Economics Technical Report
Honolulu High-Capacity Transit Corridor Project

August 15, 2008

Prepared for:
City and County of Honolulu

Preface

This technical report supports the Draft Environmental Impact Statement (EIS) prepared for the Honolulu High-Capacity Transit Corridor Project. It provides additional detail and information as it relates to:

- Methodology used for the analysis
- Applicable regulations
- Results of the technical analysis
- Proposed mitigation
- Coordination and consultation (as appropriate)
- References
- Model output (as appropriate)
- Other information/data

As described in the Draft EIS, the Locally Preferred Alternative, called the “Full Project,” is an approximate 30-mile corridor from Kapolei to the University of Hawai‘i at Mānoa with a connection to Waikīkī. However, currently available funding sources are not sufficient to fund the Full Project. Therefore, the focus of the Draft EIS is on the “First Project,” a fundable approximately 20-mile section between East Kapolei and Ala Moana Center. The First Project is identified as “the Project” for the purpose of the Draft EIS.

This technical report documents the detailed analysis completed for the Full Project, which includes the planned extensions, related transit stations, and construction phasing. The planned extensions and related construction planning have not been fully evaluated in the Draft EIS and are qualitatively discussed in the Cumulative Effects section of the Draft EIS as a foreseeable future project(s). Once funding is identified for these extensions, a full environmental evaluation will be completed in a separate environmental study (or studies), as appropriate.

Figure 1-3 through Figure 1-6 (in Chapter 1, Background) show the proposed Build Alternatives and transit stations, including the areas designated as planned extensions.

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Acronyms and Abbreviations

CAGR	compound annual growth rate
City	City and County of Honolulu
CPI	Consumer Price Index
DTS	City and County of Honolulu Department of Transportation Services
EIS	environmental impact statement
‘Ewa (direction)	toward the west (see also Wai‘anae)
FTA	Federal Transit Administration
H-1	Interstate Route H-1 (the H-1 Freeway)
Koko Head (direction)	toward the east
LOS	level of service
LRT	light rail transit
makai (direction)	toward the sea
mauka (direction)	toward the mountains
O‘ahuMPO	O‘ahu Metropolitan Planning Organization
NEPA	National Environmental Policy Act
ORTP	O‘ahu Regional Transportation Plan 2030
PUC	Primary Urban Center
RTD	City and County of Honolulu Department of Transportation Services Rapid Transit Division
TPSS	traction power substation
UH	University of Hawai‘i
Wai‘anae	toward the west (see also ‘Ewa)

Summary

The City and County of Honolulu Department of Transportation Services Rapid Transit Division (RTD), in coordination with the U.S. Department of Transportation Federal Transit Administration (FTA), is preparing a Draft Environmental Impact Statement (EIS) to evaluate alternatives that would provide high-capacity transit service on O‘ahu. The alternatives being considered for the Honolulu High-Capacity Transit Corridor Project (the Project) are as follows:

1. No Build Alternative
2. Fixed Guideway Transit Alternative via Salt Lake Boulevard (Salt Lake Alternative)
3. Fixed Guideway Transit Alternative via the Airport (Airport Alternative)
4. Fixed Guideway Transit Alternative via the Airport & Salt Lake (Airport & Salt Lake Alternative)

As part of the Draft EIS process, economic and development impacts were assessed. Both quantitative and qualitative assessments were conducted. Qualitative assessments were as follows:

- Baseline analysis of population and employment trends
- Assessment of potentially induced development, including increases to property values

Quantitative assessments were as follows:

- Construction-induced employment analysis
- Analysis of land take impacts to real property tax revenues

As part of the assessment of induced development, a share analysis was conducted to evaluate likely real estate growth in the region. This analysis estimates that ‘Ewa is expected to experience the most growth of any area in the corridor in office and retail space between 2005 and 2030, due to the robust job growth expected in that part of the study region. More than 10 million square feet of non-residential space is expected to be built in this area between 2005 and 2030. Overall, the study corridor is expected to add approximately 9 million square feet of retail space and 14.2 million square feet of office space between 2005 and 2030. This would effectively increase the corridor’s total retail and office square footage by 31 percent—from 74 million square feet in 2005 to 97.2 million square feet in 2030.

An assessment of the potential increase in property values was also conducted. Based on studies of other regions with transit systems (i.e., San Francisco, San Diego, and San Jose, California; New York, New York; and Portland, Oregon), an average home price increase of 6.4 percent within one-half mile of each transit station may be experienced. A number of local and corridor-wide induced development effects were also identified, including:

- **Geographical Expansion of Consumer Markets**—increased accessibility would expand the geographical extent of consumer markets for firms' output.
- **Expansion of Labor Markets**—increased accessibility would enable firms to draw labor from a wider geographic area—resulting in increased supply, higher variety, and reduced costs.
- **Networks of Specialization**—increased accessibility may propel firms toward new and more efficient manufacturing methods.
- **Economies of Scale/Agglomeration**—economies of scale are a by-product of network specialization—which leads to regional agglomeration.
- **Shifts in Location**—increased accessibility is a catalyst for locational shifts for households.

The results of the quantitative assessments described above are shown in Table S-1. It is worth noting that the likely increase in property value of properties within proximity to the guideway may offset some of the tax revenue losses presented in the table.

Table S-1: Summary of Economic and Development Quantitative Impacts

Alternative	Total Direct, Indirect, and Induced Jobs (Number of Job-Years)	Real Property Tax Revenue Reduction (millions 2008 $)
No Build	0	0
Salt Lake	86,500	1.2
Airport	91,000	1.2
Airport & Salt Lake	109,000	1.2

1 Background

1.1 Introduction

The City and County of Honolulu Department of Transportation Services Rapid Transit Division (RTD), in cooperation with the U.S. Department of Transportation Federal Transit Administration (FTA), is evaluating fixed-guideway alternatives that would provide high-capacity transit service on O‘ahu. The project study area is the travel corridor between Kapolei and the University of Hawai‘i at Mānoa (UH Mānoa) (Figure 1-1). This corridor includes the majority of housing and employment on O‘ahu. The east-west length of the corridor is approximately 23 miles. The north-south width is, at most, 4 miles because the Ko‘olau and Wai‘anae Mountain Ranges bound much of the corridor to the north and the Pacific Ocean to the south.

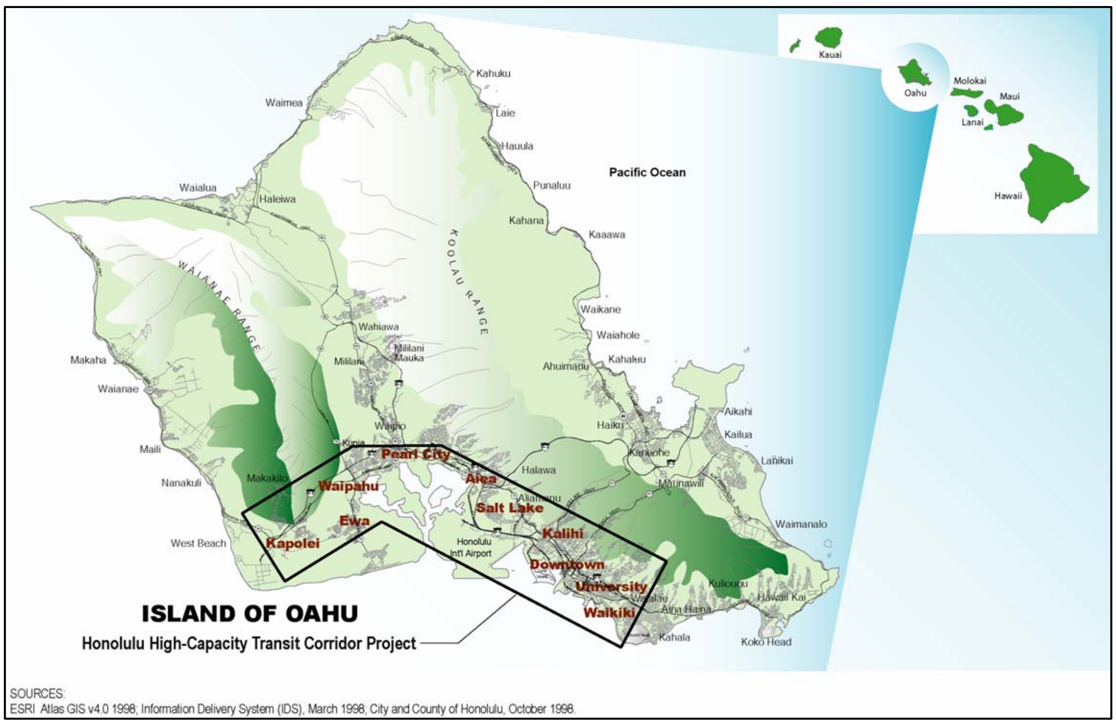


Figure 1-1: Project Vicinity

1.2 Description of the Study Corridor

The Honolulu High-Capacity Transit Corridor extends from Kapolei in the west (Wai‘anae or ‘Ewa direction) to UH Mānoa in the east (Koko Head direction) and is confined by the Wai‘anae and Ko‘olau Mountain Ranges in the mauka direction (towards the mountains, generally to the north within the study corridor) and the Pacific Ocean in the makai direction (towards the sea, generally to the south within the study corridor). Between Pearl City and ‘Aiea, the corridor’s width is less than 1 mile between Pearl Harbor and the base of the Ko‘olau Mountains (Figure 1-2).

