

CHAPTER 4.0

4.0 GENERAL DESIGN GUIDELINES FOR ALL TOWN CORE NEIGHBORHOODS

The following design guidelines apply to all project areas and provide guidelines for a wide range of design elements and planning concepts. They primarily cover the public areas within the Town Core such as street networks, public transit, and public art and will require the participation of both County and State agencies. However, there are several sections that are applicable to privately-owned properties such as landscape guidelines and sustainable design. They also provide important guidelines on designing the interface between the public and private realms in order to create inviting, walkable environments as envisioned for the Līhu'e Town Core.

The following guidelines should be reviewed and adhered to for any project proposed within the Town Core. For site-specific design guidelines and allowable land uses, please also refer to the applicable section for each neighborhood in Chapter 5.0. This chapter is organized into the following sections:

- 4.1 Neighborhood Concept
- 4.2 Street Network & Circulation Plans
 - 4.2.1 General Street Design Considerations
 - 4.2.2 Walkable Streets and Pedestrian Zones
 - 4.2.3 Street
 - 4.2.6 Detailed Street Designs
- 4.3 Public Parking
- 4.4 Public Transit
- 4.5 Public Art
- 4.6 Landscape Guidelines
 - 4.6.1 Design Considerations
 - 4.6.2 Parking Lot Landscaping
 - 4.6.3 Xeriscaping and Water-Efficient Design Considerations
 - 4.6.4 Plant Materials
 - 4.6.5 Street Trees and Accent Trees
 - 4.6.6 Kaua'i Natives and Plants Significant to Līhu'e and Kaua'i
- 4.7 Sustainable or Green Design

