02
CHAPTER

Alternatives Considered

This chapter summarizes the alternatives considered for the Honolulu High-Capacity Transit Corridor Project. The alternatives evaluated in this Draft Environmental Impact Statement (EIS) resulted from a rigorous Hawai'i Revised Statutes (HRS) Chapter 343 EIS preparation notice comment period, alternatives analysis, and National Environmental Policy Act (NEPA) scoping process.

2.1 Alternatives Screening and Selection Process

Prior to completion of this Draft EIS, alternatives were evaluated at three stages. First, a broad range of alternatives was considered and screened to four alternatives for evaluation in the *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Report* (Alternatives Analysis) (DTS 2006b). Second, the Alternatives Analysis recommended, and the City Council selected, the Fixed Guideway Alternative as the Locally Preferred Alternative. Third, scoping for the NEPA process confirmed that there were no alternatives that had not been previously studied and eliminated for good cause that would satisfy the Purpose and Need at less cost, with greater effectiveness, or less environmental or community impact.

The Alternatives Analysis phase evaluated a range of transit mode and general alignment alternatives in terms of their costs, benefits, and impacts. An initial screening process considered alternatives identified through previous transit studies, a field review of the study corridor, an analysis of current population and employment data for the study corridor, a literature review of technology modes, work completed for the *O'ahu Regional Transportation Plan 2030* (ORTP) prepared by the O'ahu Metropolitan Planning Organization (O'ahuMPO) (O'ahuMPO 2007), and public and agency comments received during the formal scoping process.

The screened alternatives included a No Build Alternative, a Transportation System Management Alternative (enhanced busway), and a number of Build Alternatives. Transit technologies that were examined included conventional bus, guided bus, light rail transit, personal rapid transit, people mover, monorail, magnetic levitation, rapid rail, commuter rail, and waterborne ferry service.

Several highway improvements were considered, including a bridge or tunnel crossing of Pearl Harbor to connect ʻEwa with the Primary Urban Center (PUC) and the construction of a two-lane elevated structure from the Waiawa Interchange to Iwilei, which would be used by transit vehicles and potentially carpools and single-occupant vehicles willing to pay a congestion-based toll. In addition, 75 fixed guideway alignment options were screened.

2.1.1 Screening of a Broad Range of Alternatives

During the fall of 2005 and winter of 2006, the City and County of Honolulu (City) completed an alternatives screening process that is documented in the *Honolulu High-Capacity Transit Corridor Project Alternatives Screening Memorandum* (DTS 2006a). The alternatives screening was accomplished through an analysis completed in five major steps, as illustrated in Figure 2-1.

The first step was to gather input needed for the analysis. The input included the Purpose and Need for the project, past studies and their recommendations, requirements of the U.S. Federal Transit Administration (FTA) Section 5309 New Starts process, adopted community and area plans, and a visual assessment of the entire corridor. The second step used the information gathered to identify a comprehensive list of potential alternatives. The third step included developing screening criteria and undertaking the initial screening of all potential alternatives to identify those that would address the needs of the corridor and would not have any "fatal flaws." The fourth step was a presentation of the viable alternatives to the public and interested public agencies and officials for comment through a scoping process. Also, the HRS Chapter 343 EIS preparation notice for the Project was issued in December 2005, and review comments were received in December 2005 and January 2006. Finally, input from the alternatives analysis scoping process and HRS 343 EIS preparation notice comment period was collected and considered, and, where appropriate, refinements were made to the alternatives.

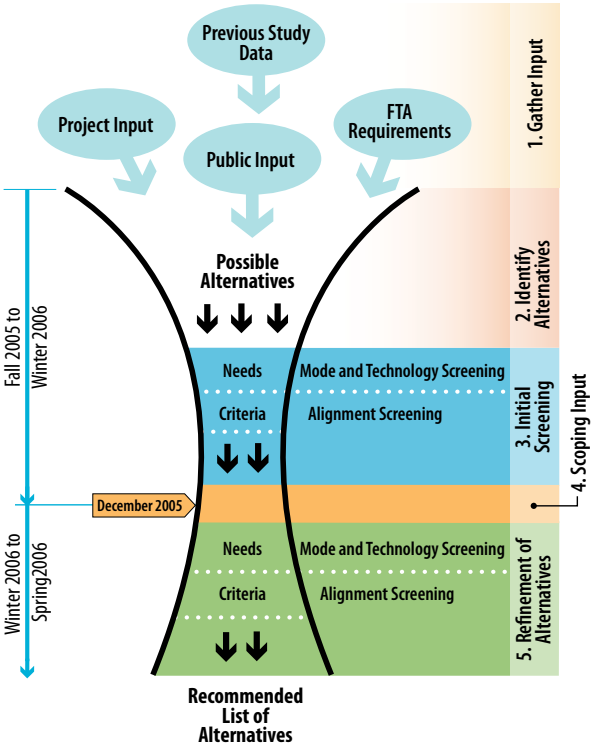


Figure 2-1 Alternatives Screening Process

The following alternatives were eliminated through this screening process before the Alternatives Analysis.

The tunnel crossing beneath Pearl Harbor was rejected because it would not improve connectivity within the study corridor, as it would bypass much of the corridor. The tunnel crossing also had been considered for the ORTP (OʻahuMPO 2007) but was rejected based on the cost compared to the limited benefit that it would have provided, as well as security concerns.

Waterborne ferry service was eliminated as a primary transit system because its capacity and travel times were not competitive with the other alternatives considered. On a demonstration basis, ferry service was implemented in 2007 as part of

a separate project to provide an additional transit option for travelers in the corridor.

Several transit technologies also were eliminated for various reasons. Commuter rail, including diesel multiple unit, was eliminated based on poor operating and environmental performance because of the need for short station spacing in the study corridor. Personal rapid transit, which operates like a horizontal elevator, was eliminated based on lack of technical maturity and low capacity. Emerging rail concepts were eliminated because they have never been proven in real-world use and would not meet the rapid implementation schedule for the project.

For the Fixed Guideway Alternative screening analysis, the corridor was divided into geographic sections. Within each section, the alignments retained for evaluation in the Alternatives Analysis were those that demonstrated the best performance related to mobility and accessibility, smart growth and economic development, constructability and cost, community and environmental quality, and consistency with adopted plans.

2.1.2 Alternatives Considered in the Alternatives Analysis

Once the screening evaluations were completed, the modal, technology, and alignment options were combined to create the following alternatives, which were evaluated in the Alternatives Analysis Report (DTS 2006b):

- No Build Alternative
- Transportation System Management (TSM) Alternative
- Managed Lane Alternative
  - Two-Direction Option
  - Reversible Option
- Fixed Guideway Alternative
  - Kalaeloa-Salt Lake-North King-Hotel Option
  - Kamokila-Airport-Dillingham Option
  - Kalaeloa-Airport-Dillingham-Halekauwila Option

These alternatives were presented to the public during a scoping process for the Alternatives Analysis and the HRS Chapter 343 Environmental Review Process in December 2005. They were evaluated based on their effectiveness in meeting transportation needs, environmental effects, and cost. The comparison of the alternatives presented in the Alternatives Analysis concluded that the TSM Alternative would provide little benefit at a relatively low cost, and that the Managed Lane Alternative would provide slightly more benefit at a substantial cost. In addition to the technical findings, the overwhelming majority (more than 80 percent) of the nearly 3,000 public testimonies received during hearings on the selection of the Locally Preferred Alternative were in favor of some form of the Fixed Guideway Alternative. The findings for the TSM and Managed Lane Alternatives are summarized in the following sections. Table 2-1 compares the alternatives evaluated in the Alternatives Analysis for several performance measures. While the results for the No Build and Fixed Guideway Alternatives that are summarized here differ from the values presented in this Draft EIS as a result of refinement to the analysis and additional engineering work, the relative performance of the alternatives has not changed.

For the Fixed Guideway Alternative as compared to the Managed Lane Alternative, the cost per hour of transit-user benefits would be between 160 and 240 percent less; daily transit trips would be between 14 and 20 percent greater; vehicle miles traveled (VMT) would be reduced by between 3 and 5 percent; and congestion, as measured by vehicle hours of delay (VHD), would be reduced by between 6 and 22 percent.

Transportation System Management Alternative

In the Alternatives Analysis phase, the TSM Alternative was developed to evaluate how well a

Table 2-1 Summary of Alternatives Analysis Findings

Alternative	Daily Islandwide Transit Trips	Vehicle Miles Traveled	Vehicle Hours of Delay	Hours of Transit User Benefits	Total Capital Cost (Millions 2006 Dollars)	Cost per Hour of Transit-user Benefit Compared to No Build
2030 No Build	232,100	13,971,000	82,000	N/A	$660	N/A
2030 Transportation System Management (TSM)	243,100	13,874,000	80,000	4,325,100	$856	$13.54
2030 Managed Lane	244,400–247,000*	14,002,000–14,034,000*	78,500–82,500*	5,528,500–5,632,700*	$3,601–$4,727*	$50.34–$63.42*
2030 Fixed Guideway	281,900–294,100*	13,464,000–13,539,000*	65,000–73,500*	15,153,600–18,770,200*	$4,192–$6,075*	$21.32–$27.05*

* Range of values provided represents the range between options reported in the Alternatives Analysis Report (DTS 2006b).

combination of relatively low-cost transit improvements could meet the study area's transportation needs. FTA requires that the TSM Alternative reflect the best that can be done for mobility without constructing a new transit guideway. Bus service was optimized, per FTA guidelines, by increasing bus service but without building a new fixed guideway for transit, such as a system of dedicated bus lanes. The analysis demonstrated that the Purpose and Need for the Project could not be met through a lower-cost, bus-based alternative alone.

After consideration of various service options and operating plans, the TSM Alternative was designed to serve the study corridor based on a hub-and-spoke network of bus routes, similar to today. Bus frequencies would have been increased during peak periods to provide improved service for work-related trips, particularly from developing areas such as Royal Kunia, Koa Ridge, and Waiawa. The bus fleet was assumed to increase from 525 to 765 buses, and park-and-ride lots were assumed at West Kapolei, UH West Oʻahu, Waipiʻo, and Aloha Stadium. In addition, the present a.m. peak-hour-only zipper lane would have been modified to operate in both the a.m. and p.m. peak periods, and relatively low-cost improvements would have been made on selected roadways to give priority to buses.

The analyses found that the TSM Alternative would have improved transit travel times somewhat by reducing the amount of time riders would have to wait for a bus to arrive at a bus stop. As a result, the TSM Alternative would have led to a slightly larger number of daily transit trips than the No Build Alternative (Table 2-1). This alternative would have generated fewer hours of transit-user benefits than either the Managed Lane or Fixed Guideway Alternative. Since most buses would still operate in mixed traffic, the TSM Alternative would have done little to improve corridor mobility and travel reliability. Roadway congestion also would not have been alleviated. In addition, because of the dispersed nature of transit service, slow bus speeds, and unreliable service, the TSM Alternative would not have supported the City's goals of concentrating growth within the corridor and reducing development pressures in rural areas.

In terms of its environmental impacts, the TSM Alternative would have generated fewer physical impacts than the Managed Lane and Fixed Guideway Alternatives. However, it would have required more transportation system energy and

generated more air and water pollution than the Fixed Guideway Alternative.

Although the TSM Alternative would have been very cost-effective, primarily because of this low cost, financial feasibility was a concern. Currently, State legislation does not allow the local excise and use tax surcharge to be used for enhancement of the existing bus transit system.

Managed Lane Alternative

The Managed Lane Alternative would have provided a two-lane elevated toll facility between Waipahu and Downtown, with variable pricing strategies for single-occupant vehicles to maintain free-flow speeds for transit and high-occupancy vehicles (HOVs). Two design and operational variations of the Managed Lane Alternative were evaluated: a Two-direction Option (one lane in each direction) and a two-lane Reversible Option. For both options, access to the facility from ʻEwa and Central Oʻahu would be via ramps from the H-1 and H-2 Freeways prior to the Waiawa Interchange. Both options would have required modification to the design of the Hawaiʻi Department of Transportation's planned Nimitz Flyover Project and would have terminated with ramps tying into Nimitz Highway at Pacific Street. An intermediate bus access point would have been provided near Aloha Stadium. The Two-direction Option would have served express buses operating in both directions during the entire day. The Reversible Option would have served peak-direction bus service, while reverse-direction service would have used the H-1 Freeway. Twenty-nine bus routes, with approximately 93 buses per hour, would have used the managed lane facility during peak hours for either option. The Alternatives Analysis found that of the two options, the Reversible Option would have provided a better transit-user benefit-to-cost ratio.

The Managed Lane Alternative was evaluated for its ability to meet project goals and objectives related to mobility and accessibility, supporting planned growth and economic development, constructability and cost, community and environmental quality, and planning consistency. VMT would have increased compared to any of the other alternatives. While this alternative would have slightly reduced congestion on parallel highways, systemwide traffic congestion would have been similar to the No Build Alternative as a result of increased traffic on arterials trying to access the facility. Total islandwide VHD would have increased with the Managed Lane Reversible Option as compared to the No Build Alternative, indicating an increase in systemwide congestion (Table 2-1). Transit reliability would not have been improved except for express bus service operating in the managed lanes. The Managed Lane Alternative would not have supported planned concentrated future population and employment growth because it would not provide concentrations of transit service that would serve as a nucleus for transit-oriented development. The Managed Lane Alternative would have provided very little transit benefit at a high cost. The cost-per-hour of transit-user benefits for the Managed Lane Alternative would have been two to three times higher than that for the Fixed Guideway Alternative (Table 2-1). Similar to the TSM Alternative, the Managed Lane Alternative would not have substantially improved service or access to transit for transit-dependent communities.

The Managed Lane Alternative would have generated the greatest amount of air pollution, required the greatest amount of energy for transportation use, and would have resulted in the largest number of transportation noise impacts of all the alternatives evaluated. Because the Managed Lane Alternative would have served a shorter portion of the study corridor, it would have resulted in fewer displacements and would have impacted fewer archaeological, cultural, and historic resources than the Fixed Guideway Alternative. The Managed Lane Alternative would not have affected

any farmlands. Visually, the elevated structure would have extended a shorter distance, but it would have been more visually intrusive because its elevated structure would have been much wider than the Fixed Guideway Alternative. It would have provided little community benefit, as it would not have resulted in substantially improved transit access in the corridor. Lastly, no funding sources were identified for the Managed Lane Alternative.

Fixed Guideway Alternative

The Fixed Guideway Alternative presented in the Alternatives Analysis included the construction and operation of a fixed guideway system between Kapolei and the University of Hawai'i at Mānoa (UH Mānoa). The study corridor for the Fixed Guideway Alternative was evaluated in five sections to simplify the analysis and facilitate evaluation.

Each alignment was evaluated individually and compared to the other alignments in that section in relation to transportation benefits, environmental and social consequences, and costs. The comparison resulted in an optimal alignment of Saratoga Avenue/North-South Road to Farrington Highway/Kamehameha Highway to Aolele Street to Dillingham Boulevard to Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard.

Summary of Alternatives Considered during the Alternatives Analysis

The Fixed Guideway Alternative performed better at meeting the project's Purpose and Need than any of the other alternatives evaluated in the Alternatives Analysis. A fixed guideway system would improve transit performance and reliability, be more cost-effective, and would substantially reduce VHD for all travelers, not just transit users (Table 2-1). The Managed Lane Alternative would not have qualified for local excise and use tax surcharge funding. Because single-occupant vehicles would have been permitted, even if tolled, Federal New Starts funding could not have been used.

Table 2-2 summarizes the alternatives considered but rejected. The TSM Alternative would not have substantially reduced congestion relative to the No Build Alternative and would not have improved corridor mobility and travel reliability.

After review of the Alternatives Analysis Report (DTS 2006b) and consideration of public comments, the City Council selected a fixed guideway transit system extending from Kapolei to UH Mānoa with a connection to Waikīkī as the Locally Preferred Alternative. The selection, which eliminated the TSM and Managed Lane Alternatives, became Ordinance 07-001 on January 6, 2007.

2.1.3 Alternatives Consideration Process after the Alternatives Analysis

Ordinance 07-001 authorized the City to proceed with the planning and engineering of a fixed guideway project from Kapolei to UH Mānoa with a connection to Waikīkī. The City Council also passed City Council Resolution 07-039, which directed the first construction project to be fiscally constrained by anticipated funding sources and to extend from East Kapolei to Ala Moana Center via Salt Lake Boulevard.

The FTA issued a Notice of Intent to prepare this Draft EIS in the *Federal Register* on March 15, 2007. All interested individuals and organizations, as well as Federal, State, and Local agencies, were invited to comment on the Purpose and Need to be addressed by a fixed guideway transit system from East Kapolei to Ala Moana Center (the Project); the alternatives, including the modes and technologies to be evaluated and the alignments and termination points to be considered; and the environmental, social, and economic impacts to be analyzed.

The alternatives evaluated in this Draft EIS and described in this chapter are the result of the alternatives screening process and reflect

Table 2-2 Alternatives and Technologies Considered but Rejected

	Why Rejected	When Rejected
Alternative		
Pearl Harbor Tunnel	Rejected by O`ahuMPO based on high cost and limited benefit	Screening
Waterborne Ferry Service	Insufficient capacity and uncompetitive travel time	Screening
Transportation System Management	Would not have supported Honolulu General Plan; minimal impact to vehicle miles traveled and vehicle hours of delay	Alternatives Analysis
Managed Lane Alternative	Would not have supported Honolulu General Plan; minimal impact to vehicle miles traveled and vehicle hours of delay	Alternatives Analysis
Technologies		
Diesel Multiple Unit	Not suitable for urban transit	Screening
Personal Rapid Transit	Unproven technology and insufficient capacity	Screening
Commuter Rail	Not suitable for urban transit	Screening
Emerging Concepts	Unproven technology	Screening
Rubber-tired Guided Vehicles	Proprietary technology	After Alternatives Analysis
Magnetic Levitation	Proprietary technology unproven in U.S.	After Alternatives Analysis
Monorail	Proprietary technology	After Alternatives Analysis

comments received during the scoping process, as summarized in the *Honolulu High-Capacity Transit Corridor Project National Environmental Policy Act Scoping Report* (DTS 2007). The NEPA scoping process affirmed the selection of the Locally Preferred Alternative decision.

The Notice of Intent and Scoping Information Package included the No Build and two Build Alternatives (a Fixed Guideway Transit Alternative via Salt Lake Boulevard and a Fixed Guideway Transit Alternative via the Airport & Salt Lake Boulevard). They also included five technologies.

Several scoping comments were received requesting reconsideration of the Managed Lane Alternative that was considered and rejected during the Alternatives Analysis. No new information was provided that would have changed the findings of the Alternatives Analysis regarding the Managed Lane Alternative; therefore, it is not included in this Draft EIS.

In addition to suggestions for reconsideration of previously eliminated alternatives, three separate alternatives were proposed during the NEPA scoping process and documented in the Scoping Report (DTS 2007). One comment suggested providing additional bus service with either school buses or private vehicles. The second proposal was for a High Speed Bus Alternative that would include aspects of both the Managed Lane Alternative that was eliminated during the Alternatives Analysis and the Fixed Guideway Alternative. The third comment requested consideration of a third fixed guideway alternative.

