Federal Aviation Administration Input for the Federal Transit Administration
Honolulu High-Capacity Transit Corridor Project
Environmental Impact Statement

Evaluation of Honolulu International Airport Rail Transit Alignment Options

Introduction

The Federal Aviation Administration (FAA) is assigned responsibilities pursuant to 49 USC 40101 et seq., for civil aviation and regulation of air commerce in the interests of aviation safety and efficiency. The FAA is a Cooperating Agency on the Honolulu High-Capacity Transit Corridor Project (HHCTP) Environmental Impact Statement (EIS), in accordance with 40 Code of Federal Regulations (CFR) Part 1501.6(a)(1), since it has special expertise and jurisdiction by law to approve proposed development at Honolulu International Airport (HNL). As a Cooperating Agency on this EIS, FAA will use the HHCTP EIS documentation to comply with its own requirements under the National Environmental Policy Act (NEPA) for federal actions. The FAA will also use the EIS to support a subsequent decision(s) and federal actions including unconditional approval of the portion of the Airport Layout Plan (ALP) depicting the proposed rail alignment at HNL and potential federal funding for the eligible portion of the proposed rail alignment.

The November 2008 HHCTP Draft EIS evaluated three fixed guideway transit alternatives. Two of the alternatives (Airport Alternative and the Airport and Salt Lake Alternative), included a rail alignment through HNL property. The Airport Alternative was selected as the preferred alternative by the Honolulu City Council, when it passed Resolution 08-261 on January 28, 2009, which identifies that planning, engineering, design, and construction should be completed for the Airport Alternative. Figure 1 shows the City and County of Honolulu's (CCH) proposed rail alignment through HNL.

The FAA and the Hawaii Department of Transportation Airports Division (HDOT-A) have examined CCH's proposed alignment to determine its effect on the safe and efficient operation of the airport. The proximity of the proposed rail alignment would result in potential impacts to Runways 4L/22R and 4R/22L, and affect the planned future air cargo expansion on the northeastern area of HNL. A proposal was made by CCH to shift Runway 4R/22L and the associated taxiway to the south, and Runway 22R be lowered to indicate use of this runway by slower aircraft in Aircraft Approach Category A and B. This proposed runway shift would result in further affects to the airport, including the need to relocate the visual and electronic navigational aids for Runway 4R/22L, and will be discussed in more detail later in this section of the EIS.

The State of Hawaii, through HDOT-A owns and operates HNL as the airport sponsor. Decisions to develop an airport are the responsibility of the local airport sponsor and not the FAA or FTA. Therefore HDOT has the ultimately responsibility to approve any proposed transit alignment through the airport. HDOT must make their decision based on an alignment that does not result in adverse impacts to safety of aircraft and airport operations. Further the proposed alignment must comply with FAA airport design standards described in FAA Advisory Circular 150/5300-13, *Airport Design*. HDOT-A

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identifies their plans for any proposed airport changes by updating an ALP. The updated ALP is submitted for a formal review by the FAA to ensure compliance with airport standards and to ensure there are no airspace conflicts. The updated ALP is shown in [Appendix *FTA to insert*] of this EIS and shows the alignment approved by HDOT-A. FAA's review and approval of HDOT-A's ALP is part of its federal oversight responsibilities and also ensures compliance with various grant-in-aid obligations held by the State of Hawaii under the Airport Improvement Program.

Figure 1 – CCH Proposed Rail Alignment at Honolulu International Airport

The following sections describe the aircraft operations at HNL, possible transit alignments through or near HNL and evaluates these alignments for potential impacts to HNL.

Description of HNL Aircraft Operations

HNL is the largest commercial service airport in the State of Hawaii and is the gateway for interisland, mainland and international flights to the state. The airport is part of the State of Hawaii Airport System and is owned and operated by the State of Hawaii. HNL also functions as a joint military-civilian airport in which Hickam Air Force Base shares airfield facilities with HNL. In 2008, HNL accommodated almost 288,000 aircraft operations. For the purposes of this EIS, FAA defines an aircraft operation as "one takeoff or one landing" by an aircraft.

HNL has four active paved runways for land based aircraft operations and two sealanes for seaplane operations. FAA's Air Traffic Control operates the runways at HNL as a system that is interdependent to fulfill its statutory mission to ensure the safe and efficient use of navigable airspace. Runways at airports are designated using magnetic directional headings to the nearest 10 degree increments. Thus a north/south oriented runway having a magnetic headings of 180 degrees (for operations to the south) and 360 degrees (for operations to the north). The zero is not used when marking runways. Therefore runway

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designations in the United States use a single or two digit numbering system. At HNL, Runway 8L/26R is an east/west runway that is 12,300 feet long and 150-feet wide. This runway is the primary runway for daytime arrivals. This runway is equipped with electronic and visual navigational aids to assist pilots arriving into HNL during low visibility conditions. Runway 8R/26L (also known as the Reef Runway) is 12,000 feet long and 200 feet wide and is used mainly for aircraft departures.

HNL also has two parallel crosswind runways oriented in a northeast/southwest configuration. Runway 4R/22L is 9,000 feet long and 150 feet wide. This runway is equipped with an instrument landing system providing pilots with both vertical and horizontal guidance on approach during low visibility conditions. Runway 4R/22L is used primarily for arrivals during the night time hours (7 p.m. to 7 a.m.) as a noise abatement measure to reduce adverse noise impacts to the populated areas around HNL. This runway is also used for aircraft departures during Kona wind conditions. Parallel Runway 4L/22R is 6,700 feet long by 150 feet wide and is used primarily by general aviation aircraft (aircraft other than scheduled commercial air carriers and the military).

Sealane 8W/26W is 5,000 feet long by 300-feet wide. Sealane 4W/22W 3,000 feet long by 150 feet wide. Neither of the Sealanes have any electronic instrumentation for use by seaplanes. All approaches must be made using visual cues. Figure 2 is an airport diagram of HNL and shows the runway configuration at the airport.

The FAA provides Air Traffic Control services to pilots of aircraft through a variety of air traffic control facilities throughout the United States. At the airport, FAA provides these services through its Airport Traffic Control Tower (ATCT). After aircraft have departed the airport, FAA helps pilots maintain adequate separation both vertically and horizontally from its Terminal Radar Control (TRACON) facility. Once an aircraft has passed through the airspace controlled by the TRACON, the Air Route Traffic Control Center provides air traffic control services.

At HNL, the airport is used in various runway configurations so that aircraft can operate safely by taking off and landing into the wind as much as possible.

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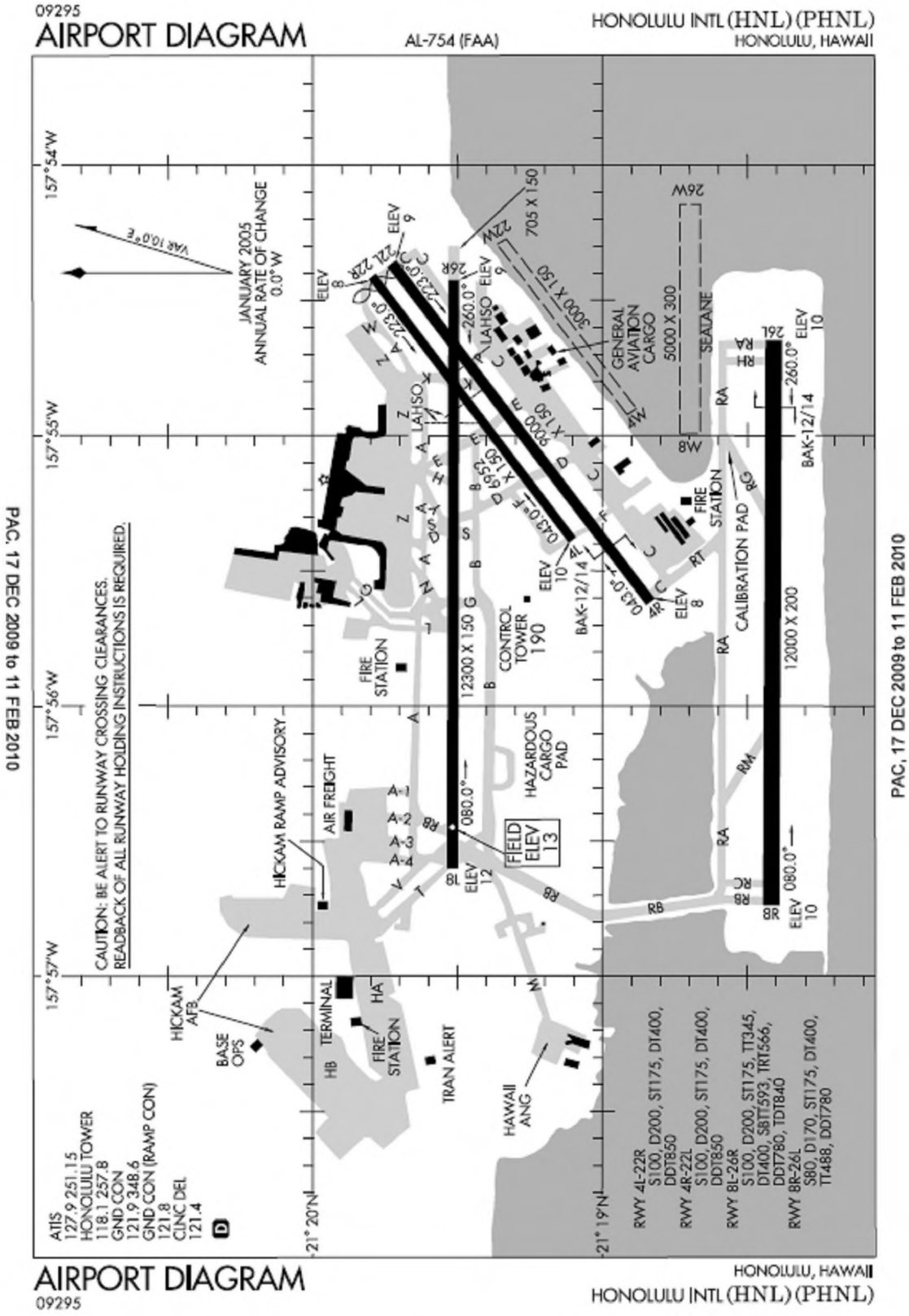

