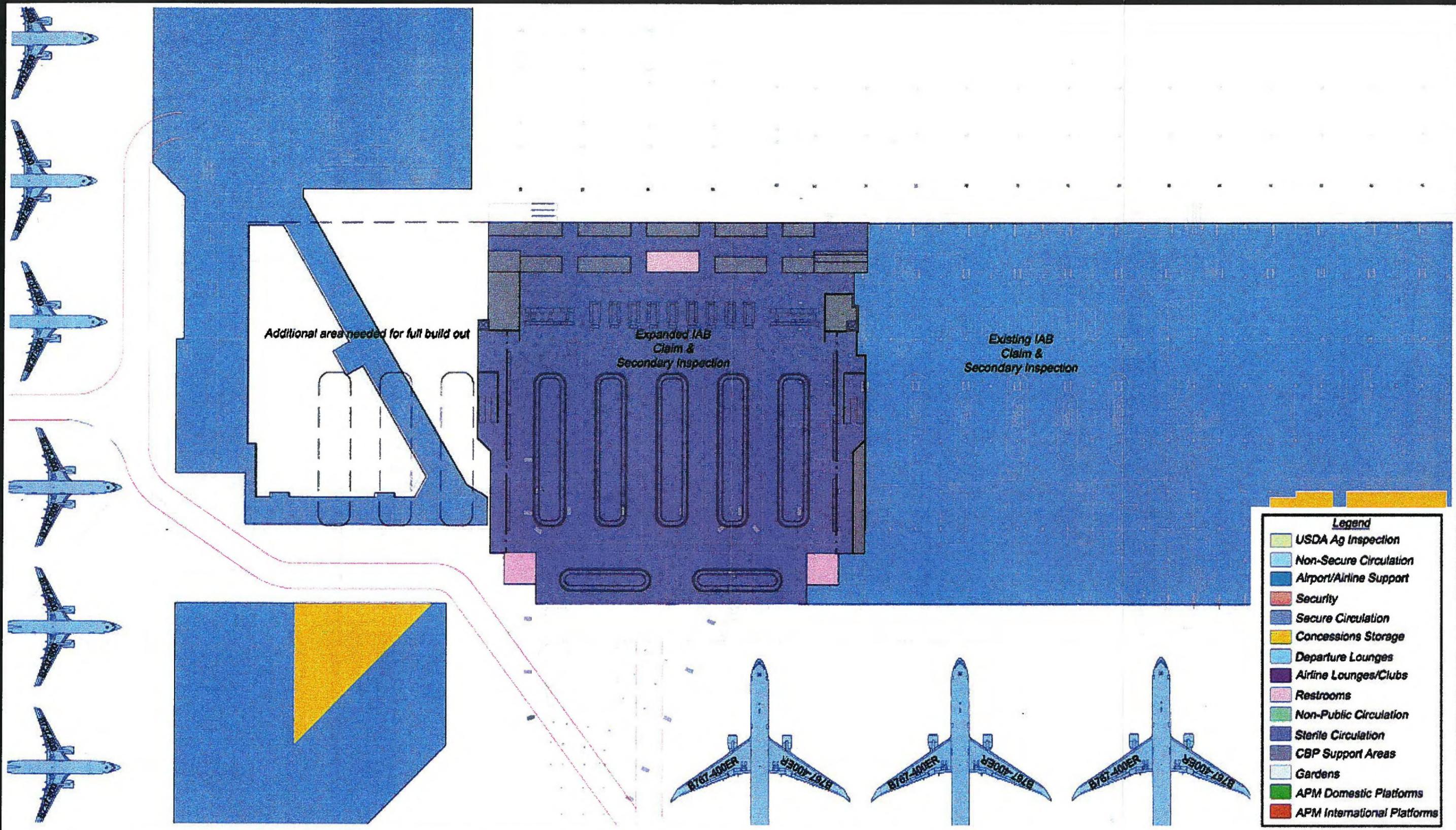


Honolulu
International
Airport

Terminal Redevelopment Concept - A

Upper Level Expanded IAB Primary Inspection

EKNA Services, Inc. LeB Elliott



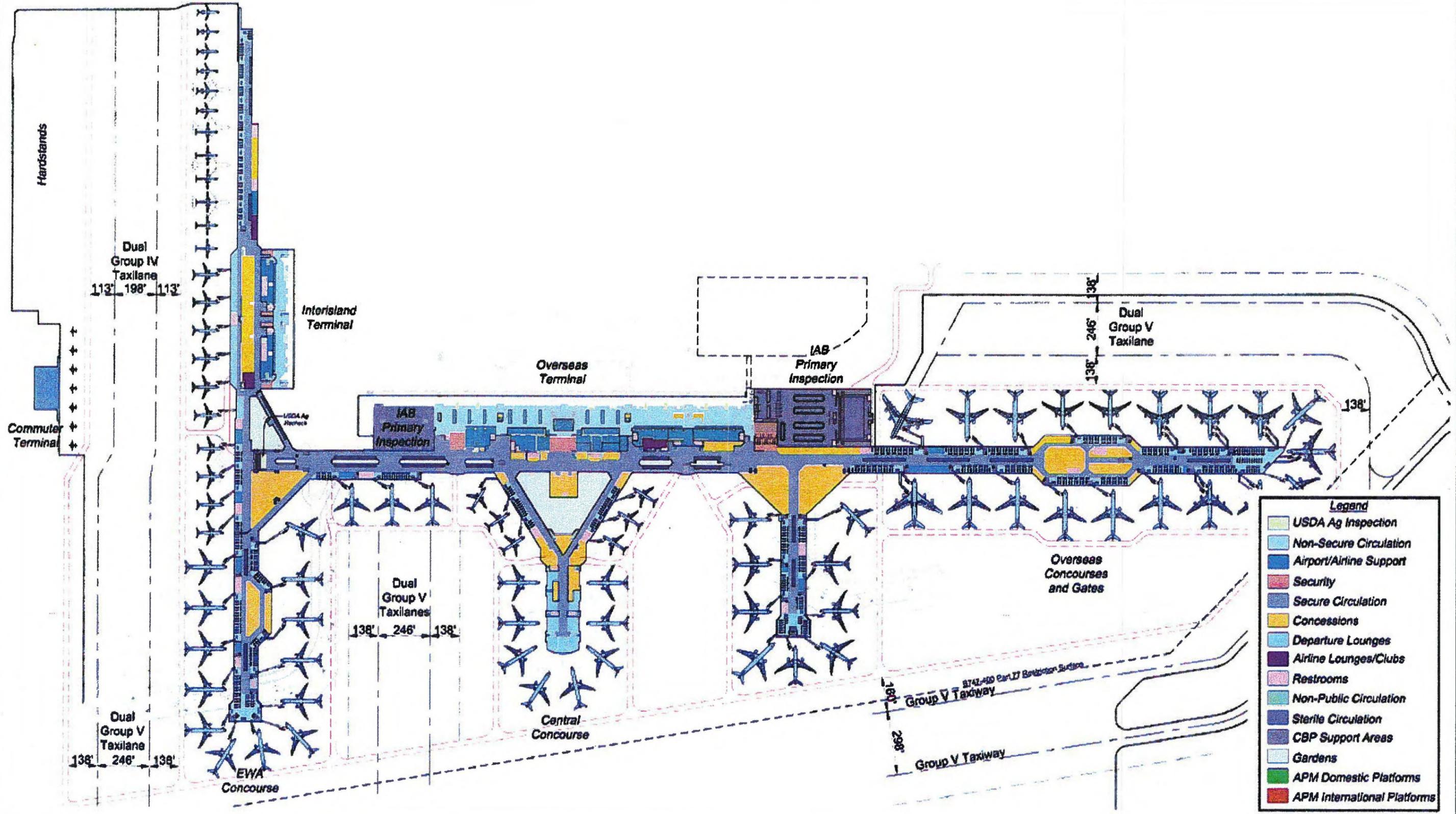

Honolulu International Airport

Terminal Redevelopment Concept - A

Lower Level Expanded IAB Secondary Inspection








Honolulu International Airport

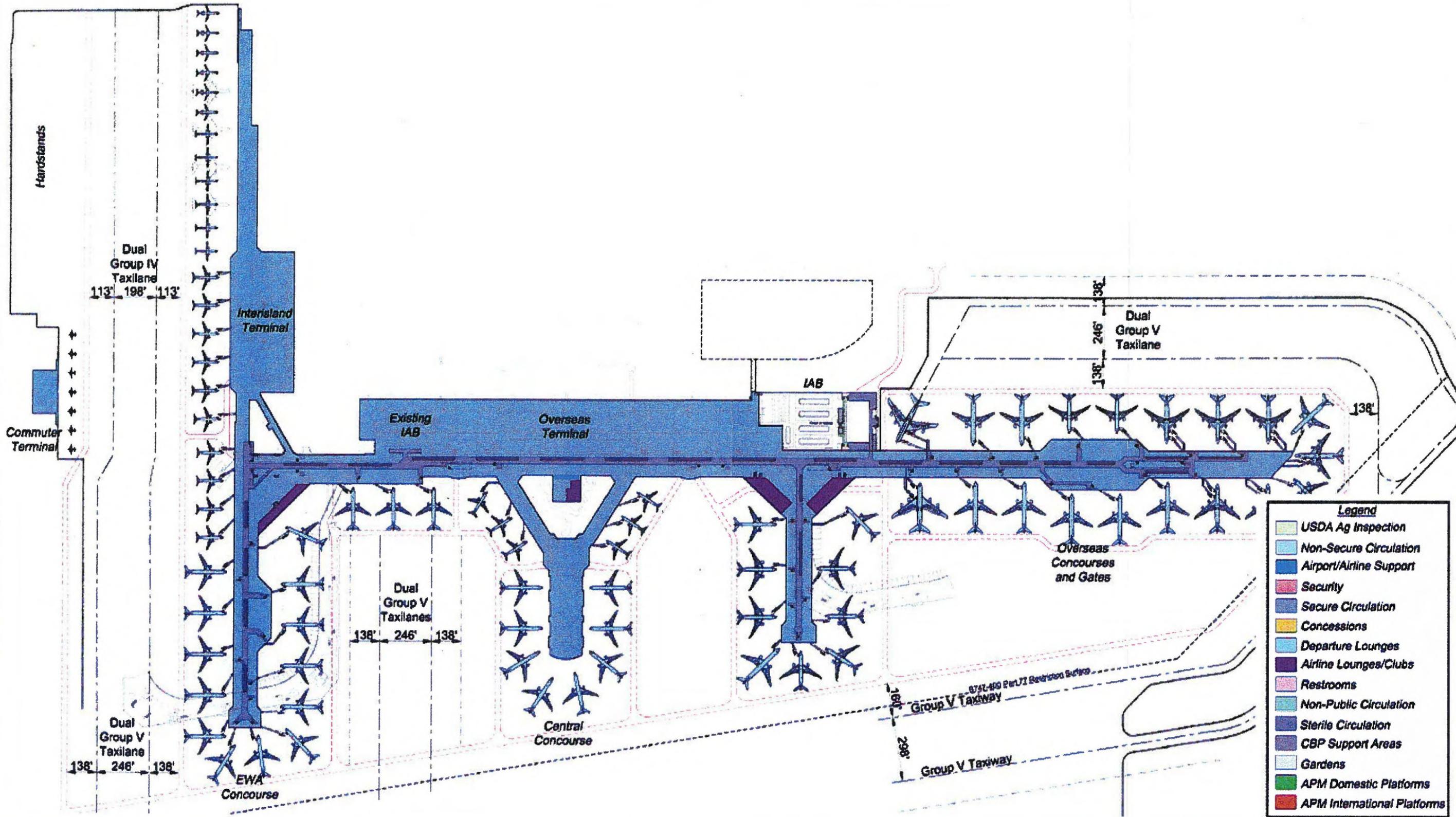
Terminal Redevelopment Concept - A

Upper Level Floor Plan & Split IAB Arrivals





EKNA Services, Inc. Lea Elliott



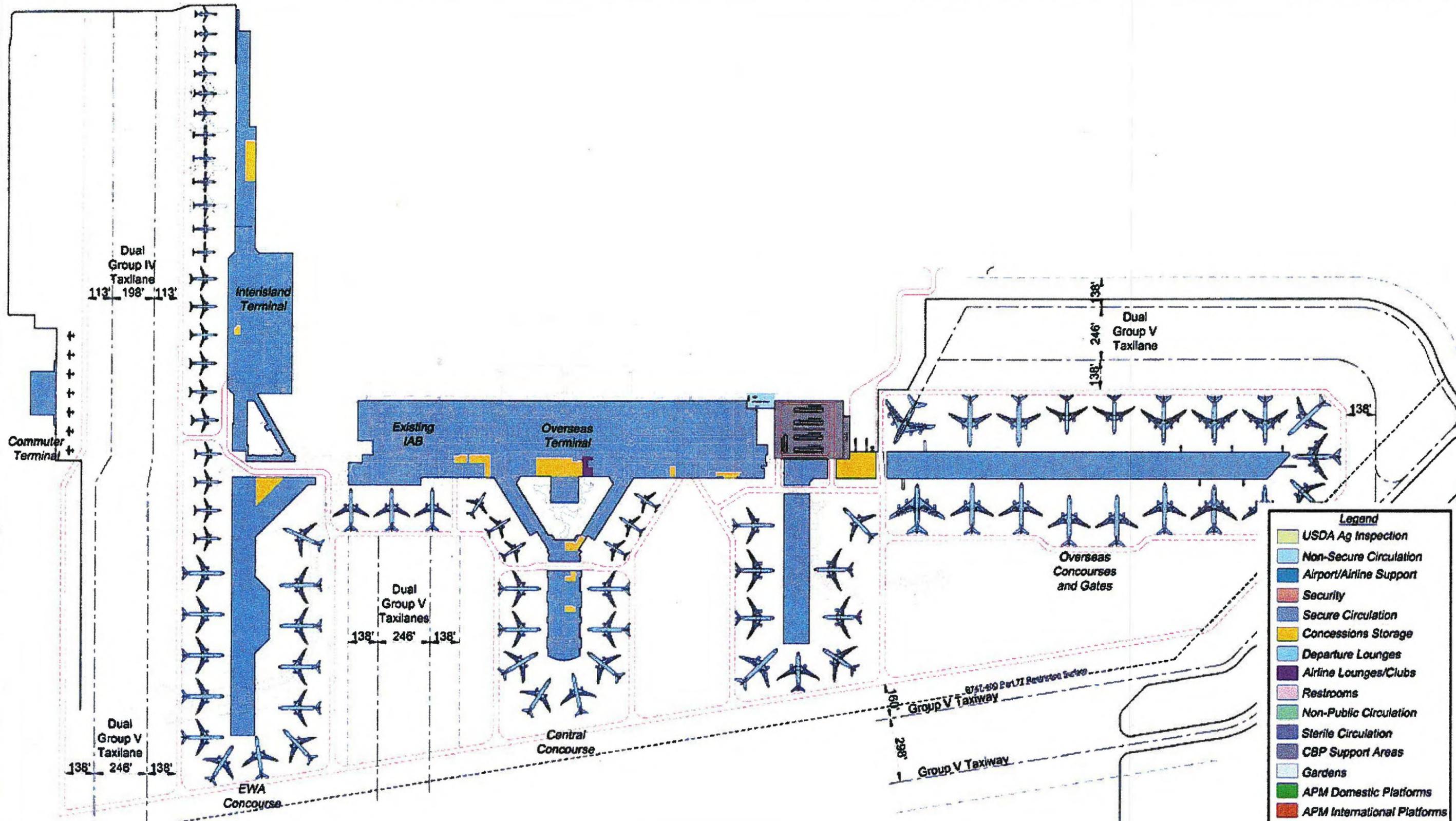

Honolulu International Airport

Terminal Redevelopment Concept - A

3rd Level Split IAB Sterile Floor Plan







Honolulu
International
Airport

Terminal Redevelopment Concept - A

Lower Level - Split IAB



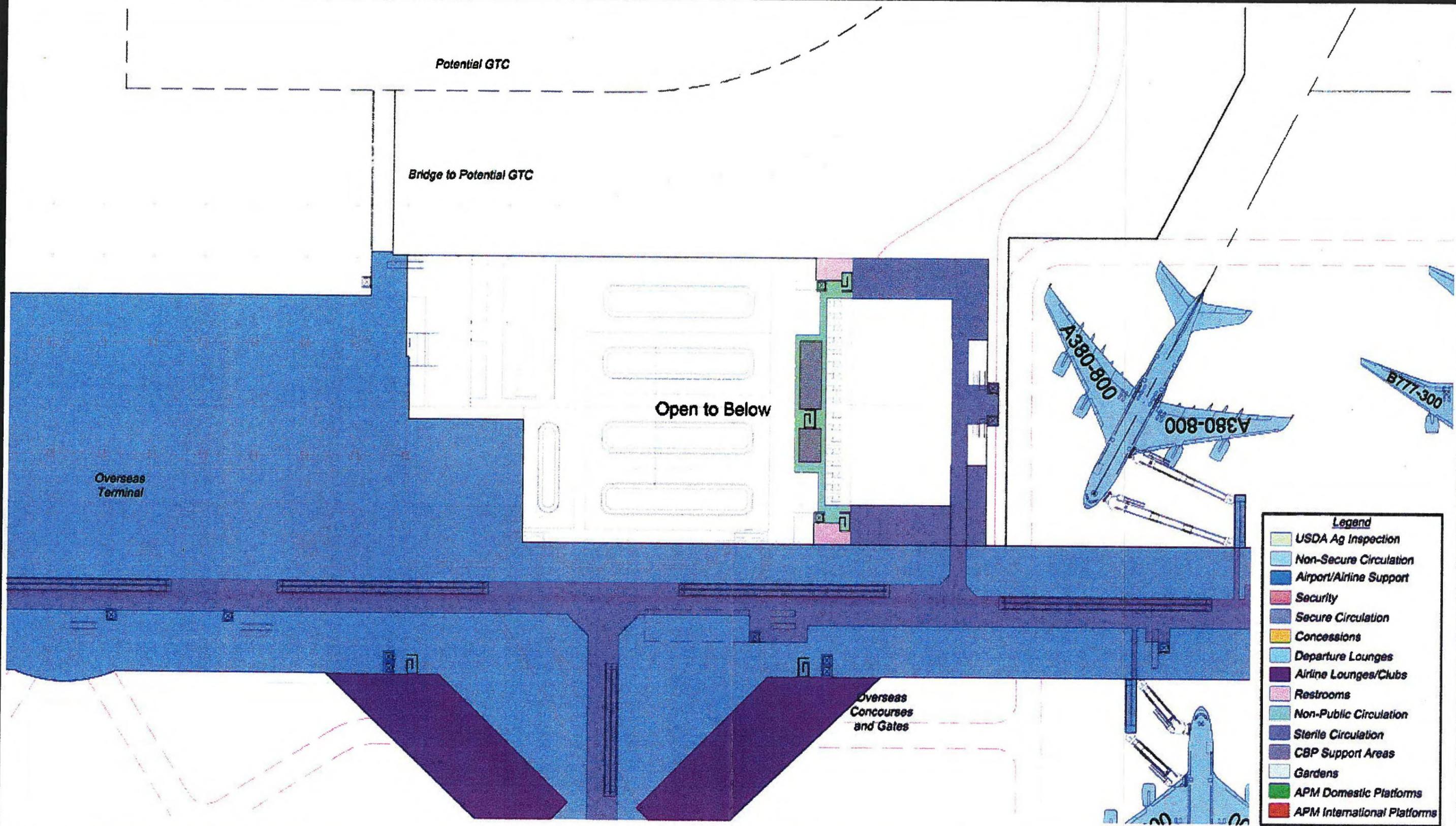
EKNA Services, Inc.



LeB Elliott



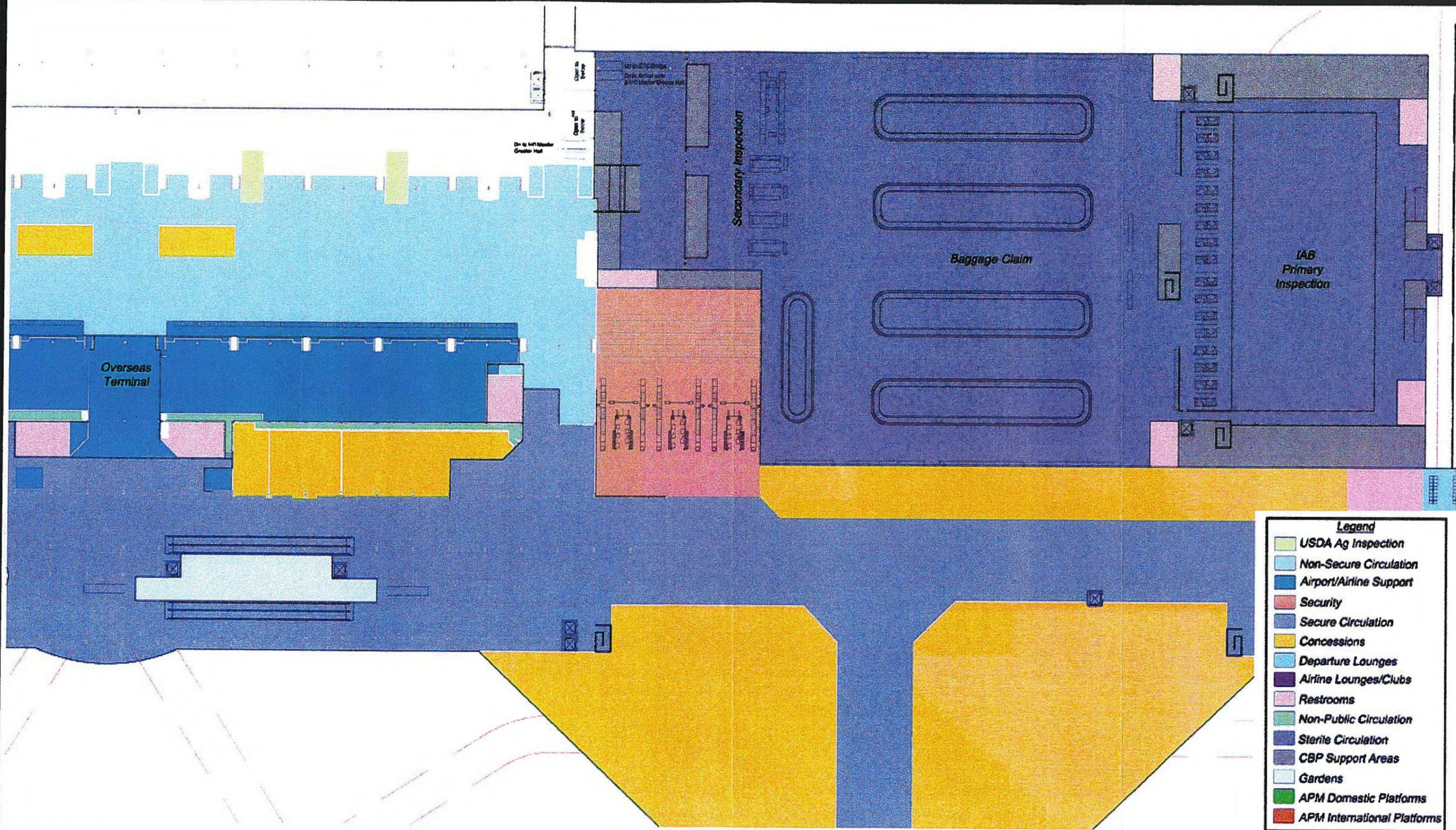
0 200 400
FEET



Honolulu
International
Airport

Terminal Redevelopment Concept - A 3rd Level Diamond Head IAB Mezzanine Floor Plan