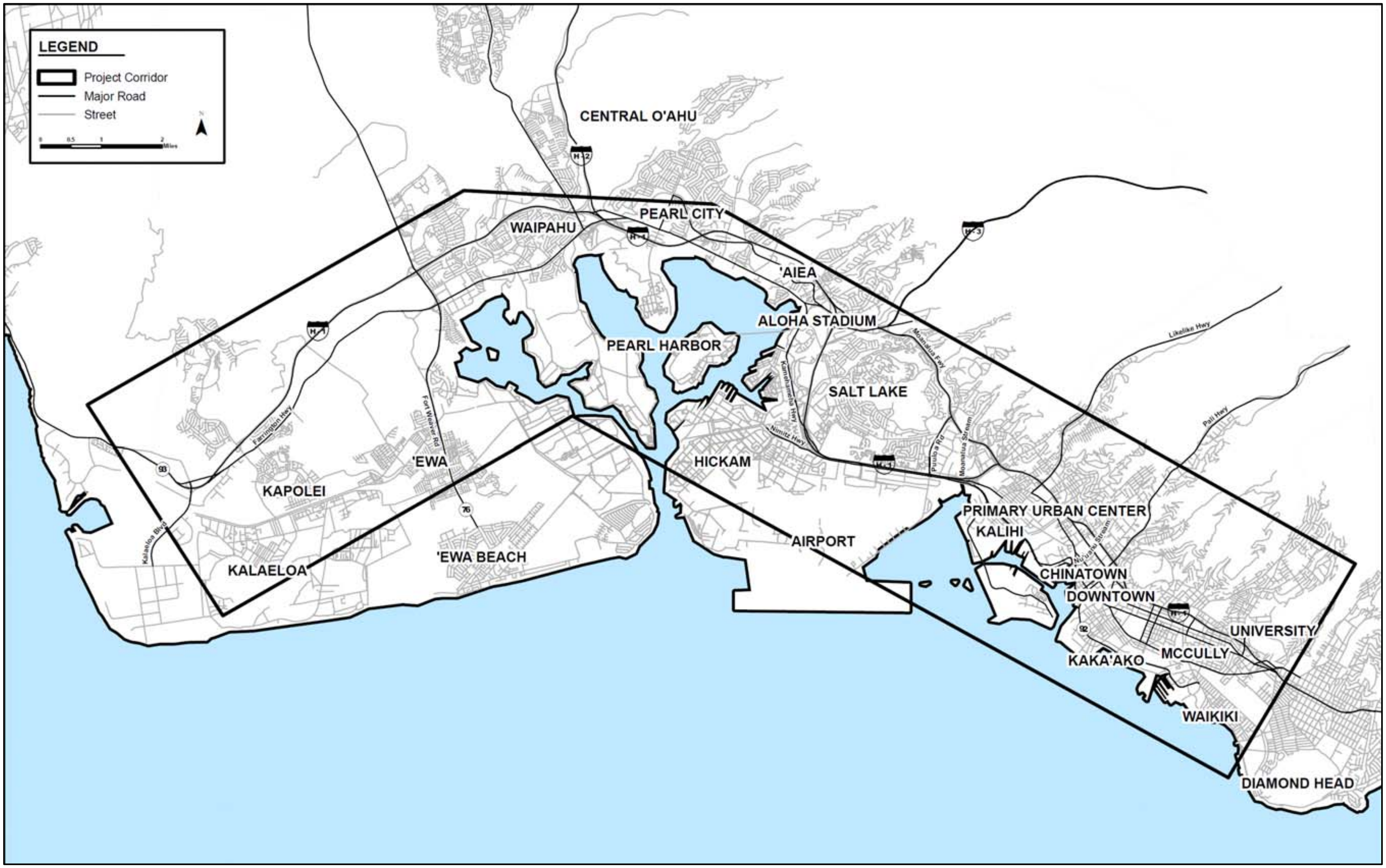


Figure 1-2: Areas and Districts in the Study Corridor

1.3 Alternatives

Four alternatives are being evaluated in the Environmental Impact Statement (EIS). They were developed through a screening process that considered alternatives identified through previous transit studies, a field review of the study corridor, an analysis of current and projected population and employment data for the corridor, a literature review of technology modes, work completed by the O‘ahu Metropolitan Planning Organization (O‘ahuMPO) for its *O‘ahu Regional Transportation Plan 2030* (ORTP) (O‘ahuMPO 2007), a rigorous Alternatives Analysis process, selection of a Locally Preferred Alternative by the City Council, and public and agency comments received during the separate formal project scoping processes held to satisfy National Environmental Policy Act (NEPA) (USC 1969) requirements and the Hawai‘i EIS Law (Chapter 343) (HRS 2008). The alternatives evaluated are as follows:

1. No Build Alternative
2. Salt Lake Alternative
3. Airport Alternative
4. Airport & Salt Lake Alternative

1.3.1 No Build Alternative

The No Build Alternative includes existing transit and highway facilities and committed transportation projects anticipated to be operational by 2030. Committed transportation projects are those identified in the ORTP*,* as amended (O‘ahuMPO 2007). Highway elements of the No Build Alternative also are included in the Build Alternatives. The No Build Alternative would include an increase in bus fleet size to accommodate growth, allowing service frequencies to remain the same as today.

1.3.2 Build Alternatives

The fixed guideway alternatives would include the construction and operation of a grade-separated fixed guideway transit system between East Kapolei and Ala Moana Center (Figure 1-3 to Figure 1-6). Planned extensions are anticipated to West Kapolei, UH Mānoa, and Waikīkī. The system evaluated a range of fixed-guideway transit technologies that met performance requirements, which could be either automated or employ drivers. All parts of the system would either be elevated or in exclusive right-of-way.

Steel-wheel-on-steel-rail transit technology has been proposed through a comparative process based on the ability of various transit technologies to cost-effectively meet project requirements. As such, this technology is assumed in this analysis.

The guideway would follow the same alignment for all Build Alternatives through most of the study corridor. The Project would begin by following North-South Road and other future roadways to Farrington Highway. Proposed station locations and other project features in this area are shown in Figure 1-3. The guideway would follow Farrington Highway Koko Head on an elevated structure and continue along Kamehameha Highway to the vicinity of Aloha Stadium (Figure 1-4).

Between Aloha Stadium and Kalihi, the alignment differs for each of the Build Alternatives, as detailed later in this section (Figure 1-5). Koko Head of Middle Street, the guideway would follow Dillingham Boulevard to the vicinity of Ka‘aahi Street and then turn Koko Head to connect to Nimitz Highway in the vicinity of Iwilei Road.

The alignment would follow Nimitz Highway Koko Head to Halekauwila Street, then along Halekauwila Street past Ward Avenue, where it would transition to Queen Street and Kona Street. Property on the mauka side of Waimanu Street would be acquired to allow the alignment to cross over to Kona Street. The guideway would run above Kona Street through Ala Moana Center.

Planned extensions would connect at both ends of the corridor. At the Wai‘anae end of the corridor, the alignment would follow Kapolei Parkway to Wākea Street and then turn makai to Saratoga Avenue. The guideway would continue on future extensions of Saratoga Avenue and North-South Road. At the Koko Head end of the corridor, the alignment would veer mauka from Ala Moana Center to follow Kapi‘olani Boulevard to University Avenue, where it would again turn mauka to follow University Avenue over the H-1 Freeway to a proposed terminal facility in UH Mānoa’s Lower Campus. A branch line with a transfer point at Ala Moana Center or the Hawai‘i Convention Center into Waikīkī would follow Kalākaua Avenue to Kūhiō Avenue to end near Kapahulu Avenue (Figure 1-6).

Salt Lake Alternative

The Salt Lake Alternative would leave Kamehameha Highway immediately ‘Ewa of Aloha Stadium, cross the Aloha Stadium parking lot, and continue Koko Head along Salt Lake Boulevard (Figure 1-5). It would follow Pūkōloa Street through Māpunapuna before crossing Moanalua Stream, turning makai, crossing the H-1 Freeway and continuing to the Middle Street Transit Center. Stations would be constructed near Aloha Stadium and Ala Liliko‘i. The total guideway length for this alternative would be approximately 19 miles and it would include 19 stations. The eventual guideway length, including planned extensions, for this alternative would be approximately 28 miles and it would include 31 stations.

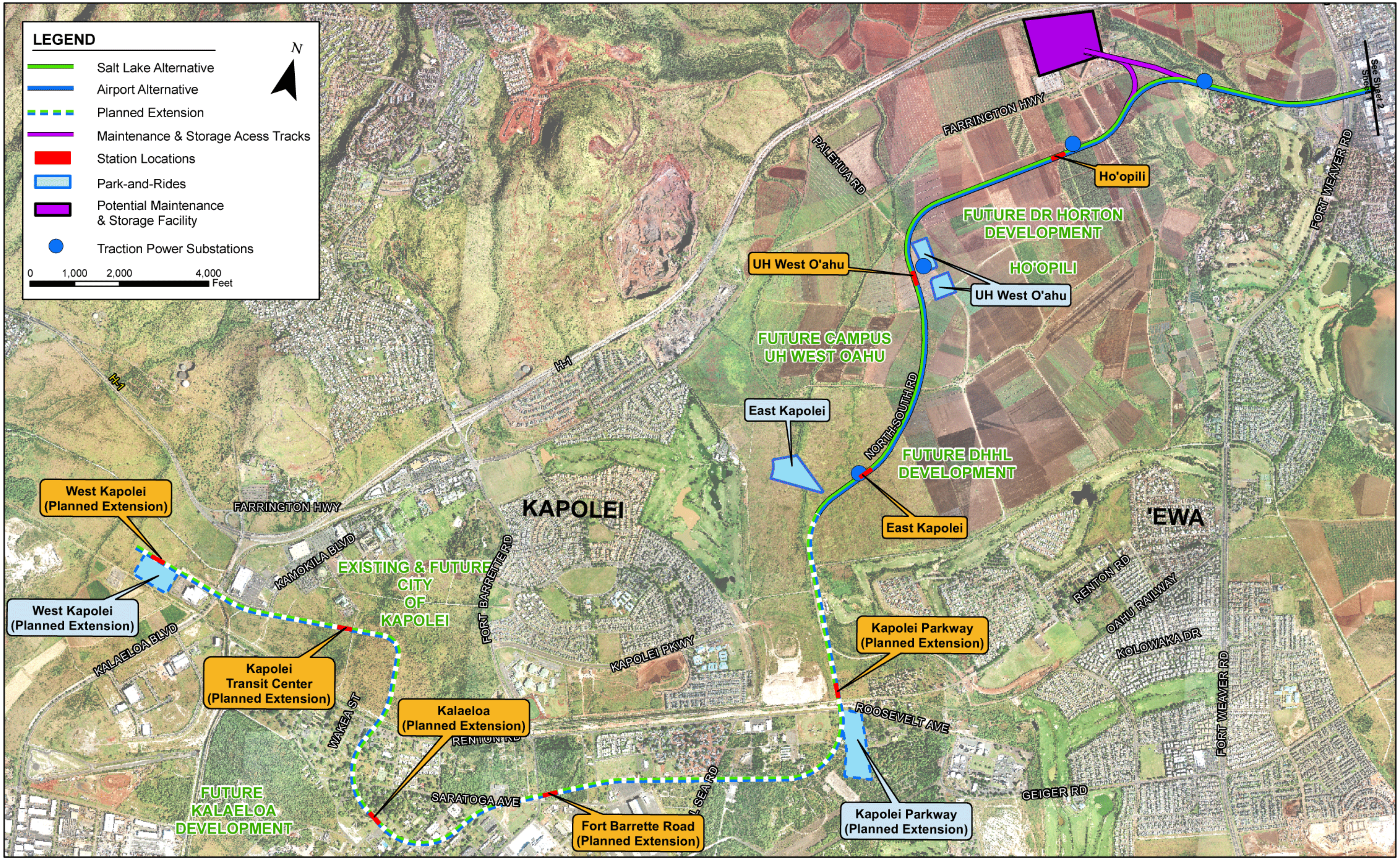


Figure 1-3: Fixed Guideway Transit Alternative Features (Kapolei to Fort Weaver Road)