Providing additional bus service with either school buses or private vehicles represents variations on the TSM Alternative that would provide additional bus capacity using different vehicles or be limited to certain times of day; it did not differ structurally from the TSM Alternative. As a result, providing additional bus service with school buses or private vehicles would not provide substantial benefit when compared to the TSM Alternative

already evaluated; therefore, it is not included in this Draft EIS.

Constructing an elevated bus facility with multiple access points for the entire length of the Fixed Guideway Alternative would be more costly and have more severe impacts to many elements of the environment because of its increased width, both for the entire length of the system as compared to the Fixed Guideway Alternative, and at stations where the width would approach 100 feet. These impacts would be similar to those of the Two-direction Managed Lane Alternative that was evaluated in the Alternatives Analysis, but would have extended for the entire length of the corridor from Kapolei to UH Mānoa. Substantial right-of-way would have been required to accommodate the structure through urban Honolulu, including more right-of-way for the additional proposed ramps; therefore, this alternative is not included in this Draft EIS.

Scoping comments requested the evaluation of a third fixed guideway alternative that would serve the airport in lieu of following Salt Lake Boulevard. This alternative would meet the Project's Purpose and Need and could generate the same or fewer environmental or community impacts than the other fixed guideway alternative options under consideration; therefore, it was added for evaluation in this Draft EIS.

The NEPA Notice of Intent requested input on five transit technologies. The comments received did not substantially differentiate any of the following five considered technologies as being universally preferable to the other technologies:

- Light-rail transit
- Rapid-rail transit (steel wheel on steel rail)
- Rubber-tired guided vehicles
- Magnetic levitation system
- Monorail system

A technical review process that included opportunities for public comment was used subsequent to the scoping process to select a transit technology. The process included a broad request for information that was publicized to the transit industry. Transit vehicle manufacturers submitted 12 responses covering all of the technologies listed in the Notice of Intent.

The responses were reviewed in February 2008 by a five-member panel appointed by the City Council and the Mayor that considered the performance, cost, and reliability of the proposed technologies. The panel twice accepted public comment as part of its review. By a four-to-one vote, the panel selected steel wheel operating on steel rail as the technology for the Build Alternatives evaluated in this Draft EIS. Table 2-2 contains the technologies that were considered but rejected. The four panel members eliminated proprietary technologies, meaning that selection of one of those technologies would have required all future purchases of vehicles or equipment to be from a single manufacturer, because none of the proprietary technologies offered substantial proven performance, cost, and reliability benefits compared to steel wheel operating on steel rail.

The panel's findings were summarized in its report to the City Council dated February 22, 2008. The panel's report resulted in the City establishing steel wheel operating on steel rail as the technology for the Build Alternatives evaluated in this Draft EIS. Therefore, the analyses of the fixed guideway alternatives in this Draft EIS are based on steel wheel on steel rail technology.

2.2 Alternatives Evaluated in this Draft Environmental Impact Statement

Four alternatives are evaluated in this Draft EIS. They include the No Build Alternative and three

fixed guideway alternatives (Build Alternatives) with different lengths and alignments:

- No Build Alternative
- Fixed Guideway Transit Alternative via Salt Lake Boulevard (Salt Lake Alternative) (Figure 2-2)
- Fixed Guideway Transit Alternative via the Airport (Airport Alternative) (Figure 2-3)
- Fixed Guideway Transit Alternative via the Airport and Salt Lake Boulevard (Airport & Salt Lake Alternative) (Figure 2-4)

All alternatives include existing transit and highway facilities, as well as committed transportation projects, exclusive of the fixed guideway transit project, anticipated to be operational by 2030. Committed transportation projects are those identified in the ORTP (O'ahuMPO 2007). Highway congestion relief projects in the ORTP are described in Table 2-3.

Transit fare policy is anticipated to be continued for all Build Alternatives.

Land use, population, and employment assumptions for the year 2030 have been kept constant for all alternatives. The data were provided by the City and County of Honolulu Department of Planning and Permitting (DPP) and are consistent with the ORTP forecast assumptions.

A connection to the Honolulu International Airport could be built as a construction phasing option of the Airport & Salt Lake Alternative following the completion of the section of the Project between East Kapolei and Ala Moana Center along Salt Lake Boulevard.

2.2.1 No Build Alternative

The No Build Alternative is included in this Draft EIS to provide a comparison of what the future conditions will be if none of the Build Alternatives were implemented. It includes the elements described as common to all alternatives.

The No Build Alternative bus network would include all routes in operation today, plus planned route modifications and additions to the existing bus network that are likely to occur between now and the year 2030 to respond to the population and employment estimates for the year 2030.

The No Build Alternative's transit component would include an increase in fleet size. However, due to increasing traffic congestion and slower travel times, transit service levels and passenger capacity would remain about the same as they are today (Table 2-4).

2.2.2 Build Alternatives

The Build Alternatives would include the construction and operation of a grade-separated fixed guideway transit system between East Kapolei and Ala Moana Center (Figures 2-5 to 2-8). Detailed plans of the alignment are included in Appendix A of this Draft EIS. The system would use steel wheel on steel rail technology. The vehicles could either be manually operated by a driver or fully automated (driverless). All parts of the guideway would be elevated, except near Leeward Community College, where it would be in exclusive right-of-way.

The guideway would follow the same alignment for all Build Alternatives through most of the study corridor, except between Aloha Stadium and Kalihi (Figure 2-7). From Wai'anae to Koko Head (west to east), the guideway would follow North-South Road and other future roadways to Farrington Highway (Figure 2-5). The guideway would follow Farrington Highway Koko Head on an elevated structure and continue along Kamehameha Highway to the vicinity of Aloha Stadium (Figure 2-6).

Between Aloha Stadium and Kalihi, the alignment differs for each of the Build Alternatives, as detailed later in this section (Figure 2-7). Koko Head of Middle Street, the guideway would follow Dillingham Boulevard to the vicinity of Ka'aahi

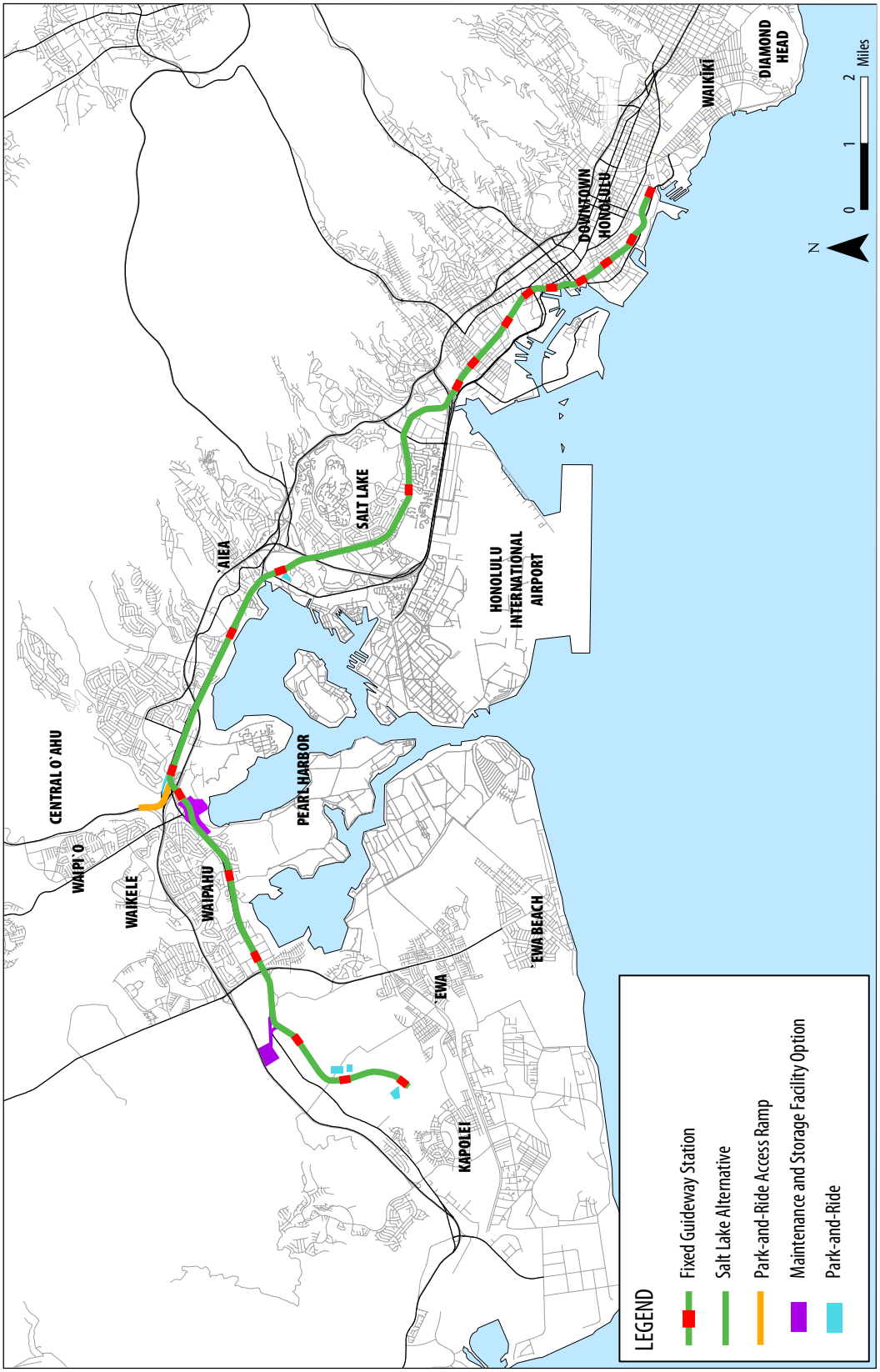


Figure 2-2 Salt Lake Alternative

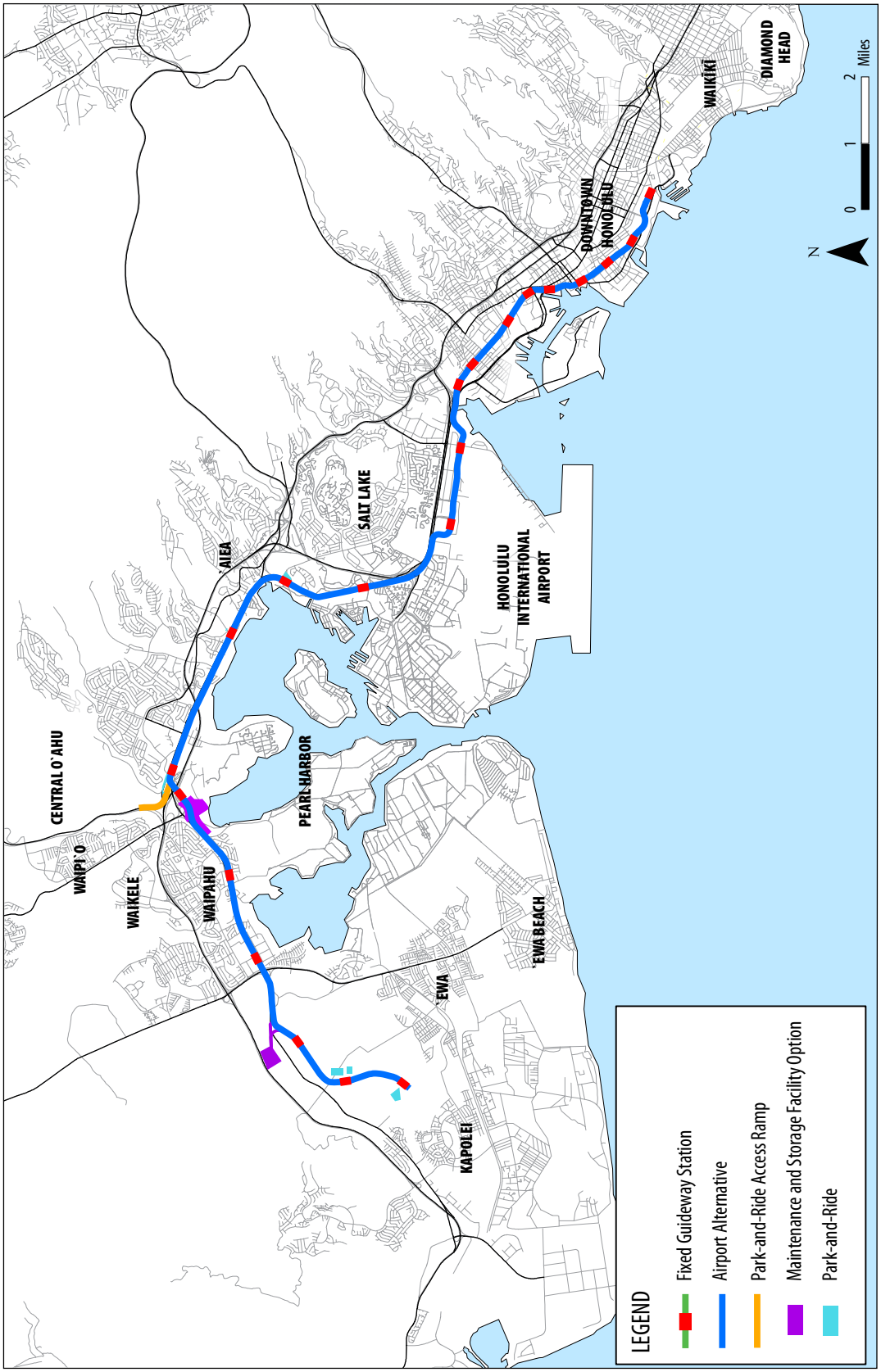


Figure 2-3 Airport Alternative

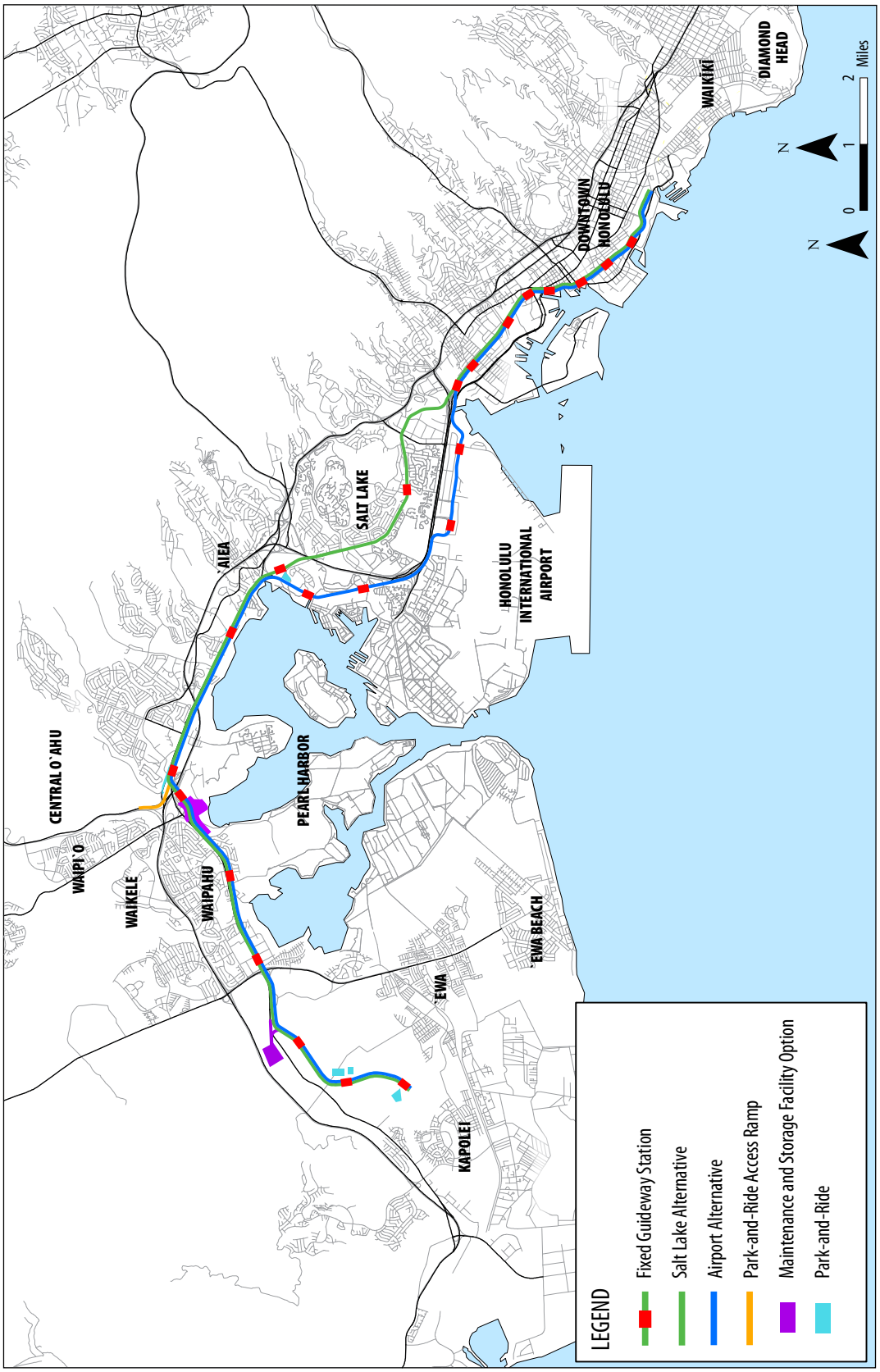


Figure 2-4 Airport & Salt Lake Alternative

Table 2-3 Committed Congestion-relief Projects in the O`ahu Regional Transportation Plan 2030

Facility	Description
Farrington Highway	Widen Farrington Highway from Golf Course Road to just west of Fort Weaver Road
Fort Barrette Road	Widen Fort Barrette Road from Farrington Highway to Franklin D. Roosevelt Avenue
Hanua Street	Extend Hanua Street from Malakole Street to Farrington Highway and construct new on- and off-ramps at H-1
H-1 Freeway	Construct new H-1 Kapolei Interchange
H-1 Freeway	Widen H-1 in the eastbound direction from Middle Street to Vineyard Boulevard
H-1 Freeway	Modify the weaving movements on H-1, in the westbound direction, between the Lunalilo Street on-ramp and the Vineyard Boulevard off-ramp
H-1 Freeway	Construct a new eastbound off-ramp and westbound on-ramp to H-1 at the Makakilo Interchange
H-1 Freeway	Widen H-1 in the westbound direction from the Waiau Interchange to the Waiawa Interchange
H-1 Freeway	Widen H-1 in the westbound direction through the Waiawa Interchange
H-1 Freeway	Construct a zipper lane on H-1 in the westbound direction from the Ke`ehi Interchange to the Kunia Interchange
H-1 Freeway	Widen the Waipahu Street off-ramp in the westbound direction
H-2 Freeway	Widen ramps at the Waipi`o Interchange
H-1 Freeway	Improve operations between Ward Avenue and University Avenue
H-1 and H-2 Freeways	Modify the H-1 and H-2 Waiawa Interchange
Kamehameha Highway	Widen Kamehameha Highway between Lanikuhana Avenue and Ka Uka Boulevard
Kapolei Parkway	Extend Kapolei Parkway
North-South Road	Widen and extend North-South Road
Makakilo Drive	Extend Makakilo Drive south to H-1 and connect to North-South Road
Farrington Highway	Widen Farrington Highway from Kunia to Waiawa Interchange
Farrington Highway	Widen Farrington Highway from Hakimo Road to Kalaeloa Boulevard
H-1 Freeway	Widen H-1 in the eastbound direction from Liliha Street to Pali Highway
H-1 Freeway	Modify and/or close various ramps on H-1 from Middle Street to University Avenue
H-1 Freeway	Modify on- and off-ramps at the University Avenue Interchange on H-1
H-1 Freeway	Widen H-1 in the westbound direction from Vineyard Boulevard to Middle Street
H-1 Freeway	Construct HOV lanes from the Waiawa Interchange to the Makakilo Interchange
H-1 Freeway	Widen H-1 in the eastbound direction from the Waiawa Interchange to the Hālawa Interchange
H-1 Freeway	Widen H-1 in the eastbound direction from Ward Avenue to Punahou Street
H-2 Freeway	Construct a new interchange between Meheula Parkway and Ka Uka Boulevard
Kahekili Highway	Widen Kahekili Highway from Kamehameha Highway to Ha`ikū Road
Kunia Road	Widen Kunia Road from Wilikina Drive to Farrington Highway
Likelike Highway	Widen Likelike Highway from Kamehameha Highway to Kahekili Highway
Makakilo Mauka Frontage Road	Construct a new Makakilo Mauka Frontage Road from Kalaeloa Boulevard to Makakilo Drive
Nimitz Highway	Construct a new two-lane elevated and reversible HOV flyover above Nimitz Highway
Pi`ikoi and Pensacola Streets	Reverse the existing one-way Pi`ikoi Street and Pensacola Street couplet
Pu`uloa Road	Widen Pu`uloa Road from Pukuloa Street to Nimitz Highway
Central Mauka Road	Construct Central Mauka Road, a new road from Mililani Mauka to Waiawa
Wahiawā, Second Access	Construct a new second access road between Whitmore Village and Wahiawā
Wai`anae, Second Access	Construct a new second access road to Wai`anae from Farrington Highway

Street and then turn Koko Head to connect to Nimitz Highway near Iwilei Road.