Figure 2, HNL Airport Diagram

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HNL Aircraft Departures - Trade Wind Conditions. Under typical trade wind conditions, with winds from the northeast, the airport is configured in a west to east flow. HDOT's November 2004 Noise Exposure Map document reports the trade wind configuration is used about 89 percent of the time. Large Jet or propeller driven aircraft use Runways 8L and 8R departing to the east. Upon departing the runway, the aircraft turn right to remain offshore of Downtown Honolulu, than will either turn right to westward destinations or continue east to eastward destinations.

Also, during trade wind conditions, small aircraft will depart from Runways 4R and 4L to the north east. After they pass the end of the runway, pilots flying west of the airport will turn left and travel west along a route north of Pearl Harbor. Aircraft bound for the eastern part of the island or to the other islands east of Oahu will travel east above the H-1 freeway.

HNL Aircraft Arrivals. During trade wind conditions, arriving jet or large propeller driven aircraft will arrive at HNL using Runway 8L during the day and Runway 4R during the evening and night hours.

In an effort to reduce adverse noise impacts on noise sensitive land uses, westbound aircraft (coming from origination points to the east, such as the continental United States) enter HNL airspace from the northeast and pass over the Koolaus east of Manoa Valley. Once over the south shore of Oahu, the aircraft turns right and remains about a mile off-shore traveling parallel to the shore, until turning right to a final straight-in leg to Runway 8L. The right turn is generally initiated west of Kalaeloa Airport (formerly Naval Air Station Barbers Point).

Interisland jet aircraft from the east typically will remain off-shore of Waikiki and turn right to a final approach to Runway 8L through the Pearl Harbor Channel. During the evening or at night, these aircraft fly further offshore, and then turn right to a final straight-in approach to Runway 4R or 4L. Eastbound aircraft would perform a straight-in approach to Runway 8L or remain offshore until turning left into Runway 4R or 4L. Small aircraft arriving from the east following the H-1 Freeway alignment and make several left turns to land onto Runway 4R or 4L. Small aircraft from the west usually fly north of Pearl Harbor, typically along Kamehameha Highway and perform a series of turns to land on Runway 4R or 4L.

Aircraft Departures - Kona Wind Conditions. The November 2004 HDOT Noise Exposure Map document reports Kona wind configurations are used about 11 percent of the time. During Kona Wind flow (east to west) the large and heavy aircraft depart to the west using Runways 26R and 26L, and to the southwest using Runway 22L. Small aircraft use either Runway 22R or 22L will make a right turn and similarly fly north of Pearl Harbor or over the H-1 freeway if traveling in a eastward direction.

Aircraft Arrivals - Kona Wind Conditions. Arrivals for large and heavy jet aircraft is constrained to one queue for Runways 26L and 26R, to minimize the aircraft noise impacts from over flights of Downtown Honolulu and navigational obstructions east of

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HNL. Aircraft arriving at HNL during Kona wind conditions will remain offshore of Diamond Head on a 304 degree heading based on the localizer navigational aid at the east end of Runway 8L/26R. As the aircraft approach within two to three miles of the Airport, the majority of the aircraft make a left turn to their final approach to Runway 26L. Some of the interisland aircraft make a right turn then a left turn to final approach to Runway 26R. Typically, the small and general aviation propeller aircraft approaching from the east follow the H-1 corridor and make a left turn to a final approach to Runway 22R or 22L. Propeller aircraft approaching from the west stay north of Pearl Harbor and make a right turn to a final approach to Runways 22R or 22L.

These flight routes have been established in conjunction with HDOT-A's informal preferential runway use plan at HNL to reduce aircraft noise impacts on various noise sensitive land uses on Oahu. The two major objectives of the informal preferential runway use plan are to:

- Departures: Minimize adverse noise impacts on communities east of the Airport by using the Runway 8R (Reef Runway) which allows jet aircraft departures over the ocean; and

- Arrivals: To reduce the noise impact over the Ewa Plains by shifting evening and night arrivals to Runways 4R and 4L.

HNL Daily Average Hourly Arrivals/Departures. The table below shows the current estimated average arrivals and departures at HNL by the hour of the day. During the nighttime hours shown highlighted from 7:00 p.m. to 7:00 a.m., noise abatement procedures are in place to shift arrivals from the primary daytime arrival Runway 8L onto Runway 4R. As shown below most of the flights at HNL occur during the day time hours. The majority of the flights occur between 9 a.m. and 6 p.m. local time. The peak time occurs between 11 a.m. and 2:00 p.m.

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Current Estimated Average Daily Arrivals/Departures Per Hour at HNL

TIME HST	TOTAL PER HOUR
07-0800	38.43
08-0900	40.35
09-1000	51.42
10-1100	50.90
11-1200	65.03
12-1300	46.93
13-1400	59.83
14-1500	57.77
15-1600	48.51
16-1700	47.00
17-1800	46.41
18-1900	38.25
19-2000	38.49
20-2100	29.79
21-2200	28.88
22-2300	15.49
23-0000	12.58
00-0100	5.61
01-0200	5.25
02-0300	8.06
03-0400	7.67
04-0500	8.69
05-0600	17.55
06-0700	20.77
Total	789.66

HNL Hourly Acceptance Rates. The current capacity for HNL to accommodate aircraft arrivals and departures is identified by the hourly arrival/departure acceptance rates. During the Trade Wind conditions in which Runways 4 and 8 are the primary arrival/departure runways, the maximum number of arrivals/departures that HNL can handle before flight delays are encountered is shown below. The acceptance rate is shown during Visual Meteorological Conditions (VMC), when visual landings and departures can be made, and during Instrument Meteorological Conditions (IMC), when instrument landings and departures must be made. During Kona Wind Conditions, which occurs approximately 11 percent of the time, Runways 22 and 26 are the primary arrival and departure runways. These Kona Wind conditions can last up to 5 - 7 days at a time. It is important to note that when one of the runways is closed, as shown below, the acceptance rate for aircraft arrivals and departures is even further reduced.

Since HNL has both parallel and intersecting runways, the operation of the runways is complex and interdependent. FAA's Air Traffic Controllers at the HNL ATCT manage

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use of Runways 8R and 8L, and 4R and 4L as a system to maintain safe and efficient aircraft arrivals and departures by the various types of aircraft operating at the airport. Runway 8L is a primary arrival runway because it is 12,000 feet long and has an ILS capability. It is also the closest runway to the passenger terminal building reducing aircraft taxi time, thus minimizing aircraft fuel usage and engine emissions. Runway 8R is used primarily for departures.

