As required by the Code of Federal Regulations Title 40 Part 1505.2(b), both the No Build and Build Alternatives are considered to be environmentally preferable, depending on the factors considered. The No Build Alternative would best protect historic and cultural resources, while the Build Alternatives would cause the least damage to the biological and physical environment and best preserve natural resources because they would reduce transportation energy consumption and air and water pollution.

Considered Resource	No Build Alternative	Build Alternatives
Biological Environment		X
Physical Environment		X
Historic Resources	X	
Cultural Resources	X	
Natural Resources		X

X = Alternative causes least damage or best protects, preserves, or enhances resource.

AR00143126

4.1 Land Use

This section describes the existing land uses, including farmlands, development trends, and long-term plans for the study corridor. It also evaluates the Project's consistency with the long-term plans for the study corridor. An assessment of potential changes in land use that could result from the improved mobility that would be provided by the long-term operation of the Project is presented in Section 4.17. For additional information and references, see the *Honolulu High-Capacity Transit Corridor Project Land Use Technical Report* (RTD 2008b) and the *Honolulu High-Capacity Transit Corridor Project Neighborhoods and Communities Technical Report* (RTD 2008d). Farmlands are described in detail in the *Honolulu High-Capacity Transit Corridor Project Geology, Soils, Farmlands, and Natural Hazards Technical Report* (RTD 2008m).

4.1.1 Background and Methodology

A variety of data sources, including field surveys, were used to record existing land uses on properties adjacent to and within close proximity of the study corridor.

For farmlands, this investigation documented the location of existing properties that are actively cultivated and also checked information published by the U.S. Department of Agriculture, Natural Resources Conservation Service, to see if properties in the study corridor have been designated as prime, unique, and/or of statewide importance.

Additionally, government documents related to planned transportation improvements and land development were reviewed to assess the future context of the Project in the urban environment. The Project was also evaluated to assess whether it would be consistent with transportation and urban development plans and policies.

4.1.2 Affected Environment

Existing Land Use

Table 4-2 provides an overview of existing land use within the study corridor in the planning areas delineated by the *City and County of Honolulu General Plan (as amended)* (DPP 2002a). Figure 4-2 illustrates the location of these planning areas and shows the future planned land uses. The corridor traverses through three major planning areas—'Ewa, Central O'ahu, and the Primary Urban Center (PUC).

The 'Ewa region is a rural and agricultural area that is undergoing urbanization and includes Kapolei, which is developing as O'ahu's "second city." The Wai'anae terminal station for the Project is at Kapolei. This station would serve the area where both population and employment are forecasted to grow by approximately 400 percent. The Wai'anae terminus is near the UH West O'ahu campus, the Salvation Army Kroc Center, and a master-planned development in Ho'opili, all of which are planned to open between 2009 and 2012 and are consistent with the goals of transit-oriented development (TOD). Commercial space will grow to 7.1 million square feet (compared to 8.4 million square feet existing in Honolulu today). The UH West O'ahu campus is projected to have 7,600 students and 800 staff and faculty by 2020. Central

Prime farmland is land that has the best combination of physical and chemical characteristics for producing agricultural crops.

Unique farmland is land other than prime farmland with a special combination of qualities to produce specific high-value crops.

Farmland of statewide importance is land other than prime or unique farmland, important for the production of agricultural crops as determined by the State.

AR00143127

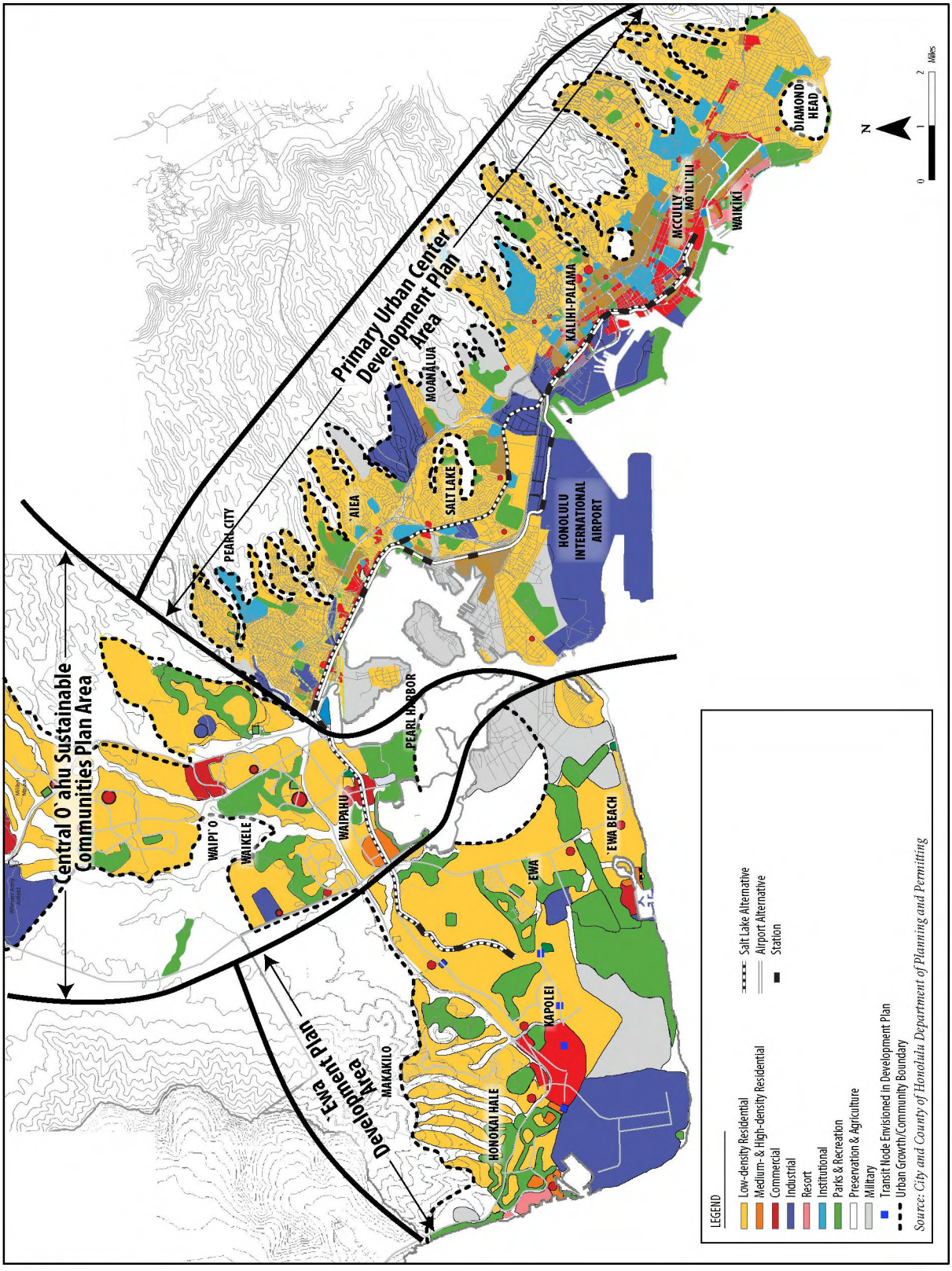


Figure 4-2 Planning Regions and Planned Land Use

AR00143128

O'ahu has a suburban development pattern encompassing smaller cities and community centers. Only part of the Central O'ahu planning area is within the study corridor. The PUC encompasses the most urbanized part of the island, including Downtown Honolulu. Figures 4-3 through 4-6 show existing land uses within the study corridor (one-half mile from the project alignment).

Farmlands

Much of the study corridor is currently developed, and only a small portion of the corridor—primarily in the 'Ewa Development Plan area—consists of land that is currently used for agriculture.

The 'Ewa Plain, including properties surrounding the Project, was once a major agricultural area. Prior to 1995, the primary crop had been sugar cane. Despite recent rapid urbanization, much of the 'Ewa Plain is still classified or zoned for agricultural use by either the State of Hawai'i or the City and County of Honolulu (City). Much of 'Ewa that is not developed is also classified as "Prime Agricultural Land."

Future Land Use Plans and Policies

State, regional, and community plans and policies affecting future land use are currently in place and enforced through zoning and other requirements at State and Local levels. Proactive neighborhood-based plans establish a comprehensive framework for implementing long-range land use policies and goals for O'ahu's future. The plans that are relevant to the goals and objectives of providing improved transit services within the study corridor include the following:

- The *Hawai'i Statewide Transportation Plan* (HDOT 2002)—this plan envisions a multimodal transportation system and promotes transit-supportive development in activity centers along the corridor.
- The *O'ahu Regional Transportation Plan 2030* (O'ahuMPO 2006)—this plan focuses on improving mobility with a series of strategies and programs to address future transportation needs. Within the 2030 scope, this plan calls for a rail transit system that would serve the corridor between Kapolei and Honolulu.
- The *City and County of Honolulu General Plan (as amended)* (DPP 2002a)—this plan establishes transit-supportive objectives and policies for Honolulu's future and directs future growth on O'ahu to the PUC, Central O'ahu, and 'Ewa.

Development plans for the PUC and 'Ewa direct new growth and supporting transit facilities and TOD to these areas. Sustainable community plans for East Honolulu, Central O'ahu, and other parts of the island focus on supporting the character of these communities and preserving their natural and cultural resources.

The City is currently pursing a TOD special district amendment to a land use ordinance. TOD special districts would restrict development in agricultural and open space areas and encourage mixed-use, high-density, walkable communities around transit stations. The special districts also encourage public input into the design of TOD neighborhood plans to reflect unique community identities. TOD planning would occur before the fixed guideway stations are constructed.

The *Waipahu Livable Communities Initiative* (DPP 1998) and the *'Aiea-Pearl City Livable Communities Plan* (DPP 2004b) promote transit-supportive development patterns and pedestrian-friendly environments.

AR00143129

4.1.3 Environmental Consequences and Mitigation

Environmental Consequences

Land Use

No Build Alternative

Under the No Build Alternative, the Project would not be built and would not have any impacts to existing land use. Although the projects on the ORTP would be built, their environmental impacts would be studied in separate documents. The No Build Alternative is not consistent with local and regional long-range plans.

Common to All Build Alternatives

Table 4-3 identifies the acreage that would be affected by each of the project's Build Alternatives where existing land use would be converted to a transportation use. Only those parcels that would be completely acquired (full acquisition) would result in changes in land use resulting directly from the Project. For some properties, only a small portion of the parcel would be required (partial acquisition), and existing land uses would remain unchanged by the Project. The largest potential effect would be displacement of Aloun Farms operations mauka of Farrington Highway for the proposed 45-acre maintenance facility. Traction power substantions (TPSS) will be located approimxately every mile. A description of the substations is provided in Chapter 2. The substations have been placed in roadway rights-of-way, vacant lots, or in rights-of-way that will be acquired for stations and station features. A more complete analysis of the types of land uses that would be affected is presented in Section 4.3, where displacements and relocations associated with the acquisition of residential, commercial, and other types of properties are discussed.

Table 4-3 Property Acquisition by Alternative

Alternative	Acquisition Acreage
Salt Lake	147
Airport	141
Airport & Salt Lake	160

The acquired acreage under each of the Build Alternatives represents approximately 1 percent of the total acreage within the study corridor. A majority of the land uses being converted to a transportation use represent business uses (approximately 84 percent), which include retail, office, industrial, and warehouse. The remaining 16 percent of land conversions would be residential land uses.

Farmlands

No Build Alternative

Under the No Build Alternative, the Project would not be built and would not have any impacts to farmlands designated prime, unique, or agricultural lands of statewide importance. Although the projects on the ORTP would be built, their environmental impacts would be studied in separate documents. The adopted *'Ewa Development Plan* (DPP 2000), however, has recognized that agricultural lands adjacent to the project alignment would be developed some time in the future.

Common to All Build Alternatives

The only farmlands that would be acquired for the Project are in the 'Ewa Plain and, therefore, common to all Build Alternatives. Because the properties are relatively large, only a small portion of each agricultural parcel would be acquired (Figures 4-7 and 4-8). The figures show the agricultural lands currently in cultivation as well as agricultural lands that have been designated by the U.S. Department of Agriculture (USDA), the Natural Resources Conservation Service (NRCS), or the State of Hawai'i as prime, unique, or of statewide importance. Some of the designated lands are not currently in active cultivation. Approximately 80 acres of prime farmland and 8 acres of

AR00143130

statewide-important farmlands would be acquired by the Build Alternatives, of which 70 acres are actively cultivated.

All the affected properties designated as prime, unique, or of statewide importance and/or actively being farmed are owned by individuals, corporations, or agencies that plan to develop them in conformance with the *'Ewa Development Plan* (DPP 2000).

The *2002 Census of Agriculture* (USDA 2004) reported that there are more than 70,000 acres of agricultural land in cultivation on O'ahu, including those designated as prime, unique, or of statewide importance. The displacement of agricultural lands as a result of the Project represents less than one-tenth of one percent of available agricultural land. Considering that the amount of affected farmland is such a small proportion of all agricultural lands on O'ahu, including those designated as prime, unique, or of statewide importance, the effect would not be significant and no mitigation would be required.

Future Land Use Plans and Policies

No Build Alternative

Under the No Build Alternative, a transit system would not be constructed. However, this is not consistent with public transportation and land use planning documents that call for the development of a central transit system within the study corridor. Projects on the ORTP will be constructed, and separate environmental documents will be prepared for those projects.

Common to All Build Alternatives

The Build Alternatives would be consistent with adopted State and Local government transportation and land use plans and policies. The transit system would link Honolulu with outlying developing areas and activity centers that have been designated to receive increasing amounts of future residential and employment growth. The system would provide reliable rapid transit within the study corridor that would serve all population groups, improve transit links, and offer an alternative to the use of private automobiles.

The *'Ewa Development Plan* was the first of the conceptual development plans to be adopted by the City. Significant growth in population and employment are projected for the 'Ewa area by 2030.

The *'Ewa Development Plan* states that higher-density residential and commercial uses should be developed along a major rapid transit corridor linking Kapolei with Primary Urban Center communities to the east (DPP 2000). In addition, the plan recommends that the new UH West O'ahu campus should be oriented to support pedestrian access to and from a major transit node on North-South Road.

All of the Build Alternatives are equally consistent with adopted State and Local plans and policies.

Mitigation

The acquisition of property for the Build Alternatives would be conducted consistent with Federal and State regulations and with the procedures outlined in the *Honolulu High-Capacity Transit Corridor Project Real Estate Acquisition Management Plan* (RTD 2008q).

Based on the relatively small number of parcels affected by full acquisitions, the effects on different types of land uses in the study corridor would be minimal. No mitigation measures would be needed.

AR00143131

of persons displaced by federally supported actions. The USDOT's regulations implementing this Act require that relocation and advisory assistance be provided to all individuals and businesses displaced and that it be done in accordance with the provisions set forth in 49 CFR 24. Comparable housing that is decent, safe, and sanitary must be available and affordable for displaced persons, and commercial space must be available for displaced businesses. It also prohibits discrimination with regard to appraisals and acquisitions of properties. HRS Chapter 101, Eminent Domain, and Chapter 113, Land Acquisition Policies for Federally Assisted Programs, encompass these Federal regulations.

Methodology

The parcels that could be affected by the Project were identified based on conceptual engineering drawings prepared for the Project's Build Alternatives. Generally, if only a portion of the property would be required, then it is considered a partial acquisition. However, if a substantial amount of the land and/or the primary structure were located within the portion of the parcel to be acquired, then the entire property would be purchased. This is referred to as a *full acquisition*. For residential properties, if the proposed right-of-way line comes within 5 feet of a residential structure, it is considered a full acquisition. If the right-of-way line is more than 5 feet away, it is considered a partial acquisition. For commercial properties, including situations where the commercial property could lose its function, full acquisition was considered. Once it was determined that a parcel would be acquired, the displacement and relocation of residences, businesses, and uses were analyzed. Information regarding the amount of acreage needed for each alternative, the number of parcels to be acquired, the type of acquisition (partial or full), the type of uses affected, and the number of dwelling units and businesses that would be relocated were included in the analysis.