Table 2-4 Transit Vehicle Requirements

Alternative	Bus		Fixed Guideway	
	Peak	Fleet	Peak	Fleet
2007 Existing Conditions	434	540	0	0
2030 No Build	501	601	0	0
2030 Salt Lake	469	563	50-55	60-65
2030 Airport	465	558	56	67
2030 Airport & Salt Lake	465	558	52-57	62-67

The guideway would follow Nimitz Highway Koko Head to Halekauwila Street, then proceed along Halekauwila Street past Ward Avenue where it would transition to Queen Street. The guideway would cross from Waimanu Street to Kona Street in the vicinity of Pensacola Street. The guideway would run above Kona Street to Ala Moana Center.

In addition to the guideway, the Project would require the construction of stations and supporting facilities. Supporting facilities include a vehicle maintenance and storage facility, transit centers, park-and-ride lots, and traction power substations. The vehicle maintenance and storage facility would either be located in the planned Hoʻopili development near Farrington Highway or near Leeward Community College (Figures 2-5 and 2-6).

Transit centers would be constructed as stand-alone facilities or as part of park-and-ride lots at:

- **UH West O`ahu**
- **West Loch**
- **Pearl Highlands**
- **Aloha Stadium**

Some bus routes would be reconfigured to bring riders on local buses to nearby fixed guideway transit stations. To support this system, the bus fleet would be increased (Table 2-4).

The Project would provide high-capacity transit service between East Kapolei and Ala Moana Center with future extensions planned for West Kapolei to East Kapolei and from Ala Moana Center to UH Mānoa and to Waikīkī.

The East Kapolei Station is the proposed Waiʻanae terminus for the Project. It is located on North-South Road (under construction) near the planned Salvation Army Kroc Center, approximately one mile Koko Head of the UH West Oʻahu Station (Figure 2-5). This area of East Kapolei is undergoing development that will be a mixture of residential, recreational, educational, industrial, and commercial land uses. The location of the terminus would support one of the project goals to "improve access to planned development to support City policy to develop a second urban center," as defined in the ʻEwa Development Plan.

As part of this development, the immediate area is also planned for future Department of Hawaiian Home Lands housing development. Kroc Center, scheduled to open in 2010, will be a 15-acre family support, education, recreation, and cultural arts facility for the general public and will provide services for low-income children, seniors, and families.

Projected year of opening (2018) ridership shows that the East Kapolei Station would have one of the highest boardings in the system. Because there is available space in the vicinity of the station, it would include a park-and-ride lot that would accommodate automobile, motorcycle, and bicycle commuters. The station would serve local and express transit commuters from ʻEwa, ʻEwa Beach, Kapolei, and Kalaeloa.

Figure 2-5 Fixed Guideway Transit Alternative Features, Kapolei to Fort Weaver Road

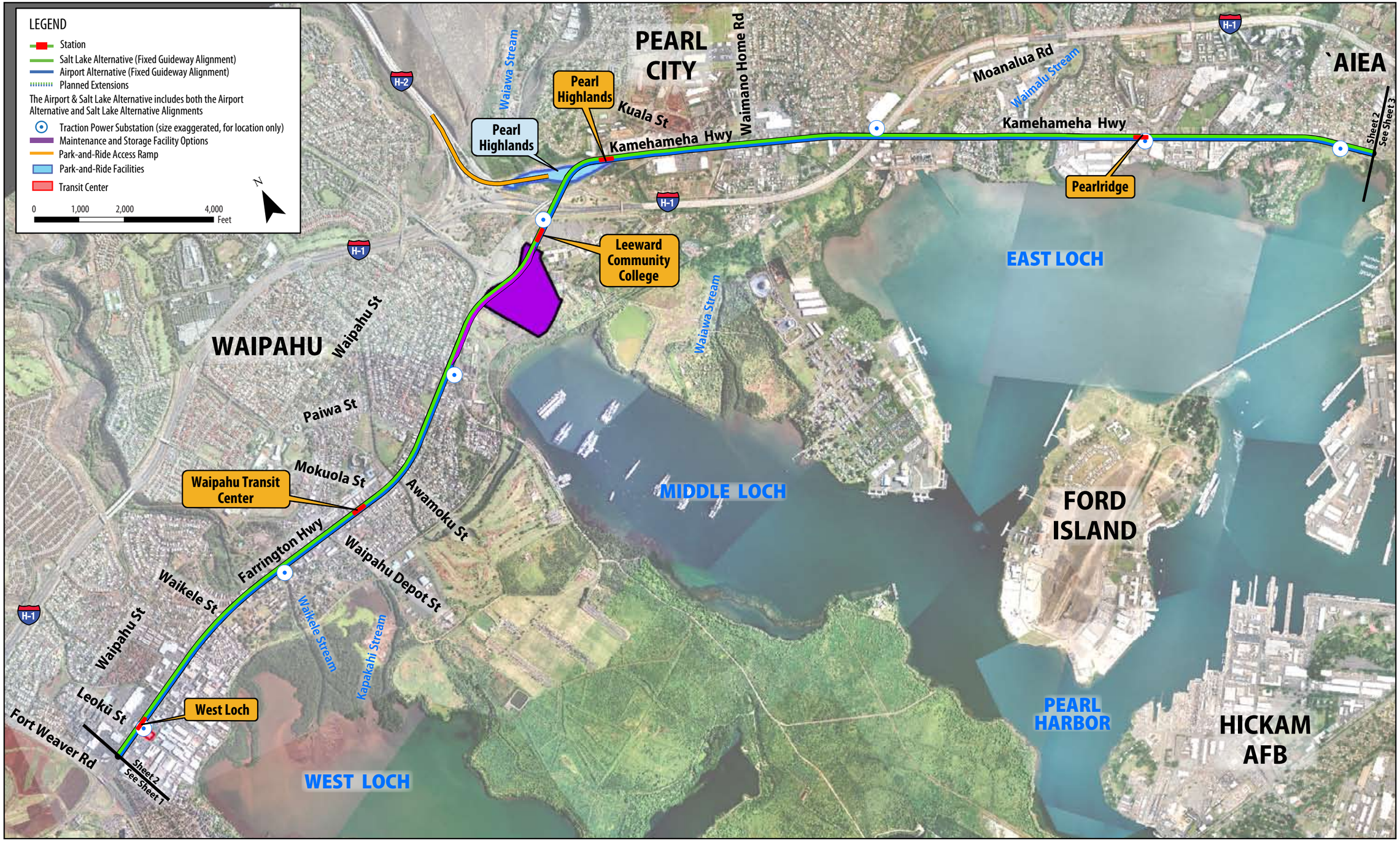


Figure 2-6 Fixed Guideway Transit Alternative Features, Fort Weaver Road to Aloha Stadium

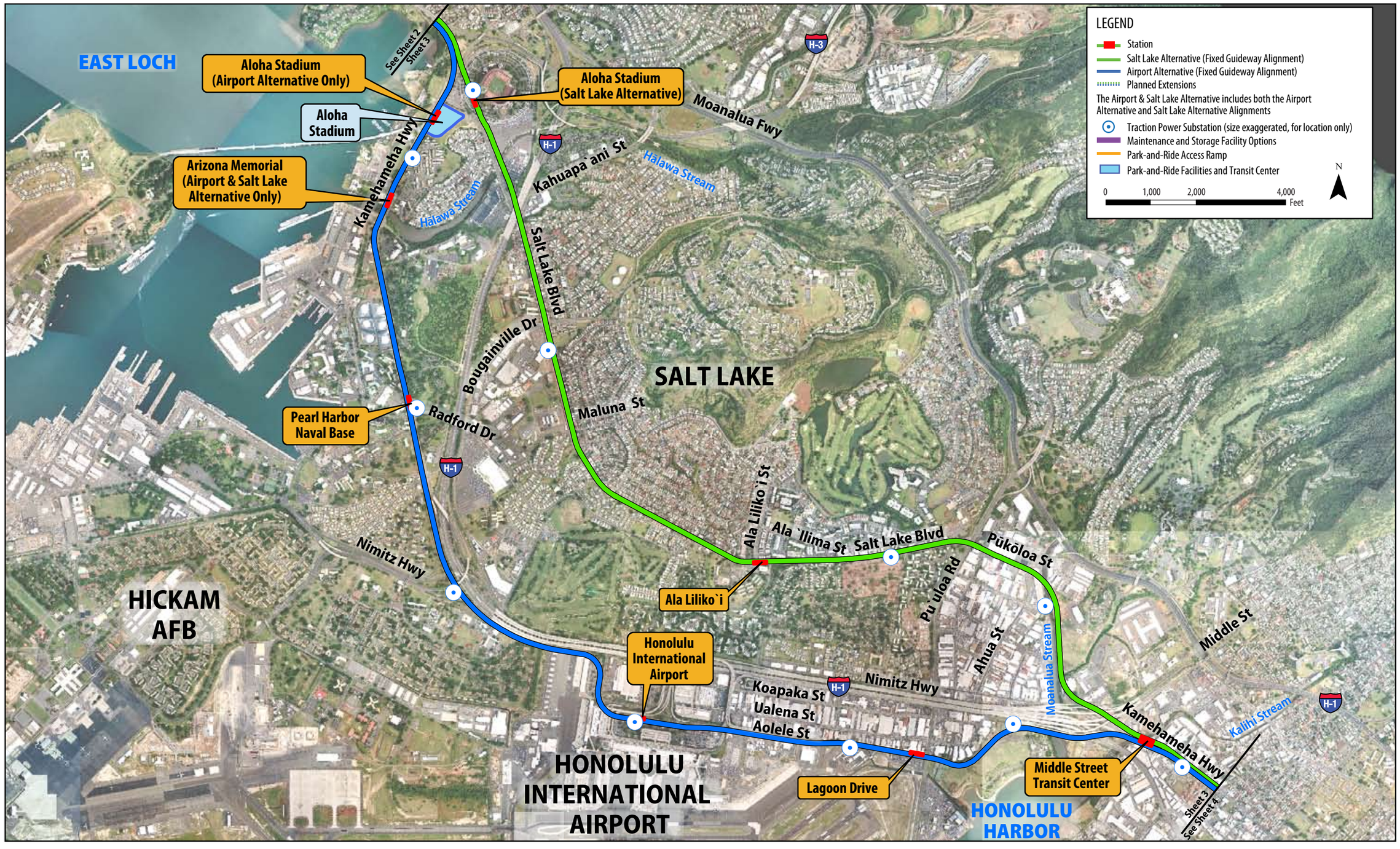


Figure 2-7 Fixed Guideway Transit Alternative Features, Aloha Stadium to Kalihi

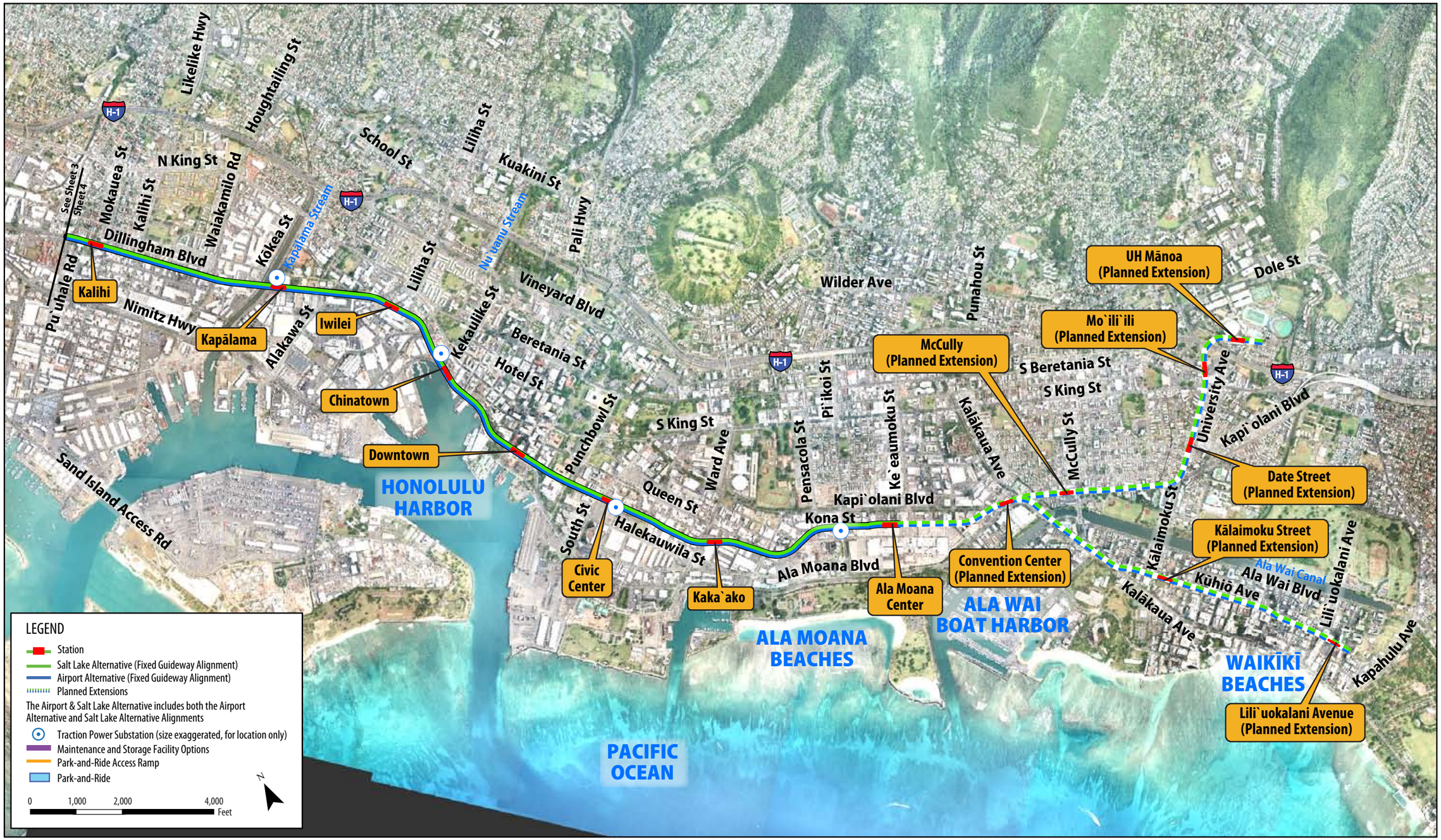


Figure 2-8 Fixed Guideway Transit Alternative Features, Kalihi to UH Mānoa and Waikīkī

Ala Moana Center is the logical Koko Head terminus because as Oʻahu's largest shopping center it is a major activity center. Ala Moana Center also is a major transit hub with more than 2,000 weekday bus trips. The Koko Head terminus would allow commuters the ability to link to the major employment centers and traffic generators in the area.

Therefore, East Kapolei and Ala Moana Center are rational end points for the system and can operate independent of any other transportation improvements, except those planned as part of the No Build Alternative and assumed in to be place prior project completion.

Salt Lake Alternative

The Salt Lake Alternative would leave Kamehameha Highway immediately ʻEwa of Aloha Stadium, cross the Aloha Stadium main parking lot, and continue Koko Head along Salt Lake Boulevard (Figure 2-7). It would follow Pūkōloa Street through Māpunapuna before crossing and following Moanalua Stream to cross over the H-1 Freeway and continue to the Middle Street Transit Center. Stations would be constructed at Aloha Stadium and Ala Likiloʻi Street. The alignment for the Salt Lake Alternative is shown in Figure 2-2. Under this alternative, feeder bus connections would be provided from fixed guideway stations to Pearl Harbor Naval Base, Honolulu International Airport, and Hickam Air Force Base. The total guideway length for the Salt Lake Alternative would be approximately 19 miles and it would include 19 stations.

Airport Alternative

The Airport Alternative would continue past Aloha Stadium along Kamehameha Highway makai to Nimitz Highway and turn makai onto Aolele Street. It would then follow Aolele Street Koko Head to reconnect to Nimitz Highway near Moanalua Stream and continue to the Middle Street Transit Center (Figure 2-7). Stations would be constructed at Aloha Stadium, Pearl Harbor Naval Base, Honolulu International Airport, and Lagoon Drive. The alignment for the Airport Alternative is shown in Figure 2-3. Under this alternative, feeder bus connections would be provided from fixed guideway stations to locations along Salt Lake Boulevard. The total guideway length for the Airport Alternative would be approximately 20 miles and it would include 21 stations.

