

Honolulu High-Capacity Transit Corridor Project Alternatives Analysis

Technical Memorandum on Roadway Modifications

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City and County of Honolulu

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Acronyms Used in this Document

DTS	Department of Transportation Services
HDOT	Hawai‘i Department of Transportation
HHCTCP	Honolulu High Capacity Transit Corridor Project
HOV	High Occupancy Vehicle
OMPO	O‘ahu Metropolitan Planning Organization
TSM	Transportation System Management
UH	University of Hawai‘i

This report discusses potential modifications to the roadway transportation system that may be required for each of the Honolulu High Capacity Transit Corridor Project (HHCTCP) Alternatives.

The study area of the HHCTCP extends from Kapolei in the west (Wai‘anae or ‘Ewa direction) to the University of Hawai‘i at Mānoa (UH Mānoa) in the east (Koko Head direction), and is confined by the Wai‘anae and Ko‘olau Mountain Ranges to the north (mauka direction) and the Pacific Ocean to the south (makai direction). The four alternatives are described in detail in *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Detailed Definition of Alternatives Report* (DTS, 2006a) and include:

- No Build Alternative
- Transportation System Management (TSM) Alternative
- Managed Lane Alternative
- Fixed Guideway Alternative

The first two alternatives, the No Build Alternative and the TSM Alternatives, are intended to increase fleet sizes of the existing transit system and service frequency as well as amenities. The No Build Alternative is not expected to result in any physical modifications to the transportation system (including motorized or non-motorized) beyond what is programmed in the *2030 O‘ahu Regional Transportation Plan* prepared by OMPO. The TSM Alternative would have relatively minor modifications to roadways during the approximately one-year construction period for the new transit centers in Pearl City and ‘Aiea. No permanent modifications are expected, however, from the TSM Alternative to the existing and future roadway geometry, right-of-way or non-motorized modes. The Managed Lane Alternative would be using the right-of-way of the existing medians, shoulders, high occupant vehicle lanes on the existing freeways and highways and will consist of an elevated facility above the H-1 freeway, thus resulting in minimal modifications to the surface streets and circulation upon completion of construction. Therefore, this memorandum focuses on the discussions of the roadway modifications that may occur due to the Fixed Guideway Alternative. The types of modifications to the existing and future transportation for these two alternatives may include physical changes to the roadway geometry, right-of-way, removal of parking and the non-motorized modes, and temporary roadway modifications during the construction period of these alternatives.

This memorandum is divided into five chapters. Chapter I consists of this introduction. Chapter II describes the potential modifications to the existing and future transportation system for the Managed Lane Alternative. Chapter III presents the potential modifications to roadway geometry for the Fixed Guideway Alternative. Potential modifications to the access and services of the non-motorized modes are presented in Chapter IV for each of the Fixed Guideway Alternatives. Chapter V summarizes the conclusions and findings of this analysis.

Chapter 2 Modifications to the Roadway System for the Managed Lane Alternative

Potential roadway modifications that may be required for the Managed Lane Alternative are included in this chapter. The Managed Lane Alternative would include construction of a two-lane, grade-separated facility between Waipahu and Downtown Honolulu for buses, paratransit vehicles, high-occupancy vehicles, and potentially toll-paying lower occupancy vehicles depending on whether excess capacity remained. Two design and operational variations of the Managed Lane Alternative are proposed, as shown in Figures 2-1 and 2-2: a Two-direction Option (one lane in each direction) and a two-lane Reversible Option. One option provides two-way operation with one lane in each direction for all day travel. The second option is a reversible operation with two lanes in each direction, reversing by time of day.

The Managed Lane Alternative would be designed to be within existing freeway or highway rights-of-way, using the median, the shoulder or the HOV lanes of the existing H-1 and H-2 Freeways on the 'Ewa side of the alignment and the medians of Kamehameha Highway and Nimitz Highway. On the Koko Head side of the alignment, the managed lane facility would integrate with the Hawai'i Department of Transportation's (HDOT's) proposed Nimitz Flyover project included in *2030 O'ahu Regional Transportation Plan*. Both options would require modification to the Nimitz Flyover project's design and would terminate with ramps tying into Nimitz Highway just 'Ewa of Pacific Street. Both options would also include a bus-only connector ramp between Nimitz Highway and King Street via Iwilei Road. The H-1 zipper lane would be maintained in the Two-direction Option but discontinued in the Reversible Option.

The two design variations for the Managed Lane Alternative offer a limited number of access points to maintain optimal lane operations. For both options, access to the facility in West O'ahu would be via ramps from the H-1 and H-2 Freeways just prior to the Waiawa Interchange. The H-2 access ramps to the facility would be constructed from the outside lanes (i.e., the 'Ewa side) of the H-2 Freeway for both options, and overpass the freeway structures before connecting to the Managed Lanes in the median of Kamehameha Highway. For the 'Ewa-bound connections to H-2 from the Managed Lane, the Two-direction option would connect to the outside lanes of H-2, while the Reversible Option would connect to the inside HOV lane on H-2.

The park-and-ride location for Central O'ahu residents would be near Ka Uka Boulevard and H-2. It could include using the median of H-2 (makai of the Ka Uka interchange the H-2 median provides sufficient space for a facility and access and egress lanes) for the park-and-ride facility as discussed in the Mililani Mauka Park-and-Ride Facility Master Plan. Leeward residents would be able to park at a couple of locations, including near the Kalaeloa Boulevard, H-1 and Farrington Highway Interchange for Wai'anae Coast and West Kapolei residents and, near H-1 and the North-South Road by the UH West O'ahu Campus for East Kapolei, Makakilo and 'Ewa residents.

An intermediate bus access point would also be provided in the vicinity of Aloha Stadium. A park-and-ride lot would also be provided at this location. Bus service using the managed lane facility would be restructured and enhanced, providing additional service between

Kapolei and other points ‘Ewa of the Primary Urban Center, and downtown Honolulu and the University of Hawai‘i at Mānoa (UH Mānoa).

Anticipated roadway modifications and impacts as a result of the Managed Lane Alternative are summarized as follows:

- While the Managed Lane Alternative would use portions of the median, the shoulder or the HOV lanes of the existing H-1 and H-2 Freeways on the ‘Ewa end of its alignment, it is not anticipated to physically impact traffic operations or roadway configurations on H-1 or H-2.
- Along Kamehameha Highway, columns would be placed in the existing median in the section from Farrington Highway to Salt Lake Boulevard. This may involve the re-striping or reconstruction of the left-turn lanes affected by the modifications necessary for the medians. Closures of existing median openings necessitated by column placements may affect left-turn access to cross streets or adjacent land uses, although attempts would be made to minimize or avoid this through strategic placement of columns.
- At the Aloha Stadium area, modifications to the existing surface parking would likely be required to provide sufficient space for the proposed bus-only access ramp facilities.
- The two design options would also require modification to the Nimitz Flyover project’s proposed design in order to increase the design speed. As in the Nimitz Flyover design, the facility would terminate with ramps tying into Nimitz Highway ‘Ewa of Pacific Street.
- The bus-only connector ramp from Nimitz Highway to King Street via Iwilei Road would have no impact to roadways except at the intersection of Iwilei Road with King Street where the double left-turn lane from Iwilei Road to ‘Ewa bound King Street would be reduced to a single left-turn lane.
- The H-1 zipper lane would be maintained in the Two-direction Option but discontinued in the Reversible Option. As a result, the lanes taken up by the zipper lane in the other alternatives would be “freed up” in the Reversible Option (i.e., H-1 would have its full number of ‘Ewa bound lanes in the AM peak period, and all Koko Head bound lanes would be available in the PM peak period.

Regarding impacts to non-motorized facilities, the managed lane elevated facility would be constructed above Kamehameha Highway in the Pearl City/‘Aiea and Pearl Harbor areas and H-1 in the airport area and is expected to have minimal modifications to pedestrian and bicycle facilities. Pedestrian access points would be constructed at the Pearl City and ‘Aiea Transit Center and near Radford Drive. Vertical circulation to transport passengers from surface streets to the elevated stations by the managed lanes would be constructed. At the Pearl City and ‘Aiea Transit Center, passengers arriving at the transit center from community circulator routes would be able to access buses traveling in both the ‘Ewa and Koko Head direction.

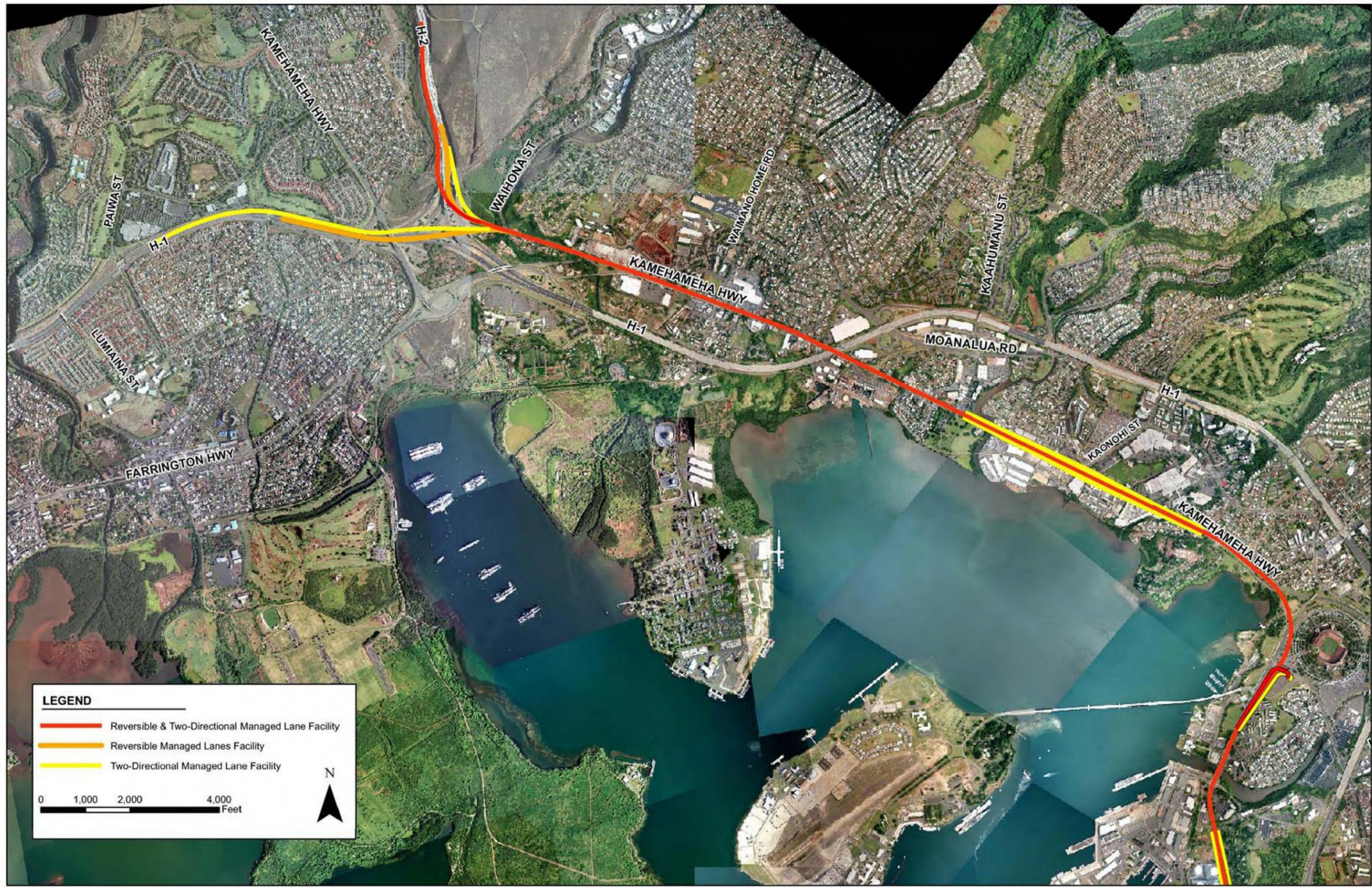


Figure 2-1: Managed Lane Alternative (‘Ewa Section)