The following information shows the various arrival/departure acceptance rates at HNL for both VMC and IMC conditions. The IMC acceptance rate is lower due to the need to maintain increased in-trail aircraft separation distances for safety purposes due to the reduced visibility:

HNL Airport Arrival/Departure Hourly Acceptance Rates

Trade Wind Conditions

Runway 4 and 8 configuration, all runways open: VMC-60, IMC-30

Runway 4 and 8 configuration, one runway closed: VMC-45, IMC-30

Kona Wind Conditions

Runway 22 and 26, all runways open: VMC-45, IMC-30

Runway 22 and 26, one runway closed: VMC-30, IMC-15

HNL Runway Total Operations Summary. The Runway Total Operations Summary table below shows the number of flights from the Part 150 Study 2008 forecast data. The data is reasonably consistent with current operations. Although the actual number of flights at HNL has decreased due, in part, to the overall downturn in the national economy, the relative percentage for runway arrival/departure use is expected to remain the same. It is important to note the importance of Runways 8L and 4R, which are the only runways that have navigation equipment for instrument landings at HNL. Runway 8L is the primary arrival runway during the day and Runway 4R is the primary runway for arrival at night. Of the total number of arrivals at HNL, 50.9% of the arrivals occur on Runway 8L and 30.3 % of the arrivals occur on Runway 4R. The remaining arrivals are distributed on the other runways. To reduce the amount of people subject to aircraft noise at night, HDOT-A has implemented noise abatement procedure where between 7:00 p.m. to 7:00 a.m. aircraft use Runway 4R as the primary arrival runway.

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Runways Total Operations Summary								
Runway ID	Arrival Operations	Arrival Percent	Departure Operations	Departure Percent	T&G* Operations	T&G* Percent	Total Operations	Percent Of Total
04L	11,319.0	7.5%	10,908.6	7.3%	-	0.0%	22,227.7	7.4%
04R	45,477.9	30.3%	14,170.5	9.4%	-	0.0%	59,648.4	19.9%
08L	76,450.5	50.9%	57,572.9	38.3%	-	0.0%	134,023.4	44.6%
08R	1,079.7	0.7%	51,566.1	34.3%	-	0.0%	52,645.8	17.5%
22L	1,755.3	1.2%	6,705.2	4.5%	-	0.0%	8,460.6	2.8%
22R	1,634.0	1.1%	98.7	0.1%	-	0.0%	1,732.8	0.6%
26L	6,443.6	4.3%	2,943.0	2.0%	-	0.0%	9,386.6	3.1%
26R	6,129.9	4.1%	6,191.6	4.1%	-	0.0%	12,321.5	4.1%
Totals	150,290.0	100.0%	150,156.8	100.0%	-	0.0%	300,446.8	100.0%

* One Touch-and-Go = Two Operations

FAA Role in Supporting Airport Development

The federal government through the FAA provides support in developing civil airports by authorizing grants to local communities to assist in the development of airport facilities. These grants-in-aid also contain grant assurances that obligate the State of Hawaii as the airport sponsor, to operate and maintain its airport facilities safely and efficiently in accordance with specified conditions. This FAA grant funding represents an investment by the American public. The FAA does not attempt to control and direct the operation of airports. This is the responsibility of the State of Hawaii as the airport owner or sponsor. However, when the airport sponsor accepts federal funds, they also obligate themselves to ensure that the public interest is well served by the federal investment.

The State of Hawaii, as the sponsor for HNL cannot unilaterally convert airport land to non-aeronautical uses nor allow a degradation of the airport's utility based on its contractual obligations to the FAA. There are a number of grant-in-aid assurances that apply to this situation:

- Assurance 5, Rights and Powers: The sponsor will not take any action that will deprive it of its rights and powers to comply with its contractual obligations to the federal Government.

- Assurance 19, Operation and Maintenance: The sponsor will not cause or permit any activity or action on the obligated airport that would interfere with its use for airport purposes.

- Assurance 20, Hazard Removal and Mitigation: The sponsor will prevent the establishment or creation of any future airport hazard.

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- Assurance 22, Economic Nondiscrimination: The sponsor will make the airport available for all kinds and classes of aeronautical activities on reasonable terms and without unjust discrimination. The sponsor is obligated to make the airport available for aeronautical activities.

- Assurance 29, Airport Layout Plan (ALP): The sponsor will not make or permit any changes to the airport or any of its facilities that are not in conformity with the FAA-approved ALP or which might in the opinion of the FAA adversely affect the safety, utility, or efficiency of the airport.

These assurances obligate HDOT-A to ensure they do not allow uses that would result in any interference to current and future aviation uses at the airport, and that the primary use of airport property is maintained for aeronautical uses. A proposed rail alignment on the airport cannot interfere or prevent future uses of the airport for aeronautical activities. The notion of payment for the transit rail by a non-airport sponsor or repayment of grant funds back to the FAA does not eliminate the grant-in-aid obligations on the part of the airport sponsor.

The transit rail line would provide important transportation benefits for members of the public to be able to access HNL. However, an alignment through the airport must not impair the important function provided by HNL to also serve the air transportation needs of the State of Hawaii. The two modal systems; airport and rail need to complement each other and be mutually beneficial.

The EIS also needs to consider whether an alignment may impact other protected resources such as having direct or constructive use of public parks and recreational properties protected by Section 4(f) of the Department of Transportation (DOT) Act. Although a public park is located outside of airport property, an alignment through the airport that has direct or constructive use of the adjacent park would lead to a Section 4(f) impact. The EIS would need to address that there are no feasible alternatives to impacting the park and that all reasonable measures have been taken to mitigate these impacts.

Description of Alignment Options for Rail Transit at HNL

The CCH evaluated five potential alignment options for the transit rail through the HNL. These five options include the Aolele Street Option, the Ualena Street Option, the Koapaka Street Option, the Makai H-1 Option, and the H-1 Median Option. The entire route would be on an elevated platform. Four of the five airport alignment options use a common portion on HNL property near the HNL passenger terminal. The option along the H-1 median does not use airport property. The Aolele Street, Ualena Street, Koapaka Street, and Makai H-1 options would have the same entry to the airport in the northwest section of HNL and have a connecting station near the existing airport parking garage, see Figure 3. These four options have different alignments to the east of the HNL Airport Station and each of the option segments is approximately 1.6 miles in length. These alignment options are described below.

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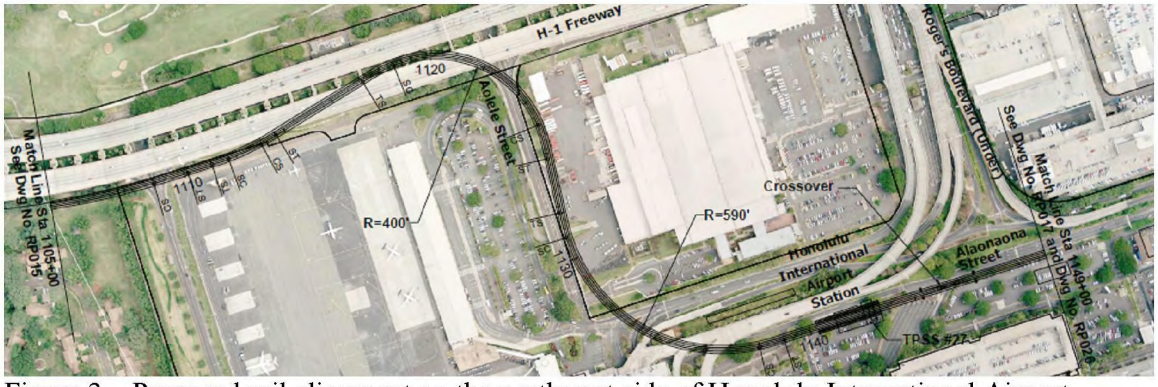

Figure 3 – Proposed rail alignment on the northwest side of Honolulu International Airport common to a four of the five optional alignments evaluated

Aolele Street Option

The Aolele Street Option is the alignment that has been proposed as the CCH preferred alignment through the eastern portion of HNL. This option has been presented as the HNL alignment in the November 2008 Draft EIS, as shown in Figure 1. The rail line would enter airport property on the northwest section of the HNL and an airport station would be located adjacent to the existing parking garage at HNL, see Figure 3. The rail alignment would continue east and cross onto Aolele Street where it would run along the Mauka side of the road, see Figure 4a. The Lagoon Drive Station has been relocated west of the previously planned site location along Aolele Street. The rail line continues along Aolele Street through HNL airport property until it reaches Lagoon Drive, see Figure 4b. After Lagoon Drive, the alignment would cross into Ke'ehi Lagoon Beach Park.