Airport & Salt Lake Alternative

The Airport & Salt Lake Alternative is identical to the Salt Lake Alternative, with the additional segment that follows Kamehameha Highway and Aolele Street from Aloha Stadium to Middle Street (Figure 2-7). This alternative would follow the alignments described for both the Salt Lake Alternative and the Airport Alternative. All the station locations discussed for the Salt Lake Alternative would be provided as part of this alternative. All stations discussed for the Airport Alternative also would be included, except that the Aloha Stadium Station on Kamehameha Highway would be relocated south 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 alignment for the Airport & Salt Lake Alternative is shown in Figure 2-4. The total guideway length for this alternative would be approximately 25 miles and it would include 23 stations.

Construction of the Airport & Salt Lake Alternative would be completed in phases. The section between East Kapolei and Ala Moana Center along Salt Lake Boulevard would be constructed first, followed by the connection from the Middle Street Transit Center to the airport, and finally the connection from the airport to Aloha Stadium.

Operating Parameters

The fixed guideway system is planned to operate between 4 a.m. and midnight (Table 2-5), with a train arriving in each direction at each station between every three and ten minutes. Trains would be capable of reaching 50 miles per hour (mph) or greater and achieve an average speed, including dwell times at stations, of 30 mph or greater. It is envisioned that bicycles would be allowed on trains.

Table 2-5 Fixed Guideway Operating Assumptions

Time of Day[1]	System Headway[2]
4 a.m. to 6 a.m.	6 minutes
6 a.m. to 9 a.m.	3 minutes
9 a.m. to 3 p.m.	6 minutes
3 p.m. to 6 p.m.	3 minutes
6 p.m. to 8 p.m.	6 minutes
8 p.m. to midnight.	10 minutes

[1]System is closed from midnight to 4 a.m.

[2]Branch-line headway on Airport and Salt Lake alignments would be twice that of the main line for the Airport & Salt Lake Alternative.

A unified fare structure is planned, similar to the current structure for TheBus and TheBoat; however, other fare policies could be considered in the future. Fare vending machines would be available at all stations, and standard fare boxes would be used on buses. Fare-collection for the fixed guideway system would be proof of payment. Fare inspectors would ride the system and randomly check that passengers have valid tickets, passes, or transfers. Violators would be cited and fined.

The system is planned to operate with multi-vehicle trains approximately 120 to 180 feet long, with each train capable of carrying 325 or more passengers. This would provide a peak capacity of at least 6,000 passengers per hour per direction. The system would be expandable to accommodate longer trains of up to 300 feet in the future to increase capacity by more than 50 percent. Also, the system could be operated with shorter headways (time between train arrivals) to increase peak capacity. This level of service would require a peak-period fixed guideway fleet of 50 to 57 vehicles depending on the final vehicle design selected (Table 2-4).

Transit Technology

The selected transit technology would be electrically powered, industry-standard steel wheel on steel rail powered from a third-rail system (Figure 2-9). The selected vehicle would be capable of a top speed greater than 50 mph and meet the environmental and operating parameters discussed in this Draft EIS.

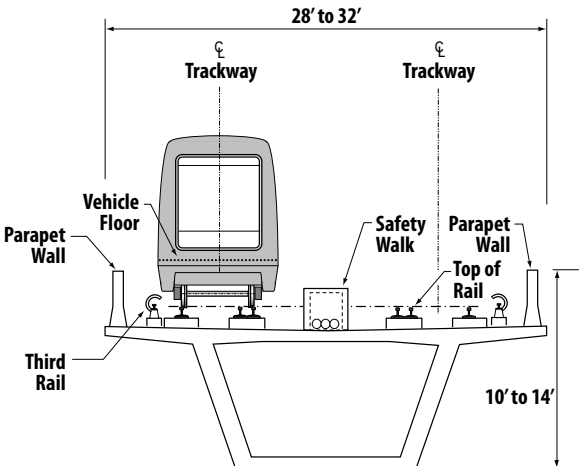


Figure 2-9 Example Vehicle on Elevated Guideway (Cross-section)

The vehicles could either be manually operated by a driver or fully automated (driverless). This is possible because the fixed guideway would operate in exclusive right-of-way with no automobile or pedestrian crossings.

Station Characteristics

All fixed guideway stations would have similar design elements. The stations would provide one, two, or three platforms 300 feet long and be a minimum of 12 feet wide to accommodate passenger demand beyond 2030. Center platform stations would have a minimum 30-foot-wide platform. All platforms would be high level (at the same level as the vehicle floor) to provide level boarding for all passengers and to accommodate wheelchairs. In

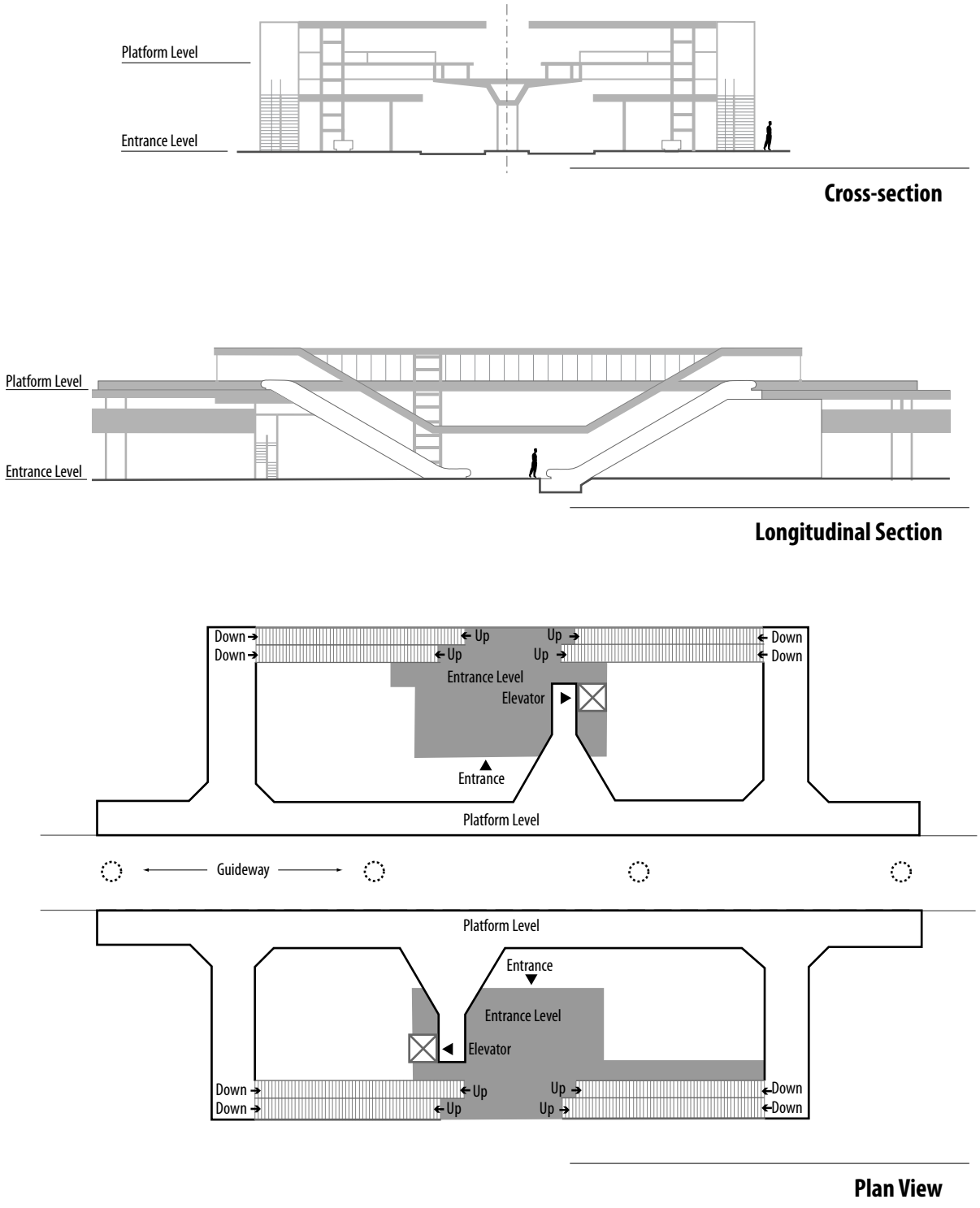
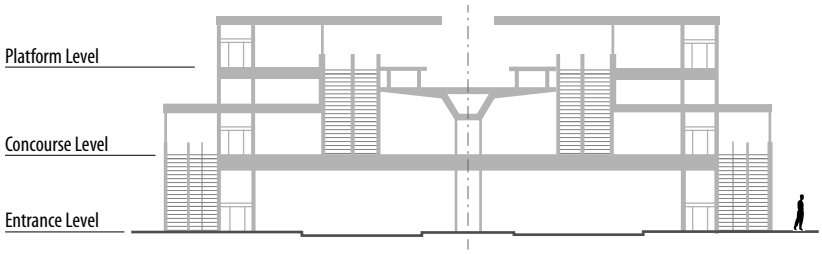
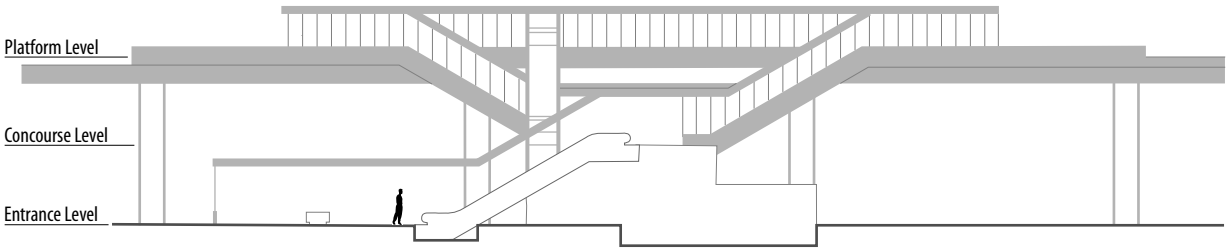


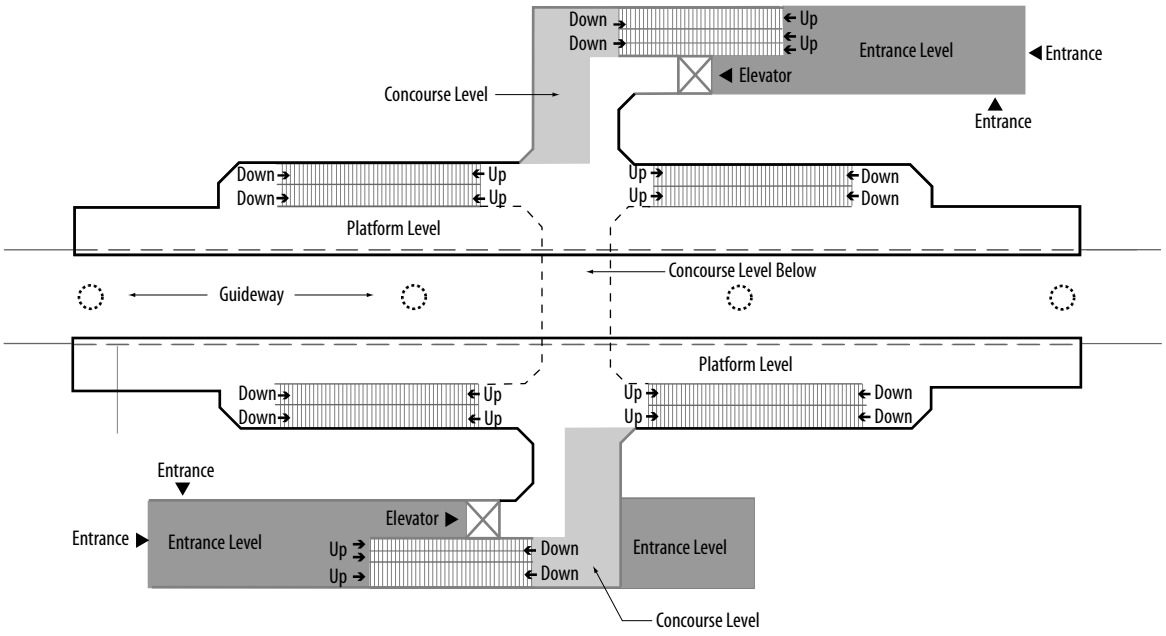
Figure 2-10 Typical Side-platform Station Configuration without a Concourse



Cross-section

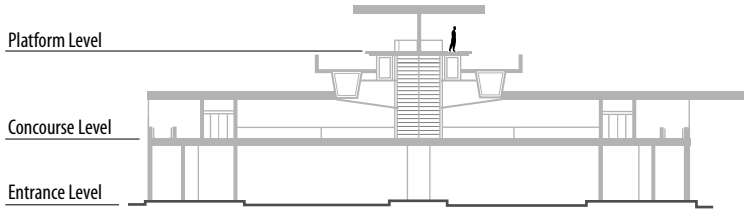


Longitudinal Section

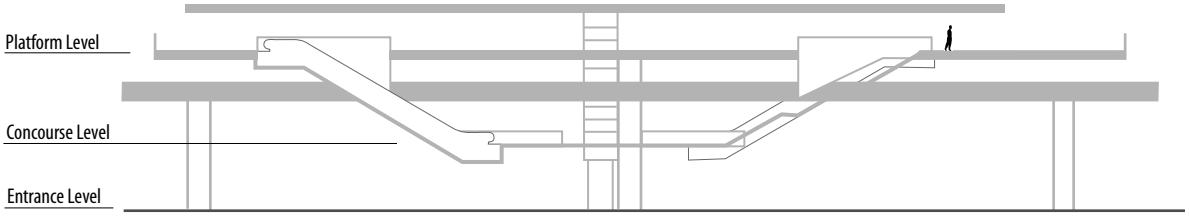


Plan View

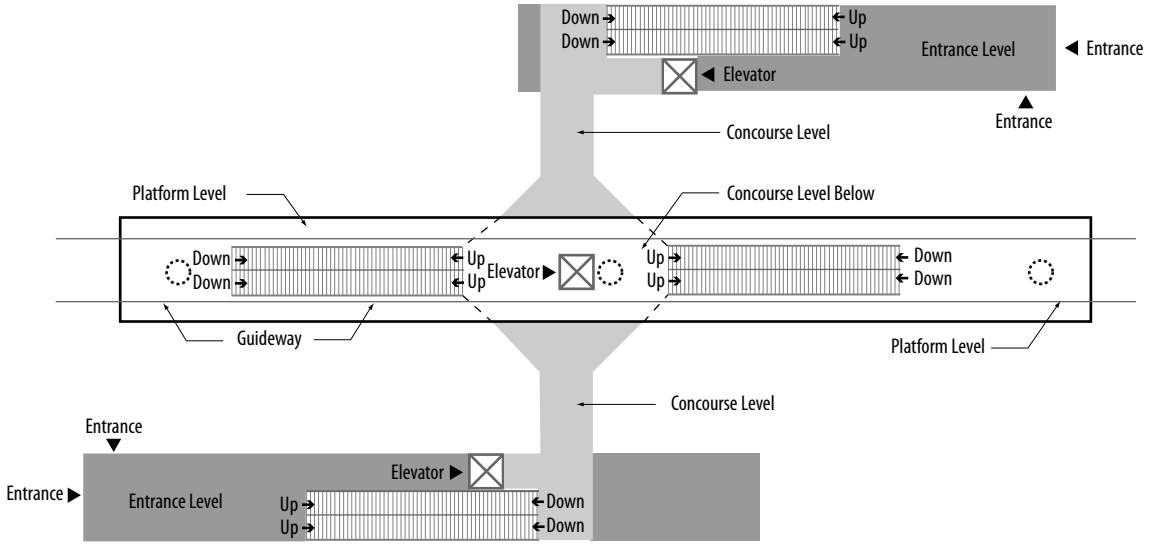
Figure 2-11 Typical Side-platform Station Configuration with a Concourse



Cross-section



Longitudinal Section



Plan View

Figure 2-12 Typical Center-platform Station Configuration with a Concourse

addition to stairs and escalators, elevators would be provided at all stations to accommodate elderly and disabled riders. Bicycle racks or lockers also would be provided.

Each station would include the following:

- **Stairs, elevators, and escalators for access**
- **Ticket-vending machines**
- **Bicycle parking**
- **Landscaping**
- **Lighting**

Ticket-vending machines would be provided at all stations. Stations would be designed to accommodate fare gates and a station manager's booth, which could either be on the ground or mezzanine level. The stations would have one of three general configurations:

- Side platforms without a mezzanine (Figure 2-10)
- Side platforms with a mezzanine (Figure 2-11)
- Center platforms with a mezzanine (Figure 2-12)

Side-platform stations without a mezzanine allow the guideway to continue through the station without changing its height above the ground, which averages approximately 30 feet to the top of the tracks. Side-platform and center-platform mezzanine stations require the guideway to climb approximately 18 feet to provide clearance for a mezzanine below the platform that would provide adequate clearance above the street below. Center-platform mezzanine stations would require the tracks to split several hundred feet before the station to pass on each side of the platform. The specific layout would vary at each station for all three station types, depending on available space, the location of bus connections, and the number of passengers that would use each station.

Each of the 24 station locations is shown in Figures 2-13 through 2-37. The figure titles indicate which of the Build Alternatives would include the station.

Bus System

Bus fleet requirements are shown in Table 2-4. Bus service would be enhanced and the bus network would be modified to coordinate with the fixed guideway system. Some existing bus routes, including peak-period express buses, would be altered or eliminated to reduce duplication of services provided by the fixed guideway system. Buses removed from service in the study corridor would be shifted to service in other parts of Oʻahu, resulting in improved transit service islandwide. Certain local routes would be rerouted or reclassified as feeder buses to provide frequent and reliable connections to the nearest fixed guideway station. Bus routes accessing the fixed guideway stations are shown in Figures 2-14 through 2-37.

In Waiʻanae, local and express services would be enhanced through shorter routes and more frequent service to connect to the fixed guideway system in East Kapolei with the major connection point at the UH West Oʻahu Station (Figure 2-38). Central Oʻahu connections to the fixed guideway system would occur at the Pearl Highlands Station (Figure 2-39). Few changes would occur in Pearl City and ʻAiea. Pearl Harbor Naval Base and Hickam Air Force Base would be served by circulators connecting to fixed guideway stations. Kalihi services are anchored at the Middle Street Transit Center. A number of routes would connect to this transit center. In Downtown and Waikīkī, buses would continue to operate on the major east-west transit streets of King, Hotel, Beretania, Kapiʻolani, and Ala Moana to provide local circulation (Figure 2-40). In Windward Oʻahu, a few routes would be altered to connect with the fixed guideway system, thus offering Windward residents connections to Leeward Oʻahu.