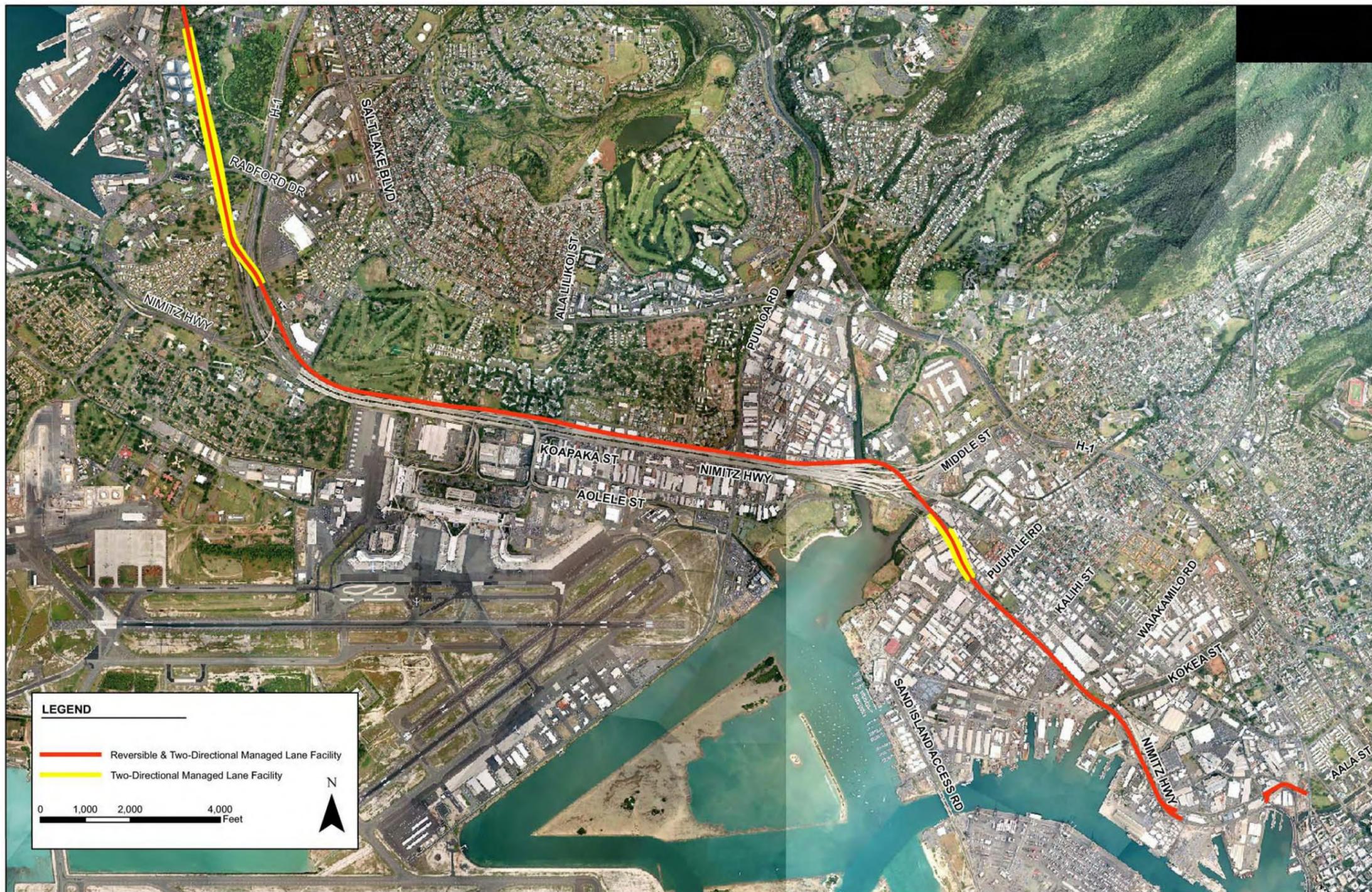


Figure 2-2: Managed Lane Alternative (Koko Head Section)

Chapter 3 Modifications to the Roadway System for the Fixed Guideway Alternative

The Fixed Guideway Alternative would include the construction and operation of a fixed-guideway transit system between Kapolei and UH Mānoa. Potential roadway modifications resulting from the column placement that may be required for the Fixed Guideway Alternative Build Alternatives are discussed in this Chapter. Five primary sections have been developed for the fixed guideway alternatives; within each section are several alignment options, as illustrated in Figures 3-1 to 3-5. Detailed alignment drawings are available in *Honolulu High-Capacity Transit Corridor Project Alignment Plans and Profiles* (DTS, 2006f).

Depending on the selection of the proposed alignments in each section, potential modifications to the roadway geometry and services of the existing and future transportation system are considered to provide different service options. Each alignment is evaluated individually and compared to the other alignments in that section. The sections, the alignments within each section, and the number of stations considered for each alignment are listed in Table 3-1.

For the purposes of this discussion, the potential roadway modifications resulting from the column placements are evaluated assuming that columns would generally be 6' wide on a 120' spacing. Allowing for 2' clear on either side, columns would require a 10' wide footprint when in the street. The following discussions are organized in sections.

Table 3-1: Fixed Guideway Alternative Analysis Sections and Alignments

Section	Alignments Being Considered	Number of Stations
I. Kapolei to Fort Weaver Road	Kamokila Boulevard/Farrington Highway	5
	Kapolei Parkway/North-South Road	6
	Saratoga Avenue/North-South Road	8
	Geiger Road/Fort Weaver Road	7
II. Fort Weaver Road to Aloha Stadium	Farrington Highway/Kamehameha Highway	5
III. Aloha Stadium to Middle Street	Salt Lake Boulevard	2
	Mauka of the Airport Viaduct	3
	Makai of the Airport Viaduct	4
	Aolele Street	4
IV. Middle Street to Iwilei	North King Street	3
	Dillingham Boulevard	3
V. Iwilei to UH Mānoa	Beretania Street/South King Street	8
	Hotel Street/Kawaiaha'o Street/Kapi'olani Boulevard	12
	King Street/Waimanu Street/Kapi'olani Boulevard	9
	Nimitz Highway/Queen Street/Kapi'olani Boulevard	10
	Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard	10
	Waikīkī Branch	3