Most of the information used to assess the types of land uses that would be affected by displacements and relocations was based on property tax assessment records. This information was used to determine land use type, including residential structures and units, commercial-type structures, and square footage. In addition to reviewing real property tax records, a windshield survey was conducted in 2008 to determine the number of businesses and, in some cases, residential units that would be acquired. The calculation of displaced persons for residential acquisitions was based on the average persons per household (2000 census data) in the study corridor. The calculation of displaced employees for business acquisitions was based on industry multipliers by type of commercial property (windshield survey).

4.3.2 Affected Environment

The project alignment traverses a variety of different land uses and different urban, suburban, rural, and agricultural environments as described in Section 4.1.

4.3.3 Environmental Consequences and Mitigation

Environmental Consequences

No Build Alternative

Under the No Build Alternative, the Project would not be built and would not have any impacts to residential or commercial properties. Although the projects in the ORTP would be built, their environmental impacts would be studied in separate documents.

Common to All Build Alternatives

Table 4-5 summarizes the number of partial and full parcel acquisitions by Build Alternative.

Partial acquisitions would vary more than full acquisitions depending on the alternative. A partial acquisition typically is either a narrow strip of land or a more substantial portion of a large parcel. It is assumed that for the properties that would be

AR00143132

Airport & Salt Lake Alternative

The Airport & Salt Lake Alternative would require more parcel acquisitions than the other alternatives. It would result in the same number of residential displacements and more business displacements than the other Build Alternatives. The effects of partial and full acquisitions on residential and commercial uses would be similar to the effects described under the headings *Common to All Build Alternatives, Salt Lake Alternative,* and *Airport Alternative.*

Mitigation

Where relocations would occur, compensation would be provided to affected property owners, businesses, or residents in compliance with all applicable Federal and State laws and would follow the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, as well as procedures outlined in the *Real Estate Acquisition Management Plan* (RTD 2008q). The plan includes the following measures related to relocations:

- The City would assist all affected persons in locating suitable replacement housing and business sites within an individual's or business's financial means.
- The City would provide relocation advisory services to businesses where acquisition of adjacent property may substantially reduce clientele, limit accessibility, or affect a business in other substantial ways.
- A minimum 90-day written notice would be provided before any business or resident would be required to move.
- Relocation services would be provided to all affected business and residential property owners and tenants without discrimination; and persons, businesses, or organizations that are displaced as a result of the Project would be treated fairly and equitably.
- Where landscaping, sidewalks, and driveway access would be affected by the Project, coordination would occur with the landowner, and these property features would be replaced and/or the property owner would be compensated in accordance with the *Real Estate Acquisition Management Plan* (RTD 2008q).

4.4 Community Services and Facilities

This section describes the community services and facilities, public services, and utilities in the study corridor and the potential effects on these resources under each of the Build Alternatives as compared to the No Build Alternative. Community facilities are schools, libraries, religious institutions, cemeteries, government institutions, and military installations. Public and private parks and recreational facilities include pedestrian trails, golf courses, regional recreational complexes, community and neighborhood parks, memorial parks, and a major sports stadium. Public services include police, fire, hospitals and emergency medical services, and transit (bus). Utilities include electricity, natural gas, telecommunications, and surface-water management. For additional information and references, see the *Honolulu High-Capacity Transit Corridor Project Neighborhoods and Communities Technical Report* (RTD 2008d).

4.4.1 Background and Methodology

Regulatory Context

Section 6(f) of the Land and Water Conservation Fund Act of 1964 was created to preserve, develop, and increase accessibility of outdoor recreational resources. In the case of a transportation project, Section 6(f) protects recreational properties that were constructed from Land and Water Conservation Fund funds from being converted to transportation use. The study corridor does not contain any Section 6(f) properties. Section 4(f), as amended, of the USDOT Act of 1966 (49 USC 303) protects public parklands and recreational lands, wildlife refuges, and historic sites of National, State, or Local significance.

AR00143133

Environmental Services provides solid waste, wastewater, and stormwater services. The Hawaiian Electric Company, an investor-owned utility regulated by the Hawai'i Public Utilities Commission, provides electricity to residential, commercial, and industrial customers. The Gas Company is also an investor-owned utility regulated by the Hawai'i Public Utilities Commission and provides synthetic natural gas manufactured at Campbell Industrial Park to mostly commercial and industrial customers on O'ahu. Telecommunications services are provided by Hawaiian Telecom. Cable services are provided by Oceanic Time Warner Cable.

Because much of the project alignment is located along heavily urbanized roadways, many utilities and associated infrastructure are located in the project study area. Typically, overhead utility lines and buried conduits and pipelines are installed in the right-of-way for those roadways. At-grade utility facilities, such as substations, pumping stations, pressurizing stations, and gas odorizing stations, are on parcels adjacent to the right-of-way.

4.4.3 Environmental Consequences and Mitigation

Environmental Consequences

No Build Alternative

Under the No Build Alternative, the Project would not be built and, therefore, would not have any impacts to community services and facilities, parklands and recreational facilities, public services, or utilities. However, continued congestion within the project alignment would impact emergency response times. Although the projects in the ORTP would be built, their environmental impacts would be studied in separate documents.

Community Facilities

Section 4.4.2, Affected Environment, lists schools, libraries, churches, parks and recreational facilities, and cemeteries adjacent to the alignment. Of those, one church would be displaced by the Project. Fourteen community facilities would be partially acquired by the Project. The number of community facilities varies by alternative. Table 4-7 lists all impacted community facilities, the nature of the acquisition, and by which alternative the resource might be impacted. No cemeteries or burial sites would be impacted by the Build Alternatives.

The schools that would be affected by partial acquisitions from the Build Alternatives are Honolulu Community College, Waipahu High, Leeward Community College, and the UH Mānoa Urban Garden Center. Partial acquisition would occur at the Bethesda Temple Apostolic Church, and the Alpha Omega Christian Fellowship would be displaced as part of full acquisition of the commercial building where this facility is located.

Additional community facilities expected to be affected by partial property acquisition would involve various parcels owned by the Local, State, and Federal governments. The Project would require partial acquisition of land from parcels associated with government or military facilities. These are the Pearl City Post Office (0.06 acres), the Federal office building at 300 Ala Moana Boulevard (0.34 acres), the O'ahu Correctional Facility (0.21 acres), and a City office building. Partial acquisitions would be required at the Fort Shafter Army Reservation, Makalapa Naval Housing, the Pearl Harbor Complex, and the Naval Reservation. The military properties include lands used for military operations as well as residential accommodations for enlisted personnel and their families.

Salt Lake Alternative

The Salt Lake Alternative would also require parts of Āliamanu Elementary and Middle Schools, Radford High, the Salt Lake-Moanalua Public Library, the Calvary United Methodist Church, and the Fil-Am Christian Church. There would be a partial parcel acquisition at U.S. Navy Base Housing and a State property.

AR00143134

hoods is focused on their individual demographics and character.

4.5.2 Affected Environment

Neighborhoods

The Project transects nine city-designated neighborhoods (Figure 4-13). In 2000, the population within the study corridor was about 552,100. The area had experienced moderate growth over the previous decade with less than 1 percent average annual growth per year. The population of the neighborhoods ranges from 12,300 in Downtown and Ala Moana-Kaka'ako to more than 54,000 in Āliamanu-Salt Lake.

Residents in the neighborhoods of the study corridor are very diverse with 60 to 80 percent of Asian ancestry. However, based on the 2000 census, the Airport and Waikīkī neighborhoods are more than 50 percent White, including military personnel and their dependents, as well as people who have moved from the mainland. In general, there is a wide diversity of household sizes throughout the study corridor, ranging from studio apartments to larger multi-family households.

Due to their location in the urban core, the Kalihi-Palama, Downtown, Ala Moana-Kaka'ako, Waikīkī, and McCully-Mō'ili'ili neighborhoods are distinct from the western O'ahu neighborhoods, which are predominantly comprised of single-family residences. Households in these urban core neighborhoods tend to be smaller with more than 40 percent of individuals living alone.

The following paragraphs describe the general land use, character, and unique physical or social attributes of the study corridor neighborhoods.

`Ewa

'Ewa is one of O'ahu's suburban growth centers and is experiencing rapid change. It encompasses the communities of Kapolei (the "second city"), 'Ewa Villages, 'Ewa by Gentry, Hono'uli'uli, 'Ewa Beach, Ocean Pointe, and Iroquois Point. Between 1990 and 2000, the population of this neighborhood doubled as sugar cane lands were developed into housing and commercial uses. Despite the substantial development, some former sugar cane land is being used for diversified agriculture.

Waipahu

Historically, the Waipahu community makai of the H-1 Freeway was a sugar plantation town, and the community retains strong identity to this historic economic activity. Newer apartment buildings and strip retail plazas are generally limited to the fringes of the commercial district along Farrington Highway. Waipahu has a recreation center, health clinics, churches, and social services offices. Many residents travel outside of the community for employment.

Pearl City

The Pearl City area consists of residential development, mixed-commercial uses, and military housing and facilities. The community was originally developed by Benjamin Dillingham in the 1890s as Hawai'i's first planned city and suburban development for affluent and independent farmers. Retail and commercial venues include the Pearl City Shopping Center and the Pearl Highlands Center. Blaisdell Park near Pearl Harbor is a regional recreation amenity that is popular for outdoor community activities. A small area known as the Banana Patch lies within the Pearl City neighborhood boundary. This neighborhood is unique in that, while it is in an urban region, residents are able to maintain an agricultual, subsistence lifestyle. The community, which is discussed in more detail in Section 4.6, Environmental Justice, has a high concentration of Filipinos.

`Aiea

This community consists of residential development, mixed-commercial uses, and military housing and facilities. Most of the residential subdivisions are mauka of Kamehameha Highway.

AR00143135

would not affect community identity or cohesion as the transit system would be compatible with the existing community character along the alignment. The Project would impact the Banana Patch community, which is discussed in Section 4.6.

ʻAiea—The route through the ʻAiea neighborhood continues to follow Kamehameha Highway, and the effects would be very similar to those described for the Pearl City and Waipahu neighborhoods. Most of the residential areas are mauka of Kamehameha Highway with land uses makai of the highway being primarily commercial or military. As such, the Project would not create a barrier to adjacent communities nor would it limit pedestrian or other travel modes within these communities. As the transit route passes Aloha Stadium, there are very few buildings adjacent to the alignment due to the expanse of the stadium parking. Few residential communities are located nearby.

The effects on the Airport and Āliamanu-Salt Lake neighborhoods are discussed separately for the individual alternatives below.

Kalihi-Palama—The project alignment through the Kalihi-Palama neighborhood follows Dillingham Boulevard. The boulevard is a major arterial that travels through smaller, well-established residential communities, but also functions as a major collector for neighborhood circulation. Small-scale commercial businesses and a few historic land uses line the boulevard. Dillingham Boulevard is a much narrower roadway than either the Farrington or Kamehameha Highways. As a result, the Project would require widening the roadway to maintain the same number of travel lanes while accommodating the guideway's support columns. This widening would result in full acquisitions of two residential parcels and partial property acquisitions along Dillingham Boulevard. Several true Kamani trees would also be removed by the Project. Impacts would occur to historic properties, as discussed in Section 4.15. These impacts would be mitigated, and mitigation may include replacing the trees.

Downtown—The Project would continue through the Downtown neighborhood within the median of Nimitz Highway. This highway is similar to Farrington and Kamehameha Highways as it is a heavily traveled roadway with limited cross traffic. As such, the highway already represents a physical barrier to the neighborhoods on each side. The Project would not create a new barrier or affect the physical character of adjacent communities. Within the Downtown area, the Project would pass the historic districts of Chinatown and Merchant Street. Nimitz Highway is located along the perimeter of these two districts between the downtown uses and the shoreline; therefore, the transit system would have little effect on the integrity of the historic districts or their uses. As the alignment transitions to Halekauwila Street, a relatively narrow city street, the adjacent buildings become primarily high-rise government office buildings with little or no open space between them. Views of the alignment would be limited to short segments as the guideway crosses city streets since high-rise buildings and tall trees already obstruct views. The transit system would be elevated so it would not affect the flow of traffic, bicyclists, or pedestrians within the Downtown neighborhood.

Ala Moana-Kakaʻako—The Project would extend to Ala Moana Center traveling mostly along Halekauwila and Kona Streets. The transition between these streets would require property acquisitions and displacements. Land uses adjacent to the alignment include two- and three-story walk-up apartments and commercial uses within the Kakaʻako area and newer urban mixed-use development within the Ala Moana area. In general, land uses are less dense than in the Downtown neighborhood. Because Kakaʻako has been designated a redevelopment area, changes in land uses to transit-oriented development (TOD) is likely, which may result in a change in character along the alignment, especially near stations.

AR00143136

4.6 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (USEO 1994) was signed by President Clinton on February 11, 1994. This Executive Order directs Federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects of their projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The order directs Federal actions, including transportation projects, to use existing law to avoid discrimination on the basis of race, color, or national origin, and to avoid disproportionately high and adverse impacts on minority and low-income populations. These are often referred to as environmental justice (EJ) populations.

The three basic principles of EJ are to (1) ensure public involvement of low-income and minority groups in decision-making; (2) prevent disproportionately high and adverse impacts of decisions on low-income and minority groups; and (3) ensure low-income and minority groups receive proportionate shares of benefits.

Executive Order 12898 requires all Federal agencies to incorporate EJ into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. A "disproportionately high and adverse effect" is defined as follows:

> Disproportionately High and Adverse Effect on Minority and Low-Income Populations means an adverse effect that:
>
> (1) is predominately borne by a minority population and/or a low-income population; or
>
> (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low- income population. (USDOT Order 5610.2).

The EJ analysis for the Project identifies O'ahu Metropolitan Planning Organization (O'ahuMPO) EJ Areas within the study corridor and presents the impact determinations regarding the likelihood that disproportionately high and adverse impacts would be experienced. This section discusses potential measures to avoid, minimize, and/or mitigate those impacts to EJ populations and documents the Project's public outreach efforts to EJ communities. For more detailed information and references, see the *Honolulu High-Capacity Transit Corridor Project Neighborhoods and Communities Technical Report* (RTD 2008d).

4.6.1 Background and Methodology

Regulatory Context

The principles of EJ are rooted in Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving Federal financial assistance. Additional laws, statues, guidelines, and regulations that relate to EJ issues include the following:

- Title 49 of the United States Code (USC) Section 5332, Nondiscrimination (USC 1994)
- Title 49 of the Code of Federal Regulations (CFR) Part 21, *Nondiscrimination in Federally Assisted Programs of the Department of Transportation—Effectuation of Title VI of the Civil Rights Act of 1964* (CFR 1996d)
- Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (USEO 1994)
- *Environmental Justice Guidance Under the National Environmental Policy Act* (CEQ 1997b)

AR00143137

or low-income households was in the highest 16 percent (greater than one standard deviation) of frequencies across the island. Block groups were then assembled into the O'ahuMPO EJ Areas (O'ahuMPO 2004). These data are presented in Section 4.6.2, Affected Environment.

Coordination with the City and County of Honolulu Department of Transportation Services (DTS) and Department of Planning and Permitting (DPP), the State of Hawai'i Department of Transportation (HDOT), the FTA, and the U.S. Environmental Protection Agency (EPA) resulted in the determination that the O'ahuMPO method for determining O'ahuMPO EJ Areas was appropriate for the Project. Therefore, the definition of EJ populations for this Project includes low-income and minority populations that are within the O'ahuMPO-EJ Areas.

Communities of Concern

In addition to minority and income status, other data were used as additional indicators of communities of concern, including linguistically isolated households, transit-dependent populations, and areas with public housing and community services. The U.S. Census Bureau defines a "linguistically isolated household" as a household in which all members age 14 or over speak English less than "very well." Block groups with 25 percent or more of households with no vehicle or with 21 percent or more linguistically isolated households are included in the areas designated as communities of concern and are illustrated on Figure 4-15. These criteria serve to further identify transit-dependent populations but are not included in the definition of EJ populations. Communities-of-concern data also serve to direct public outreach efforts. In addition to the census data, field surveys, data gathered for other projects within the study corridor, and on-going public involvement activities were used to assist in identification of communities of concern.

4.6.2 Affected Environment

Figure 4-14 shows the areas that have met the O'ahuMPO EJ threshold within the study corridor (one-half-mile from the project alignment). Figure 4-15 shows areas identified as containing communities of concern. As described in Section 4.5, the physical, social, and economic characteristics across and within each neighborhood vary, including the racial, ethnic, and economic composition of the population. The demographics of the neighborhood areas are also described in Section 4.5.