Figure 4a, Aolele Street Option

Figure 4b, Aolele Street Option, continued

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Ualena Street Option

The Ualena Street Option proceeds from the HNL parking garage area, heads eastbound and initially proceeds on Aolele Street and then transitions north toward Ualena Street, see Figure 5a. The airport boundary is on the Makai side of Ualena Street, so the transition from Aolele Street to Ualena Street would cross from airport property to off-airport property once the alignment is on Ualena Street. The alignment transition would affect land that is currently being leased at HNL. The Lagoon Drive Station would be built near Lagoon Drive. After Lagoon Drive, the alignment would go onto Waiwai Loop road, see Figure 5b. The alignment would cross and affect several businesses before reaching Ke'ehi Lagoon Beach Park. The alignment would run along the park road and then run alongside the H-1 Freeway.

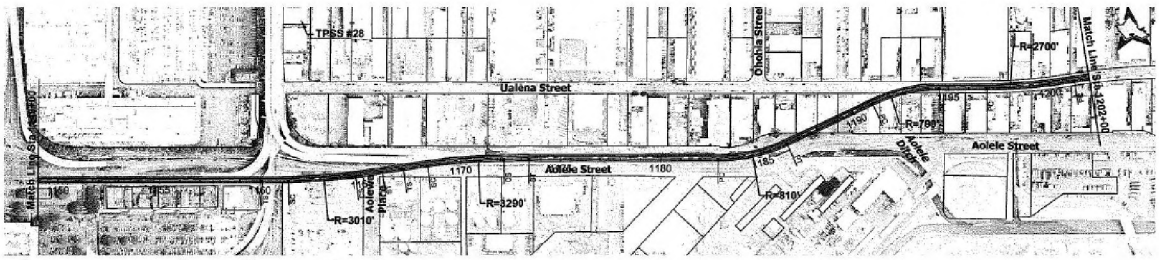

Figure 5a, Ualena Street Option

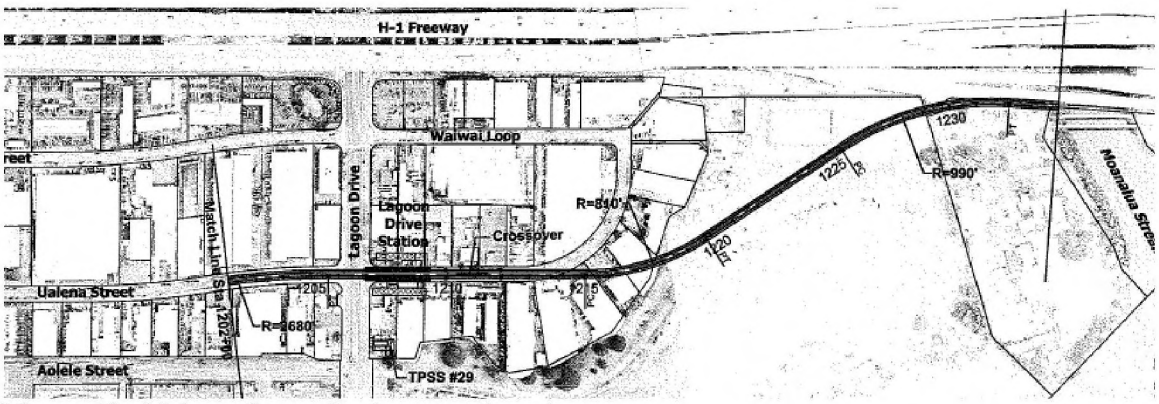

Figure 5b, Ualena Street Option, continued

Koapaka Street Option

The Koapaka Street Option would follow the same initial entry into HNL on the northwest side of the airport, with a station located close to the parking garage. The alignment would then head east and then north to transition onto an easterly alignment along Koapaka Street as shown in Figures 6a and 6b. The Lagoon Drive Station would be built adjacent to Lagoon Drive. The alignment would cross alongside of the northern edge of the park to minimize impacts to the park.

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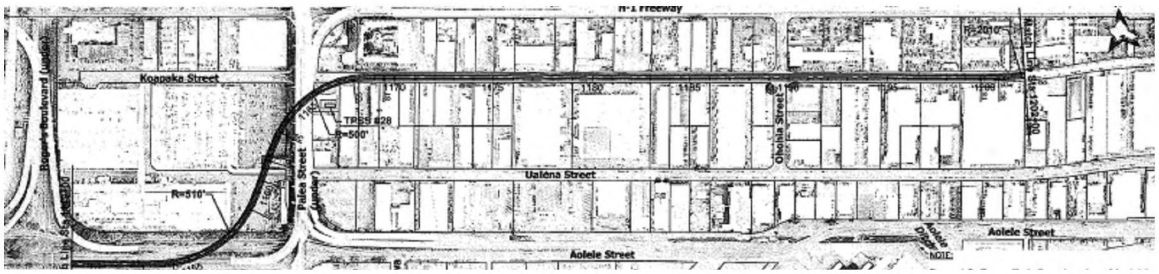

Figure 6a, Koapaka Street Option

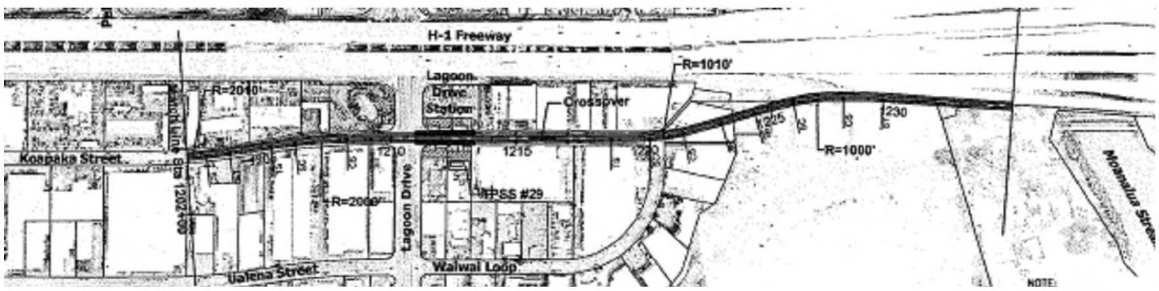

Figure 6b, Koapaka Street Option, continued

Makai H-1 Option

The Makai H-1 Option would follow the same initial entry into HNL on the northwest side of the airport, with a station located close to the parking garage. The alignment would then head east and then north to transition onto an easterly alignment along the makai side of the freeway.

H-1 Median Option

The H-1 Median option would have the rail alignment within the median of the H-1 freeway. This is the only option that would not have the rail alignment crossing through HNL. Therefore, there would be no anticipated impacts to HNL.

Evaluation of Airport Impacts for the HNL Rail Transit Alignment Options

The following information discusses the evaluation of the five HNL design option alignments and the potential impacts. The option alignments were evaluated based in the potential impacts to the airport. The FAA also conducted a preliminary safety review of the proposed alignments to determine if any safety risks are associated with a particular alignment.

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Aolele Street Option

The Aolele Street rail alignment would penetrate the runway protection zones (RPZ) for the approach ends of Runway 22L and 22R. FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, Paragraph 212, indicates the RPZ's function is to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape and centered about the extended runway centerline. AC 150/5300-13 provides the required dimensions for an RPZ, which is a based on the type of aircraft using the runway and the approach visibility minimum associated with that runway end. The RPZ for the Runway 22L and 22R ends is 1700 feet long and the rail line would cross through these RPZ's.

The proposed rail alignment on Aolele Street would also sever a portion of HNL property, which has been planned since 1998 for future air cargo use. This area is being leased for revenue production uses and the rail alignment would permanently limit the potential use of this area for future aviation uses. The rail project would be a non-aeronautical use of airport land, which in accordance with grant conditions, the land is obligated to be maintained for aeronautical uses. The rail alignment would prevent aircraft access to this property and prevent any future air cargo improvements that have been planned at the airport. Construction of the proposed transit system through this portion of HNL property would also result in an economic loss to the State of Hawaii in developing HNL property to its highest and best use. FAA encourages airport sponsors to become as self-sufficient as possible in order to reduce the economic burden on the surrounding communities. The loss of potential future revenue to HDOT has not been fully evaluated.