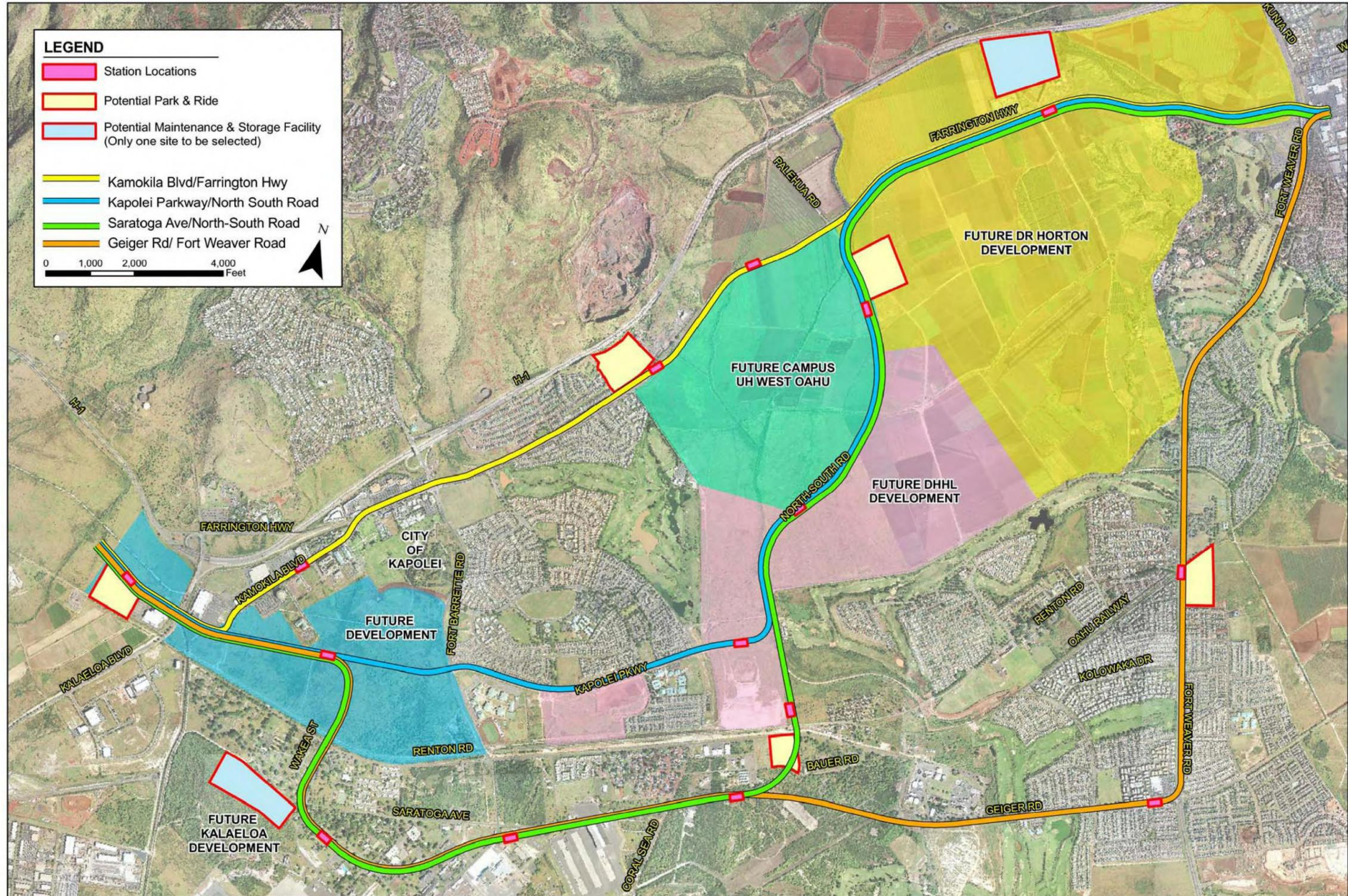


Figure 3-1: Fixed Guideway Alternative Section I

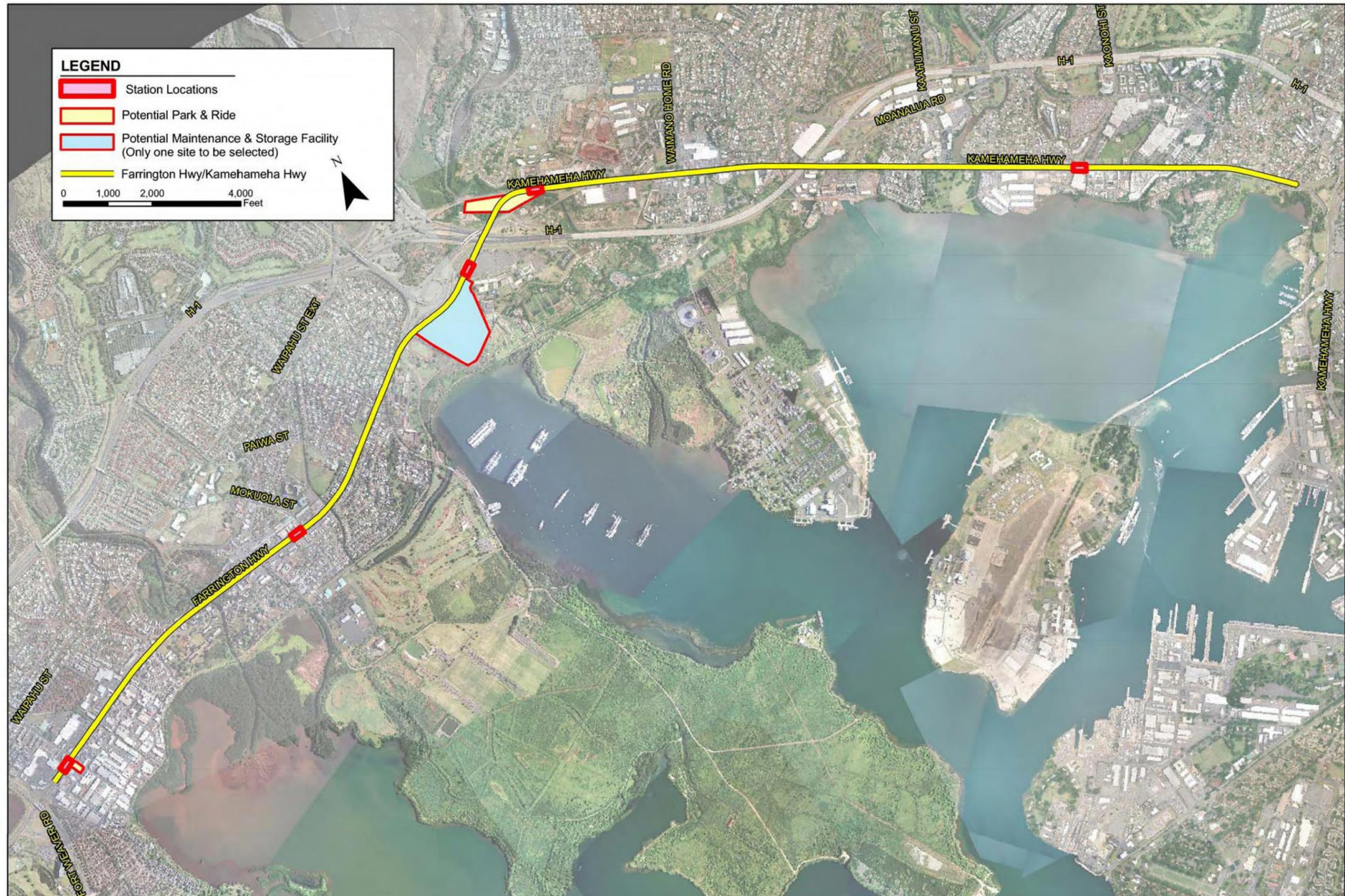


Figure 3-2: Fixed Guideway Alternative Section II

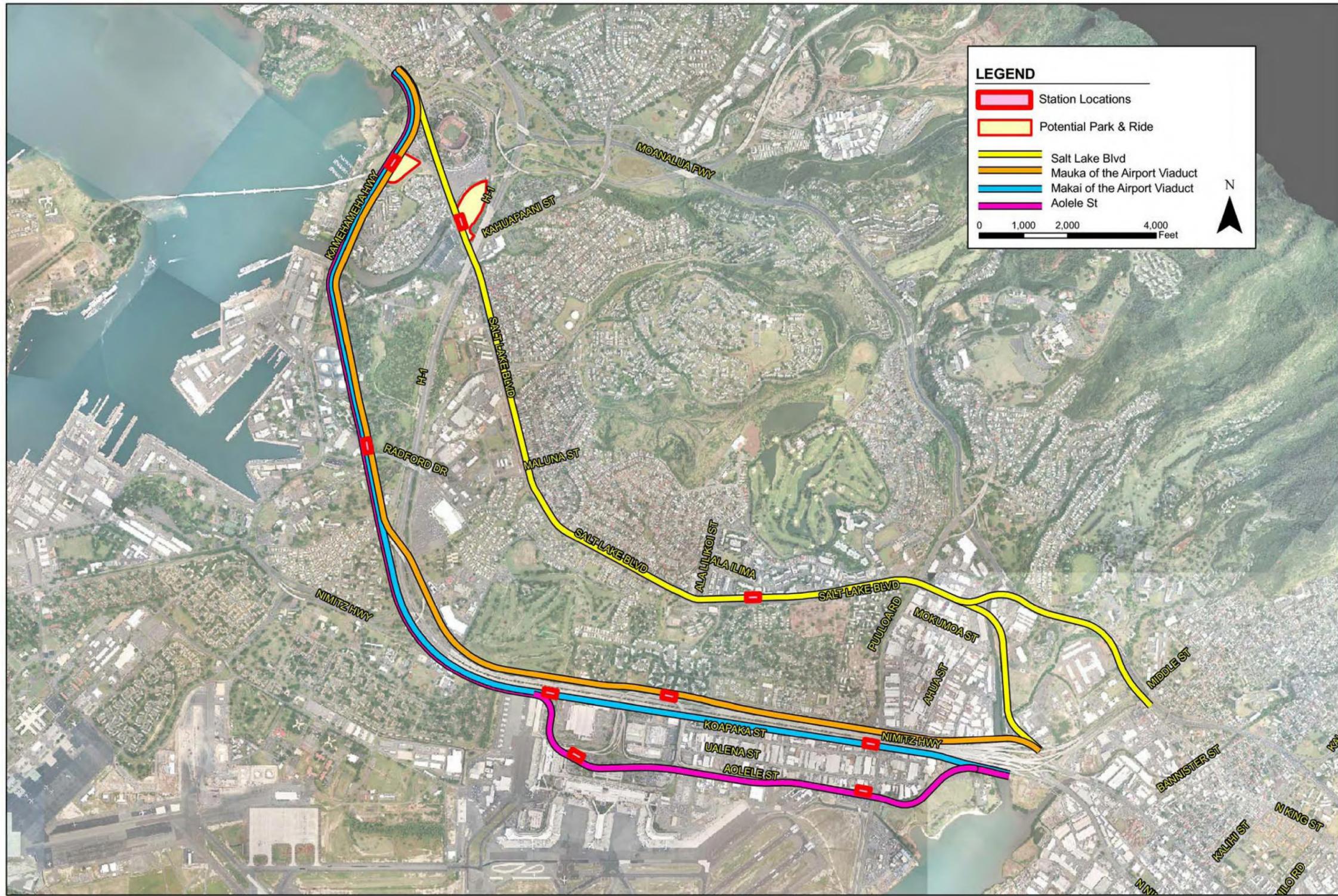


Figure 3-3: Fixed Guideway Alternative Section III

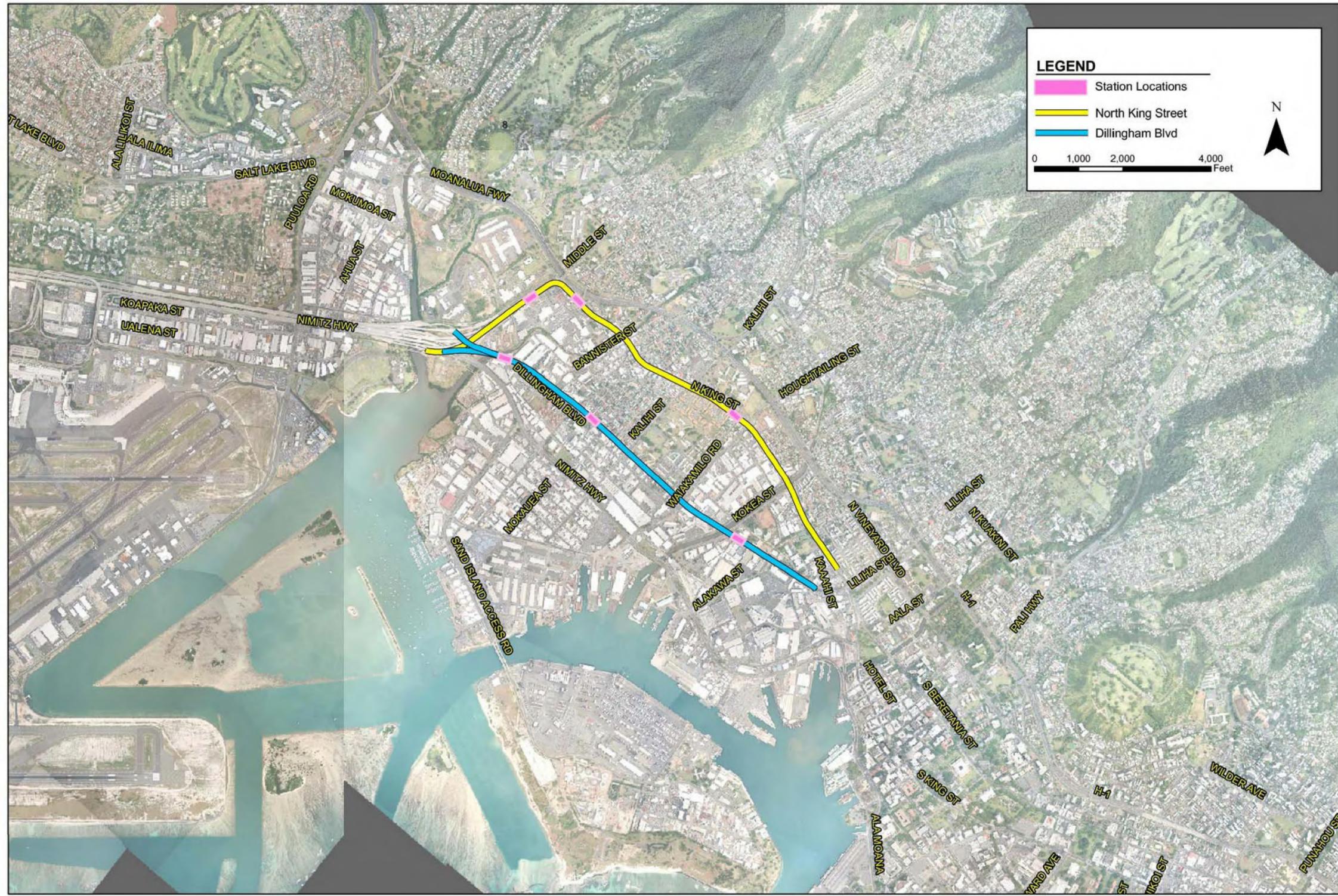


Figure 3-4: Fixed Guideway Alternative Section IV

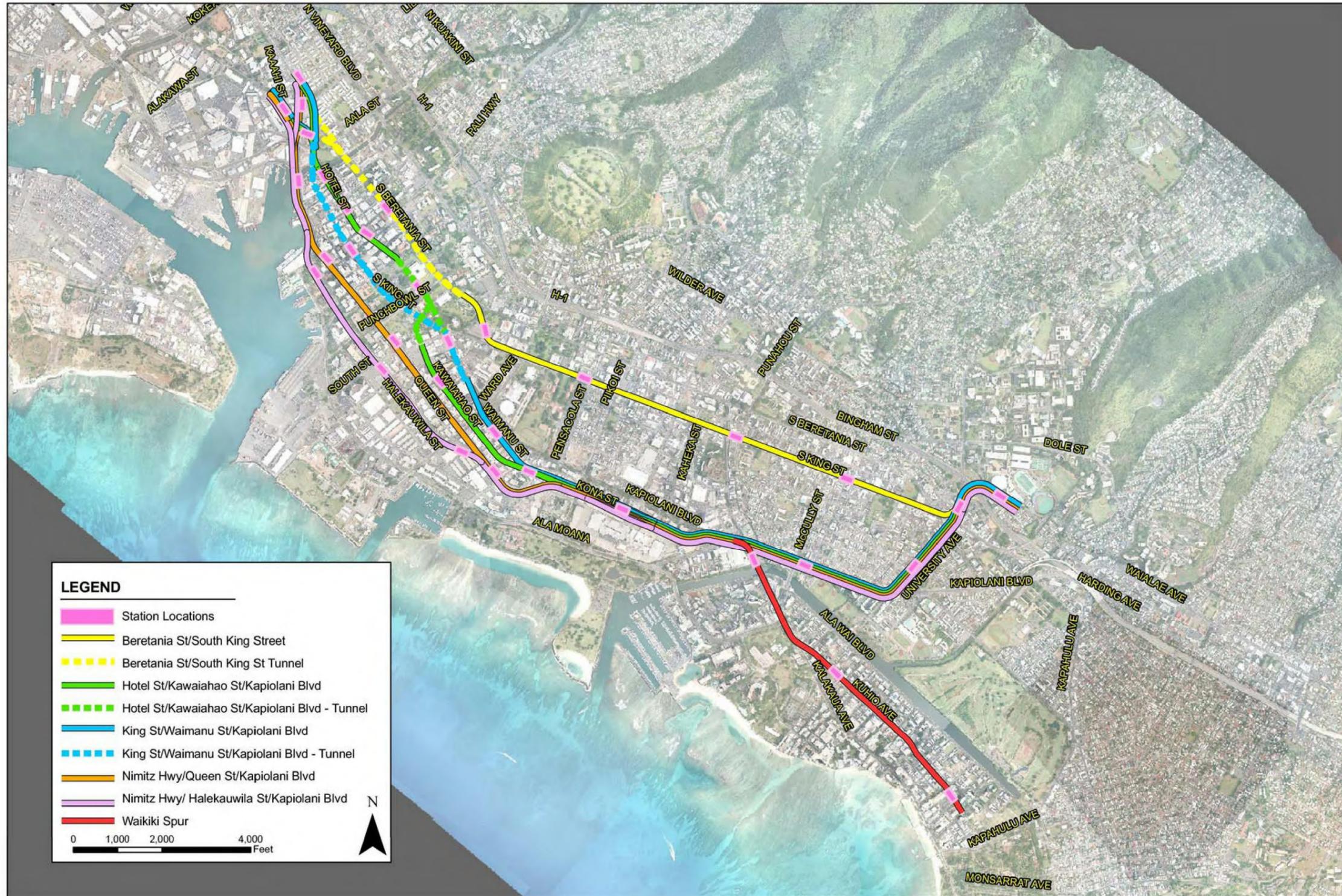


Figure 3-5: Fixed Guideway Alternative Section V

Section 1: Kapolei to Fort Weaver Road

Four alignment options are available in Section 1. They include: Kamokila Boulevard/Farrington Highway; Kapolei Parkway/North-South Road; Saratoga Avenue/North-South Road; and Geiger Road/Fort Weaver Road. Each alignment begins at the Kapolei Parkway & Hanua Street terminal station and continues in varying routes ending at Fort Weaver Road.