4.1 NEIGHBORHOOD CONCEPT

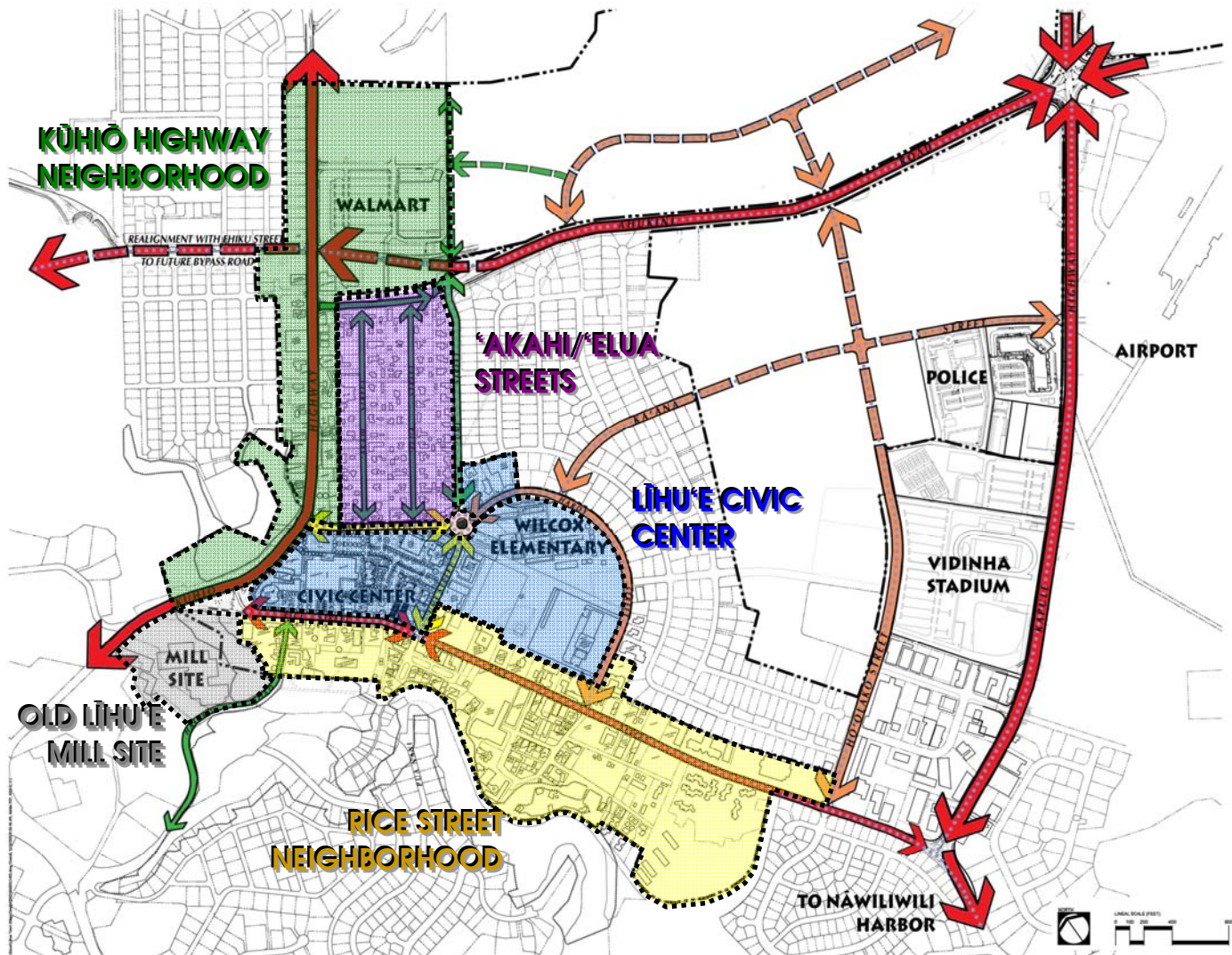


Figure 4-1: Design Guideline Neighborhoods

- There are design guidelines for the five key neighborhoods in the study area (Figure 4-1). The neighborhoods are:
 1. Rice Street Neighborhood
 2. Kūhiō Highway Neighborhood
 3. 'Akahi and 'Elua Streets
 4. Līhu'e Civic Center
 5. Old Līhu'e Mill Site
- Each neighborhood has their own character based on different land uses, streetscapes, and design themes.

- Each neighborhood is designed to complement, not compete, each other.
- The detailed design guidelines for each of the neighborhoods are provided in Section 5.0.
- Overlay districts, called “Special Design Districts,” are created where appropriate with specific design guidelines for future development. These Special Design Districts allow existing zoning to remain in place while clarifying allowable land uses and development standards in order to preserve the character of the neighborhood.

4.2 STREET NETWORK & CIRCULATION PLANS

Streets are multi-faceted corridors of the public realm. Not only do they convey traffic, but they are social arenas where people walk, bike, exercise, chat with neighbors, enter businesses, see and be seen. The following recommendations for the Līhu'e street network attempt to balance the need for improved vehicle, pedestrian and bicycle circulation throughout Līhu'e Town and the desire to preserve and recapture the integrity and charm of a historic community.