EKNA Services, Inc. LeB Elliott



- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

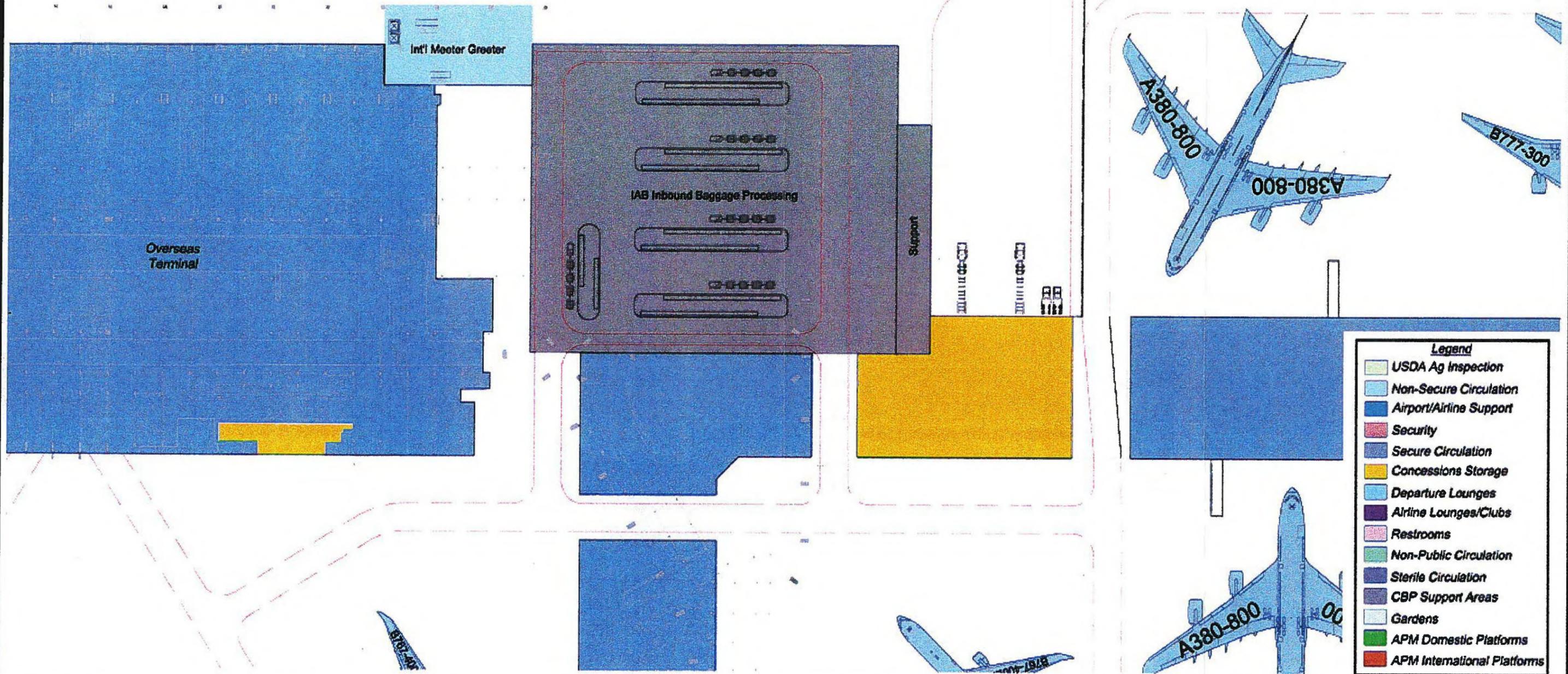


Honolulu
International
Airport

Terminal Redevelopment Concept - A

Upper Level Floor Plan - Diamond Head IAB Arrivals

EKNA Services, Inc. LeB Elliott



Honolulu
International
Airport

Terminal Redevelopment Concept - A

Lower Level Diamond Head IAB Inbound Baggage



EKNA Services, Inc.

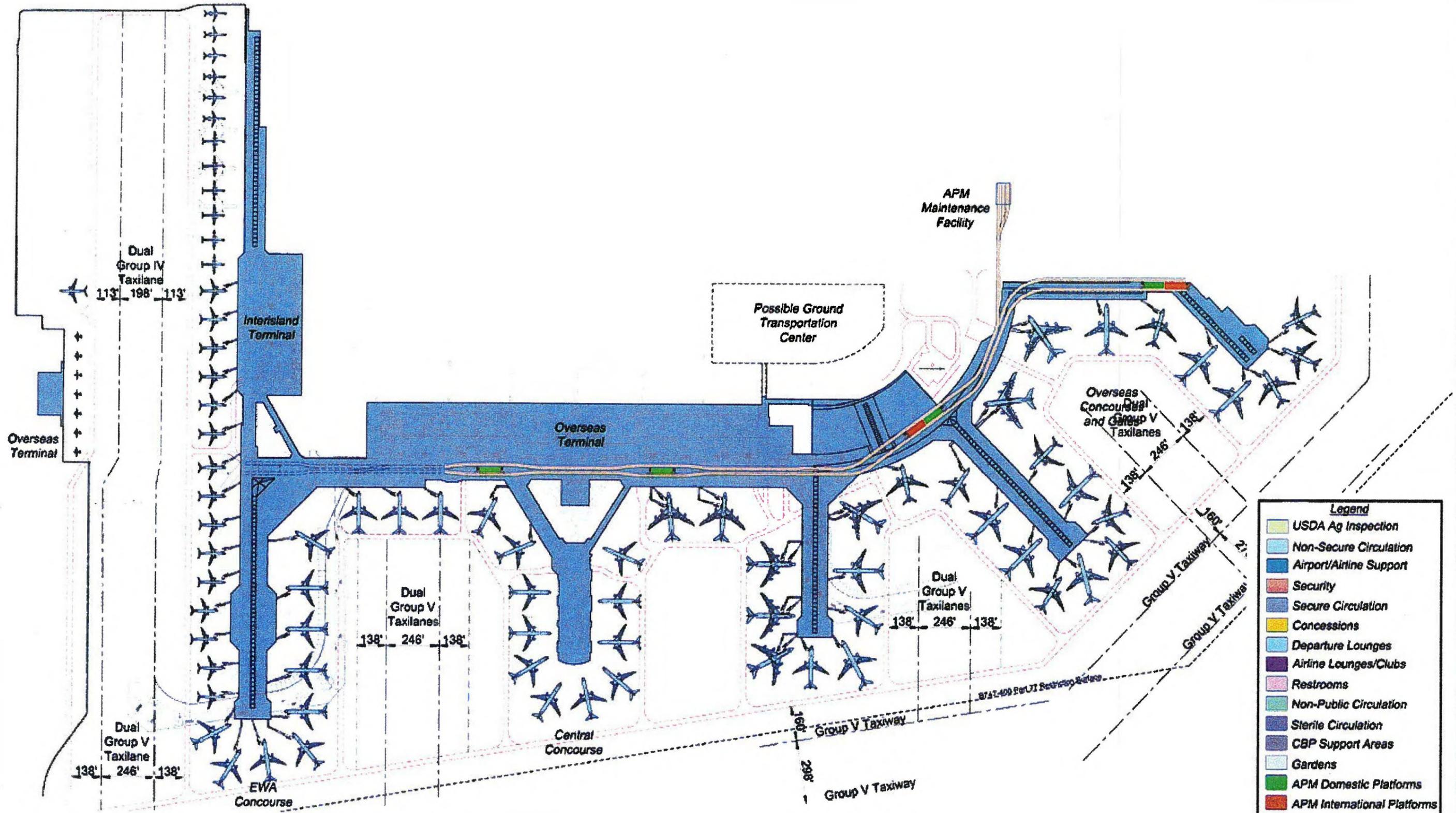


LeB Elliott



APPENDIX D

TERMINAL CONCEPT B - SPACE UTILIZATION



Legend

[Light Green]	USDA Ag Inspection
[Light Blue]	Non-Secure Circulation
[Dark Blue]	Airport/Airline Support
[Red]	Security
[Medium Blue]	Secure Circulation
[Yellow]	Concessions
[Light Blue]	Departure Lounges
[Dark Blue]	Airline Lounges/Clubs
[Pink]	Restrooms
[Light Green]	Non-Public Circulation
[Dark Blue]	Sterile Circulation
[Dark Blue]	CBP Support Areas
[Light Blue]	Gardens
[Green]	APM Domestic Platforms
[Red]	APM International Platforms



