DEPARTMENT OF TRANSPORTATION'S

REPORT TO THE LEGISLATURE

ON

SECTION 128 OF ACT 213,

SESSION LAWS OF HAWAII 2007

(KONA INTERNATIONAL AIRPORT AT KEAHOLE: TERMINAL EXPANSION)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
JANUARY 2008

1. Address the coordination and phasing of all modernization projects at Kona International Airport at Keahole.

The modernization projects at Kona include $74M for construction of a new Terminal and Federal Inspection Facility in FY2010. There will be one project for the entire improvement so phasing and coordination will be accommodated therein. There are currently some preparatory projects in progress including parking improvements, relocation of the Onizuka Center and interim renovations to address shortcomings until the new terminal is built. These preparatory projects will be completed before the new Terminal is started so no coordination or phasing is required.

2. Outline plans to mitigate the impacts of construction on travelers and other users of the airport.

The new Terminal and Federal Inspection Facility is a self-contained project and will include phasing to minimize impacts to travelers and users of the airport.

3. Include preliminary drawings and maps showing the proposed changes to the airport.

The Master Plan is currently underway. In the master planning process several alternatives are presented and a preferred alternative will be recommended according to the schedule in the attached timeline. The current status of the master plan has the alternatives in draft form which are attached. Based on the timeline, the airport alternatives will be briefed for public input in January 2008. Public meetings are scheduled for April 2008 to discuss the recommended alternatives and Master Plan. The final Master Plan will be completed in July 2008.

4. Explain how the updated master plan for the Kona International Airport at Keahole accounts for the proposed modernization projects.

The master plan by nature of its process and public involvement addresses future needs for the terminal and as such is providing design parameters for the new Terminal and Federal Inspection Facility. In this process other functions such as cargo, ARFF, general aviation, commercial development, ground transportation, fueling, etc. are being strategically positioned in relation to the terminal improvements in the Airport Layout Plan for Kona's ultimate 25 year buildout.

5. Provide any other information necessary to explain the details of the Department's plans for the aforementioned modernization projects.

The design contract for the new Terminal and Federal Inspection Facility has been executed. The first task for the design team is to work on the preparatory projects mentioned above while the master plan is finalized. These projects need to be completed regardless of which alternative is recommended. Once the master plan is complete in June 2008 the design team can start the terminal design. The timing for the completion of the terminal design should coincide with the request for construction funds in FY2010.

KONA INTERNATIONAL AIRPORT
AIRPORT MASTER PLAN/14 CFR PART 150 STUDY
"TENTATIVE" PROJECT SCHEDULE
UPDATED: NOVEMBER 29, 2007

PROJECT ELEMENT	BEGIN DATE *	END DATE *	STATUS
Notice-to-Proceed	October 1, 2006	October 1, 2006	***Complete***
Kick-Off Meeting	November 14, 2006	November 14, 2006	***Complete***
Establish Planning Advisory Committee (PAC)	October 1, 2006	February 15, 2007	***Complete***
Prepare Committee Workbooks and the Introduction Chapter	November 15, 2007	February 15, 2007	***Complete***
Prepare the Inventory Chapter (Master Plan & Part 150)	November 15, 2007	February 15, 2007	***Complete***
Conduct TAC Meeting #1	March 7, 2007	March 7, 2007	***Complete***
Conduct Public Information Workshop #1	March 7, 2007	March 7, 2007	***Complete***
Receive PAC Comments on the "Draft" Chapters	March 7, 2007	April 1, 2007	***Complete***
Prepare the Forecast Chapter (Master Plan)	April 1, 2007	July 6, 2007	***Complete***
Prepare the Facility Requirements Chapter (Master Plan)	May 1, 2007	July 6, 2007	***Complete***
Prepare the Aviation Noise Analysis Chapter (Part 150)	May 1, 2007	July 6, 2007	***Complete***
Prepare the Noise Impacts Chapter (Part 150)	June 1, 2007	July 6, 2007	***Complete***
Conduct the Review of the Existing NCP (Part 150)	May 1, 2007	July 6, 2007	***Complete***
Conduct TAC Meeting #2	July 18, 2007	July 18, 2007	***Complete***
Conduct Public Information Workshop #2	July 18, 2007	July 18, 2007	***Complete***
Receive PAC Comments on the "Draft" Chapters	July 18, 2007	July 31, 2007	***Complete***
Prepare the Airport Development Alternatives Chapter (Master Plan)	August 1, 2007	December 21, 2007	***Draft at DOT***
Prepare the Noise Abatement Alternatives Chapter (Part 150)	August 1, 2007	December 21, 2007	***Draft at DOT***
Prepare the Land Use Alternatives Chapter (Part 150)	September 1, 2007	December 21, 2007	***Draft at DOT***
Conduct TAC Meeting #3	January 10, 2008	January 10, 2008	***Pending***
Conduct Public Information Workshop #3	January 10, 2008	January 10, 2008	***Pending***
Receive PAC Comments on the "Draft" Chapters	January 10, 2008	January 24, 2008	***Pending***
Prepare the Recommended Development Concept Chapter (Master Plan)	January 24, 2008	April 4, 2008	***Pending***
Prepare the Financial Plan Chapter (Master Plan)	February 1, 2008	April 4, 2008	***Pending***
Prepare the "Draft" Airport Layout Plan Set (Master Plan)	September 1, 2007	April 4, 2007	***Pending***
Prepare the Noise Compatibility Plan Chapter (Part 150)	January 24, 2008	April 4, 2008	***Pending***
Conduct PAC Meeting #4	April 16, 2008	April 16, 2008	***Pending***
Conduct Public Information Workshop #4	April 16, 2008	April 16, 2008	***Pending***
Receive PAC Comments on the Draft Chapters	April 16, 2008	April 30, 2008	***Pending***
Public Hearing (Part 150)	May 1, 2008	June 11, 2008	***Pending***
DOT-A Approval of the "Draft" Master Plan and Part 150 Study	June 11, 2008	June 11, 2008	***Pending***
Submit "Final" ALP to the FAA	June 12, 2008	June 30, 2008	***Pending***
Print the "Final" Master Plan and Part 150 Reports	June 12, 2008	July 15, 2008	***Pending***
Submittal of the "Final" Master Plan and Part 150 Reports	July 31, 2008	July 31, 2008	***Pending***

**** All dates are subject to change.***

ALTERNATIVES

In the process of updating the master plan for Kona International Airport at Keahole (KOA), it is important to review development potential and constraints at the airport. The purpose of this chapter is to consider the actual physical facilities which are needed to accommodate projected demand and meet the program requirements as defined in **Chapter Three - Facility Requirements**.

A series of airport development scenarios are considered for the airport. In each of these scenarios, different physical facility layouts are presented for the purpose of discussion and evaluation. The ultimate goal is to develop the underlying rationale which supports the final master plan recommendations. Through this process, an evaluation of the highest and best uses of airport property is made while considering local goals, physical constraints, and federal airport design standards, where appropriate.

Any development proposed by a master plan evolves from an analysis of projected needs. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands through the planning period.

The number of potential alternatives which can be considered is endless. Therefore, some judgment must be applied to identify the alternatives which have the greatest potential for implementation. The alternatives presented in the chapter have been

developed to meet the overall program objectives for the airport in a balanced manner. Through coordination with the Technical Advisory Committees (TAC), the public, and the Hawaii Department of Transportation – Airports Division (DOT-A), the alternatives (or a combination thereof) will be refined and modified as necessary to shape the recommended development program. Therefore, the alternatives presented in this chapter can be considered a beginning point for formulating the updated master plan development program, and input will be necessary to define the resultant program.

PREVIOUS PLANNING EFFORTS

Prior to presenting airport development alternatives, it is helpful to review some of the previous planning efforts and the subsequent development now in place. The last airport master plan for KOA was completed in 1998. Along with the previous master plan, there have also been three terminal-specific studies completed since 1997. The following briefly discusses each of these plans as they relate to what has taken place with regard to airport facility development.

1998 MASTER PLAN

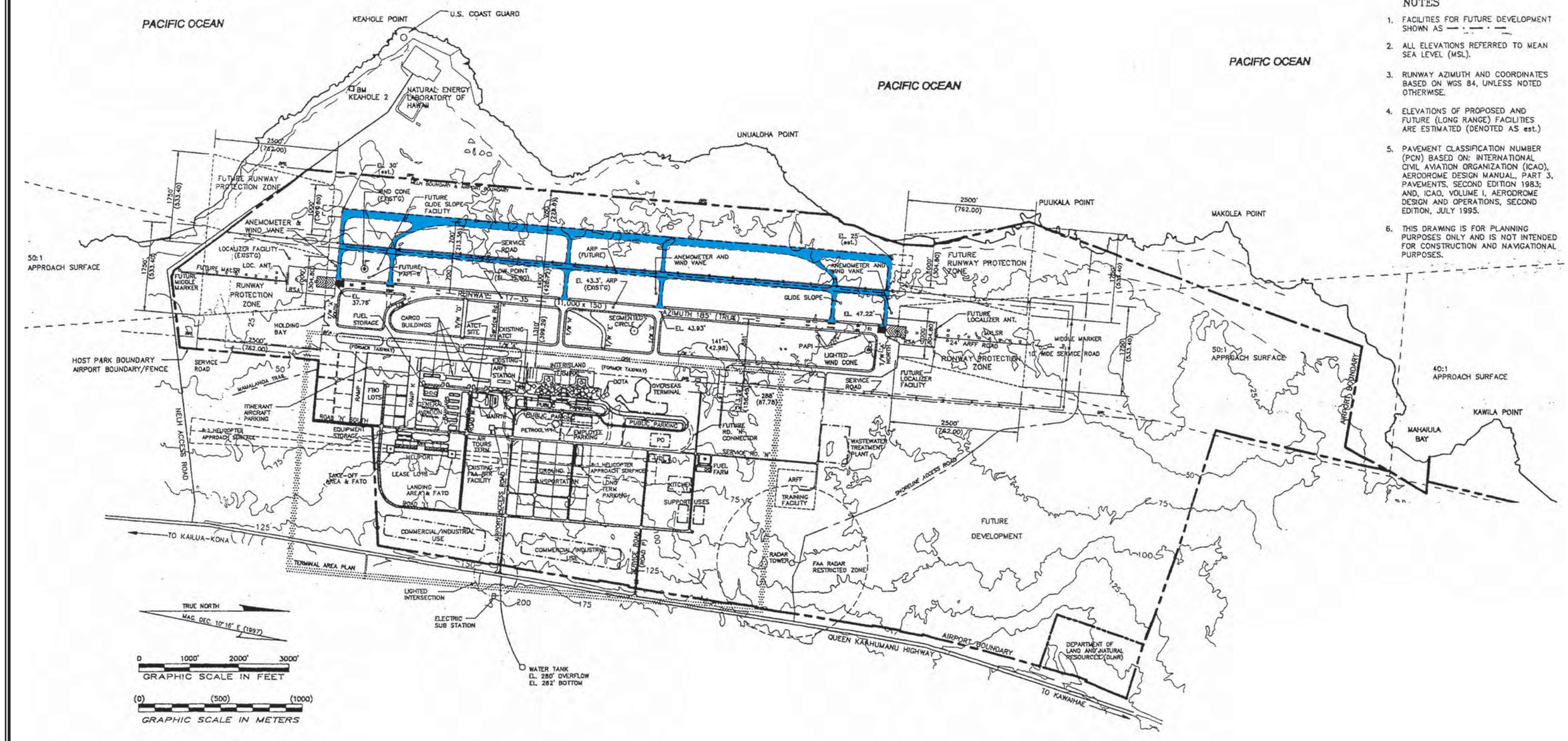
The previous master plan was based primarily on the projected aviation demands through 2015, but also factored in some flexibility for demand to 2020 and beyond. Long-range facilities were designated on the airport layout plan (ALP) for land reservation purposes.

The runway had just been extended to 11,000 feet in 1993 and was viewed by the Master Plan as adequate for the future. In fact, the only airfield-related improvements recommended through 2015 were the development of a new air traffic control tower (ATCT) mauka (east) of U'u Street and a heliport. To date, neither has been developed.

The demand forecast by the 1998 Master Plan suggested that the single runway would be adequate through 2020. The plan, however, did include a future parallel runway 1,400 feet makai (west) of the existing runway to ensure that adequate space was reserved beyond the planning period. As shown on **Exhibit 4A**, a parallel taxiway was also planned between the two runways. Category I instrument approach capability was also reserved for each runway end.

On the landside, the proposed terminal complex development was planned to maintain its linear pattern. The major expansion of the passenger terminal was to the north of the existing complex with expansion of general aviation, air tour facilities, and air cargo to the south.

At the time, remedial improvements were in progress to serve overseas flights from the existing terminal. The master plan recommended that ultimately the existing terminals would return strictly to inter-island use with a new overseas terminal planned to the north. The parking lot



NOTES

1. FACILITIES FOR FUTURE DEVELOPMENT SHOWN AS — · — · —
2. ALL ELEVATIONS REFERRED TO MEAN SEA LEVEL (MSL).
3. RUNWAY AZIMUTH AND COORDINATES BASED ON WGS 84, UNLESS NOTED OTHERWISE.
4. ELEVATIONS OF PROPOSED AND FUTURE (LONG RANGE) FACILITIES ARE ESTIMATED (DENOTED AS est.)
5. PAVEMENT CLASSIFICATION NUMBER (PCN) BASED ON: INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO), AERODROME DESIGN MANUAL, PART 3, PAVEMENTS, SECOND EDITION 1983; AND, ICAO, VOLUME I, AERODROME DESIGN AND OPERATIONS, SECOND EDITION, JULY 1995.
6. THIS DRAWING IS FOR PLANNING PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION AND NAVIGATIONAL PURPOSES.

and terminal loop would be expanded to the north to Road N to provide for additional parking, terminal curb, and circulation. A following subsection provides more background on terminal planning.

Moderate growth in air cargo was projected and the master plan called for accommodating this growth by expanding the current cargo area to the south with an additional cargo building in line with the two existing buildings.

The master plan projected a doubling of based aircraft so doubling of hangar space was planned. The existing general aviation facilities were split on either side of the cargo area. The area to the south had already been graded for future development. The master plan recommended the development of ramp and fixed base operator (FBO) facilities to the south to anchor a new general aviation area. The existing general aviation hangars were planned to be relocated to the south to consolidate all general aviation in one area. This would include the relocation of the existing air tour facilities to a permanent site adjacent to the rest of the general aviation facilities.

The itinerant aircraft parking that was planned to the south along Taxiway A has been developed. This includes taxiway stubs on either side that were intended to provide depth into the general aviation area as it was developed.

Finally, the heliport was planned for an area mauka Road N. This area would include two heliports as well as lease lots, helicopter parking, and vehicle parking.

Support uses were generally planned to the north of the passenger terminal. This included areas for a fuel farm, wastewater treatment, flight kitchen, postal facilities, and administrative uses. Ground transportation service and storage was planned to remain and expand in its current location just north of the airport access road. The plan also included the relocation of the rental car counters and ready return area in the parking lot to the service and storage areas. This has occurred since the master plan was completed.

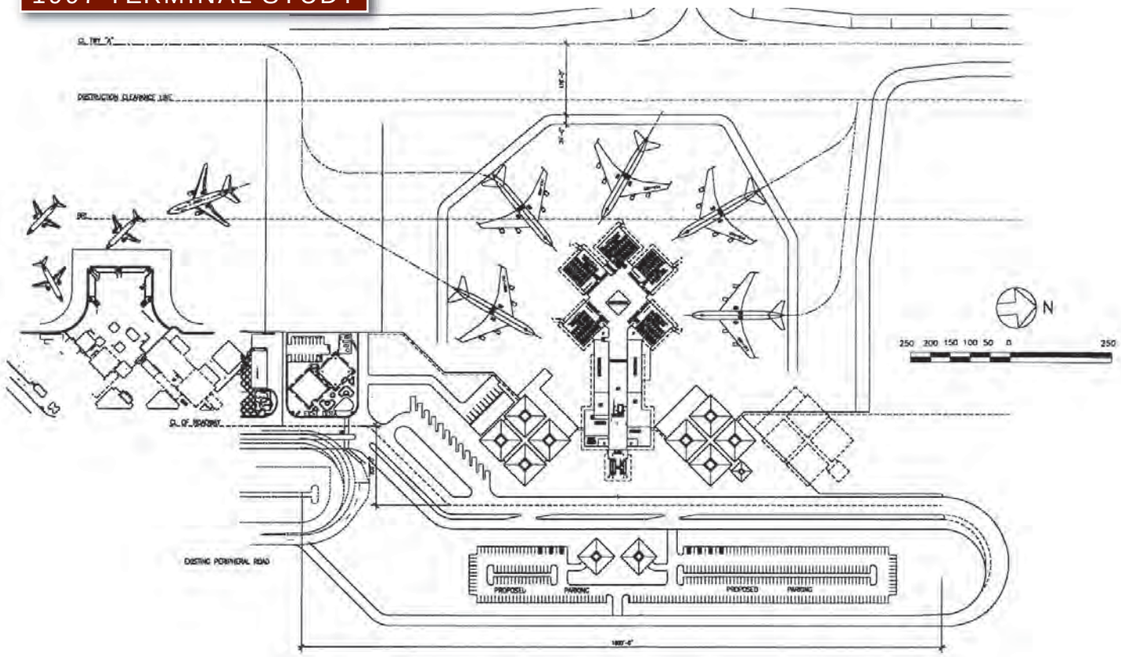
Besides expansion of the terminal loop road described earlier, on-airport circulation included the development of a pattern of roads in support of not only the flight line development but other areas within the airport property. The airport access road was planned to be expanded to four lanes. A second access to Queen K Highway was planned for a service road (Road P) to the north of the access road. Roads “L”, “M”, and “N” were planned as internal circulation routes as shown within **Exhibit 4A**.