Alignment: Kamokila Boulevard/Farrington Highway

This alignment is approximately 6.1 miles long and generally follows Kapolei Parkway (future street) to Kamokila Boulevard to Farrington Highway and ends at Fort Weaver Road. Five station locations are proposed along this alignment:

- The future Kapolei Parkway from Hanua Street to Kamokila Boulevard is expected to have a 44-foot wide median. There would be sufficient space to accommodate columns in the median.
- The existing section of Kamokila Boulevard from Kapolei Parkway to Farrington and the section of Farrington Highway from Kamokila Boulevard to Kapolei Golf Course Road both have a 20-foot wide median. There would be adequate space to accommodate columns in the medians.
- Along Farrington Highway from Kapolei Golf Course Road to Old Fort Weaver Road, the alignment would be located on the makai side of the roadway. No significant roadway modifications from column placement are anticipated.
- Along Farrington Highway from Old Fort Weaver Road to Fort Weaver Road, the alignment would be located on the mauka side of the roadway. No significant roadway modifications from column placement are anticipated.

Alignment: Kapolei Parkway/North-South Road/Farrington Highway

This alignment is approximately 7.2 miles long and generally travels along Kapolei Parkway (future street) to North-South Road (future street) to Farrington Highway and ending at Fort Weaver Road. Six station locations are proposed along this alignment. The future Kapolei Parkway from Kamokila Boulevard to North-South Road is expected to have a 44-foot wide median while the future North-South Road from Kapolei Parkway to Farrington Highway is expected to have a 28-foot wide median. There would be sufficient space to accommodate columns in the median for this alignment section.

Alignment: Saratoga Avenue/North-South Road/Farrington Highway

This alignment is approximately 9.0 miles long and generally travels from the Kapolei terminus to Wākea Street (future street) to Saratoga Avenue (future street) to North-South Road (future street) to Farrington Highway and ending at Fort Weaver Road. Eight stations are planned along this alignment.

- The future Wākea Street from Kapolei Parkway to Saratoga Avenue is expected to have a 14-foot wide median. There would be adequate space to accommodate columns in the median.
- The future Saratoga Avenue from Wākea Street to North-South Road is expected to have a wide median. There would be adequate space to accommodate columns in the median.

- The future North-South Road from Kapolei Parkway to Farrington Highway is expected to have a 28-foot wide median. There would be adequate space to accommodate columns in the median; no significant roadway modifications from column placement are anticipated.

Alignment: Saratoga Avenue/Geiger Road/Fort Weaver Road

This alignment is approximately 8.9 miles long and generally travels from the Kapolei terminus to Wākea Street to Saratoga Avenue to Geiger Road to Fort Weaver Road and ending at Farrington Highway. Seven station locations are proposed along this alignment.

- A new median would be constructed along Geiger Road to accommodate columns. Geiger Road would need to be widened to create the new median.
- The section of Fort Weaver Road from Geiger Road to Farrington Highway has a median width of 32 to 34 feet wide. A separate widening project along Fort Weaver Road may narrow the median slightly, but it is expected that there would be sufficient room for columns in the median.

Section 2: Fort Weaver Road to Aloha Stadium

Only one alignment option is available in Section 2. The alignment travels from the Farrington Highway & Leokū Street station to the vicinity of Aloha Stadium. The alignment follows Farrington Highway to Interstate H-1; it then crosses Interstate H-1 and joins with Kamehameha Highway; the route then follows Kamehameha Highway to Aloha Stadium (junction of Salt Lake Boulevard and Kamehameha Highway).

Alignment: Farrington Highway/Kamehameha Highway

This alignment is approximately 6.7 miles long and travels from the Farrington Highway & Leokū Street station to the vicinity of Aloha Stadium. Five station locations are proposed along this alignment.

- Columns would be placed in the existing median in the section of Farrington Highway from Fort Weaver Road to Kamehameha Highway. With the existing wide medians, no significant modification to the roadway geometry is expected.
- Columns would be placed in the existing median in the section of Kamehameha Highway from Farrington Highway to Salt Lake Boulevard. This may involve the re-striping or reconstruction of the left-turn lanes affected by the modifications necessary for the medians. Closures of existing median openings necessitated by column placements may affect left-turn access to cross streets or adjacent land uses, although attempts would be made to minimize or avoid this through strategic placement of columns.

A park-and-ride access ramp would be constructed from the H-2 Freeway to Kamehameha Highway at the entrance to the Pearl Highlands Station (Kamehameha Highway and Kuala Street) of the Fixed Guideway Alternative. This access ramp would begin on the ‘Ewa side of the H-2 Freeway, have an elevated structure over the H-2 Freeway and the Waiawa Interchange, and end at the Kamehameha Highway. This placement of this access ramp may affect the access to Waihona Street. In addition, one of the proposed fixed guideway stations for this section may

be located at the intersection of Kamehameha Highway and Kaonohi Street 'Ewa of the Pearlridge Center. Due to the station construction, this intersection may require widening and may involve re-striping or reconstruction of the left-turn lanes affected by the column placement.

Section 3: Aloha Stadium to Middle Street

Four alignment options are available in Section 3. They include: Salt Lake Boulevard; Mauka of the Airport Viaduct; Makai of the Airport Viaduct; and Aolele Street. Each alignment begins at the junction of Salt Lake Boulevard/Kamehameha Highway and continues in varying routes ending in the vicinity of the Kalihi Interchange/Middle Street. Significant modifications to the roadway geometry are expected for this section to accommodate the elevated structures.

Alignment: Salt Lake Boulevard

This alignment is approximately 4.8 miles long and generally travels from Aloha Stadium along Salt Lake Boulevard to Pūkōloa Street, runs adjacent to the Moanalua Freeway, and ends at Middle Street. An alternative alignment travels from Pululoa Street along the Koko Head side of the Moanalua Stream and ends at the Ke'ehi Interchange. Two station locations are proposed along this alignment.

- The section along Salt Lake Boulevard from Kamehameha Highway to Pu'uloa Road may have issues with column placement on the median due to the grade difference between the two sides of the roadway. A new median would be constructed on the portions of Salt Lake Boulevard without a median. The new median could affect access and future bicycle lanes.
- Along Pūkōloa Street from Pu'uloa Road to Ahua Street, columns would be placed along the makai side curb lane. On-street parking in the area would be modified as a result.
- Along the section of the Moanalua Freeway from Ahua Street to Middle Street and the Koko Head side of the Moanalua Stream, the column placement would be off-street and require minimal modifications to the existing transportation system.

Alignment: Mauka of the Airport Viaduct

This alignment is approximately 5.1 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1, crosses Interstate H-1 and continues mauka of the Airport Viaduct to the Ke'ehi Interchange.

- A wide median would be constructed in portions of Kamehameha Highway between Salt Lake Boulevard and Interstate H-1 where narrow medians currently exist.
- There are two options for the portion of the alignment mauka of Interstate H-1 from Kamehameha Highway to Dillingham Boulevard: at-grade and elevated. Columns for the elevated option would be off-street and hence would not affect any roadways. For the at-grade option, new grade crossings would be created at Camp Catlin Road and Catlin Drive.

Alignment: Makai of the Airport Viaduct

This alignment is approximately 5.2 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1 and continues along Nimitz Highway, makai of the Airport Viaduct, to the Ke‘ehi Interchange. Four station locations are proposed along this alignment.

- A wide median would be constructed in portions of Kamehameha Highway between Salt Lake Boulevard and Interstate H-1 where narrow medians currently exist.
- Columns for the portion of the alignment makai of Interstate H-1 from Kamehameha Highway to Dillingham Boulevard would be off-street and hence would not affect any roadways.

Alignment: Aolele Street

This alignment is approximately 5.4 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1 and continues makai of the Airport Viaduct to Aolele Street, turning towards the Airport along Aolele Street and continuing to Dillingham Boulevard along an off-street alignment which cuts across a portion of Ke‘ehi Lagoon Park. Four station locations are proposed along this alignment.

- A wide median would be constructed in portions of Kamehameha Highway between Salt Lake Boulevard and Interstate H-1 where narrow medians currently exist.
- Column placement would occur along the sides of, but not in, Aolele Street from Interstate H-1 to Dillingham Boulevard, hence not affecting any roadways.

Section 4: Middle Street to Iwilei

Two alignment options are available in Section 4. They include: North King Street and Dillingham Boulevard.

Alignment: North King Street

This alignment is approximately 2.3 miles long and generally travels from the Ke‘ehi Interchange through the Middle Street Transit Center, along Middle Street and continues Koko Head along North King Street to Liliha Street. Three station locations are proposed along this alignment.

- Column placement would be off-street and on the Koko Head side along the section of Middle Street from Nimitz Highway to King Street.
- Along North King Street, the column placements would be on the makai side of the street between Middle Street and Kopke Street and on the mauka side of the street between Kopke Street and Liliha Street. This would result in the loss of on-street parking spaces in the vicinity of the columns. In portions along North King Street, the roadway would be re-striped to provide space for the columns.

Alignment: Dillingham Boulevard

This alignment is approximately 1.8 miles long and generally travels from the Ke‘ehi Interchange to Iwilei via Dillingham Boulevard. Three station locations are proposed along this alignment.

Several modifications are expected along the section of Dillingham Boulevard from Nimitz Highway to Ka‘aahi Street. The column placements would require the addition of a new median, which would prevent left-turn access to/from driveways along Dillingham Boulevard. The existing width of Dillingham Boulevard is not adequate for U-turns, which, in combination with the median, would force motorists wishing to access adjacent land uses to travel out of their way in circuitous paths. The circuitous travel would be further aggravated by the lack of a full street grid in the area, making it difficult to travel around the block. Significant modifications of existing structures may occur to the makai side of Dillingham Boulevard between Kōkea Street and Ka‘aahi Street and require further study to determine the column placement locations.

Section 4 to Section 5 Connections

Eight combinations are possible for the connections between the two possible Section 4 alignments and the possible Section 5 alignments. A fixed guideway station located between Pua Lane and Iwilei Road would be built for the selected connection. Four locations are considered for the station depending on the connection alternatives.

The connector alignments are part of Section 5 but are described below:

Alignment: North King Street – Beretania Street

This alignment connects North King Street to Beretania Street and has a station located on the ‘Ewa side of the King Street/Liliha Street intersection. Column placement would be off-street and on private property.