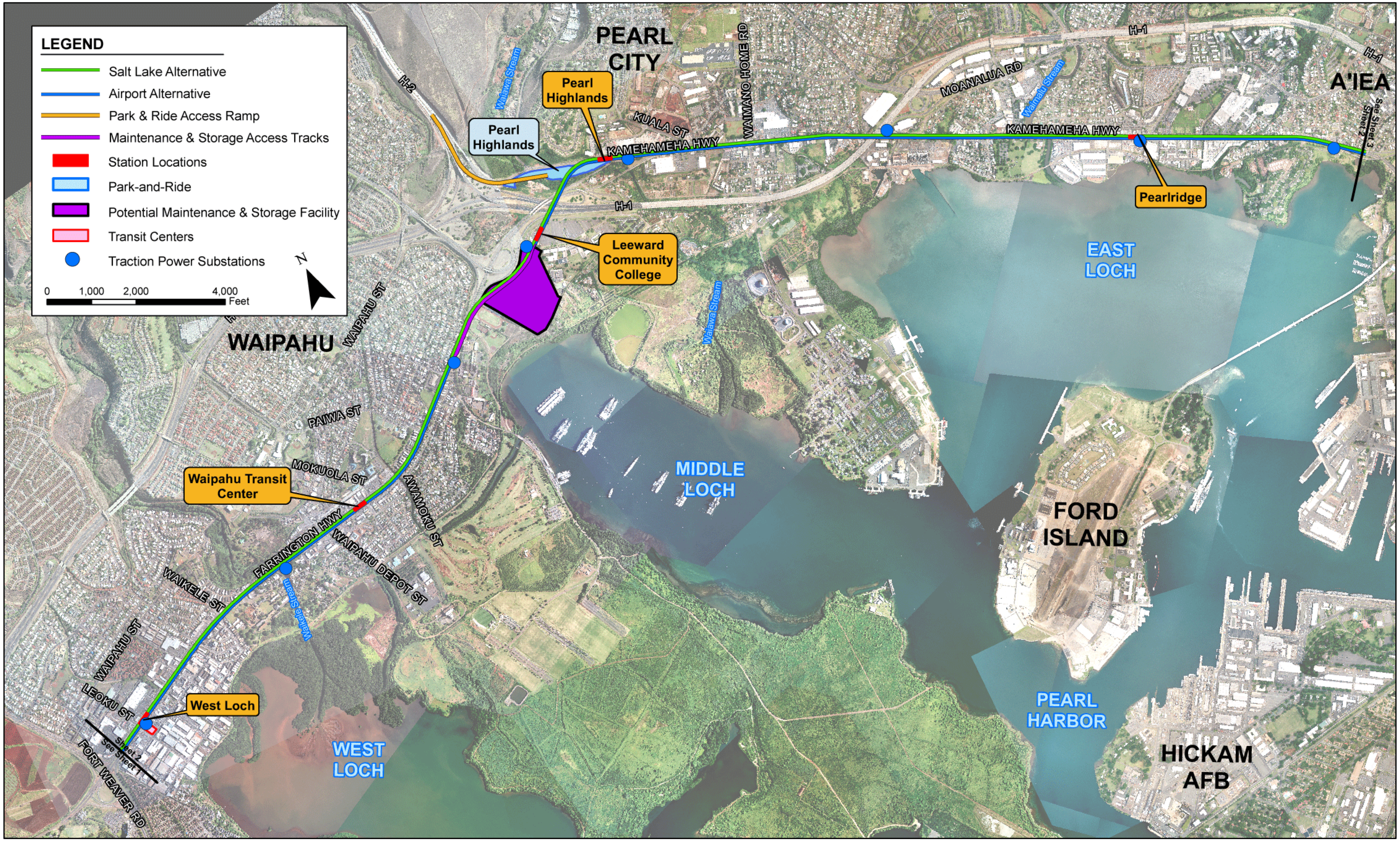


Figure 1-4: Fixed Guideway Transit Alternative Features (Fort Weaver Road to Aloha Stadium)

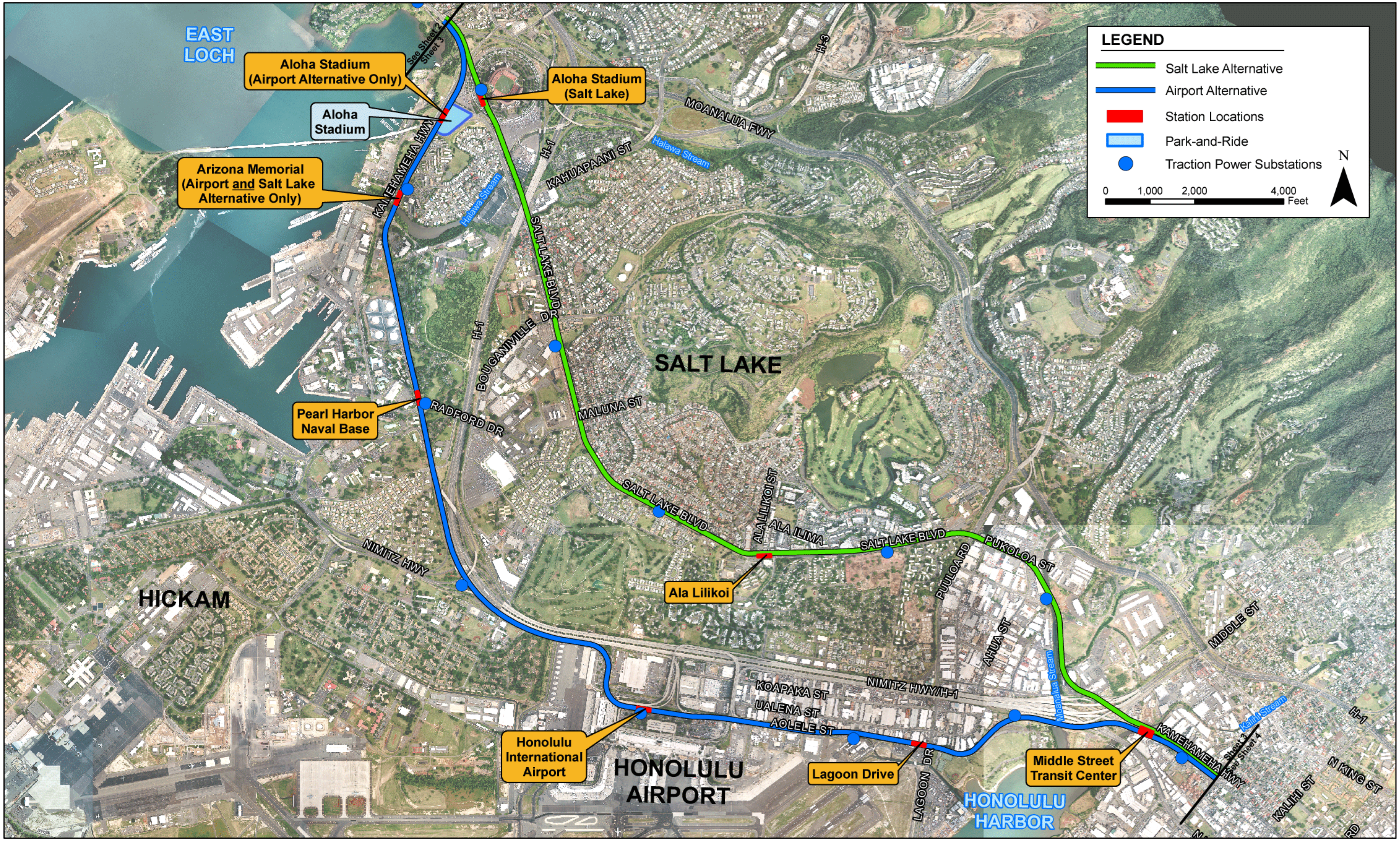


Figure 1-5: Fixed Guideway Transit Alternative Features (Aloha Stadium to Kalihi)

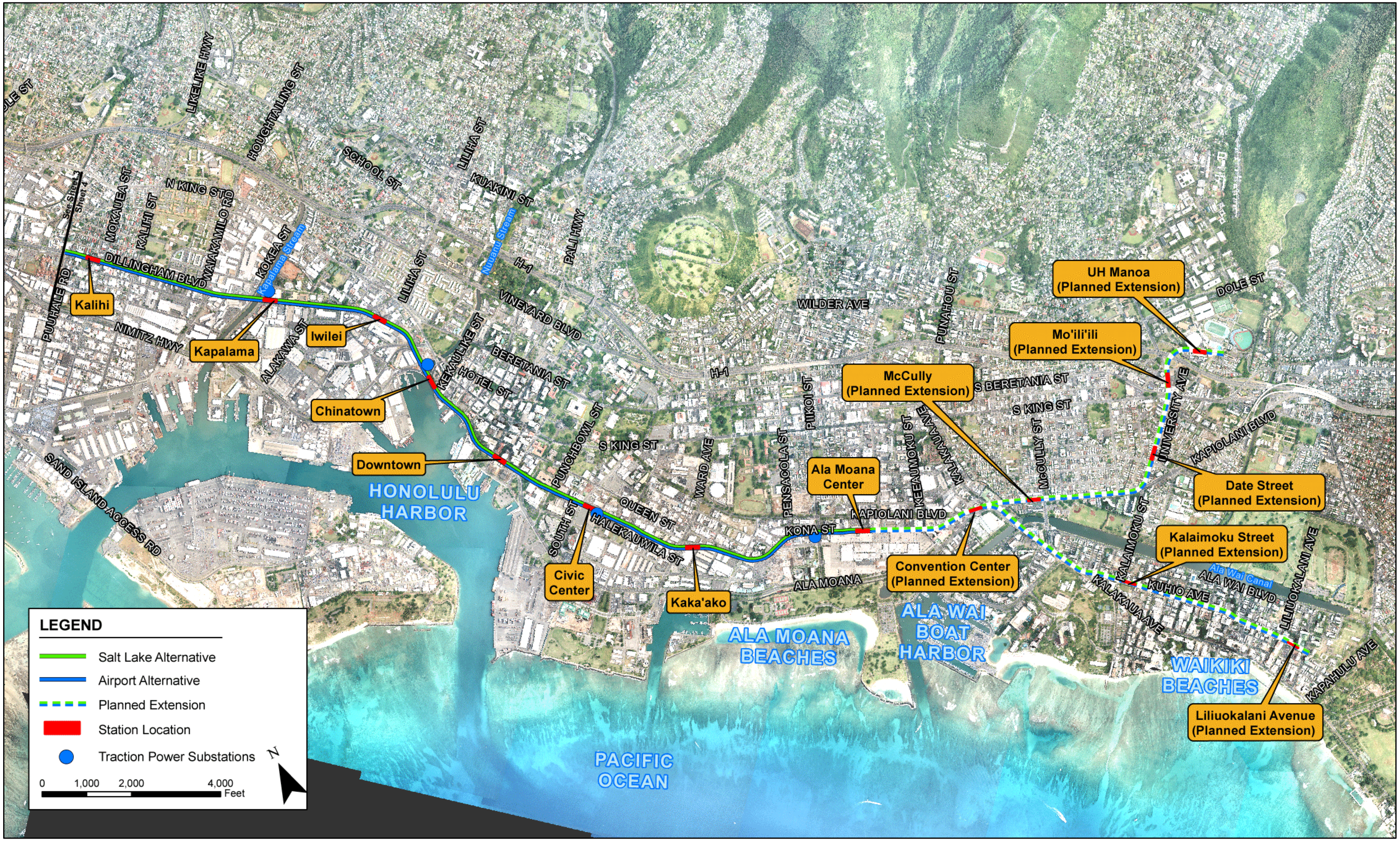


Figure 1-6: Fixed Guideway Transit Alternative Features (Kalihi to UH Mānoa)

Airport Alternative

The Airport Alternative would continue along Kamehameha Highway makai past Aloha Stadium to Nimitz Highway and turn makai onto Aolele Street and then follow Aolele Street Koko Head to reconnect to Nimitz Highway near Moanalua Stream and continuing to the Middle Street Transit Center (Figure 1-5). Stations would be constructed at Aloha Stadium, Pearl Harbor Naval Base, Honolulu International Airport, and Lagoon Drive. The total guideway length for this alternative would be approximately 20 miles and it would include 21 stations. The eventual guideway length, including planned extensions, for this alternative would be approximately 29 miles and it would include 33 stations.

Airport & Salt Lake Alternative

The Airport & Salt Lake Alternative is identical to the Salt Lake Alternative, with the exception of also including a future fork in the alignment following Kamehameha Highway and Aolele Street at Aloha Stadium that rejoins at Middle Street. The station locations discussed for the Salt Lake Alternative would all be provided as part of this alternative. Similarly, all the stations discussed for the Airport Alternative also would be constructed at a later phase of the project; however, the Aloha Stadium Station would be relocated makai to provide an Arizona Memorial Station instead of a second Aloha Stadium Station. At the Middle Street Transit Center Station, each line would have a separate platform with a mezzanine providing a pedestrian connection between them to allow passengers to transfer. The total guideway length for this alternative would be approximately 24 miles and it would include 23 stations. The eventual guideway length, including planned extensions, for this alternative would be approximately 34 miles and it would include 35 stations.

1.3.3 Features Common to All Build Alternatives

In addition to the guideway, the project will require the construction of stations and supporting facilities. Supporting facilities include a maintenance and storage facility, transit centers, park-and-ride lots, and traction power substations (TPSS). The maintenance and storage facility would either be located between North-South Road and Fort Weaver Road or near Leeward Community College (Figure 1-3 and Figure 1-4). Some bus service would be reconfigured to transport riders on local buses to nearby fixed guideway transit stations. To support this system, the bus fleet would be expanded.