PREVIOUS PASSENGER TERMINAL PLANNING

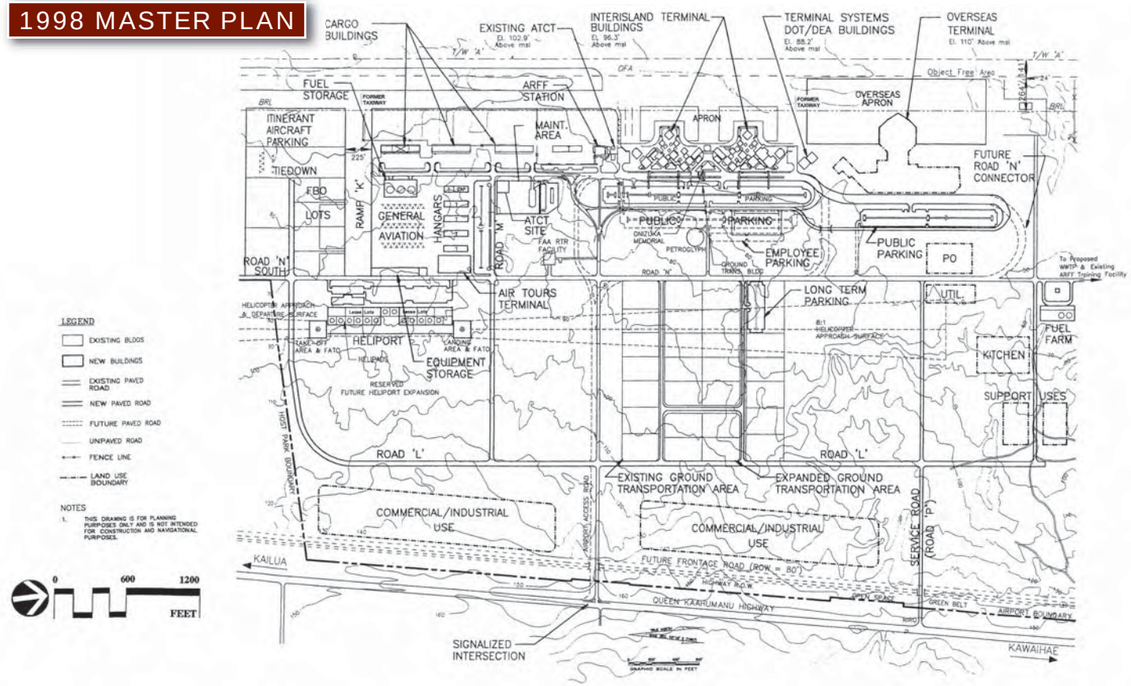
The plans recommended from the previous terminal planning studies (including the 1998 master plan) are all depicted on **Exhibit 4B** for review and comparison. Each is discussed below.

06MP06-4B-11/20/07

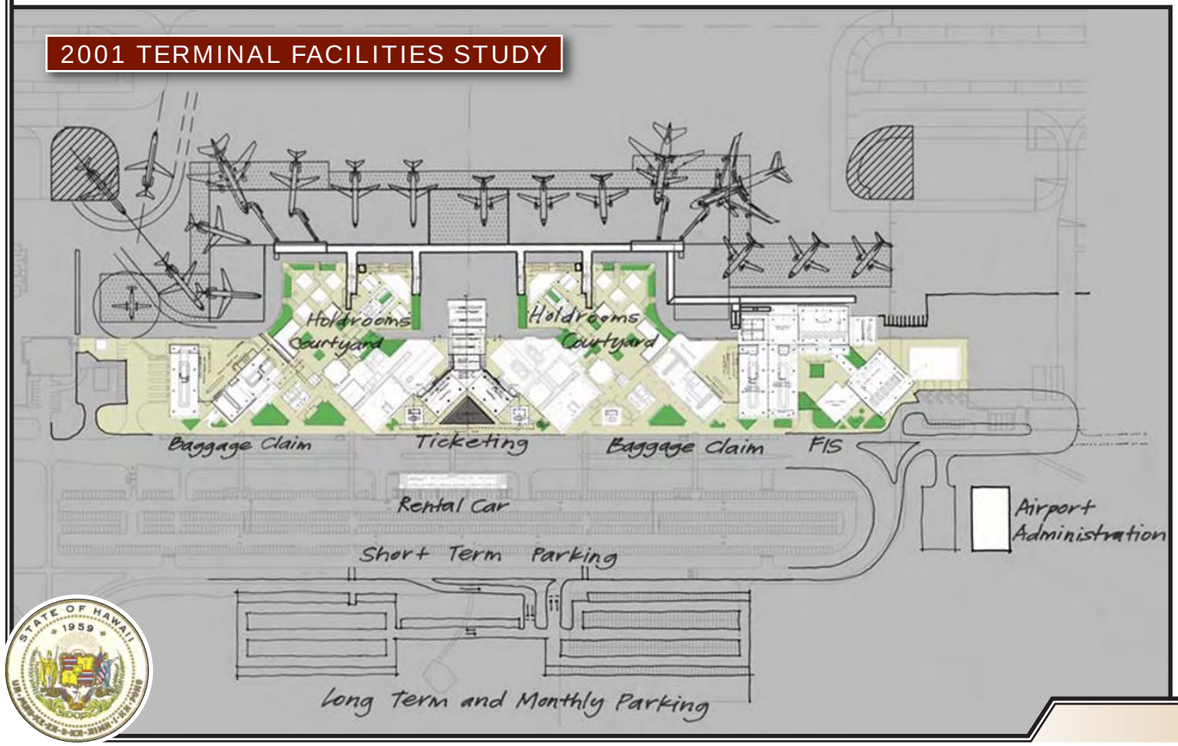
1997 TERMINAL STUDY



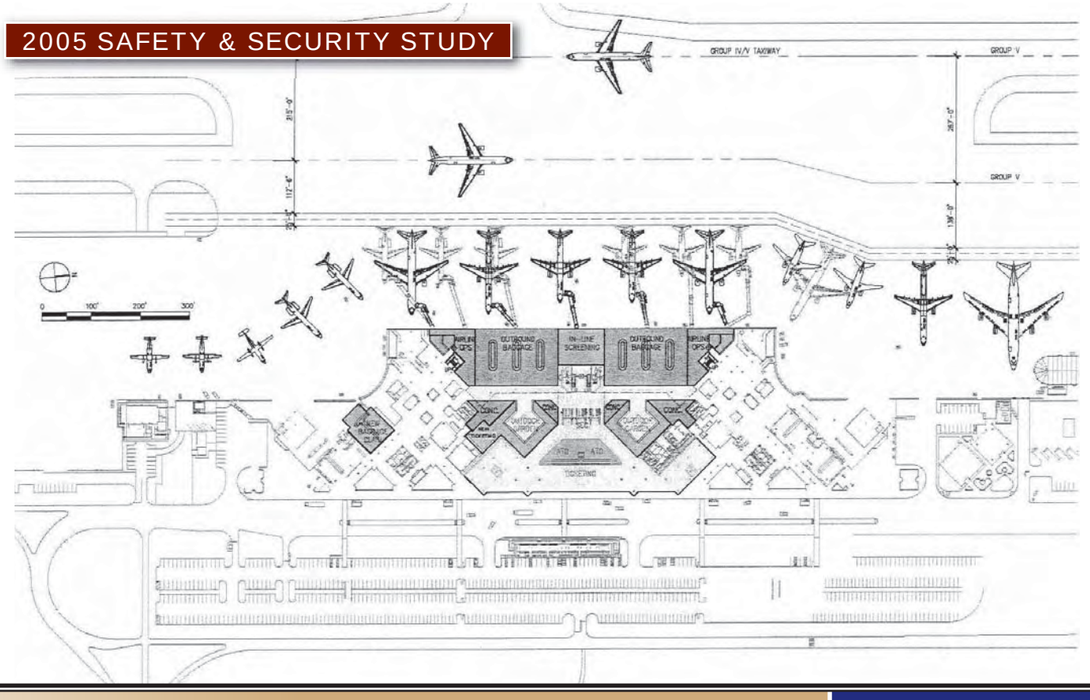
1998 MASTER PLAN



2001 TERMINAL FACILITIES STUDY



2005 SAFETY & SECURITY STUDY



Overseas Terminal III 1997

This study was conducted shortly after the interim FIS (Federal Inspection Services) facility was completed to service flights arriving from Japan. Forecasts at the time of the study showed an increase in wide body service from Asia, thereby requiring the development of an overseas terminal with an appropriate level of service. The recommended terminal would be located north of the existing main terminal and would require a new peripheral roadway, infrastructure, and parking. The terminal building itself would be built for international and domestic overseas flights with a two-level pier concourse. The concept was phased for an initial two-gate concourse with a later five-gate expansion planned. This preferred concept was never realized and the interim tent structure is still in operation today as the CBP (Customs and Border Protection) facility for international arriving flights.

Master Plan Update 1998

This study proposed a development plan that followed the projected growth of an estimated 3.8 million passengers in the year 2020. The study confirms the overseas passenger growth of the 1997 study and incorporates the overseas terminal concept into the master plan. Facility requirements for the growth in inter-island traffic are accommodated through improvements within the existing terminal with space resulting from the relocation of overseas operations to the new Overseas Terminal (OST). Recommended improvements include additional public and employee parking, additional airline operating spaces, expanded baggage facilities, and additional covered space in the wait areas near the gates. The study cited that improvements should provide for the efficient flow of passengers and traffic.

Terminal Facilities Study 2001

This study followed the Master Plan Update of 1998 and provided a more detailed evaluation of the development opportunities for the terminal area. These opportunities include the aircraft apron, passenger processing facilities, airport and airline operations facilities, passenger service concessions, and the terminal curbs, parking, and roadways. The preferred plan would improve and expand facilities in the existing terminal area for the purpose of elevating passenger levels of service, and increasing capacity, efficiency, and flexibility of operations. The preferred concept included an elevated passenger boarding corridor that would provide a connection to all holdrooms and to the FIS facility. It would function as a covered walkway for inter-island passengers as well as a sterile corridor for international arriving passengers. The main terminal area functions such as Ticketing (centralized to one zone) and Baggage Claim (two separate zones) are grouped for clearer understanding of overall airport functions. The current "two-unit terminal" airport layout transitioned toward a more centralized terminal by connecting south and north terminal areas with airside im-

provements. The Onizuka Space Center was planned to remain in its existing location. Additional holdroom and baggage handling facilities were also included in the recommended plan as well as an increase in long term parking capacity.

Terminal Safety and Security Study 2005

This terminal study evaluates the current terminal facilities for safety and security requirements and makes recommendations for terminal development to accommodate forecast growth through 2025. The study focused on six key areas which included holdrooms, security screening checkpoints, FIS facility, ticket lobby, baggage claim, and baggage screening. Recommendations were phased for short term, mid-term, and long-term projects. Improvements included centralizing ticketing and security screening as well as additional baggage claim and a centralized and larger outbound bound baggage facility in the space between the north and south holdrooms. Above this baggage facility would be an enclosed second level concourse level that would include loading bridges. The recommended concept assumed the relocation of the Onizuka Space Center. Long term phase recommendations include expanding the facility to the north, incorporating a new FIS international arrivals facility.

NON-DEVELOPMENT ALTERNATIVES

Non-development alternatives include the "No Action" or "Do Nothing" alternative, transferring service to an existing airport, or developing an airport at a new location. Several previous planning efforts have also considered these alternatives. All have resulted in the same conclusion: continue to develop the existing airport site to meet the needs of Hawaii County and its western coast.

NO ACTION

The "No Action" alternative essentially considers keeping the airport in its existing condition, with no additional improvements. As the island of Hawaii continues to develop and grow, the transportation system must also adjust to meet the changing needs. Air transportation is a part of this system and, in many ways, the most dynamic and key element of the system. Travel by air is the fastest means to cover long distances, and it provides businesses the capability to expand their markets nationally and globally. It provides tourists the means to maximize their vacation experience within the time available. It can be argued that the airlines provide the most successful form of mass transportation in the world today.

Today's technological advancements have made the internet the most dy-

namic form of communication. While the capabilities of the internet may have reduced the need for some transportation for communications (i.e., certain meetings and letter deliveries), it has also increased the demand for short turnarounds, both in business and household purchases. Air transportation is critical to providing the "just-in-time deliveries" for an industry that has dramatically reduced overhead related to inventory storage. Even individual households can have virtually any consumer product delivered to the doorstep within 24 hours because of the capabilities of the internet and air transportation.

Activity statistics for Kona International Airport at Keahole indicate that it has evolved into the most important interface to the air transportation system on the Big Island. The airport's forecasts and facility requirements analysis indicate future needs for improvements throughout the facility. The passenger terminal building, which is often the first and last memory of the area for visitors, will need to be able to adapt and grow to accommodate changing security and inspection requirements as well as a growing nonstop overseas market.

A simple review of history indicates that today's airport is handling nearly two million more passengers than it did in the early 1980s. Growth in air cargo has been just as dramatic. General aviation needs continue to evolve and change as the use of corporate aircraft become more commonplace. The use of general aviation for sightseeing and interisland travel is also increasing, and the Big Island is also being discovered as an excellent location for pilot training.

The opening of the airport in 1970 brought the west coast of the island into the jet age. Runway extensions since that time have provided direct links to the mainland and to the world.

Landside improvements have allowed the airport to adjust to the increasing volumes of passengers as well.

If KOA had not been able to respond to the growth in demand and the changing marketplace, the island's and the state's ability to participate and compete in the national and global economy would have been compromised. If facilities are not maintained and improved so that the airport remains a pleasant experience to the visitor or business traveler, or if delays and queues become unacceptable, then these groups or individuals may consider doing business elsewhere or choose not to frequent the area.

Thus, a "No Action" alternative remains inconsistent with the goals of the State of Hawaii, as well as those of the Federal Aviation Administration (FAA), which include enhancing local and interstate commerce. A policy of no action would be considered an irresponsible approach affecting the long term economic growth of the island and the state.

TRANSFERRING AVIATION SERVICES

Transferring services to another airport, existing or new, is one that may typically be favored by many residing close to an existing airport. Relocating an airport, however, is very complex and expensive, especially when commercial service is involved.

TRANSFER SERVICES TO AN EXISTING AIRPORT

A master plan for an existing airport typically looks at the needs over a 20- to 25-year period. In this manner, any short term investment in improvements at the airport will be ensured of being amortized over a useful period of time. The same would be true of transferring services to another existing airport, provided that the transfer airport could absorb much of the current and 20-year demand without major investment beyond what would be required at the present airport.

Examples of how this could occur would be if services could be effectively consolidated at another nearby commercial service airport, a large general aviation airport, or at a nearby military air base. In most cases, an existing general aviation airport will require such an extensive upgrade that it would essentially be the same as starting over with a new airport on the same site.

The military air base is viable only if there is one available that is either planned to be or recently was decommissioned, or a base that is willing to operate as a joint-use facility. This most recently occurred in Austin, Texas, where Bergstrom AFB was converted to Austin-Bergstrom International Airport. Of course, Honolulu International Airport is currently a joint-use facility with Hickam Air Force Base. There are, however, no air bases on the Big Island to even be considered.

The other commercial service airport on the Big Island is Hilo International Airport (ITO). Like all public airports in Hawaii, ITO is owned by the state and operated by the Hawaii Department of Transportation Aviation Division (DOT-A). The airport has two intersecting runways, the longest of which is 9,800 feet long. ITO currently handles approximately half the passenger level of KOA. Annual operations have been around 100,000 for the last several years.

The level of facilities available at ITO would need to upgrade significantly to accommodate the traffic at KOA. The primary runway is 1,200 feet shorter than the 11,000-foot runway at KOA. The facility requirements indicated that additional airfield capacity will be needed at KOA in the short term. The same would be required immediately at Hilo International Airport if services were to be transferred. This would likely include a parallel runway. The passenger facility would be required to nearly triple in size along with an expansion of cargo facilities just to handle to current levels of traffic at one airport. Access roads would also require upgrading.

Hilo International Airport is surrounded by established urban devel-

opment on its north, west, and southwest sides. Adding the traffic levels of KOA to this airport would more than double operations and increase the potential for impacts on the established neighborhoods nearby.

Perhaps the largest drawback, however, is the travel distance from the west side of the island to Hilo. It is approximately a 96-mile drive between the two airports with a drive time estimated at over two hours one-way. Most of the trip would be on two-lane highways. This would be a significant cost in time and travel to the large majority of KOA passengers. The additional travel distance would have a major impact not only on residents but also on the tourism industry on the west coast. As the state's largest island, the distance between the two major economic centers on the island is the primary reason there are two existing airports. To transfer services to one commercial service airport would have a major economic impact on the island and the state.

Waimea-Kohala Airport and Upolu Airport are the two general aviation airports on the Big Island. Both are in the northern reaches of the island. Waimea-Kohala Airport has a 5,197-foot runway while Upolu Airport has a 3,800-foot runway. Each of these airports would need to basically be redeveloped like a new site if either were to serve as a replacement commercial service airport for KOA. This would also require major property acquisitions and have potentially major environmental impacts.

One of the advantages of Kona International Airport at Keahole is that it is relatively centrally located for the four districts on the west side of the island. Waimea-Kohala Airport is the closest of the two airports to KOA, and it is over 36 miles northeast and approximately 47 minutes drive time. This distance would be even further from the South Kona district.

Kona International Airport was designed and planned in the late 1960s with room to develop. Its current location best serves the population and tourism industry of the west side of the island. As long as this facility remains viable with room to meet the long term aviation needs, transferring services to another site would not be prudent or feasible.

The two airports do serve a purpose of providing convenient general aviation access to the north side of the island. Waimea-Kohala Airport does have some small commuter activity as well. In addition, both airports can be valuable for supporting training activity that is generated by flight schools based at KOA. Continuing to support the development and improvement of general aviation facilities at these two airports can help to accommodate some of the growing general aviation demand on the west coast.

RELOCATE TO A NEW AIRPORT SITE

In addition to the major financial investment, the development of a new commercial airport also takes a commitment of extensive land area. The location for a new site is usually undeveloped. As a result, the potential for

impacts to wildlife habitat, wetlands, prime farmland, and cultural resources is higher than at an existing site which still has development capability.

That is why in the past 30 years, there have been only two completely new "green field" airports constructed in the United States to replace existing airports serving over one million annual enplanements. Those airports were in Ft. Myers, Florida and Denver, Colorado. Southwest Florida International Airport was constructed because the existing airport was severely limited in runway length and room for airfield or terminal development. Denver International Airport was constructed primarily to replace an airport with some of the highest operational delays in the nation and with no feasible means to increase the airfield's capacity on-site.

Kona International Airport at Keahole does not experience any of these constraints, nor is it expected to experience severe constraints. The airport was developed in the late 1960s with the foresight to acquire and protect sufficient acreage to be able to develop and grow in the future. As presented in the 1998 Master Plan, the airport has adequate room to grow and develop to carry the facility well into the future. Given the investment in the existing facilities and the ability to meet future needs, complete relocation to another site would be neither prudent nor feasible.

A less demanding alternative could be the development of a new general aviation airport or heliport. The previous chapter indicated a need for capacity improvements such as a parallel runway and/or a heliport. In essence, this capacity could be provided at a new general aviation "reliever" airport or stand-alone heliport. If developed in a location convenient to general aviation users, such an airport could serve to relieve operational level demand at the existing airport.