Table 4-9 lists each of the O'ahuMPO EJ Areas illustrated in Figure 4-14, with the demographic data from the 2000 census. It shows there is considerable ethnic and racial diversity along the project alignment.

Because potential impacts to O'ahuMPO EJ Areas could include social and community resources, such as meeting halls, public gathering places, or community resources of special importance to EJ populations, this analysis documented five community resources adjacent to the alignment. Potential impacts to these facilities are discussed in the following section.

Through public involvement activities, an EJ area of concern was identified. The Banana Patch community is not an O'ahuMPO EJ Area but is discussed in Section 4.6.4, Public Outreach.

4.6.3 Environmental Consequences

No Build Alternative

Under the No Build Alternative, the project would not be built and would not have any impacts to O'ahuMPO EJ Areas or populations. Although the projects in the ORTP would be built, their environmental impacts would be studied in separate documents.

AR00143138

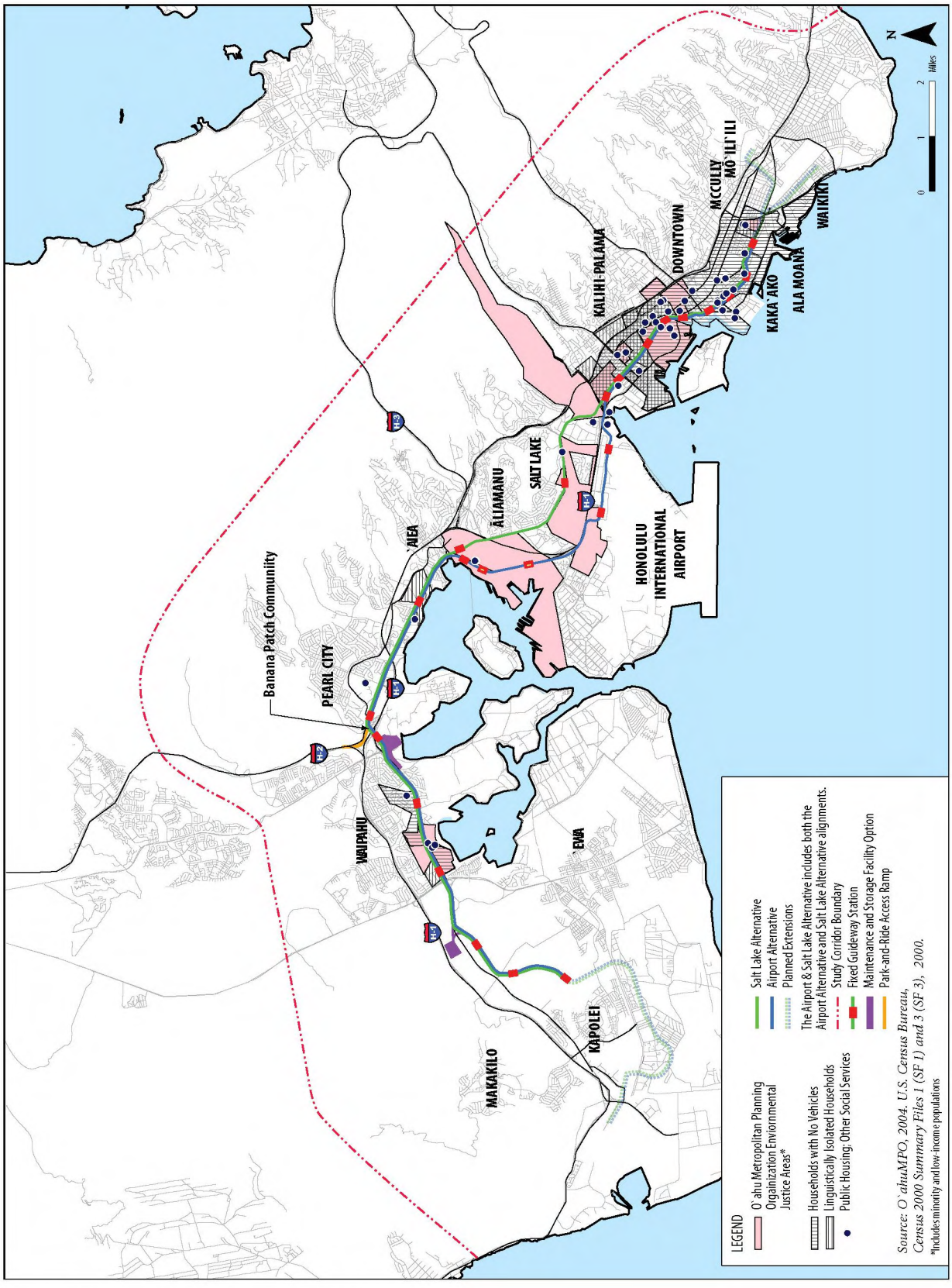


Figure 4-15 Communities of Concern within the Study Corridor

AR00143139

a new advertising campaign will also specifically target EJ populations and communities of concern. Public outreach and coordination with EJ populations and communities of concern have been ongoing throughout the Project. Outreach has included translated flyer materials, presentations to cultural groups (i.e., Japanese and Chinese organizations), distribution of project information to low-income communities, and one-on-one discussions with community members. The Project has been responsive to Neighborhood Boards, providing frequent updates about the Project in O'ahuMPO EJ Areas and communities of concern.

Although the public has been generally supportive of the Project, concerns regarding noise, costs, and visual impacts have been voiced. The majority of these concerns has been identified through scoping comments, Speakers Bureau presentations, Community Updates, Neighborhood Board presentations, and hotline and website comments. Community Updates have been held in or near communities of concern, including at Waipahu Elementary School, Alvah Scott Elementary School, Radford High School, and Farrington High School. Community Updates have been conducted at major project milestones. Presentations have also been given at senior living facilities throughout the study corridor.

Communications with Native Hawaiian groups have also identified potential concerns regarding impacts to burials, native Hawaiian landscapes, and indigenous flora and fauna. In general, Native Hawaiian groups have not expressed major concerns at this time; however, issues may arise once more information about the Project is known. Communications with Hawaiian civic groups, recognized community leaders, and community organizations have increased as project information has become available, and this will continue throughout the process.

Public involvement efforts throughout the Draft EIS public comment period will continue to include close work with EJ populations, elderly, and communities of concern to identify potential concerns and to consider cultural sensitivity throughout the design and construction of the Project. Efforts will be made to identify and coordinate with EJ populations to actively solicit their input.

4.6.5 Banana Patch Community

The Banana Patch or lower Waiawa is located along the border of the Pearl City and Waipahu neighborhoods. It is bounded by Kamehameha Highway mauka, Farrington Highway makai, and the H-1 Freeway 'Ewa. Neither the Pearl City nor the Waipahu neighborhoods were identified as EJ areas using the O'ahuMPO method. However, the Banana Patch area has been identified as an EJ area of concern after outreach to community residents in July 2008 revealed that the predominantly Asian neighborhood would need to be relocated as part of the Project.

The Banana Patch community is in Census Tract 80.01 Block Group 2, Block 2001 and Census Tract 87.01 Block Group 2, Block 2001. According to the 2000 Census, 55 persons who identified themselves as Asian resided in this area. Some of the land in Census Tract 87.01 is used for construction equipment storage, and there are no residences in this portion of the Banana Patch. Approximately 10 residential structures and the Alpha Omega Christian Fellowship Church are within Census Tract 80.01. The census block that encompasses the entire Banana Patch community is 100 percent minority. Because income data are not available at the census block level, income determinations cannot be made.

Parcels within the Banana Patch area often contain multi-generational families living in several dwelling units. In some instances, the structures have been altered to accommodate additions, which is

AR00143140

representative of multi-generational housing and is consistent with the Asian culture. The residents of this area do not have access to public water and sewer services. This community is unique in that it is located in an urban region, but residents are able to maintain an agricultural, subsistence lifestyle. While farming is not the primary source of employment or income for some of these families, it is a part of their household income.
The area was assessed in terms of potential property acquisition and/or displacements of residential and commercial buildings. An analysis of the potential displacements in the Banana Patch neighborhood was based on conceptual design plans for the Project. All of the Build Alternatives would displace residences, including single-family homes, businesses, and one church for the construction of the Pearl Highlands park-and-ride lot that would serve the Pearl Highlands Station. The community is bounded by several major highways and provides the optimal location for the Pearl Highlands park-and-ride lot. Further design refinements are not anticipated to reduce the number of impacts.

Although the alignment requires the above residential displacements, it would result in an overall minimal number of displacements that would result from construction of the Project. Therefore, displacements are not considered a disproportionately high or adverse impact from the alignment. However, impacts to the Banana Patch community suggest a disproportionate effect on community cohesion and isolation in addition to the relocation effects. The displacement of residences could result in adverse changes in social interaction or sense of community, stability, and psychological unity by removing residents from other residents who have resided in the same community for generations. Due to the high cost of living and available land, it is unlikely that residents would be co-located in another area of the city. Ongoing coordination with potentially affected residents would identify the extent of effects to social interactions and community cohesion.

The Project would have a beneficial effect on access to and from the Pearl City and Waipahu neighborhoods and other destinations by supporting the ability to travel using a variety of modes, including transit, motor vehicle, bicycle, and walking.

4.6.6 Mitigation

The identification of a disproportionately high and adverse effect on EJ populations does not preclude a project from moving forward. FHWA's Actions to Address Environmental Justice in Minority Populations and Low-income Populations (USDOT 1998) indicates that a disproportionately high and adverse effect may be carried out under the following conditions:

- "Programs, policies, and activities that will have disproportionately high and adverse effects on minority populations or low-income populations will only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effects are not practicable. In determining whether a mitigation measure or an alternative is 'practicable,' the social, economic (including costs), and environmental effects of avoiding or mitigating the adverse effects will be taken into account.
- Respective programs, policies or activities that have the potential for disproportionately high and adverse effects on populations protected by Title VI (protected populations) will only be carried out if:
  (1) A substantial need for the program, policy, or activity exists, based on the overall public interest; and
  (2) Alternatives that would have less adverse effects on protected populations have either:

AR00143141

(a) adverse social, economic, environmental, or human health impacts that are more severe; or
(b) would involve increased costs of an extraordinary magnitude."

CEQ guidelines state that "mitigation measures identified in an EIS or developed as part of a Finding of No Significant Impact should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable." A range of mitigation measures would be recommended for those O'ahuMPO EJ Areas where disproportionate impacts are anticipated. Mitigation measures for affected O'ahuMPO EJ Areas would be identified through consultation with affected populations and will be consistent with Federal, State, and Local standards.

The Project would not result in disproportionately high and adverse impacts within O'ahuMPO EJ Areas. Therefore, no specific mitigation measures to reduce impacts are warranted.

Mitigation for Banana Patch Community

During the public comment period, a community meeting will be held in the Banana Patch community. All residents will be invited to attend this meeting. The FTA Civil Rights Officer will attend this meeting. This coordination will enable the FTA and RTD to develop mitigation specific to this community.

Mitigation Summary

The Project has and will continue to actively solicit input regarding project alternatives and design. This on-going public outreach effort is described in Section 4.6.4, Public Outreach. EJ populations and communities of concern would receive the same level of mitigation that other population groups along the project alignment would receive. Such measures would include the following: the acquisition of property would comply with all applicable Federal and State laws, including the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, as well as procedures outlined in the project-specific Real Estate Acquisition Management Plan (RTD 2008q). Coordination would occur with O'ahuMPO EJ populations and communities of concern during preparation of the project-specific SSMP and other design-phase plans.

AR00143142

projects in the ORTP would be built, their environmental impacts would be studied in separate documents.

Common to All Build Alternatives

The Build Alternatives would be set in an urban context where visual change is expected and differences in scales of structures are typical. However, some viewer groups may perceive that visual changes associated with the Project are substantial, particularly when considered at a single location. Residents living in high-rise buildings adjacent to the project alignment would experience visual changes as a result of the Project.

Visual simulations of the Build Alternatives were developed for 20 representative viewpoints that would be affected by the Project to illustrate commonly experienced visual effects. The locations of these viewpoints are shown on Figure 4-16. The simulations (Figures 4-17 through 4-36) depict the guideway and other project elements to illustrate the facilities' sizes and positions but do not include detailed design features. For stations, they show a typical prototype without design detail because station configurations and finishes have yet to be developed, and input will be considered from communities surrounding each station through the Draft EIS and design processes.

The fixed guideway and stations would be elevated structures. They would result in noticeable changes to views where project elements would be near existing views or in the foreground of these views. This change would also occur for motorists traveling on the roadways along and under the guideway. The stations would be dominant visual elements in their settings and would noticeably change views. Stations are represented by the visual simulations in Figures 4-23, 4-24, 4-26, and 4-32. Support facilities, such as traction power substations, would also noticeably change existing views. However, most would be located adjacent to roadways where utilities are already part of the view, so the change would not be dramatic or substantial.

There would be additional lighting associated with park-and-ride facilities, stations, maintenance and storage facility, and trains, which include interior and safety lighting for the stations and interior lighting and headlights on the trains. For most of the alignment, light and glare associated with the guideway and trains are not anticipated to have an effect because the guideway would generally be located in existing roadway rights-of-way, which currently produce transportation-related light and glare. Furthermore, the light intensity from trains is expected to be comparable to or less than existing buildings and vehicles along the alignment.

The shadow pattern created by the elevated stations and guideway would change throughout the day and seasonally, depending on the alignment's direction, time of day, and time of year. Shadow impacts along the alignment would vary with orientation, height of the stations and guideway, and the height of surrounding trees and local development.

Viewpoints not located near the alignment would generally be less affected by changes in the visual environment because they would take in a longer, more expansive landscape. Project elements would be noticeable but not dominant features in these views, and visual effects to significant views and vistas would be low to moderate. Passengers on trains would have enhanced views of these areas compared to passengers in vehicles, whose views are often obstructed by buildings, vehicles, and commercial signage. Public views include views along streets and highways, mauka-makai view corridors, panoramic and significant landmark views from public places, views of natural features, heritage resources and other landmarks, and view corridors between significant landmarks (ROH 1978b). The City's General Urban Design Principles and controls state that "[s]uch public

AR00143143

views shall be protected by appropriate building heights, setbacks, design and siting controls" and that "[t]hese controls shall be determined by the particular needs of each view and applied to public streets and to both public and private structures." The guideway and some stations would partially block mauka-makai public views from streets that intersect with the alignment.

RTD will coordinate with the City to identify the particular needs of each view; however, the Build Alternatives would introduce a new linear visual element to the corridor, and changes to some views would be unavoidable. Depending on the degree of view obstruction or blockage, some view changes would be substantial. The viewer's response to this change would vary with exposure and sensitivity and depend on the alignment orientation, guideway and station height, and height of surrounding trees and/or buildings. View changes would be less notable in wider vista or panoramic views where the project elements serve as smaller components of the larger landscape. Generally, the project elements would not be dominant features in these views.

Effects on views within three of the four landscape units would be common to all Build Alternatives. Only effects on views within the Aloha Stadium to Kalihi landscape unit would differ between the Build Alternatives. Significant views and vistas and an assessment of expected changes in visual quality for viewpoints and views along the project alignment are presented below for each landscape unit.

The Project would provide users with expansive views from several portions of the corridor by elevating riders above highway traffic, street trees, and low structures adjacent to the alignment.

East Kapolei to Fort Weaver Road Landscape Unit

The surrounding visual environment consists mostly of scattered residential development and open agricultural land. The area is planned for future development, which would substantially alter the visual environment independent of the Project. The Build Alternatives would change the visual environment in this area, but these changes are expected to occur in a similar time frame as the planned development.

The potential for the guideway and stations to block mauka-makai views and vistas of features and landmarks would vary throughout this landscape unit. Viewpoints that are not close to the alignment would generally be less sensitive to changes in the visual environment because they take in a longer, more expansive landscape. Several mauka views of na pu'u are designated significant views under the 'Ewa Development Plan. Project elements would not likely be dominant features in these views or the following significant protected views and vistas, and visual effects would be low:

- Views of the Wai'anae Mountain Range
- Distant vistas of the shoreline
- Views of Central Honolulu and Diamond Head

The guideway would introduce an elevated linear structure and urban elements (e.g., transit stations, park-and-ride lots, traction power substations, and a possible maintenance and storage facility) to what is currently an open, rural, and country-like setting. The guideway would range from 30 to 45 feet in height. The top of the stations with a mezzanine would be about 15 feet higher than the guideway where it enters the station. The guideway and stations would noticeably contrast with the smaller scale buildings nearby, such as the U.S. Navy housing. They would also contrast with the open, undeveloped character that is predominant in this area. However, these areas are expected to be developed or re-developed and become more urban in character in a similar time frame as the transit improvements. As a result, the contrast would become less noticeable.