2 Studies and Coordination

The reader does not need to have prior knowledge or review published reports or other background materials to understand this report. All material is presented as part of the analysis. If needed, full citations of all materials can be found in the *References* chapter at the end of this report. Laws applicable to this analysis are as follows:

- **Definition of Real Estate Property Tax Rates**—*Real Estate Tax Rate Tables*, City of Honolulu, Department of Budget and Fiscal Services, Real Property Assessment Division, *http://www.honolulu.gov/rpa/ staterpt/ 2007_staterpt.htm*, February 2008.
- **Definitions of Real Property Tax Classifications**—Revised Ordinances of Honolulu, Chapter 8. 1978.

3 Methodology

3.1 Area-wide Market Development Demand Analysis and Development Impact Analysis

3.1.1 Market Development Demand Analysis

This assessment provides a “top-down” perspective of the area-wide market demand, which provides the necessary context for the detailed station area analysis. Based on this analysis, the characteristics of the station area development concepts were assessed and recommended revisions identified where appropriate.

The study corridor encompasses three regional development plan areas:

- Primary Urban Center (PUC) Development Plan (DPP 2004)
- Central O‘ahu Sustainable Communities Plan (DPP 2002)
- ‘Ewa Development Plan (DPP 1997)

The corridor’s future growth potential was evaluated based on the following factors:

- Historic growth levels in the Honolulu metropolitan region and within the region as a whole.
- Historic capture rates for employment and population within the Honolulu metropolitan region and the corridor, relative to the State as a whole. A ratio share analysis was used for population and a shift share analysis was used for employment. In a shift share analysis, changes in employment within a given industry are divided into regional economic and area-specific components. By comparing changes in employment within the study area with changes in the (larger) reference area, it is possible to determine whether growth (or decline) in the local area was mainly due to the regional economy’s competitive advantages (or disadvantages), or to local area supply factors that might have made the study area more or less competitive. These factors could readily include transportation accessibility.
- Existing projections of employment and population growth, including existing control totals for the State and metropolitan Honolulu region. These control totals are assumed to be consistent with the future population and employment estimates used in the travel demand model. Reliable third-party data were also evaluated, including regional forecasts from Global Insight, an economic and financial forecasting company.
- In support of existing control totals for population and employment, a survey of select development officials and researchers (both university and private) was conducted to qualitatively assess the pace of development and specific types of development (e.g., multi-family housing, mixed-used development, transit oriented development, and commercial and retail development).

- Population and employment market-demand estimates were translated into potential demand for residential, office, and retail space in the region for five-year increments over the same forecast period. This was accomplished by using historical trends and correlations obtained during this analysis.

3.1.2 Development Impact Analysis

As part of a wider economic impact assessment, likely constraints that the existing transportation system would place on planned regional growth were identified. Potential opportunities that the Project would induce and the Project's effects on property values were also evaluated.

Potential Opportunities Induced by the Project

Potential opportunities induced by the Project were evaluated to assess additional growth and development over and above the baseline market assessment (i.e., conditions that would exist in the absence of the Project). These impacts are likely to occur within station areas but may extend out more generally in the study corridor. This assessment is based on publicly available research, site visits, and interviews with regional stakeholders (e.g., State agencies, City and County of Honolulu, business associations, real estate interests).

The Project's Effect on Property Values

The Project's impact on the market value of property in the corridor was estimated. Multipliers derived from previous research on this subject (at the national level) were used. Whenever available, additional and updated research specific to Honolulu was used. For example, Bay Area Economics (BAE 2005), among others, has estimated a statistically significant positive association between proximity to rail stations and property values (i.e., development closer to transit stations is likely to have higher property values than development farther from stations).

3.2 Construction Impacts on Employment

This analysis assumes that total construction employment is a function of the following:

- Direct employment (i.e., on-site construction employment): this measures the initial effect attributable to the investment related to the construction of a major project (e.g., the Project) compared to the current civil construction market.
- Indirect employment (i.e., off-site employment): this includes the manufacturing and preparation of supplies and equipment, and measures the subsequent intra- and inter-industry purchases of inputs as a result of the initial change in output of the directly affected industry.
- Induced employment (i.e., employment generated to fulfill demands for goods and services to newly employed households): this reflects changes in

household spending that result from changes in earnings through direct and indirect effects.

To estimate the total number of jobs that would be created, this analysis assumes employment multipliers derived from the 2002 State Input-Output Study for Hawai‘i (DBEDT 2002). Direct, indirect, and induced multipliers for the heavy and civil engineering construction sector were used accordingly (multiplier values of 9.25, 4.03, and 8.90, respectively). The final-demand employment multiplier indicates the change in the number of jobs (i.e., 22.18 total jobs—the sum of direct, indirect, and induced multipliers) for a $1 million change in final construction demand. Jobs are measured in job-years. Thus, one job derived with an input-output multiplier estimates employment of one person for one year.

Employment multipliers represent a quantitative expression of the extent to which construction of the Project would generate additional employment. This expression reflects interdependencies associated with some assumed and/or empirically established "endogenous" linkage system. (*Endogenous* refers to a method of growth modeling that assumes resources internal to an economy are used for research and development.) Although multipliers are often used to estimate these effects, the following caveats are important when using them:

1. The final-demand employment multipliers tend to decrease over time due to increases in worker productivity and inflation. Basically, technological advances continually shift capital/labor ratios (i.e., increased reliance on capital [equipment] can lead to a reduced role for labor). As such, using a 2008 multiplier may yield inflated employment estimates for subsequent years of analysis (e.g., 2009, 2010).
2. Direct employment impacts are short-term, so there is a higher degree of confidence regarding ensuing construction cost estimates.
3. Indirect and induced employment effects may continue after construction is complete. Thus, indirect and induced employment estimates may not fully account for the resulting employment (i.e., these estimates may be conservative).

Although these uncertainties are inherent in this analysis, the conservative nature of caveats 2 and 3 (above) may moderate the inflated employment numbers resulting from the “technology effect” outlined in caveat 1.

3.3 Impacts of Right-of-Way Acquisition on Real Property Tax Revenues

The City and County of Honolulu (City), as with many municipalities, assesses real property taxes based on the value of land and structures. Property used for City purposes is exempt from taxes (ROH 1978). As a result, land taken as part of the Project would reduce the taxable base and overall tax revenues.

Based on land acquisition information from the *Honolulu High-Capacity Transit Corridor Project Neighborhoods and Communities Technical Report* (RTD 2008), resulting property tax revenue losses can be calculated in one of two ways: (1) investigating historical tax liabilities for each acquired parcel, then assuming a reduction in these taxes based on proposed acquisitions and associated tax liability, or (2) applying assumed tax rates to each parcel and calculating the resulting reduction in property tax revenue.

For this analysis, an assumed rate was applied to the assessed value of property proposed to be acquired. Table 3-1 shows real property tax rates for the fiscal year ending June 2007, which was used for this analysis (DBFS 2008). In cases of partial acquisitions, the reduction in taxable value was assumed in the same proportion as the ratio of the area of land acquired to the total parcel area. Building value was not assessed separately from land value, because project designs have not yet achieved sufficient detail to determine which buildings would be acquired for project right-of-way.

This analysis does not take into account increases in assessed values for parcels in close proximity to proposed fixed guideway stations. Although some discussion is provided in Section 5.2.1, there is no clear conclusion or quantification of these value increases and thus no quantifiable impact on property taxes. However, it is likely that property value increases would somewhat offset real property tax base losses caused by land acquisitions.

Table 3-1: City of Honolulu 2007 Real Property Tax Rates

Property Type	Tax Rate per $1,000 Property Value
Improved residential	$3.59
Unimproved residential	$5.72
Apartment	$3.59
Hotel and resort	$11.97
Commercial	$11.97
Industrial	$11.97
Agricultural	$8.57
Preservation	$9.57
Public service	$0.00
Vacant agriculture	$8.57

Source: City and County of Honolulu, Department of Budget and Fiscal Services.

4 Affected Environment

4.1 Introduction

This section evaluates historic and projected population and employment trends in Hawai‘i in order to gauge the current and potential market demand for the Project. This section provides data for three different levels of geography: the State of Hawai‘i, the Island of O‘ahu, and the study corridor.

The PUC includes Downtown Honolulu and serves as the center for the main industries on O‘ahu: tourism and professional and business services. Central O‘ahu consists of commercial, residential, and military land uses. ‘Ewa is in the western part of the Island where several significant residential, governmental, and educational projects are under development.

A second breakdown of the study corridor includes six individual growth centers that constitute the largest commercial and residential areas in O‘ahu. The growth centers were identified in interviews with industry experts who included university professors, development experts, real estate professionals, and business associations. During the interview process, experts identified the following regions, in the study corridor, as having strong growth or potential for growth: Downtown-Chinatown, Kaka‘ako, Waikīkī, ‘Aiea-Pearl City, Kapolei, and Waipahu. District-level data were used when studying historical and forecast employment.

The population analysis was conducted using a share analysis, based on O‘ahu's population as a percentage of the State's and the study corridor's population as a percentage of the population of O‘ahu. Although this does not show growth in absolute terms, it provides reasonable estimates of growth and trends that can be used to estimate impacts on the transit system.

4.2 Historical Population and Employment Trends

O‘ahu is the largest island in terms of population and employment, accounting for approximately 74 percent of the State's population. The study region accounts for nearly three quarters of the population of O‘ahu, making it the largest population center in O‘ahu and within the State.

Table 4-1 shows the State's population as a whole, which increased at over two times the pace of O‘ahu between 1995 and 2005—from 1.196 million to 1.273 million, or by 0.49 percent annually. O‘ahu's population grew from 881,400 in 1995 to 904,600 in 2005—a 0.33-percent average annual increase. This difference is a result of other less populated Hawaiian Islands (e.g., The Big Island and Maui) growing at relatively higher annual rates—1.8 and 1.7 percent annually, respectively. An estimated 685,500 people lived in the study corridor in 2006.

Table 4-1: Historical Population of Hawai'i and O'ahu

Population	1995	2000	2005
Hawai'i (State)	1,196,900	1,212,100	1,273,300
O'ahu	881,400	876,100	904,600
Percent of State	74%	72%	71%
Population Growth	**1995–2000**	**2000–2005**	**1995–2005**
Hawai'i (State)	15,200	61,200	76,400
O'ahu	-6,000	28,500	23,200
Percent of State	0%	47%	30%
Population Growth (percent of average annual increase)	**1995–2000**	**2000–2005**	**1995–2005**
Hawai'i (State)	0.25%	1.00%	0.49%
O'ahu	-0.14%	0.65%	0.33%