FAA regulations and the airport's grant assurances prohibit the restriction of a class of aircraft from using the airport. So forcing general aviation to move to a different airport is not an alternative. A new general aviation airport would have to be convenient and offer advantages to attract general aviation users. Such advantages could include less congested and less restricted airspace, as well as shorter taxis and more advantageous locations for general aviation services.

A new general aviation airport will require less property and will likely have fewer environmental impacts than a new commercial service airport. A site as convenient as the existing airport and without significant environmental impacts may be difficult to find. As long as there are economically feasible and environmentally reasonable alternatives for providing adequate capacity at the existing airport site, development of a new general aviation airport cannot be considered as prudent or feasible at this time.

KEY PLANNING ISSUES

Analysis in the previous chapters of this master plan indicates that several

improvements will be necessary to enhance the capability of the airport to serve its users well into the 21st century. The key airfield issue facing the airport in the coming years is expected to be operational capacity. In the terminal area, early public input has indicated that maintaining a "sense of place" will be critical as issues are addressed in the organization, optimization, and ultimate expansion of the passenger terminal. Opportunities for general aviation of all types to develop and grow are a key concern. Adequate space to accommodate air cargo needs in a consolidated manner must be considered. Support facilities to complement these primary components must also be incorporated. Finally, the acreage associated with Kona International Airport at Keahole offers opportunities to further enhance aviation on the Big Island as well as provide avenues to generate revenue towards maintaining a self-sufficient airport and state aviation system.

Exhibit 4C outlines key considerations for this alternatives analysis. The facility requirements analysis from the previous chapter identified several needs over the planning period. Carrying over from the previous master plan is the development of a parallel runway. Added to the airfield mix, however, is the short austere airfield (SAAF) proposed by the United States Air Force. This is essentially a landing strip 4,250 feet long intended for the purpose of practicing short field landings by C-17 Cargomaster aircraft.

The previous master plan also recommended an independent touchdown and lift-off (TLOF) area for helicopters. This heliport concept still needs to be considered as it can improve the capacity of the airfield. As the airport has a large amount of existing and potential helicopter training, consideration should also be given to a separate training area for practicing landings and takeoffs, auto-rotations, etc. for capacity relief.

In addition to operational capacity, the airfield planning must also consider safety and efficiency enhancements. The airfield's taxiway system will be reviewed to ensure that runway incursion potential is minimized, and that the available taxiways provide efficient access and egress to the runway system. Circulation is also a key to the overall efficiency of the system. The locations of future taxiway exits will be reviewed, as will the parallel and connecting taxiway system.

As indicated in the previous chapter, the Airbus 380-800 and the Boeing 747-800 aircraft requires ARC D-VI airfield standards. The potential for ultimately accommodating these standards at KOA as at least an alternate airport to Honolulu International Airport will be considered.

The facility requirements indicated that the runway length is currently adequate. While there is no specific need at this time, to ensure viability for the future, the opportunity for reserving an ultimate runway length up to 12,000 feet will be considered.

Other airfield issues include the ATCT relocation which is currently being evaluated by the FAA, the airport res-

AIRFIELD CONSIDERATIONS

- **Airfield capacity**
  - SAAF for C-17
  - Parallel runway
  - Independent helicopter operations
- **ARC D-V vs. D-VI design**
- **Ultimate runway length**
- **Future south CAT I approach**
- **Taxiway system**
  - Parallels
  - Exit locations
- **Support facilities**
  - ATCT location
  - Relocate VOR on-airport
  - ARFF
  - Maintenance facilities

TERMINAL CONSIDERATIONS

- **Maintaining sense of place and character**
- **Passenger comfort**
  - Shade and cooling
  - Protection from inclement weather
- **Terminal layout and organization**
  - Future north terminal option
  - Commuter terminal vs. Integrated operations
- **Optimization of the existing terminals**
  - Balance utilization of terminals
  - Common use vs. exclusive leases
  - Combine terminals
- **Departures processing**
  - Electronic and off-site check-in and bag drop-off
  - Security checkpoint (split vs. consolidated)
  - Agricultural check combined with TSA bag screening
  - In-line baggage screening
  - Passenger circulation and wayfinding
- **Baggage claim**
  - Claim device capacity
  - Circulation/greeter space requirements
- **Concourse development**
  - Second level boarding/enhanced boarding
  - Agricultural check-in line with Security checkpoint
  - Retail/concessions requirements
  - Restroom expansion/modernization
  - Adequate seating and amenities
- **International operations/CBP requirements**
  - Integrate CBP within terminal vs. separate facility
  - Improve international passenger experience
- **Phased construction**
  - Maintaining operations and passenger safety

OTHER CONSIDERATIONS

- **Air cargo development**
  - Future cargo site requirements
  - HDOA site requirements
  - Post office site location
- **General aviation development**
  - Commuter terminal and parking requirements
  - Underserved hangar needs
  - FBO development sites
  - Apron and overflow parking requirements
  - Helicopter facilities
- **Expanded fuel storage/distribution**
- **Land use development revenue generation**
  - Onizuka Space Center relocation
  - Regional ARFF/public safety training facility
  - Shared government office complex
  - Commercial development opportunities
- **Access and circulation**
  - Future airport access points
  - Loop road/internal road circulation
  - Public parking needs
  - Cell phone lot
- **Infrastructure**
  - Utility upgrade and development
  - Wastewater treatment plant
  - Sustainability opportunities

cue and firefighting (ARFF) station, and the airport maintenance facilities which need to allow for space for potential expansion with growth of the airfield.

The passenger terminal at KOA is unique among the world's airports, being completely open air and preserving the indigenous architecture of the island. Passengers walk under hut roof structures, through open courtyards and alongside tropical landscaping on their way to and from the aircraft. While the terminal was originally designed to service small aircraft flying interisland routes, the terminal has seen increasing passenger traffic from the U.S. mainland and Asia. With the continued popularity for Kona as a tourist destination, the challenge in this master plan will be to expand the terminal to meet the forecast demand while maintaining the character and ambience that is strongly desired by the community and passengers. This will be balanced, however, by considering an adequate level of passenger security and comfort such as shade, cooling, and protection from inclement weather.

Originally designed to operate as two separate terminals for interisland aircraft, the airport's capacity is now challenged by larger overseas aircraft and an unbalanced demand between the two terminals. Concepts that optimize current facilities through operational improvements such as common use systems and combining two terminals into one will be considered. This will be followed by efficient, flexible, and expandable alternatives that meet the forecast demands. Maintaining airport operations and passenger security and safety will be requirements for the alternatives. Improving the passenger experience through the departures and arrivals processing will be another important consideration. This will include good passenger circulation and wayfinding throughout the terminal, consolidating processing functions, improving passenger amenities, and providing protection for passenger boarding of aircraft.

As overseas flights increase as forecasted, there will be a need to provide facilities that are appropriate to multiple larger size aircraft. This facility could also include international arrivals processing which is currently contained in a temporary tent structure.

Air cargo continues to be an industry that shows dynamic potential worldwide. On the Big Island, however, it is also an essential part of the modern economy. Protecting the potential for increased cargo capability will be important for the island's west coast. In addition, cargo development has the potential to work in concert with a foreign trade zone to further enhance regional economic development and airport revenue generation.

Currently, cargo is handled in two separate parts of the airport. As demand grows, consolidation of cargo facilities will become more of a necessity for safety and functional efficiency. Other considerations are the needs of the U.S. Postal Service for a facility on site, as well as the needs of the Hawaii Department of Agriculture for refrigeration storage, enclosed holding space, and inspection areas.

General aviation is once again a growing industry. This is being reflected at KOA as corporate activity increases, pilot training grows, and the demand for small aircraft storage is on the rise. The rise in second homes, high end resorts, and convention opportunities are contributing to the increased corporate demand. Flight schools on the airport have found a large demand for training in the excellent weather conditions of the west coast. In addition to the growth, there is a large underserved demand for hangars on the airport.

Maintaining areas for corporate aviation development, FBO and specialty operator growth, and individual aircraft storage are essential for serving this sector of the aviation industry. More defined areas for helicopter activity will also be considered.

The on-site fuel storage capabilities at KOA are dangerously low, especially considering the fact that fuel must currently be trucked around the island from the port in Hilo. This chapter will consider potential locations for increased fuel storage.

Another planning consideration on the airport includes the potential use of remaining landside property on the airport. While it is important to maintain these areas on-airport for operational safety and land use compatibility purposes, putting them to use in a manner that will generate revenue to support airport operational costs, as well as provide economic opportunities for the community, should be considered.

AIRFIELD IMPROVEMENT CONSIDERATIONS

Airfield facilities are, by nature, a focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the critical factor in the determination of viable airport development. Analysis in the previous chapter indicated the need to plan for additional airfield, as well as examine options that could provide additional runway length if ever needed for longer haul overseas flights. Other factors to be considered include the airfield taxiway system and the potential to accommodate airport reference code (ARC) D-VI at least as an alternate airport. The relocation of the ATCT is being evaluated by the FAA and is discussed here. Options for relocating the very high frequency omnidirectional range (VOR) onto the airport are also examined.

AIRFIELD CAPACITY ALTERNATIVES

Physical improvements that can increase airfield capacity include additional taxiway exits, a parallel runway, and independent helicopter landing areas. There is an opportunity to increase airfield capacity by up to 10 percent at KOA with the proper placement of two additional taxiway exits. These will be addressed later in the taxiway subsection. A more significant increase in capacity, however, can be attained with the development

of a parallel runway. A helicopter landing and takeoff area that can support operations independent of the runway activity can also increase capacity due to the level of helicopter activity at the airport. The following subsections examine parallel runway and helicopter TLOF alternatives. The discussion begins, however, with a description of the SAAF a programmed for KOA by the Department of Defense.

C-17 Short Austere Airfield (SAAF)

The United States Air Force utilizes the C-17 aircraft in its role of supporting security response, providing civil defense, and supplying humanitarian aid. The C-17 is used to furnish supplies, equipment, food, clothing, and military assistance throughout the world and within the Pacific Asian Theater of Operations. A squadron of eight C-17 aircraft has recently been established at Hickam Air Force Base (AFB) as part of this mission.

One of the critical elements of the training curriculum for the C-17 air crews is the use of an SAAF to gain experience in operating into and out of short runways. The SAAF may be up to 4,250 feet long and 90 feet wide. The FAA searched and evaluated alternative locations for an SAAF in the Hawaiian Islands, ultimately selecting an alternative at Kona International Airport at Keahole. An environmental assessment was prepared on the proposed SAAF in 2004.

Exhibit 4D includes a depiction of the SAAF as proposed by the Air Force. The proposed SAAF is planned within the alignment of the ultimate parallel taxiway between the proposed parallel runways in the 1998 Master Plan. This would place the centerline of the SAAF 700 feet makai (west) of the centerline of Runway 17-35. The 4,250-foot SAAF would also have 300-foot paved overruns within a 500-foot extended safety area off each end. Exit taxiways are planned to align with Taxiway A North and with Taxiway G. Training aircraft will land on the SAAF, then use the taxiways to return to Runway 17-35 for departure. This layout is included in each of the proposed airfield alternative layouts to be discussed.

Parallel Runway

When possible, the best means for improving runway capacity is the development of a parallel runway. The optimum capacity is attained by a parallel runway that matches the design of the primary runway. A runway that can accommodate a majority of the airport's operational mix, however, can still significantly improve capacity. Since instrument meteorological conditions (IMC) exist a small percentage of the time at KOA, there is not a need for simultaneous instrument approaches. For simultaneous operations in visual conditions, a runway separation of 1,200 feet is the minimum FAA standard for aircraft in airport reference code (ARC) D-V and D-VI.

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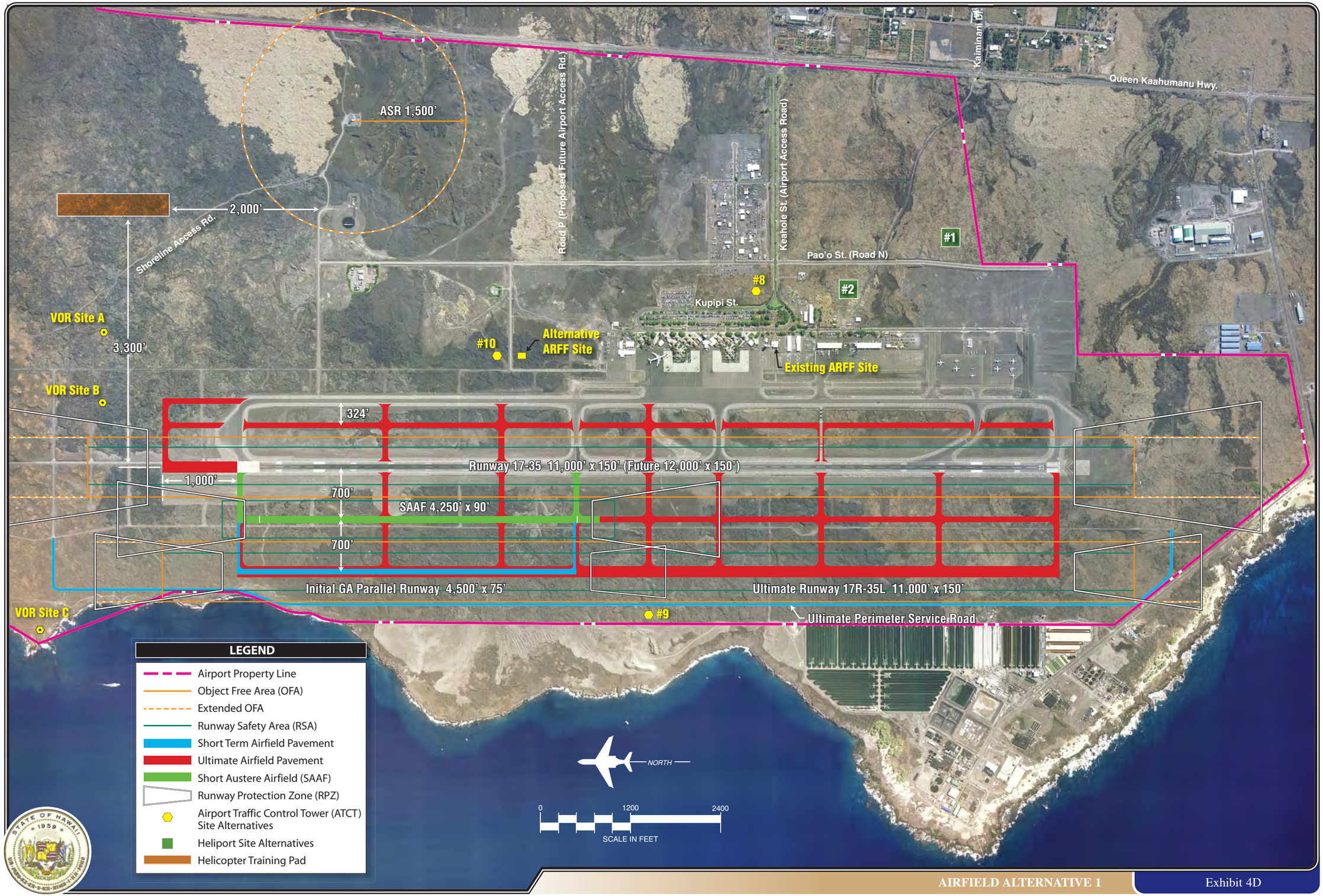

AIRFIELD ALTERNATIVE 1

Exhibit 4D

Exhibit 4D presents the parallel runway in the location proposed in the 1998 Master Plan. The runway separation is 1,400 feet. Besides the physical runway there are several minimum standards that are designed to allow for safe operation of the runway. As discussed in the previous chapter, these vary with the operating characteristics of the design aircraft. While the parallel runway may initially start out with a lesser design, it is prudent to plan and protect the area expected to be needed over the long term.

The runway safety area (RSA) is the most critical standard. As can be seen on the exhibit, this would be graded and maintained within the current property. At the north end of the runway, however, there is minimal clearance between the RSA and the property boundary. Next is the runway object free area (ROFA), also depicted on the exhibit. While this area does not necessarily need to be graded, the ROFA should still be kept clear of all objects not fixed by airfield function, and those objects must be on frangible mounts. Airport fencing and perimeter service roads should be located outside of the ROFA. The ROFA on the north end of the ultimate parallel runway in this alternative would extend beyond the airport property and over the water. This would require that the perimeter fencing and service road be placed within the standard ROFA in this area. To accommodate the fence and road, the FAA would need to issue a Modification to Design Standard for this alignment to be feasible.

Another runway design standard is the runway protection zone (RPZ). While it is desirable to keep this trapezoidal area off each of the runway clear of all objects, uses such as parking and roadways are permissible outside the central core (extended ROFA) of the RPZ. It is also preferred that the airport maintain fee simple control of the area if at all possible.

As shown on **Exhibit 4D**, the south RPZ of the parallel runway would extend over a public road and into property leased by the National Energy Laboratories of Hawaii (NELHA). This would require FAA approval of the public road within the RPZ as well as easements over the property currently outside the airport boundary.

Exhibit 4E presents an alternative where the parallel runway would be located at the minimum standard separation of 1,200 feet from Runway 17-35. In addition, the ultimate runway would be shifted 1,000 feet to the north. This would keep the ROFA entirely within the existing makai (west) boundary of the airport and allow for the perimeter fencing and service road to remain outside the ROFA. This also would allow the potential to ultimately develop airport landside uses makai (west) of the runways.

Alternative 2 would place the runway closer to the planned SAAF. This would be an operational problem only if the SAAF and parallel runway were intended to have simultaneous operations.

As indicated earlier, the parallel runway can be expected to be developed in

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ASR 1,500'

Shoreline Access Rd.

1,800'

2,500'

VOR Site A

VOR Site B

VOR Site C

Road P (Proposed Future Airport Access Rd.)

Keahole St. (Airport Access Road)

Kaiminani Dr.

Queen Kaahumanu Hwy.

Pao'o St. (Road N)

#1

#2

#8

#9

#10

Kupipi St.

Alternative ARFF Site

Existing ARFF Site

381'

500'

1,000'

700'

500'

Runway 17-35 11,000' x 150' (Future 12,000' x 150')

SAAF 4,250' x 90'

Ultimate Runway 17R-35L 11,000' x 150'

Initial GA Parallel Runway 3,600' x 75'

Ultimate Perimeter Service Road

LEGEND

- Airport Property Line
- Object Free Area (OFA)
- Extended OFA
- Runway Safety Area (RSA)
- Short Term Airfield Pavement
- Ultimate Airfield Pavement
- Short Austere Airfield (SAAF)
- Runway Protection Zone (RPZ)
- Airport Traffic Control Tower (ATCT) Site Alternatives
- Heliport Site Alternatives
- Helicopter Training Pad

NORTH

0 1200 2400

SCALE IN FEET

AIRFIELD ALTERNATIVE 2

Exhibit 4E

stages. A length of 3,600 feet would be capable of accommodating aircraft weighing less than 12,500 pounds with less than 10 seats. To accommodate small aircraft with 10 or more passenger seats, a 4,200-foot runway would be needed.