Honolulu
International
Airport

Terminal Redevelopment Concept - B

4th Level IAB (Two Level) APM Platforms

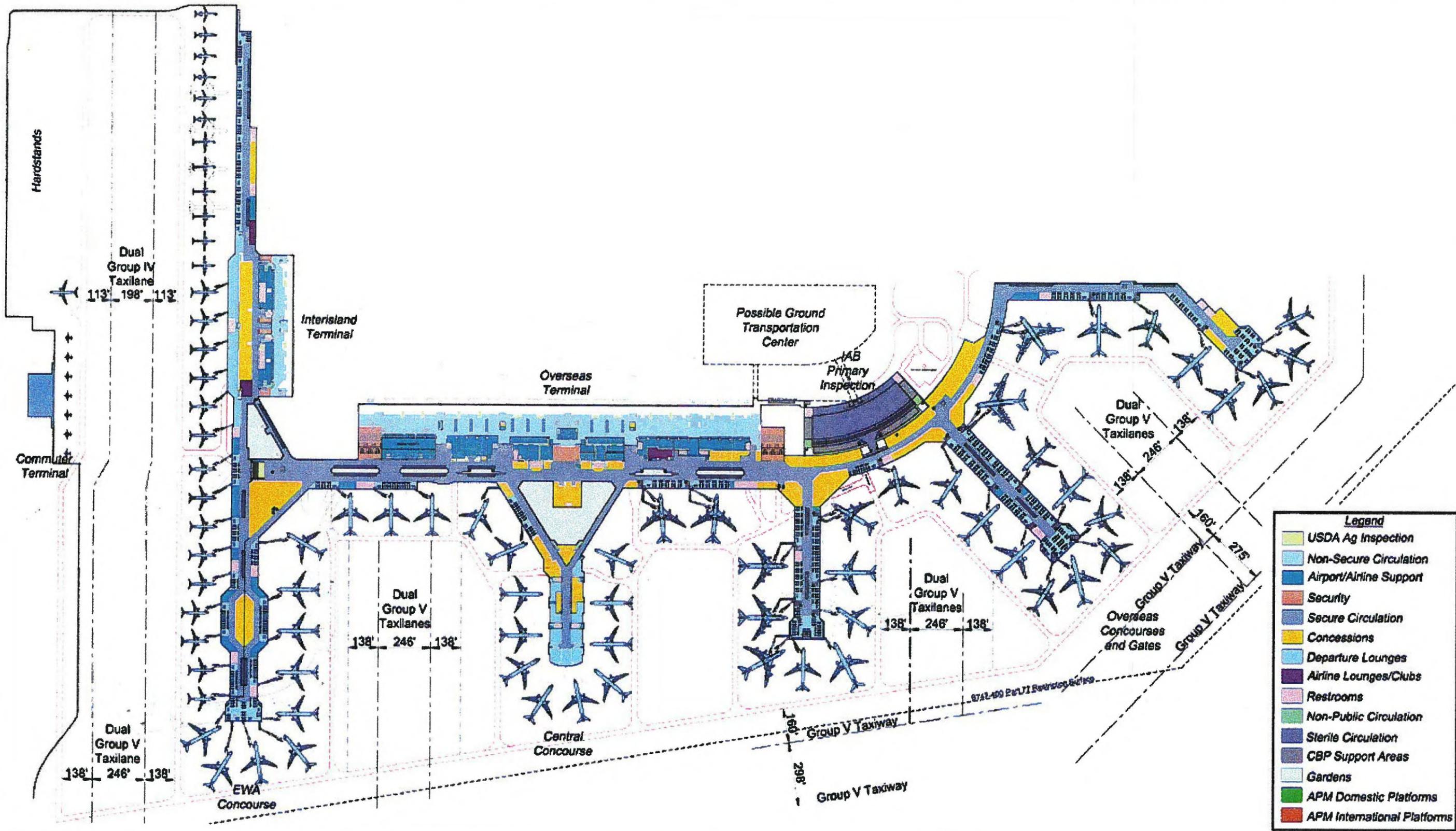


EKNA Services, Inc.



LeB Elliott





Honolulu
International
Airport

Terminal Redevelopment Concept - B

Upper Level Floor Plan & Two Level IAB Arrivals



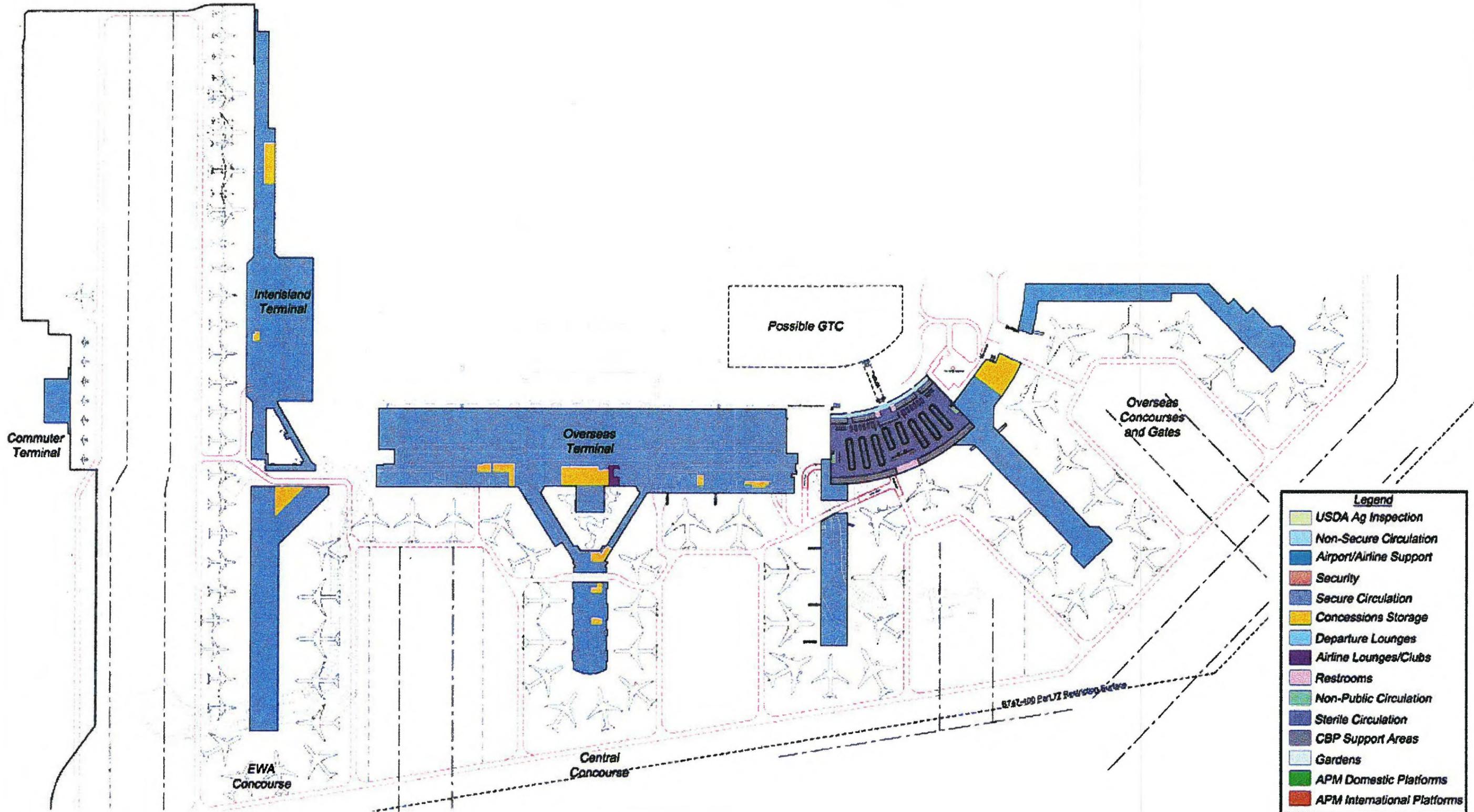
EKNA Services, Inc.



LeB Elliott



200 400



Legend	
	USDA Ag Inspection
	Non-Secure Circulation
	Airport/Airline Support
	Security
	Secure Circulation
	Concessions Storage
	Departure Lounges
	Airline Lounges/Clubs
	Restrooms
	Non-Public Circulation
	Sterile Circulation
	CBP Support Areas
	Gardens
	APM Domestic Platforms
	APM International Platforms



Honolulu
International
Airport

Terminal Redevelopment Concept - B

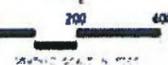
Lower Level (Two Level IAB)



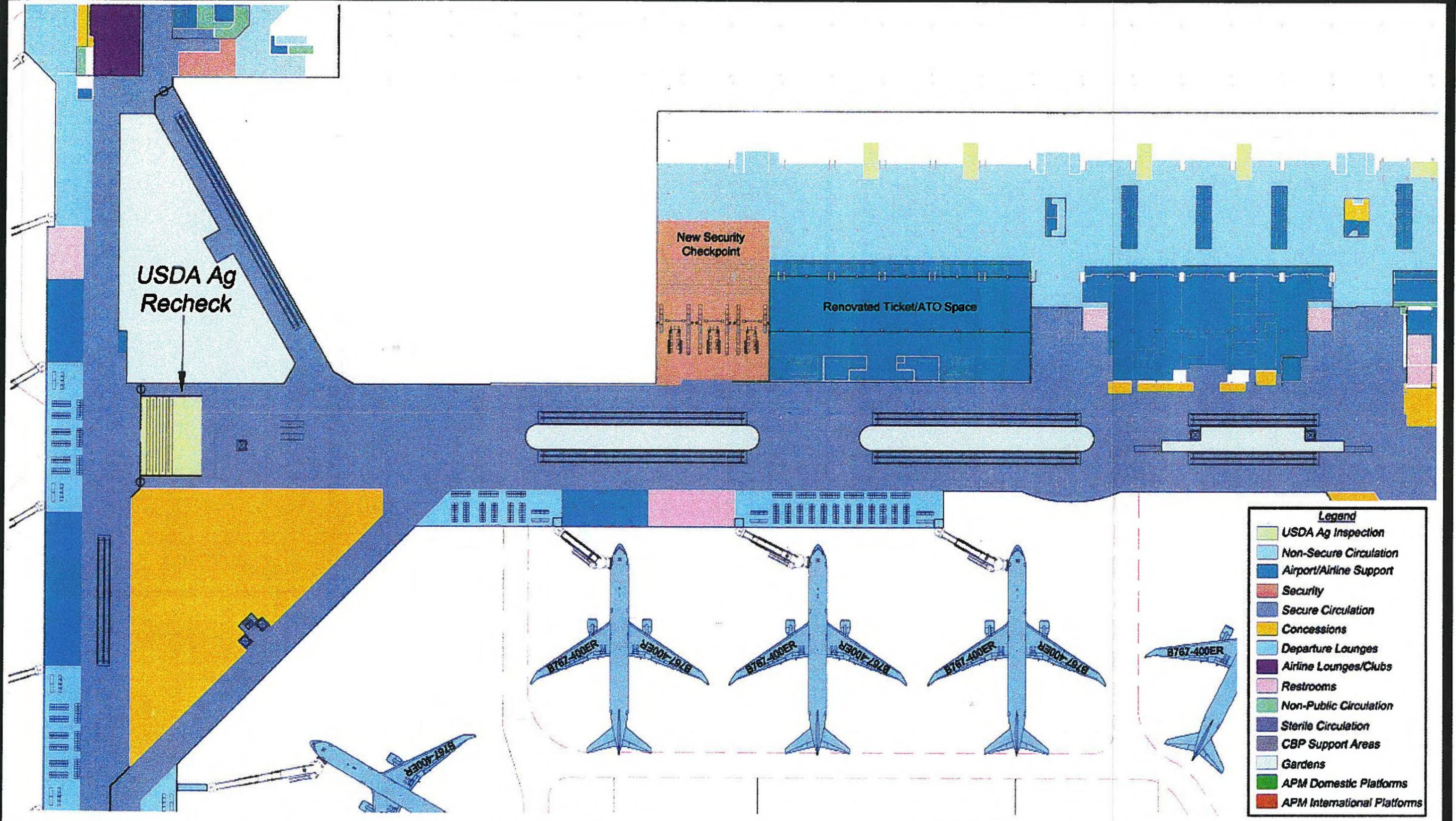
EKNA Services, Inc.



Leach-Elliott



SCALE: 1/8" = 1'-0"



- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

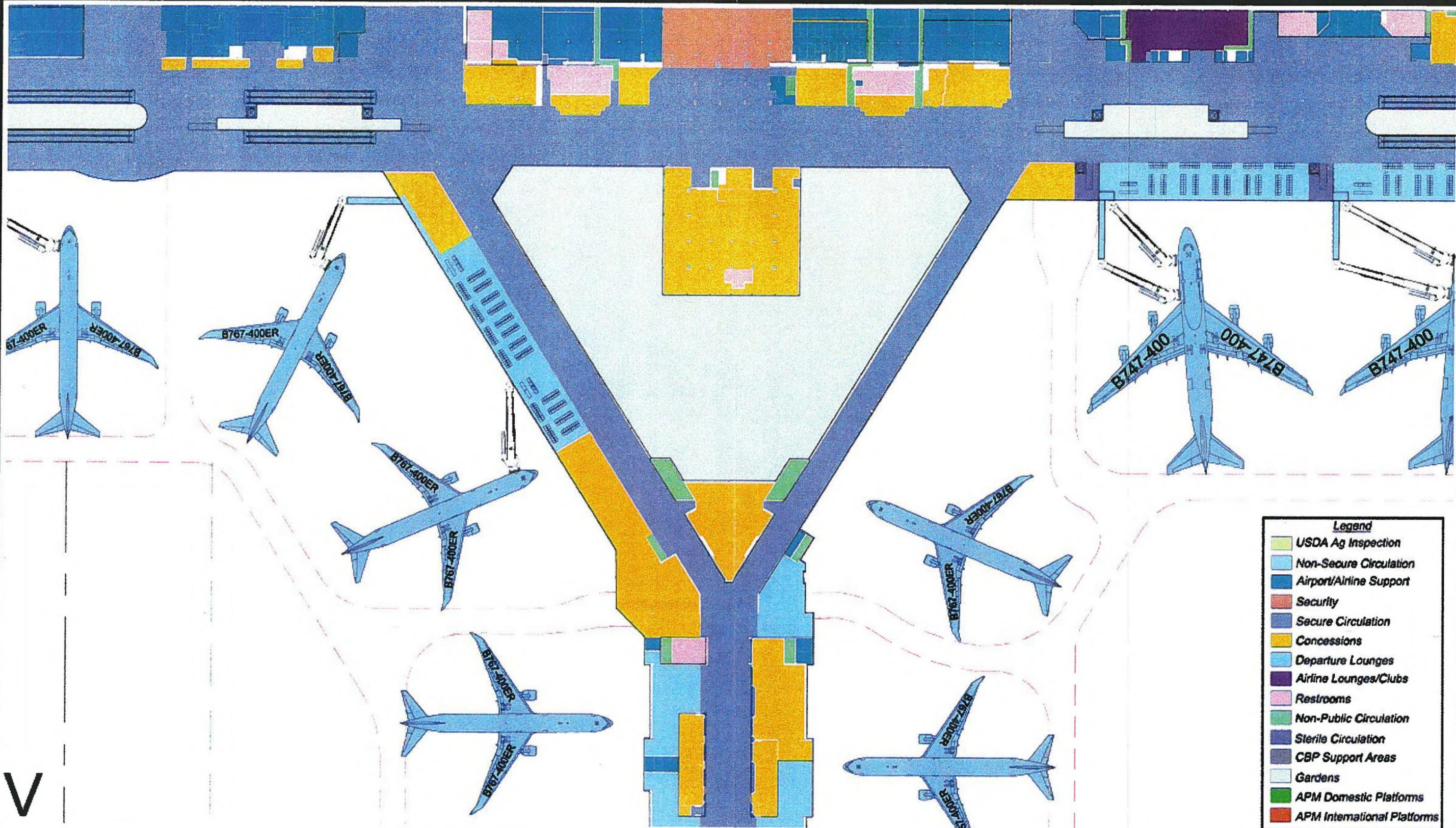

Honolulu International Airport

Terminal Redevelopment Concept - B

Upper Level OST to IIT Connector & EWA Concessions







Legend

- USDA Ag Inspection
- Non-Secure Circulation
- Airport/Airline Support
- Security
- Secure Circulation
- Concessions
- Departure Lounges
- Airline Lounges/Clubs
- Restrooms
- Non-Public Circulation
- Sterile Circulation
- CBP Support Areas
- Gardens
- APM Domestic Platforms
- APM International Platforms