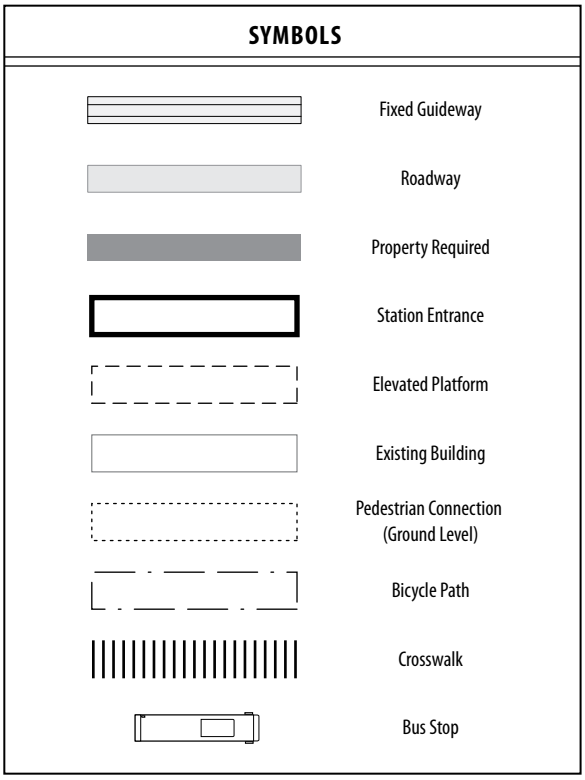


Figure 2-13 Legend for Figures 2-14 to 2-37

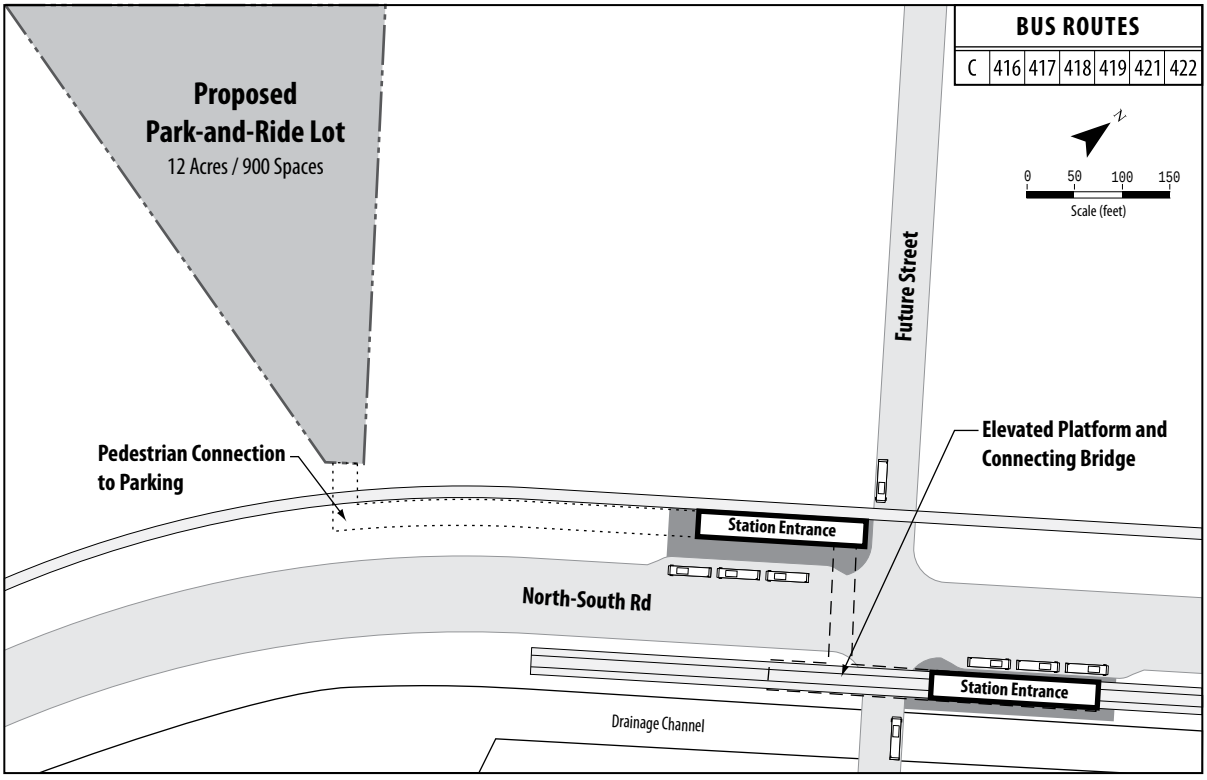


Figure 2-14 East Kapolei Station (All Build Alternatives)

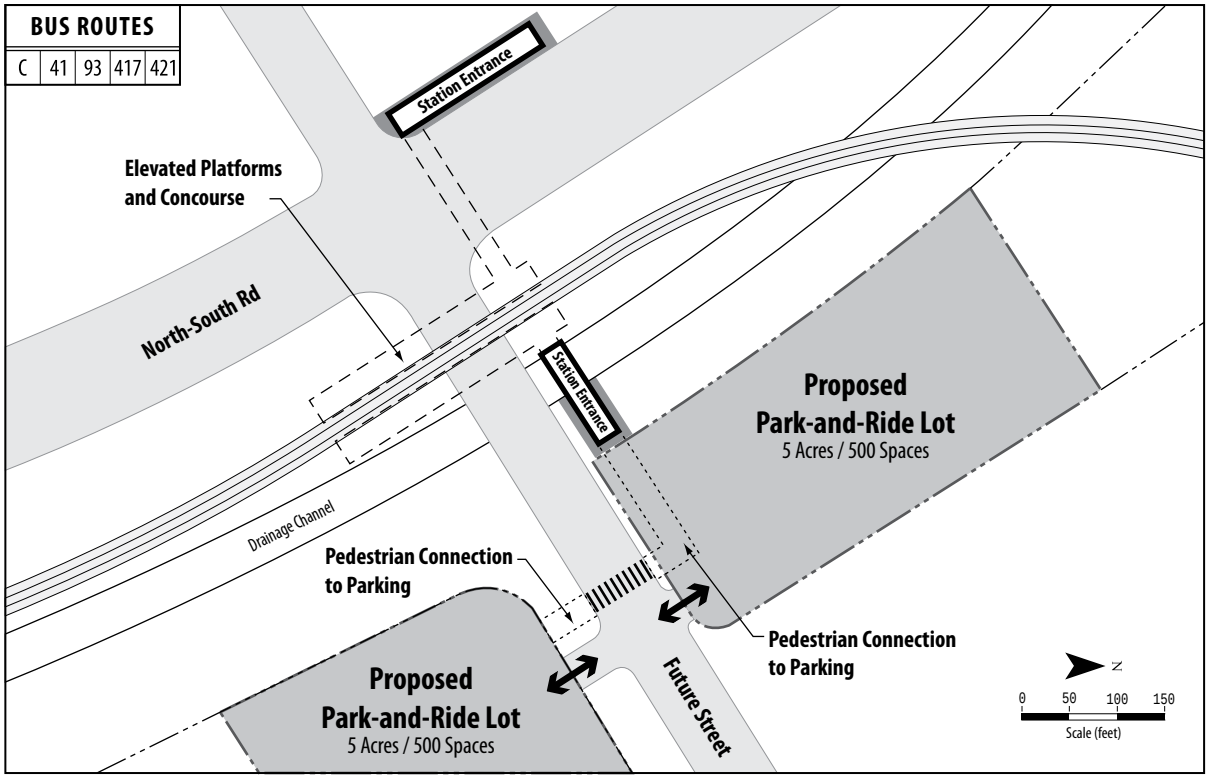


Figure 2-15 UH West O`ahu Station (All Build Alternatives)

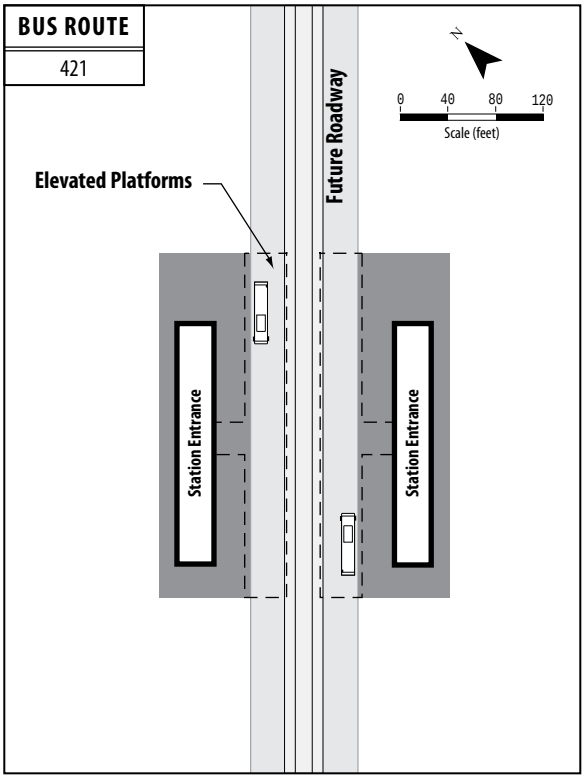


Figure 2-16 Ho`opili Station (All Build Alternatives)

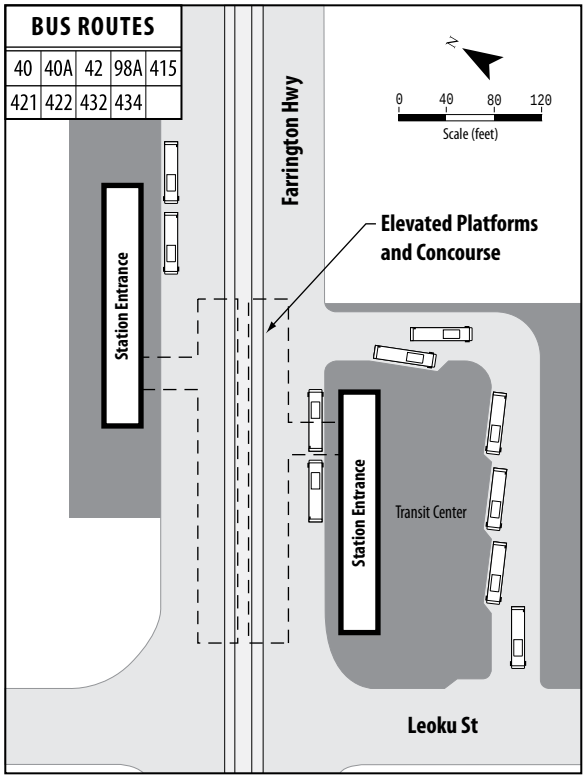


Figure 2-17 West Loch Station (All Build Alternatives)

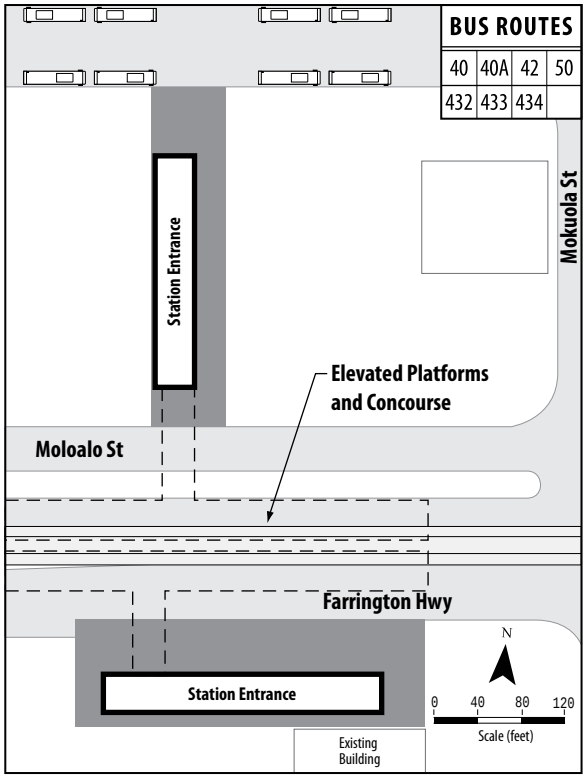


Figure 2-18 Waipahu Transit Center Station (All Build Alternatives)

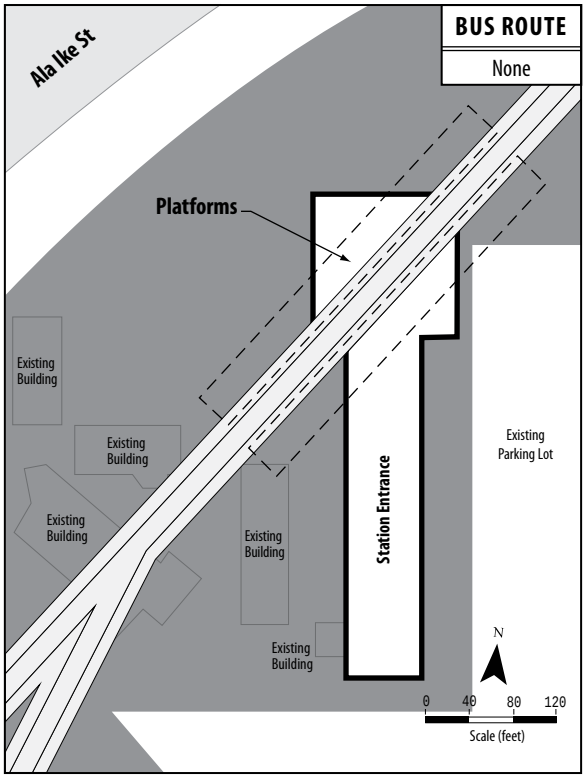


Figure 2-19 Leeward Community College Station (All Build Alternatives)

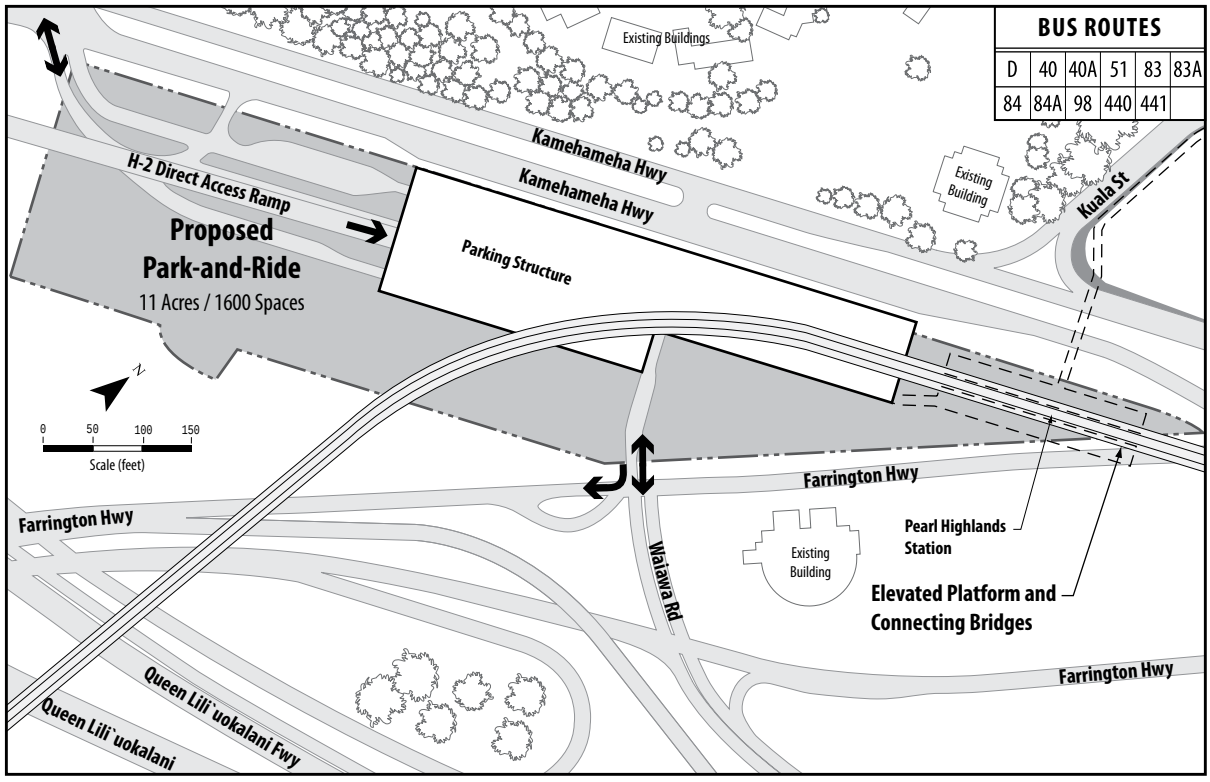


Figure 2-20 Pearl Highlands Station (All Build Alternatives)

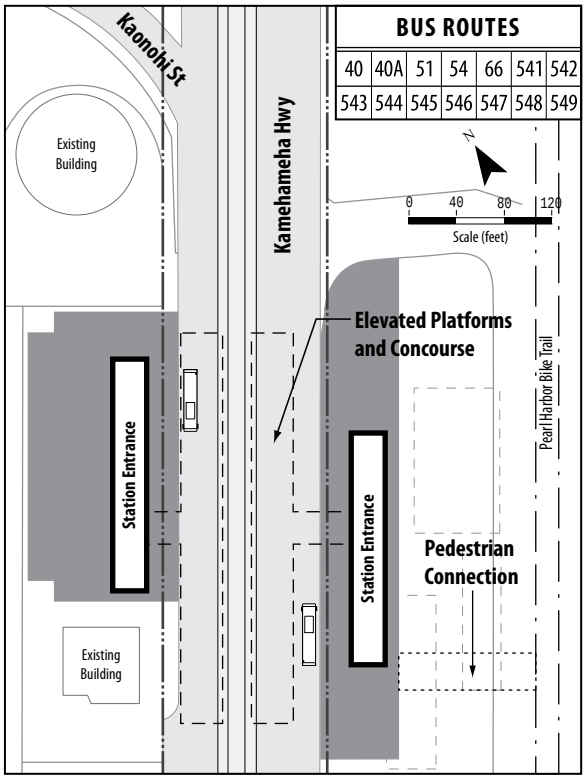


Figure 2-21 Pearlridge Station (All Build Alternatives)