Panoramas and distant views of the shoreline, Downtown, and Diamond Head would change to

AR00143144

The Civic Center Station area is currently in transition from scattered one- and two-story businesses to higher-density taller structures. The guideway and columns would block views from the fourth- and fifth-story windows of adjacent offices and residences and create additional shade and shadows. Trains traveling on the guideway would increase light and glare. Mother Waldron Park is Koko Head at Cooke Street. The proposed station would substantially change views and contrast with the scale and character of the surrounding environment. Overall visual effects would be high.

Past Ward Avenue and the Kaka'ako Station, the alignment would transition to Queen Street. Property on the mauka side of Waimanu Street would be acquired to allow the alignment to cross over to Kona Street. No visually sensitive resources are in this area. Kaka'ako Station would be noticeable, but it would blend with the character of nearby big-box stores and smaller industrial use buildings. Visual effects would be moderate.

The guideway would run above Kona Street through Ala Moana Center. Mature trees would be removed from Pi'ikoi Street through the Ala Moana Center Station area, substantially changing the character of the streetscape. With the exception of the mature trees near Pi'ikoi Street, visually sensitive resources would not be affected, and most views of the mountains, Koko Head, and skyline would not be blocked. The Ala Moana Center Station would be at the end of the Project. The station and the guideway would be located between the Ala Moana Center and mid- to high-rise buildings and would not change the view from adjacent offices and residences.

Throughout this landscape unit, the potential would vary for the guideway and stations to block protected mauka-makai views of the following features and landmarks that are identified in policy documents:

- Ko'olau and Wai'anae Mountain Ranges and foothills
- Pacific Ocean, Pearl Harbor's East Loch, Ford Island, Honolulu Harbor, Ke'ehi Lagoon, and Kewalo Basin
- Volcanic craters of Lē'ahi (Diamond Head), Pūowaina (Punchbowl), and Āliamanu
- From Ala Moana Beach Park toward the Ko'olau Mountain Range
- From Kewalo Basin toward Punchbowl and the Ko'olau Mountain Range

Viewpoints that are not close to the alignment would generally be less sensitive to changes in the visual environment because they would take in a longer, more expansive landscape. The project elements would be noticeable, but not dominant, features in these views, and visual effects to significant protected views and vistas would range from moderate to high depending on the viewer's position and location.

The Project would cross, but not block, views along the following protected mauka-to-makai street view corridors:

- Bishop Street—the guideway and columns would be dominant elements in makai views between Nimitz Highway and Queen Street, and views of the horizon would be partially blocked. The bulk and scale of the guideway and columns would be compatible with Nimitz Highway, which functions as a major transportation corridor. Mauka of Queen Street, these elements would likely appear less dominant because the vista would take in a longer view and be more expansive.
- Cooke Street—the guideway and columns would be dominant elements in mauka-makai views, respectively, between Pohukaina Street and Queen Street. Views of the horizon would be partially blocked from viewpoints near the alignment, including mauka views from the park at Halekauwila Street and Cooke Street. The bulk and scale

AR00143145

of the guideway and columns would conflict with the pedestrian-oriented streetscape.

- Ward Avenue—the guideway and columns would be dominant elements in mauka-makai views, respectively, between Auahi Street and Queen Street. Views of the horizon would be partially blocked from viewpoints near the alignment. The bulk and scale of the guideway and columns would conflict with the pedestrian-oriented streetscape. For mauka views from Ala Moana Boulevard and makai views mauka of Queen Street, these elements would likely appear less dominant because the vista would take in a longer view and be more expansive.
- Pi'ikoi Street—the guideway and columns would be dominant elements in mauka-makai views, respectively, between Waimanu Street and Kapi'olani Boulevard. Views of the horizon would be partially blocked from viewpoints near the alignment. Although the bulk and scale of the guideway and columns would conflict with the pedestrian-oriented streetscape, the view includes rows of mature trees, which would reduce this effect.
- Ke'eaumoku Street—the guideway and columns would run along the mauka side of Ala Moana Center and blend with the bulk and scale of its three and four-story buildings. The Koko Head end of the station would also be visible. Mauka views from upper stories of the shopping center would be partially blocked by the guideway. The guideway and columns would be a noticeable change in makai views from Kapi'olani Boulevard.
- Aina Moana Park (Magic Island)— the guideway would be noticeable behind Ala Moana Center in mauka views from Magic Island. However, the contrast in bulk and scale would be low because the overall view is dominated by tall buildings and the parking garage.

Viewpoints 12 through 20 illustrate views of the Project within this landscape unit (Figures 4-28 through 4-36).

Salt Lake Alternative

The Salt Lake Boulevard alignment would leave Kamehameha Highway just 'Ewa of Aloha Stadium, cross the Aloha Stadium parking lot, and continue Koko Head along Salt Lake Boulevard. Aloha Stadium is at a major freeway interchange and is surrounded by parking lots where transportation elements are already part of the view. The contrast in scale and character of the guideway and columns with the existing environment would be low. As the guideway continues Koko Head to the Aloha Stadium Station, the contrast with the makai residential neighborhood at Kalaloa Street would be more noticeable and some mauka views would be obstructed by the station, guideway, and columns. The proposed park-and ride lots nearby are not expected to result in a substantial change because large parking lots are already prevalent. Visual effects in this area are expected to be moderate.

As the guideway crosses over the H-1 Freeway and beyond Maluna Street, it would continue 30 to 40 feet above Salt Lake Boulevard. This area is a mix of one- and two-story residences mauka and taller buildings that comprise industrial parks and schools makai. The bulk and scale of the guideway, columns, and station would contrast with this character. In addition, the guideway, with a height of about 40 feet above the roadway, would be noticeable elements that would obstruct some views across Salt Lake Boulevard. Residents whose homes are adjacent to Salt Lake Boulevard would be the most sensitive to the visual change. However, many of the residences on the hillside above the boulevard have panoramic views where the project elements would serve as smaller components of the larger landscape in a wider vista. Visual effects in this area are expected to be moderate.

AR00143146

Table 4-13 FTA Transit Noise Impact Criteria—Land Use Categories

Category	Metric	Land Use Description
1	Leq(h) (dBA)	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, land uses such as outdoor amphitheaters and concert pavilions, and National Historic Landmarks with substantial outdoor use.
2	Ldn (dBA)	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Leq(h) (dBA)	Institutional land uses with primary daytime and evening use. This category includes schools, libraries, and churches where it is important to consider interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls, fall into this category. It also includes places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

Source: FTA 2006a.

criteria group noise-sensitive land uses into the categories shown in Table 4-13.

The FTA criteria define moderate and severe impacts. The project-generated noise level (project noise exposure) at which an impact would occur depends on the existing noise environment and the category of land use. The noise impact criteria for transit operations are shown on Figure 4-38. Reading from the graph, if the existing noise level in a residential area is 60 dBA Ldn, then a project that generates less than 58 dBA Ldn would not have an effect. If it generates between 58 and 63 dBA Ldn, it would cause a moderate impact, and if it generates more than 63 dBA Ldn, it would cause a severe impact. Future noise exposure is the combination of existing noise exposure and the additional noise exposure caused by a project.

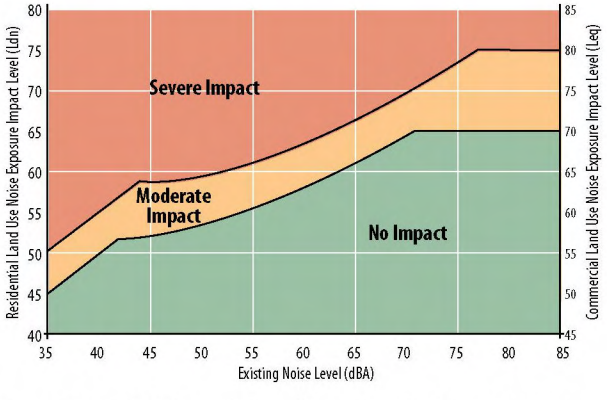


Figure 4-38 FTA Transit Project Noise Exposure Impact Criteria

Severe noise impacts are considered significant within the context of NEPA. Severe noise impacts require the evaluation of alternative locations/alignments to avoid severe impacts altogether. If it is not practical to avoid severe impacts by changing the location of the Project, mitigation measures must be considered and incorporated into the Project unless there are truly extenuating circumstances that prevent it. Moderate noise impacts also require consideration and adoption of mitigation measures when it is reasonable. The mitigation of moderate impacts should consider the predicted increase over existing noise levels, the type and number of noise-sensitive land uses affected, existing outdoor/indoor sound insulation, community views, special protection provided by law, and the cost-effectiveness of mitigating noise to more acceptable levels.

Vibration Criteria for the Project

Vibration effects from transit operations are generated by motions/actions at the wheel/rail interface. The smoothness of these motions/actions are influenced by wheel and rail roughness, transit vehicle suspension, train speed, track construction (including types of fixation and ballast), location of switches and crossovers, and the geologic strata (layers of rock and soil) underlying the track. Vibration from a passing train has the potential

AR00143147

to move through the geologic strata, resulting in vibration transferred through the building foundation. The principal concern is annoyance to building occupants.

Ground-borne vibration is usually characterized in terms of vibration velocity. This is because—over the frequency range relevant to ground-borne vibration (about 1 to 200 hertz)—both human and building response tends to be more proportional to velocity than to displacement or acceleration. Vibration velocity is often reported as vibration decibels (VdB) relative to a reference velocity of 10^{-6} inches/second.

The FTA has developed criteria for acceptable levels of ground-borne vibration (FTA 2006a) as shown in Table 4-14.

Noise and Vibration Assessment Methodology

Project-related noise levels for the Build Alternatives were calculated using FTA reference sound levels for rail transit. Potentially noise-sensitive land uses and vibration-sensitive buildings were identified, as well as appropriate locations for noise monitoring.

Ground-level noise levels were measured at locations along the Build Alternative alignments and near proposed station locations to establish the most sensitive existing environment (i.e., existing baseline noise levels). This is done by performing a series of measurements at representative locations. All noise measurements were made in accordance with American National Standards Institute procedures for community noise measurements.

Noise measurements were taken at 53 noise-sensitive locations along the project corridor. Measurements for 24-hour periods were conducted at 29 sites that include residences and other buildings where people normally sleep (Category 2 sites). These measurement locations were supplemented with short-term 15-minute measurement sites to determine existing noise levels at typical recreational, institutional, and commercial land uses with primarily daytime and evening activity (Category 3 sites). Additional measurements were taken from upper floors of residential buildings with open lanais. Potential noise effects from transit park-and-ride lots and maintenance and storage facility operations were also identified.

Noise effects from the Project were determined by comparing the project-generated noise exposure level at each representative receptor in the corridor to the appropriate FTA criterion, given the land use and existing noise levels. If the project-generated noise would be below the level for moderate impact, no impact would occur. If the noise level would be between the level for moderate impact and severe impact, a moderate impact would

Table 4-14 FTA Ground-borne Vibration Impact Criteria

Land Use Category	Ground-borne Vibration Impact Levels (VdB)	
	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations	65 VdB[3]	65 VdB[3]
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB

Source: FTA2006a.

[1] "Frequent Events" are defined as over 70 vibration events per day.
[2] "Infrequent Events" are defined as less than 70 vibration events per day. This includes most commuter rail systems.
[3] This criterion is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC system and stiffened floors.

AR00143148

occur. If the project noise level would be equal to or above the severe impact level, a severe impact would occur.

Vibration effects from the Build Alternatives were determined using the detailed vibration assessment information and procedures contained in the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment* (FTA 2006b). FTA reference levels for a transit vehicle and FTA reference data on ground transmission of vibration energy were used to estimate vibration levels at distance from the fixed guideway.

4.9.2 Affected Environment

This section describes the noise survey used to establish baseline conditions. Ambient vibration levels were not measured as part of this study.

Ambient Noise Conditions in the Study Area

The measurement locations and existing sound levels are shown in Figures 4-39 through 4-42. These locations represent noise-sensitive land uses along the corridor.

Ambient Vibration Conditions in the Study Area

Ambient vibration levels were not measured as part of this study but are anticipated to be below perceptible levels.

4.9.3 Environmental Consequences and Mitigation

Environmental Consequences

No Build Alternative

Under the No Build Alternative, the Project would not be built and the only source of future noise levels would be traffic movements on local streets and highways. The Project would not generate any new noise impacts.Similarly, no new vibration sources would occur in the absence of the Project. Although the projects in the ORTP would be built, their environmental impacts would be studied in separate documents.

Common to All Build Alternatives

Noise

The Project would include an integrated noise-blocking parapet wall at the edge of the guideway structure that extends 3 feet above the top of rail and a system specification for vehicles with wheel skirts. The parapet wall would substantially reduce ground-level noise. Wheel skirts would increase the benefit of the parapet wall at locations above the elevation of the track. Figures 4-39 through 4-42 show the measured existing noise level and future project noise exposure at each site for each Build Alternative. The data table included in these figures for each site is labeled no impact or moderate impact for each site. Table 4-15 shows the total number of residential buildings that would experience adverse noise effects.

Table 4-15 Number of Residential Buildings, Parks, and Schools with Noise Impacts

Alternative (2030)	Moderate Impacts	Severe Impacts
Salt Lake	23	0
Airport	18	0
Airport & Salt Lake	18	0

The Project would cause no severe noise impacts. Moderate impacts would occur at between five and seven areas, depending on the alternative (Table 4-16). The lowest number of noise impacts experienced at sensitive receptors would occur under the Airport Alternative because the guideway would travel near fewer sensitive receptors. Noise levels in the Salt Lake neighborhood would be lower with the Airport & Salt Lake Alternative than with the Salt Lake Alternative because only half as many trains would travel on the Salt Lake alignment under that alternative.

The greatest noise source from the traction power substations would be air-conditioning equipment, which would not generate substantial noise impacts. Project park-and-ride lots would be located

AR00143149

Table 4-16 Noise Impacts Common to All Build Alternatives

Area	Receptor Description	Buildings Affected	Level of Impact
Common to All Build Alternatives			
West Loch to Waipahu Transit Center	94-340 Pupumomi Street	1 9-floor building	Moderate impact to 5th floor and above
Pearl Highlands	1060 Kamehameha Highway	1 46-floor building	Moderate impact to 2nd through 5th floors
Pearlridge to Aloha Stadium	Kamehameha Highway at Kauhale Street	14 single-family residences	Moderate impact at ground level
Civic Center to Kaka`ako	860 Halekauwila	1 30-floor building	Moderate impact to 6th floor and above
Kaka`ako to Ala Moana Center	1133 Waimanu	1 28-floor building	Moderate impact to 7th through 9th floors
Salt Lake Alternative			
Ala Liliko`i	3215 Ala `Ilima Boulevard	1 12-floor building	Moderate impact above 9th floor
Ala Liliko`i to Middle Street Transit Center	2889 Ala `Ilima Boulevard	4 10- to 20-floor buildings	Moderate impact above 9th floor

in undeveloped or commercial areas. The nearest distance from a park-and-ride lot to a residential use would be more than 1,000 feet to the center of the park-and-ride site at the Pearl Highlands park-and-ride lot.

Noise sources at the maintenance and storage facility would include trains operating and switching within the facility and maintenance and cleaning activities. These activities would occur over a 24-hour period. There are no noise-sensitive uses near the Ho'opili maintenance site option. Leeward Community College and Waipahu High School are both approximately 700 feet from the center of the Leeward Community College site. At this distance, the maintenance activities would not generate substantial noise impacts.

Vibration

Vibration levels at adjacent properties would not exceed 65 VdB for the elevated rail transit. This level is less than the FTA criterion of 72 VdB for residential buildings and other structures where people normally sleep (Category 2). No land use along the alignment is identified as having vibration-sensitive equipment that would require the use of lower vibration impact criteria; therefore, no vibration effects are anticipated.