Source: U.S. Census Bureau

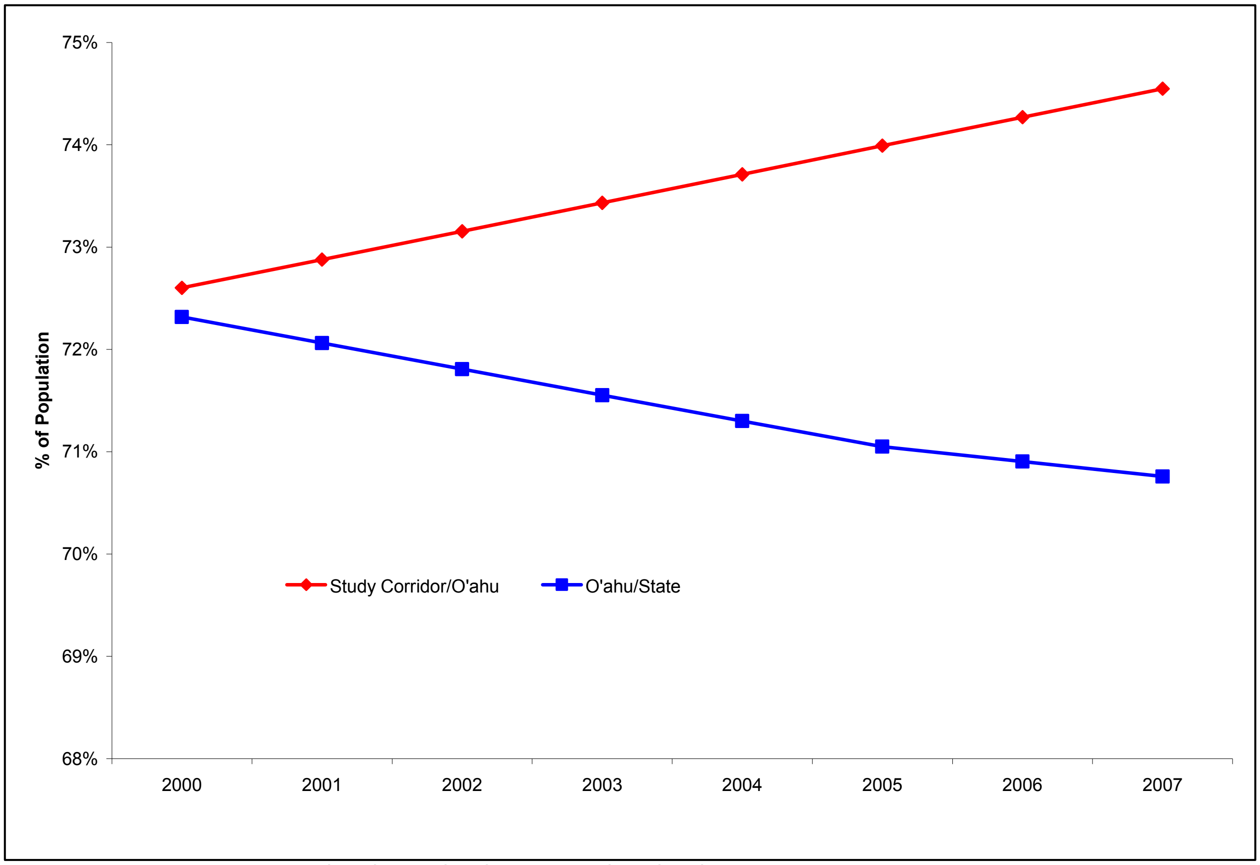
Table 4-2 shows the age distribution of O'ahu's population, which has aged over the past 17 years—a trend expected to continue in Hawai'i and many parts of the United States. Age groups above 45 years old have all increased since 1990, with somewhat proportional decreases in age groups below 45. As this trend continues, the demand for smaller residential properties that are easier to maintain by the elderly will increase.

Table 4-2: Age Distribution in O'ahu

Population	Historical				Current
	1990	1995	2000	2005	2007
Age 0 through 14	21.12%	20.54%	19.92%	19.49%	19.43%
Age 15 through 24	15.50%	14.67%	14.04%	14.37%	14.08%
Age 25 through 34	18.65%	16.76%	14.85%	13.21%	13.40%
Age 35 through 44	15.51%	15.61%	15.59%	13.89%	13.21%
Age 45 through 54	9.76%	11.59%	13.42%	13.75%	13.27%
Age 55 through 64	8.53%	8.58%	8.74%	11.26%	11.77%
Age 65 and older	10.92%	12.25%	13.44%	14.03%	14.84%

Totals may not add to 100% due to rounding.
Source: Global Insight, Inc.

Figure 4-1 shows that despite O'ahu's declining population share relative to the State, the study corridor has experienced an increase in the Island's population share—from 73 percent in 2000 to 75 percent in 2007. This is primarily due to growth in jobs in the tourism and professional and business services industries.

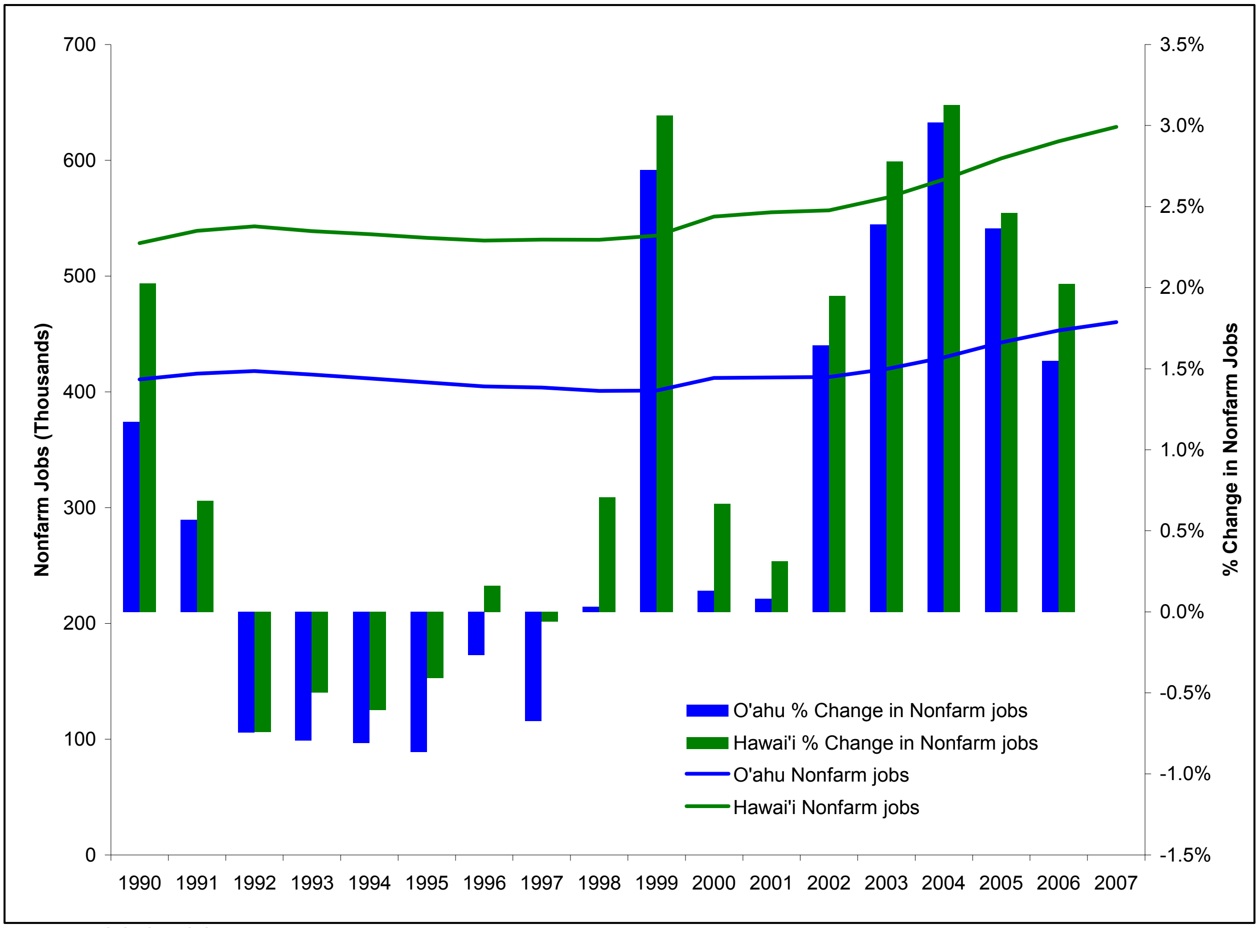


Source: U.S. Census Bureau and O‘ahu Regional Transportation Plan data.

Figure 4-1: Population Shares for O‘ahu and the Study Corridor (2000–2007)

Honolulu has a higher number of jobs than any other area in O‘ahu or the State, accounting for almost 70 percent of the State’s total nonfarm employment.

Historically, job growth for nonfarm jobs on O‘ahu and the State of Hawai‘i has been slow. Between 1993 and 1998 there was a decline in the number of nonfarm jobs. However, between 2000 and 2006 there was positive growth of between 0.1 and 3.0 percent. Figure 4-2 shows the historical growth in nonfarm jobs for the State and O‘ahu. The vertical bars show the annual percent change (right axis) and the lines show the absolute trend in nonfarm employment (left axis).



Source: Global Insight, Inc.

Figure 4-2: Nonfarm Jobs (Numbers and Percentage Change) (O‘ahu and Hawai‘i)

Employment in Honolulu is primarily dependent on the tourism industry, although the professional and business services sectors are also growing rapidly, currently accounting for 14 percent of total nonfarm employment. Expected residential growth on the ‘Ewa side of the study region will result in the need for additional population-serving employment (retail and service jobs). Some educational and research and development jobs are also expected to develop on the ‘Ewa side of the Island, but tourism—especially near Waikīkī—will continue to be the largest industry and job generator on O‘ahu.

4.3 Market Development Demand Forecast

Table 4-3 shows a forecast of population age distribution on O‘ahu. Almost all the seven age strata are expected to be stable or to decline between 2007 and 2030, except for the oldest age category. The proportion of people age 65 and older is expected to more than double from today’s level, continuing the historical trend shown in Table 4-2.

Table 4-3: Forecast Age Distribution on O'ahu (2007–2030)

Population	Current 2007	Forecast 2030
Age 0 through 14	19.43%	14.14%
Age 15 through 24	14.08%	11.83%
Age 25 through 34	13.40%	13.73%
Age 35 through 44	13.21%	12.06%
Age 45 through 54	13.27%	8.56%
Age 55 through 64	11.77%	9.50%
Age 65 and Older	14.84%	30.19%

Source: Global Insight, Inc.

As shown in Table 4-4, the study corridor's population as a share of O'ahu's population is expected to grow from 63 percent in 2000 to 69 percent in 2030 (O'ahuMPO 2006). This indicates that people moving to O'ahu or current residents are choosing to reside in or relocate to the study corridor. This gradual increase in population share will lead to a higher annual growth rate of 1 percent per year.

Table 4-4: Total Population of the State, O'ahu, and the Study Corridor (2000–2030)

	2000	2030	CAGR[1]
Hawai'i	1,273,300	1,512,100	0.6%
O'ahu	876,200	1,111,300	0.8%
Corridor	552,100	764,600	1.1%
O'ahu/Hawai'i	69%	73%	
Corridor/O'ahu	63%	69%	

[1]CAGR = Compound annual growth rate

Source: Global Insight, Inc., and O'ahu Regional Transportation Plan data.

Job growth is expected to be the primary attractor of younger people to the study region and the individual growth centers. High-tech jobs in bio-tech, research and development, and professional and business services are expected to develop both in Honolulu and other portions of the study region. Overall, the study corridor's employment base as a share of O'ahu's is expected to increase from 80 percent in 2000 to 83 percent in 2030 (as shown in Table 4-5). However, the number of jobs in the growth centers as a share of the study region is expected to remain constant at 44 percent between 2000 and 2030.

Table 4-5: Forecast of Total Jobs in the Growth Centers and the Study Corridor (2000–2030)

	2000	2030	CAGR[1]
O'ahu	501,100	630,700	0.8%
Corridor	399,300	524,200	0.9%
Growth Centers	173,800	231,900	1.2%
Corridor/O'ahu	80%	83%	
Growth Centers/Corridor	44%	44%	

[1]CAGR = Compound annual growth rate
Source: O'ahu Regional Transportation Plan data.

Employment growth in O'ahu is expected to be boosted by strength in the sectors mentioned above and in the construction sector, due to the large-scale residential development expected to occur in 'Ewa. Table 4-6 shows expected growth in key employment segments. The table indicates that slower growth should be expected in the tourism industry while faster growth is expected in the retail and service industries.