CCH has proposed that HDOT reclassify Runway 22R to recognize its use by slower airplanes in Aircraft Approach Category A/B, so the RPZ for the approach end of Runway 22R can be reduced in size to 1,000 feet long instead of the current 1,700 foot length. This is based on the runway's current shorter length compared to Runway 22L and its common use by general aviation aircraft.

CCH has proposed that Runway 4R/22L be extended to the south by 460 feet to allow the RPZ on the Runway 22L end to shift to the south, so the proposed train is no longer in the central portion of the RPZ. CCH also proposes that declared distances be used on this runway to mitigate the loss of the existing Runway Safety Area (RSA) on the departure approach end of Runway 22L that meets FAA Airport Design Standards. Figure 7 shows the CCH's proposed Runway 4R/22L mitigation, where the runway is extended to the south by 460 feet. FAA airport design standards require a 1,000 foot long RSA on the departure end and a 600 foot long RSA beyond the arrival end of the runway. Therefore depending on the direction of flight, the takeoff run available (TORA) and the landing distance available (LDA) for an aircraft is pre-established to ensure that appropriate RSA distances are maintained.

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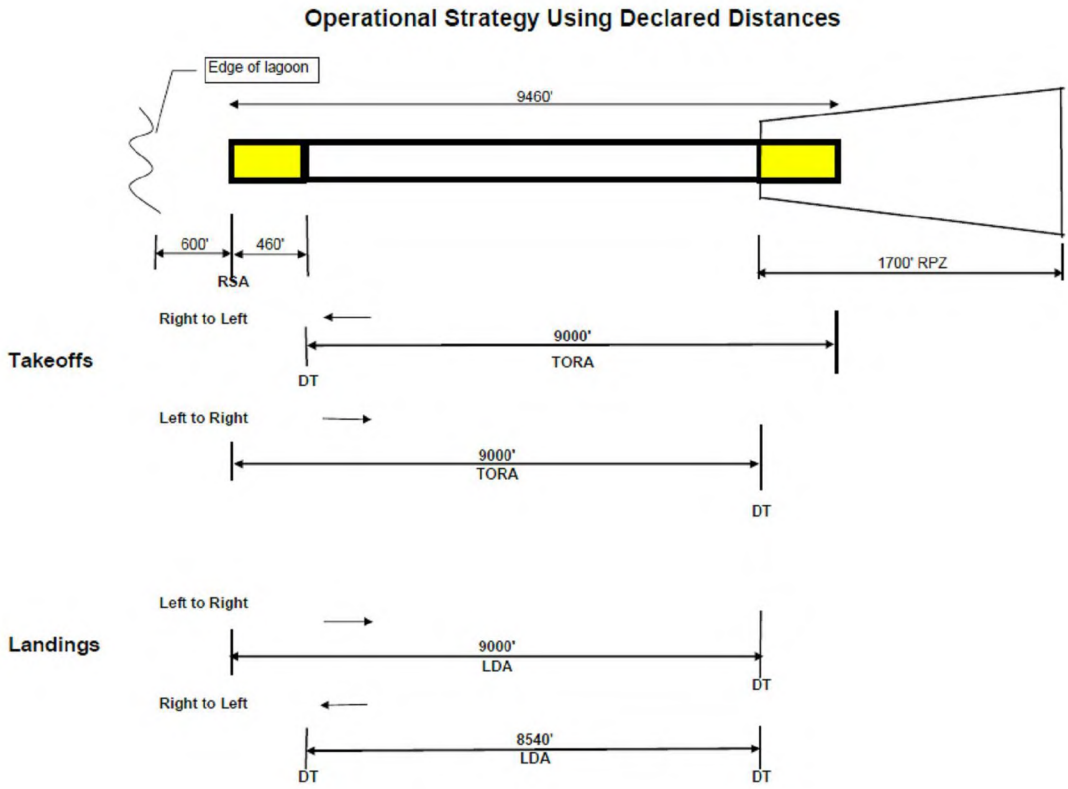

Figure 7, CCH Proposed Runway 4R/22L Runway Safety Area Mitigation

Generally the FAA does not support use of declared distances as a means to mitigate adverse impacts to runways that currently meet design standards caused by the introduction of a new penetration of the RSA or RPZ. The use of declared distances is used when there are circumstances beyond the control of the airport that prevent the airport from meeting FAA Airport Design Standards. As indicated in above, HDOT-A as the airport sponsor has grant-in-aid assurances with the FAA requiring HDOT-A to prevent the introduction of any proposed development that is known to have an adverse impact on aviation use of the airport. The FAA AC 150/5300-13, in Appendix 14 states that:

> "*The purpose of declared distances in airport design is to provide an equivalent runway safety area (RSA), runway object free area (ROFA), or runway protection zone (RPZ) in accordance with the design standards in Chapters 2 and 3 at* ***existing constrained airports*** [emphasis added] *where it is otherwise impracticable to meet standards by other means. Declared distances are also employed when there are obstructions in the runway approaches and/or departure surface that are beyond the ability of the airport owner to remove and result in a displaced runway threshold or change in the departure end of the runway (DER).*"

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The use of declared distances as "mitigation" where there is a proposed development that will affect a runway, is generally not an acceptable means to allow impacts to a runway that currently meets FAA airport design standards. HDOT action, as the airport sponsor, along with any subsequent FAA approval of such a proposal would set a precedent contrary to FAA's Congressional mandate to ensure all RSA at airports that hold a certificate under 14 CFR Part 139 meet FAA Airport Design Standards, where practicable, by 2015. CCH's proposal to use of declared distances would reduce the total landing distance available on Runway 22L. This is done to provide a Runway Safety Area for the departure end of Runway 22L that meets FAA Airport Design Standards. The application of declared distances in this manner is contrary to the guidance in FAA's Advisory Circular.

Although the FAA does not support the use declared distances in this type of situation, the FAA and HDOT-A conducted a careful evaluation of the potential impacts based on the CCH's proposed mitigation to shift Runway 4R/22L to the south and using declared distances.

Under this scenario, construction of the additional runway pavement to the south of the existing physical approach end of Runway 4R would also require relocation of the visual and electronic navigational equipment used on the runway. It would also require relocation of critical power and communication cables that are located south of Runway 4R and 4R. Runway 4R is one of only two runways at HNL that are equipped with an Instrument Landing System (ILS). An ILS runway has various electronic and visual navigational equipment that are sited for the particular runway to allow aircraft operations during low visibility conditions. Siting and placement of the navigational aids is a critical component to ensure the equipment is capable of providing the necessary visual and electronic signals needed for safe aircraft operations. Instrument approach procedures are also developed based on the existing runway thresholds. Any change to the location of the runway thresholds will require the relocation of navigational equipment, signage and development of new approach and departure procedures. These changes are costly and require extensive coordination with FAA. The associated relocations and costs are identified later in this section of the EIS.

The following discusses the short term construction impacts and also other associated impacts that will affect the airport from this proposal to shift Runway 4R/22L.

Airport Impacts During Construction of Runway 4R/22L Shift:

HNL handles a wide array of aircraft and aircraft performances, varying from the single-engine Cessna aircraft to the Hawaii Air National Guard F-15 fighters. The existing runway configuration allows keeping the smaller and slower general aviation traffic separated from the high performance military and heavy jet (defined as aircraft capable of being 255,000 lbs or more) air carrier traffic. The use of a secondary runway such as Runway 4R is necessary to keep the flow of air traffic into and out of HNL efficient and safe. Runway 4R is also one of two runways with instrument approaches to the airport. It is also critical for Land and Hold Short Operations (LAHSO) which increases the

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landing rate at the airport. This operation allows the simultaneous landings of foreign heavy air carriers on Runway 8L and domestic air carriers on Runway 4R, thereby maintaining the efficient and safe flow of air traffic into the airport. As the efficiency of arrival traffic increases, the easier it becomes to allow departures to take off. During construction, when Runway 4R/22L is closed, all arrivals will need to be flowed to a single arrival runway. The steady stream of inbound aircraft does not allow the air traffic controller to allow aircraft departures from that runway as freely had some of the arrivals been sequenced to another secondary runway.

Runway 4R is also one of only two runways at HNL with an ILS available for use during conditions when visual landings cannot be conducted. Runway 8L is the primary arrival runway at HNL. Runway 8L is the only other ILS runway at HNL. When the ILS for Runway 8L is not available due to maintenance, repairs or mishap, then Runway 4R is the only ILS runway available for landings at HNL. Any construction on Runway 4R/22L will reduce HNL's instrument runway capability down to one runway, and increases aircraft delays during poor visibility periods. Since there would be no backup ILS runway, any problems with the 8L ILS runway could force a situation where arrivals would have to be diverted to other islands during inclement weather conditions. There is no other air carrier capable airport that could accommodate air carrier operations on the Island of Oahu during inclement weather. Consideration may need to be given to installing ILS equipment on Runway 4L/22R or 8R/26L (Reef Runway), while construction is being performed on Runway 4R/22L.