Mitigation Common to All Build Alternatives

Noise

Two sites would experience moderate noise impacts. No feasible and reasonable mitigation is available to eliminate the moderate impact at Kauhale Street.

In areas with high-rise apartments and hotels that have lanais above the elevation of and facing the rail, the parapet wall would have a limited benefit (less than a 3-dBA noise reduction) at floors above the level of the guideway. Wheel skirts, which would be used on the vehicles, would reduce noise levels at floors above the guideway. The moderate noise impact that would occur at the high-rise buildings indentified in Table 4-16 would only be experienced from units above track level. Measures to reduce noise levels above the track elevation, such as sound-absorptive materials in the track area, would be evaluated during preliminary engineering of the Project.

Vibration

Because no vibration effects are projected for the Build Alternatives, no mitigation is proposed.

AR00143150

4.10 Energy and Electric and Magnetic Fields

This section describes the energy required for operating the Project and analyzes electric and magnetic fields (EMFs) as related to the Project's operation. Energy used during the Project's operation would include fuel consumed by buses, electricity used to power transit vehicles, and a negligible amount of energy for signals, lighting, and maintenance. For more information and references, see the *Honolulu High-Capacity Transit Corridor Project Electric and Magnetic Fields Technical Report* (RTD 2008h).

EMFs are a result of the voltage or electric potential of an object. For this Project, the high-capacity transit system would be powered by electricity from a third line located next to the rail tracks. Whenever an electrical current flows, it creates a magnetic field. An analysis of EMFs is included in this Draft EIS because of public concern about potential health effects and effects on equipment and machines adjacent to the corridor that may be sensitive to EMFs.

4.10.1 Background and Methodology

Energy

The analysis of operational energy consumption on O'ahu was based on the transportation analysis prepared for the Project. Changes in overall transportation energy use for vehicles traveling on O'ahu were assessed using daily VMT and speed values calculated from the transportation demand forecasting model.

The energy consumed by electrically powered transit operations for the high-capacity transit system was also considered. Fixed guideway high-capacity transit systems require energy for propulsion and to account for energy lost during transmission from the energy-generation site to the transit vehicles. The average energy consumption for a rail transit vehicle in the U.S. is 62,700 British thermal units (BTUs) per vehicle-mile of service (USDOE 2007).

Electric and Magnetic Fields

EMFs are produced wherever wires distribute electric power and wherever electrical equipment is used. EMFs decrease with the square of distance away from operating equipment or away from current-carrying electric lines. Sensitive equipment that may be affected by changes to the Earth's geomagnetic field caused by operation of the Project may be located at research, manufacturing, medical, and possibly military facilities. Available data on high-voltage power lines, medical and diagnostic facilities, institutional and research facilities, and military operations were assembled. This information was confirmed through field reconnaissance to verify site locations and identify equipment that may be sensitive to the influence of EMFs associated with the Project.

4.10.2 Affected Environment

Energy

In 2006, 291 million gallons of gasoline were consumed on the Island of O'ahu. Gasoline represents the largest segment of transportation energy consumption, closely followed by aviation fuel, then by diesel.

Transportation modeling results for 2007 show approximately 11.5 million daily VMT on O'ahu. This results in a daily consumption of approximately 666,000 gallons of fuel with an energy content of 85,600 million BTUs (MBTUs).

Electric and Magnetic Fields

Twenty locations were found during a field survey that are within 200 feet of the centerline of the Build Alternatives and which could have sensitive electronic equipment that could be affected by operation of the Project. The facility managers were contacted, and all but one facility was eliminated (Table 4-17). Honolulu Community College has

AR00143151

Table 4-17 Location of Potential EMF Receptors within 200 Feet of Project Alternatives

Address	Building Name	Equipment
Institutional—University/Research		
874 Dillingham Boulevard	Honolulu Community College	Electron microscope

an electron microscope that is between 200 and 250 feet from the alignment.

4.10.3 Environmental Consequences and Mitigation

Environmental Consequences

Energy

No Build Alternative

Transportation energy consumption for the No Build Alternative would include motor vehicle fuel consumption islandwide. This is estimated to be 94,610 MBTUs in 2030 (Table 4-18).

Common to All Build Alternatives

For all of the Build Alternatives, the total transportation energy demand for transit and highway vehicles would be lower than for the No Build Alternative. Table 4-18 summarizes the anticipated average daily transportation demand in 2030 for each of the alternatives. All Build Alternatives are anticipated to reduce daily transportation energy demand by approximately 2 percent compared to the No Build Alternative.

The Project would consume approximately 1 to 2 percent of the total projected electricity generated on O'ahu in 2030. The planned electricity generation capacity on O'ahu would be sufficient to support the transit system, but the electricity distribution system would require various upgrades to support the system (HECO 2008).

Integration of photo-voltaic cells into stations and other project features could reduce net project electricity demand.

Electric and Magnetic Fields

No Build Alternative

There would be no features generating EMFs.

Common to All Build Alternatives

The magnetic-field disturbance generated by operation of the Project would be low-frequency (0 to 10 hertz) and would occur at intervals determined by passing trains. EMFs produced by the Project would be of such low magnitude that the only potential effects would be to highly sensitive instruments that may be in use within facilities adjacent to the right-of-way. The electron microscope at Honolulu Community College is unlikely to be affected by the Project; however, this will be confirmed during preliminary engineering. A review of the state of the science regarding health effects associated with EMFs found no new evidence linking these fields to biological issues given the levels and frequencies expected to be present near the Project.

EMFs would not result in adverse health effects.

Because no negative health effects or effects on equipment related to EMFs are anticipated, mitigation would not be needed.

AR00143152

Examples of sites ranked "2" include the following:

- Sites adjacent to the Project that have been remediated (e.g., Pacific Machinery in Waipahu)
- Sites with large releases that are somewhat distant or downgradient from the Project (e.g., BHP Gas Company in Iwilei)
- Sites with institutional controls (e.g., where excavation is restricted due to the presence of contaminants) that are near the Project (e.g., Chuei Shokoh in Kakaʻako, a former dry cleaner)
- Sites observed to have limited hazardous materials issues (e.g., improper waste storage at Hi-Pace Racing in Kakaʻako)

The ground beneath any portion of the Project could be contaminated, most likely by petroleum products. Contamination is most likely to be present in the historically more industrial neighborhoods and near individual sites ranked "1" or "2." In addition, the geology and hydrogeology of the Airport Industrial Area, Māpunapuna, Kapālama-Iwilei, and Kakaʻako areas make them particularly likely to harbor residual pollutants. In these areas there would be a greater likelihood that spilled chemicals would remain in the area and not readily migrate or degrade. Therefore, soil and groundwater in these neighborhoods is frequently found to be degraded by petroleum and other contaminants. The potential for contamination has been confirmed by other projects in the industrial areas.

The Navy Drum site, inactive since the early 1970s, is a potential location for the fixed guideway maintenance and storage facility near Leeward Community College. In 1971, vandals started a fuel pump, which resulted in the release of motor gasoline to the ground surface. A remedial investigation was completed at the Navy Drum property by the Department of Navy in 2000 (Navy 2000). The investigation concluded that contaminants from the property have not and would not migrate to the deep freshwater aquifer or the artesian well water supply for the watercress ponds. There are no adverse human health or ecological effects that have, or will, result from the 1971 motor gasoline release. The Department of Health & Human Services reviewed the study and concurred with the findings (DHHS 2005).

4.11.3 Environmental Consequences and Mitigation

Environmental Consequences

No Build Alternative

Under the No Build Alternative, the Project would not be built, and there would be no impacts associated with hazardous materials. The projects defined in the ORTP would be built, and environmental impacts associated with those projects would be studied in separate documents.

Table 4-19 Summary of Sites of Concern that Could Be Polluted near the Project

Alternative	Number of Sites Ranked 1 Based on Database Records	Number of Sites Ranked 2 Based on Database Records	Number of Additional Sites Ranked 1 Based on Field Reconnaissance	Number of Additional Sites Ranked 2 Based on Field Reconnaissance	Total Number of Sites Ranked 1	Total Number of Sites Ranked 2
Salt Lake	22	16	0	9	22	25
Airport	26	14	1	8	27	22
Airport & Salt Lake	22	16	0	9	22	25

AR00143153

- Ensuring public access to beaches, recreation areas, and natural reserves

Groundwater

The EPA has designated the Southern O'ahu Basal Aquifer as the sole or principal source of drinking water for southern O'ahu. The 1984 Sole Source Aquifer Memorandum of Understanding between the EPA and the USDOT requires projects potentially impacting a sole-source aquifer to coordinate with the EPA to evaluate potential impacts.

Floodplains

Protection of floodplains is required by Presidential Executive Order 11988 (USEO 1977); USDOT Order 5650.2 (USDOT 1979); the Federal Aid Highway Program Manual (FHWA 1992b); and 23 CFR 650 (CFR 1999). These regulations place special importance on floodplains and require Federal agencies to avoid conducting, allowing, or supporting actions on a floodplain. If a project is located within a floodplain, a sufficient analysis must be included in the project's Final EIS, as specified in USDOT Order 5650.2.

Existing floodways and floodplain limits within the study corridor have been identified using Federal Emergency Management Agency Flood Insurance Rate Maps and other existing data. The State National Flood Insurance Program staff has also been consulted.

As piers for the Project are located and designed, the proposed structures' potential effects on floodplains would be evaluated by conducting hydraulic studies at these specific locations.

Wetlands

Several Federal and State agencies are authorized to regulate wetlands through the CWA and Section 10 of the Rivers and Harbors Act of 1899 (USC 1899), as well as associated State rules for water quality standards. The Army Corps of Engineers makes a Jurisdictional Determination for wetlands in the project area. Under Section 404 of the CWA, the discharge of dredge or fill material into "waters of the U.S." and adjacent wetlands, as defined by 33 CFR 328, automatically triggers the need for a permit from the Corps of Engineers. This is called a "Department of the Army permit." Under Section 401 of the CWA, the need for a Department of the Army permit triggers the need for a Section 401 Water Quality Certification from the Clean Water Branch of the Hawai'i Department of Health.

The criteria used in evaluating Section 404 filling activities have been promulgated by the EPA in 40 CFR 230, also known as the "404(b)(1) Guidelines." To demonstrate compliance with these guidelines, applicants for Section 404 permits must conduct an alternatives analysis to determine that there are no practicable alternatives to placing fill in wetlands.

If mitigation is required for fill placed in wetlands, the Project must comply with *Compensatory Mitigation for Losses of Aquatic Resources Final Rule.*

Methodology

Field investigations for wetlands were conducted along the project alignment in December 2007 and January 2008 to identify areas with wetland characteristics, including the presence of water (hydrology), hydrophytic vegetation, and hydric soils. Functions and values (e.g., waterbird habitat, stormwater storage, and riverine watercourses) were qualitatively assessed for any wetlands that the Project could affect.

4.13.2 Affected Environment

Surface and Marine Waters

Streams

Streams within the study corridor are listed in Table 4-25 and illustrated in Figures 4-44 and 4-45. Most of these stream channels have been altered in their lower reaches and are not of high ecological quality. The overall water quality in these urban streams is poor, and many are included on Hawai'i

AR00143154

levels, convey stormwater toward the ocean, and help moderate floods when they occur. These areas also support plants and wildlife within urbanized areas, while maintaining areas for outdoor recreation and enjoyment and preserving the land's natural beauty. The floodplains and their associated waters, functions, and zones are listed in Table 4-27.

Wetlands

Wetlands near the project alignment are associated with riverine, tidal, and spring water systems. Wetland areas are listed in Table 4-28 and illustrated in Figures 4-44 and 4-45. Land development has altered or destroyed most of these wetlands, leaving only a few remnants today.

Table 4-28 Water Resource Systems

Associated Water Resource	Channel	Potential Wetlands Classification	Functions/Values
Honouliuli Stream at Fort Weaver Road	Concrete culvert	Riverine	Drainage
Hō`ae`ae Stream at Farrington Highway	Concrete channel	Riverine	Drainage
Waikele Stream at Farrington Highway	Concrete channel	Riverine	Drainage
Kapakahi Stream at Farrington Highway	Natural drainage	Riverine	Drainage
Makalena Stream at Farrington Highway	Concrete channel	Riverine	Drainage
Waiawa Stream at Farrington Highway	Natural drainage	Riverine	Drainage
Waiau Stream at Kamehameha Highway	Natural drainage	Riverine	Drainage
Waiau Spring at Kamehameha Highway (mauka of HECO power plant)[1]	Natural drainage	Palustrine	Agricultural, water storage, water purification, wildlife habitat/aesthetic, cultural
Waimalu Stream at Kamehameha Highway	Natural/concrete drainage	Riverine	Drainage
Sumida Watercress Farm (Kalauao Spring) at Kamehameha Highway[2]		Wet agricultural field	Agricultural, water storage, water purification, wildlife habitat/waterbird watching, cultural
Kalauao Stream at Kamehameha Highway	Natural drainage	Riverine	Drainage
`Aiea Stream at Kamehameha Highway	Natural drainage	Riverine	Drainage
Hālawa Stream at Salt Lake Boulevard	Concrete channel	Riverine	Drainage
Hālawa Stream at Kamehameha Highway	Concrete channel	Riverine	Drainage
Drainage Ditch parallel to Aolele Street	Concrete drainage	Man-made channel	Localized drainage sump
Moanalua Stream at Nimitz Highway	Natural drainage	Riverine	Drainage/fishing, recreation
Kalihi Stream at Dillingham Boulevard	Natural drainage	Riverine	Drainage
Kapālama Canal at Dillingham Boulevard	Concrete channel	Riverine	Drainage

[1] The proposed guideway will be adjacent to Waiau Spring for a distance of approximately 300 feet. There is an approximately 15- to 20-foot upland buffer from the mauka edge of the highway. The adjacent area surrounding the wetland is developed with residential housing.

[2] The Sumida Watercress Farm is hydrologically linked to the Kalauao Spring approximately 900 feet to the north of the highway. The Project will be adjacent to this watercress farm for a distance of approximately 530 feet.

AR00143155

Groundwater

The Project would meet the coordination requirements of Section 1424(e) of the Safe Drinking Water Act, in accordance with the 1984 Sole Source Aquifer Memorandum of Understanding between the EPA and the FHWA. A Water Quality Impact Assessment for EPA is underway. It is anticipated that contamination of the Southern O'ahu Basal Aquifer would not occur, based on the construction methods that would be employed and the presence of an upward hydraulic gradient in the study corridor. Therefore, there would be no adverse effect to groundwater quality.

The Build Alternatives would increase impermeable surfaces and redirect runoff. By installing permanent BMPs, runoff would be directed back into the ground to recharge the groundwater system, resulting in no change in the amount of infiltration. In this way, although runoff from surrounding surfaces may enter the groundwater system along a different path than previous, the groundwater recharge needed to sustain the aquifer system would continue. Therefore, the Project would not result in any long-term changes to groundwater levels, including artesian conditions. Runoff from the guideway itself is expected to be relatively free of pollutants and would not threaten groundwater quality.

Floodplains

As a linear feature, the guideway would cross several floodplains. However, the Build Alternatives would not cause significant floodplain encroachment as defined by USDOT Order 5650.2. The guideway and stations would be elevated above the floodplain by piers, but some facilities, such as stairs, elevators, and traction power substations, would have to be built at ground level. These features could be affected by flooding if and where they are placed within a floodplain.

The fixed guideway would provide a safe alternative to surface transportation during storms. No likely future damage associated with floodplain encroachment is anticipated that could be substantial in cost or extent. The guideway would be elevated and could continue to run even if flooding occurred on the ground below.

There would be no notable adverse impacts on natural and beneficial floodplain values. In general, the only beneficial functions for the floodplains analyzed in the study corridor are the recharge of groundwater and drainage conveyance. None of the Build Alternatives would affect these functions.

Wetlands

Most of the guideway, stations, and transit facilities are planned within existing roadway corridors and in non-wetland areas. Therefore, no direct impacts to wetlands are expected for any of the Build Alternatives.

One major spring-fed wetland system in Kalauao is adjacent to a segment of the Project and is currently used by the Sumida Watercress Farm. Placement of the guideway structure within the median of Kamehameha Highway would not directly impact these wetlands, but shadows cast by the elevated structure may slightly affect water temperatures and affect watercress growth. These consequences are anticipated to be very slight to non-existent, based on the proposed guideway's distance from open water and watercress farming areas. Shade would only reach open water and watercress in the late afternoon. No direct impact to either of the springs and associated wetlands is anticipated.