Exhibits 4D and **4E** depict two options for this initial development. Alternative 1 shows the initial parallel runway developed at the north end of the airfield. This would be aligned with the north end of existing Runway 17-35 and the planned SAAF. The initial length would be 4,500 feet with taxiway access at each end of the runway.

Alternative 2 shows the initial parallel runway developed at the south end of the shifted runway. Starting the runway development at the south end would maintain the runway closer to the airport's general aviation facilities. This would reduce taxi times and likely increase the propensity of general aviation operators to regularly use the parallel runway. As depicted, the runway could initially be developed at a length of 3,600 feet and with taxiway exits at both ends. This would not only be staggered south of the SAAF, but would also be clear of the RPZ for the SAAF. A 4,500-foot long runway would require the north exit taxiway to cross the RPZ for the SAAF. If the ultimate runway alignment were planned similar to Alternative 1, a length of 4,600 feet could be attained before the SAAF's RPZ became a factor.

Independent Helicopter TLOF

To better accommodate the growing helicopter traffic as well as increase the airfield's capacity, helipads for independent operations by helicopters should be considered. For completely independent operations, the helicopter TLOF should be separated at least 2,500 feet from the runway. A base heliport for operators should be considered as well as a separate landing area for helicopter training. Ideally, the heliport should be in reasonable proximity to the general aviation facilities for potential cross-utilization of services and facilities. The training TLOF can be located in a separate area away from other activities.

The previous master plan recommended a separate heliport location mauka (east) the general aviation area across Pao'o Street (Road N). This location is generally depicted by Heliport Site #1 on **Exhibit 4D**. In this location the heliport would be at least 2,500 feet from the runway. Alternate Site #2 is also shown on the exhibit. This site is closer to the general aviation facilities, for even greater cross-utilization of services and facilities. A helipad in this area, however, would be as close as 2,200 feet from the runway. Heliport layouts for these two locations will be examined later with the general aviation landside alternatives.

The airport's large acreage offers opportunities for establishing a helicopter training area away from other air-

side and landside facilities. The optimum location appears to be at the north end of the airport away from the general aviation area, and at least 2,500 feet from the runway. For compatibility with developing off-airport land uses, locations in close proximity to Queen K Highway were avoided.

The Hawaii County General Aviation Council (HCGAC) has recommended a training area/runway 1,500 feet long and 300 feet wide. The area would be paved and marked to accommodate multiple training aircraft. While this would be ideal, funding and other development factors could limit the paved width of the facility, although the 1,500-foot length should be maintained.

Exhibit 4D depicts an alternate training location approximately one-half mile makai (west) of Queen K highway. This location maintains a 3,300-foot separation from Runway 17-35. The separation from the heliport in the general aviation area should be sufficient to establish separate traffic routes for the two landing areas.

Exhibit 4E presents an alternate location at 2,500 feet mauka (east) of Runway 17-35. This location is generally along an extension of the Road N (Pao'o Street) alignment. This alignment would provide a general flight path between the training area and the heliport terminal.

RUNWAY 17-35

Runway 17-35 is currently the only runway on the airport. While parallel runway alternatives to improve airfield capacity are being considered, Runway 17-35 will likely remain as the primary runway because of its current length, instrument capability, and proximity to the terminal area.

One consideration for Runway 17-35 as traffic increases is a CAT I approach to the south end of the runway. While this may not be a short term priority, the capability for CAT I minimums should be protected for future viability. The primary planning consideration is to ensure that the approach is protected. This would include planning for an RPZ for CAT I standards. **Exhibits 4D** and **4E** depict this RPZ off the south end of the runway. All but the southwest corner of the RPZ would remain within the current airport boundaries. The National Energy Laboratory-Hawaii (NELHA) has a roadway that is within this corner off-property. According to FAA design criteria, roadways are acceptable within the RPZ as long as they are outside an extended ROFA to the back of the RPZ. The NELHA roadway would remain outside the extended ROFA, suggesting that a future CAT I approach can be accommodated on Runway 35.

While there is not a pending need for additional runway length, the facility

requirements indicated that reserving the capability for a runway up to 12,000 feet in length should be considered in long range planning. **Exhibit 4D** depicts adding 1,000 feet to the north end of the runway. This can be accommodated well within the airport property. The existing approach light lane as well as the glide slope would have to be relocated. A southern extension would require not only relocation of the localizer, but would also place a larger portion of the future runway protection zone over NELHA and its roadway. As a result, any future runway extension is recommended to be planned at the north end of Runway 17-35.

The runway and its taxiway system currently meet FAA design standards for up to ARC D-IV. This includes aircraft such as the B-767 and DC-10. The runway itself meets ARC D-V standards to accommodate aircraft such as most B-747 and B-777 aircraft. If the runway were to regularly accommodate ARC D-VI aircraft such as the A380-800 and the B747-800, it should be planned for a 200-foot width with taxiways 100 feet wide. While this can be accommodated, it is not anticipated to be necessary. The current runway and taxiway widths will be adequate to accommodate these large aircraft on an infrequent basis, such as a special charter or to serve as a diversion airport for Honolulu International Airport.

Most important in the short term is to provide adequate separation distances on the taxiway system. The separation from the partial parallel taxiway in the terminal area is currently not adequate for Group V aircraft. In fact, separation from some aircraft parking positions is also affected by Group V taxiway standards. To provide such separation mauka (east) of the existing Taxiway A, it would require moving terminal facilities farther back from the runway. Since the taxiway is currently located 881 feet from the runway, there is adequate space between the runway and taxiway to consider improving circulation makai (west) of Taxiway A. **Exhibit 4D** depicts establishing a second parallel taxiway alignment 324 feet makai (west) of the current parallel taxiway. This would meet taxiway separation standards for Group VI aircraft. The clearances in the terminal area, however, would remain tight, thus limiting aircraft parking flexibility at the terminal gates.

Exhibit 4E examines locating the inside taxiway closer to the runway. A 500-foot runway-taxiway separation would still meet Group V design standards. This would also allow a "bump-out" of Taxiway A in front of the terminal, thereby increasing the terminal apron for parking and circulation. As will be demonstrated in the discussion of terminal alternatives, this also enhances terminal development options.

The dual parallel taxiway can also provide flexibility for adding taxiway exits. **Exhibits 4D** and **4E** depict recommendations for the placement of additional taxiway exits to enhance runway efficiency. The grade differential between the runway and Taxiway A in front of the current cargo area, however, currently prohibits an exit in this area. This leaves a 3,000-foot gap

between exits for aircraft that cannot slow sufficiently to exit within 6,400 feet of the runway threshold. The grade of the inside parallel taxiway could be designed to allow an exit in this area.

The exit plan as proposed on these exhibits would ultimately maintain exits from the runway at least every 2,000 feet, with a higher concentration near midfield.

AIRFIELD SUPPORT FACILITIES

Air Traffic Control Tower

As indicated in the previous chapter, the existing ATCT is old and out-of-date. In addition, the cab height is not sufficient to provide full line-of sight of all airfield movement areas. In particular, a northern section of Taxiway A and portions of the terminal apron are shadowed the tower by large aircraft parked on the terminal ramp. The FAA is currently undergoing the process to relocate/replace the tower in the short term. An ongoing site selection study being conducted by the FAA identified and evaluated 10 potential sites, including the current location. From this preliminary evaluation, the sites were narrowed down to three alternate locations for further analysis. Those three sites are identified on both **Exhibits 4D** and **4E**.

Site #8 is located mauka (east) of the terminal loop and parking lot, between Kupipi Street and Pao'o Street. This would place this alternative in a location that could include future terminal parking. While the basic footprint of the terminal would have a minimal impact, the potential requirement for a 300-foot secure radius around the tower could require shifting future parking farther north.

Site #9 is located makai (west) of the current airfield, near the west boundary of the airport. A concern with this site is its proximity to the parallel runways as proposed by Airfield Alternatives 1 and 2.

Site #10 is located north of the current terminal along the flightline. While this area is currently undeveloped, it does have access and can be maintained within the security. The location is sufficiently north of the terminal so that it should not impede northward development of the terminal for well beyond the planning period.

The FAA is currently conducting its final evaluations and is expected to make a determination of final rankings by early 2008. The final recommendation will be included in the master plan concept.

VOR Relocation

The Kona VOR is currently located 4.3 nautical miles south of the airport. Development pressures around this site require that the FAA find a new location for the VOR, preferably within the airport boundaries. As with the ATCT, the FAA will be conducting a site study to determine its future location. For planning purposes, the Master Plan examines potential locations on-site for considera-

tion. Three potential locations are outlined on **Exhibits 4D** and **4E**.

General siting requirements recommend that the VOR be located a minimum of 500 feet from any runway centerline and at least 250 feet from taxiway centerlines. The VOR should also be at least 500 feet from metal fences and overhead transmission lines. A single tree can be tolerated at 500 feet, but groupings of trees should be maintained at least 1,000 feet away. Structures should be kept at least 1,000 feet away. In addition, metal structures beyond 1,000 feet should not penetrate a 1.2 degree angle from the base of antenna, and non-metal structures should not penetrate a 2.5 degree angle.

All three potential locations are at the north end of the airfield to avoid development. **VOR Site A** is located 500 feet mauka (east) of the airport service road. This area is currently undeveloped and outside the secured airfield perimeter. Power could be extended from the service to the approach lighting system on Runway 17. Access could be extended north from the existing perimeter service road.

VOR Site B is located within the secured airfield perimeter, approximately 500 feet makai (west) of the service road, and 900 feet mauka (east) of the runway centerline. This site could be readily serviced from the power to the approach light system. Access could be extended from the service road.

VOR Site C is located on a point overlooking the ocean north and makai (west) of the airfield. This site is outside the secured airfield perimeter and would require the longest extensions of access and power.

Airport Rescue and Firefighting Facility

The current ARFF is located south of the terminal area next to the ATCT. This location is suitable for future needs provided the ATCT is relocated as planned and/or the T-hanger to the south can be relocated to allow for expansion and improvements to the ARFF building.

If a passenger terminal alternative is selected that requires development to the south, the ARFF building would need to be relocated. The key consideration for siting an ARFF facility is the response time requirements under FAR Part 139. Proximity to the terminal is also advantageous for emergency medical response. **Exhibits 4D** and **4E** depict an alternate location for the ARFF if it becomes necessary to be relocated. The location south of ATCT Site #10 will still meet required airfield response times, as well as be relatively close to the terminal building without impacting future terminal growth. It is also adjacent to an existing service road.

PASSENGER TERMINAL COMPLEX

The alternatives analysis for the passenger terminal complex at Kona International Airport at Keahole includes the terminal, roads and park-

ing, and adjacent facilities. The analysis of the terminal building on the airside will be limited by the constraints imposed by the runway and taxiway systems and the utilization of the aircraft apron. Airfield alternatives that alter the constraints and allow for terminal growth opportunities will be coordinated with the terminal alternatives.

Both initial and long term strategies that are considered will be developed. These include the optimization of existing terminal facilities, and identifying potential modest incremental expansion to meet near term demand. A critical factor in the implementation of the incremental expansion will be based on the appropriate availability of funding.

For the airside analysis, the focus is on the efficient utilization of the aircraft apron as it relates to the terminal, size, and type of aircraft it serves, and the needs of the airlines operating the aircraft. In addition, aircraft movement in and out of the gates, servicing of the aircraft, and passenger boarding methods are considered.

The focus of the landside analysis is the level of service afforded to passengers, efficiency of airport operations, passenger safety and security, efficient use of capital resources, and operational flexibility. Together these optimize the utilization of terminal building facilities. The landside analysis also considers how development strategies relate to operations sectors (interisland, overseas U.S. mainland, and international) of the airport and the terminal facilities needs of the airline.

DESIGN BASIS

The existing terminal facilities at KOA can be very crowded at peak times. There is already concern about the level of service provided to passengers at the airport. Seating space is limited at peak departure times for mainland passengers, restrooms are not well placed for convenient access, and concessions are limited in their space and offering. Ticketing and bag claim are each congested during their respective peak periods, as is passenger security screening. With all of this in mind, launching into a remodel and expansion of these facilities while keeping them in full public use requires careful attention to a number of factors.

These include the following Basis of Design factors:

1. Create a unique environment for people: their travel experience; level of service and convenience; reduce stress.

2. Continue the focus on the natural environment: responsive to climate; efficient use of site; sustainable.

3. Retain and reinforce community values, culture and vision.

4. Create an efficient, flexible, expandable facility responding to forecast demands as they occur and meeting all safety and security requirements.

5. Create alternatives responsive to funding availability: prioritized

"shopping list" of improvements; upgrade existing facilities; optimize operations and maintenance; maximize revenue generation opportunities.

DEVELOPMENT CONSTRAINTS AND OPPORTUNITIES

(Strategies to Expand the Terminal Area)

The alternative analysis begins with a thorough understanding of the terminal building constraints that are influenced by runway and taxiway setback and clearance regulations, the terminal building's unique location as it relates to existing buildings, and development within the terminal area. Knowledge of these constraints then reveals the opportunities available for terminal growth as outlined by the Constraints/Opportunities diagram on **Exhibit 4F**.

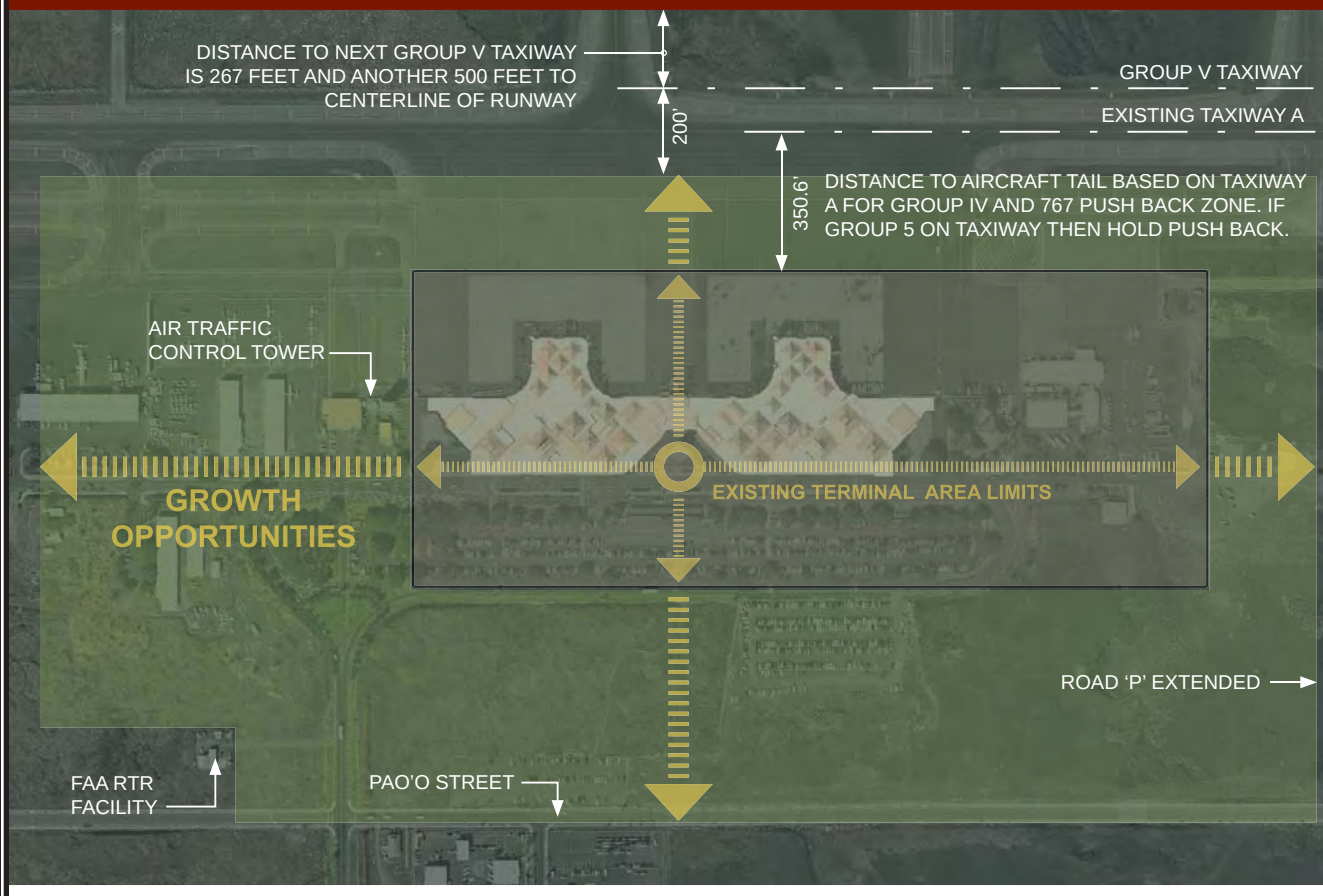
The size, in total land area and shape, of the existing terminal area limits opportunities for future facilities development that will be required to meet aviation demand. Thus, determining strategies to expand the footprint of the terminal area are appropriate.

The existing terminal area includes the aircraft parking apron, the terminal buildings and the terminal drives, roadways, and parking. The terminal area envelope is defined as the footprint boundary of these facilities – from the ground plane up to the vertical height limit determined by the lower of two imaginary surfaces. The first imaginary surface is a horizontal plane 165 feet above grade. The second has both a horizontal and sloped surface where the horizontal component projects 500 feet from the centerline of Runway 17-35 at grade. The sloped component begins where the horizontal ends and projects upward at a slope of one vertical to seven horizontal until it intersects the 165-foot height limit. Other horizontal controls that affect the boundary of the terminal area mainly occur along the makai (west) and mauka (east) edges of the existing terminal area. On the airside, it is the layout of the airfield – runway, parallel taxiway, and taxilanes. On the landside, it is the layout of the terminal drives, roadways, and parking.

The terminal area envelope can be expanded to the north into the former fuel facilities (recently removed) and developing vacant land. Expanding to the south would require the relocation of the ATCT and ARFF facility and consolidating general aviation and air cargo facilities. Expanding to the makai (west) requires relocating the parallel taxiway, and to the mauka (east) relocating roadways and parking.