Runway 4R also serves as the main arrival runway at HNL from 7 p.m. to 7 a.m. in order to reduce adverse noise impacts to noise sensitive land uses to the west of the airport. Arrivals into Runway 4R are over the ocean, while arrivals into 8L final approach fly over residential areas (Ewa, Iroquois Point). During construction, when Runway 4R/22L would be closed, all night time arrival traffic (excluding small light aircraft) would be rerouted to Runway 8L. Based on current operations data, it is estimated that approximately 24 nightly flights from Runway 4R would be shifted to Runway 8L. Additional aircraft operations during the night time on Runway 8L would increase the number of people exposed to adverse noise impacts in the residential communities west of the airport.

The United States Air Force maintains a Barrier Arresting Kit (BAK)-12/14 system on the approach end of Runway 4R for emergency recovery of high performance military tactical jet aircraft. The importance of this safety system cannot be understated. During construction of Runway 4R/22L, this safety system would not be available. The approach end of Runway 26L also has a BAK-12/14 arresting barrier system. However, if that system were engaged due to an emergency fighter jet recovery, with Runway 4R closed, all arrivals and departures to/from HNL would have to use Runway 8L. The result of this scenario would be extensive delays to all users (arrivals and departures), extreme increase in workload on the air traffic controllers, and no backup arresting barrier system on the airport for the military.

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During closure of Runway 4R for construction, all arrival aircraft, other than the small light aircraft which can be assigned to Runway 4L, will be sequenced to land on Runway 8L. This single stream of arrivals will result in arrival delays to the users, as well as departure delays because the steady stream of arrivals will not allow departures off Runway 8L. This results in all departures being taken to Runway 8R and these aircraft having to cross Runway 8L, increasing the opportunity for runway incursions to occur. LAHSO operations will not be available, thereby increasing aircraft delays at HNL. Workload on the air traffic controllers will increase in order to maintain this single stream of arrivals. The increased taxi requirements and the extensive delays will result in increased fuel costs to the airlines and increased aircraft engine emissions due to longer taxi times.

Construction on Runway 4R/22L would involve excavation and extensive work on the runway, as well as the re-wiring and reinstallation of all the runway lighting systems associated with the runway. Runway 4R/22L has High Intensity Runway Lights (HIRL), Runway 4R has Precision Approach Path Indicators (PAPI) that will need to be relocated. Runway 22L has Runway End Identifier Lights (REIL) and Visual Approach Slope Indicators (VASI) that will need to be relocated.

CCH's proposal would also require the extension of parallel Taxiway C to the new approach end of Runway 4R, the resultant closure of Taxiway C abeam Taxiway RT (the parallel taxiway for the Runway 8R/26L [Reef Runway]) will shut off access for all departures taxiing to Runway 8R from the south ramp. UPS, FEDEX, and any other private jets on the south ramp would have to cross Runways 4R and 4L to get in line on Taxiway RB for departure to Runway 8R. The longer taxi route will again increase fuel costs to the users, increase in aircraft engine emissions. Further, additional runway crossings would increase the opportunities for runway incursions.

Under this scenario, general aviation and air taxi aircraft on the south ramp would be impacted heavily. When Runway 4R is closed, all aircraft arrivals and departures must use the 7,000 foot long Runway 4L. As is the case on Runway 8L, with all the arrivals on Runway 4L, there will be extensive delays for departures off that runway. Aircraft can only depart during opportunities between arrivals on Runway 4L. Airport usage efficiency would be reduced due to the steady stream of arrivals on Runway 8L, and the same requirement that aircraft departures occur between arrivals to Runway 8L (due to intersecting of these runways). FAA's ATCT must ensure that adequate time is provided after aircraft have landed or departed for aircraft wake turbulence to dissipate for safety reasons. Thus, opportunities for timely departures from Runway 4L will be extremely reduced. The result will be extensive delays to the users.

Runway 22L is heavily used for takeoffs during Kona Wind conditions, which occurs approximately 11 percent of the time annually. Kona Wind conditions exist when the prevailing winds blow from the southwest. During the Kona Wind conditions the loss of Runway 22L as departure runway for large aircraft affects the efficient operations at the airport. During IMC conditions operations would be reduced by 50 percent from 30 to 15 arrivals/departures per hour.

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During Kona Wind conditions, when HNL is on the Runway 22 and 26 use configuration, and Runway 4R/22L closed during construction, all light general aviation aircraft would arrive and depart on Runway 22R. Again, with a single stream of arrivals to a single runway, and the need to ensure adequate time for aircraft wake turbulence to dissipate the opportunities for timely departure diminish. Also, due to the traffic congestion on Runway 22R, and the fact that it intersects with Runway 26R, Runway 26R will not be available to relieve some of the arrival traffic to Runway 26L. All other arrivals will be sequenced to Runway 26L, again creating a single stream of arrivals to a single runway, translating to extensive delays to arrivals. The departures will have delays, as they no longer have Runway 22L to depart from. Due to the shorter length of Runway 22R, all heavy jet departures will have to depart from Runway 26L, which is already heavily restricted due to the single stream of arrivals, all arriving on that runway. The resultant closure of Taxiway C abeam Taxiway RT will limit access for aircraft taxing to Runway 26L for departures. Departures from Runway 26R would be an option, with an increase in noise levels to Iroquois Point and Ewa Beach. This would also require close coordination with Kalaeloa Airport due to the close proximity of that airport. Again, the users would incur increased fuel costs due to delays. Aircraft engine emissions would increase as well.

Other Airport Impacts:

There are also other impacts from the shift in Runway 4R/22L that will result and require further airport changes as noted below:

The existing Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) for Runway 4R is positioned to the south of the runway and consists of stations with flashing and stationary light bars that direct aircraft towards the runway threshold. These light stations extend out approximately 2400 feet beyond the Runway 4R threshold. A proposed extension of the Runway 4R/22L to the south would require that the MALSR also be extended. This would also require new light stations in the environmentally sensitive lagoon area south of the runway. This area is designated by the State of Hawaii as conservation land and any use will need a conservation use permit, and potential U.S. Army Corps permit and Clean Water Act permit. The State of Hawaii Land Use laws sets out four major land use divisions within the state: Conservation, Agriculture, Rural and Urban. The use of Conservation lands are regulated by the State of Hawaii, Board of Land and Natural Resources. In addition, coordination with the U.S. Fish and Wildlife Service regarding any federally listed threatened and endangered species and any Coastal Zone development issues would need to be addressed.

The extension of the MALSR light stations would overlap onto the taxiway for Runway 8R/22L and conflict with aircraft operations. Options to maintain a full MALSR would require additional surveys to determine if in-pavement approach lights are feasible and requires a safety analysis. If these options are not possible, maintaining a full length MALSR would require relocating Taxiway RA 460 feet south. Relocating Taxiway RA,

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in turn may also require that a key airport navigational aid, the HNL Very High Frequency Omnidirectional Radio Range and Tactical Air Navigation (VORTAC) be moved. The siting of the VORTAC is extremely critical and the availability for suitable locations appears limited. Any location change would also require changes to flight procedures based on the VORTAC's position. It would also require flight fixes and airways to also be updated. This would result in additional cost for the CCH's preferred alignment option and time needed to develop, prepare the necessary NEPA documentation and flight check the new procedures. Any relocation of Taxiway RA and VORTAC would be extremely costly as shown in Table 1 below.

If a full MALSR is not put in place, it will require the approach lighting system to be down graded to a MALS, without the runway alignment indicator lights. This would raise the minimum altitude requirements for the instrument approaches to Runway 4R, resulting in diminished flight services available to the users compared to what is available today. This would limit the instrument approaches to 3/4 of a mile visibility rather than having the 1/2 mile capability that currently exists for the ILS.