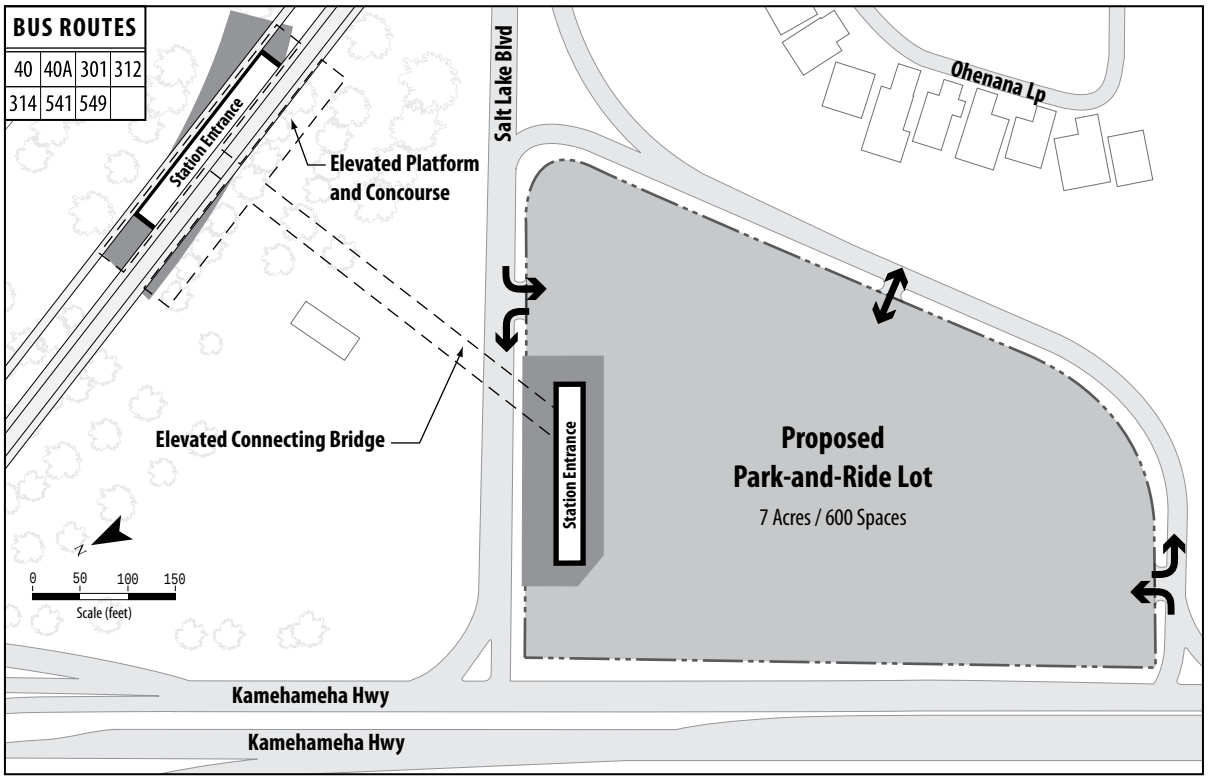


Figure 2-22 Aloha Stadium Station (Salt Lake Alternative and Airport & Salt Lake Alternative)

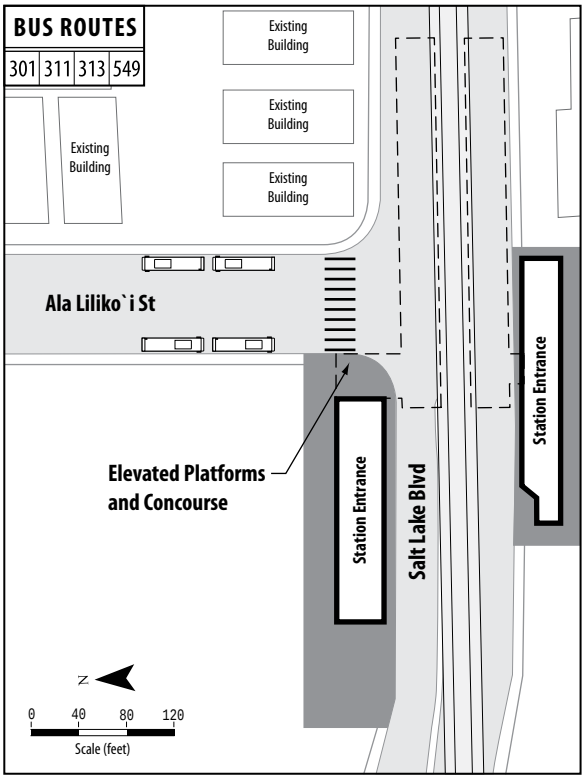


Figure 2-23 Ala Liliko`i Station (Salt Lake Alternative and Airport & Salt Lake Alternative)

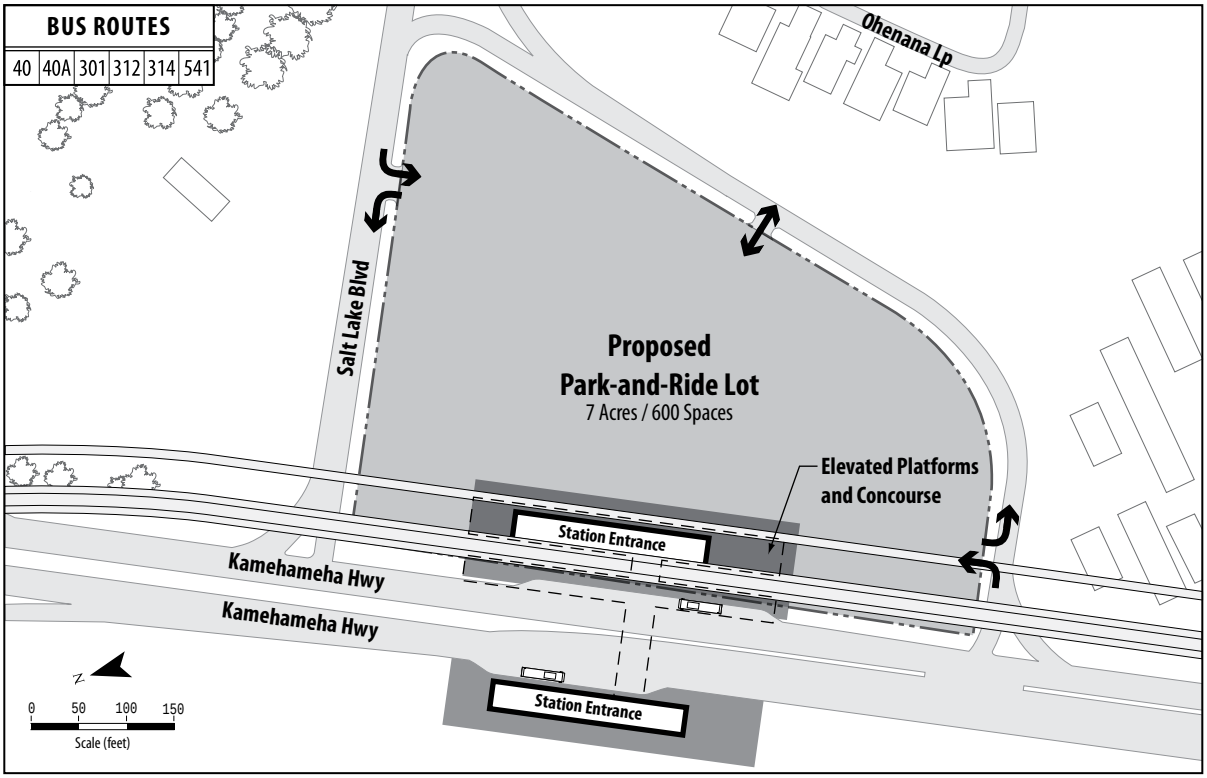


Figure 2-24 Aloha Stadium Station (Airport Alternative)

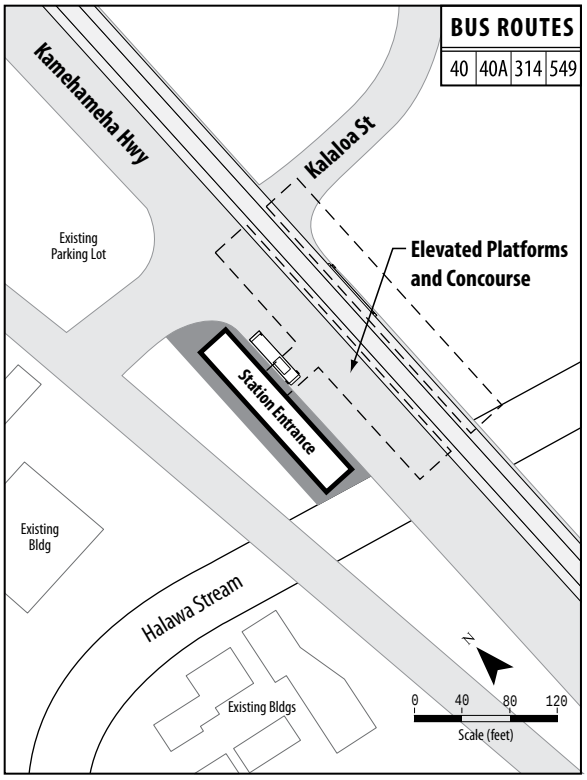


Figure 2-25 Arizona Memorial Station (Airport & Salt Lake Alternative)

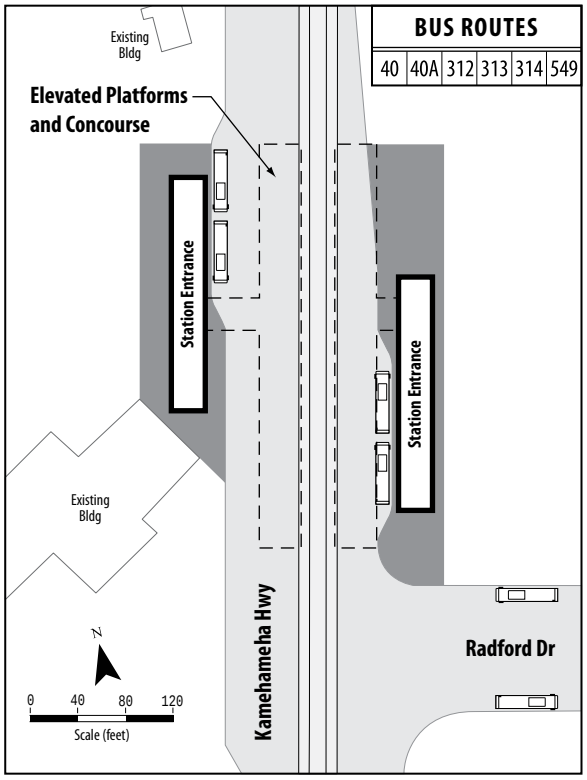


Figure 2-26 Pearl Harbor Naval Base Station (Airport Alternative and Airport & Salt Lake Alternative)

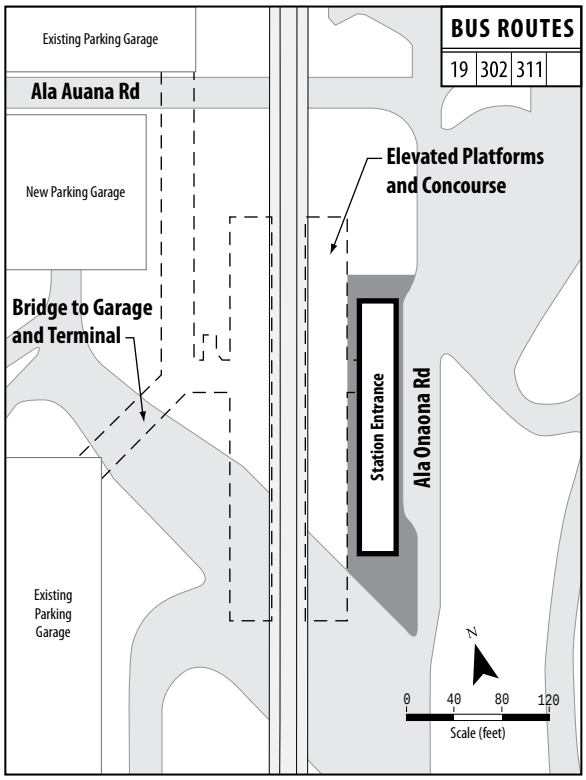


Figure 2-27 Honolulu International Airport Station (Airport Alternative and Airport & Salt Lake Alternative)

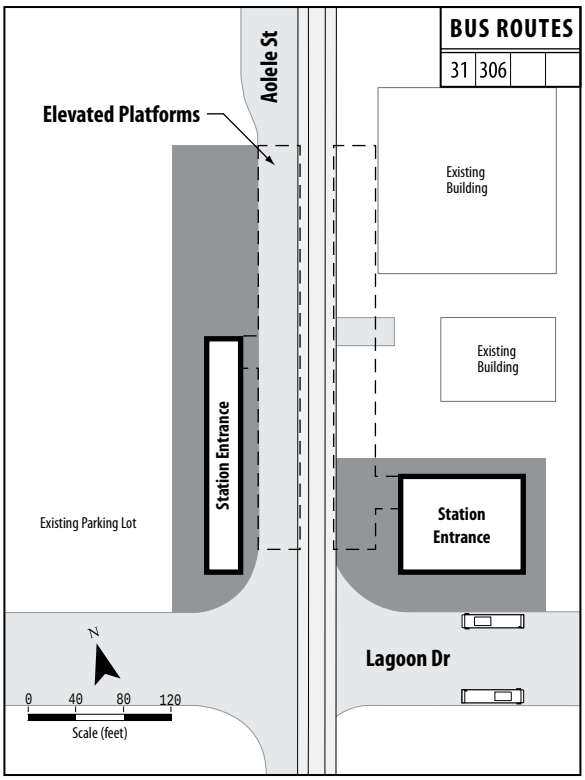


Figure 2-28 Lagoon Drive Station (Airport Alternative and Airport & Salt Lake Alternative)

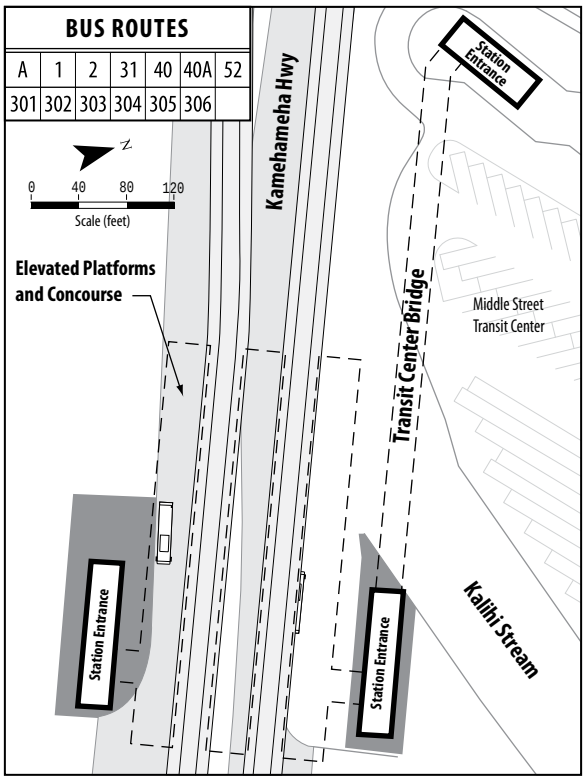


Figure 2-29 Middle Street Transit Center Station (All Build Alternatives)

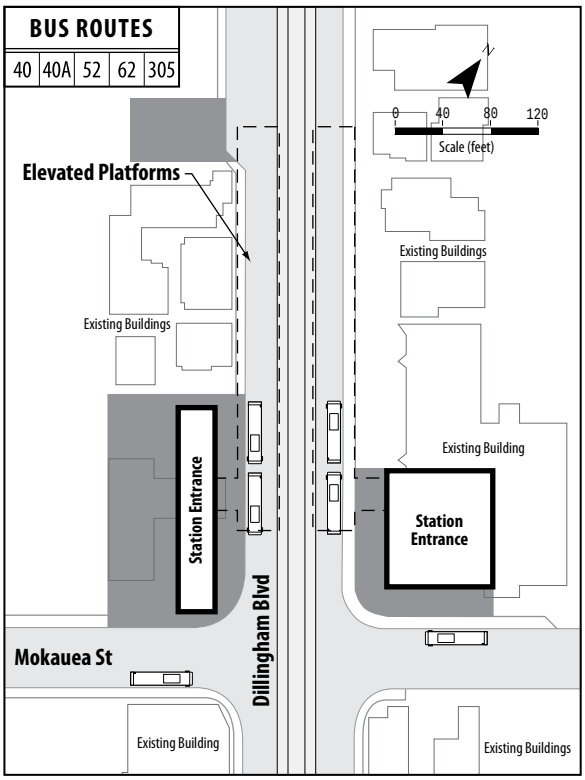


Figure 2-30 Kalihi Station (All Build Alternatives)

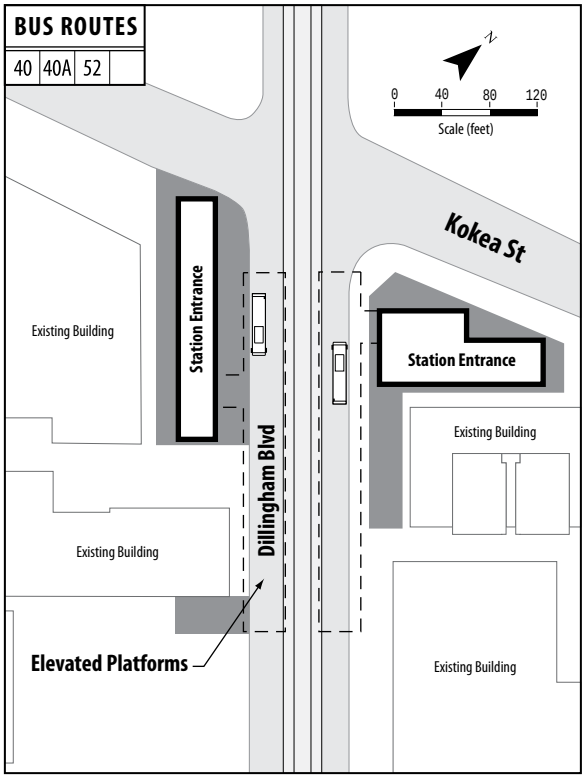


Figure 2-31 Kapālama Station (All Build Alternatives)

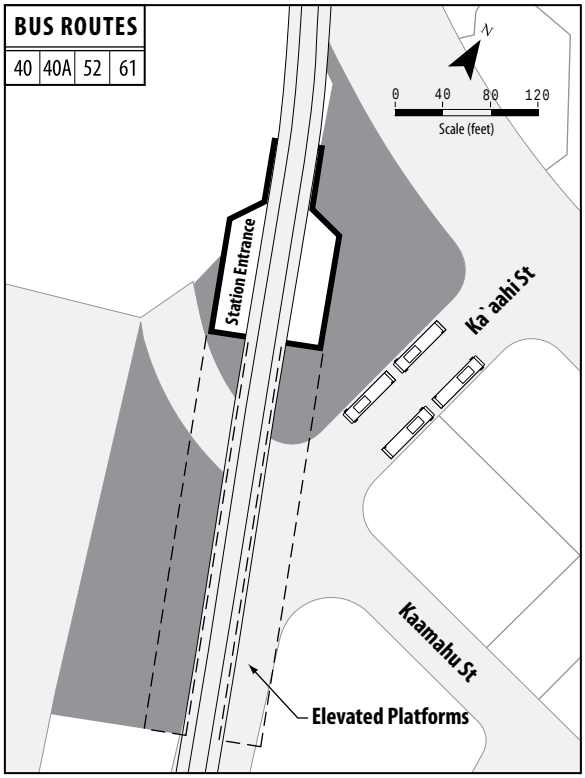


Figure 2-32 Iwilei Station (All Build Alternatives)