Alternatives were developed for planning horizons that can be implemented on an as needed basis according to aviation demand. Generally, they incrementally increase in magnitude from limited operational changes to major facilities relocation and additions.

CONSTRAINTS/OPPORTUNITIES



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Short Term

This strategy results in a very limited footprint increase along the west edge of the aircraft apron. The operational change requires downsizing Taxiway A from Group V capability to Group IV, striping an aircraft push-back zone designed for B767-300 ER aircraft size, and striping for a vehicle service road (VSR). The resulting depth of the aircraft parking apron would be approximately 200 feet.

The impact of this strategy on the airfield operations is that if a Group V aircraft is taxiing on Taxiway A, then aircraft ready to push back would have to hold until that aircraft passes.

Terminal facilities improvements would be limited to those that would provide the most immediate improvement to the passenger level of service.

Intermediate

This strategy results in a reasonable footprint increase along the makai (west) edge of the aircraft apron and along the terminal landside. The improvements include relocating the Taxiway A centerline to a position 767 feet east of the centerline of Runway 17-35 for the length between the ARFF service road and Taxiway G. Relocating this distance from the runway allows the addition of a new parallel taxiway between the runway and Taxiway A in the future. Both the new taxiway and Taxiway A would be Group V capable. A new Group IV taxilane would be placed east of Taxiway A with a vehicle service road (VSR) adjacent. The resulting depth of the aircraft apron would be approximately 285 feet. Alternatively, if the new Group IV taxilane were designed specifically for B767-300 ER aircraft or smaller, then the resulting aircraft apron depth would be approximately 310 feet. If the taxilane would be further reduced to Group III capability, the resulting apron depth would be approximately 367 feet.

A further strategy results in a reasonable footprint increase along the mauka (east) edge of the terminal buildings. The improvements include relocating the terminal drive to the first row of parking. Short term parking would remain within the loop with a new long term parking lot constructed mauka (east) of the terminal roadway.

The terminal area footprint can be expanded to the north by removing the fuel farm facilities which are no longer in use and to the south by relocating the ATCT, ARFF, and consolidating general aviation facilities.

The impact of this strategy on the airfield operations is limited to aircraft movement flexibility lost as the taxilane is downsized from Group IV, though frequency of large aircraft movements is not high at this airport and the future configuration of the airfield for maximum flexibility is not affected. The impact on the landside is that the long term parking location requires pedestrian crossing of the terminal loop roadway and terminal drives to reach the terminal buildings through the intermediate phase.

Long Range

This strategy results in a very large footprint increase along the west edge of the aircraft apron, along the terminal landside, and to the north or south. The improvements include relocating the Taxiway A centerline to a position 767 feet east of the centerline of Runway 17-35 for the length between the ARFF service road and Taxiway G if not accomplished in the intermediate phase and constructing a new full-length taxiway 500 feet east of the runway centerline. Both taxiways would be capable of Group V aircraft movement. After reserving space for a VSR, the resulting depth of the aircraft apron would be approximately 450 feet. This configuration allows for total flexibility of aircraft parking and movement adjacent to the terminal.

The long range plan also provides a very large footprint increase along the mauka (east) edge of the terminal buildings. The improvements include relocating the terminal drive to the first row of parking if not already implemented in the intermediate phase and relocating the terminal roadway to the existing Road N.

The north turn of the new roadway and drives would align with the future terminal area entrance roadway from Queen Kaahumanu Highway at approximately existing Road P. The south turn of the new roadway would continue its connection to the existing airport access road. The interior of the roadway system would be large enough to include all types of parking, short term, long term, employee, other ground transport, as well as a park area which would include the petroglyph site and a potential cultural heritage development between the terminal area to the rental car site.

The terminal area footprint can be expanded to the north by removing the fuel farm facilities no longer in use and improving undeveloped land. Expansion to the south requires relocating the ATCT, the ARFF facility, consolidating general aviation and air cargo facilities, each of which are considered for relocation as a part of this master plan.

The impact of this strategy on operations is minimal since it generally expands the terminal area footprint without changing the relationship adjacencies of the aircraft parking area, terminal buildings, and the roadway system and vehicle parking. Further, each component can be expanded to meet its individual demand without requiring changes to the other components. The long range capability of this strategy to meet future aviation demand beyond the 20-year time frame is excellent.

TERMINAL AREA ALTERNATIVE DEVELOPMENT CONCEPTS

The strategies to expand the terminal area are identified and can be incrementally implemented as demand for additional air terminal facilities requires. Alternative development concepts for using the expanded terminal area footprint are associated with the Short Term, Intermediate, and Long Range opportunities. The alternative concepts to add terminal facility ca-

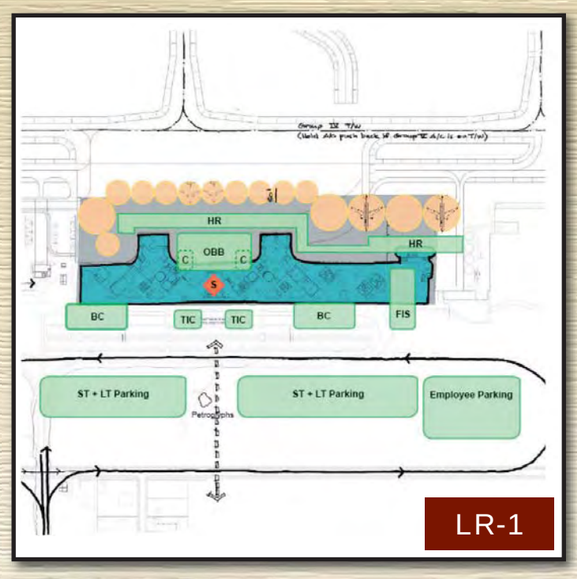
pacity focus on aircraft gates, passenger terminal processing facilities, terminal roadways, and parking. They depict potential means to add capacity to the terminal area for each of the strategies that expand land area.

The terminal area at KOA has an existing capacity to meet current passenger demand, and the facility requirements also project future need for facilities. Generally, there is a current need to add capacity for departure queuing areas and gate holdrooms, baggage claim, baggage and passenger security screening, concessions, improving restrooms, and adding capacity to public parking. The short term need includes more facilities for these areas and the relocation of baggage security screening to the baggage make-up area. Beyond the short term planning horizon, the need for capacity improvements to all departures and arrivals facilities would logically follow growth in passenger processing demand. Notably, intermediate and long range passenger processing need is for agricultural check, security checkpoint, gate holdroom space, baggage make-up and claim, concessions and restrooms, public parking, rental car facilities, and one to three additional aircraft gates. The expansion of facilities for processing arriving international passengers will also be required.

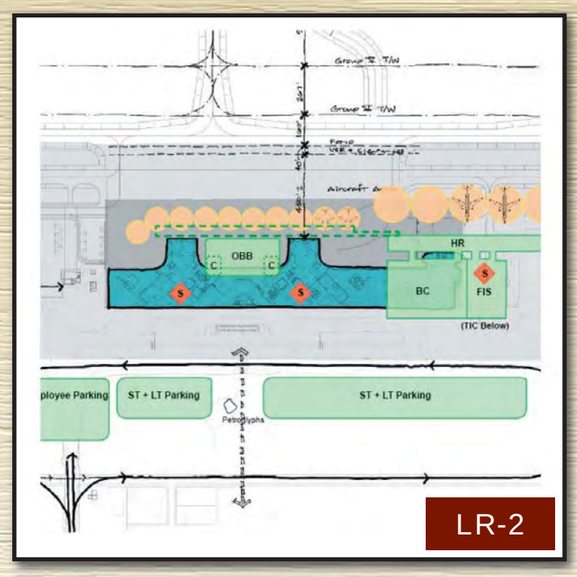
Current need for airport terminal improvement is incorporated within the short term alternative concept depicted on **Exhibit 4F** and is common to all three alternatives. Alternatives for future development have a broader range as the terminal area footprint is enlarged. Some of the near term concepts evolve into longer range opportunities by the nature of their configuration to flexibly grow into other layouts. This increases their viability for incremental expansion.

Three alternatives were developed associated with the forecast facilities demand growth and opportunities to increase the size and shape of the terminal area footprint. Further studies were developed for Long Range Alternative 1 (LR-1) to explore the different configurations of an expanded concourse from the existing terminal and are labeled LR-1A to LR-1D. After evaluating all concepts, the Master Plan team determined that these configurations did not offer any additional flexibility in terms of aircraft parking. If the airport decides to transition to common-use in the future, this flexibility will be required and the other concourse options would limit the choice of aircraft at the gates. These concepts are shown on **Exhibit 4G**. As noted, they can be implemented on an as-needed basis according to aviation demand. Further, each component can be expanded to meet its individual demand without requiring changes to the other components. The long range capability of this strategy to meet future aviation demand beyond the 20-year time frame is excellent. The concepts are identified by ST (Short Term), INT (Intermediate) and LR (Long Range).

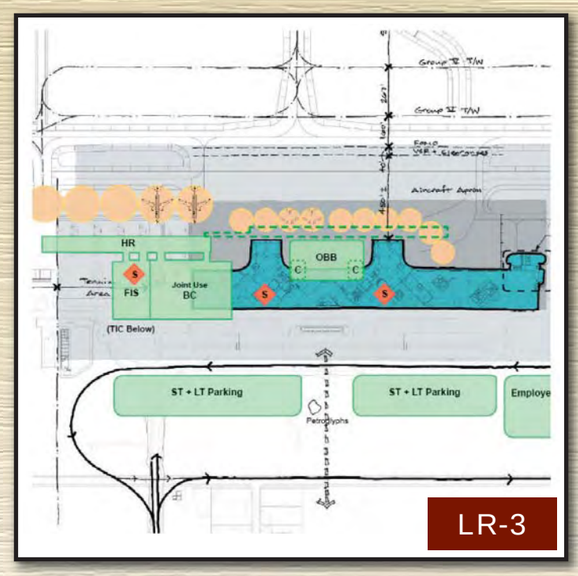
The short term expansion, as noted previously, is a “Do Minimal Work” alternative and assumes only limited funding is available. As presented on **Exhibit 4F**, this alternative allows



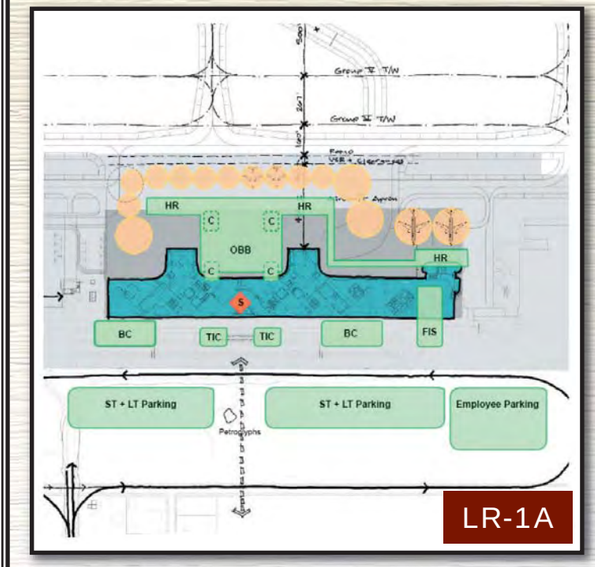
LR-1



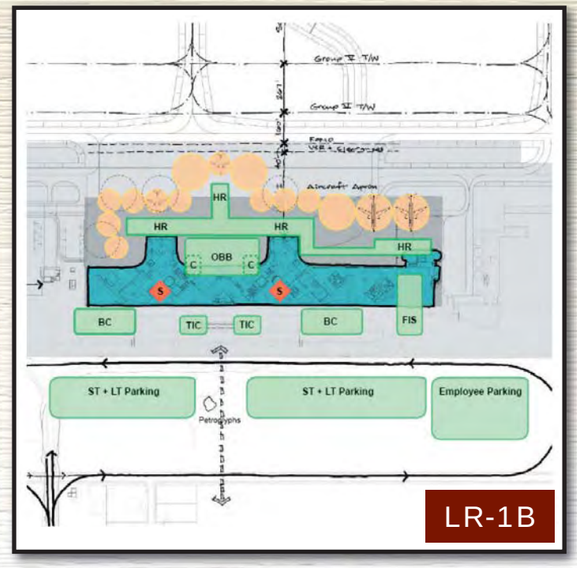
LR-2



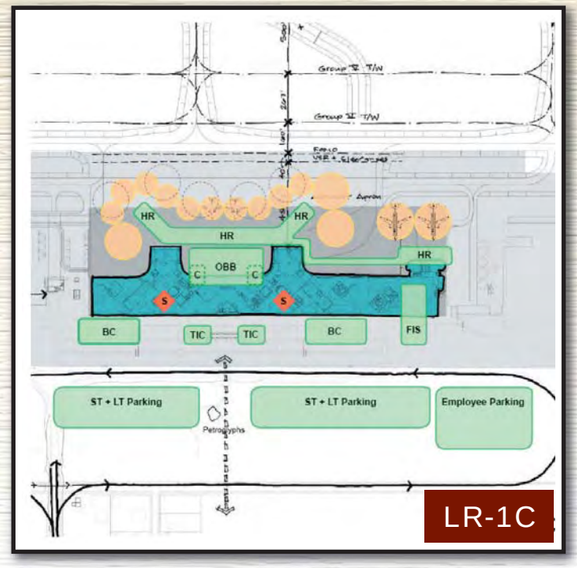
LR-3



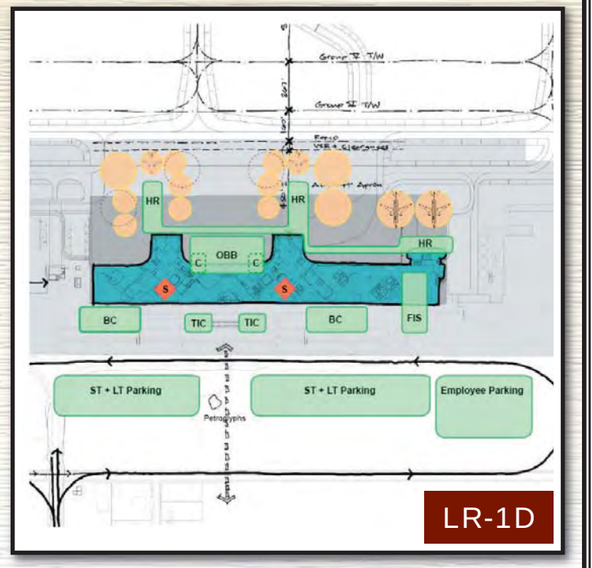
LR-1A



LR-1B



LR-1C



LR-1D

the Onizuka Space Center to remain in its current location for a period of time, continues the two separate passenger screening checkpoints, and generally retains the existing separate North and South Terminal configuration. An additional lane would be added to the passenger security screening lanes, baggage security screening would be relocated into the present bag make-up areas, and new bag claim devices would be added to the north and south claim areas.

The flow at ticketing would be improved by reorganizing the processing between agriculture screening, kiosks and ticket counter, and a change to common use kiosks and check-in. These kiosks could also be placed in the rental car area as well as in the old rental car pavilion adjacent to parking to further expedite the flow. Restrooms would be upgraded and expanded as would flight information and signage. This alternative does not address the passenger boarding process or aircraft parking. If sufficient budget is available for a more aggressive development program, parts of this short term development could be incorporated with implementation of one of the three intermediate alternatives.

The three basic terminal area development alternatives will be described in detail below. They are coordinated with exhibits that show the overall growth in relation to the terminal area as well as the operational detail of the facility. The discussion and appropriate exhibits focus on intermediate and long range development.

Alternative 1 focuses all development on continued use and expansion of the existing terminal area facilities.

Alternative 2 creates a new terminal for overseas and international passengers north of the existing terminal area, retaining the existing terminal facilities for interisland passengers. The improvements incorporated into the existing facilities are limited to those which will continue the existing passenger experience and upgrade facilities to current standards. Temporary facilities for Customs and Border Protection (CBP) are required for this alternative.

Alternative 3 creates a new terminal for overseas and international passengers to the south while retaining the existing terminal for interisland passengers as in Alternative 2.

All three alternatives assume a basic upgrade to the existing terminal buildings and systems as required for preventive maintenance and code compliance.