The impact of a future reduction in Runway 4's instrument capability from a ½ mile to a ¾ mile visibility minimum will result in some large carrier and military aircraft not being able to use Runway 4R, especially at night and would require that another arrival runway be used. Since Runway 8L has an ILS capability, it would experience an increased number of night time arrivals that are not being experienced today. This would be a direct result from shifting Runway 4R/22L to the south and not having a full MALSR installed. Based on current operations data, there are approximately 24 night time arrivals on Runway 4R. It can be assumed that anywhere from 30% to 70% of these arrivals may choose to use Runway 8L for operational necessity or the need to take advantage of the ILS capability and close proximity to the terminal. This would result in anywhere from 7 to 17 additional flights on Runway 8L on any given night, depending on the weather and visibility conditions, as well as air carrier procedures. This would represent a significant permanent new change in night time noise impacts to residential communities west of the airport that will need to be disclosed.

Based on the November 2004 Part 150 Noise Compatibility Program Study prepared by HDOT-A, there are a significant number of people and residences that would experience a permanent increase in noise level from aircraft operations at HNL. The State of Hawaii land use compatibility guidelines are even more sensitive than federal guidelines due to warm climate and open air design of homes on the island.

According to the Part 150 Study, there are 3,565 (1,956 civilian and 1,609 military) people affected by aircraft noise in the 65-70 Daytime/Nighttime Noise Average (DNL) contour. Based on an average of 4 people per dwelling unit, 891 residences in the 65-70 DNL are affected. The number of people affected within the 60-65 DNL is 27,177 people (18,827 civilian and 8,350 military). Therefore 6,794 residences within the 60-65 DNL are affected. Based on current noise impact maps, a total number of 30,742 people and 7,685 residences would be affected. It is estimated that approximately $57 million would be required to mitigate these noise impacted residences. These estimates are

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based 2004 studies and new noise maps would need to be developed to show the current and future number of people and residences affected.

The increase in aircraft noise levels would enlarge the size of the areas with elevated noise levels. The enlarged noise impact area will result in an even larger number of people adversely impacted by the aircraft noise. Scientific studies have shown that more people are highly annoyed by aircraft noise during the night time. As discussed in the previous paragraph, the increase in flights and noise levels will increase the number of people affected by aircraft noise and increase the number of residences needing sound insulation. Additional detailed noise modeling will be necessary to provide data to determine the number of noise sensitive land uses that would be affected.

The extended Runway 4R/22L would also require an additional exit taxiway; otherwise landing aircraft will remain on the runway longer in order to clear at the end and will reduce the landing rate on 4R. Also the departure rate for aircraft on Runway 8R will be reduced, since light aircraft on a left downwind to the relocated runway 4R would likely overfly runway 8R to line up for a landing.

The instrument approach procedures associated with Runway 4R are the ILS RUNWAY 4R, RNAV Y, RNAV Z, VOR/DME or TACAN or GPS-B, VOR or TACAN 4R. Moving the approach end of the runway may affect the vertical guidance of the approach procedures, resulting in the re-charting of the instrument approach procedures, and possible environmental studies associated with the new flight paths. The new runway thresholds will need to have to be surveyed. It is estimated that once the runway and NAVAID facility data is prepared, it will take approximately 18 months for the new instrument procedures to be completed and published.

The main and back-up power and communications cables for the Honolulu Control Facility (HCF) and the HNL airfield electrical vault duct banks are located to the south of the Runways 4L/4R would require relocation. The HCF is a critical facility that provides combined control of en-route air traffic, arrivals, departures, and over-flights in and around the numerous airports of the Hawaiian Island chain, as well as to aircraft from the U.S. Mainland, Asia, South Pacific, New Zealand and Australia. The runway extension construction would need to ensure no disruption of power and communications capability for this critical facility.

The costs for the Runway 4R/22L extension, associated requirements for relocation of NAVAIDS and other related costs has been identified in Table 1 below. These costs are significantly more than the $20 million estimate initially provided by the consultant for CCH. These include costs of (1) rerouting the power/communication duct bank located south of Runway 4R and 4L, (2) extension of Runway 4R/22L to the south by 460 feet, (3) installation of NAVAID's and (4) costs to maintain a full MALSR and current ILS capability. As discussed above, to maintain the current ILS 1/2 mile minimum for Runway 4R requires moving Taxiway RA to the south and relocation of the VORTAC. The cost of shifting the taxiway and VORTAC will be approximately $82.6 million.

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Since the VORTAC siting criteria is critical to its operation, it is not known if a suitable location elsewhere on the airport would be available.

Table 1, Runway 4R/22L Extension and NAVAID Relocation Estimate Maintains Current ILS ½ Mile Minimum (IN THOUSANDS)

Item	Estimate
(1) HCF Power/Communication Duct Bank Rerouting	$4,608
(2) 4R/22L Runway/Taxiway Construction	
Extend Runway 4R end, 460 feet by 150 feet, rated for 850,000 double dual tandem wheel loadings Runway 4R end edge lights, threshold lights, signs, markings, etc. Relocate Runway 4R/22L edge lights (1/2 runway length, 4,500 feet) Relocate Vault X and Z duct banks at Runway 4R end, including HECO and HTEL Connector taxiway 4R end, 1,300 feet by 75 feet, rated for 850,000 double dual tandem wheel loadings Connector taxiway 4R end edge lights, hold lines, signs, markings, etc. Connector taxiway 22L end, 400 feet by 75 feet, rated for 850,000 double dual tandem wheel loadings Connector taxiway 22L end edge lights, hold lines, signs, markings, etc. State Environmental Total 4R/22L Runway/Taxiway Construction Source HDOT-A (Includes Design and Construction Contingency)	$23,584
(3) 4R/22L NAVAID Installation	
Install PAPI-4 for Runway 4R Install PAPI-4 for Runway 22L Install REIL for Runway 22L New Runway 22L lighting Modify Runway 4R Medium Intensity Approach Lights with Runway Alignment Indicator Lights (MALSR) to a MALS New Instrument Landing System Total 4R/22L NAVAID Installation Source FAA (Includes Construction Contingency and Reimbursable Cost)	$11,022
Total Costs to Shift Runway 4R/22L and Associated Actions	**$39,214**
(4) Cost to Maintain Current Runway 4R MALSR and ILS at ½ Mile Minimum Capability and VORTAC Relocation	
Taxiway RA Relocation/VORTAC Relocation/ Full MALSR (source FAA)	$82,582
Total Airport Costs if VORTAC can be relocated	**$121,796**
Estimated Lost Opportunity Cost for Loss of Airport Cargo Area	$6,000
Total Cost of Airport Impacts	**$127,796**

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As discussed above, if the VORTAC cannot be relocated and a full MALSR cannot be installed, the ILS minimums on Runway 4R would be increased and result in additional noise impacts to residential communities near HNL due to the shift in aircraft, which would result in additional noise mitigation costs. Table 2 shows these costs.

Table 2, Runway 4R/22L Extension and NAVAID Relocation Estimate
Runway 4R ILS Downgraded to ¾ Mile Minimum
(IN THOUSANDS)

Item	Cost
Total Costs to Shift Runway 4R/22L and Associated Actions (same as above)	$39,214
Estimated Noise Mitigation to Homes Impacted by Added Noise on Runway 8L	$57,000
Estimated Lost Opportunity Cost for Loss of Airport Cargo Area	$6,000
Total Cost of Airport Impacts	**$102,214**

Construction of the additional runway length on Runway 4R/22L and relocation of the navigational equipment will take up to approximately 8 months to complete. Development of new flight procedures may also take up to 18 months to complete.

CCH provided their rail construction and property acquisition costs for the alignment options to FTA for review. FTA's engineering consultant reviewed this information and updated these cost estimates. These updated FTA rail cost estimates are used in this report to show the costs of the rail alignment options and property acquisition costs.

The cost of constructing this 1.6 mile portion of the rail alignment would be approximately $200.2 million, plus a range of $102.2 million to $127.8 million for airport related costs including the extension of Runway 22L/4R and relocation of navigational aids. The HNL rail line would be constructed in the third phase of the overall construction. This portion of the project is estimated to take about 2-3 years to complete. The portion of the alignment on Aolele Street has relatively open access with few utility issues. The alignment would require access through Ke'ehi Lagoon Beach Park, which is a public park and would require a DOT Act Section 4(f) determination by FTA for potential impacts.

The FAA convened a Preliminary Safety Analysis (PSA) Panel on February 24, 2010, to review the alignment options. The PSA Panel's mission was to collect potential National Airspace System (NAS) impacts for the alignment options, and to record any and all impacts requiring additional safety risk analysis. The PSA panel identified the need for new flight procedures, approaches and revisions as a result of the Runway 4R/22L shift due to the Aolele Street option. There were numerous visual and electronic navigational aids identified for relocation. There is insufficient room for the full MALSR and results

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in an impacted ILS. The possibility to adversely impact the VORTAC as well as numerous additional impacts to the NAS were flagged for additional risk assessment.