A letter has been sent to the Army Corps of Engineers asking for their Jurisdictional Determination concurring that the Project will not have a direct impact on wetlands.

AR00143156

plans so that new plantings would provide similar advantages to the community. If new plantings would not offer equitable mitigation (e.g., older mature trees that are removed), additional younger trees could be planted that would, in time, develop similar benefits.

4.15 Archaeological, Cultural, and Historic Resources

This section provides the regulatory context that governs archaeological and cultural resources, as well as historic structures. It also discusses how the Project would affect resources and structures within the Area of Potential Effect (APE) and proposed mitigation to address those effects. For more information and references, see the *Honolulu High-Capacity Transit Corridor Project Archaeological Resources Technical Report* (RTD 2008n), the *Honolulu High-Capacity Transit Corridor Project Cultural Resources Technical Report* (RTD 2008p), and the *Honolulu High-Capacity Transit Corridor Project Historic Resources Technical Report* (RTD 2008o).

The Area of Potential Effect (APE) is the geographical area or areas within which an undertaking may directly or indirectly change the character or use of historic properties .

4.15.1 Background and Methodology

Regulations

The Project must comply with Federal and State archaeological, cultural, and historic preservation laws and regulations.

Federal

The Project is subject to compliance with the National Historic Preservation Act (NHPA) of 1966, as amended (USC 1966). According to Section 106 of the NHPA, the responsible Federal agency is required to consider the effect of a project on cultural resources (consisting of archaeological, historic, and architectural properties) included or eligible for inclusion on the National Register of Historic Places (NRHP). The lead Federal agency, in consultation with the State Historic Preservation Division (SHPD), is responsible for the determination of eligibility for listing on the NRHP and for the finding of effect. The Federal Advisory Council on Historic Preservation (ACHP) is given the opportunity to comment on the Project and its effects on cultural resources and participate in development of the Memorandum of Agreement (MOA).

Cultural resources include prehistoric and historic districts, sites, buildings, structures, and objects that represent past human activities. This term includes artifacts, features, and remains that are related to and located within such properties, as well as properties of traditional religious and cultural importance that meet the significance criteria described in this section. This section defines archeological, cultural, and historic resources separately, although each of them are called "historic properties" when they are determined eligible for the NRHP.

Section 4(f) of the U.S. Department of Transportation Act of 1966 also applies to historic properties and is addressed separately in Chapter 5.

State

HRS 343 also includes a cultural component: House Bill No. 2895 H.D.1, passed by the 20th Legislature and approved by the Governor on April 26, 2000, as Act 50. This act amends the EIS law and expands the definition of "significant effect" to include adverse effects on cultural practices.

HRS 6E preserves significant historical sites of value to the people of Hawai'i. HRS 6E-43 and HAR 13-300 establish provisions pertaining to the discovery of historic burial sites outside of

AR00143157

established, maintained cemeteries on non-Federal lands within the State.

Under NHPA, Section 106 requires Federal agencies to consider the effects of their actions on historic properties. This includes traditional cultural properties, which are beliefs, customs, and practices of a living community of people that have been passed down through the generations. Hawai'i's historic preservation review legislation [HAR 13-275(b)] includes similar requirements. The following steps describe the consultation process:

- Initiate consultation and public involvement
- Identify the APE
- Identify and evaluate the NRHP eligibility of resources within the APE
- Assess effects on historic properties currently listed or eligible for listing on the NRHP
- Involve the SHPD consulting parties regarding adverse effects on historic properties resulting in an MOA
- Submit the MOA to the Advisory Council on Historic Preservation
- Implement provisions of the MOA

Area of Potential Effect

After coordination with SHPD, the FTA defined the APE for aboveground cultural and historic resources to be generally one parcel deep from the project alignment but larger around stations and in a few other locations. The APE also includes parcels immediately adjacent to all facilities associated with the fixed guideway system, such as park-and-ride lots, traction power substations, and the maintenance and storage facility. The APE around transit stations has been defined to include entire blocks (or to extend 500 feet where blocks are not discernible) around the facilities. A copy of correspondence from SHPD dated February 4, 2008, concurring with the APE is located in Appendix D of this Draft EIS.

The Project's APE for below-ground archaeological resources is defined as all areas of direct ground disturbance. Confining the archaeological resources' APE to the limits of ground disturbance is warranted because the surrounding built environment is largely developed and becomes progressively more urban as the Project progresses Koko Head.

Methodology

NRHP criteria defined in 36 CFR 60.4 were applied to evaluate pre-1969 properties in the APE, which would be 50 years or older at completion of the Project. These regulations state that "the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association." These properties must also meet one or more of the following broad cultural/historic Significance Criteria (NPS 1991; 36 CFR 60.4):

- Criterion A—resource is associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B—resource is associated with the lives of persons significant in our past.
- Criterion C—resource embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D—resource has yielded or may be likely to yield information important in prehistory or history.

In its review of technical reports prepared for the Project, SHPD did not have any questions or comments regarding the methodology used to determine historic significance. Appendix D of this Draft EIS includes a letter from SHPD dated September 26, 2008, that includes its review

AR00143158

comments on the Historic Resources Technical Report (RTD 2008o).

Archaeological Resources

The vast majority of archaeological resources within the study area have been previously identified, investigated, and recorded as a result of cultural resource management work conducted since the 1970s. This work has supported the historic preservation and/or environmental compliance efforts of various private-, Municipal-, State-, and Federal-funded projects and undertakings.

To evaluate below-ground effects on archaeological resources within the study corridor, the corridor was divided into 10 different sub-areas. A qualitative rating system describing potential archaeological impacts was developed and applied to each sub-area. This rating system considered existing archaeological documentation, geological and depositional characteristics, and some field inspection within the study corridor. The 10 sub-areas are rated Low, Moderate, or High as defined below:

- A *Low* rating indicates potential effects are possible but not considered likely, or that there is a reasonable expectation of potential effects in no more than 10 percent of a given sub-area.
- A *Moderate* rating indicates a reasonable potential for effects on between 10 and 50 percent of a given sub-area.
- A *High* rating indicates a reasonable expectation of potential effects on more than 50 percent of a given sub-area.

A High rating does not mean that at least 50 percent of a sub-area is expected to encounter archaeological deposits. Rather, this rating only means that there is a reasonable potential to encounter archaeological deposits within at least 50 percent of the sub-area. The actual percentage of the sub-area where archaeological resources are encountered would undoubtedly be smaller.

Similarly, the rating system says nothing regarding the NRHP eligibility of potential archaeological resources. That evaluation and consultation will be deferred until an alignment is selected and design is further along. The Archaeological Resources Technical Report (RTD 2008n) describes the methodology and consultation process in detail.

The primary goal of the Project's archaeological effort would be to provide additional background research and limited field investigation results for those areas that would be disturbed by the Project, as well as cultural consultation to support development of the archaeological portions of the Project's MOA. The MOA would describe the archaeological historic property and resource identification and evaluation effort, as well as the mitigation procedures for identified archaeological resources. Mitigation would be conducted in advance of, and in some cases during, the construction phases in the Project's different geographic areas.

Cultural Resources

Cultural resources are sites or places associated with significant events and/or people important to the native Hawaiian patterns of prehistory in the project area. These resources also include sites or places that embody distinctive characteristics or that are likely to yield information important for research on the prehistory of Hawai'i. Sites that yield resources important for past and present native Hawaiian cultural practices and items that are part of a cultural place-based context are also included.

The analysis of cultural resources was based on compliance requirements for NEPA (USC 1969); Section 106 (USC 1966a), and Act 50 (HHB 2000). The purpose of an Act 50 Cultural Impact Assessment is to: (1) gather information about traditional cultural practices, ethnic cultural practices, urban cultural practices, and pre-historic and historic cultural resources and practices that may

AR00143159

be affected by implementation of a development project; (2) analyze the data; (3) produce an impact assessment; and (4) provide mitigation measures and suggestions.

The Act 50 information-gathering process included: (1) identifying individuals and groups with expertise about cultural resources, practices, and beliefs within the transit and station corridor; (2) conducting field surveys (e.g., canvassing or conducting ethnographic pedestrian surveys) in selected areas of the corridor; (3) conducting semi-focused interviews of cultural experts or other individuals familiar with details of cultural practices that would be adversely affected; (4) making site visits; and (5) reviewing pertinent archival documents. In addition to the NHPA criteria A-D, Act 50 adds criteria that have traditional cultural significance to an ethnic group, including religious structures and/or burials.

Historic Resources

Known and potential historic resources were identified and evaluated, and the Project's effects on them were determined. GIS data were compiled and used to identify resources to survey. Properties within the APE were identified as those with construction dates before 1969. Field observations were made and photographs were taken of these properties.

Section 106 Consultation

Extensive effort was made to contact, identify, and consult with various cultural and ethnic groups to identify traditional cultural properties and practices during the Alternatives Analysis process. The information gathered at that time provided a starting-point for work to support this Draft EIS.

The purpose of consultation was to identify cultural resources and other issues relating to the Project's potential effects on cultural resources. Information was obtained from individuals and organizations likely to have knowledge of potential resources in the project study area. A reasonable and good faith effort must be made to identify Native Hawaiian organizations that might attach religious and cultural significance to historic properties in the APE, and they must be given an adequate opportunity to express their views.

In addition to consultation with SHPD, Section 106 consultation letters were sent to Native Hawaiian historic and cultural preservation organizations to request the identification of any cultural concerns that may require attention. The letters initiated an ongoing consultation process with the following groups (Section 106 consulting parties) to identify resources, consider project effects, and develop mitigation to limit the adverse effects of the Project.

- Advisory Council on Historic Preservation
- National Trust for Historic Preservation
- Historic Hawai'i Foundation
- University of Hawai'i Historic Preservation Certificate Program
- American Institute of Architects
- Hawai'i Thousand Friends
- Hawai'i Community Development Authority (for Kaka'ako)
- U.S. Navy, Naval Facilities Engineering Command, Hawai'i
- Office of Hawaiian Affairs
- O'ahu Island Burial Council
- Hui Malama I Na Kupuna O Hawai'i Nei (Group Caring for the Ancestors of Hawai'i)
- Royal Order of Kamehameha
- The Ahahui Ka'ahumanu (civic club formed in 1864 to celebrate the life of Queen Ka'ahumanu)
- The Hale O Na Ali'i O Hawai'i
- The Daughters and Sons of the Hawaiian Warriors
- Association of Hawaiian Civic Clubs—and 15 individual clubs

For a copy of the letters, see Appendix D.

AR00143160

4.15.2 Affected Environment

Archaeological Resources in the APE

Archaeological resources already documented within the study area include remnants of fishponds, human burials, subsurface cultural layers related to traditional Native Hawaiian occupation, historic building and structure foundations, and historic trash pits and privies.

Three general categories of archaeological resources that could be affected are identified: burials, pre-contact archaeology, and post-contact archaeology. They are shown by area and rated by probability of occurrence in Figure 4-50 (see Archaeological Resources under Methodology in Section 4.15.1, Background and Methodoloy).

Cultural Resources in the APE

Because of the level of existing development along the study corridor, many cultural resources have been destroyed or altered beyond repair. The Cultural Resources Technical Report (RTD 2008p) lists cultural resources identified within the Project's APE.

Historic Resources in the APE

The APE contains 86 historic resources (individual or districts). The Historic Resources Technical Report (RTD 2008o) lists all historic resources identified within the Project's APE. SHPD completed determination of eligibility for historic structures on October 3, 2008. A copy of the determination letter is included in Appendix D of this Draft EIS.

4.15.3 Environmental Consequences and Mitigation

Environmental Consequences

No Build Alternative

Under the No Build Alternative, the Project would not be built, and there would be no impacts associated with archaeological, cultural, or historic resources. The projects defined in the ORTP would be built, and environmental impacts associated with those projects would be studied in separate documents.

Archaeological Resources

Subsurface features and deposits that have not been previously identified may be affected by the Project. Native Hawaiian testimonies in Land Commission Award claims indicate that there are documented burials within the study corridor. These effects would occur during construction (see Section 4.16 for more information). After completion of construction, no additional project-related effects on archaeological resources are expected.

Cultural Resources

Potential long-term effects on cultural resources include permanent modification (e.g., moving, damage, or destruction). The permanent destruction of sub-surface cultural resources, including filled fishponds, filled/covered terraces, enclosures, shrines, and 'auwai (irrigation ditch system), is another potential long-term effect. Table 4-30 summarizes the number of resources possibly affected by each Build Alternative.

Table 4-30 Summary of Effects on Cultural and Historic Resources

Alternative	Cultural Resources Affected	Adverse Effects to Historic Properties
Salt Lake	7	7
Airport	7	7
Airport & Salt Lake	7	7

Any surviving cultural resources that are uncovered would be assessed through collaborative consultation with appropriate cultural practitioners and/or community groups. Table 4-31 lists resources along the alignment APE and within the APE that would be affected.

Historic Resources

Full and partial takes would occur from parcels that contain historic resources. The Project would

AR00143161

Table 4-31 Potential Long-term Adverse Effects on Cultural Resources Related to Act 50

Resource	Type	Effect
Waiawa Stream	Resource (water)	Route crosses in two places. May adversely affect access to stream and resources within stream.
Dee Lite Bakery	Practice	Displacement
Aku Bone Lounge & Grill	Practice	Displacement
Hawai`i International Child	Practice	Displacement
Makana Esthetics Wellness Academy	Practice	Displacement
Tio Restaurant	Practice	Displacement
Rock-n-Roll Sushi	Practice	Displacement

These resources are identified as having potentially adverse long-term impacts. Under Act 50, these types of impacts are called "significant effects" (HHB 2000).

change the visual setting surrounding several identified resources. The Project could affect up to 86 resources (Figure 4-51 and Table 4-32).

Eighty-six individual resources or districts within the APE already determined to be on the NRHP or eligible for inclusion on the NRHP would experience possible "diminishment of integrity of setting, feeling, and/or association" from one or more of the alternatives (Table 4-30). These resources are listed in Table 4-32. The majority of these resources would experience effects on setting. All Build Alternatives would cross through the Chinatown National Historic Landmark but would not directly affect any of the contributing resources.

Of the seven resources that would be adversely affected by all Build Alternatives, one is a grouping of street trees that would require removal and the remainder are historic properties where right-of-way needs would demolish buildings or create a significant parcel acquisition. For the Airport Alternative and the Airport & Salt Lake Alternative, a small amount of right-of-way would also be required from the Pearl Harbor National Historic Landmark, but none of the contributing resources would be directly affected.

The SHPD has reviewed the preliminary determination of effect presented in this Draft EIS. The division has not yet completed concurrence on determinations of adverse effects and has enquired about indirect effects to several resources and the magnitude of effect to the Chinatown Historic District. Consultation is ongoing related to the effects of the Project and commitment of mitigation to reduce those effects to historic resources.

An adverse effect is found when an undertaking may alter any of the characteristics that qualify an historic property for inclusion on the National Register (36 CFR 800.5(a)(1)).

Mitigation

To comply with NHPA Section 106, consultation with Hawai'i SHPD regarding NRHP eligibility and effects resulting from a proposed undertaking is required through preparation of a Determination of Eligibility/Finding of Effect. Because this Project would result in adverse effects and avoidance is not possible, an MOA will be prepared to outline responsibilities and measures to mitigate or reduce project effects. The ACHP and other Section 106 consulting parties will be notified of the potential adverse effects and will be invited to participate in development of the MOA. The MOA will be prepared concurrently with the effects determination to ensure that any project commitments considered in the effects determination are addressed in the MOA.