Terminal Alternative 1 (Exhibit 4H)

Intermediate Horizon (INT-1):

This stage of development addresses the need to improve the existing aircraft boarding procedure as well as increase terminal capacity. A second level concourse with passenger loading bridges would be connected to the existing gate holdrooms by ramps or mechanical means such as escalators or

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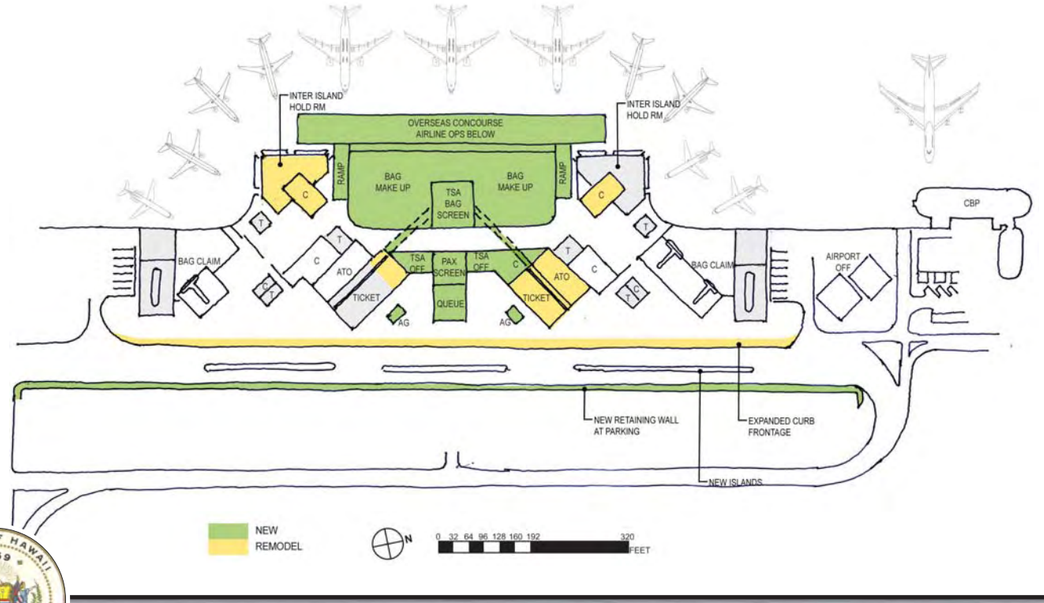
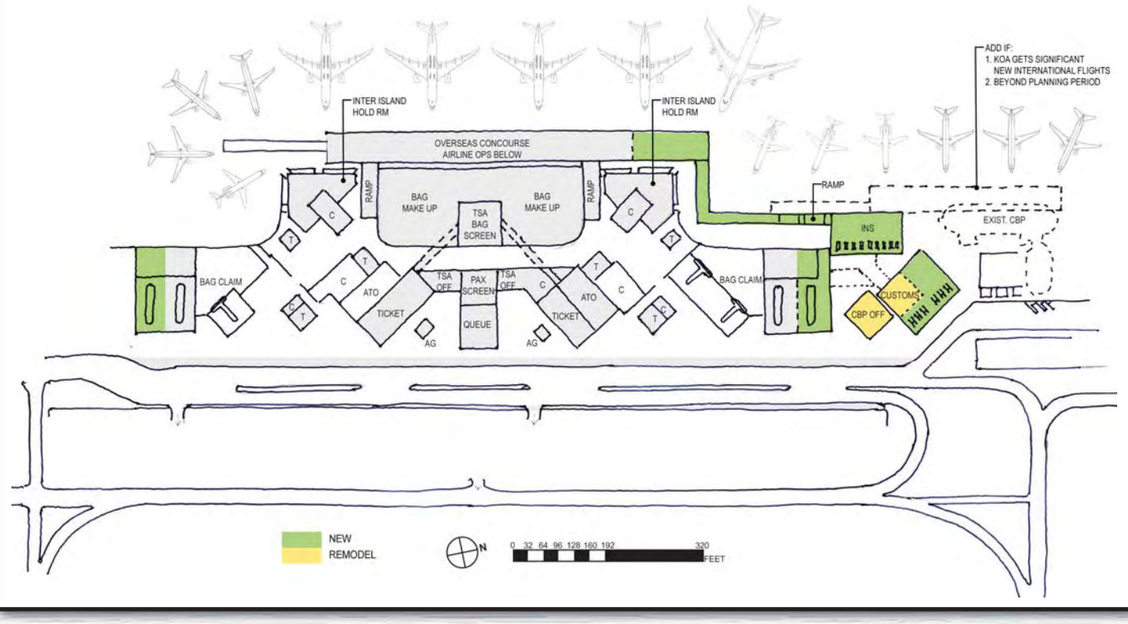
ALTERNATIVE 1 - INTERMEDIATE TERM



ALTERNATIVE 1 - LONG RANGE



elevators. The second level concourse would primarily serve four larger aircraft for overseas flights while the existing hold rooms would serve the ground-loaded interisland flights.

Taking full advantage of the elevated concourse, large glazed windows on the airside would provide views across the apron to the ocean. To the mauka side, views of the unique terminal structures, palm trees and courtyards and the mountains welcome arriving passengers and continue the Aloha experience for departing passengers. The roof of the baggage make-up area would include various arrangements of local natural materials to further enhance the views. While air conditioning of the concourse is an option, it may also be able to be served by natural ventilation.

During periods when the larger aircraft are not present, the apron can be used for multiple interisland aircraft parking and the loading bridges would be configured to serve both the widebody and interisland aircraft. Other interisland aircraft would continue to be ground-loaded. Taxiway A would remain in its current location. When a Group V aircraft is taxiing on Taxiway A, however, aircraft ready to push back would have to hold in the gate until the aircraft passes. Given the low-level frequency of large aircraft movements, both now and anticipated in the future, the loss of flexibility is minor and can be alleviated at a later stage if necessary.

This alternative includes relocation of the Onizuka Memorial Space Center from the center of the terminal complex. This opens the opportunity for a single, centralized passenger security screening process with adequate queuing area. TSA search rooms and office space would be located adjacent to the screening area. Upon clearing security, passengers can go directly to either the north or the south secure waiting areas.

With the relocation of the overseas passenger holdrooms to the second level concourse, some of the existing holdrooms adjacent to the central courtyards can be converted to concessions to improve the offering and revenue generation, as well as the addition of cultural and regional displays. The courtyards would continue to provide places for enjoyment of the natural environment and reinforce the Aloha spirit. All passengers, both departing and arriving, would be exposed to these concession areas, displays, and courtyard plantings as arriving overseas and interisland passengers will still flow through the courtyards on their way to bag claim.

Consolidated bag make-up with TSA bag screening would be developed between the north and south terminals served by tunnels from ticketing. Additional capacity for baggage claim can be provided adjacent to existing claim devices if not already provided by the short term improvements. Some additional ticketing will be provided adjacent to the existing area on the south.

Additional queuing for departure processing areas will be provided by relocating the terminal curb to the east so that the terminal drives are immediately adjacent to the edge of the existing short term parking area. This will also provide opportunity for

additional covered queuing and waiting areas as well as additional planting and local and cultural displays. Some additional concessions may be provided as well. Additional public long term parking will be provided east (mauka) of the entry loop road.

Individual improvements can be implemented in a phased manner according to priorities and budget availability. If there is sufficient budget and demand, a new Customs and Border Protection (CBP) facility can be developed to replace the existing prefabricated international arrivals facility. Initially, passengers would deplane to the apron and walk to the new facility as they do today. International aircraft parking would be coordinated with interisland aircraft parking so as to maximize the latter while not compromising the required security separation of the former.

The initial phase of the CBP would include a new immigration hall, a new baggage claim area which may be used for domestic bag claim when not needed for international passengers, and customs offices and inspection facilities in remodeled and expanded existing airport management offices. These replacement facilities can be built without interrupting use of the existing clearance facilities. The existing greeters area, bus parking, and other facilities will continue to serve the new CBP facility.

Long Range (LR-1):

The Alternative 1 Long Range expansion builds upon the terminal framework created in the intermediate phase. If warranted due to unacceptable delays of departing aircraft pushback due to Group V aircraft on Taxiway A, the apron could be expanded to the west (makai) and the taxiway rerouted between Taxiway "G" and the ARFF Service Road as noted above. This taxiway alignment was depicted on Airfield Alternative 2 (**Exhibit 4E**).

The second level concourse would be extended to the north to provide for holdroom for one additional widebody aircraft. An elevated and enclosed secure corridor would extend to the CBP facility with a ramp to grade connecting to the Immigration Area for arriving international passengers. Views from the corridor to the ocean and the mountains would introduce passengers to the beauty of Hawaii. Access to ground-loaded interisland aircraft would be under this raised corridor. If not provided as part of the Intermediate expansion phase, the Customs and Border Protection facilities (described earlier in the Intermediate phase) would be developed at this time. If already in place, the CBP would be expanded as needed to respond to international arriving passenger demand. A second large capacity claim device would be added, as before, with the ability to be cross-utilized for domestic passengers when not needed for secure international bag claim. The claim device provided earlier in the Intermediate phase would become exclusively for domestic passengers.

An additional large capacity claim device would also be provided adjacent to the south claim area. The passenger

screening checkpoint can be expanded to six lanes as required to meet demand. It is not anticipated that additional ticketing will be required due to further enhancements to the common use system and improvements to passenger self check-in.

The entrance roadway from Queen Ka'ahumanu Highway may be relocated to the north to the general location of the existing Road "P." This alignment would extend to the terminal area providing an extended curb frontage at the CBP area. The recirculation road would be relocated to existing Pao'o Street (Road "N"). Long term parking would be further expanded in the area adjacent to the petroglyphs with an open park setting from the terminal to the rental car area further enhancing this cultural heritage site. The existing rental car area will be expanded to the north with access and egress from the new airport entrance road at Road "L."

Alternative 2 (Exhibit 4J)

Intermediate (INT-2)

Alternative 2 creates a new terminal facility to the north of existing terminal. The new terminal would include facilities to process international arriving passengers as well as arriving and departing overseas mainland passengers. Customs and Border Protection facilities must be continuously available to process arriving international passengers. This can be achieved by phasing the construction of the new terminal such that the new CBP facilities are constructed first, the existing CBP demolished, then the remainder of the new terminal constructed on its site. The existing terminal would be used for interisland flights and receive upgrades appropriate to meet the needs of this aviation sector.

In order to locate the new terminal close to the existing facilities and avoid extensive construction in the existing lava field to the north, it may be appropriate to first construct the CBP facilities as shown in Alternative 1, using the existing DOT-A office buildings, demolish the temporary CBP structure, and build the initial phase of the new north terminal immediately north of the DOT-A / CBP facility. When the new north terminal CBP functions are in place and operational, the existing facilities can be removed and the terminal completed on that site.

The concept organizes the new terminal with departures processing, passenger and bag security screening, baggage make-up, domestic and international bag claim, and Customs clearance facilities on the ground level with international arrivals immigration processing on the third level above the concourse and passenger support facilities at the second level. The holdrooms on the concourse would be at the second level as would concessions, restrooms, airline club rooms, and other passenger amenities. The concourse would provide loading bridges for four aircraft positions. By locating the new terminal close to the existing terminal, there would be apron available for ground-loading/deplaning of flights that arrive

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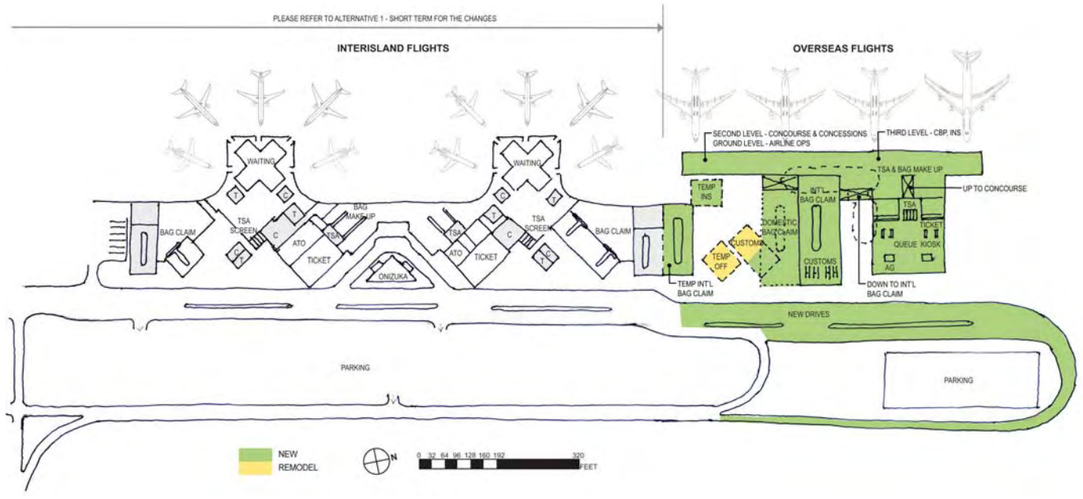
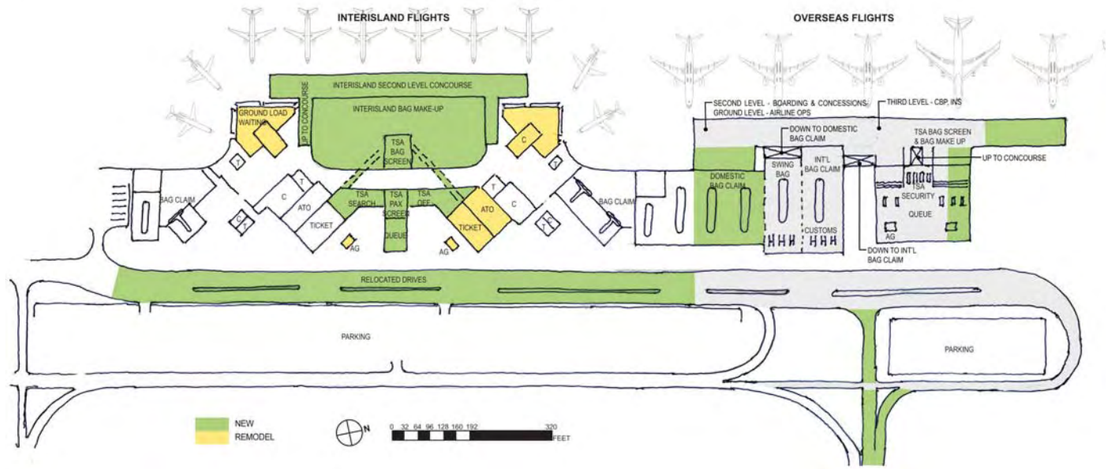
ALTERNATIVE 2 - INTERMEDIATE TERM



ALTERNATIVE 2 - LONG RANGE



off-schedule should no second level gate be available.

International arriving passengers would proceed from the aircraft up across the sterile concourse to the immigration processing areas at the third level, then down to ground level for bag claim, customs clearance, and exit. Arriving domestic passengers would proceed down the concourse to a separate escalator/elevator/stair to domestic bag claim at ground level. The international claim device would be used for domestic claim when not in use for international passengers.

With the relocation of all overseas passengers to the new terminal, the existing terminal facilities would be more than adequate to serve the inter-island passengers through the full planning period. Baggage screening would be located in the existing bag make-up areas, and passenger screening would remain in its current location. There may be a need for additional bag claim facilities both north and south due to the existing congestion in these areas and the length of time required to design and build the new north terminal. Ground loading of aircraft would continue. Restrooms would be upgraded and concession and display areas would be expanded somewhat. The Onizuka Memorial Space Center would not need to be relocated. Maximum use would be made of the existing facilities with improvements to the structures and systems to respond to preventive maintenance and code requirements.

The terminal loop drive would be extended to the north to provide curb frontage for the new terminal, and public parking would be provided within the loop.

The northern portion of the new terminal site and aircraft apron is currently an undeveloped lava field. Extensive site development and new infrastructure to serve the terminal will be required. Views to the ocean and the mountains will be provided from the second level of the terminal, as well as development of planting and other amenities at grade. There would be the potential for natural ventilation in the concourse, as well as in the new terminal. Air-conditioning as a backup option during certain times would be an option for further study.

Long Range (LR-2):

The long range expansion of the new north terminal would include those areas required to meet the demand levels. CBP functions would only require significant expansion if a second international flight were to arrive at approximately the same time as the current flight. Departures processing is not anticipated to require significant expansion due to further enhancements to the common use systems and self check-in. Baggage security screening and baggage make-up will require significant expansion as will domestic bag claim.

The facility requirements forecast a need for five second level gates for the long range planning horizon. Should a sixth plane position be required, it would be added on the south end of the concourse as the existing CBP facilities will have been removed. This

will also avoid further incursion into the lava field to the north.

The existing terminal facilities may be upgraded if there is sufficient budget so as to provide second level boarding with loading bridges, a centralized bag screening and makeup area, and a single passenger screening and queuing area after the Onizuka Memorial Space Center is relocated away from the terminal area.

Road access to the terminal area in the long range may be relocated to the north at the Queen K Highway to approximately the existing service Road P. It would extend west directly to the terminal area turning to the north at Pao'o Street and looping to align with the existing terminal curb. The extension to the north will be sufficient to provide adequate curb frontage for the new terminal. Additional short and long term parking would be provided within the new loop drive, having to be developed upon the existing lava field. Rental car areas can be extended to the north from their current location with access and egress provided to the new airport road at Road L.

Alternative 3 (Exhibit 4K)

Intermediate (INT-3):

Alternative 3 is similar to Alternative 2 except that the new terminal is developed immediately south of the existing terminal area. This location requires the relocation of the ATCT, the ARFF facility and the general aviation aircraft parking and tie-down areas. The ATCT is already planned for relocation, and there are alternatives for relocating the other uses if necessary. The new south terminal and its CBP facilities can be built adjacent to the existing terminal area while the existing CBP facility continues in operation.

The site has already been developed for its current uses; thus, a certain amount of infrastructure is already in place compared to the north terminal development in Alternative 2. To limit the difference in size and scale between the new terminal and the existing structures, the new terminal will be largely on grade with only the second level concourse and its support functions of concessions, restrooms, airline clubs, and other passenger amenities at the second level. Views of the airfield and the ocean would be provided, as would views to the mountains on the east. Natural ventilation may be able to be used in the concourse as well as the rest of the new terminal while air conditioning may be provided as a backup system, but this issue will require further analysis. The need to build gates beyond the forecast demand can be eliminated by cross-utilizing interisland apron area and ground boarding aircraft when there is a need for an additional gate due to flight delays or other circumstances.