V



Honolulu
International
Airport

Terminal Redevelopment Concept - B

Upper Level OST & Central Concourse Concessions

EKN Services, Inc. LeB Elliott

Possible Ground Transportation Center

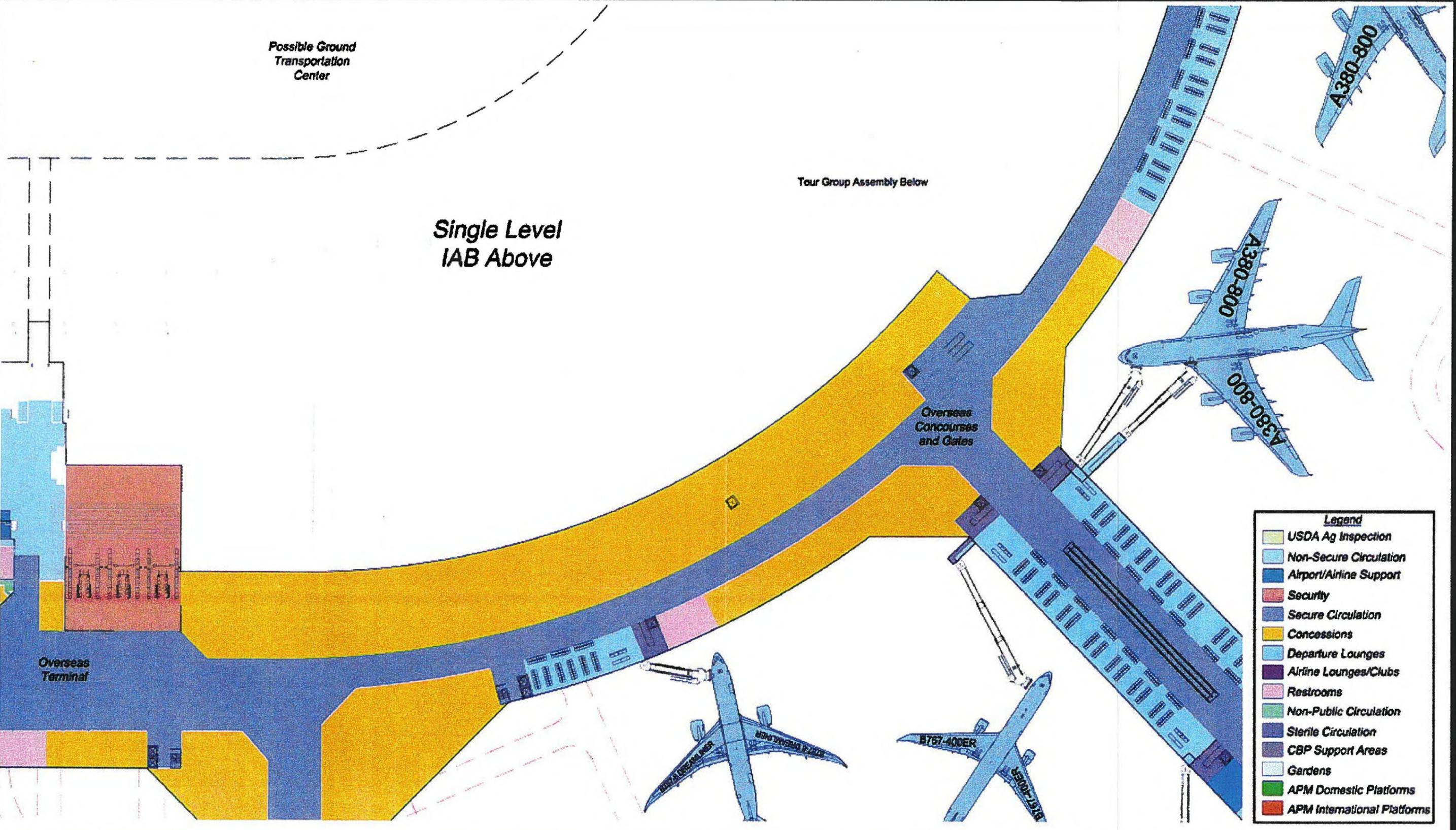
Tour Group Assembly Below

Single Level IAB Above

Overseas Concourses and Gates

Overseas Terminal

- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms



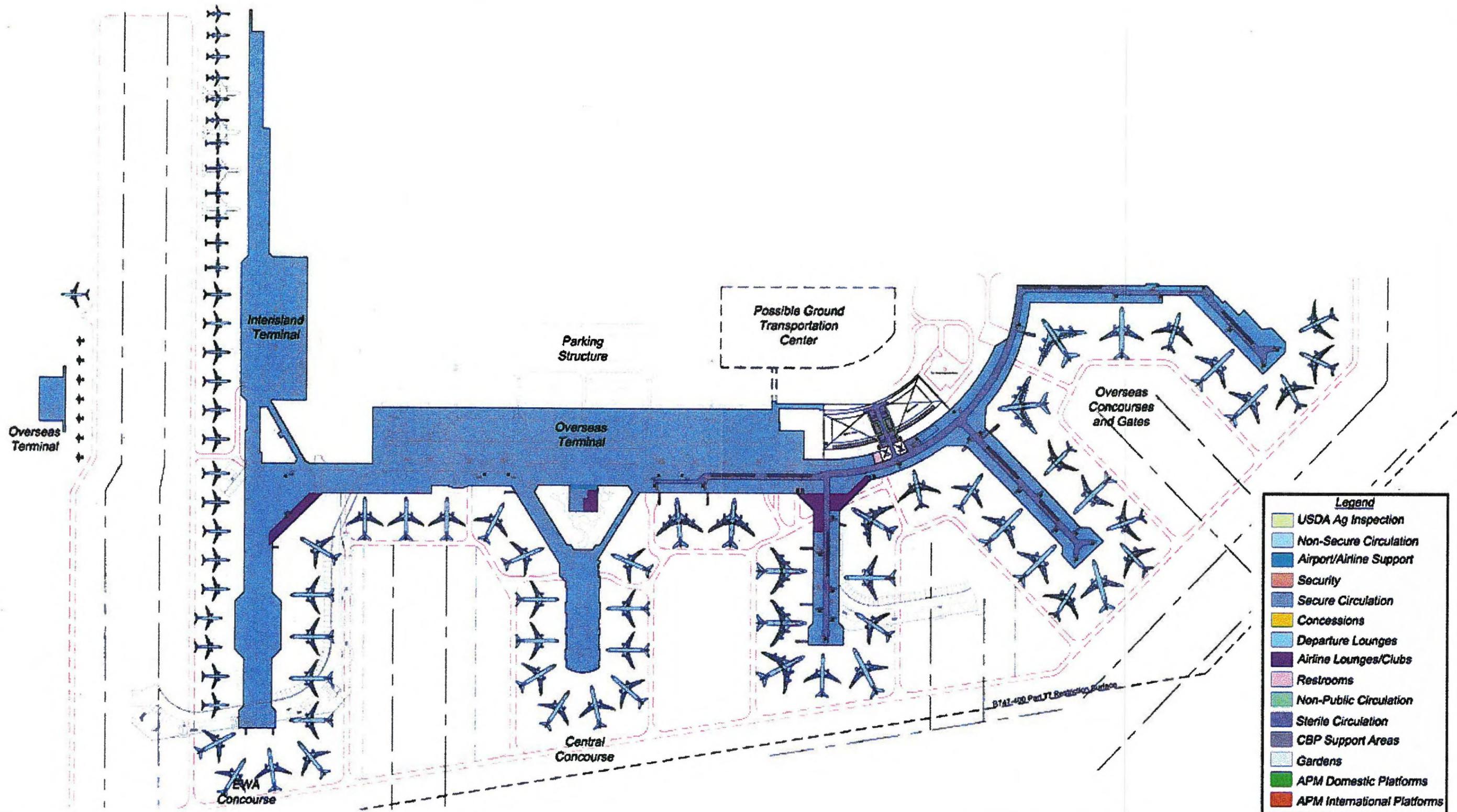

Honolulu International Airport

Terminal Redevelopment Concept - B

Upper Level Diamond Head Concessions (Third Level IAB Above)



EKNA Services, Inc. LeB Elliott



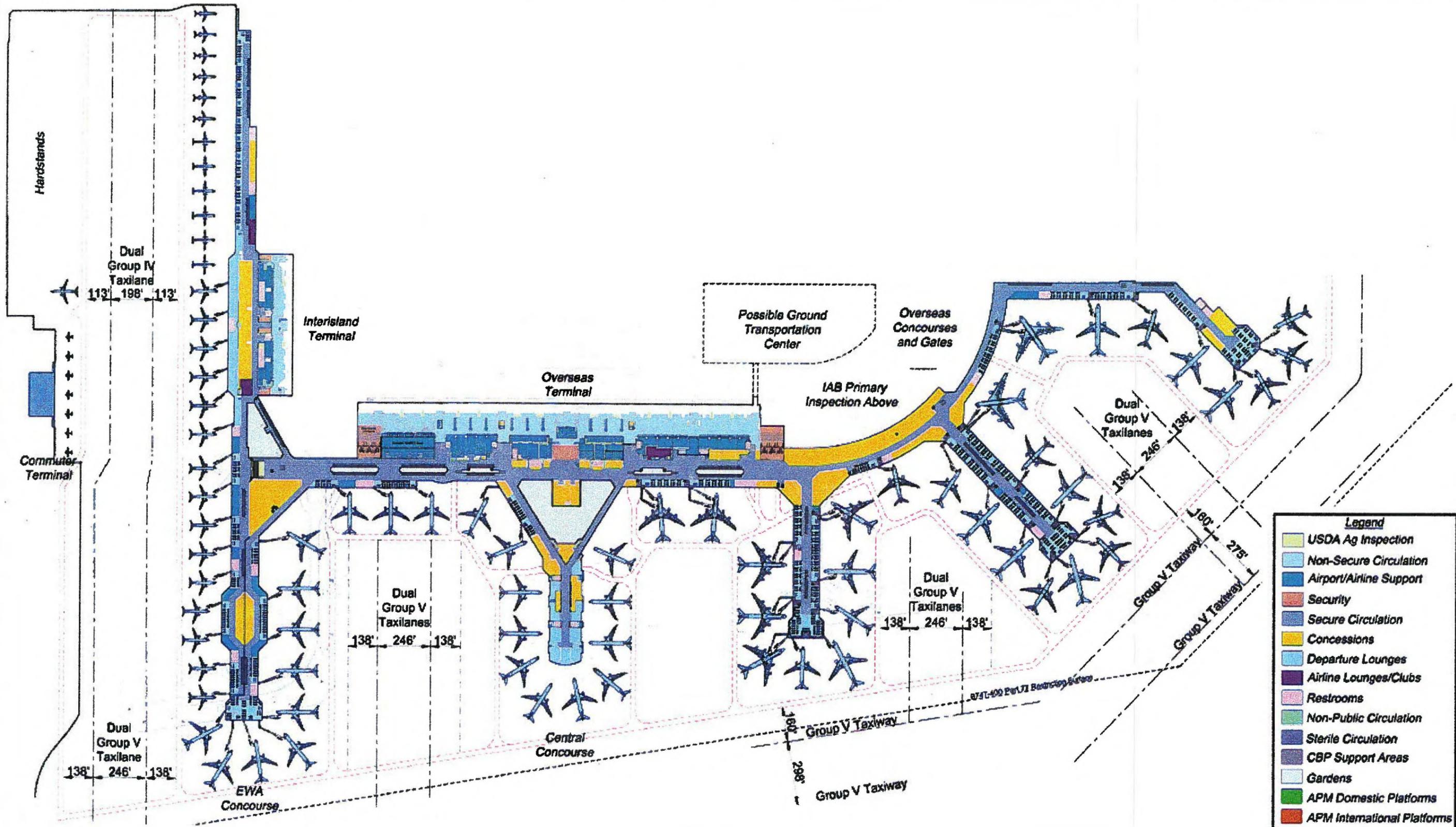

Honolulu International Airport

Terminal Redevelopment Concept - B

3rd Level Diamond Head IAB (Two Level) Sterile Plan







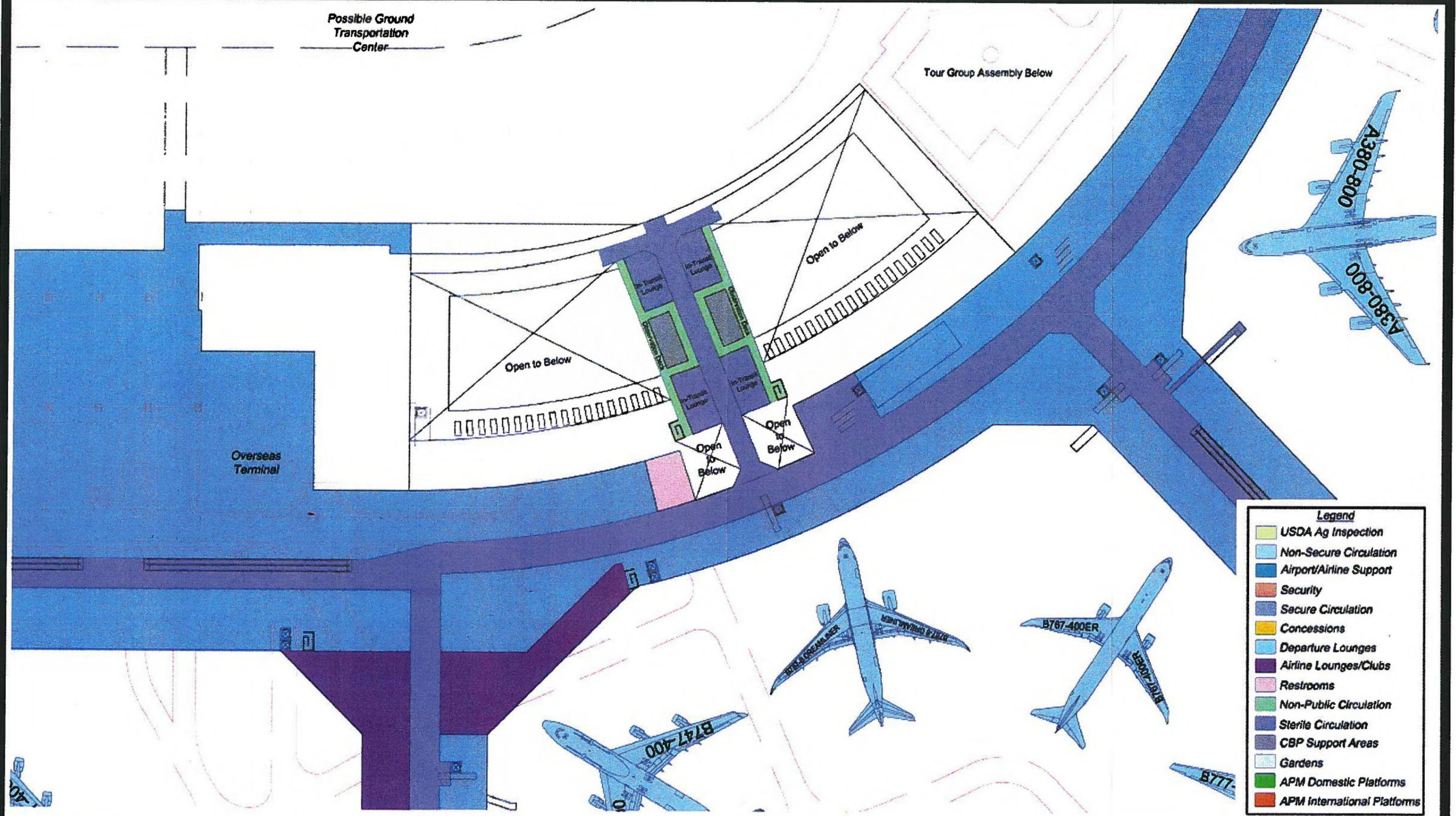

Honolulu International Airport

Terminal Redevelopment Concept - B

Upper Level Floor Plan (Third Level IAB Arrival)







- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

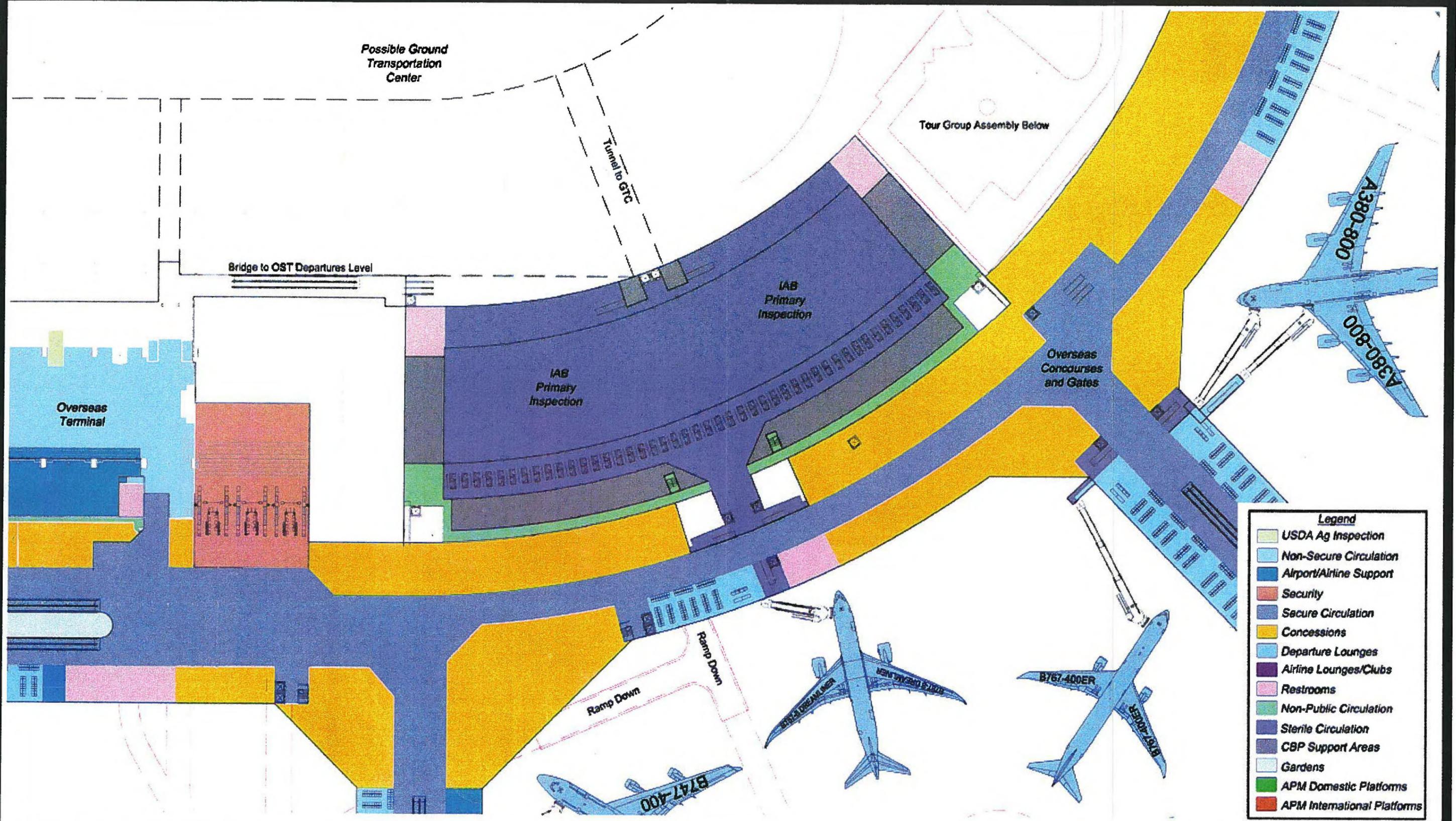


Honolulu
International
Airport

Terminal Redevelopment Concept - B

3rd Level Diamond Head IAB (Two Level) Sterile Plan

EKNA Services, Inc. LeB Elliott



- Legend**
- USDA Ag Inspection
 - Non-Secure Circulation
 - Airport/Airline Support
 - Security
 - Secure Circulation
 - Concessions
 - Departure Lounges
 - Airline Lounges/Clubs
 - Restrooms
 - Non-Public Circulation
 - Sterile Circulation
 - CBP Support Areas
 - Gardens
 - APM Domestic Platforms
 - APM International Platforms

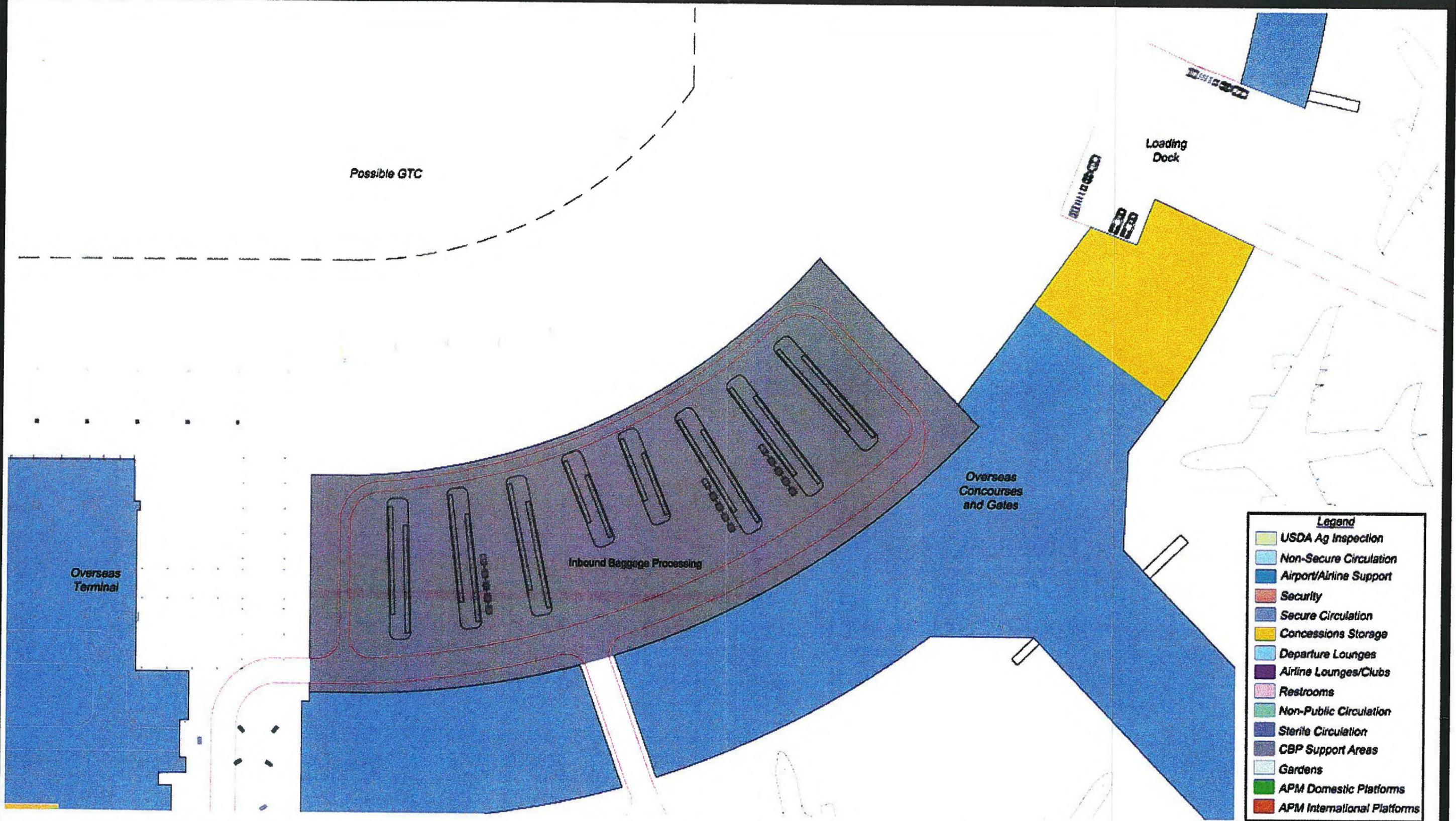

Honolulu International Airport

Terminal Redevelopment Concept - B

Upper Level Diamond Head IAB Primary Inspection







Legend

- USDA Ag Inspection
- Non-Secure Circulation
- Airport/Airline Support
- Security
- Secure Circulation
- Concessions Storage
- Departure Lounges
- Airline Lounges/Clubs
- Restrooms
- Non-Public Circulation
- Sterile Circulation
- CBP Support Areas
- Gardens
- APM Domestic Platforms
- APM International Platforms

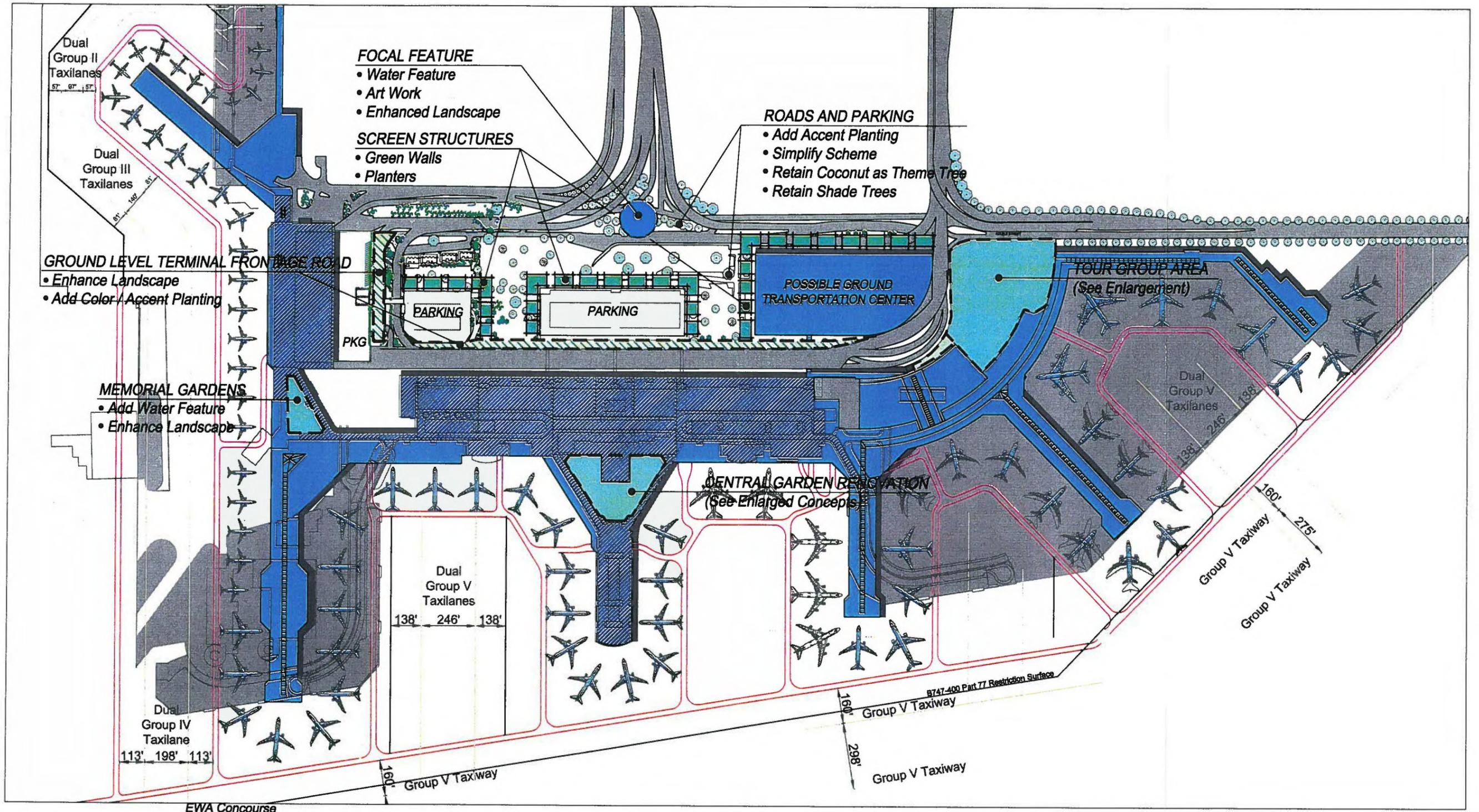

Honolulu International Airport

Terminal Redevelopment Concept - B

Lower Level Diamond Head IAB Inbound Baggage







Honolulu
International
Airport

Terminal Redevelopment Concept - B

Conceptual Landscape Master Plan



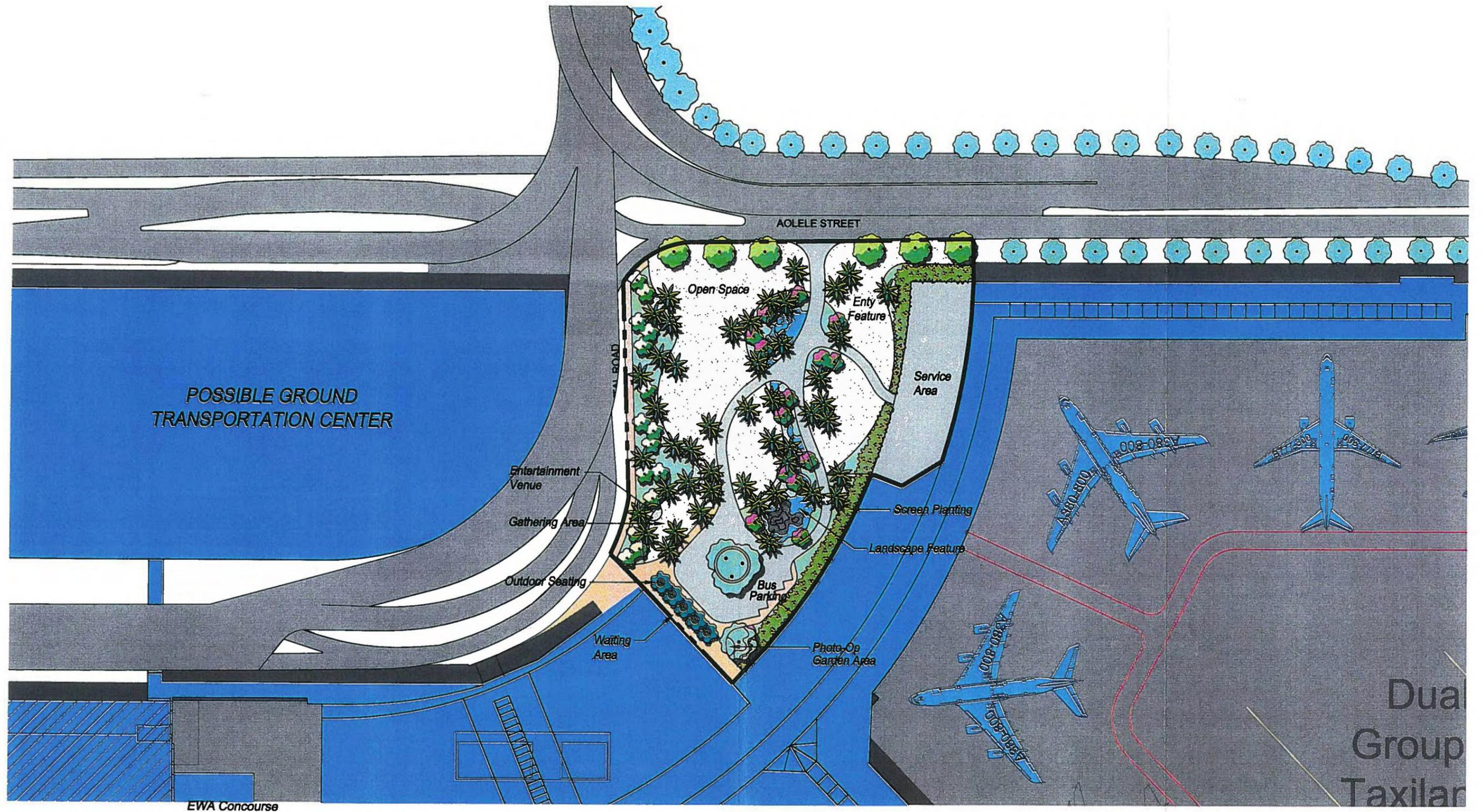
EKNA Services, Inc.