Alignment: North King Street – Hotel Street

This alignment connects North King Street to Hotel Street. The station along this connection would be the same as in the North King Street – Beretania connection. Column placement would be off-street and on private property between Liliha Street and Beretania Street. Between Beretania Street and Hotel Street, the column placement would result in the loss of one Koko Head bound lane (reducing the number of Koko Head bound lanes in this section from four to three). This is not expected to significantly affect traffic flow, however, since the existing four-lane section is short and is fed by only three upstream lanes.

Alignment: North King Street – Nimitz Highway

This alignment travels from the North King Street/Liliha Street intersection, through private property makai of North King Street, before it connects to Nimitz Highway. A station would be located on private property on the makai side of King Street near Liliha Street.

Alignment: North King Street – King Street Tunnel

This alignment follows a similar alignment and has the same station location as the North King Street – Nimitz Highway alignment between Liliha Street and Iwilei Road. On the Koko Head side of Iwilei Road, the alignment is underground and connects to King Street by going under Nu‘uanu Stream and private properties makai of King Street.

Alignment: Dillingham Boulevard – Beretania Street

This alignment travels from Dillingham Boulevard/Akepo Lane, through private property in the industrial area, before it connects to Beretania Street. The transit station for this connection would be located on private property near the intersection of King Street and Iwilei Road in the industrial area.

Alignment: Dillingham Boulevard – Hotel Street

This alignment travels from Dillingham Boulevard/Akepo Lane, through private property in the industrial area before it connects to Hotel Street. The transit station for this connection would be located on private property near the intersection of Ka‘aahi Street and Ka‘aahi Place in the industrial area. On-street parking would be removed along portions of Ka‘aahi Street.

In portions of King Street between Beretania Street and Hotel Street, the column placement would result in the loss of one Koko Head bound lane (reducing the number of Koko Head bound lanes in this section from four to three). This is not expected to affect traffic flow significantly, however, since the existing four-lane section is short and is fed by only three upstream lanes.

Alignment: Dillingham Boulevard – Nimitz Highway

This long alignment travels from Dillingham Boulevard/Akepo Lane, through private property in the industrial area, before it connects to Nimitz Highway. The transit station for this connection would be located on private property near the intersection of Ka‘aahi Street and Ka‘aahi Place. On-street parking would be removed along portions of Ka‘aahi Street.

Alignment: Dillingham Boulevard – King Street

This alignment travels from Dillingham Boulevard, through private property in the industrial area, before it connects to King Street. The transit station for this connection would be located on private property on the ‘Ewa side of Iwilei Road in the industrial area. Modifications to on-street facilities are expected to be minimal.

Section 5: Iwilei to UH Mānoa or Waikīkī

Five alignment options and one spur route are available in Section 5. These alignments include: Beretania Street/South King Street; King Street/Waimanu Street/Kapi‘olani Boulevard; Hotel Street/Kawaiaha‘o Street/Kapi‘olani Boulevard; Nimitz Highway/Queen Street/Kapi‘olani Boulevard; Nimitz Highway/Halekauwila Street/Kapi‘olani Boulevard; and a spur to Waikīkī. Each alignment begins at Iwilei and continues in varying routes ending at UH Mānoa. The Waikīkī spur begins at Kapi‘olani Boulevard and ends at the Koko Head end of Waikīkī.

Alignment: Beretania Street/South King Street

This alignment is approximately 4.0 miles long and generally travels from Iwilei to UH Mānoa via tunnel below Beretania Street and above ground along South King Street, terminating on the UH Lower Campus. Eight station locations are proposed along this alignment, including the Ka‘aahi Street station or the North King Street at Liliha Street station on the connector alignment between Section 4 and Section 5.

- The section along Beretania Street from Liliha Street to Alapa‘i Street would be in an underground tunnel and would not create permanent modifications to the roadway geometry on the surface streets. Access to the municipal parking lot could be affected by this alignment.
- Column placement within the makai side curb lane along South King Street from Alapa‘i Street to University Avenue would result in the loss of a peak hour travel lane and the removal of off-peak on-street parking spaces in the vicinity of the columns.
- A new median on University Avenue from King Street to Varsity Place would affect left-turn access to driveways and adjoining streets.

In addition, two of the proposed stations – the University Avenue & South King Street station and the UH Lower Campus station – may require modifications to on-street parking on the adjacent roadways due to column placement for the elevated station structures. The proposed University Avenue & South King Street station would be located on University Avenue mauka of King Street. Construction of this elevated station would involve the re-striping and reconstruction of the left-turn lanes affected by the column placements at the South King Street/University Avenue intersection.

The planned UH Lower Campus station would be located on the makai side of Lower Campus Road. Column placement for the UH Lower Campus station would be located makai of the roadway and no loss of travel lanes or curb parking is anticipated on Lower Campus Road.

Alignment: King Street/Waimanu Street/Kapi‘olani Boulevard

This alignment is 4.6 miles long and generally travels from Iwilei to UH Mānoa via tunnel below King Street and Kapi‘olani Boulevard to Waimanu Street and above ground along Waimanu Street and Kona Street and Kapi‘olani Boulevard to University Avenue, terminating on the UH Lower Campus. Nine station locations are proposed along this alignment, including the Ka‘aahi

Street station or the North King Street at Liliha Street station on the connector alignment between Section 4 and Section 5.

- The section along King Street and Kapi‘olani Boulevard from River Street to Dreier Street would be in an underground tunnel and would not create permanent modifications to surface transportation.
- Columns would be placed along the mauka side of Waimanu Street from Ward Avenue to Kamake‘e Street. Waimanu Street would need to be widened and this would result in the loss of some on-street parking spaces.
- Columns would be placed along the mauka side of Kona Street from Koko Head of Kamake‘e Street to Pi‘ikoi Street. Kona Street would need to be widened, resulting in the loss of some on-street parking.
- The columns along Kona Street from Pi‘ikoi Street to Ke‘eaumoku Street would be placed in the median. No significant modifications to the surface streets are expected.
- The elevated structure would transition to the makai side of Kona Street from Ke‘eaumoku Street to just ‘Ewa of Atkinson Drive. No significant modifications to the surface streets are expected.
- Along Kapi‘olani Boulevard from Atkinson Drive to McCully Street, column placement would require a new median and would result in the restriction of left-turn access to driveways along Kapi‘olani Boulevard. Options may be investigated to reduce the scale of roadway modifications.
- On Kapi‘olani Boulevard between McCully Street and University Avenue, the column would be located in the existing median.
- The section of University Avenue from Kapi‘olani Boulevard to King Street would require modifications to on-street parking and may result in loss of a bicycle lane due to column placement in the median.
- A new median on University Avenue from King Street to Varsity Place would affect left-turn access to driveways and adjoining streets.

In addition, two of the proposed stations – the University Avenue & South King Street station and the UH Lower Campus station – may require modifications to on-street parking on the adjacent roadways due to column placement for the elevated station structures. The proposed University Avenue & South King Street station would be located on University Avenue mauka of King Street. Construction of this elevated station would involve the re-striping and reconstruction of the left-turn lanes affected by the column placements at the South King Street/University Avenue intersection.

The planned UH Lower Campus station would be located on the makai side of Lower Campus Road. Column placement for the UH Lower Campus station would be located makai of the roadway and no loss of travel lanes or curb parking is anticipated on Lower Campus Road.

Alignment: Hotel Street/Kawaiaha‘o Street/Kapi‘olani Boulevard

This alignment is approximately 4.6 miles long and generally travels from Iwilei to UH Mānoa via Hotel Street at-grade to a tunnel connecting to Kawaiaha‘o Street and above ground along Kawaiaha‘o Street and Kona Street and Kapi‘olani Boulevard to University Avenue, terminating on the UH Lower Campus. Twelve station locations are proposed along this alignment,

including the Ka‘aahi Street station or the North King Street at Liliha Street station on the connector alignment between Section 4 and Section 5.

- The section along Hotel Street from River Street to Alakea Street would be at-grade in the existing transit mall. The vertical transition from elevated to at-grade at the ‘Ewa end of the section would require loss of existing bus lanes in this area. One option would be to move buses off of Hotel Street transit mall altogether and reroute them to King Street and Beretania Street, although this could affect traffic flows along King and Beretania Streets. Another option would be to route the buses back onto Hotel Street via River Street, but this would have buses operating in the same lanes as the fixed guideway along the transit mall and thus buses could block trains and vice-versa. Pedestrian crossings and vehicular cross traffic along Hotel Street may be blocked by the length of trains stopped at stations.
- The alignment transitions from at-grade to underground section along Hotel Street between Alakea Street to Richards Street. Hotel Street would be widened to allow Koko Head bound traffic to continue to Richard Street.
- The section between Richards Street and Kawaiaha‘o Street would be in an underground tunnel and would not cause permanent modifications to surface transportation facilities.
- The alignment would transition to above ground along the section of Kawaiaha‘o Street from South Street to Cooke Street. The tunnel portal would be placed on the mauka side of the street and Kawaiaha‘o Street would be widened. Roadway modifications that may occur include reduction of on-street parking and blocking of access to Curtis Street.
- The alignment follows Kawaiaha‘o Street from Cooke Street to ‘Ewa of Kamake‘e Street where it transitions in the mauka direction to connect to Kona Street. Kawaiaha‘o Street would be widened and columns would be placed along the makai side, resulting in the loss of on-street parking spaces.
- The columns along Kona Street from Pi‘ikoi Street to Ke‘eaumoku Street would be placed in the median
- The elevated structure would transition to the makai side of Kona Street from Ke‘eaumoku Street to just ‘Ewa of Atkinson Drive. No significant roadway modifications are anticipated to the roadway.
- Along Kapi‘olani Boulevard from Atkinson Drive to McCully Street, column placement would require a new median and would result in the restriction of left-turn access to driveways along Kapi‘olani Boulevard. Options may be investigated to reduce or scale down the level of modifications.
- On Kapi‘olani Boulevard between McCully Street and University Avenue, the column would be located in the existing median.
- The section of University Avenue from Kapi‘olani Boulevard to King Street would require modifications to on-street parking and result in loss of a bicycle lane due to column placement in the median.
- A new median on University Avenue from King Street to Varsity Place would affect left-turn access to driveways and adjoining streets.

In addition, two of the proposed stations – the University Avenue & South King Street station and the UH Lower Campus station – may require modifications to street parking on the adjacent roadways due to column placement for the elevated station structures. The proposed University Avenue & South King Street station would be located on University Avenue mauka of King Street. Construction of this elevated station would involve the re-striping and reconstruction of the left-turn lanes affected by the column placements at the South King Street/University Avenue intersection.

The planned UH Lower Campus station would be located on the makai side of Lower Campus Road. Column placement for the UH Lower Campus station would be located makai of the roadway and no loss of travel lanes or curb parking is anticipated on Lower Campus Road.

Alignment: Nimitz Highway/Queen Street/Kapi‘olani Boulevard

This alignment is approximately 4.6 miles long and generally travels from Iwilei to UH Mānoa via Nimitz Highway, Queen Street, Kona Street and Kapi‘olani Boulevard to University Avenue, terminating on the UH Lower Campus. Ten stations are planned along this alignment, including the Ka‘aahi Street station or the North King Street at Liliha Street station on the connector alignment between Section 4 and Section 5.

- Columns would be placed in the existing median in the section of Nimitz Highway from Iwilei to Queen Street. This is expected to have minimal modifications to Nimitz Highway, due to the existing wide median.
- Columns would be placed on the makai side of Queen Street from Nimitz Highway to Kamake‘e Street. This would result in the loss of one of the two ‘Ewa-bound lanes on Queen Street between Bishop Street and Nimitz Highway. This would also result in a loss of on-street parking spaces and a travel lane in the Kaka‘ako area.
- Column placement would be in the median on the section of Queen Street from Kamake‘e Street to Waimanu Street. The alignment would then transition to Kona Street.
- The columns along Kona Street from Pi‘ikoi Street to Ke‘eaumoku Street would be accommodated within the existing median.
- The elevated structure would transition to the makai side of Kona Street from Ke‘eaumoku Street to just ‘Ewa of Atkinson Drive.
- Along Kapi‘olani Boulevard from Atkinson Drive to McCully Street, column placement would require a new median and would result in the restriction of left-turn access to driveways along Kapi‘olani Boulevard. Options may be investigated to reduce the level of modifications to existing roadway and circulation patterns in the vicinity.
- On Kapi‘olani Boulevard between McCully Street and University Avenue, the column would be accommodated in the existing median.
- The section of University Avenue from Kapi‘olani Boulevard to King Street would require modifications to on-street parking and may result in loss of a bicycle lane due to column placement in the median.
- A new median on University Avenue from King Street to Varsity Place would affect left-turn access to driveways and adjoining streets.