As with Alternative 2, the existing terminal facilities will continue to be used for ground-loaded interisland flights. The baggage security screening would be located in the existing make-up areas. The two passenger screening areas would be maintained,

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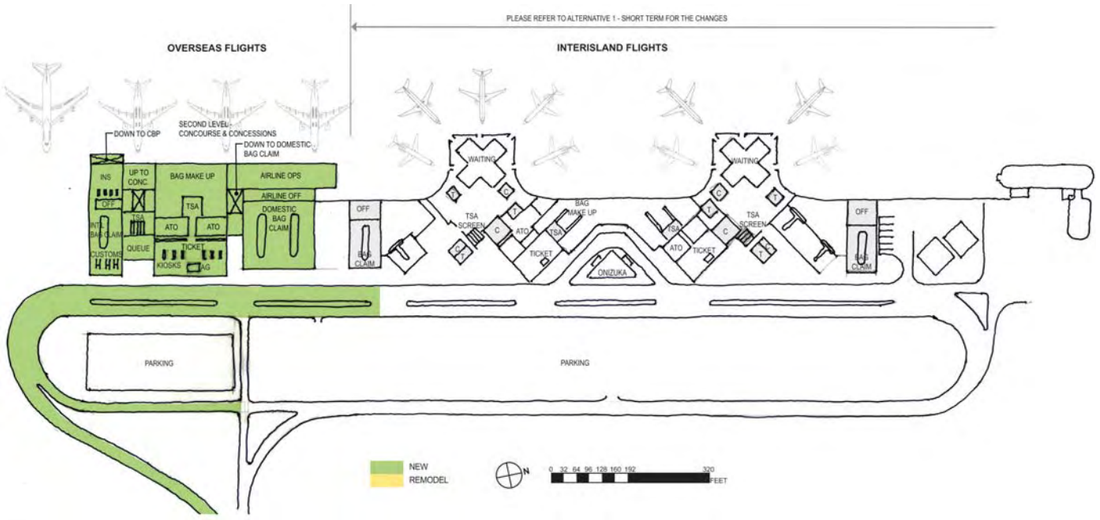
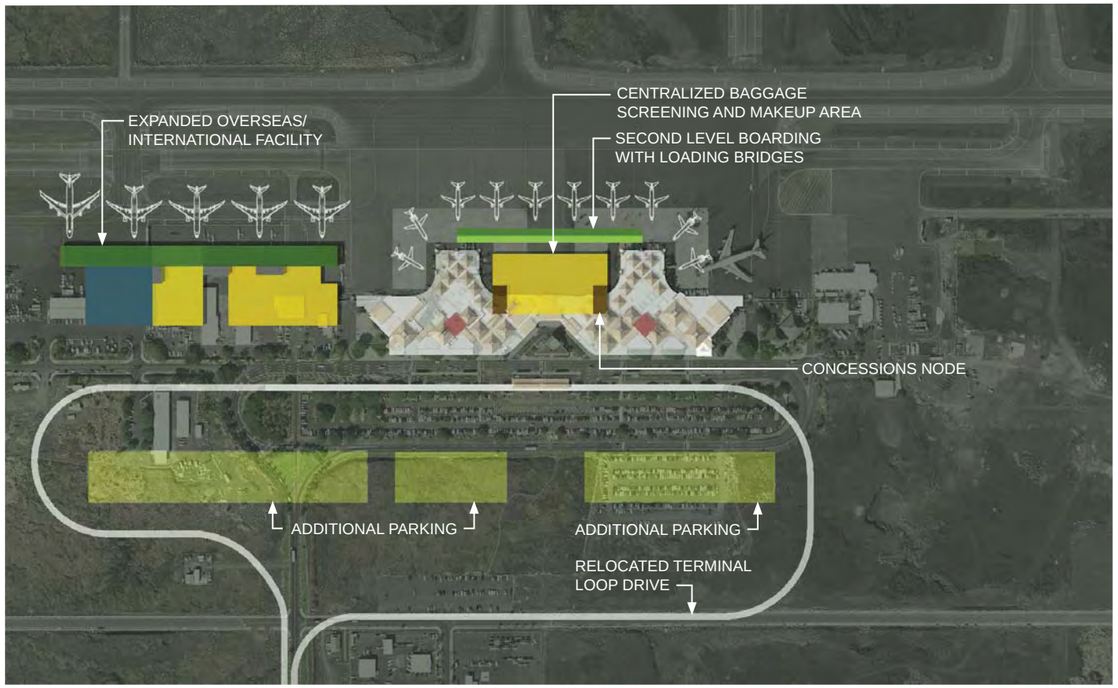
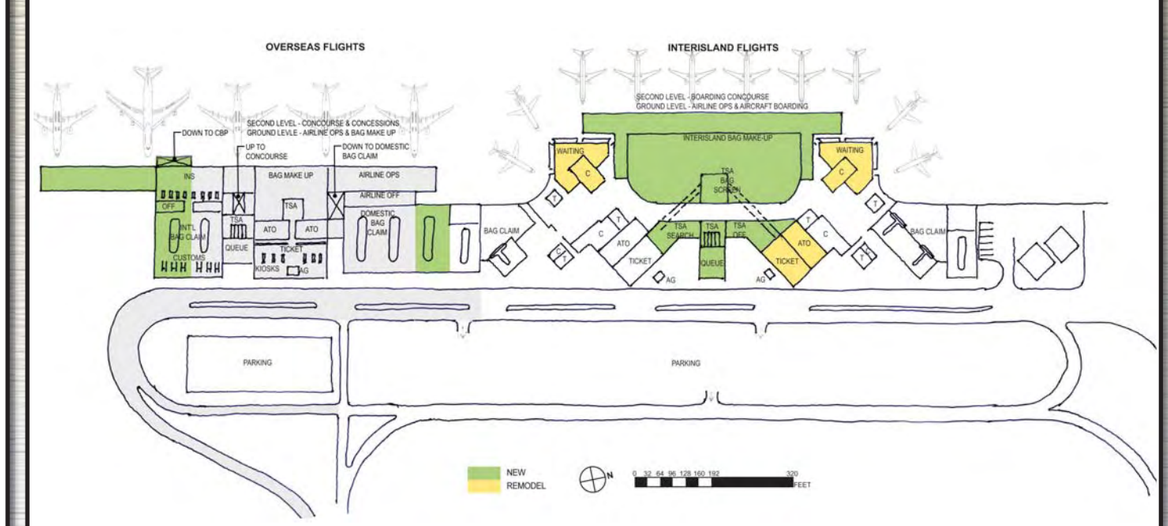
ALTERNATIVE 3 - INTERMEDIATE TERM



ALTERNATIVE 3 - LONG RANGE





and the relocation of the Onizuka Memorial Space Center could be delayed until the long range planning horizon, if necessary.

If required, an additional bag claim device would be added adjacent to the existing bag claim area on the north and south. This may be required in the interim due to current demand and the length of time it will take to design and build the new terminal. If a new bag claim device is required in the short term for the existing south terminal, it may be incorporated into the new terminal when it is built. Unlike the new north terminal which would have the capability of shared bag claim between international and domestic operations, the new south terminal would require two separate claim areas. The existing terminal structures and systems would be upgraded to meet current codes and preventive maintenance. Some additional concessions, improved restrooms, and other passenger amenities would be provided.

The existing terminal curb will be extended to the south to serve the new terminal to about existing O'opu Street. The loop road back to the entrance road will require the relocation of the airport maintenance facilities but would not affect the existing FAA RTR facility.

Long Range (LR-3):

In the long range, the second level concourse of the new south terminal would be extended to the north to provide one additional gate for overseas flights. Baggage claim, baggage security screening, and baggage make-up areas would require expansion, as would passenger security screening. Expansion of the passenger processing is not anticipated to be needed due to improvements in common use functions and self check-in.

If there is sufficient budget available, the existing terminal facilities may be expanded to include second level boarding, improved concessions and passenger amenities, a central passenger security screening location, and centralized baggage screening and make-up once the Onizuka Memorial Space Center is relocated away from the terminal area.

As with each of the other alternatives, the airport entrance and egress location may be moved north on Queen Ka'ahumanu Highway providing a new entrance at approximately Road P directly to the terminal area. Recirculation and exiting traffic would use Pao'o Street to return to the new entry road. Substantial additional short and long range parking would be required within the loop roadway proximate to the new south terminal.

Long Range Flexibility

It should be noted that Alternative 1 can be developed through the intermediate development phase and still allow the development of any of the three long range alternatives without altering any of the investment made to that point in the terminal, apron, roadways, or parking.

AIR CARGO DEVELOPMENT ALTERNATIVES

Currently, air cargo operations are conducted from two different locations on the airport. The cargo area to the south of the terminal includes an apron and two cargo buildings. This is used primarily by Aloha airlines for its five daily cargo flights with B-737 aircraft. There is not adequate space in the cargo area to handle the daily UPS B-747 aircraft. That aircraft is currently handled on the ramp immediately east of the International Arrivals facility.

To accommodate all of the cargo activity in the current cargo area would require redevelopment of the current facility. Alternative 1 on **Exhibit 4L** depicts a layout for the area that could accommodate the forecasts air cargo needs at the current location. As proposed in this alternative, the current air cargo buildings would be replaced mauka (east) of their present location to provide the apron depth necessary to accommodate larger aircraft. The ramp would also need to be expanded south to provide for adequate parking positions for the long term planning horizon. This would displace the commuter terminal ad adjacent facilities.

U'u Street would need to be abandoned at the cargo area as well with access developed off Pao'o Street. The new access would feed into a larger landside area developed to include loading docks and vehicle parking.

The United States Postal Service (USPS) has maintained rights to a leasehold area on the airport to service as a regional distribution center. To date they have not developed any facilities on the airport. While the USPS does not require direct airfield access, proximity to aircraft carrying mail under contract would be advantageous. Their original site was located makai (west) of Pao'o Street, north of the passenger terminal. When obtained several years ago, most mail was transported by the passenger airlines. Today, most mail is handled by contract carrier. The current carrier is FedEx which subcontracts with Aloha Airlines for interisland mail to and from KOA. In addition, the original leasehold is expected to be within the area needed for long term terminal development.

Thus, a location closer to the air cargo facilities is now more desirable. **Cargo Alternative 1** depicts a location that has been considered for a USPS facility to replace the present leasehold. This location (Post Office Site Alternative 2) is mauka (east) of Pao'o Street near the proposed Road M serving the southern general aviation facilities. As discussed earlier, the location is also a potential heliport site.

While it appears that the site could be redeveloped to accommodate the needs for the planning horizon, air cargo is very dynamic and perhaps has the greatest potential to exceed the forecasts. As is evidenced by the exhibit, the site is very constrained for further cargo development. Expansion into the terminal or general aviation areas would be necessary for further growth. As a result, an undeveloped area along

06MP06-4L-11/20/07

ALTERNATIVE 1

#2

Pao'o St. (Road N)

#8

Kupipi St.

Road M

U'u St.

PASSENGER TERMINAL

AIR CARGO

GENERAL AVIATION

ALTERNATIVE 2

#1

AIR CARGO

#10

PASSENGER TERMINAL

LEGEND

- Airport Property Line
- Ultimate Road/Parking
- Ultimate Airfield Pavement
- Ultimate Building
- Airport Traffic Control Tower (ATCT) Site Alternatives
- Post Office Site Alternatives
- Passenger Terminal
- General Aviation

ALTERNATIVE 3

#1

AIR CARGO

#10

PASSENGER TERMINAL

NORTH

0 800

SCALE IN FEET

ALTERNATIVE 4

#1

AIR CARGO

#10

PASSENGER TERMINAL

STATE OF HAWAII 1959

AIR CARGO ALTERNATIVES

Exhibit 4L

the flightline north of the terminal area was examined as an alternative.

Cargo Alternative 2 on **Exhibit 4L** depicts the similar layout on the north site. The location is north of ATCT Site #10, so it would not impede future terminal development to the north. It has ready access to the airfield, as well as landside access and utilities from Road N.

This cargo area could be developed beyond the planning horizon activity levels by continuing the linear pattern to the north.

While the general topography of the airport slopes towards the ocean, on the north cargo alternative site, elevations range from 50 feet above mean sea level (MSL) on the south side to as much as 80 feet in the northwest corner near the wastewater treatment facility. The southern half of the site would require much less grading than the northern half of the site for Cargo Alternative 2 due to the layout of the ramp.

Cargo Alternative 3 organizes the cargo area into a "pod" with the cargo buildings perpendicular to the airfield and on both sides of a cargo ramp that extends deeper into the site. Under this alternative, the southern half of the pod could be developed in stages to meet the needs of the planning horizon, while taking the best advantage of the site topography. The northern half would provide expansion flexibility beyond the long term horizon activity level.

The two previous concepts maintain a single, continuous ramp that requires a large graded area with minimum slope. **Cargo Alternative 4** maintains the perpendicular concept of the previous alternative, but places the cargo building and landside docks and parking in a center core with separate ramps both north and south of the core. This provides some flexibility for reducing the grading requirements for the site. The south ramp could be at a lower grade than the north ramp.

Each of the north cargo alternatives indicates the location of a USPS site mauka (east) Pao'o street. Trucks could have easy accessibility from the cargo area. In fact, trailers could be transferred directly from the ramp to the USPS facility via the service road.

GENERAL AVIATION DEVELOPMENT ALTERNATIVES

Since the last master plan, general aviation has been focused on the south side of the airport. In fact, several grading and ramp improvements have been undertaken to establish this area for future general aviation development. A series of development alternatives have been formulated for the general aviation area on the south side of the airport. Each of the four alternatives presented have the following in common:

- All are designed to accommodate at least the general aviation facility requirements as outlined in **Chapter Three – Facility Requirements**.

- Each assumes that the existing general aviation T-hangars would eventually either be relocated or replaced by new hangars farther south in the expanded general aviation area.

- The two taxilane stubs (K and L) located in the south general aviation area can be extended to the mauka (east) from their current terminus at U'u Street.

- The future core of the general aviation area can be made accessible from Pao'o Street (Road N) by a connector road (Road M).

- Road M subdivides the developable area mauka (east) of U'u Street into two areas described here as "mauka north" and "mauka south."

- The south end of the general aviation area can be made accessible from the landside by an extension of Pao'o Street (Road N) and a connector road to the makai (west) from Road N.

- Heliport facilities will be planned in one of the two areas (makai and mauka of Road N) depicted on the alternative exhibits.

During the preparation of the master plan, the Hawaii DOT-A has been in the process of requesting proposals for development of a 10-acre parcel at the south end of the general aviation area. The parcel is outlined on each alternative exhibit. The alternatives included in this master plan provide examples of the types of general aviation facilities that can readily be developed within the proposed 10-acre parcel, but are not meant to restrict or limit the general aviation development opportunities and options for the parcel.

GENERAL AVIATION ALTERNATIVE 1

General Aviation Alternative 1, as depicted on **Exhibit 4M**, would establish two FBO sites in the center core at the end of the new Road M. Expansion of the flight line apron would be reserved south of Taxilane K to front the 10-acre parcel.

This alternative assumes that the current air cargo facilities would be relocated to another area of the flight line, opening up the ramp and adjacent flight line for general aviation uses. This would include a new commuter terminal in the location of the current south cargo building. The north cargo building would be subdivided or replaced with a multi-tenant facility to house specialty operators. Locating the heliport facilities directly to the east of this area would provide for a common use parking lot for the various tour operators. It should be noted, however, that this heliport location is closer than the 2,500-foot separation from the runway desired to accommodate helicopter operations independent from the runway.

The existing commuter terminal area would be subdivided into several smaller lease parcels that could accommodate buildings for various specialty operators. Farther north, the existing T-hangars would be relocated and replaced with a wash rack. The

06MP06-4M-11/19/07

Pao'o St. - Road N

CONVENTIONAL HANGAR

AIRPORT MAINTENANCE EXPANSION

HELICOPTER TERMINAL

T-HANGARS

Road M

CONVENTIONAL HANGARS

U'u Street

WASH RACK

ARFF

PARKING

SPECIALTY OPERATORS

COMMUTER TERMINAL

FBO

FUEL STORAGE

FBO

APRON EXPANSION

Taxilane K

Taxilane L

Taxiway A

LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- Ultimate Building
- Ultimate Road/Parking
- Building to be Removed
- Lease Parcels
- 10 Acre Lease Site
- Touchdown & Liftoff Area (TLOF)
- Final Approach & Takeoff Area (FATO)
- Helipad Safety Area
- Protection Zone

NORTH

0 300 600

SCALE IN FEET

GENERAL AVIATION LANDSIDE ALTERNATIVE 1

Exhibit 4M

wash rack area would be designed to not only be used to wash aircraft, but also ground service equipment (GSE) and airport maintenance equipment.

The mauka north area would be reserved for T-hangar development. The mauka south area would be reserved primarily for large parcel development intended for large conventional and corporate hangars.

GENERAL AVIATION ALTERNATIVE 2

The remaining three alternatives focus new general aviation development from the current terminal area south. All still assume that the existing T-hangars would be relocated or replaced to the south. Redevelopment north of the current commuter terminal would be dependent upon future air cargo and passenger terminal alternatives in this area.

Alternative 2 (**Exhibit 4N**) would develop a new commuter terminal immediately south of the existing terminal. The terminal would be placed in the corner with ramp access to the south as well as the current ramp. This would minimize disruption to current operations while the new terminal was constructed.

One FBO site would be developed in the core area at the end of Road M. The second site would be converted to apron expansion with a location for a wash rack also designated in this area. The flight line apron would be expanded to the south of Taxilane L with two development parcels fronting it. These parcels could be developed for either FBOs or large corporate aircraft storage hangars.

Like in Alternative 1, the mauka north area is planned primarily for small general aviation aircraft storage, just not all in T-hangars. While half of the area is planned for the standard T-hangars, the other half is planned for executive hangars of 5,000 square feet or less.

Also like Alternative 1, the mauka south area is planned for large corporate parcels designed primarily for corporate aircraft users. A "hammerhead" taxilane at the end of Taxilane L would subdivide and provide access to several parcels ranging from one to two acres in size.

The helipads and helicopter parking would be developed mauka (east) of Pao'o Street. This would provide the 2,500-foot separation desired for operations independent from the runway. This layout is similar to that proposed in the previous master plan. Parcels are provided adjacent to the helipads for lease by helicopter operators on the airport.

GENERAL AVIATION ALTERNATIVE 3

General Aviation Alternative 3, as presented on **Exhibit 4P,** would redevelop an expanded commuter terminal in its current location. It would also maintain the two FBO locations within the core at the end of new Road M. As with the other alternatives, the flightline apron would expand to the

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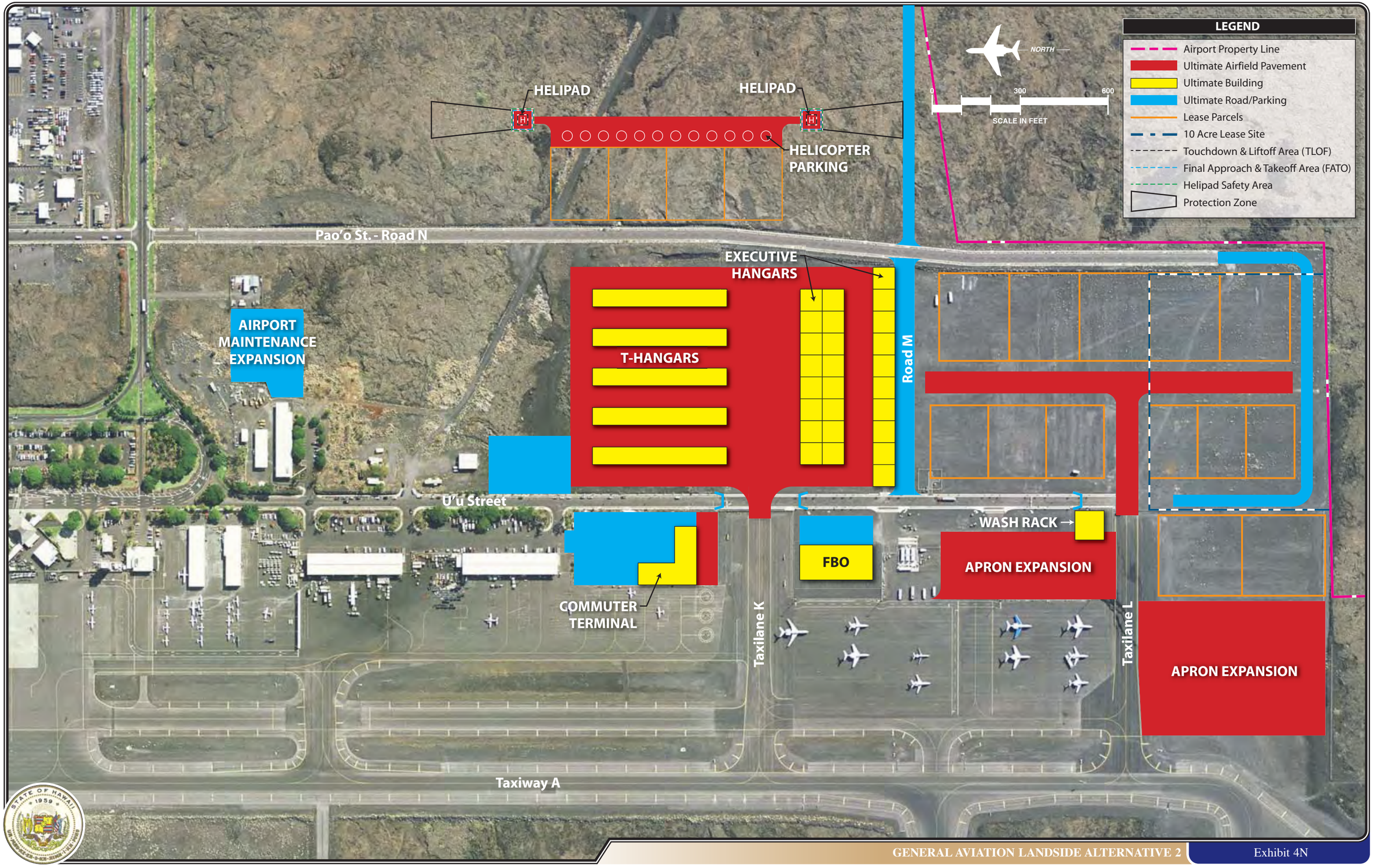

06MP06-4P-11/19/07

LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- Ultimate Building
- Ultimate Road/Parking
- Lease Parcels
- 10 Acre Lease Site
- Touchdown & Liftoff Area (TLOF)
- Final Approach & Takeoff Area (FATO)
- Helipad Safety Area
- Protection Zone

NORTH

0 300 600

SCALE IN FEET

CONVENTIONAL HANGARS

CONVENTIONAL HANGARS

HELICOPTER TERMINAL

Pao'o St. - Road N

EXECUTIVE BOX HANGARS

Road M

T-HANGARS

CONVENTIONAL HANGARS

RELOCATED AIRPORT MAINTENANCE

Street

WASH RACK

FBO

FBO

FUEL STORAGE

COMMUTER TERMINAL

Taxilane K

Taxilane L

APRON EXPANSION

ALTERNATIVE 3 TERMINAL PLAN

STATE OF HAWAII 1959

GENERAL AVIATION LANDSIDE ALTERNATIVE 3

Exhibit 4P

south, but the wash rack would be located in the southeast corner of the apron.