Lea Elliott



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GRAPHIC SCALE IN FEET



Honolulu
International
Airport

Terminal Redevelopment Concept - B

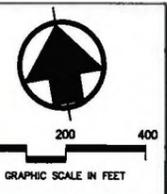
Tour Group Area



EKNA Services, Inc.



LeB Elliott



Created: T:\94\Terminal Area Master Plan\0207-05-11 - Final Illustrations\Planning\TRC_B\Illustrations\Layout Name - Last Based on: Wednesday, Jul 23 2008 @ 11:19 AM - L:\Delbert et 0.004

APPENDIX E

TERMINAL LANDSCAPE CONCEPTS



LANDSCAPE MASTER PLAN UPDATE

**Honolulu International Airport
Honolulu, Hawaii**

August 2009

**By
Miyabara Associates LLC
Landscape Architects & Planners**

**For
State of Hawaii
Department of Transportation,
Airports Division (DOT-A)**

LANDSCAPE MASTER PLAN

HONOLULU INTERNATIONAL AIRPORT - MASTER PLAN UPDATE

Miyabara Associates LLC

EKNA Services, Inc.

August 2009

INTRODUCTION

For most visitors and returning residents, the Honolulu International Airport (HNL) is their initial welcoming experience to Hawaii. As a world-renown destination area, the first impression and appearance of the HNL is an important one, especially to those visiting for the first time. The outdoor environment at HNL should represent a glimpse of what is to be expected for the rest of the Hawaiian Islands.

Over the years, the HNL has undergone numerous changes and expansion, with much needed improvements and expansion planned as part of the Master Plan Update project. The landscape has undergone similar changes as well to accommodate the new and expanded facilities. In addition, the passing of time has resulted in a landscape that is aged and worn. Currently, the exterior environment and grounds have an appearance that is eclectic and lacking a clear theme.

A landscape survey and analysis was conducted in 2004 and recommended that the landscape undergo a major renovation effort to restore and enhance the exterior landscaped areas at HNL.

PROPOSED CONCEPTS

HAWAIIAN LANDSCAPE THEME

The landscape theme at HNL should be distinct and unmistakably associated with Hawaii, her people and their culture. At the core of Hawaiian culture is the spirituality of the Hawaiian people as exhibited through religion, legend, mythology, and traditional practices. Hawaiian landscape elements further enhance the essence of Hawaii as a unique place. Such theme elements include:

Plants

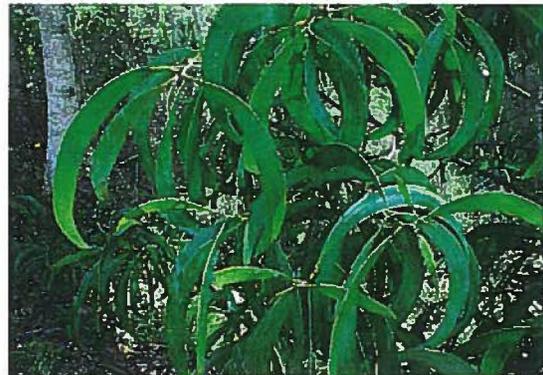
The early Hawaiian settlers brought with them an abundance of plants and animals that were critical to surviving and perpetuating a new life. These and the native plants that were already established were used in every facet of life from

food, shelter, herbs and medicines, clothing, housewares, tools, weapons, transportation, and religious practices.

Iconic native and Polynesian-introduced plants that should be incorporated into the HNL landscape include:



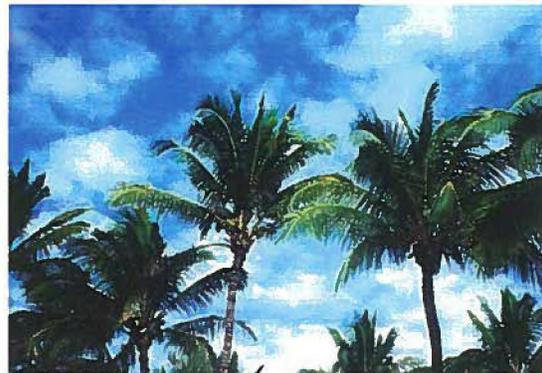
Kukui (Candlenut) *Aleurites moluccana*



Koa (Acacia) *Acacia koa*



Hala (Screw Pine) *Pandanus odoratissimus*



Niu (Coconut) *Cocos nucifera*

Niu or Coconut in particular should continue to be used as the predominant landscape element at HNL. While not endemic to the Islands, the Coconut plays a vital part of traditional practices and lore and is symbolically a visual icon of Hawaii.

Water

It can be said that all of traditional Hawaiian life revolved around the natural world and the greater landscape, notably exemplified by the concept of the *Ahupua'a*, the land management system extending from the top of the mountain to the shore of the sea, defined by the regional watershed.

Wai, or water, is the resource that is protected, used, and returned to the *ahupua'a* and is the very essence of all life. Water elements and features should be incorporated and made an integral part of the HNL landscape.

Other important theme elements that can be used or demonstrated at the HNL include the geographic isolation of the islands, its fragile environment and ecosystem, and its history of voyaging and discovery.

SIMPLIFICATION

Following the axiom of "less is more", the overall landscape at the HNL should be simplified for both aesthetic and management reasons. It is more desirable and easier to appreciate the exterior environment when composed of few visually strong elements than many disparate components. A cohesive landscape will also result in a more memorable experience. Some specific guidelines include:

1. Simplify the plant palette by reducing the number of plant types used.
2. Arranging plantings in masses rather than single plants.
3. Minimize the use of plants requiring excessive maintenance, such as shrubs pruned into hedges or topiary-like shapes.

INDOOR/OUTDOOR RELATIONSHIP

One of the most important aspects of the Hawaiian culture and lifestyle is the inseparable relationship between the indoor and outdoor environment. The mild climate allow for the free flow from the inside to the outside and vice versa. This quality should be utilized and enhanced wherever possible throughout the HNL.

INTEGRATED MANAGEMENT PROGRAM

Equal in importance to a sound landscape master plan is sustainability through the establishment of an integrated landscape management program. First and foremost is a positive commitment to managing the landscape as an important part of the HNL facility and not as a long-term maintenance liability and budgetary constraint. The plan should address control of pests and disease and promoting the health of the landscape through the use of eco-friendly products and practices.

PROPOSED IMPROVEMENTS

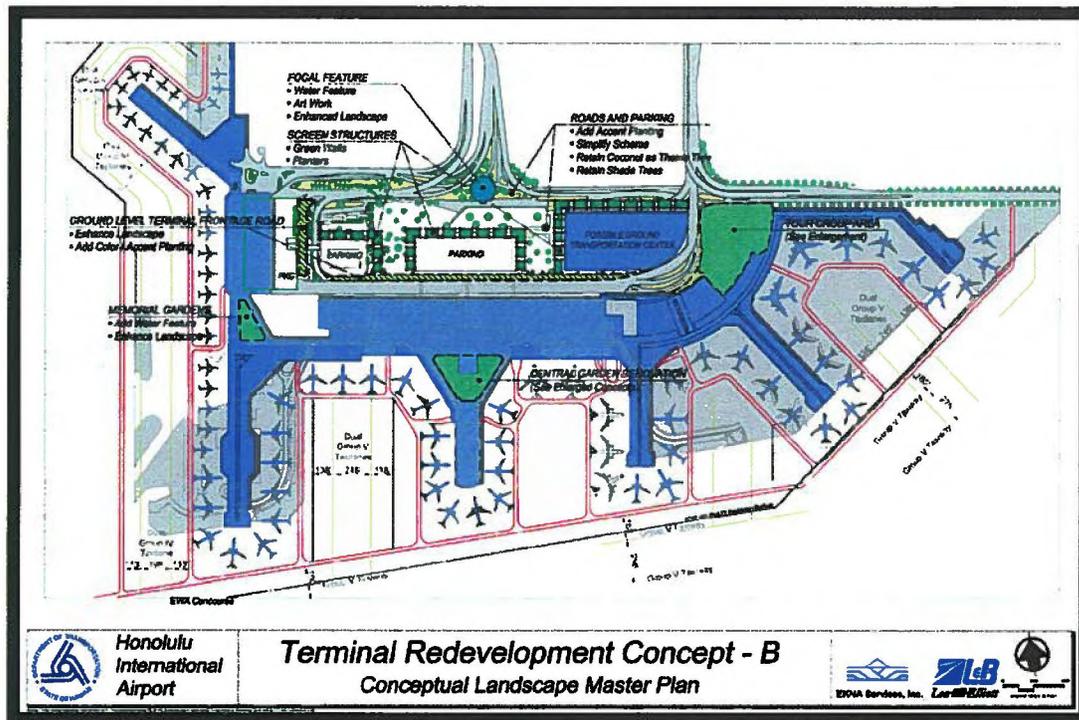


Figure 1 - Conceptual Landscape Masterplan

ROADS AND PARKING

The existing roads (including freeway ramps) and parking areas comprise the bulk of the HNL property outside of the runway and operational areas. There is little or no pedestrian and bicycle traffic in or out of the airport thus delegating the roads as the primary way incoming and departing passengers, users, and employees perceive the airport.

The goal is to have a well-maintained and attractive landscape to make this experience as pleasant as possible. Signage and sight clearances are also important characteristics with respect to the landscape treatment along the roads and parking areas.

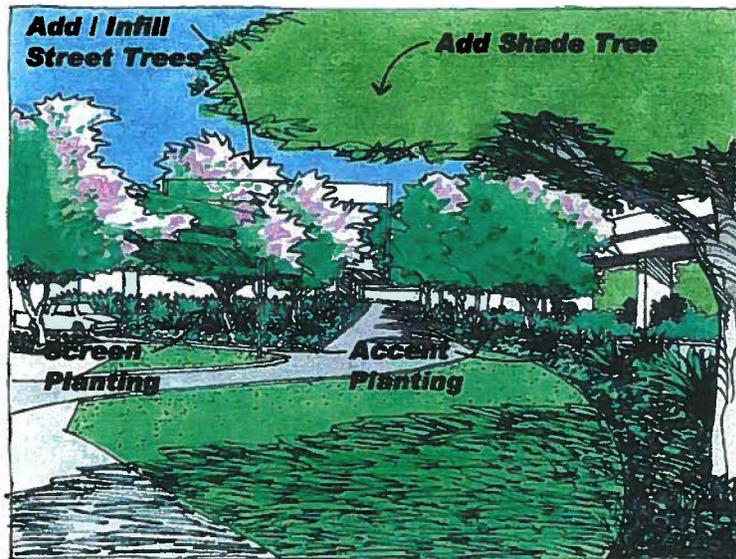
Key recommendations include:

- Simplify Plantings – avoid numerous types of species planted together. This will simplify maintenance and also be visually more appealing.
- Add Accent Planting – where visually important, such as key intersections, plants with color or unusual foliage can be used.

- Retain Coconuts as Major Planting – although requiring diligent maintenance, the Coconut, is universally recognized as a part of the Hawaiian landscape.
- Retain Shade Trees – Particularly in open parking areas, shade trees provide green relief from the sun and screens parking areas from upper ramps. Where possible, add additional street trees on major roads to further provide visual relief and shade.



Existing Landscape Condition



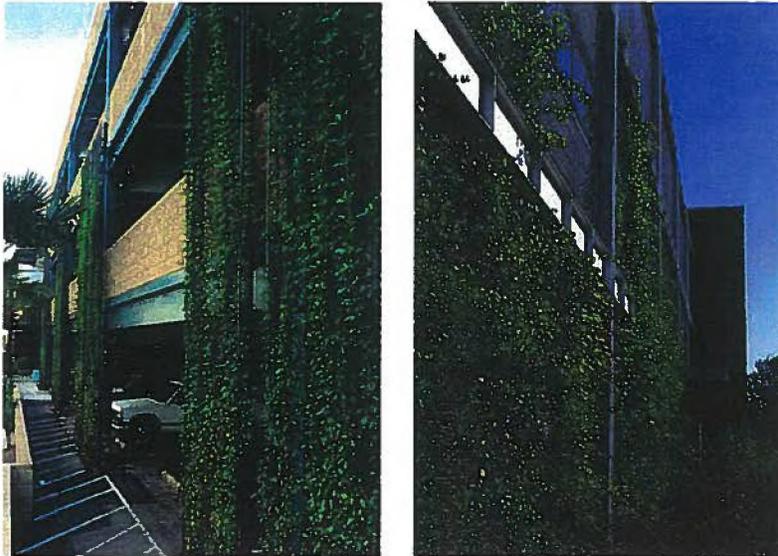
Proposed Landscape

SCREEN STRUCTURES

Major structures include the Terminal Buildings and Parking Structures. Wherever possible, install landscape materials to visually screen these structures from roads and ramps.

Possible techniques include:

- “Green Walls” – there are systems available that are constructed of light-weight open structures that allow plants, usually vines, that can grow onto them to provide a landscaped screen.



- Large Screen Plantings – install large-scale plantings that can effectively screen or soften the effect of building walls. Plants include large clumping palms (Areca or MacArthur Palms), accent plants (Traveler’s Tree), or vertical trees (Gold Trees).

- Planters – install planters along visually important walls for plants to soften the impact of the structure and screen cars.



GROUND LEVEL TERMINAL FRONTAGE ROAD

This area is comprised of the landscaped areas directly adjacent to the main roads at the ground level of the main terminal building, beginning with the Inter-Island and Overseas Terminals and International Arrivals Building (IAB).

The main hurdles in creating an attractive and sustainable landscape are the harsh conditions encountered in these areas, such as limited area (narrow spaces, overhead structures) and lack of full sunlight, which limits the type of plantings that can thrive in a healthy condition.

Recommended are:

- Rejuvenate Existing Soil – the areas have been compacted and depleted of nutrients. Re-cultivation and perhaps even improvements to the drainage systems will help to create a healthy planting environment.
- Accent Plantings – install plantings that have color or unique foliage, preferably native species, but other tropical, non-invasive species will provide visual interest.
- Enhance Landscape – install plantings in all areas, i.e. no bare areas. In extreme conditions, utilize inorganic materials as ground covers such as decorative rocks or stones or mulch.



TOUR GROUP AREA

At the new IAB, a new Tour Group Area is proposed with large landscape open spaces, anchoring the Diamond Head end of the Terminal Building – see Figure 2 Tour Group Area. This area is, for most first-time visitors to the Islands, their initial impression of the Hawaiian landscape. As such, it is important that there is appropriate attention given to the level of landscape development.

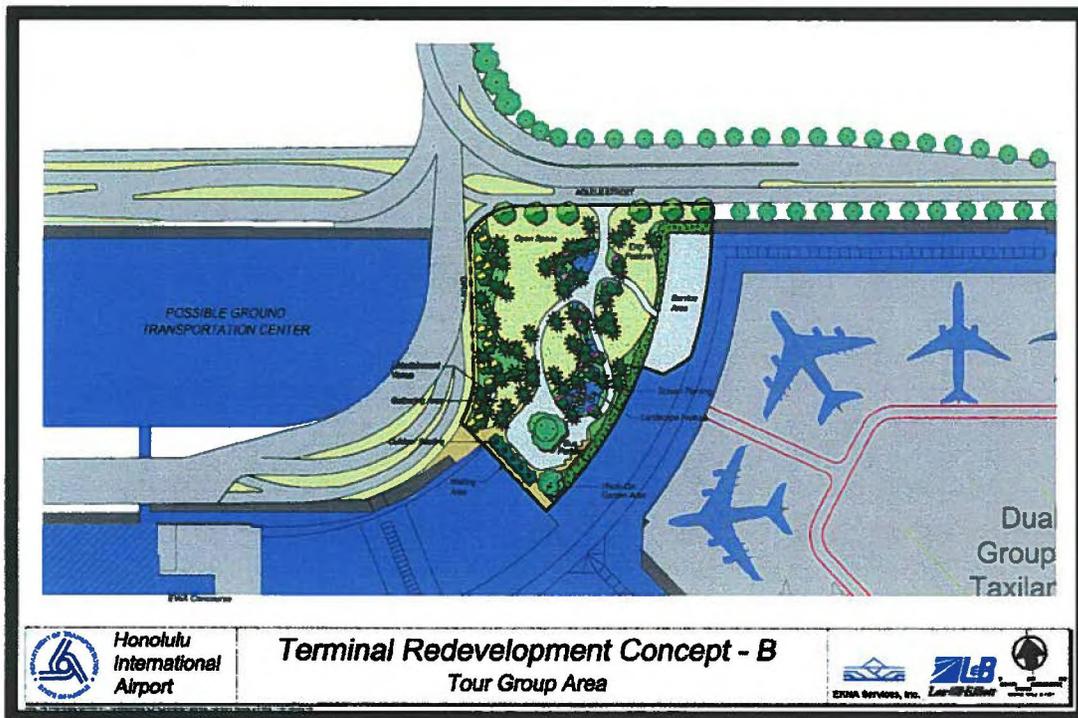


Figure 2 - Tour Group Area

Major features and landscape characteristics include:

- **Open Areas** – outdoor spaces open to a clear sky with the normal prevailing trade wind make for a positive impression. Outdoor gathering areas as also opportunities to provide a unique venue for interpretive programs, entertainment and respite.
- **Accent Plantings** – use of iconic and native Hawaiian and Polynesian-introduced species will impart a genuine ambiance of the Hawaiian landscape.
- **Landscape Features** – installation of features within the landscape areas such as water features and native artwork add interest to the landscape. Smaller lush gardens with other accent plantings such as non-invasive flowering tropical species can also provide a backdrop for photo opportunities.