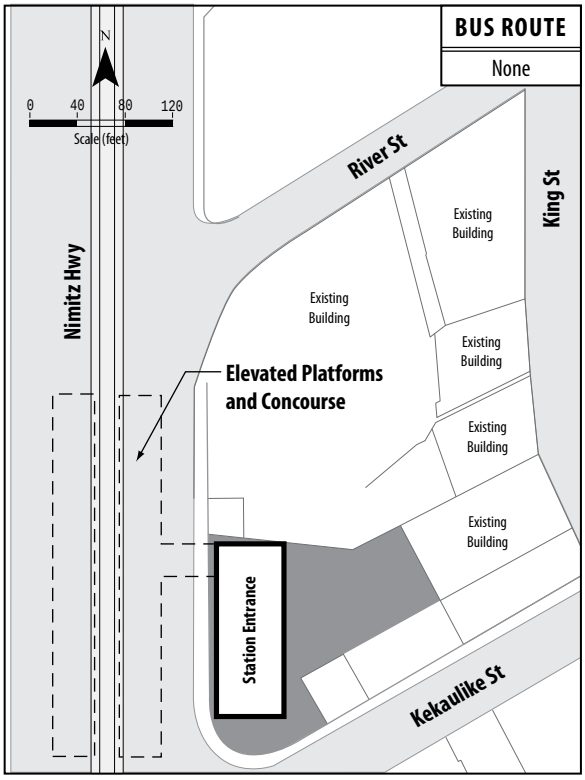


Figure 2-33 Chinatown Station (All Build Alternatives)

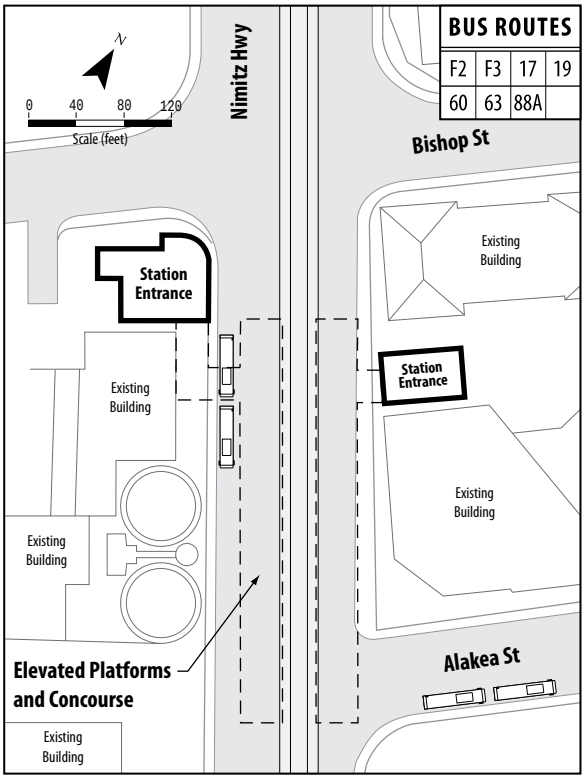


Figure 2-34 Downtown Station (All Build Alternatives)

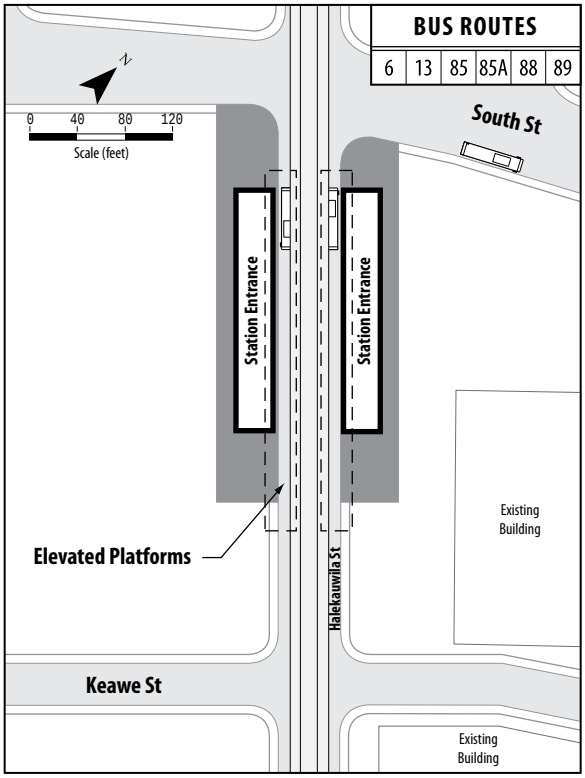


Figure 2-35 Civic Center Station (All Build Alternatives)

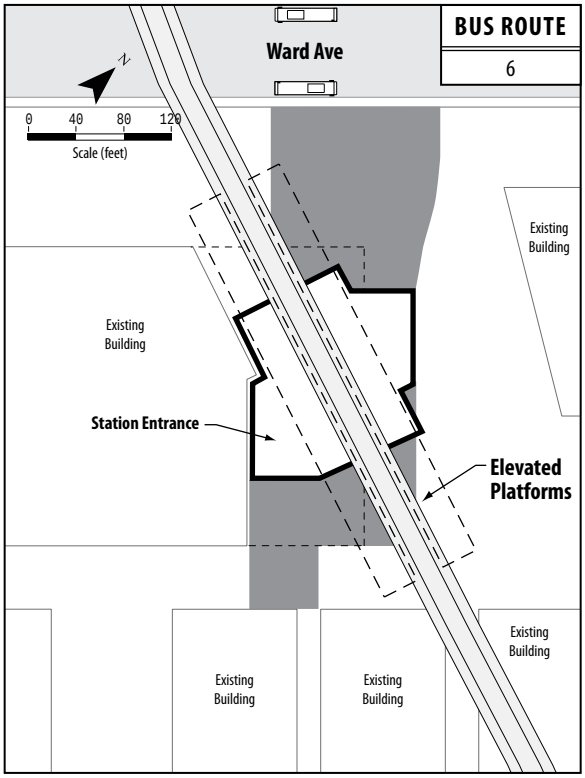


Figure 2-36 Kaka`ako Station (All Build Alternatives)

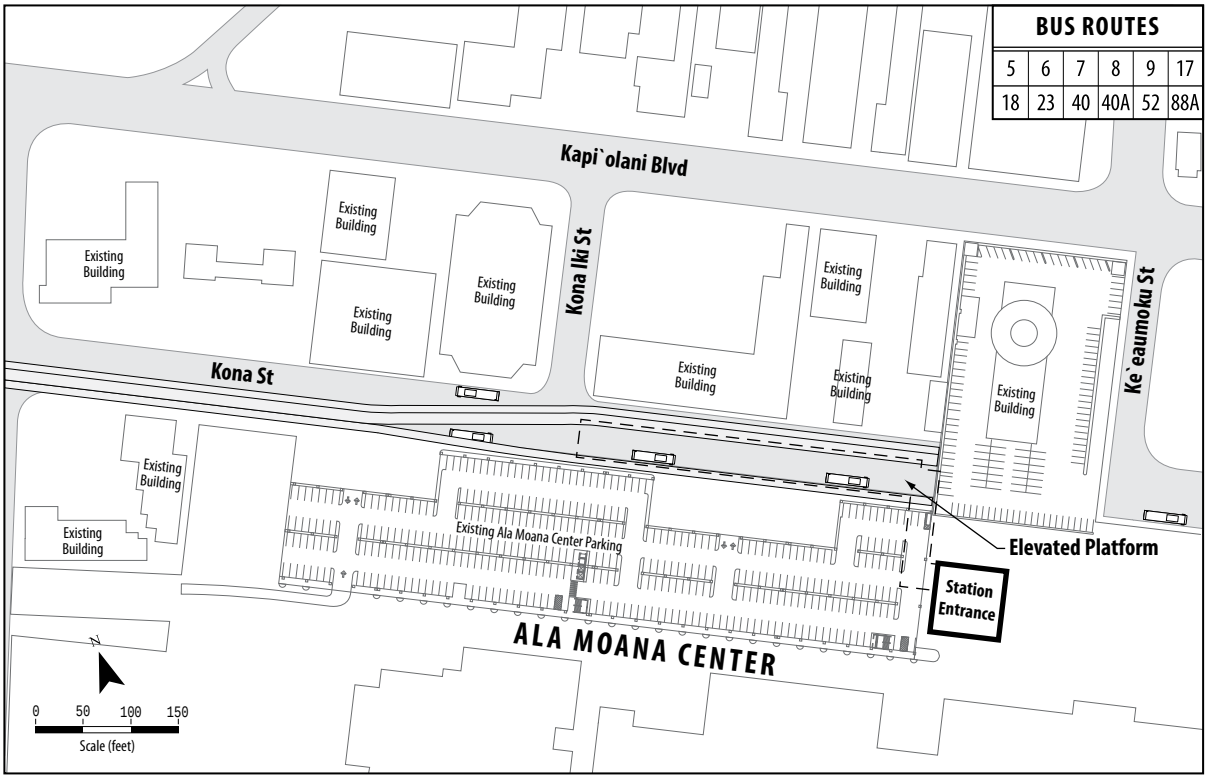


Figure 2-37 Ala Moana Center Station (All Build Alternatives)

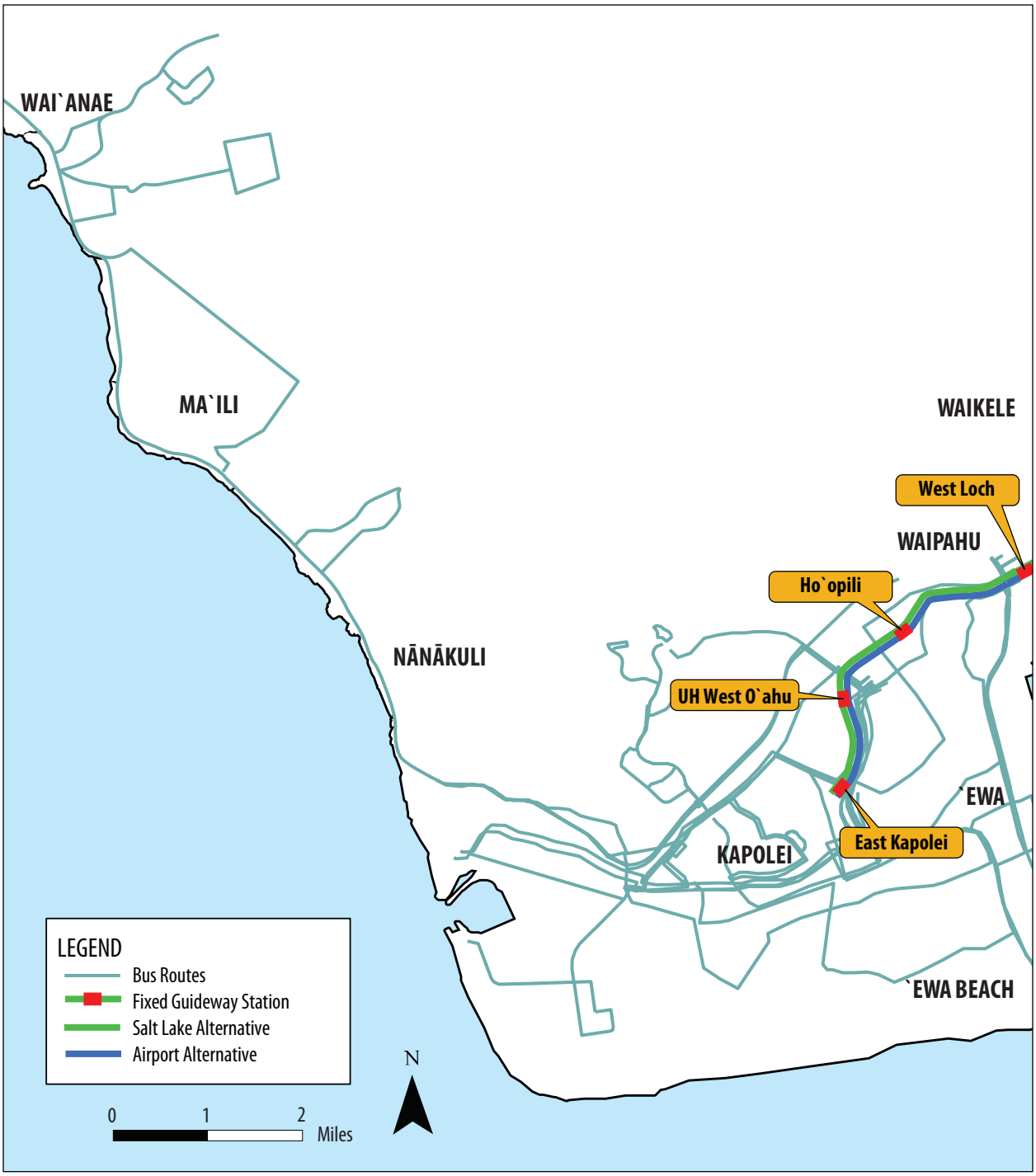


Figure 2-38 Kapolei Bus Service

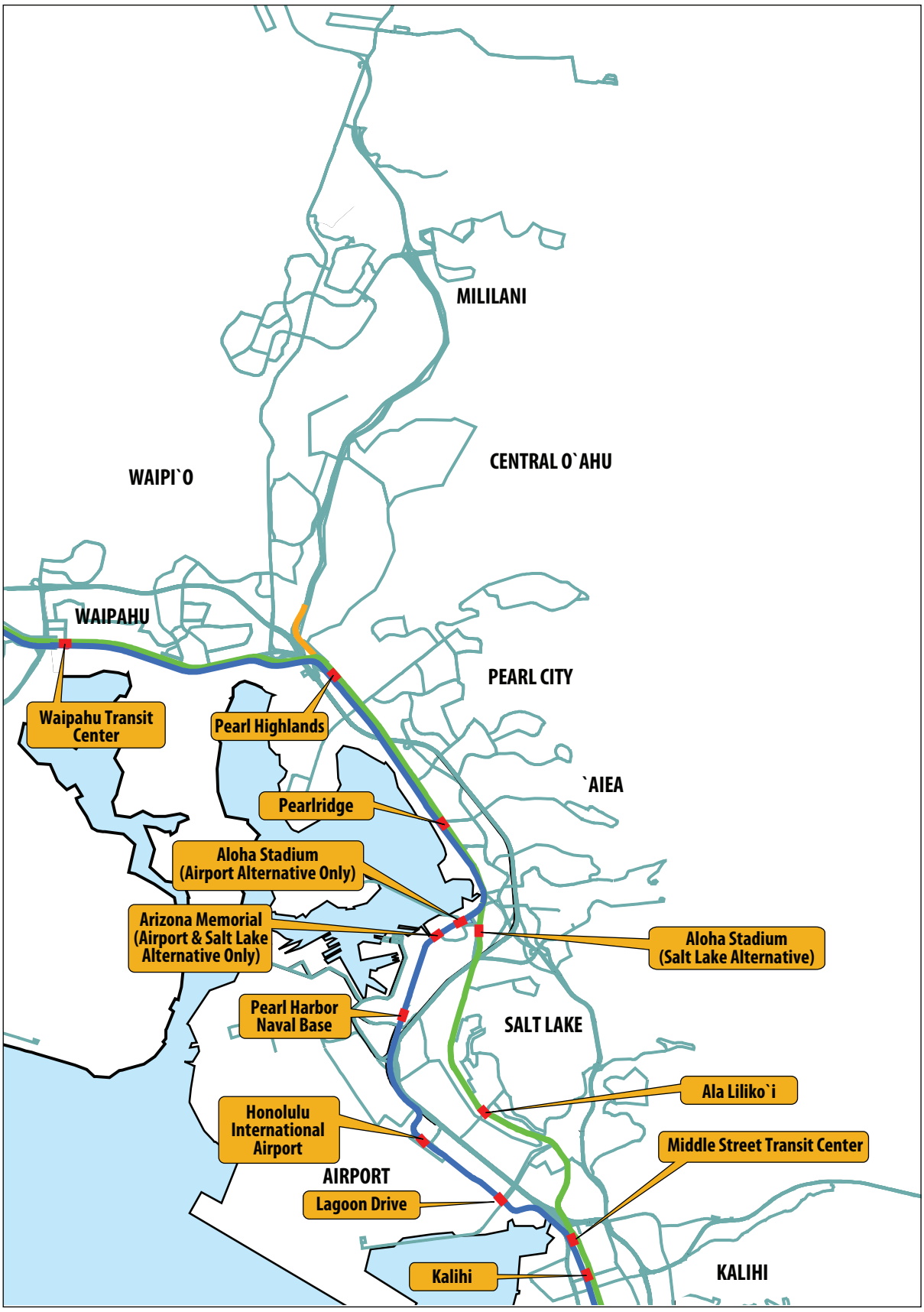


Figure 2-39 Central O`ahu Bus Service

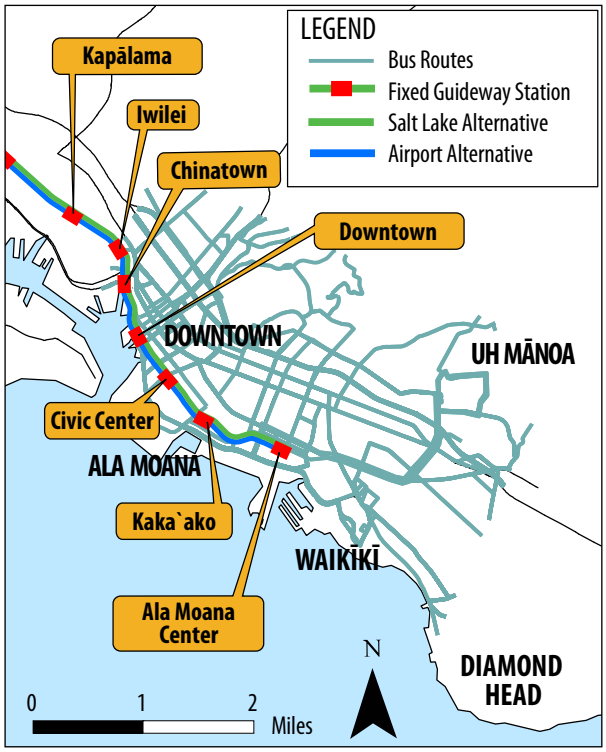


Figure 2-40 Ala Moana to UH Mānoa Bus Service

Most fixed guideway stations would offer connections to local bus routes. In some cases, an off-street transit center either already exists or would be built to accommodate transfers. In other cases, an on-street bus stop with dedicated curb space or a pullout would be located adjacent to the fixed guideway station. Paratransit vehicles would be accommodated at all stations and, in some cases, space for private tour buses, taxis, and/or special shuttles also would be included. Dedicated kiss-and-ride pullouts (passenger drop off) or parking spaces would be provided at many stations to facilitate drop-off and pick-up.

Bus System Enhancements

Traffic-signal priority turns signals green for transit buses before other traffic.

Automated vehicle identification uses GPS to track bus location at all times.

Off-vehicle fare collection allows passengers to buy their tickets before they board the bus or train.

Transit centers are facilities that accommodate transfers between fixed guideway, bus, bicycle, and walking. Park-and-ride and kiss-and-ride access and passenger amenities (covered waiting areas, benches, and transit information) are also available at some transit centers.

Bus transfers would be made at off-street transit centers adjacent to fixed guideway stations at UH West Oʻahu, West Loch, Waipahu Transit Center, Pearl Highlands, Pearlridge, Aloha Stadium, Middle Street Transit Center, and Ala Moana Center. The transit centers at UH West Oʻahu, West Loch, Pearl Highlands, and Aloha Stadium would be constructed as part of this Project. The other transit centers already exist or are planned for construction to support bus operations independent of this Project. On-street bus transfers would be accommodated at most other fixed guideway stations.