The mauka areas would develop with basic hangar storage on either side of Road M and larger parcel development on the north and south ends. The mauka north area would have T-hangars adjacent to Road M with the corporate parcels on the opposite side of the extended Taxilane K. The mauka south area would have conventional hangars (up to 10,000 square feet) as well as executive box hangars. The 10-acre parcel could be subdivided for several corporate-type users with landside access extended around the south side.

As with the previous alternative, the heliport would be developed mauka (east) of Pao'o Street. The layout shown is a variation with staggered helipads and four rows of parking for up to 12 helicopters. In addition, a helicopter terminal and conventional hangar pads are provided around three sides of the parking stands.

The exhibit also shows this alternative could be developed in concert with Terminal Alternative 3. For the terminal to develop southward, the T-hangars and general aviation parking apron would first need to be relocated into the expanded general aviation area. Air cargo would then need to be relocated to the north side of the airfield as presented in three of the four air cargo alternatives. This would open up space for the airport maintenance facilities to be relocated and provide separation between the general aviation area and passenger terminal complex.

GENERAL AVIATION ALTERNATIVE 4

The last general alternative is shown on **Exhibit 4Q** and locates an expanded commuter alternative adjacent to U'u Street to allow an expansion of the ramp in front the terminal. Parking for the terminal would be relocated and expanded mauka (east) of U'u Street.

The helicopter facilities are depicted makai (west) of Pao'o Street, again allowing for some cross-utilization of landside access and parking with the commuter terminal. As with Alternative 1, however, independent operation may be sacrificed with the location because the separation from the runway is less than 2,500 feet.

Only one FBO would be located in the center core off Road M with a second FBO located at the southeast corner of the expanded flightline ramp. This would allow additional ramp development and a wash rack in the core area.

This alternative would locate the larger three-to-five acre development parcels in the mauka north area off an extended Taxilane K. The mauka south area would include the T-hangar development next to Road M and conventional hangar development area within the 10-acre parcel.

ACCESS AND LAND USE

After the major functional elements intrinsic to the airport are accommodated, other areas can be considered

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Pao'o St. - Road N

HELICOPTER PARKING

AIRPORT MAINTENANCE EXPANSION

CONVENTIONAL HANGARS

U'u Street

COMMUTER TERMINAL

Road M

T-HANGARS

CONVENTIONAL HANGARS

FBO

WASH RACK

FUEL STORAGE

FBO

Taxilane K

Taxilane L

Taxiway A

LEGEND

- Airport Property Line
- Ultimate Airfield Pavement
- Ultimate Building
- Ultimate Road/Parking
- Lease Parcels
- 10 Acre Lease Site
- Touchdown & Liftoff Area (TLOF)
- Final Approach & Takeoff Area (FATO)
- Helipad Safety Area
- Protection Zone

NORTH

0 300 600

SCALE IN FEET

STATE OF HAWAII 1959

GENERAL AVIATION LANDSIDE ALTERNATIVE 4

Exhibit 4Q

for uses that provide additional support to the airport function, generate revenue to help the airport maintain self-sufficiency, or promote economic development for the community. Key to the land use considerations, however, is access and circulation. This section begins with a discussion of alternatives related for off-airport access and circulation within the airport boundaries.

ACCESS AND CIRCULATION

Queen Ka'ahumanu Highway will remain the primary off-airport access. There is currently only one point of access to the airport from the highway. That is at the intersection with Keahole Street. The previous master plan proposed a second access point to the north along a new road named Road P. This has been carried forward in areawide planning to date.

Queen Ka'ahumanu Highway is planned as a limited access highway. The planned widening north from Kealakahe Parkway to the airport will restrict the number of full intersections with the highway. The Kona Community Development Plan (CDP) supports a frontage road makai of Queen Ka'ahumanu Highway from the airport south to Honokohau Harbor to consolidate access points along the highway. The frontage road is envisioned with its own 60-foot right-of-way, but it must be outside the 300-foot right-of-way of the highway. It will cross the NELHA property as well as the O'oma development south of the airport.

Original consideration was for a frontage road alignment connecting to Pao'o Street on the airport. While this would take advantage of an existing roadway on the airport, it could ultimately create larger circulation problems as airport traffic grows. As the terminal expands, the section of Pao'o Street between Road P and Keahole Road is expected to become part of the one-way terminal loop road system. Use of this street as the frontage road would add unnecessary through traffic and truck to not only the airport's primary access road, but also the terminal loop.

A better alternative would appear to be a more traditional frontage road closer to the highway, as depicted on **Exhibit 4R**. This would stay near the mauka side of the airport, but well outside of the highway right-of-way. It would also better serve access for future development opportunities along the highway.

Alternative 1 also shows the potential for two additional access points connecting to the airport. In this alternative, Keahole Street would remain as the primary access point. Other access points would be available at Road P to the north and Kaiminani Road to the south. This alternative presents the Kaiminani Road access as entirely off-airport within the NELHA property until it intersects with Pao'o Street south of proposed Road M. If desired for NELHA purposes, Road M may be extended to the south into NELHA, but not as a through frontage road.

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SECONDARY ACCESS

PRIMARY ACCESS

Kaiminani Dr.

Queen Kaahumanu Hwy.

Proposed Frontage Road

ASR 1,500'

RETAIL

Proposed Museum Site

MIXED USE/ COMMERCIAL

Flight Kitchen

INDUSTRIAL/WAREHOUSE/ AVIATION SUPPORT

Keahole St.

HOTEL/ CONFERENCE CENTER

NELHA

Halalu St.

Road P

GROUND TRANSPORTATION

Helicopter Training Pad

Shoreline Access Rd.

PUBLIC SAFETY TRAINING CAMPUS

Fuel Farm

USPS

AIRPORT RESERVE

MIXED USE/ COMMERCIAL

Pao'o St. (Road N)

Waste Water Treatment

LARGE AIRCRAFT USES

CARGO

Kupipi St.

TERMINAL

AIRPORT SUPPORT

GENERAL AVIATION

U'U Street

AIRPORT SUPPORT

Runway 17-35 11,000' x 150' (Future 12,000' x 150')

SAAF 4,250' x 90'

Initial GA Parallel Runway 4,500' x 75'

Ultimate Runway 17R-35L 11,000' x 150'

Airport Property Line

Ultimate Perimeter Service Road

NORTH

0 1200 2400

SCALE IN FEET

ACCESS/LAND USE ALTERNATIVE 1

Exhibit 4R

Road P could provide access to the cargo area and other support uses at the north end of the flight line. It is not likely that the DOT Highways Division will accept three full access points so close together. Two access points are more likely with one of them at Kaiminani Drive. Road P would provide better separation between the full intersections than Keahole Street. **Alternative 2** on **Exhibit 4S** presents this option. Keahole Street would be restricted to right-in, right-out traffic. As shown, Road P would ultimately be developed with a full interchange; the interchange would provide access not only to the terminal area, but to planned off-airport development mauka of Queen Ka'ahumanu Highway.

Road P would tie into the terminal loop at the north end of the terminal. Access to the cargo area would be developed from a Road P intersection with Halalu Street. As shown, the roadways could ultimately be grade-separated. If it is desirable for the Queen Ka'ahumanu Highway frontage road to extend to Road P in this scenario, Halalu Street might be considered for the alignment as shown on the exhibit.

In this alternative, the road extending makai from the Kaiminani intersection would run along the airport property boundary and tie directly into Road M. This would ultimately become the primary access for general aviation users. Other roadways within the property can be developed for circulation in support of the proposed land use development. The following section discusses the alternatives for land use outlined on **Exhibits 4R** and **4S**.

LAND USE CONSIDERATIONS

Flight line uses are outlined on each of the alternatives. From earlier in this chapter, general aviation will generally be along the south portion of the flight line. The airport passenger terminal is planned for the center of the airfield with air cargo to the north of it. Airport support corridors are located between the three key aviation uses to meet the needs for ATCT, ARFF, airport maintenance, etc.

The flight line north of the cargo area could be developed for large aircraft uses such as hangars for large commercial jet storage and/or maintenance. This could include not only commercial service needs, but also needs for the private corporate users of large commercial aircraft.

This leaves a large expanse of airport property for aviation-related support uses as well as for revenue support uses.

Land Use Alternative 1

Land Use Alternative 1 is based upon Keahole Street remaining as the primary access to the passenger terminal. Road P would be a secondary access for air cargo, and the Kaiminani extension would serve general aviation.

Land uses immediately mauka of the terminal loop and parking and north

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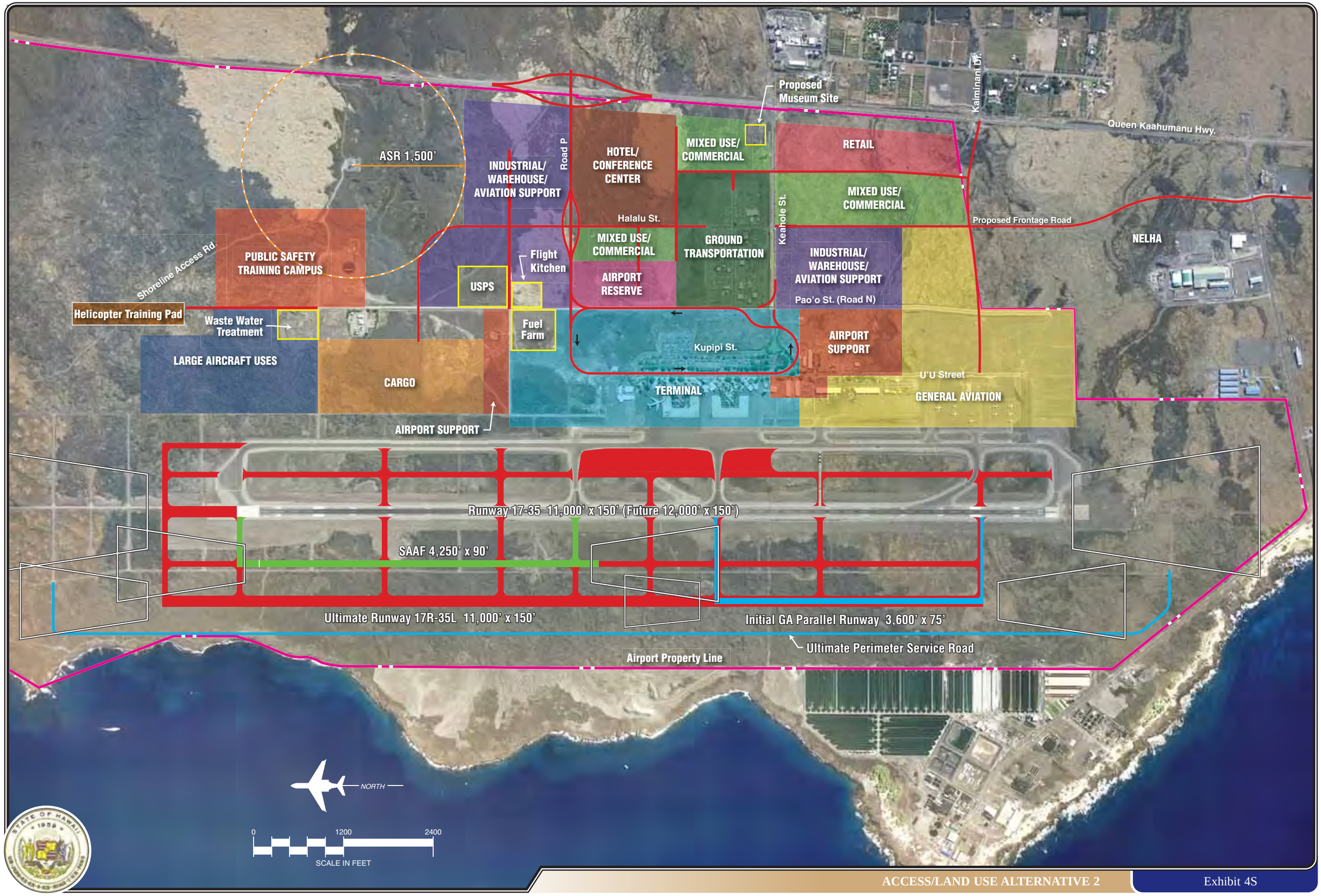

ACCESS/LAND USE ALTERNATIVE 2

Exhibit 4S

of the access road would remain primarily in ground transportation uses. A flight kitchen location is also shown in this area. Other property along the access road would be recommended for mixed use/commercial, while retail uses are planned mauka of the frontage road to take advantage of the visibility from the highway. The preferred site for the relocation of the Onizuka Space Center is shown near the airport entrance. It too would have high visibility from Queen Ka'ahumanu Highway. A location for a hotel/conference center is shown just south of Keahole Street in this alternative. The hotel/conference center would be a focal point along the airport's main entryway and would be surrounded by retail and commercial uses, as well as across the street from the transportation center and the Onizuka Museum.

A natural extension mauka of the cargo area are uses related to the support of cargo and the terminal. The USPS parcel would be highly compatible with the cargo area. This would allow access to the cargo ramp and to the terminal area via the service road makai of the USPS site. Alternative 1 also depicts a fuel farm location along Pao'o Street that could service the cargo and terminal areas.

If Road P is planned primarily for air cargo access, the area along this roadway would be planned for industrial and warehouse uses that can take advantage of the proximity to the air cargo facilities. This alignment provides greater separation from the Queen Ka'ahumanu Highway entrance to allow for the ultimate grade separations.

Another potential use that is well suited for the airport environment is a public safety training center. The primary focus of the training center would be for training the airport's emergency and security personnel. The airport is being considered as a location for a statewide ARFF training facility. This could become an anchor for the training center, which could also be expanded to include training for other island public safety and emergency preparedness agencies. A 60-acre site is depicted on **Exhibit 4R** for this use. The location encompasses the present ARFF training facility and extends northward along an extended Pao'o Street. As shown on the exhibit, the proximity of the proposed helicopter training area could allow it to be used in training programs as well.

This alternative provides room for expansion of the wastewater treatment facility to the north of the current site. The proposed road circulation system can serve as the basic grid for utility line distribution. Pao'o Street has been considered as the alignment for a potential chilled water distribution line from NELHA for energy conservation in cooling the terminal and potentially other buildings on the airport.

Land Use Alternative 2

Exhibit 4S presents a land use alternative based upon the primary airport entrance moving north to Road P. In this scenario, Keahole Street will likely become a secondary access with right-in/right-out traffic. As proposed, Halalu Street would become the primary airport frontage.

With the primary entryway moved north, the hotel/conference center use is also positioned along Road P between the Queen Ka'ahumanu Highway interchange and Halalu Street. Mixed use commercial and ground transportation uses would surround it to the south and mauka (east). Retail remains proposed along the Queen Ka'ahumanu frontage south of Keahole Street, along with mixed use commercial behind it.

As with the previous alternative, industrial/warehouse and airport support uses are recommended mauka of the cargo area north of Road P. This area would include the USPS facility and fuel farm, as shown on the exhibit. This is also an alternative location for a flight kitchen. On this alternative, additional industrial/warehouse use is shown to the south of Keahole Street between Pao'o Street and Halalu Street. This would be in the approach to the heliport.

Sixty acres at the north end of the area is also set aside for the public safety training campus. The area shows the flexibility in space design that is available to design a facility that can best serve the training needs of the airport, the island, and the state in a single, consolidated location.

Finally, an alternative site for an expanded wastewater treatment facility is depicted farther north of the current site. As with the previous alternative, the circulation system forms the grid for utility planning for the site.

CONCLUSIONS

The process used in formulating and evaluating airside and landside development alternatives involves an analysis of short and long range requirements, as well as future growth potential. Compliance with airport design standards was considered in every scenario. Safety, both air and ground, were given high priority in the analyses, as were potential effects on the environment.

Upon review of the draft working paper by the Technical Advisory Committee (TAC), a master plan concept will be recommended and refined. The resultant plan will represent an airside facility that fulfills safety and design standards and a landside complex that can be developed as demand dictates.

The updated development plan for the airport must represent a means by which the facility can be improved in a balanced manner, both airside as well as landside. In addition, it should consider flexibility to meet activity growth beyond the planning horizons.

The remaining chapters will be dedicated to refining the proposed concept into a final plan with recommendations to ensure proper implementation as a demand-based program.