AR00143162

Table 4-32 Historic Properties within Project's Area of Potential Effect (continued on next page)

Tax Map Key	Resource Name	Description of Effect	Preliminary Section 106 Determination
Common to All Build Alternatives			
None	Hono`uli`uli Stream Bridge (Farrington Highway)	No use of land	No Effect
94025008	Ishihara House	No use of land	No Adverse Effect
94027127	West O`ahu Christian Church/former American Security Bank (round plan)	No use of land	No Adverse Effect
94036071	Waipahu Hawai`i Stake, Church of Jesus Christ of Latter-Day Saints	No use of land	No Adverse Effect
94039082	Tehahira Apartments	No use of land	No Adverse Effect
None	Waikele Stream Bridge, eastbound span and bridge over OR&L spur	No use of land	No Effect
94017043	Cavalho Apartments	No use of land	No Adverse Effect
94019020	Ohara Apartments	No use of land	No Adverse Effect
94038050	Sandobal House	No use of land	No Adverse Effect
96003026	Watercress of Hawaii	No use of land	No Effect
None	Waiawa Booster Pump Station	No use of land	No Effect
None	Waiawa Stream 1932 Bridge (westbound lanes)	No use of land	No Effect
None	Waiawa Stream 1952 Bridge (eastbound lanes)	No use of land	No Effect
None	Waiawa Separation Bridge	No use of land	No Effect
96003018	***Solomirin House***	***Full acquisition, including building***	***Adverse Effect***
98003010	Hawaiian Electric Company Waiau Plant	No use of land	No Adverse Effect
98006024	Nishi Service	No use of land	No Adverse Effect
98016047	Sumida Watercress Farm	No use of land	No Adverse Effect
98018041	Akiona House (Quonset)	No Use of Land	No Adverse Effect
98018042	Forty-Niner Saimin Restaurant	No use of land	No Adverse Effect
98022081	Waimalu Shopping Center	No use of land	No Adverse Effect
None	Waimalu Stream Bridge	No use of land	No Effect
None	Kalauao Springs Bridge	No use of land	No Effect
None	Kalauao Stream Bridge	No use of land	No Effect
99012006 & 99012001	`Aiea Plantation Cemetery	No use of land	No Adverse Effect
12013006	Foremost Dairy	No use of land	No Adverse Effect
12013007	GasPro Store	No use of land	No Adverse Effect
None	Lava Rock Curbs (Laumaka Street to South Street, except not along Nimitz Highway)	No use of land	No Effect
12002108	Duarte House	No use of land	No Adverse Effect
12002113	Ten Courtyard Houses	No use of land	No Adverse Effect
12009017	***Afuso House***	***Full acquisition, including building***	***Adverse Effect***
12009017	***Higa Duplex***	***Full acquisition, including building***	***Adverse Effect***

AR00143163

Table 4-32 Historic Properties within Project's Area of Potential Effect (continued on next page)

Tax Map Key	Resource Name	Description of Effect	Preliminary Section 106 Determination
12009018	***Teixeira House***	***Full acquisition, including building***	***Adverse Effect***
12009060	Pang House	No use of land	No Effect
12012014	Pu`uhale Market	No use of land	No Adverse Effect
15029060	***Boulevard Saimin Restaurant***	***Minor parcel acquisition (0.01 acre), close to building***	***Adverse Effect***
15015008	Six Quonset Huts	Minor strip take along Dillingham Boulevard	No Adverse Effect
15022004	Two-story (Tsumoto) Shop House	No use of land	No Adverse Effect
15022005	AC Electric	No use of land	No Adverse Effect
None	Kapālama Stream Bridge	No use of land	No Effect
None	***True Kamani Trees on Dillingham Boulevard***	***Removal of approximately 28 trees along Dillingham Boulevard***	***Adverse Effect***
15007001 & 15007002	OR&L Office/Document Storage Building and Terminal Building	No impact on historic properties	No Adverse Effect
15007001 & 15007002	OR&L basalt street paving	No impact on historic properties	No Adverse Effect
15007001	Former filling station	No use of land	No Adverse Effect
15007003	Tong Fat Co.	No use of land	No Adverse Effect
15007003	Wood Tenement Buildings	No use of land	No Adverse Effect
15007033	Tamura Building	No use of land	No Adverse Effect
17002, 17003, & 17004 plats	Chinatown Historic District	Minor parcel acquisition near Chinatown Marketplace (0.3 acre), no impact to building	No Adverse Effect
None	Nu'uanu Stream Bridge	No use of land	No Effect
21001056	Harbor retaining wall of coral blocks from Honolulu Fort	No use of land	No Effect
Tax Map Keys in plats 17002 & 21002	Merchant Street Historic District	No use of land	No Adverse Effect
21001001	Pier 10/11 Building	No use of land	No Adverse Effect
21001005	Department of Transportation Harbors Division Offices	No use of land	No Adverse Effect
21001013	Aloha Tower	No use of land	No Effect
21013007	Irwin Park	No use of land	No Adverse Effect
21014003	***Dillingham Transportation Building***	***Minor parcel acquisition (0.06 acre), very close to building***	***Adverse Effect***
21014006	Hawaiian Electric Company Downtown Plant	Minor parcel acquisition (0.14 acre), no impact to building	No Adverse Effect
various	Hawai`i Capital Historic District	No use of land	No Adverse Effect

AR00143164

Table 4-32 Historic Properties within Project's Area of Potential Effect (continued on next page)

Tax Map Key	Resource Name	Description of Effect	Preliminary Section 106 Determination
None	Walker Park	No use of land	No Adverse Effect
21030014	Kamaka Ukulele	No use of land	No Effect
21031012	Department of Transportation Building	No use of land	No effect
21031018	[Old] Kaka`ako Fire Station	No use of land	No Effect
21031021	Royal Brewery/The Honolulu Brewing & Malting Co.	No use of land	No Effect
21051006 & 21051005	Mother Waldron Playground	No use of land	No Adverse Effect
21050049	Ching Market & House	No use of land	No Effect
21050052	American Savings Bank/Liberty Bank—Queen-Ward Branch/ Blair's	No use of land	No Effect
21052008	Fuji Sake Brewing Co.	No use of land	No Adverse Effect
23007029	Pacific Development Office Building	No use of land	No Adverse Effect
23039023	Hawaiian Life Building	No use of land	No Adverse Effect
23022013	Craftsman-style House	No use of land	No Adverse Effect
23039001	Ala Moana Building	No use of land	No Adverse Effect
Salt Lake Alternative			
11010011	Facility X-24/Quonset Hut (Navy Public Works Center)	No impact near historic properties	No Adverse Effect
99002023	Radford High School	Minor parcel acquisition (0.01 acres)	No Adverse Effect
11021018	Āliamanu Pumping Station (Board of Water Supply)	No use of land	No Adverse Effect
11007036	First Hawaiian Bank—Māpunapuna Branch	No use of land	No Adverse Effect
11017006–11018014	Potential Salt Lake Duplexes Historic District	No use of land	No Adverse Effect
Airport Alternative			
99003029	Pearl Harbor National Historic Landmark	Minor parcel acquisition (0.6 acre)	No Adverse Effect
99003066 (partial)	Kamehameha Highway Bridge over Hālawa Stream (mauka span)	No use of land	No Effect
99002004	CINCPACFLT Admin Building/CINCPAC Headquarters—Facility 250	No use of land	No Adverse Effect
99001008	Ossipoff's Aloha Chapel, SMART Clinic, and Navy-Marine Corps Relief Society—Facility 1514	No impact near historic properties	No Adverse Effect
99001008	Navy WWII splinterproof shelter —Facility S-51	No use of land	No Adverse Effect
99001008	Navy Rehab Center/former Fire Station—Facility 199	No use of land	No Adverse Effect
99001001	Fuel Oil Pump House—Facility S-386	No impact to historic properties	No Adverse Effect
99002004	Potential Makalapa Housing Historic District	No impact to historic properties	No Adverse Effect
99002004	Potential Little Makalapa Housing Historic District	No use of land	No Adverse Effect
11016004	Hawai`i Employers Council	No use of land	No Adverse Effect

AR00143165

Table 4-32 Historic Properties within Project's Area of Potential Effect (continued from previous page)

Tax Map Key	Resource Name	Description of Effect	Preliminary Section 106 Determination
Airport & Salt Lake Alternative			
11010011	Facility X-24/Quonset Hut (Navy Public Works Center)	No impact near historic properties	No Adverse Effect
99002023	Radford High School	Minor parcel acquisition (0.01 acres)	No Adverse Effect
11021018	Āliamanu Pumping Station (Board of Water Supply)	No use of land	No Adverse Effect
11007036	First Hawaiian Bank—Māpunapuna Branch	No use of land	No Adverse Effect
11017006–11018014	Potential Salt Lake Duplexes Historic District	No use of land	No Adverse Effect
99003029	Pearl Harbor National Historic Landmark	Minor parcel acquisition (0.5 acre)	No Adverse Effect
99003066 (partial)	Kamehameha Highway Bridge over Hālawa Stream (mauka span)	No use of land	No Effect
99002004	CINCPACFLT Admin Building/CINCPAC Headquarters—Facility 250	No use of land	No Adverse Effect
99001008	Ossipoff's Aloha Chapel, SMART Clinic, and Navy-Marine Corps Relief Society—Facility 1514	No impact near historic properties	No Adverse Effect
99001008	Navy WWII splinterproof shelter —Facility S-51	No use of land	No Adverse Effect
99001008	Navy Rehab Center/former Fire Station—Facility 199	No use of land	No Adverse Effect
99001001	Fuel Oil Pump House—Facility S-386	No impact to historic properties	No Adverse Effect
99002004	Potential Makalapa Housing Historic District	No impact to historic properties	No Adverse Effect
99002004	Potential Little Makalapa Housing Historic District	No use of land	No Adverse Effect
11016004	Hawai`i Employers Council	No use of land	No Adverse Effect

Because archaeological resources are only expected to be affected during construction, mitigation measures for these resources are discussed in Section 4.16. Where archaeological, cultural, or historic resources remain or are discovered, all efforts would be made to avoid destruction.

Mitigation measures for historic resources affected by the Project are being developed in consultation with SHPD and other Section 106 consulting parties. In addition, Section 106 regulations direct the Federal (or designated) agency to consult with the State Historic Preservation Officer, Chairperson of the Hawai'i Department of Land and Natural Resources, to develop "modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on historic properties" (36 CFR 800.6). Discussions with SHPD with regard to mitigation have included preparation of cultural landscape reports and NRHP forms for eligible resources, and historic significance signing and design review with the SHPD and other appropriate stakeholders. The NRHP nominations would be updated for affected resources. These will be developed in coordination with SHPD and appropriate stakeholders.

Decisions to avoid adverse effects were made during the Project's Alternatives Analysis phase, including selecting an alignment that would affect

AR00143166

the fewest historic resources. Modifications to the Project that could minimize adverse effects involved making engineering refinements (e.g., alignment variations and changes in station designs) and shifting station locations. Further design refinement, such as exact column placement to avoid archaeological resources, will continue during the ongoing design of the Project. Discussions with the SHPD will continue to determine engineering choices to minimize adverse effects on areas with the highest-density and highest-quality historic resources.

Businesses that have been identified as cultural resources to the community that would be displaced by the Project would receive relocation assistance, as described in Section 4.3.

State of Hawai`i Act 50 Findings

Act 50 findings are detailed in the Historic Resources Technical Report (RTD 2008o). Archival and ethnographic research shows that most traditional cultural resources within the study corridor have been heavily damaged or destroyed through previous development, with the exception of a few sink holes in the 'Ewa-Kapolei section and streams in the Pearl City-Moanalua sections. A few of the identified cultural resources would be adversely affected. The greatest effect would be displacement of current traditional/ethnic/urban resources. These would be mitigated with the same measures identified in Section 4.3. Effects on traditional cultural practices associated with streams will be mitigated by minimizing the effects on streams, as discussed in Section 4.13.

4.16 Construction Phase Effects

Construction effects would be temporary and limited in area as construction proceeds along the length of the project alignment. Construction work details will be developed during preliminary and final design. Effects could include dust, noise, and traffic disruption congestion, and diversion, as well as limited or temporarily lost access and parking to residences and businesses. This section of the Draft EIS discusses construction effects related to the natural and built environment with regard to the entire Project. Section 3.5, Construction-Related Effects on Transportation, of this Draft EIS discusses transportation-related construction impacts.

Construction-related effects would result primarily during construction of the main structural components, foundations and columns, superstructure (the elevated guideway structure), and stations. Construction of other system components, such as traction power substations, the maintenance and storage facility, and park-and-ride lots, would also have associated effects but to a lesser degree. The maintenance and storage facility, park-and-ride lots, and stations could be used for construction staging areas. Additional areas would be identified by the contractor as needed. The contractor would be responsible for obtaining any necessary permits and approvals. The effects of activities in the staging areas known at this time are included in the discussion of construction effects on the natural and built environments.

The proposed construction methods, as described in Appendix C, Construction Approach, would minimize potential adverse construction effects. Construction is expected to begin in late 2009, and the Project is anticipated to be complete in 2018. Because construction would generally be completed sequentially from the UH West O'ahu to Ala Moana termini, the duration of disruption in any single location would be substantially less than the nine-year total construction period.

Project construction would not have a substantial effect on some resources discussed in earlier sections of Chapter 4, including electric and magnetic fields, natural hazards, and farmlands. Effects on other resources are discussed in the following sections.

AR00143167

As described in Chapter 2, the Project would open in phases, including potentially a connection to the airport as a phase construction of the Airport & Salt Lake Alternative. Stations at the ends of each phase would operate temporarily as terminal stations until the next phase is completed. This operation would temporarily affect access and travel patterns around the stations.

4.16.1 Land Use and Economic Activity

Developed areas Koko Head of Waipahu would experience more land use and community effects than currently undeveloped sections in West O'ahu. Temporary construction activities, such as temporary detours, may be required in parcels near the project right-of-way. Effects on land use from these activities would be temporary.

Business Access

Access to businesses near construction activities could be temporarily affected. In several locations left-turn lanes would be closed during construction, requiring drivers to change their approach and make a right-hand turn to the businesses. Such closures are expected on Farrington Highway in Waipahu, Kamehameha Highway in Pearl City, Salt Lake Boulevard, and Dillingham Boulevard. Segments of Halekauwila and Queen Streets may be made temporarily one-way or have parking eliminated during construction. The MOT Plan would be developed by the contractor prior to construction and would address temporary effects on access to businesses during construction. Proposed mitigation to reduce adverse economic hardships for existing businesses along the project alignment during construction activities may include the following:

- Access to businesses would be maintained during construction.
- A public involvement plan would be developed prior to construction to inform business owners of the construction schedule and activities
- Initiating public information campaigns to reassure people that businesses are open during construction and to encourage their continued patronage
- Minimizing the extent and number of businesses, jobs, and access affected during construction
- To the extent practicable, coordinating the timing of temporary facility closures to minimize impacts to business activities—especially those related to seasonal or high sales periods
- Minimizing, as practical, the duration of modified or lost access to businesses
- Providing signage, lighting, or other information to indicate that businesses are open
- Providing public information (e.g., press releases or newsletters) regarding construction activities and ongoing business activities, including advertisements in print and on television and radio
- Phasing construction in each area so as to maintain access to individual businesses for pedestrians, bicyclists, passenger vehicles, and trucks during business hours and important business seasons
- Providing advance notice if utilities would be disrupted and scheduling major utility shut-offs during non-business hours

Employment

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

AR00143168

Table 4-33 Employment Effects

Alternative	Construction Cost 2007 $ (millions)	Average Number of Jobs per Year (9 years of Construction)[1]			
		Direct	Indirect	Induced	Total
No Build	$0	0	0	0	0
Salt Lake	$3,901	4,000	1,700	3,900	9,600
Airport	$4,105	4,200	1,800	4,100	10,100
Airport & Salt Lake	$4,805	4,900	2,100	4,700	11,700

[1] Multipliers of 9.25 for direct, 4.03 for indirect, and 8.90 for induced jobs are based on the 2008 State of Hawai`i Input-Output factor for heavy civil construction (jobs per million $)

This analysis estimates the total direct, indirect, and induced jobs to be as high as 11,700 jobs per year over the nine-year construction period (Table 4-33).