In addition, two of the proposed stations – the University Avenue & South King Street station and the UH Lower Campus station – may require modifications to on-street parking due to column placement for the elevated station structures. The proposed University Avenue & South King Street station would be located on University Avenue mauka of King Street. Construction of this elevated station would involve the re-stripping and reconstruction of the left-turn lanes affected by the column placements at the South King Street/University Avenue intersection.

The planned UH Lower Campus station would be located on the makai side of Lower Campus Road. Column placement for the UH Lower Campus station would be located makai of the roadway and no loss of travel lanes or curb parking is anticipated on Lower Campus Road.

Alignment: Nimitz Highway/Halekauwila Street/Kapi‘olani Boulevard

This alignment is approximately 4.7 miles long and generally travels from Iwilei to UH Mānoa via Nimitz Highway, Halekauwila Street, Kona Street and Kapi‘olani Boulevard to University Avenue, terminating on the UH Lower Campus. Ten station locations are proposed along this alignment, including the Ka‘aahi Street station or the North King Street at Liliha Street station on the connector alignment between Section 4 and Section 5.

- Columns would be placed in the existing median in the section of Nimitz Highway from Iwilei to Queen Street.
- Column placement on Halekauwila Street from Nimitz Highway to Ward Avenue would be along the makai side of the street, resulting in the loss of on-street parking spaces in the vicinity of the columns.
- The alignment would remain elevated and transition to Queen Street in the vicinity of Ward Avenue. This would result in the loss of on-street parking spaces and a travel lane along Queen Street, ‘Ewa of Kamake‘e Street.
- Column placement would be in the median on the section of Queen Street from Kamake‘e Street to Waimanu Street. The alignment would then transition to Kona Street.
- The columns along Kona Street from Pi‘ikoi Street to Ke‘eaumoku Street would be accommodated in the median.
- The elevated structure would transition to the makai side of Kona Street from Ke‘eaumoku Street to just ‘Ewa of Atkinson Drive. No significant modifications are anticipated to the roadway.
- Along Kapi‘olani Boulevard from Atkinson Drive to McCully Street, column placement would require a new median and would result in the restriction of left-turn access to driveways along Kapi‘olani Boulevard. Options may be investigated to scale down the modifications to the roadways.
- On Kapi‘olani Boulevard between McCully Street and University Avenue, the column would be located in the existing median.
- The section of University Avenue from Kapi‘olani Boulevard to King Street would require modifications to on-street parking and result in potential loss of a bicycle lane due to column placement in the median.
- A new median on University Avenue from King Street to Varsity Place would affect left-turn access to driveways and adjoining streets.

In addition, two of the proposed stations – the University Avenue & South King Street station and the UH Lower Campus station – may require modifications to on-street parking on the adjacent roadways due to column placement for the elevated station structures. The proposed University Avenue & South King Street station would be located on University Avenue mauka of King Street. Construction of this elevated station would involve the re-striping and reconstruction of the left-turn lanes affected by the column placements at the South King Street/University Avenue intersection.

The planned UH Lower Campus station would be located on the makai side of Lower Campus Road. Column placement for the UH Lower Campus station would be located makai of the roadway and no loss of travel lanes or curb parking is anticipated on Lower Campus Road.

Alignment: Waikīkī Spur

This alignment is approximately 1.5 miles long and travels from the intersection of Kalākaua Avenue/Kapi‘olani Boulevard to the Koko Head side of Waikīkī. The spur follows Kalākaua Avenue to Kūhiō Avenue, ending at Ka‘iulani Avenue. Three station locations are proposed along this alignment.

- The spur alignment would follow along the Koko Head side of Kalākaua Avenue between Kapi‘olani Boulevard and Kūhiō Avenue. There would be a loss of one ‘Ewa bound lane between Ala Wai Boulevard and ‘‘ena Road in Waikīkī.
- Along Kūhiō Avenue, from Kalākaua Avenue to Ka‘iulani Avenue, the alignment would follow the mauka side of the street. This would result in the loss of one ‘Ewa-bound lane. Parking and loading zones may be created in pockets between columns.

Chapter 4 Modifications to the Non-Motorized Transportation System

Potential conflicts or physical modifications created by the construction of the proposed Fixed Guideway Alternative alignments on existing and proposed bicycle facilities and the pedestrian circulation system are evaluated in this chapter. Information regarding the existing and proposed bikeway system was obtained from Bike Plan Hawai'i (2003) and the Honolulu Bicycle Master Plan (April 1999). As previously detailed, there are five primary sections to the fixed guideway alternatives; within each section are several alignment options.

Section 1: Kapolei to Fort Weaver Road

Four alignment options are proposed in Section 1, beginning at the Kapolei Parkway and Hanua Street terminal station and continuing in varying routes ending at Fort Weaver Road. The following describes the potential modifications on the bicycle and pedestrian system due to the construction of each Fixed Guideway Alignment.

Alignment: Kamokila Boulevard/Farrington Highway

This alignment is approximately 6.1 miles long and generally follows Kapolei Parkway to Kamokila Boulevard to Farrington Highway and ends at Fort Weaver Road. One existing bicycle facility and three future bicycle facilities are identified in the vicinity of the proposed Fixed Guideway Alignment. Bicycle lanes currently exist on Kapolei Parkway, Kamokila Boulevard and Farrington Highway from Kamokila Boulevard to Kapolei Golf Course Road, generally following the proposed Fixed Guideway Alignment. Future proposed bicycle facilities include: the extension of the bicycle lane on Kapolei Parkway from Kalaeloa Boulevard to Ali'inui Drive near Ko 'Olina Golf Club, the addition of a signed shared roadway (bicycle route) on Farrington Highway from Kapolei Golf Course Road to Fort Weaver Road, and the addition of a bicycle path on Farrington Highway from the future North-South Road to Fort Weaver Road. The alignment is located in the currently lower density area of Kapolei. A pedestrian circulation system may be developed later with the future Kapolei development. The following describes the potential modifications that may be required for the non-motorized transportation system due to the construction of this alignment:

- The fixed guideway sections along Kapolei Parkway from Hanua Street to Kamokila Boulevard, Kamokila Boulevard from Kapolei Parkway to Farrington Highway, and Farrington Highway from Kamokila Boulevard to Golf Course Road would be elevated and be located on the median on Kapolei Parkway. With the wide median of the future Kapolei Parkway, column placement is not expected to affect the continued use of existing bicycle lanes or future operations on signed bicycle routes along Kapolei Parkway or Kalaeloa Boulevard. Modifications may be required at the major access point to the Kapolei Parkway & Hanua Street terminal station to reduce or avoid potential conflicts between transit buses/vehicles and pedestrian movements at the Kapolei Parkway/Kamokila Boulevard intersection

- The section along Farrington Highway from Golf Course Road to Old Fort Weaver Road would be elevated off of the street along the makai side. Since this would be off-street, it would not conflict with bicycle operations on Farrington Highway.
- The section along Farrington Highway from Old Fort Weaver Road to Fort Weaver Road would be elevated off of the street along the mauka side of the roadway. Steps should be taken to ensure that this does not conflict with bicycle operations on the proposed bicycle path and signed bicycle route along the mauka side of Farrington Highway.

Alignment: Kapolei Parkway/North-South Road/Farrington Highway

This alignment is approximately 7.2 miles long and generally travels along Kapolei Parkway to North-South Road to Farrington Highway and ending at Fort Weaver Road. The alignment is located in the currently lower density area of Kapolei. A pedestrian circulation system may be developed later with the campus of UH West O‘ahu and with the DHHL Development. Three future bicycle facilities are identified in the vicinity of the proposed alignment, including the proposed bicycle lane on Kapolei Parkway and North-South Road, proposed signed bicycle route along Farrington Highway from North-South Road to Fort Weaver Road, and the proposed bicycle path along Farrington Highway from future North-South Road to Fort Weaver Road. The following describes the potential modifications that may be applied to the non-motorized transportation system due to the construction of this alignment:

- The fixed guideway sections along Kapolei Parkway and North-South Road would be elevated and above the medians. With the expected wide median on Kapolei Parkway extension and the future North-South Road, no modifications would be expected to pedestrian movement or the bicycle operations of the proposed bicycle lanes on Kapolei Parkway and North-South Road.
- The section along Farrington Highway from Golf Course Road to Old Fort Weaver Road would be elevated off of the street along the makai side. Since this would be off-street, it would not conflict with bicycle operations on Farrington Highway. Column placement is not expected to interrupt pedestrian flow.
- The section along Farrington Highway from Old Fort Weaver Road to Fort Weaver Road would be elevated off of the street along the mauka side of the roadway. Steps should be taken to ensure that this does not conflict with bicycle operations on the proposed bicycle path and signed bicycle route along the mauka side of Farrington Highway. Column placement is not expected to interrupt pedestrian flow.

Alignment: Saratoga Avenue/North-South Road/Farrington Highway

This alignment is approximately 9.0 miles long and generally travels from the Kapolei terminus to Wākea Street to Saratoga Avenue and to North-South Road to Farrington Highway, ending at Fort Weaver Road. The pedestrian circulation system would be developed later with future Kalaeloa Development and future campus of UH West O‘ahu. One existing and six future bicycle facilities are identified in the vicinity of the proposed alignment, including the existing bicycle lanes and proposed bicycle lane extension on Kapolei Parkway Wai‘anae of Kamokila Boulevard, the Leeward Bikeway on Roosevelt Avenue that is currently under construction, the

proposed signed bicycle routes on Enterprise Street and along Farrington Highway from North-South Road to Fort Weaver Road, and the proposed bicycle paths on Coral Sea Road and along Farrington Highway from future North-South Road to Fort Weaver Road. The following describes the potential issues regarding the non-motorized transportation system due to the construction of this alignment:

- The fixed guideway section along Kapolei Parkway from Hanua Street to Wākea Street would be elevated and located above the median. With the wide median of the future Kapolei Parkway, column placement is not expected to affect the continued use of existing bicycle lanes or future operations on signed bicycle routes along Kapolei Parkway. Modifications to the major access point to the Kapolei Parkway & Hanua Street terminal station may be required to minimize the conflicts between transit buses/vehicles maneuvers and pedestrian movement at the Kapolei Parkway/Kamokila Boulevard intersection
- The section along Wākea Street from Kapolei Parkway to Saratoga Avenue would be elevated and located above the median. Column placement is not expected to affect the pedestrian access or bicycle operations of the Leeward Bikeway on Roosevelt Avenue.
- The section along Saratoga Avenue from Wākea Street to North-South Road would be at-grade within the median. No modifications are expected to the pedestrian system or operations of the proposed signed bicycle route on Enterprise Street or the proposed bicycle path on Coral Sea Road.
- The section along North-South Road would be elevated and located above the median. Column placement is not expected to affect future pedestrian circulation or operations of proposed bicycle lanes on North-South Road.
- The section along Farrington Highway from Golf Course Road to Old Fort Weaver Road would be located off the street along the makai side, with some portions elevated and some at-grade. Since this would be off-street, it would not conflict with bicycle operations on Farrington Highway or interrupt pedestrian flow.
- The section along Farrington Highway from Old Fort Weaver Road to Fort Weaver Road would be elevated off of the street along the mauka side of the roadway. Steps should be taken to ensure that this does not conflict with bicycle operations on the proposed bicycle path and signed bicycle route along the mauka side of Farrington Highway.