Table 4-6: Forecast Jobs in Key Industries in the Study Region (2005–2030)

	2005	2030	CAGR[1]
Military	32,000	32,100	0.0%
Government	32,000	36,200	0.5%
Hotels and hospitality	16,200	18,300	0.5%
Agriculture	2,300	2,600	0.5%
Transportation, communication, and utilities	36,000	45,100	0.9%
Industrial	27,100	31,600	0.6%
Retail	70,000	92,400	1.1%
Financial, insurance, real estate	55,500	67,600	0.8%
Service	128,600	173,300	1.2%
Construction	21,200	23,700	0.4%

[1]CAGR = Compound annual growth rate
Source: PB Analysis

The corridor's six major growth centers are where the majority of job and household development is expected to occur. Figure 4-3 shows the number of jobs in the individual growth centers as a percentage of the total number of jobs in the study region. Downtown-Chinatown is expected to experience the greatest decline in employment relative to the other growth centers, and Kapolei-Ko 'Olina-Kalaeloa is expected to experience the greatest relative increase.

Waikīkī, Downtown-Chinatown, and Waipahu are prominent retail and entertainment centers. They could be more susceptible to job stagnation or losses due to relatively slower expected tourism sector growth on O'ahu. The increase in the share of jobs in Kapolei is attributed to employment-supporting population increases due to the new housing developments, the new UH West O'ahu campus, government employment, and the growth of new industries in the 'Ewa part of the study region.

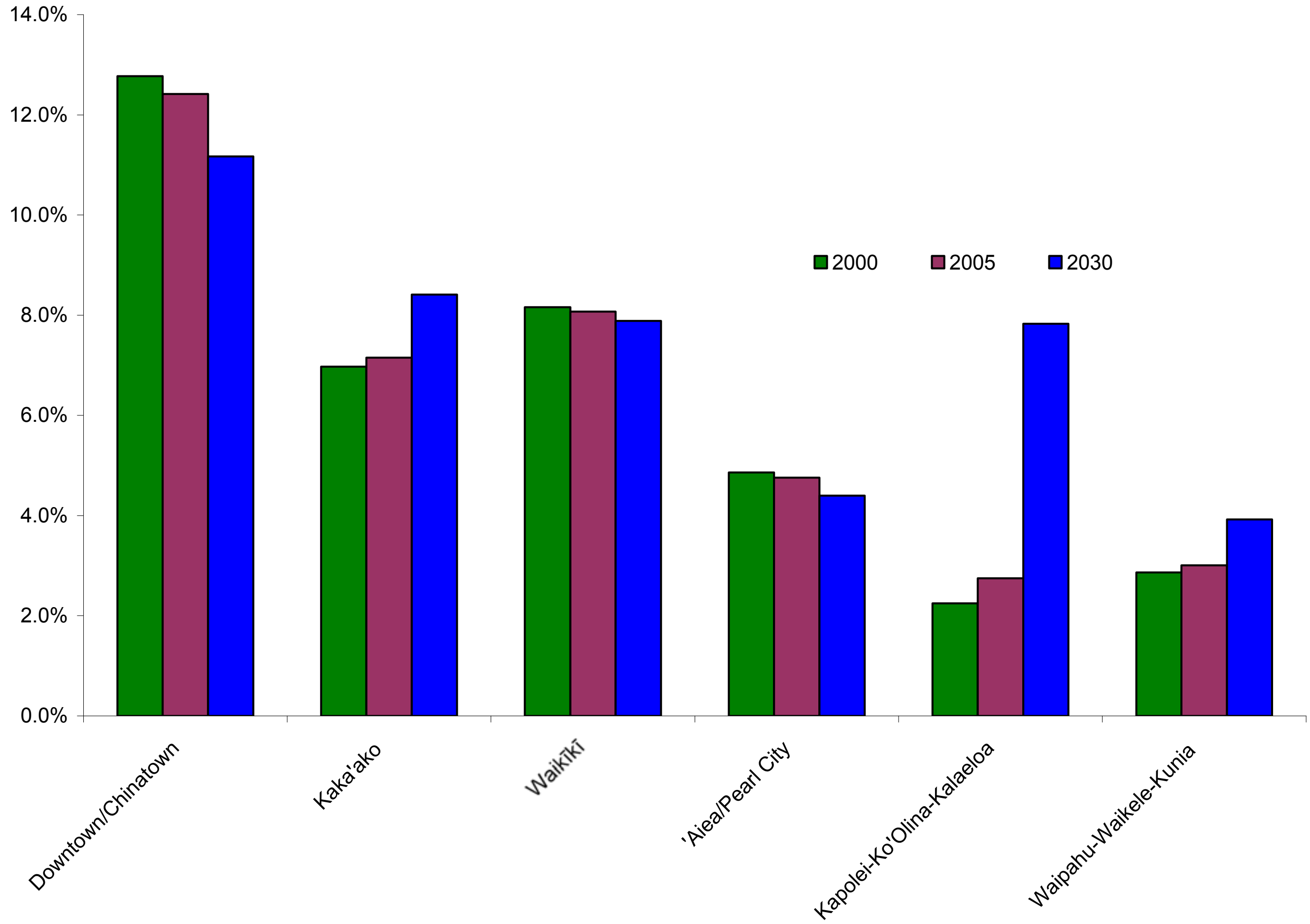


Figure 4-3: Share of Job Growth Centers—2000, 2005, 2030

Note: 2030 share extrapolated based on available growth rates (2005–2025)

The forecasts of job growth discussed previously were used to estimate quantities of non-residential real estate expected to be built over the forecast period. A comprehensive survey of vacancies, land entitlements, and parcel-level zoning was not performed as part of this analysis. However, planning-level estimates of gross square footage of office and retail space were made using standard multipliers of employment per square foot of building space. In this analysis, 400 square feet of space per retail employee and 250 square feet of space per office employee were applied to forecast job growth. Forecasts of employment that would be housed in retail and office space were estimated using industry-level employment forecasts. Employment housed in office space consisted of portions of the finance, insurance and real estate, services, transportation, communications, and utilities sectors. Employment housed in retail space consisted of portions of the retail and services industries. Government employment was not included in this analysis. Forecasts were based on employment growth projections provided by the City, which take into account known plans of major development.

Table 4-7 shows that ‘Ewa is expected to experience the most growth in office and retail space between 2005 and 2030 due to the robust job growth expected in that part of the study region. More than 10 million square feet of non-residential space is expected to be built in ‘Ewa between 2005 and 2030. Overall, the study region is expected to add approximately 9 million square feet of retail space and 14.2 million square feet of office space between 2005 and 2030. This would effectively increase the corridor’s total retail and office square footage or by 31 percent—from 74 million square feet in 2005 to 97.2 million square feet in 2030.

Table 4-7: Potential Demand for Office and Retail Space in the Study Region (Millions of Square Feet and CAGR)

		Employment Growth 2005–2030		Gross Square Foot Factor	Gross Square Feet
		CAGR[1]	Increment		
PUC	Retail	0.5%	7,200	400	2,880,000
	Office	0.6%	24,000	250	6,000,000
‘Ewa	Retail	7.6%	13,500	400	5,400,000
	Office	4.0%	21,400	250	5,350,000
Central O‘ahu	Retail	0.7%	1,700	400	680,000
	Office	1.7%	11,400	250	2,850,000
Total Corridor	Retail	1.1%	22,400	400	8,960,000
	Office	1.1%	56,800	250	14,200,000
2005–2030 Growth			**79,200**		**23,160,000**
2005 Estimate			**254,064**		**74,010,000**
2030 Estimate			**333,264**		**97,170,000**

[1]CAGR = Compound annual growth rate

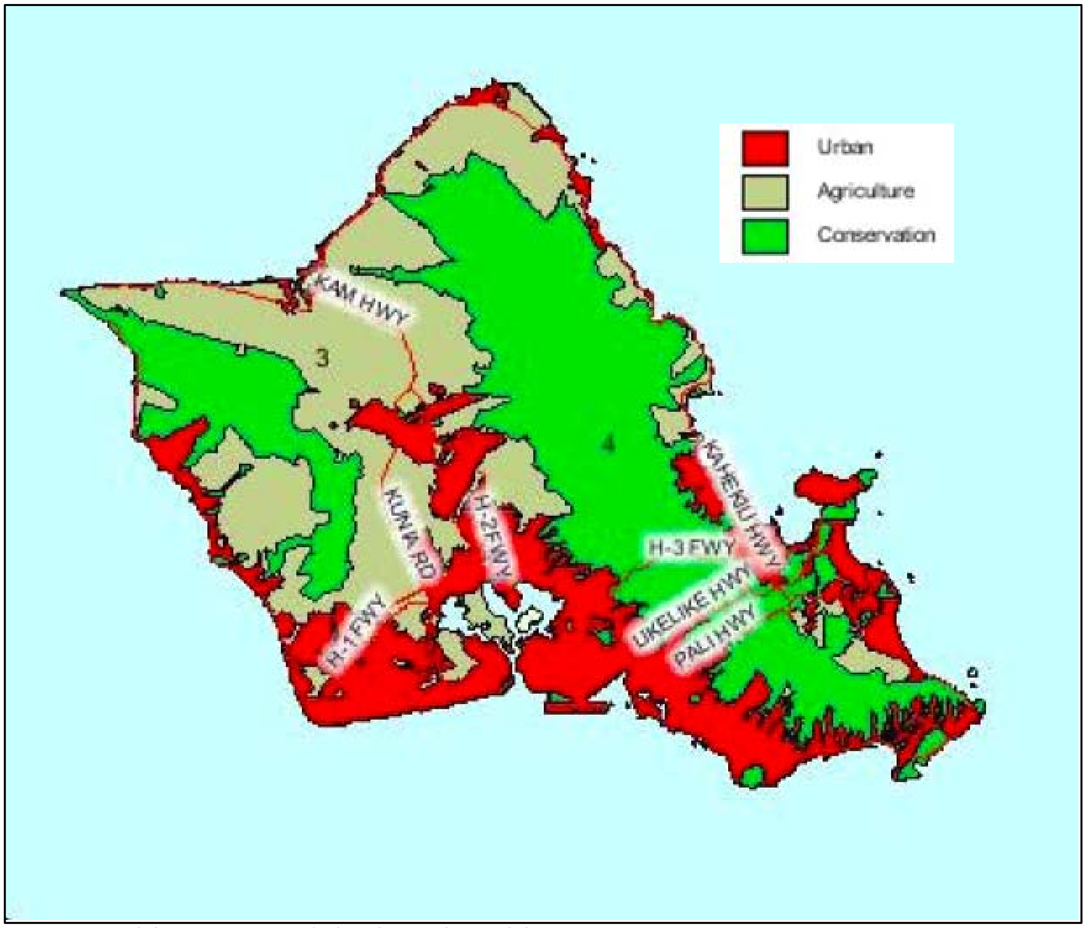
4.4 Corridor Land Use

The study region passes through three distinct development areas, as described in detail previously. These areas are listed in Table 4-8, along with their general land use descriptions.

Under the current system, land is classified at the State level as urban, rural, agricultural, and conservation. Although counties have the ability to plan within the State’s urban, rural, and agricultural lands, conservation lands are controlled at the State level. O‘ahu’s two major mountain ranges are primarily conservation lands, and thus are expected to remain restricted from development. These areas, as well as other land classifications on O‘ahu, are shown in Figure 4-4.