Enhanced bus service would be provided between the terminal stations of the Project and the planned extensions of the total fixed guideway system. System improvements, including traffic-signal priority, automated vehicle identification, and off-vehicle fare collection, would complement frequent bus service at the East Kapolei, Pearl Highlands, and Ala Moana Center Stations. These bus improvements would reduce travel time and improve intermodal transfers. Bus and fixed guideway departures and arrivals would be coordinated and predictable to minimize transfer time and total trip time.

Park-and-Ride Lots

Park-and-ride lots would be constructed at stations with the highest demand for drive-to-transit access (Table 2-6). With the exception of Pearl Highlands, which would be a parking structure, all park-and-ride lots are expected to be constructed as surface parking. The proposed size, location, and access for each proposed lot is shown in the figures for the

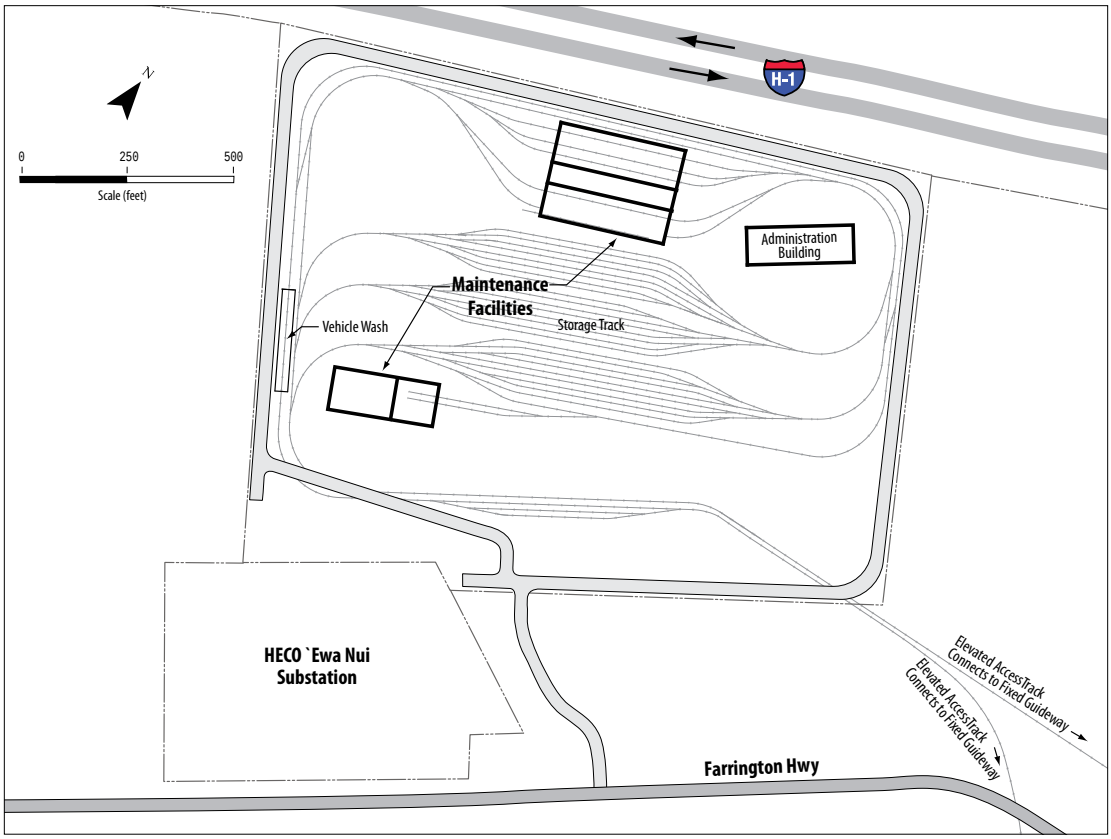


Figure 2-41 Maintenance and Storage Facility in Ho`opili Location and Conceptual Layout

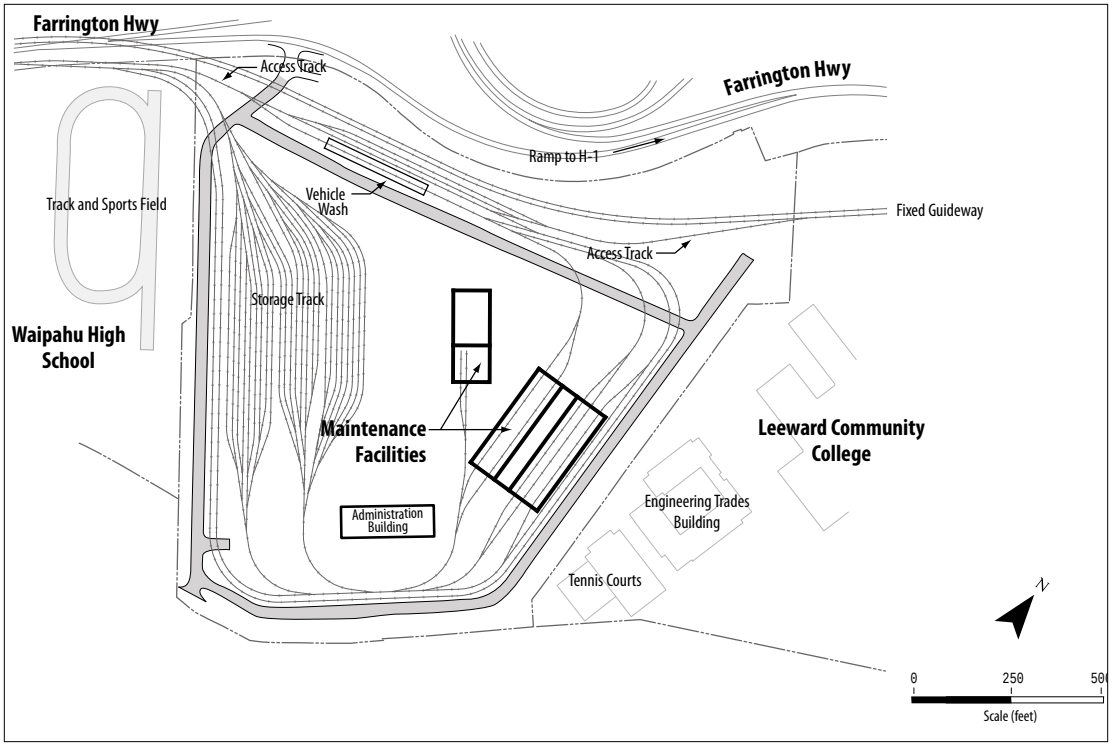


Figure 2-42 Leeward Community College Maintenance and Storage Facility Option

associated fixed guideway stations (Figures 2-14, 2-15, 2-20, and 2-22 or 2-24).

Table 2-6 Locations and Capacity of Park-and-Ride Facilities

Park-and-Ride Location	Size	Capacity
East Kapolei	12 acres	900 spaces
UH West O`ahu	10 acres	1,000 spaces
Pearl Highlands	11 acres	1,600 spaces
Aloha Stadium	7 acres	600 spaces

Vehicle Maintenance and Storage Facility

The Project would include a vehicle maintenance and storage facility to maintain and store up to 100 vehicles. Maintenance operations would occur over the 24-hour day in three shifts. Two locations are being considered for the facility: a 41-acre area currently in agricultural use adjacent to an electrical substation in Hoʻopili (Figure 2-41) and a 43-acre vacant site near Leeward Community College (Figure 2-42). Only one maintenance and storage facility site would be selected. Either site would include a number of buildings, maintenance facilities, a vehicle wash area, storage track, a system control center, and employee parking. The site near Leeward Community College would allow for more efficient system operation because it is more centrally located and vehicles could enter and exit the fixed guideway in either direction.

Traction Power Substations

The Project would require traction power substations approximately every mile to provide vehicle propulsion and auxiliary power. The planned locations are shown in Figures 2-5 through 2-8. Each substation would be approximately 40 feet long, 16 feet wide, and 12 feet high; would include transformers, rectifiers, batteries, and ventilation equipment; and would be connected to the existing power grid. Each substation would consist of a painted steel box housing the equipment and sufficient area to access and maintain the equipment (Figure 2-43). Many substations would be incorporated into fixed guideway stations. At other locations, the substations may be enclosed within a fence.

Figure 2-43 Installation of a Traction Power Substation

Project Phasing

The Locally Preferred Alternative adopted by the City Council identified a fixed guideway transit system between Kapolei and UH Mānoa with a branch line to Waikīkī. The Build Alternatives in this Draft EIS would begin to implement the Locally Preferred Alternative. The Project would begin near the planned UH West Oʻahu campus and extend to Ala Moana Center. This is the portion of the Locally Preferred Alternative that can be constructed with anticipated funding. The remainder of the Locally Preferred Alternative, referred to in this Draft EIS as "planned extensions," would be constructed once additional funding is secured.

The Project connects East Kapolei and Ala Moana Center. The Project would connect multiple activity centers, provide cost-effective transit-user benefits, and meet the Purpose and Need for the Project whether or not the planned extensions are provided. Construction of the Project would not preclude future development of the planned extensions.

Because of its length, the Project would be constructed in phases to accomplish the following:

- Match the anticipated schedule for right-of-way acquisition and utility relocations
- Reduce the time that each area will experience traffic and community disturbances
- Allow for multiple construction contracts with smaller contract size to promote more competitive bidding
- Match the rate of construction to what can be maintained with local workforce and resources
- Balance expenditure of funds to minimize borrowing

The Project is proposed to be constructed in the following four phases (Figure 2-44):

- East Kapolei to Pearl Highlands
- Pearl Highlands to Aloha Stadium
- Aloha Stadium to Middle Street
- Middle Street to Ala Moana Center

As portions of the Project are completed, they would be opened so that system benefits, even if limited during the initial phases, would be realized prior to completion of construction of the entire Project. The temporary effects associated with the interim operations are discussed in Sections 3.5, Construction-related Effects on Transportation, and 4.17, Construction Phase Effects, of this Draft EIS. The Project's cash flow analysis, which is presented in Section 6.4, anticipates the use of Local funds for the first construction phase and a combination of Local and Federal funds for the remaining phases.

The Airport & Salt Lake Alternative would include additional construction phases. The section between East Kapolei and Ala Moana Center along Salt Lake Boulevard would be constructed as discussed above, followed by a 2.1-mile connection from the Middle Street Transit Center ʻEwa to the Honolulu International Airport, and finally the section from the airport to Aloha Stadium. The final phases could be completed after 2018.

Prior to completion of the section from the airport to Aloha Stadium, the connection to the airport would provide a direct link from the Koko Head terminus of the Project to the airport but would require a transfer at Middle Street for those traveling from the ʻEwa end of the line. It would accommodate the demand for access to the large employment base at and near the airport and provide access for travelers to and from the airport.

Construction Schedule

Construction is currently planned to be completed in four overlapping phases of work. Construction activities would be similar for each phase and are described in Appendix C, Construction Approach. The first phase would include construction of the vehicle maintenance and storage facility and a portion of the Project between the Waiʻanae end of the Project and Pearl Highlands. The limits of the first phase have been selected so that the fixed guideway could connect to either maintenance and storage facility option because system testing and operation could not be completed without access to the maintenance and storage facility. Selection of the vehicle maintenance and storage facility near Leeward Community College would allow construction phasing in either the ʻEwa or Koko Head direction from that site. Station areas, park-and-ride lots, and the maintenance and storage facility site would function as construction staging areas for the first construction phase.

The remainder of the Project likely would be built in three overlapping phases continuing Koko Head from Pearl Highlands, first to Aloha Stadium, then to Middle Street, and finally to Ala Moana Center. Construction staging areas for future phases beyond station areas, park-and-ride lots, and the maintenance and storage facility site would be identified and developed by the contractors and approved by the City. Variations to the schedule would continue to be evaluated during Preliminary Engineering. Conceptual design for the Project is under way, and work on the first construction

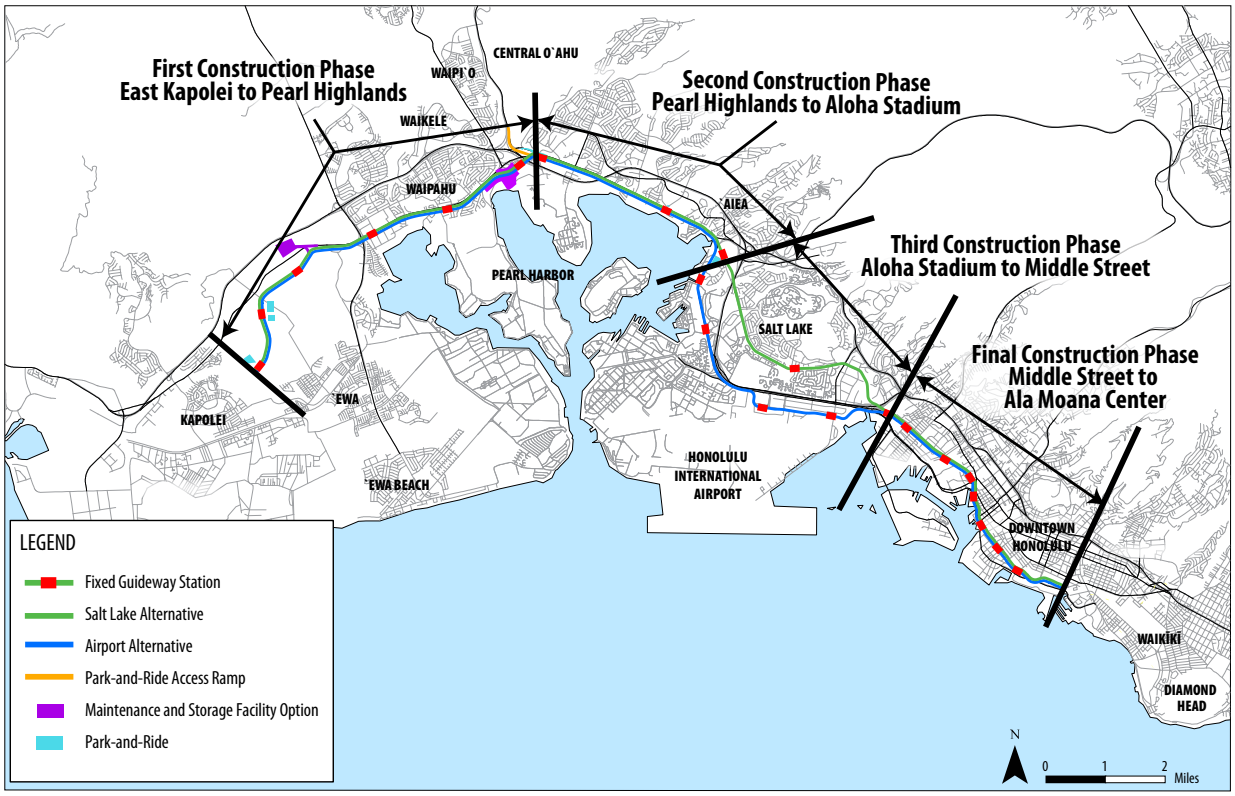


Figure 2-44 Project Construction Phases

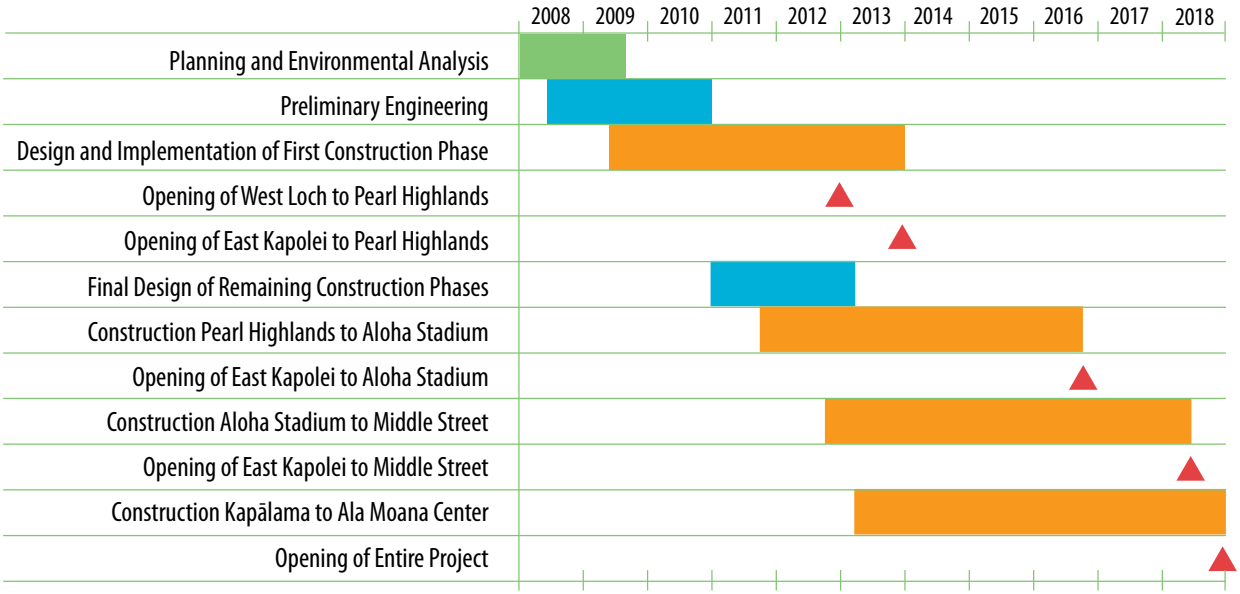


Figure 2-45 Project Schedule

phase would begin in 2009 (Figure 2-45). The entire Project is planned to be in operation in 2018.

Planned Extensions

In addition to the Project, the Locally Preferred Alternative includes three planned extensions connecting the Project to the following areas:

- West Kapolei
- UH Mānoa
- Waikīkī

The planned extensions are included as illustrative projects in the ORTP (OʻahuMPO 2007) and are anticipated by RTD to be completed at some time in the future prior to 2030 as separate projects that would receive detailed environmental review. The extensions include approximately 9 additional miles of guideway and 12 additional stations.

The West Kapolei extension would begin at the Waiʻanae end of the corridor and is anticipated to follow Kapolei Parkway to Wākea Street and then turn makai to Saratoga Avenue. Proposed station locations and other project features in this area are shown in Figure 2-5. The guideway would continue on planned extensions of Saratoga Avenue and North-South Road and connect to the Waiʻanae end of the current Project.

The UH Mānoa extension would connect to the current Project at Ala Moana Center and then veer mauka to follow Kapiʻolani Boulevard to University Avenue. It would then turn mauka to follow University Avenue over the H-1 Freeway to a proposed terminal facility on UH Mānoa's Lower Campus (Figure 2-8).

The Waikīkī extension would follow Kalākaua Avenue to Kūhiō Avenue and end near Oʻahu Avenue (Figure 2-8). The Ala Moana Center and Convention Center Stations would be transfer points between the UH Mānoa and Waikīkī branch lines.

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