Alignment: Saratoga Avenue/Geiger Road/Fort Weaver Road

This alignment is approximately 8.9 miles long and generally travels from the Kapolei fixed guideway terminus to Wākea Street to Saratoga Avenue to Geiger Road to Fort Weaver Road, ending at Farrington Highway. Pedestrian circulation has been developed in the high-density residential neighborhoods along Geiger Road and Fort Weaver Road. Several existing and future bicycle facilities may be affected due to the construction of the proposed alignment, including the existing bicycle lanes and proposed bicycle lane extension on Kapolei Parkway Wai‘anae of Kamokila Boulevard; existing bicycle paths and proposed bicycle lanes on Geiger Road; the existing bicycle path and proposed signed bicycle route along and across Fort Weaver Road; the Leeward Bikeway on Roosevelt Avenue currently under construction; the proposed signed

bicycle route along Enterprise Street; and the proposed bicycle lanes and bicycle routes on Hanson Road. The following describes the potential issues regarding the non-motorized transportation system due to the construction of this alignment:

- The fixed guideway section along Kapolei Parkway from Hanua Street to Wākea Street would be elevated above the median. With the wide median of the future Kapolei Parkway, column placement is not expected to affect continued use of existing bicycle lanes or future operations on signed bicycle routes along Kapolei Parkway. Modifications to the major access point to the Kapolei Parkway & Hanua Street station may be required to minimize the conflicts between transit buses/vehicles maneuvers and pedestrian movement at the Kapolei Parkway/Kamokila Boulevard intersection,
- The section along Wākea Street from Kapolei Parkway to Saratoga Avenue would be elevated above the median. Column placement is not expected to affect pedestrian access or bicycle operations of the Leeward Bikeway on Roosevelt Avenue.
- The section along Saratoga Avenue from Wākea Street to North-South Road would be at-grade within the median. No modification is expected to the pedestrian system or operations of the proposed signed bicycle route on Enterprise Street or the proposed bicycle path on Coral Sea Road.
- The section along Geiger Road from North-South Road to Fort Weaver Road would be elevated above a new median. Geiger Road would be widened to accommodate the new median. Existing bicycle paths and proposed bicycle lanes on Geiger Road and the proposed bicycle lanes and bicycle routes on Hanson Road may require modifications.
- The section along Fort Weaver Road from Geiger Road to Farrington Highway would be elevated above the median. Minimal modifications would occur to pedestrian circulation and operations of the existing bicycle path and proposed signed bicycle route along and across Fort Weaver Road.

Section 2: Fort Weaver Road to Aloha Stadium

Only one alignment option is proposed in Section 2, traveling primarily along Farrington Highway and Kamehameha Highway. The following describes the potential issues regarding the non-motorized transportation system due to construction of this alignment:

Alignment: Farrington Highway/Kamehameha Highway

Existing uses along the alignment are primarily mixed residential and commercial. The pedestrian system is generally developed and well-connected along the proposed fixed guideway alignment. Several existing and future bicycle facilities in the vicinity of the proposed alignment are identified, including the existing signed bicycle route and proposed bicycle lane on Farrington Highway; proposed bicycle lanes makai of Farrington Highway on Waipahu Depot Road, Mokuola Street and Paiwa Street; proposed bicycle path on Waipi‘o Point Access Road; proposed bicycle lanes on Kamehameha Highway from Farrington Highway to Salt Lake Boulevard; and the Pearl Harbor Bike Path parallel to Farrington Highway.

- The fixed guideway section along Farrington Highway from Fort Weaver Road to Kamehameha Highway would be elevated above the median. With the wide median, column placement on Farrington Highway is expected to have minimal modifications to pedestrian circulation, existing and proposed bicycle facilities on and across Farrington.
- The section along Kamehameha Highway from Farrington Highway to Salt Lake Boulevard would be elevated above the median. No modifications would be expected to the pedestrian system or proposed bicycle lanes on Kamehameha Highway.

Section 3: Aloha Stadium to Middle Street

Four alignment options are proposed in Section 3, each beginning at the junction of Salt Lake Boulevard and Kamehameha Highway 'Ewa of the Aloha Stadium and continuing in varying routes ending in the vicinity of Ke'ehi Interchange and Middle Street. All stations are well-connected by roadways under all alignments in Section 3. The following describes the potential issues regarding non-motorized transportation due to construction of each alignment:

Alignment: Salt Lake Boulevard

This alignment is approximately 4.8 miles long and generally travels from Aloha Stadium along Salt Lake Boulevard to Pūkōloa Street, joins the Moanalua Freeway, and ends at Middle Street. An alternative alignment travels from Pukuloa Street along the Koko Head side of the Moanalua Stream and ends at the Ke'ehi Interchange. The pedestrian system has been generally developed along the proposed Salt Lake Boulevard alignment, with proximity to high-density residential neighborhoods. Future bicycle lane extensions are proposed on Salt Lake Boulevard from Kamehameha Highway to Arizona Boulevard and from Pu'uloa Road to Middle Street.

- The fixed guideway section along Salt Lake Boulevard from Kamehameha Highway to Pu'uloa Road would be elevated above both existing and new medians. Modifications may be required to the bicycle operations on the proposed bicycle lane on Salt Lake Boulevard.
- The section along Pukuloa Street from Pu'uloa Road to Ahua Street would be elevated and located on the makai-side curb lane. Column placement is not expected to interrupt pedestrian flow.
- The alternative section along the Moanalua Freeway from Pu'uloa Road to the Interstate H-1 would be elevated and located off-street on the Koko Head side of the Moanalua Freeway. No bicycle facilities exist or are proposed in the vicinity of this alignment; therefore no modifications to pedestrian or bicycle access are expected for this section.

Alignment: Mauka of the Airport Viaduct

This alignment is approximately 5.1 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1, crosses Interstate H-1 and continues mauka of the Airport Viaduct to the Ke'ehi Interchange. Pedestrian circulation is less integrated in the vicinity of the Airport Viaduct. An existing bicycle path is identified along Nimitz Highway in the

vicinity of the proposed alignment. Column placement for the elevated fixed guideway structure would be in the median of Kamehameha Highway and off-street along the mauka portion of the Interstate H-1 right-of-way; hence, no modifications to pedestrian or bicycle movements are expected. The at-grade option mauka of Interstate H-1 would create grade crossings at Camp Catlin Road and Catlin Drive for non-motorized traffic using those facilities.

Alignment: Makai of the Airport Viaduct

This alignment is approximately 5.2 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1 and continues along Nimitz Highway, makai of the Airport Viaduct, to the Ke‘ehi Interchange. Pedestrian circulation is less integrated in the vicinity of the Airport Viaduct. An existing bicycle path is identified along Nimitz Highway in the vicinity of the proposed alignment. As column placement for the elevated fixed guideway structure would be in the median of Kamehameha Highway and on the makai side of the Interstate H-1 right-of-way, impacts to pedestrian access or bicycle operations on the existing Nimitz Highway bicycle path are expected to be minimal.

Alignment: Aolele Street

This alignment is approximately 5.4 miles long and generally travels from Aloha Stadium along Kamehameha Highway to Interstate H-1 and continues makai of the Airport Viaduct to Aolele Street, turning towards the Airport along Aolele Street and continuing to Dillingham Boulevard via Lagoon Drive. Pedestrian circulation is less integrated in the vicinity of Aolele Street. In the vicinity of the proposed alignment, a bicycle path currently exists on Nimitz Highway and a bicycle lane extension on Pu‘uloa Road from Salt Lake Boulevard to Lagoon Drive is currently underway. As column placement for the elevated fixed guideway structure would be in the median of Kamehameha Highway and off-street along Aolele Street, impacts on pedestrian circulation or future operations of bicycle facilities on Nimitz Highway and Lagoon Drive are expected to be minimal.

Section 4: Middle Street to Iwilei

Two alignment options are proposed in Section 4, each beginning at the Ke‘ehi Interchange and continuing in varying routes via either North King Street or Dillingham Boulevard ending in Iwilei. The following describes the potential issues regarding the non-motorized transportation system due to construction of each of these alignments:

Alignment: North King Street

This alignment is approximately 2.3 miles long and generally travels from the Ke‘ehi Interchange through the Middle Street Transit Center, along Middle Street and continues Koko Head along North King Street to Liliha Street. This alignment travels through an industrial area in Kalihi and mixed residential/commercial uses along King Street. The pedestrian system around King Street is generally developed and connected around the proposed Fixed Guideway Alignment. Four proposed future bicycle facilities may be modified due to the construction of

the proposed alignment, including the proposed bicycle facilities on Middle Street, North King Street, Liliha Street, and Waiakamilo Road:

- The section along Middle Street from Nimitz Highway to North King Street would be elevated and located off-street. No modifications are expected to the pedestrian system or the proposed bicycle facility on Middle Street.
- The section along King Street from Middle Street to Kopke Street would be elevated and located on the makai side. Column placement in this section may have conflicts with bicycle operations on the proposed bicycle facility on North King Street. Column placement is not expected to interrupt pedestrian flow.
- The section along King Street from Kopke Street to Liliha Street would be elevated and located on mauka side of street. Column placement in this section may have conflicts with bicycle operations on the proposed bicycle facilities on North King Street. Column placement is not expected to interrupt pedestrian flow.

Alignment: Dillingham Boulevard

This alignment is approximately 1.8 miles long and generally travels from the Ke‘ehi Interchange to Iwilei via Dillingham Boulevard. Three proposed future bicycle facilities may be impacted due to the construction of the proposed alignment, including the proposed bicycle facilities on Dillingham Boulevard from Middle Street to Kōkea Street, Waiakamilo Road, and Alakawa Street:

- The proposed Dillingham Boulevard alignment would be elevated and located on a new median. Due to the narrow width of Dillingham Boulevard, column placement in this section may have conflicts with the bicycle operations on the proposed bicycle facilities on Dillingham Boulevard and may negatively affect the future biking experience around the alignment.

Section 5: Iwilei to UH Mānoa

Five alignment options and one spur route to Waikīkī are proposed in Section 5, each beginning at Iwilei and continues in varying routes ending at UH Mānoa. The following describes the potential issues regarding the bicycle and pedestrian access due to the construction of each section along this alignment:

Alignment: Beretania Street/South King Street

This alignment is approximately 4.0 miles long and generally travels from Iwilei to UH Mānoa via tunnel below Beretania Street and aboveground along South King Street. The pedestrian system is generally well-connected along the alignment, with easy access to adjacent commercial or residential uses. Existing and four proposed future bicycle facilities are identified in the vicinity of the Fixed Guideway Alignment, including an existing bicycle route on University Avenue from South King Street to Dole Street; and proposed bicycle facilities on Beretania Street, South King Street and McCully Street, and the couplet of Pensacola Street and Pi‘ikoi Street.

- The section along Beretania Street from Liliha Street to Alapa‘i Street would be in an underground tunnel and would not need modifications to the pedestrian or bicycle systems above ground.
- Column placement within the makai side curb lane along South King Street from Alapa‘i Street to University Avenue would result in the loss of a peak hour travel lane and could affect proposed bicycle facilities on King Street.
- The section along University Avenue near UH Mānoa would be elevated in the median of University Avenue and on the makai side of Lower Campus Road. Column placement in this section may have conflicts with the bicycle movement on University Avenue. Column placement is not expected to interrupt pedestrian flow.

Alignment: King Street/Waimanu Street/Kapi‘olani Boulevard

This alignment is about 4.6 miles long and generally travels from Iwilei to UH-Mānoa via tunnel below King Street and Kapi‘olani Boulevard to Waimanu Street and above ground along Waimanu Street and Kona Street and Kapi‘olani Boulevard to University Avenue, terminating on the UH Lower Campus. The pedestrian system is well connected along portions of the alignment, although sidewalks are not continuous along Waimanu Street in the Kaka‘ako area. One existing and several proposed future bicycle facilities are identified in the vicinity of the fixed guideway alignment, including: existing bicycle route on University Avenue from South King Street to Dole Street, and proposed bicycle facilities on Cooke Street, Queen Street, Kapi‘olani Boulevard, McCully Street, and Kalākaua Avenue.