Table 4-8: Land Use Overview

Corridor Subdivision	Land Use Overview
'Ewa: includes Honouliuli-'Ewa Beach, Kapolei-Ko 'Olina-Kalaeloa, and Makakilo-Makaiwa	'Ewa is primarily an agricultural area being developed into single-family and garden-style apartment residential uses, as well as some light industry and commercial uses. This area includes the City of Kapolei. A number of State and Local government offices have moved to Kapolei, as well as some light industry (including a bio-tech facility). Planned developments in the area include: • UH West O'ahu campus—a 76-acre planned campus near the proposed UH West O'ahu station • A mixed-use community named Ho'opili planned by DR Horton on land it currently owns • The Kroc Center, a major recreational facility and activity center, will be built across North-South Road from the East Kapolei fixed guideway station.
Central O'ahu: includes Waipahu-Waikele-Kunia, Waiawa-Koa Ridge, Mililani-Melemanu-Kīpapa, and Wahiawā-Whitmore-Schofield	Central O'ahu, including Waipahu, is comprised of moderate-density residential, commercial, and light industrial uses. Commercial use includes big-box retail and Waipahu Shopping Village along Farrington Highway. Leeward Community College is located between Waipahu and Pearl City and will have a dedicated station. Planned developments in the area include the following: • The City of Honolulu Department of Planning and Permitting has initiated a transit-oriented development plan for the Waipahu area • Waiawa Ridge residential development • The former Navy drum site is one of two possible locations for a transit maintenance and storage yard
Primary Urban Center (PUC): includes Ward-Chinatown, Kaka'ako, Punchbowl-Sheridan-Date, Waikīkī, Kāhala-Tantalus, Pauoa-Kalihi, Iwilei-Māpunapuna-Airport, Hickam-Pearl Harbor, Moanalua-Hālawa, and 'Aiea-Pearl City	The PUC is a wide-ranging development district stretching from Pearl City through Salt Lake, Downtown Honolulu, and Kaka'ako. Land uses along the corridor in Pearl City include big-box retail and health services. Aloha Stadium is located in Salt Lake along with associated parking, shopping facilities, some residential development, military uses, and associated residences, schools, and some light industry close to Honolulu Harbor and Kalihi. As the corridor approaches Downtown Honolulu, moderate to high-density uses become more prominent. The Downtown area is comprised of all high-density uses, including major office buildings, retail, and high-density condominiums. Major State and Local government offices are also located Downtown. Adjacent to Downtown, Kaka'ako contains a mix of large retail uses, restaurants, and theaters. Ala Moana Shopping Center has 1.8 million square feet of retail space and is the largest shopping center on the Island. Planned developments in the area include the following: • Kamehameha Schools plans to redevelop land it owns in Kalihi into mixed-use developments, including residential and retail • Possible development of a power-plant site • 18 stories of affordable housing on Keawe and South Streets • Potential redevelopment in Kaka'ako on land owned by Kamehameha Schools, General Growth Properties, and the Hawai'i Community Development Authority • In general, less development is expected in the PUC than in 'Ewa because this area is already heavily developed



Source: Honolulu Department of Planning and Permitting.

Figure 4-4: O‘ahu Zoning Areas

4.5 Property Value

Median home prices on O‘ahu are high, on average exceeding those of all but a few mainland U.S. metropolitan areas (NAR 2007). Condominiums prices on O‘ahu are also high. Real estate prices within the corridor vary, with the lowest property values currently in ‘Ewa because of agricultural lands.

The highest property value areas on O‘ahu are outside the study region in Diamond Head and Hawai‘i Kai (median selling prices were $1.1 million and $860,000 in 2007, respectively, estimated based on first three quarters of figures from the Honolulu Board of Realtors). These statistics are shown in Table 4-9.

Table 4-9: O‘ahu 2007 Median Real Estate Prices [1]

Region	Single-Family Homes	Condominiums
PUC	$696,402	$326,326
Central O‘ahu	$644,486	$294,892
‘Ewa	$547,959	$321,104
Entire island	$665,386	$335,117

[1]2007 median selling prices based on estimates current through third quarter of 2007.

In general, property values on O‘ahu have grown strongly over the past 20 years. From 2000 to 2007, the prices of single-family homes and condominiums grew at a CAGR of 12 percent and 15 percent, respectively (HBR 2007), well outpacing general inflation which was 3.1 percent during the same period (Inflation is estimated using the Consumer Price Index for the State of Hawai‘i [GII 2008]). A comparison of median single-family home and condominium prices statewide and nationally, over the same period, is shown in Table 4-10 and Table 4-11 (GII 2008) (data not available for statewide condominium price growth).

Table 4-10: Median Single-Family Home Price Growth

Region	CAGR[1] (2000–2007)
PUC	12.7%
Central O‘ahu	15.7%
‘Ewa	14.8%
Entire island	12.3%
State of Hawai‘i (existing)	13.6%
National (existing)	7.5%

[1]CAGR = Compound annual growth rate

Table 4-11: Median Condominium Selling Price Growth

Region	CAGR[1] (2000–2007)
PUC	15.7%
Central O‘ahu	19.3%
‘Ewa	20.4%
Entire island	15.1%
National (existing)[2]	4.5%

[1]CAGR = Compound annual growth rate
[2]Median national condominium price CAGR based on best available data (2004–2007).

Strong property value growth results, in part, from a restricted supply of developable land. O‘ahu’s developable area is naturally restricted to a small footprint because of the Wai‘anae and Ko‘olau Mountain Ranges. Hawai‘i also has both statewide and local zoning that is restrictive to real estate development. Additionally, agricultural land tends to be difficult to convert to commercial or residential zoned land, although this has occurred on the ‘Ewa Plain. Because of these restrictions on development, the housing supply has not kept up with demand, which is one reason for the relatively high property values on the Island.

5 Consequences

5.1 No Build

Although the No Build Alternative assumes completion of projects defined in the *O'ahu Regional Transportation Plan 2030* (ORTP) (O'ahuMPO 2006), no construction would be directly undertaken as part of the Project. Economic and development-related impacts associated with development of the individual projects listed in the ORTP are not detailed in this evaluation, because these projects will undergo planning and environmental review as part of their individual project development process. Therefore, no economic or development-related impacts are associated with the No Build Alternative for the Project.

5.2 Consequences Common to All Build Alternatives

5.2.1 Development Impact Analysis

Evaluation of the Constraining Effects of the Existing Transportation System on Worker Accessibility

To the extent that No Build congestion levels will result in significantly increased commute times to employment-rich areas within the study region, the corridor's full employment potential may be constrained in the future, resulting in less employment and development than might be achieved from a pure market development perspective. To allow for inferences about whether congestion-related labor market constraints may exist in the future—and whether such constraints might be mitigated with the Project—the impact of the proposed high-capacity transit system on areas most severely impacted by congestion were identified. Specifically, differences in commute times and level of service (LOS) were examined for the No Build and Build Alternatives, including the number and percentage of peak-period trips within the corridor with commute times that would exceed a reasonable threshold (e.g., one hour) with and without the Project. This assessment is based on information derived from the travel demand model.

Although a one-hour commute time is only a benchmark, it may be reasonably viewed as presenting a psychological barrier for workers, especially those at the lower end of the income spectrum. These lengthy travel times may be viewed as prohibitively long from the perspective of many workers. Workers with a one-hour, one-way commute time represent approximately 7 percent of all workers in the United States (Pisarski 2006) living in metropolitan areas.

Table 5-1 shows the two areas projected by the travel demand model to have travel times of over one hour in 2030, with the No Build Alternative: Kapolei and 'Ewa. With the Project, the travel time savings with the First Project's 20-mile alignment (as defined in the *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Draft Transportation Impacts Results Report* [DTS 2006a]) would be 37 minutes for Kapolei (a 41-percent reduction) and 33 minutes for 'Ewa (a 36-percent reduction).

This reduction in travel times from Kapolei and ‘Ewa to Downtown would lower the average commute from these areas to less than one hour.

Table 5-1: AM Peak-Period Transit Travel Times (minutes) by Origin Destination Pair[1]

	Kapolei-Downtown	‘Ewa-Downtown	Waipahu-Downtown	Pearlridge Center-Downtown	Downtown-Waikīkī
2030 No Build					
Transit travel time (minutes)	90	91	66	57	33
2030 Build					
Transit travel time (in minutes)	53	58	33	28	27

[1]Represents the a.m. peak period defined in the source report.
Source: Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Draft Transportation Impacts Results Report (DTS 2006).

Other areas that would experience significant peak-period travel time reductions include Pearlridge Center and Waipahu in the direction of Downtown. Although these areas do not exhibit commute times of over one hour under the No Build Alternative, commute times and congestion delay from these areas are still sizeable and significant percentage reductions in these commute times would help workers access their places of employment in a more timely manner.

Transit usage is expected to increase from 6.1 percent of total trips with the No Build Alternative to 7.4 percent with the Build Alternatives. Total vehicle trips are expected to decrease by 1.6 percent. This switch in modes indicates that any travel time savings on transit would impact a potentially larger number of travelers.

The H-1 Freeway is the most heavily congested corridor during the peak hour on O‘ahu. It has an average volume-to-capacity ratio of 1.11 and average speeds of 24 miles per hour, making it LOS F (the lowest obtainable grade). In general, the Project would improve overall congestion by about one LOS grade on the H-1 Freeway during peak hours, compared to the No Build Alternative. The greatest benefit would be evident in Koko Head-bound trips in the Kapālama Canal and Ward Avenue areas, where LOS would improve by at least one grade under all Build Alternatives. This is due to an average decrease of 3.9 percent in the forecast traffic volumes (measured in vehicles per hour).

Based on these findings, the potential for measurable accessibility improvements for employees in the corridor is significant. These improvements may be sufficient to ensure that employers in the corridor—and particularly in the high-density employment core Downtown—will be able to find workers at competitive wage levels.

Effect on Property Values

This section outlines possible positive and negative effects on property values, and summarizes the Project’s potential effects on O‘ahu property values.

Potential Positive Effects

The Project’s potential positive effects on property values were evaluated based on research, industry experience, and expert interviews. To accomplish this, research was compiled on a national level to examine the relationship between property value and transit station proximity. Although based on data from mainland United States cities, this information is relevant for use in this analysis to develop a range of potential impacts in Honolulu from a fixed guideway transit system.

The research presented in Table 5-2 shows that residential property values increased as much as $2,300 in market value for every 100 feet closer to a station. This has been documented in densely populated areas such as New York City. In other areas, value increases were also realized but to a lesser extent.

Table 5-2 presents a small sample of the research that has been performed on this topic, using a variety of methods and assumptions. This information is not presented herein to suggest that any of these value increases will occur in Honolulu. Indeed, most studies on real estate value impacts from transit show increases in value, but they cannot explicitly isolate transit benefits from other market forces that affect real estate values. In some cases, transit has a negative effect on real estate values—a circumstance explored in the following *Potential Negative Effects* section.

Value increases within proximity of a transit station are realized in sales price or rent premiums. For residential properties, these increases resulted from potential commute or recreational travel time savings and associated vehicle cost reductions. For commercial properties, transit proximity potentially broadens the customer base, increases foot traffic near businesses, and contributes to employee accessibility.

Table 5-2: Fixed Guideway System Benefits Research Summary

Rail System	Technology	Increase in Home Sales Price	Source
BART— San Francisco	Rapid Rail	$1,578 increase for every 100 feet closer to a station	Lewis-Workman 1997
MTA— New York City	Rapid Rail	$2,300 increase for every 100 feet closer to a station	Lewis-Workman 1997
San Diego	LRT	$82.90 increase for every 100 feet closer to a station	Landis 1995
San Jose	LRT	$60 increase for every 100 feet closer to a station	Landis 1995
MAX—Portland	LRT	$202 increase for every 100 feet closer to a station	Al-Mosaind 1993
Metro— Washington, D.C.	Rapid Rail	$0.23 increase *in per-square-foot rent* for every 100 feet closer to a station	FTA 2000

BART = Bay Area Rapid Transit MTA = Metropolitan Transportation Authority MAX = Metropolitan Area Express

Potential Negative Effects

Negative impacts on property values from transit (termed “nuisance” effects) can occur. Measurable noise impacts from vehicles, increased foot traffic, adjacent structures, transit-associated parking lots, and increased bus traffic interfacing with transit stations can reduce the desirability of properties in the immediate vicinity of the station or fixed guideway. These nuisance effects would most likely occur in areas where value is not attributed to the accessibility improvements that transit provides, but to other factors such as isolation from high-density areas and other aesthetic characteristics. Although this does not appear likely within the study region based on the results of the analyses undertaken to date, if the transit system does not provide travel-time savings or accessibility benefits, the system may be more likely to depress values than to increase them.