FOCAL FEATURE

As the most important entry and departure point of Hawaii, it is important that the HNL possess a memorable image. Currently, the most iconic feature of the airport is the control tower, primarily because it is the highest vertical structure within the HNL property.

As part of the master plan improvements, one option is to architecturally renovate and update the existing tower. Possible improvements are:

- **Re-Paint the Terminal** – new colors and or patterns would provide a subtle improvement without any structural changes.
- **Re-Design the Control Tower** – perhaps adding an iconic new roof structure that recalls or imparts a unique Hawaiian style would provide a new visual image.

- Change or improve the signage, possibly with the inclusion of graphic images, all in conformance with signage ordinances.

Another option is to create an entirely new focal feature within the landscape. Challenges include achieving visibility from all of the numerous entry and arrival avenues, which occur at ground level as well as the raised ramps. A possible location is where the freeway ramps enter the HNL property and the makai end of Rodgers Boulevard – see Figure 1 - Conceptual Landscape Master Plan. Key considerations of the feature would include:

- Be visible from the ramp and ground levels, requiring the feature to be a primarily vertical element.
- Incorporate artwork with a distinct and identifiable Hawaiian theme.
- Integrate water at both the upper and lower sections of the feature.

CENTRAL GARDEN RENOVATION

Existing Conditions

The project area is centrally located at the HNL Overseas Terminal Building and is the major landscape feature within the airport complex. Constructed in the early 1970's, the gardens were designed to reflect distinct cultural themes. The three main garden areas are the Chinese, Japanese and Hawaiian Gardens. Water elements are part of each garden and serve as a unifying element.

The 2004 landscape survey and analysis conducted recommended that the gardens undergo a major renovation effort due to age and deteriorating infrastructure and equipment.

Proposed Renovation Concept

As part of the HNL Master Plan Update, the concept of a major renovation to the garden area is contemplated. Possible improvements may involve the demolition of existing buildings and facilities to allow the construction of new or expansion of existing concessions and user amenities.

The Cultural Gardens Renovation Concept, as described here and illustrated on the accompanying schematic plans and sections, proposes the following:

1. Demolition of the existing building (Garden Conference Rooms) at Main Concourse.

Concept A

This concept includes an observation area immediately off the main concourse level where travelers can enjoy a full view of the gardens. A Hawaiian culture-inspired artwork feature acts as a focal feature to gather around.

The water feature element is brought up to the concourse level as another feature element that then cascades dramatically to the lower level and ties into the ponds below.

Similar to the original garden plan, the lower ponds are connected and form a unifying feature for all of the cultural gardens.

At the restaurant, outdoor dining areas, possibly terracing down to the garden level, are proposed to enhance user enjoyment of the gardens.

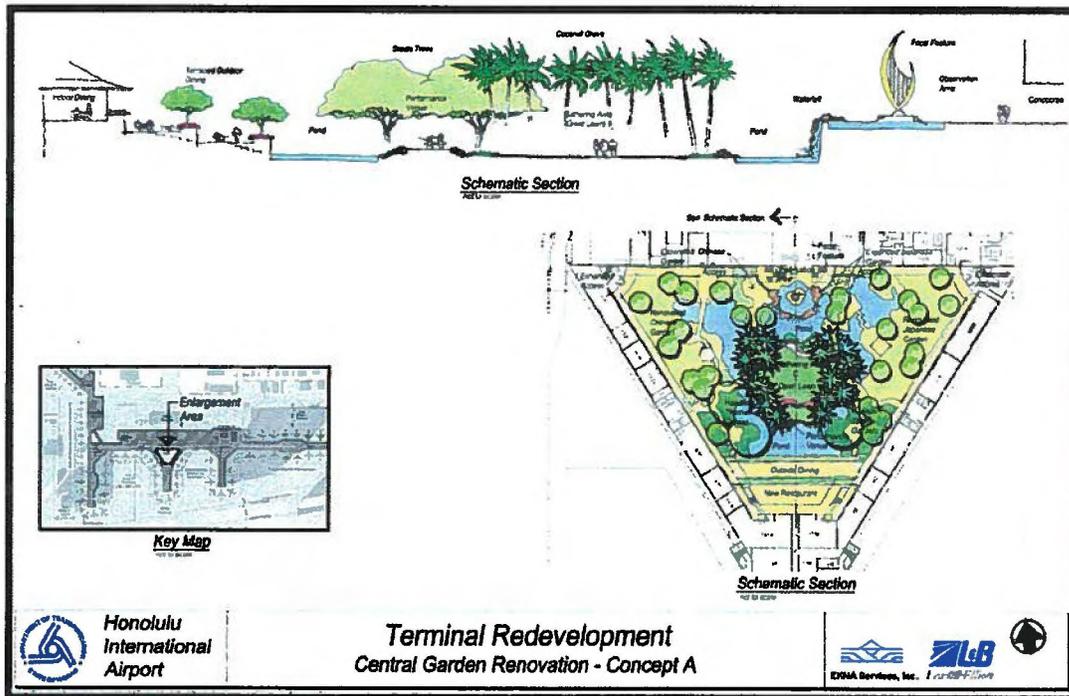


Figure 3 - Concept 'A'

Concept B

Concept B proposes using the area directly off the main concourse as an observation area, but also allows for a more direct access to the gardens via a grand stairway. Artwork is also incorporated as visual focal points.

A water feature/waterfall at the restaurant across the gardens provide a distant focal feature and attraction to entice users to enter the lower garden space.

While water continues to be used as a unifying element, this concept proposes three separate water features, each tied to it's respective design theme.

A water feature is proposed at the main level in conjunction with the new/expanded restaurant at the central concourse. A dramatic waterfall serves as a focal feature from the main concourse.

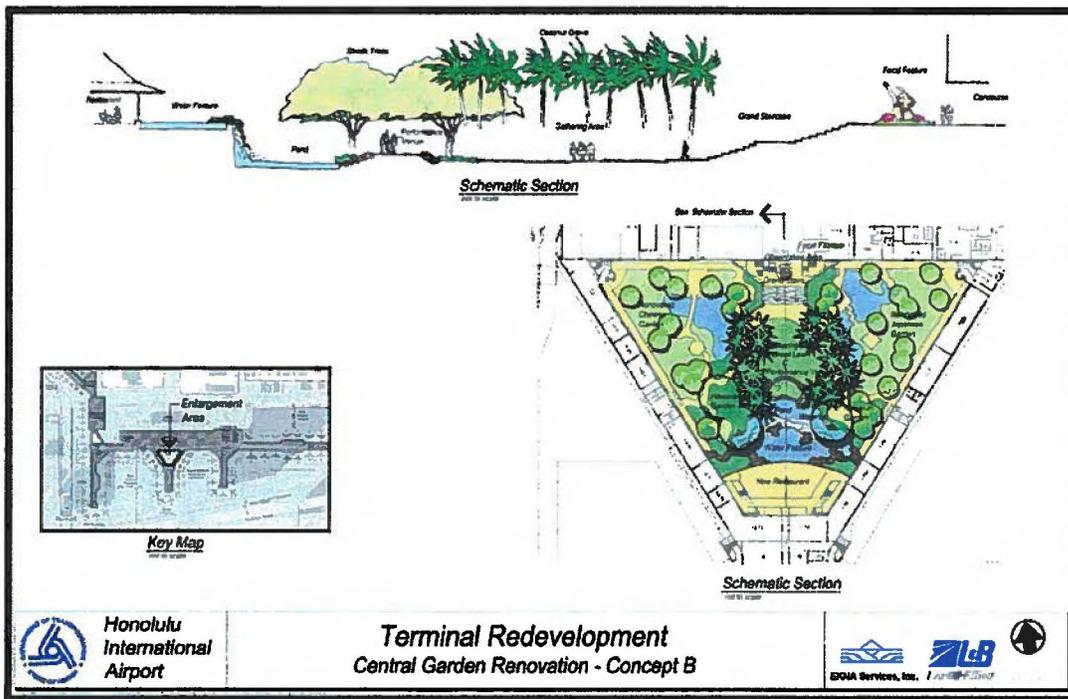


Figure 3 - Concept 'B'

MEMORIAL GARDEN

In addition to the Central Gardens, there are other gardens located throughout the HNL that require renovation and enhancement. The largest of these gardens is the Memorial Garden, located at the Inter-Island Terminal. The lush landscaped garden area serves as a pleasant outdoor venue for travelers. Possible improvements include:

- Water Features or Outdoor Artwork
- Supplemental Plantings, flowering, accent or native Hawaiian species.



Numerous smaller gardens occur throughout the terminal building at arrival and departure areas in the form of pocket planters, some with interpretive displays. Enhancement of these planters can add significantly to the HNL experience.

IMPLEMENTATION and MAINTENANCE

Presently, there are no specific budgetary allocations for the proposed Landscape Improvements. The following are Budgetary Estimates of Probable Cost for each of the proposed improvements described above. These figures are not based on specific quantities or construction documents, but an estimate of the overall general scope of each item. Detailed budgets are required as selected projects proceed to implementation.

Focal Feature	\$855,000
Roads and Parking	\$2,873,000
Screening of Structures	\$4,855,000
Ground Level Landscape	\$1,378,000
Terminal Improvements	\$3,760,000
Group Tour Area	\$2,465,000
Total	\$16,186,000

Most importantly, there needs to be an increased commitment, both in terms of financial and personnel terms, to a higher level of maintenance in order to achieve the goals of the Landscape Master Plan.

In addition, preparation of a comprehensive Integrated Landscape Management Plan is recommended as part of the implementation plan and policies.

APPENDICES

A. Master Plant List

Trees

Koa (*Acacia koa*)
Kukui (*Aleurites moluccana*)
Hong Kong Orchid (*Bauhinia blakeana*)
Geometry Tree (*Bucida buceras*)
Kamani (*Calophyllum inophyllum*)
Rainbow Shower (*Cassia nealiae*)
Sea Grape (*Coccoloba uvifera*)
Kou (*Cordia subcordata*)
Royal Poinciana (*Delonix regia*)
Lignum vitae (*Guaiacum sanctum*)
Hau (*Hibiscus tiliaceus*)
Variegated Hau (*Hibiscus tiliaceus* 'Variegata')
Madagascar Olive (*Noronhia emarginata*)
Hala (*Pandanus odoratissimus*)
Singapore Plumeria (*Plumeria obtuse*)
Podocarpus (*Podocarpus gracilior*)
Mast Tree (*Polyalthea longifolia* 'Pendula')
Alahe'e (*Psydrax odorata*)
Milo (*Thespesia populnea*)
Tipu (*Tipuana tipu*)
Beach Heliotrope (*Tournefortia argentea*)

Palms

Areca Palm (*Chrysalidocarpus lutescens*)
Coconut (*Cocos nucifera*)
Blue Latan Palm (*Latania loddigesii*)
Chinese Fan Palm (*Livingstonia chinensis*)
Pygmy Date Palm (*Phoenix robelenii*)
Fiji Fan Palm (*Pritchardia Pacifica*)
Loulou (*Pritchardia* sp.)
Macarthur Palm (*Ptychosperma macarthurii*)
Rhaps Palm (*Rhaps excelsa*)
Joannis Palm (*Veitchia joannis*)
Manila Palm (*Veitchia merrillii*)
Foxtail Palm (*Wodyetia bifurcata*)

Shrubs

Red Ginger (*Alpinia purpurata*)
Bougainvillea (*Bougainvillea* sp.cv.)
Snowbush (*Breynia nivosa* var. *roseo-picta*)
Natal Plum (*Carissa grandiflora* cv.)

Croton (*Codiaeum variegatum*)
 Variegated Mirror Plant (*Coprosma repens* 'Picturata')
 Ti (*Cordyline fruticosa*)
 Spiderlily 'Queen Emma' (*Crinum angustum*)
 Spiderlily (*Crinum asiaticum*)
 'Ölena (*Cucurma longa*)
 Dwarf Golden Dewdrop (*Duranta* sp.)
 Wax Fig (*Ficus microcarpa* var. *crassifolia*)
 Caricature Plant (*Graptophyllum pictum*)
 Heliconia Varieties (*Heliconia* sp. cv.)
 Hibiscus (*Hibiscus* sp.)
 Ixora sp. cv. (*Ixora coccinea* cv.)
 Monstera (*Monstera deliciosa*)
 Firecracker Plant (*Russelia equisetiformis*)
 Mock Orange (*Murraya paniculata*)
 Oleander (*Nerium oleander*)
 'Ūlei (*Osteomeles anthyllidifolia*)
 Dwarf Pittoporum (*Pittosporum tobira* 'Wheeler's Dwarf')
 Plumbago (*Plumbago auriculata*)
 'Iliee (*Plumbago zeylanica*)
 Purple False Eranthemum (*Pseuderanthemum carruthersii*)
 Eldorado (*Pseuderanthemum reticulatum*)
 Alahe'e (*Psydrax odorata*)
 Indian Hawthorn (*Rhaphiolepis indica*)
 Beach Naupaka (*Scaevola frutescens* var. *sericea*)
 Dwarf Brassia (*Schefflera arboricola*)
 Bird of Paradise (*Strelitzia reginae*)
 Palapalai (*Microlepis strigosa*)

Groundcovers

'Ae'ae (*Bacopa monnieri*)
 Dwarf Carissa (*Carissa* g. 'Green Carpet')
 'Uki'uki (*Dianella sandwicensis*)
 Pothos (*Epipremnum pinnatum*)
 Dwarf Jamacian Heliconia (*Heliconia stricta* 'Dwarf Jamaican')
 Lirope (*Liriope muscari* cv.)
 Daylily (*Hemerocallis aurantiaca*)
 Pohuehue (*Ipomoea pes-caprae* subsp. *Brasiliensis*)
 Pā'ū O Hi'iaka (*Jacquemontia ovalifolia* subsp. *sandwicensis*)
 Nehe (*Lipochaeta integrifolia*)
 Kangaroo Paw Fern (*Microsorium diversifolium*)
 Laua'e Fern (*Microsorium scolopendrium*)
 Naio Papa (*Myoporum sandwicense* Var. 'Papa')
 Kupukupu Fern (*Nephrolepis exaltata*)
 Mondo Grass (*Ophiopogon japonicus*)

Mother-in-laws-Tongue (*Sansevieria trifastica*)
'Ākulikuli (*Sesuvium portulacastrum*)
Ilima Papa (*Sida fallax*)
Spathiphyllum (*Spathiphyllum*)
White Butterfly Syngonium
(*Syngonium podphyllum* 'White Butterfly')
Pohinahina (*Vitex rotundifolia*)
'Akia (*Wikstroemia uva-ursi*)

Grass

Bermuda Grass (*Cynodon dactylon*)
Seashore Paspalum (*Paspalum distichum*)
St. Augustine Grass (*Stenotaphrum secundatum*)

B. Prohibited Plants

1. USDA Hawaii State listed Noxious Weeds
(<http://plants.usda.gov/java/noxiousDriver>)
2. State of Hawaii Department of Agriculture - Plant Guidelines for importation to Hawaii (<http://hawaii.gov/hdoa/pi/pq/plants>)

THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY
5708 SOUTH CAMPUS DRIVE
CHICAGO, ILLINOIS 60637



Invasive and Noxious Weeds

Hawaii State-listed Noxious Weeds

95 records returned

Noxious weeds that are synonyms retain their noxious status, and are indented beneath the current PLANTS accepted name.