- The section along King Street and Kapi‘olani Boulevard from River Street to Dreier Street would be in an underground tunnel and would not need modifications above ground to the pedestrian or bicycle systems.
- The section along Waimanu Street from Ward to Kamake‘e Street would be elevated and located on the mauka side of Waimanu Street. Column placement is not expected to interrupt pedestrian flow
- The section along Kona Street from Koko Head of Kamake‘e to Pi‘ikoi Street to ‘Ewa of Atkinson Drive would be elevated and located in street. Column placement is not expected to interrupt pedestrian flow in the vicinity of Ala Moana Center.
- The section along Kapi‘olani Boulevard from Atkinson Drive to University Avenue would be elevated and located in existing and new median. Column placement could affect left-turn access of bicycles to the cross streets and driveways along Kapi‘olani Boulevard.
- The section along University Avenue from Kapi‘olani Boulevard to King Street would be elevated above the median. This would require removal of an existing bicycle lane and reduce clearance between bicyclists and vehicular traffic.
- The section along University Avenue from King Street to Varsity Place would be elevated above a new median. Column placement in this section may reduce clearance between the bicyclists and the vehicular traffic and affect the left-turn access of bicycle movement to cross streets and driveways along University Avenue. An existing bicycle lane on University would be removed.

Alignment: Hotel Street/Kawaiaha‘o Street/Kapi‘olani Boulevard

This alignment is approximately 4.6 miles long and generally travels from Iwilei to UH Mānoa via Hotel Street to a tunnel connecting to Kawaiaha‘o Street and above ground along Kawaiaha‘o Street and Kona Street and Kapi‘olani Boulevard to University Avenue. The pedestrian system is well-connected along portions of the alignment, although sidewalks are not continuous along Kawaiaha‘o Street in the Kaka‘ako area. One existing and several proposed future bicycle facilities are identified in the vicinity of the fixed guideway alignment, including: an existing bicycle route on University Avenue from South King Street to Dole Street; and proposed bicycle facilities on Cooke Street, Queen Street, Kapi‘olani Boulevard, McCully Street, and Kalākaua Avenue.

- The section on Hotel Street from River Street to Alakea Street would be at-grade in the existing transit mall. There is currently a high level of pedestrian activity along the Hotel Street transit mall and along the Kekaulike pedestrian mall in the vicinity of the proposed transit station. Bicycle movement and access to properties along Hotel Street may be obstructed due to train operations.
- The alignment transitions from at-grade to underground along Hotel Street between Alakea Street to Richards Street. No permanent modifications are anticipated to the pedestrian or bicycle systems above ground.
- The section along Richards Street from Kawaiaha‘o Street/South Street would be in an underground tunnel and would require temporary modifications to the pedestrian or bicycle systems above ground during the construction period.
- The section along Kawaiaha‘o Street from Cooke Street to ‘Ewa of Kamake‘e Street would be elevated. No modifications are anticipated to the proposed Cooke Street bicycle route.
- The section along Kona Street from Koko Head of Kamake‘e to Pi‘ikoi Street to ‘Ewa of Atkinson Drive would be elevated and located in street. Column placement is not expected to interrupt pedestrian flow in the vicinity of Ala Moana Center.
- The section along Kapi‘olani Boulevard from Atkinson Drive to University Avenue would be elevated and located in existing and new median. Column placement could affect left-turn access of bicycles to the cross streets and driveways along Kapi‘olani Boulevard. Modifications to the pedestrian circulation system are expected to be minimal.
- The section along University Avenue from Kapi‘olani Boulevard to King Street would be elevated above median. This would require removal of an existing bicycle lane and reduce clearance between bicyclists and vehicular traffic. Modifications to the pedestrian circulation system are expected to be minimal.
- The section along University Avenue from King Street to Varsity Place would be elevated above a new median. Column placement in this section may reduce clearance between the bicyclists and the vehicular traffic and affect the left-turn access of bicycle movement to cross streets and driveways along University Avenue. An existing bicycle lane on University would be removed. Modifications to the pedestrian circulation system are expected to be minimal.

Alignment: Nimitz Highway/Queen Street/Kapi‘olani Boulevard

This alignment is approximately 4.6 miles long and generally travels from Iwilei to UH Mānoa via Nimitz Highway, Queen Street, Kona Street and Kapi‘olani Boulevard to University Avenue. The pedestrian system along the alignment is generally developed and connected, although sidewalks are not continuous along portions of Queen Street in the Kaka‘ako area. Two existing and several proposed future bicycle facilities are identified in the vicinity of the fixed guideway alignment, including an existing bicycle lane on Nimitz Highway; an existing bicycle route on University Avenue from South King Street to Dole Street; and proposed bicycle facilities on Ala Moana Boulevard, Cooke Street, Queen Street, Kapi‘olani Boulevard, McCully Street, and Kalākaua Avenue.

- The section along Nimitz Highway would be elevated above the median. The section along Queen Street from Nimitz Highway to Kamake‘e Street would be elevated. Column placement would affect the proposed bicycle facility on Queen Street.
- The section along Queen Street from Kamake‘e Street to Waimanu Street would be elevated. Column placement would reduce clearance between the pedestrian and bicycle circulation and the vehicular traffic.
- The section along Kona Street from Koko Head of Kamake‘e to Pi‘ikoi Street to ‘Ewa of Atkinson Drive would be elevated and located in street. Column placement is not expected to interrupt pedestrian flow in the vicinity of Ala Moana Center.
- The section along Kapi‘olani Boulevard from Atkinson Drive to University Avenue would be elevated and located in existing and new median. Column placement could affect left-turn access of bicycles to the cross streets and driveways along Kapi‘olani Boulevard.
- The section along University Avenue from Kapi‘olani Boulevard to King Street would be elevated above median. This would require removal of an existing bicycle lane and reduce clearance between bicyclists and vehicular traffic.
- The section along University Avenue from King Street to Varsity Place would be elevated above a new median. Column placement in this section may reduce clearance between the bicyclists and the vehicular traffic and affect the left-turn access of bicycle movement to cross streets and driveways along University Avenue. An existing bicycle lane on University would be removed.

Alignment: Nimitz Highway/Halekauwila Street/Kapi‘olani Boulevard

This alignment is approximately 4.7 miles long and generally travels from Iwilei to UH Mānoa via Nimitz Highway, Halekauwila Street, Kona Street and Kapi‘olani Boulevard to University Avenue. The pedestrian system along the alignment is generally developed and connected, although sidewalks are not continuous along portions of Halekauwila Street in the Kaka‘ako area. Two existing and several proposed future bicycle facilities are identified in the vicinity of the fixed guideway alignment, including an existing bicycle lane on Nimitz Highway; an existing bicycle route on University Avenue from South King Street to Dole Street; and proposed bicycle facilities on Ala Moana Boulevard, Cooke Street, Queen Street, Kapi‘olani Boulevard, McCully Street, and Kalākaua Avenue.

- The section along Nimitz Highway would be elevated above the median. No modifications are expected to the pedestrian and bicycle system.
- The section of Halekauwila Street from Nimitz Highway to Kamake'e Street would be elevated. Halekauwila Street is not an existing or future designated bicycle route.
- The section along Queen Street from Kamake'e Street to Waimanu Street would be elevated. Bicycle and pedestrian circulation may be affected due to the inadequate clearance between pedestrian and bicycle circulation and vehicular traffic.
- The section along Kona Street from Koko Head of Kamake'e to Pi'ikoi Street to 'Ewa of Atkinson Drive would be elevated and located in the street.
- The section along Kapi'olani Boulevard from Atkinson Drive to University Avenue would be elevated and located in existing and new median. Column placement could affect left-turn access of bicycles to the cross streets and driveways along Kapi'olani Boulevard. Modifications to pedestrian access are expected to be minimal.
- The section along University Avenue from Kapi'olani Boulevard to King Street would be elevated above median. This would require removal of an existing bicycle lane and reduce clearance between bicyclists and vehicular traffic.
- The section along University Avenue from King Street to Varsity Place would be elevated above a new median. Column placement in this section may reduce clearance between the bicyclists and the vehicular traffic and affect the left-turn access of bicycle movement to cross streets and driveways along University Avenue. An existing bicycle lane on University would be removed.

Alignment: Waikīkī Spur

This alignment is approximately 1.5 miles long and travels from the intersection of Kalākaua Avenue/Kapi'olani Boulevard to the Koko Head side of Waikīkī. The spur follows Kalākaua Avenue to Kūhiō Avenue, ending at Ka'iulani Avenue. The pedestrian system along the alignment is well-integrated and heavily used. Bicycle facilities are proposed on Kapi'olani Boulevard and Kalākaua Avenue in the vicinity of the Fixed Guideway Alignment.

The sections on Kalākaua Avenue and Kūhiō Avenue would be elevated. Column placement along the Waikīkī spur could reduce clearance between bicyclists and vehicular traffic and affect access of bicycle movements to the cross streets and driveways along Kalākaua.

This chapter summarizes the key roadway modifications that may be made to the transportation system for each of the HHCTCP alternatives, including changes to the roadway geometry, surface parking, and the non-motorized transportation system:

- The No Build Alternative and the TSM Alternative are not expected to require significant roadway modifications in the study corridor.
- Along the length of its alignment, the Managed Lane Alternative would use portions of the median, the shoulder or the HOV lanes of the existing H-1 and H-2 Freeways, Kamehameha Highway, and Nimitz Highway. The two design options would require modification to the Nimitz Flyover project's design and would terminate with ramps tying into Nimitz Highway at Pacific Street. Both options would also include a bus-only connector ramp between the Nimitz Highway and Iwilei Road at King Street. The H-1 zipper lane would be maintained in the Two-direction Option but discontinued in the Reversible Option. As a result, the lanes taken up by the zipper lane in the other alternatives would be "freed up" in the Reversible Option (i.e., H-1 would have the full number of 'Ewa bound lanes in the AM peak period, and all Koko Head bound lanes available in the PM peak – period. Modifications to the existing surface parking would be required to provide sufficient space for the proposed bus-only access ramp facilities at the Aloha Stadium.
- The Fixed Guideway Alternative is anticipated to require varying levels of modifications to traffic flow, bicycle operations and pedestrian circulation depending on the particular alignment, as summarized below:
 - Roadway widening on Geiger Road to avoid loss of a travel lane in Section 1; closures of existing median openings on Kamehameha Highway that may affect the left-turn access to cross streets or adjoining land uses in Section 2; interruption of future bicycle lane access along Salt Lake Boulevard in Section 3; addition of a new median that may result in circuitous travel on Dillingham Boulevard in Section 4; loss of one Koko Head bound lane on King Street near Iwilei Road, including the connection between North King Street in Section 4 and to Hotel Street in Section 5, and the connection between Dillingham Boulevard in Section 4 and to Hotel Street in Section 5; loss of parking and/or travel lanes as well as access impacts to adjoining properties along portions of Halekauwila Street, Kawaiaha'ō Street, Kona Street, Queen Street, or Waimanu Street in Section 5; elimination of bus lanes accessing the Hotel Street transit mall with the Hotel Street at-grade alternative in Section 5; new median islands on portions of Kapi'olani Boulevard and University Avenue that may affect vehicular and bicycle access to adjacent land uses in Section 5.

- On-street parking spaces would be modified where the alignment requires placement of columns in the curb lane of streets or in medians with shifting of traffic lanes, including portions of Pūkōloa Street (Pu‘uloa Road to Ahua Street) in Section 3, North King Street (Middle Street to Liliha Street) and Ka‘aahi Street in Section 4, and South King Street (Alapa‘i Street to University Avenue), Waimanu Street (Ward Avenue to Kamake‘e Street), Kona Street, University Boulevard (Kapi‘olani Boulevard to King Street), Kawaiaha‘o Street (South Street to ‘Ewa of Kamake‘e Street), Queen Street (‘Ewa of Kamake‘e Street), Halekauwila Street (Nimitz Highway to ‘Ewa of Ward Avenue) and Kūhiō Avenue (‘Ewa of ‘Ōhua Avenue) in Section 5.
- Bicycle facilities that could be modified or affected include: the future bicycle path and signed bicycle route along Farrington Highway in Section 1, the future bicycle lane on Salt Lake Boulevard from Kamehameha Highway to Ahua Street in Section 3, proposed bicycle facilities on Dillingham Boulevard, Waiakamilo Road and Alakawa Street in Section 4, the existing bicycle route on University Avenue and proposed bicycle facilities on Kapi‘olani Boulevard, Cooke Street, Queen Street, Mc Cully Street and Kalākaua Avenue in Section 5.

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