Implications for O‘ahu

The study region contains 34 proposed transit stations and is generally subdivided into the three areas noted previously (‘Ewa, Central O‘ahu, and the PUC). To the extent that station areas would be well served by the transit system, it is likely that properties within walking distance of the stations would realize value premiums over similar properties that are farther away. In addition to simple proximity to the station, other community and system characteristics are important in creating real estate value premiums near station sites. These include relatively high-density zoning; a safe, pedestrian-friendly environment; and a balanced origin/destination mix within the fixed guideway system that provides significant time savings for users over other transportation modes.

Based on the selected residential transit impact studies presented in Table 5-2 and estimated median home prices at the times of the respective studies, an average percentage premium was calculated for residences adjacent to transit stations in comparison to those one-half mile away. The five selected studies produce an average premium of 6.4 percent, with a range of between 0.4 and 18.6 percent, as shown in Table 5-3. This wide range of calculated premiums further illustrates that there are many more variables (i.e., community and transit system characteristics) that enter into the value premium equation in addition to proximity to the station site.

Table 5-3: Potential Property Value Increases

Region	Year of Study	Property Value Increase (per ½-mile)	Median Home Price[1]	Price Premium (1/2 mile from station)
San Francisco	1997	$41,659	$475,600	8.7%
New York City	1997	$60,720	$325,100	18.6%
San Diego	1995	$2,189	$351,900	0.6%
San Jose	1995	$1,584	$453,100	0.4%
Portland	1993	$5,333	$148,900	3.6%
Average				**6.4%**

[1]Median home prices for representative metropolitan areas for 2006 discounted by 5 percent annually to year-of-study terms.

Source: Year 2006 data from the National Association of Realtors database.

Potential Opportunities Induced from the Project

This section discusses the potential incremental growth and development opportunities induced by the Project (i.e., additional growth and development over and above the baseline market assessment).

Local Area Induced Effects

To a significant extent, the previous section on potential impacts on property values represents a correlate of induced development. This is because in locations where the Project would result in an increase in property values, this is a signal that the real estate market is responsive to improvements in corridor accessibility and mobility and to the additional marketability of land within the station area itself. These market responses would be manifested both in terms of higher property values and possibly more development. Such impacts are likely to occur within the station areas, but may extend out more generally in the corridor. Conditions that would generally be associated with induced development include:

- Strong underlying real estate and economic fundamentals, both within the corridor and within the region as a whole
- Available land (vacant or redevelopable) around stations
- Transit-oriented zoning, land use patterns, and existing development patterns

The market development demand analysis in Section 3.1 provides information that can be used to make inferences about the Project's possible growth-inducing impacts. As indicated in the previous section, the study region has generally experienced reasonably strong growth relative to O'ahu. The Island as a whole, however, shows relatively small and fairly flat growth.

These real estate development trends suggest that there is a substantial potential for transit-induced development, especially around the stations with the highest amount of utilization. However, the overall market dynamics suggest that, because overall growth is not overly robust, transit-induced development may represent a shifting around/spatial reconfiguration of demand, rather than generation of a substantial amount of net new development.

Corridor-Wide (Regional) Induced Effects

The following induced developmental effects, although difficult to quantify, are sometimes observed in regions where a transit project induces accessibility changes:

- **Geographical Expansion of Consumer Markets—**increased accessibility would expand the geographical extent of consumer markets for firms' output. Consumer market expansions with increased market sphere (which allows for higher output), coupled with the constant fixed costs of operation, would improve businesses' productive efficiency and profitability.
- **Expansion of Labor Markets—**increased accessibility would enable firms to draw labor from a wider geographic area, resulting in increased supply, higher variety, and reduced costs. From an employment perspective, reduced transportation costs may induce the creation of new employment opportunities and improve the quality of existing jobs.
- **Networks of Specialization—**increased accessibility may propel firms toward new and more efficient manufacturing methods. From a labor market perspective, increased accessibility reduces geographical constraints in employment—and mobile labor can take advantage of higher-salary jobs in dynamic urban centers. This facilitates the specialization of labor markets through a better match of skills supplied and demanded.

- **Economies of Scale/Agglomeration—**economies of scale are a by-product of network specialization that leads to regional agglomeration. Economies of scale are industry/regional effects driven by the availability of physical infrastructure; abundant human capital (the advantage of a skilled labor market); localized firms that specialize in supplying intermediate inputs; and the exchange of information due to the clustering of firms.
- **Shifts in Location—**increased accessibility is a catalyst for locational shifts for households. From a household perspective, transportation improvements may induce migration, with previous urbanites relocating to suburban areas (i.e., a suburbanization effect).

5.2.2 Construction Effects

Business Access

During construction, access to businesses near construction activities could be affected and thus negatively affect businesses.

Inherent in any major construction project are inconveniences and disruptions to adjacent residents, businesses, and business customers. Temporary effects during the construction process may include:

- Presence of construction workers and materials
- Temporary road closures and traffic diversions
- Temporary reductions in parking availability
- Airborne dust, noise, and vibrations
- Businesses' loss of visibility to their customers

Proper controls may mitigate these effects to protect residents' comfort and daily life and to prevent inconveniences and disruptions to the flow of customers, employees, materials, and supplies to and from area businesses.

Employment

Based on construction cost estimates and state-specific employment multipliers, employment was estimated for direct, indirect, and induced employment. *Direct employment* refers to all new jobs created within the heavy civil engineering and construction sector. *Indirect employment* results when jobs are created in other sectors as a result of construction (i.e. increases in the food service sector to support increases in construction employment). *Induced employment* results from an overall expansion of the regional economy—and thus new jobs—due to the proposed construction. For a more detailed explanation, see the Methodology chapter of this report.

This analysis estimates total direct, indirect, and induced jobs to be as high as 108,975 job-years for the $4.8 billion Airport & Salt Lake Alternative, and as low as 86,524 job-years for the $3.9 billion Salt Lake Alternative. Units of job-years represent the employment of one person for one year. Thus the reported figures will be spread over the life of the construction project. Chronological distribution of employment will likely follow construction phasing, but has not been included in this analysis. The estimated job growth for the Airport & Salt Lake Alternative represents 3-percent growth over Honolulu's 2007 total annual non-farm employment of 454,500 (BLS 2008). Detailed employment estimates for direct, indirect, and induced employment are presented for each alternative in Table 5-4.

The availability of direct construction labor will be largely affected by labor market conditions (including the labor market's overall slack or tightness), the demand for construction labor associated with the Project, and competition for labor from other construction activity. Although no transportation construction comparable to the Project is anticipated to take place in Hawai'i or on O'ahu in the foreseeable future, over $3 billion worth of other transportation improvements is identified in the ORTP between 2007 and 2030. Nonetheless, depending on the progress of these other improvements, there may be pent-up demand for other construction work, including regular residential and commercial construction. Mitigating this potential pressure on construction labor markets is that employees in other labor-intensive industries are likely to have skills that can be transferred to the construction industry.

Table 5-4: Construction Impacts on Local Employment

Alternative	Construction Cost (millions 2007 $)[1]	Direct Employment	Indirect Employment	Induced Employment	Total Direct, Indirect & Induced Employment
Job Multiplier[2]	N/A	9.25	4.03	8.9	N/A
No Build (Full Project)	0	0	0	0	0
Salt Lake	3,901	36,084	15,720	34,719	86,524
Airport	4,105	37,970	16,547	36,535	91,052
Airport & Salt Lake	4,785	44,260	19,255	42,586	106,101

[1]Construction costs available in 2007 $ and inflated using Global Insight forecasts of the Consumer Price Index (CPI) for Honolulu (~2 percent).

[2]Based on the 2008 State of Hawai'i Input-Output factor for heavy civil construction (jobs per million $).

Not all proposed extensions are included in this analysis because they are not part of the Project and detailed construction cost data are not available.

The State of Hawai'i has seen a strong average growth in employment in the natural resource, mining, and construction sector: approximately 9 percent per year over the past four years. The total current employment in this sector is approximately 40,000 in the State, of which 30,000 are on O'ahu (HDLIR 2008). Industries within this sector have experienced even stronger growth. Building construction employment has grown an average of almost 11 percent each year for the past three years (BLS 2008). If this strong growth in construction employment continues, despite the likelihood of increasing unemployment from the country's general recession (BLS 2008), construction labor will likely be scarce in Hawai'i.

Given these employment conditions coupled with the Project's high labor requirements (Table 5-4, last column), it is likely that work crews will need to be organized early in the project to assure availability consistent with the Project construction schedule. If local labor becomes scarce, labor may need to be imported from outside of Hawai‘i, which will cause costs to rise at higher-than-anticipated rates.

Real Property Tax Effects

Based on land acquisition information developed for the Project, reductions in tax revenue were calculated using City real property tax rates (described in the Methodology chapter of this report). Potential tax reductions are approximately $1.2 million for all Build Alternatives. This would represent a 0.1-percent reduction in total FY 2007 property tax revenues compared to the No Build Alternative ($790 million) (DBFS 2008) (see Table 5-5).

It is worth noting that potential increases in the value of affected properties within proximity to the guideway may offset some of the tax revenue losses that result from properties acquired for the Project.

Table 5-5: Real Property Tax Impact

Alternative	Reduction in Taxable Base	Net Valuation for Tax	Reduction in Tax Revenue	Anticipated Tax Revenue	Reduction in Tax Revenue
	Millions 2007 $				Percent of No Build
No Build	NA	167,025	NA	790	NA
Salt Lake	101.0	166,924	1.2	789	0.2%
Airport	98.5	166,926	1.2	790	0.1%
Airport & Salt Lake	101.9	166,923	1.2	789	0.2%

All analysis assumes inclusion of the ‘Ewa maintenance facility, which is the more expensive of the two options.

Although differences exist between each alternative, in some cases they are not evident due to rounding.

All proposed extensions are not included in this analysis, because they are not part of the Project and detailed land take data are not available.

Source: City and County of Honolulu, Department of Budget and Fiscal Services, PB Analysis.

5.2.3 Materials Availability

It is anticipated that major construction materials, including steel and concrete components, will be imported from outside of Hawai‘i because there are no local mining or manufacturing facilities. Although importation will increase materials prices, supply is not expected to be restricted. Recent lulls in construction on the mainland United States are expected to help attract the interest of contractors and materials suppliers to a major project in Hawai‘i.

6 Mitigation

Because no long-term adverse economic effects have been identified, mitigation for the Project would not be required.

During construction activities, potential mitigation to reduce adverse economic hardships for existing businesses in the region may include:

- Initiating public information campaigns to inform people that businesses are open during construction and to encourage their continued patronage.
- Minimizing the extent and number of businesses, jobs, and access affected during construction.
- During construction, consider temporarily relocating businesses that would be affected to the point that all access would be lost for a period of time.
- Coordinating the timing of temporary facility closures to minimize impacts to business activities, especially those related to seasonal or high sales periods, to the extent practicable.
- Minimizing the duration of modified or lost access to businesses.
- Providing signage, lighting, or other information to indicate that businesses are open.
- Providing public information (e.g., press releases, newsletters) on construction activities and ongoing business activities. This should include advertisements in print and on television and radio.
- Maintaining access for pedestrians, bicyclists, passenger vehicles, and trucks during business hours and during important business seasons.
- Providing advance notice if utilities will be disrupted, and scheduling major utility shut-offs during non-business hours.
- Phasing construction in each area to allow vehicular and pedestrian access to individual businesses.
- Implementing dust, noise, and vibration mitigation during business hours.

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