Ualena Street Option

The Ualena Street Option would avoid the central portion of the RPZ for Runway 22L, but not for Runway 22R. The FAA has met with HDOT-A and airline representatives to discuss a change to the Runway 22R RPZ to an Aircraft Approach Category A/B, which would reduce the length of the RPZ from 1,700 feet to 1,000 feet. Runway 4L/22R is the shortest runway at HNL and used primarily for general aviation aircraft. Since the RPZ is based on the type of aircraft flying the approach to that runway, this change would reflect the current slower aircraft that are using this runway, and allow for a reduction of the RPZ length. With this change the rail alignment would not affect the Runway 22R RPZ. HDOT-A and the airline representatives have no objection to reducing the Runway 22R RPZ to an Aircraft Approach Category A/B. The results from February 24, 2010, PSA Panel indicated that based on the assumption of a 42-foot above ground level (AGL) gross obstacle height, no NAS impacts were anticipated.

The Ualena Street rail alignment would limit a portion of the area planned for future air cargo. Six business properties that are leased on airport land would be affected the rail alignment transition from Aolele Street to Ualena Street. The cost of construction for this 1.6 mile portion of the alignment is estimated by CCH at approximately $265.1 million.

Koapaka Street Option

The portion of the rail alignment along Koapaka Street is off HNL airport property in the vicinity of the approach ends of Runway 22L and 22R and would not adversely affect the use of these runways or affect any leased airport properties. The results from February 24, 2010, PSA Panel indicated that based on the assumption of a 42-foot above ground level (AGL) gross obstacle height, no NAS impacts were anticipated. The cost to construct this 1.6 mile portion of the rail alignment is estimated by CCH at $295.6 million.

Makai H-1 Option

This alignment would not create any adverse impacts to airport operations or changes to the runways at HNL. The results from February 24, 2010, PSA Panel indicated that based on the assumption of a 42-foot above ground level (AGL) gross obstacle height, no NAS impacts were anticipated. The cost to construct this 1.6 portion of the rail alignment is estimated by CCH at $324 million.

H-1 Median Option

Similar to the Makai H-1 option, the H-1 Median Option would not create any impacts to airport operations or require changes to runway operations at HNL. The results from February 24, 2010, PSA Panel indicated that based on the assumption of a 42-foot above

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ground level (AGL) gross obstacle height, no NAS impacts were anticipated. CCH provided a rough cost estimate of approximately $500 million for the 1.6 mile portion of the alignment, since they did not prepare a planning profile for this alignment.

Summary of Options and Impacts

The following table summarizes the airport impacts for the various alignment options on or near HNL.

The CCH proposed use of HNL airport property along Aolele Street and proposed airport impact mitigation is contrary to FAA Airport Design Standards. It would require extensive and complex runway modifications and relocation of navigational equipment for Runway 4R/22L. It has the potential to reduce the existing ILS capability on Runway 4R and results in significant adverse short-term impacts to airport operations and instrument arrivals on Runway 4R. While FAA could ensure a safe operation under this option, the efficiency of airspace utilization would be reduced. Reduction in airspace utilization efficiency is contrary to FAA's statutory mission to ensure the safe and efficient use of navigable airspace in the United States. Under this option, during the construction period, night time aircraft operations would increase over noise sensitive communities while Runway 4R/22L is closed.

A proposed extension of the Runway 4R/22L to the south would require the relocation of the MALSR. This would also require new light stations in the environmentally sensitive lagoon area south of the runway. Further environmental study will be required to disclose potential impacts. Additional coordination with U.S. Army Corps, the State of Hawaii, Board of Land and Natural Resources and the U.S. Fish and Wildlife Service is required and may delay finalizing the FTA EIS.

The Aolele Street Option would also render an approximate 28 acre portion of airport property unusable for any further aviation uses. This would prevent HDOT from being able to develop this part of HNL property to its highest and best use. Further, there would be a loss of future revenue that would come from future planned air cargo activity on this parcel. The increase in approach minimums for Runway 4R would also result in a permanent increase in aircraft noise impacts to noise sensitive land uses west of HNL due to increased usage of Runway 8L, especially at night. Mitigation of new noise impacts would cause the State of Hawaii and CCH to incur an additional financial burden that does not occur under the other HNL alignment options.

An alignment on Ualena Street would be less costly than the Aolele Street alignment, and with a Runway 22R RPZ reclassification to Aircraft Approach Category of A/B, would not affect the airport, but would limit a portion of the area identified for future air cargo use. An alignment on Koapaka Street would cost more to construct than the Ualena Street option. A Koapaka alignment would be outside the RPZ for Runway 22L and 22R and would not impact airport operations or sever airport property from future planned air cargo use. Both the Makai H-1 and H-1 Median Options would not result in any impacts to airport operations.

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HDOT-A as the airport sponsor has grant-in-aid obligations that require submission of an ALP showing any proposed development to the FAA for review and approval. Any proposed rail alignment on HNL property must be shown on the updated ALP.

HNL Rail Alignment Options Impacts

	Aolele Street	Ualena Street	Koapaka Street	Makai H-1	H-1 Median
Airport Impacts	-Penetration of the 1700 foot RPZ for Runway 22L - CCH proposal to shift Runway 4R/22L 460 feet to the south is not a standard practice for FAA - Full MALSR unlikely without significant costs while lack of full MALSR results in higher ILS minimums and degrades instrument capability on Runway 4R/22L - New MALS results in new light stations in environmentally sensitive conservation area -Estimated up to 17 additional night time flights on Runway 8L and increased noise over residential communities west of the airport if full MALSR not installed - RPZ penetration for approach end of Runway 22R. - Reclassification of Runway 22R	-Penetration of 1700 foot RPZ for Runway 22R. - Reclassification of Runway 22R RPZ to Aircraft Approach Category A/B. - 6 airport parcels impacted by guideway alignment transition from Aolele Street to Ualena Street - A portion of the planned air cargo area would be limited from future use	-No impacts to runways or safety areas - Rail line is off airport property in the approach for Runways 22R and 22L	-No impacts to runways or safety areas - Rail line is off airport property in the approach for Runways 22R and 22L	-No impacts to runways or safety areas - Rail line is off airport property in the approach for Runways 22R and 22L

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	Aolele Street	Ualena Street	Koapaka Street	Makai H-1	H-1 Median
	RPZ to Aircraft Approach Category A/B. - Aolele alignment limits any future aviation use of approximately 28 acres of airport property, part of which is planned by airport sponsor for cargo use and prevents direct aircraft access to properties mauka of Aolele Street				
Business Impacts / Property Acquisitions/ Relocations	- No impacts to existing businesses that lease land from HDOT - Lost opportunity for future revenue generating potential for cargo use of airport property	- 6 leased airport business properties taken	- No airport leased business properties taken	- No airport leased business properties taken	-No airport properties affected
Time to Construct	- Runway shift would need to occur before rail construction - Up to 8 months for airport construction - New flight procedures development can start prior to runway construction and take up to 18 months to complete -Runway work is subject to limited construction scheduling on an active operating	- Rail construction through the airport is planned to start 2015 and go through 2016	- Rail construction through the airport is planned to start 2015 and go through 2016	- Rail construction through the airport is planned to start 2015 and go through 2016	- No airport rail alignment

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	Aolele Street	Ualena Street	Koapaka Street	Makai H-1	H-1 Median
	airport - Rail construction through the airport is planned to start 2015 and go through 2016				
Construction	- Airport construction would disrupt airport operations, require runway closure and additional flights on the other runways - Increased noise impacts to communities west of the airport during night time hours, with additional 24 flights from Runway 4R -Increased air traffic work load -Would require coordination with HDOT-Airports for construction	- No airport operational disruption from rail construction	- No airport operational disruption from rail construction	- No airport operational disruption from rail construction	- No airport rail alignment
Total Cost to construct 1.6 mile rail segment and other costs	$302.4 to $328 million ($200.2* million for rail cost, plus $102.2 million to $127.8 million airport associated costs)	$265.1* million for rail cost and property acquisition	$295.6* million for rail cost and property acquisition	$324* million for rail cost and property acquisition	$500** million rough estimate for rail cost

* Cost estimate provided by CCH

** CCH rough cost estimate, since H-1 median rail corridor alignment/profile not developed

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