Division of Plant Industry. 2003. *List of plant species designated as noxious weeds* (<http://www.hawaiiag.org/hdoa/adminrules/AR-68.pdf>, 20 October 2003). Hawaii Department of Agriculture.

Symbol	Scientific Name	Noxious Common Name	State Weed Status†	Native Status*
ACME80	<i>Acacia mearnsii</i> De Wild.	black wattle	NW	L48 (I), HI (I)
ACNO7	<i>Acaena novae-zelandiae</i> Kirk			L48 (I)
ACNO4	<i>Acaena novae-zelandica</i> Kirk, orth. var.	New Zealand bur	NW	
ACRE3	<i>Acroptilon repens</i> (L.) DC.	Russian knapweed	NW	L48 (I), CAN (I)
AEIN	<i>Aeschynomene indica</i> L.	Kat sola, Indian jointvetch	NW	L48 (N), PR (N)
AGAD2	<i>Ageratina adenophora</i> (Spreng.) King & H. Rob.	croftonweed, Maui pamakani	NW	L48 (I), HI (I)
AGRI2	<i>Ageratina riparia</i> (Regel) King & H. Rob.	creeping croftonweed, Hamakua pamakani	NW	HI (I)
ALVI	<i>Allium vineale</i> L.	wild garlic	NW	L48 (I), AK (I), CAN (I)
ALVIC3	<i>Allium vineale</i> L. ssp. <i>compactum</i> (Thuill.) Coss. & Germ.	wild garlic	NW	L48 (I)
ANBI	<i>Andropogon bicornis</i> L.	West Indian foxtail	NW	L48 (N), PR (N), VI (N)
ANVI2	<i>Andropogon virginicus</i> L.	broomsedge	NW	L48 (N), HI (I), PR (N), CAN (N)
ANCO6	<i>Anredera cordifolia</i> (Ten.) Steenis	Madeira vine	NW	L48 (I), HI (I), PR (I)
AREL4	<i>Ardisia elliptica</i> Thunb.	shoebutton ardisia	NW	L48 (I), HI (I)
BOFR2	<i>Bocconia frutescens</i> L.	plume poppy	NW	HI (I), PR (N)
CAPU6	<i>Cardaria pubescens</i> (C.A. Mey.) Jarmolenko	hairy whitetop	NW	L48 (I), CAN (I)
CEHI3	<i>Cereus hildmannianus</i> K. Schum.			HI (I), PR (I)
CEUR	<i>Cereus uruguayanus</i> auct. non Kiesling	spiny tree cactus, Peruvian apple	NW	
CHOD	<i>Chromolaena odorata</i> (L.) King & H. Rob.	siamweed, bitterbush	NW	L48 (N), PR (N), VI (I)
CIAR4	<i>Cirsium arvense</i> (L.) Scop.	Canada thistle	NW	L48 (I), AK (I), CAN (I), GL (I), SPM (I)
CLHIH2	<i>Clidemia hirta</i> (L.) D. Don var. <i>hirta</i>	Koster's curse	NW	L48 (N)
COGR9	<i>Coccinia grandis</i> (L.) Voigt	ivy gourd	NW	L48 (I), HI (I), VI (I)
COAR4	<i>Convolvulus arvensis</i> L.	field bindweed	NW	L48 (I), HI (I), CAN (I)
COJU2	<i>Cortaderia jubata</i> (Lem.) Stapf		NW	L48 (I), HI (I)
CYRE	<i>Cymbopogon refractus</i> (R. Br.) A. Camus	barbwire grass	NW	HI (I)
CYES	<i>Cyperus esculentus</i> L.	yellow nutsedge	NW	L48 (NI), AK (I), HI (I), PR (I), VI (I), CAN (I)
CYSC4	<i>Cytisus scoparius</i> (L.) Link	Scotch broom	NW	L48 (I), HI (I), CAN (I)
CYSCA	<i>Cytisus scoparius</i> (L.) Link var. <i>andreasus</i> (Puiss.) Dippel	Scotch broom	NW	L48 (I)

CYSCS2	<i>Cytisus scoparius</i> (L.) Link var. <i>scoparius</i>	Scotch broom	NW	L48 (I), HI (I), CAN (I)
DICI2	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	aroma	NW	L48 (I)
DINU6	<i>Dichrostachys nutans</i> Benth.	marabu	NW	
ELMOS	<i>Elephantopus mollis</i> Kunth	elephantopus, elephant's foot	NW	HI (I), PR (N), VI (N)
ELRE4	<i>Elymus repens</i> (L.) Gould			L48 (I), AK (I), CAN (I), GL (I), SPM (I)
ELRE3	<i>Elytrigia repens</i> (L.) Desv. ex Nevski	quackgrass	NW	
EMSP	<i>Emex spinosa</i> (L.) Campd.	spiny emex	NW	L48 (I), HI (I)
EUES	<i>Euphorbia esula</i> L.	leafy spurge	NW	L48 (I), CAN (I)
GEMO2	<i>Genista monspessulana</i> (L.) L.A.S. Johnson			L48 (I)
CYMO5	<i>Cytisus monspessulanus</i> L.	French broom	NW	
GRBA	<i>Grevillea banksii</i> R. Br.	kahiliflower, Bank's grevillia	NW	HI (I)
HAGL	<i>Halogeton glomeratus</i> (M. Bieb.) C.A. Mey.	halogeton	NW	L48 (I)
HAMA7	<i>Harrisia martinii</i> (Labour.) Britton			HI (I)
ERMA16	<i>Eriocereus martinii</i> (Labour.) Riccob.	moon cactus	NW	
HYPE3	<i>Hyptis pectinata</i> (L.) Poit.	comb hyptis	NW	L48 (I), HI (I), PR (N), VI (N)
HYSU3	<i>Hyptis suaveolens</i> (L.) Poit.	wild spikenard	NW	HI (I), PR (N), VI (N)
IMCY	<i>Imperata cylindrica</i> (L.) P. Beauv.	cogon	NW	L48 (I)
LAMOS	<i>Lagascea mollis</i> Cav.	acuate	NW	L48 (I), PR (I), VI (I)
LELA2	<i>Lepidium latifolium</i> L.	perennial pepperweed	NW	L48 (I), CAN (I)
MAAL4	<i>Malachra alceifolia</i> Jacq.	malachra	NW	L48 (I), HI (I), PR (N), VI (N)
MEVE3	<i>Medinilla venosa</i> (Blume) Blume		NW	HI (I)
MELAS	<i>Melastoma</i> L.	melastoma	NW	
MICON	<i>Miconia</i> Ruiz & Pav.	miconia	NW	
MIMI5	<i>Mikania micrantha</i> Kunth	mile-a-minute	NW	L48 (I), PR (N)
MISC	<i>Mikania scandens</i> (L.) Willd.	climbing hempweed	NW	L48 (N), CAN (I)
MIDI8	<i>Mimosa diplotricha</i> C. Wright	giant sensitiveplant	NW	HI (I), PR (I)
MIIN80	<i>Mimosa invisa</i> Mart., non Mart. ex Colla	giant sensitiveplant	NW	
MIPE2	<i>Mimosa pellita</i> Kunth ex Willd.			L48 (N), PR (N)
MIPI	<i>Mimosa pigra</i> auct. non L.	thorny sensitive plant	NW	
MIFL3	<i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum. & Lauterb.	miscanthus, Japanese silvergrass	NW	L48 (I)
MOHI	<i>Montanoa hibiscifolia</i> (Benth.) Standl.	tree daisy	NW	HI (I)
MOFA	<i>Morella faya</i> (Aiton) Wilbur			HI (I)
MYFA	<i>Myrica faya</i> Aiton	firetree, candleberry myrtle	NW	
NATR3	<i>Nassella trichotoma</i> (Nees) Hack.			L48 (I)
STTR8	<i>Stipa trichotoma</i> Nees	nasella tussock	NW	
OXPA3	<i>Oxyspora paniculata</i> (D. Don) DC.		NW	HI (I)
PARE3	<i>Panicum repens</i> L.	torpedograss	NW	L48 (I), HI (I)
PABI5	<i>Passiflora bicornis</i> Mill.			HI (I)
PAPU13	<i>Passiflora pulchella</i> Kunth	wingleaf passionfruit	NW	
PATRM	<i>Passiflora tripartita</i> (Juss.) Poir. var. <i>mollissima</i> (Kunth) Holm-Niesen & P.M. Jørg.			L48 (I), HI (I)
PAMOS	<i>Passiflora mollissima</i> (Kunth) L.H. Bailey	banana passionfruit, banaba poka	NW	
PESE3	<i>Pennisetum setaceum</i> (Forssk.) Chiov.	fountaingrass	NW	L48 (I), HI (I)

PIAD	<i>Piper aduncum</i> L.	spiked pepper	NW	L48 (N), PR (N), VI (N)
PIUN2	<i>Pittosporum undulatum</i> Vent.	Victorian box	NW	L48 (I), HI (I)
PRJU3	<i>Prosopis juliflora</i> (Sw.) DC.		NW	HI (I)
PUPH2	<i>Pueraria phaseoloides</i> (Roxb.) Benth.	tropical kudzu	NW	HI (I), PR (I), VI (I)
RHTO10	<i>Rhodomirtus tomentosa</i> (Aiton) Hassk.			L48 (I), HI (I)
RHTO	<i>Rhodomirtus tomentosus</i> (Aiton) Hassk., orth. var.	downy rosemyrtle	NW	
RUAR2	<i>Rubus argutus</i> Link	prickly Florida blackberry	NW	L48 (N), HI (I)
RUELO	<i>Rubus ellipticus</i> Sm. var. <i>obcordatus</i> Focke	yellow Himalayan raspberry	NW	HI (I)
RUN14	<i>Rubus niveus</i> Thunb.	hill raspberry	NW	L48 (I), HI (I)
RUS14	<i>Rubus sieboldii</i> Blume	Molucca raspberry	NW	HI (I)
SAKA	<i>Salsola kali</i> L.	Russian thistle	NW	L48 (I), CAN (W), SPM (W)
SEMA15	<i>Senecio madagascariensis</i> Poir.	fireweed	NW	HI (I)
SOCA3	<i>Solanum carolinense</i> L.	horsenettle	NW	L48 (N), CAN (I)
SOEL	<i>Solanum elaeagnifolium</i> Cav.	silverleaf nightshade	NW	L48 (N), HI (I), PR (N)
SORO3	<i>Solanum robustum</i> Wendl.		NW	HI (I)
SOTO4	<i>Solanum torvum</i> Sw.	turkeyberry, terongan	NW	L48 (I), HI (I), PR (I), VI (I)
SOAR2	<i>Sonchus arvensis</i> L.	perennial sowthistle	NW	L48 (I), AK (I), CAN (I), SPM (I)
SPJU2	<i>Spartium junceum</i> L.	Spanish broom	NW	L48 (I), HI (I)
STRIG	<i>Striga</i> Lour.	witchweed	NW	
THVI2	<i>Themeda villosa</i> (Poir.) A. Camus	Lyon's grass	NW	HI (I)
TIBOU	<i>Tibouchina</i> Aubl.	tibouchina	NW	
TRRH	<i>Triumfetta rhomboidea</i> Jacq.	paroquet bur	NW	L48 (I), HI (I), PR (I), VI (I)
TRSE4	<i>Triumfetta semitriloba</i> Jacq.	Sacramento bur	NW	L48 (N), HI (I), PR (N), VI (N)
ULEU	<i>Ulex europaeus</i> L.	gorse	NW	L48 (I), HI (I), CAN (I)
URLO	<i>Urena lobata</i> L.	caesarweed	NW	L48 (I), HI (I), PR (N), VI (N)
VETH	<i>Verbascum thapsus</i> L.	mullein	NW	L48 (I), AK (I), HI (I), CAN (I)

†Code Weed Status

NW Noxious weed

*Code Native Status

I Introduced

N Native

NI Native and Introduced

W Waif

*Code Native Location

L48 Lower 48 States

US02 Alaska

US15 Hawaii

US72 Puerto Rico

US78 Virgin Islands

CA Canada

GL Greenland
SB St. Pierre and Miquelon

Additional information about noxious plants in this state can be found at:

- Hawaiian Ecosystems at Risk (HEAR) Project
- Hawaiian Ecosystems at Risk: Information Index for Alien Plants in Hawaii
- HI-Alien Species in Hawaii: distribution maps
- HI-Hawaii Cooperative Extension Service
- HI-Hawaii Department of Agriculture
- HI-Hawaii Invasive Species Council
- HI-Hawaii Plant Pest Control
- HI-Hawaii's Agricultural Gateway
- HI-Hawaiian Alien Plant Studies (U. of Hawaii, Botany)
- HI-Hawaiian Weed Map (U. of Hawaii, Botany)
- HI-Most Invasive Horticultural Plants of Hawaii
- HI-Plants of Hawaii
- HI-University of Hawaii Manoa Campus Plants

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Close Window

Plant Guidelines for Importation to Hawaii

General guidelines for the importation of plants to Hawaii are as follows:

- All plants require inspection upon entry into the state.
- Plants must be apparently free of insects and diseases.
- Plants do not need to be bare-rooted but the growing media cannot contain soil.
- Parcels brought into the state by mail or cargo must be clearly labeled with the words "Plant Materials" or "Agricultural Commodities".
- Shipments must be accompanied with an invoice or packing manifest listing the contents and quantities of the commodities imported.

The following items require permits, and/or certificates of origin or treatment. Some are subject to a holding period in a quarantine facility. See Chapter 4-70, Plant Import Rules, for more information [AR_70.PDF]. Restrictions on the importation of hosts of the Red Imported Fire Ant into the State of Hawaii are also in effect.

- **Grass family (sugarcane, bamboo, and grass):** Plants and parts require permit and quarantine. Seeds and dried parts of bamboo and grass are unrestricted.
- **Bromeliad family (pineapple, bromeliads, and tillandsia):** Plants and parts require permit, certificate of origin or treatment. Some plants require quarantine. Seeds and flasks of bromeliads are unrestricted.
- **Coffee:** Plants, plant parts, and used coffee bags require permit and certificate of treatment. Plants and seeds for propagation also require quarantine.
- **Cruciferous vegetables:** The edible roots of turnip, rutabaga, radish (daikon), and horseradish require certificate of origin or certificate of treatment depending upon where they are grown.
- **Orchid family:** Plants and propagative parts require permit and certificate of origin. Some plants require quarantine. Seeds and deflasked tissue culture plants are unrestricted.
- **Banana:** Plants and parts require permit and quarantine. Fruits are unrestricted.
- **Passion fruit:** Plants and parts require permit and quarantine.
- **Pine:** Plant and parts require certificate of origin or certificate of treatment depending upon where they are grown. Cut branches are allowed during the period from October 20 to December 31.
- **Coconut:** Plants, seednuts, and green parts are prohibited. Nuts for consumption require permit and must be completely husked and punctured. Dried products require certificate of treatment.
- **Hosts of European Corn Borer:** Corn on the cob, and non-propagative parts of sorghum, broomcorn, and sudan grass require certificate of origin or certificate of treatment depending upon where they are grown. Propagative parts (except seed) for planting require permit and quarantine.
- **Aster, chysanthemum, hollyhock, dahlia, and gladiolus:** Plants require certificate of origin or certificate of treatment depending upon where they are grown. Seeds, tubers and corms (without stems), and cut-flowers are unrestricted.
- **Palm family:** Plants from the mainland U.S. are not allowed. Plants from foreign countries and propagative parts require certificate of origin.
- **Hosts of the Caribbean Fruit Fly:** Puerto Rico and Florida fruits and berries require certificate of origin or certificate of treatment depending upon where they are grown.
- **Taro and Dasheen:** Plant and propagative parts from the Solomon Islands require permit and quarantine.





APPENDIX F

AIRPORT LAYOUT PLAN (to be completed)

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LIBRARY