4.16.2 Communities and Neighborhoods

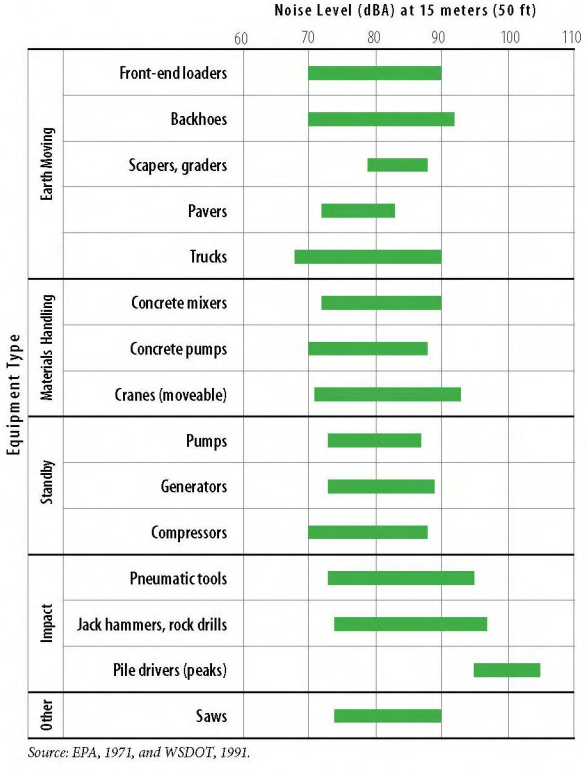
During construction, automobile, pedestrian, and transit access to communities and neighborhoods surrounding the project alignment would be affected. These effects are discussed further in the following sections.

The site-specific Construction Safety and Security Plans would be developed and implemented by the construction contractors to mitigate effects on community services, such as fire prevention and emergency preparedness and response, as well as to protect the general public, private property, and workers from construction risks. The FTA requires that such plans be prepared to address these potential construction effects.

The following emergency services departments would be consulted in preparing the Construction Safety and Security Plans and would have some responsibility for the Project's safety hazards and security risks:

- The Honolulu Police Department
- The Honolulu Fire Department
- The Department of Emergency Management
- The Honolulu Emergency Services Department

During development of the Construction Safety and Security Plans, measures would be identified to minimize effects on communities and their resources that address specific consequences



Source: EPA, 1971, and WSDOT, 1991.

Figure 4-52 Typical Construction Equipment Noise Levels

anticipated at each location within the various communities, as well as ensure the safety of the public and the environment.

In cases where traffic rerouting or delays are expected to affect access to public facilities or the

AR00143169

functioning of public and emergency services, alternate access routes would be maintained during construction. Construction in high-volume traffic and pedestrian areas could employ police support to direct and control traffic and pedestrian movements to lessen effects on mobility. To maintain the functionality of public facilities, social resources, and transportation routes during construction, mitigation would include relocating and rearranging certain facilities, noise mitigation, and other efforts deemed necessary to maintain full functionality. In cases where project placement would restrict existing vehicular or pedestrian access routes to public service buildings, alternate access points would be included in mitigation efforts.

Schools, Parklands, and Recreational Resources

Schools adjacent to the project alignment may be affected by a variety of construction issues, such as noise, vibration, air quality, and visual intrusion, depending on a school's distance from the Project. The various parks and recreational resources directly along the project alignment are expected to be affected by temporary nuisances associated with construction, such as noise, dust, and visual intrusion.

The Salt Lake Alternative would have a greater effect than the Airport Alternative to schools, parklands, and recreational resources during construction because of the greater number of such facilities along Salt Lake Boulevard.

In instances where any school, parkland, or recreational resource would experience a disruption in access, the effects would be mitigated as necessary and appropriate using applicable practices similar to those outlined in Business Access in Section 4.16.1, Land Use and Economics Activity. Temporary barrier walls or fences would be placed around any school, parkland, or recreational resource near a construction area.

Utilities

Utilities comprise facilities owned by public utility agencies and private utility companies and include service lines to adjoining properties. Utilities include sanitary sewers; storm drains; water, gas, electric power, telephone, and oil pipelines; street lights; and traffic signals. Communication and coordination have been initiated with the affected utility agencies and companies and would continue throughout design and construction. HDOT would be involved with utility coordination for utility work in the state roadways and roadway rights-of-way.

Design criteria would govern all new utility construction outside of buildings, as well as the support, maintenance, relocation, and restoration of utilities encountered or affected by construction of the fixed guideway. Utility service to abutting properties would not be interrupted. If facilities were temporarily relocated, the area would be restored as close as possible to its original condition. Replacements for existing utilities would provide service or capacity equal to that currently offered.

Utility rearrangements would ensure that construction of transit facilities may proceed without affecting utility service. Utilities that penetrate through or cross over transit structures would be designed so as to prevent damage. The vertical and lateral clearances of overhead and underground utility lines shall comply with the rules and regulations of the appropriate utility agency and Hawai'i Administrative Rules during final design and approved by the utility agencies. Coordination would occur with emergency services and utility companies to ensure that utility relocations meet their needs and that sufficient clearance is provided.

AR00143170

Environmental Justice

Construction activities would occur along the entire project alignment and would affect all population groups equally.

4.16.3 Visual and Aesthetic Conditions

During construction, visual quality may be altered for all viewer groups. Construction-related signage and heavy equipment would be visible at and near construction sites. The removal or pruning of mature vegetation, including trees, to accommodate construction of the guideway, stations, and park-and-ride lots, would degrade or partially obstruct views or vistas. Short-term changes to the visual character of areas adjacent to the alignment could result from introducing the following construction elements:

- Construction vehicles and equipment
- Clearing and grading activities that result in exposed soils until replanting or repaving occurs
- Erosion-control devices such as silt fences, plastic ground cover, and straw bales
- Dust, exhaust, and airborne debris in areas of active construction
- Stockpiling of excavated material
- Staging areas for equipment storage and construction materials

Table 4-34 Total Construction Energy Required

Alternative	Project Construction Energy (MBTUs)
Salt Lake	7,140,000
Airport	7,480,000
Airport & Salt Lake	9,020,000

MBTUs = million British thermal units

These short-term changes would be greatest at station locations, park-and-ride lots, elevated guideway, and maintenance and storage facility sites. Temporary lighting may be necessary for nighttime construction of certain project elements or in existing highway rights-of-way to minimize disruption to daytime traffic. Temporary lighting could affect residential areas by exposing residents to glare from unshielded light sources or increasing ambient nighttime light levels.

The following mitigation measures are proposed to minimize visual impacts during construction:

- Removing visibly obtrusive erosion-control devices, such as silt fences, plastic ground cover, and straw bales, as soon as an area is stabilized
- Locating stockpile areas in less visibly sensitive areas whenever possible so they are not visible from the road or to residents and businesses
- Shielding temporary lighting and directing it downward to the extent possible
- Limiting the times construction lighting could be used in residential areas
- Replacing removed street trees and other vegetation with appropriately sized vegetation after construction is completed; this would be achieved by implementing a Landscape Architecture Plan for the Project

4.16.4 Air Quality

Air pollution from construction activities would be limited to short-term increased fugitive dust or airborne particulate matter (generally of a relatively large particulate size) and mobile-source emissions. Fugitive dust primarily results from particulate matter being "kicked up" by vehicle movement around a construction site and material being blown from uncovered haul trucks. Mobile-source pollution is generated from the operation of construction equipment near construction sites and from traffic disruption and congestion during construction.

The following control measures can substantially reduce fugitive dust:

- Minimize land disturbance
- Use watering trucks to minimize dust

AR00143171

- Use low emission equipment when feasible
- Cover loads when hauling dirt
- Cover soil stock piles if exposed for long periods of time
- Use windbreaks to prevent accidental dust pollution
- Limit the number of vehicular paths and stabilize temporary roads
- Maintain stabilized construction area ingress/egress areas
- Wash or clean trucks prior to leaving construction sites
- Minimize unnecessary vehicular activities

Mobile-source pollution can be reduced by minimizing unnecessary vehicular and machinery activities and limiting traffic disruptions, particularly during peak travel hours (see Section 3.5, Construction-Related Effects on Transportation, for more detail). All State and Local regulations for dust control and other air quality emission reduction controls would be followed.

4.16.5 Noise and Vibration

Noise

Noise during construction would be bothersome and annoying to nearby residents, visitors, tourists, and businesses. All of the alternatives would generate similar types of noise, which would occur sporadically in different locations throughout the nine-year construction period.

The most common noise source in construction areas would be engine-powered machinery, such as earth-moving equipment (bulldozers), materials handling equipment (cranes), and stationary equipment (generators). Mobile equipment (e.g., trucks and excavators) operates in a cyclic manner, and stationary equipment (generators and compressors) generates noise at fairly constant levels. The loudest and most disruptive construction activities would be impact pile-driving followed by demolition, jackhammers, and hoe rams. Impact pile-driving, if used as a method for pile placement, would result in the loudest and most disruptive construction work. Impact pile-driving would only be used where less disruptive foundation placement methods cannot be used. Vibration or hydraulic insertion could be used where appropriate to replace impact pile-driving to reduce noise.

Figure 4-52 shows the range of noise levels that can be expected from different types of construction equipment. Construction noise at locations more than 50 feet away decreases at a rate of 6 to 8 dBA per doubling of the distance from the source. For example, if the noise level is 90 dBA at 50 feet from a jackhammer, it would be reduced to approximately 83 dBA at 100 feet and 76 dBA at 200 feet. Doubling the number of noise sources would increase the noise level by 3 dBA. In the above example, two jackhammers operating together would generate a noise level of 93 dBA at 50 feet from the activity.

The mitigation discussed in this section is meant to be a guideline for developing project-specific measures to reduce construction noise. Prior to construction, the contractor would be required to obtain an approved Community Noise Variance from HDOH. The permit would regulate construction times and activities and include mitigation commitments. The following measures are examples of what could be incorporated. They would be re-evaluated in more detail during preliminary design because impacts to residences cannot be accurately determined without detailed construction plans and schedules.

- Develop a monitoring plan with noise limits
- Construct temporary noise barriers or curtains
- Equip construction equipment engines with adequate mufflers and intake silencers
- Strategically place stationary equipment, such as compressors and generators

These measures can be incorporated into site-specific construction noise mitigation plans to

AR00143172

minimize noise impacts to sensitive receivers along the project alignment. Noise emission limits could also be developed. Construction hours could be set, and noise-level criteria could be decided upon and adhered to during construction. Construction noise monitors could be required. Community meetings could be held to explain the construction work, the time involved, and control measures to be taken to reduce the effects of construction noise.

The contractor would comply with standard specifications and all applicable local sound control and noise level rules, as well as regulations set by HDOH. For all alternatives, construction noise from some activities (e.g., pile-driving in certain sections of the alignment) could exceed levels set in the State noise regulations for work between 6 p.m. and 7 a.m. A variance would be required for such nighttime work, which would likely be necessary at certain locations and during certain phases of the Project. Variance permits would specify mitigation measures to minimize effects by limiting the time of day that certain activities could occur.

Vibration

Common sources of vibration during construction activities include jackhammers, pavement breakers, hoe rams, bulldozers, and backhoes. Pavement breaking and soil compaction would likely produce the highest levels of vibration. Depending on soil conditions in an area, activities such as pile-driving can generate enough vibration to result in substantial short-term noise impacts.

Pile-driving would cause the highest vibration levels of the proposed construction activities. Pile-driving activities more than 75 feet from newer, non-historic buildings would not exceed risk criteria for those buildings. For buildings closer than 75 feet to pile-driving activities, the contractor would be required to provide mitigation for vibration levels during these activities. Contractors could be required to perform a video survey of the immediate area prior to the start of any construction activity where vibration levels may be high enough to affect surrounding structures. The most appropriate method for reducing vibration would be to use drilled shafts or auger-cast piles, which are cast in-place rather than driven into the ground, in areas where vibration-sensitive buildings or utilities are located. By using these types of foundations, impact driving would be eliminated and drilling would generate lower vibration levels.

Construction vibration would have less of an effect on underground and buried utilities than on buildings. Pile-driving is the only proposed construction activity that would generate vibration levels that could damage utilities. Utilities less than 25 feet from pile-driving locations may need to be further evaluated during final design to determine whether mitigation is needed.

4.16.6 Construction Energy Consumption

Construction of at-grade high-capacity transit systems generally requires 20,000 MBTUs of energy per track mile (Caltrans 1983), including track and power systems. Because the Build Alternatives are all elevated, an additional 150,000 MBTUs of energy per track mile would be required to construct the elevated structure. Table 4-34 summarizes the energy that would be required to construct the Build Alternatives.

Measures that maintain roadway speeds and construction practices that reduce energy consumption could reduce energy demand during construction. Any transportation-control measures that reduce traffic volumes and congestion would also decrease energy consumption. Mitigation of traffic impacts during construction are discussed in Chapter 3.

4.16.7 Natural Resources

Construction activities could affect wildlife, vegetation, wetlands, and streams near the Project.

AR00143173

Protection zones would be established around these resources to avoid disturbance during construction.

Burial Treatment

During the inventory survey, burials would be identified and managed in compliance with applicable laws. This would include consulting with project proponents, the O'ahu Island Burial Council, the SHPD, and recognized lineal and/or cultural descendants to develop burial treatment plans. Although the goal would be to identify all burials and treat them appropriately prior to the start of construction in a particular area, the chance exists that additional previously undiscovered burials would be encountered during construction.

In each geographic area, the parties consulted regarding burials during the Project's inventory survey phase would be consulted if a find is made during construction. The MOA would outline the treatment of burials discovered during construction.

Cultural Resources

Adverse impacts related to cultural resources resulting from construction of the Project would likely be short-term and consist of affecting access to areas where cultural resources exist or cultural activities are practiced. The impact to cultural resources or areas would be mitigated using the same maintenance of access policies outlined for businesses.

Historic Resources

Historic resources could be inadvertently affected during construction. Any potential construction impacts would be mitigated using measures outlined in previous construction sections related to noise, vibration, air quality, and water quality. In addition, to avoid collision with or damage to historic resources during construction, protection zones would be established around such resources to avoid disturbance during construction activities.

4.16.10 Relationship between Short-term Uses of the Environment and Long-term Productivity

Construction of the Project would have short-term effects on the environment during construction, as described in this section. These effects would end with the completion of construction. The Project would provide the following improvements in productivity, which are identified as the Purpose of the Project in Chapter 1 of this Draft EIS:

- Provide faster, more reliable public transportation service
- Provide reliable mobility in areas of the corridor with limited income and aging populations
- Serve rapidly developing areas
- Provide an alternative to the private automobile
- Moderate anticipated growth in traffic congestion

The long-term benefit that would be provided by the Project would be greater than the short-term adverse effects to the human environment.

AR00143174

4.18 Commitments of Resources

As described in Chapter 4 of this Draft EIS, the Project would convert land to transportation use and consume energy, construction materials, and labor. These resources would not be available for other projects.

4.19 Anticipated Permits and Approvals

Table 4-37 summarizes permits, certificates, and/or approvals anticipated to be required for implementation of the Project.

Table 4-37 List of Anticipated Permits

Permit or Approval	Coordinating Agencies
Federal	
Archaeological Resource Protection Permit	NPS
Clean Water Act Section 404	USACE/EPA
Farmland Conversion Impact Rating	NRCS
Floodplain Management and Protection Approval	FTA
Jurisdictional Determination	USACE
Section 10	USACE/USCG
Sole Source Aquifer	EPA
State	
Archaeological Inventory Survey Plan	SHPD
Certificate of Inclusion	HDLNR (Division of Forestry and Wildlife), HDOT/USFWS
Clean Water Act Section 401	HDOH
Coastal Zone Management	DBEDT
Drainage Injection Well	HDOH (Safe Drinking Water Branch)
Memorandum of Agreement	SHPD
National Pollutant Discharge Elimination System (Dewatering)	HDOH (Clean Water Branch), City and County Environmental Services Department, HDOT (Highways Division), HDOT (Airports Division), UH Mānoa, U.S. Navy (Pearl Harbor)
National Pollutant Discharge Elimination System (General)	HDOH (Clean Water Branch)
Noise Variance	HDOH
Road Closure	HDOT
Stream Channel Alteration	HDLNR
City and County	
Pruning of Exceptional Trees	HDPR (Division of Urban Forestry)

DBEDT = State of Hawai`i Department of Business, Economic Development and Tourism
EPA = Environmental Protection Agency
FTA = Federal Transit Administration
HDLNR = State of Hawai`i Department of Land and Natural Resources
HDOH = State of Hawai`i Department of Health
HDOT = State of Hawai`i Department of Transportation
HDPR = Honolulu Department of Parks and Recreation
NPS = National Park Service
NRCS = Natural Resources Conservation Service
SHPD = State Historic Preservation Division
UH = University of Hawai`i
USACE = U.S. Army Corps of Engineers
USCG = U.S. Coast Guard
USFWS = U.S. Fish and Wildlife Service

AR00143175