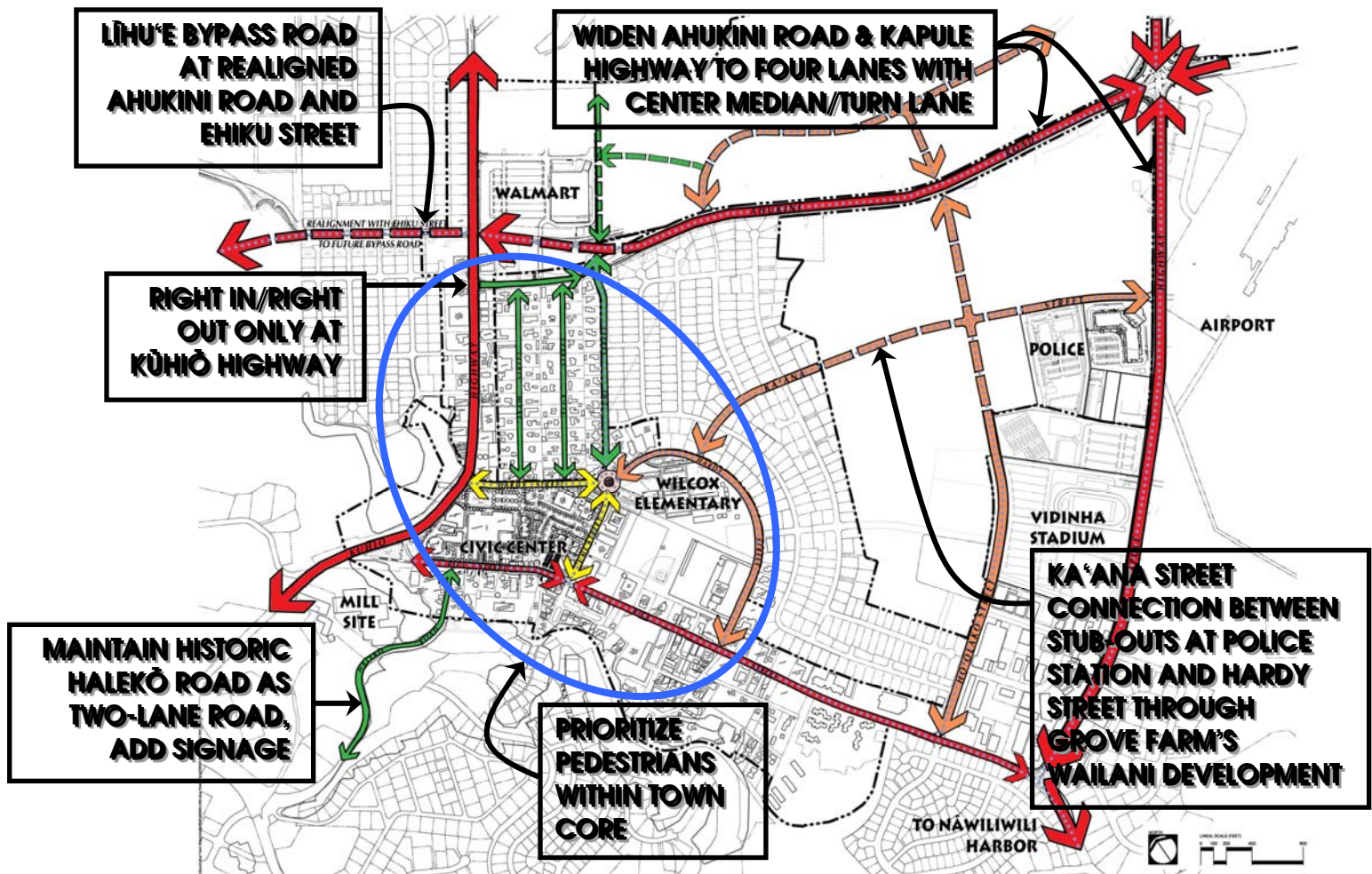


Figure 4-2: Proposed Street Network

Figure 4-2 diagrams the proposed street network for Līhu'e Town:

- **Red Arrows:** Four lane roadways that serve island-wide traffic. Ahukini Road and Kapule Highway are envisioned as divided roadways with bike lanes and limited or no pedestrian activity. Rice Street and Kūhiō Highway are undivided roadways (with the

exception of Rice Street between Kūhiō Highway and 'Umi Street) with high pedestrian activity within the Civic Center and reduced pedestrian activity further away from the Civic Center.

- **Orange Arrows:** Four lane roadways during peak traffic hours. During non-peak traffic hours, they are reduced to two-lane roadways and on-street parking is permitted on the outside lanes. Pedestrian activity is moderate to high.
- **Yellow Arrows:** Two lane roadways with a pedestrian and bike-friendly streetscape in the urban core.
- **Green Arrows:** Two lane roadways. Most are local neighborhood streets that provide important alternate routes for the main collectors. Halekō Road merits further discussion (see below).

4.2.1 GENERAL STREET DESIGN CONSIDERATIONS

- **Pedestrian- and Bicycle-Friendly:** Provide wide, ADA-accessible sidewalks in high traffic pedestrian areas such as the Civic Center and along commercial streets like Rice Street, Kūhiō Highway and the 'Ewalu and Kress/Kalena neighborhoods. Shelter pedestrians from the elements by providing awnings on storefronts and plant street trees where sidewalk widths permit.
- **Multi-modal:** Provide opportunities for multi-modal transportation. Design roadways to serve pedestrians, bicycles, and public transit as well as private vehicles.
- **Connectivity:** Provide convenient links between the various neighborhoods within Līhu'e Town as well as key destinations in the surrounding areas such as Kukui Grove Shopping Center, the future Wailani (Līhu'e-Hanamā'ulu) development, Nāwiliwili Harbor and the new Police Station/Judiciary/Vidinha Stadium complex.
- **Līhu'e Civic Center Master Plan:** Coordinate street improvements with the County's Līhu'e Civic Center Master Plan. A copy of the master plan as of January 2008 is provided in Figure 4-3
- **Underground Utilities:** Relocate overhead utilities underground to improve safety during high wind conditions. Priorities include those located along Rice Street, Kūhiō Highway, Hardy Street, 'Umi Street and within the Civic Center.



Figure 4-3
PROPOSED MASTER PLAN
LĪHU'E CIVIC CENTER
COUNTY OF KAUAI

4.2.2 WALKABLE STREETS AND PEDESTRIAN ZONES

Walkability is the cornerstone and key to an urban area's efficient ground transportation. Every trip begins and ends with walking. Walking remains the cheapest form of transport for all people, and the construction of a walkable community provides the most affordable transportation system any community can plan, design, construct and maintain. Walkable communities put urban environments back on a scale for sustainability of resources (both natural and economic) and lead to more social interaction, physical fitness and diminished crime and other social problems. Walkable communities are more livable communities and lead to whole, happy, healthy lives for the people who live in them. (Walkable Communities, Inc.)

Consider the organization of a typical street in section. There are four basic zones within this section (moving from the outside edge of the right-of-way inward): the Building Interface Zone, the Pedestrian Passing Zone, the Roadway Interface Zone, and the Vehicle Roadway (includes vehicle travel lanes and crosswalks). A sidewalk typically includes the first three zones and a street's walkability is measured by the width and treatment of these zones.

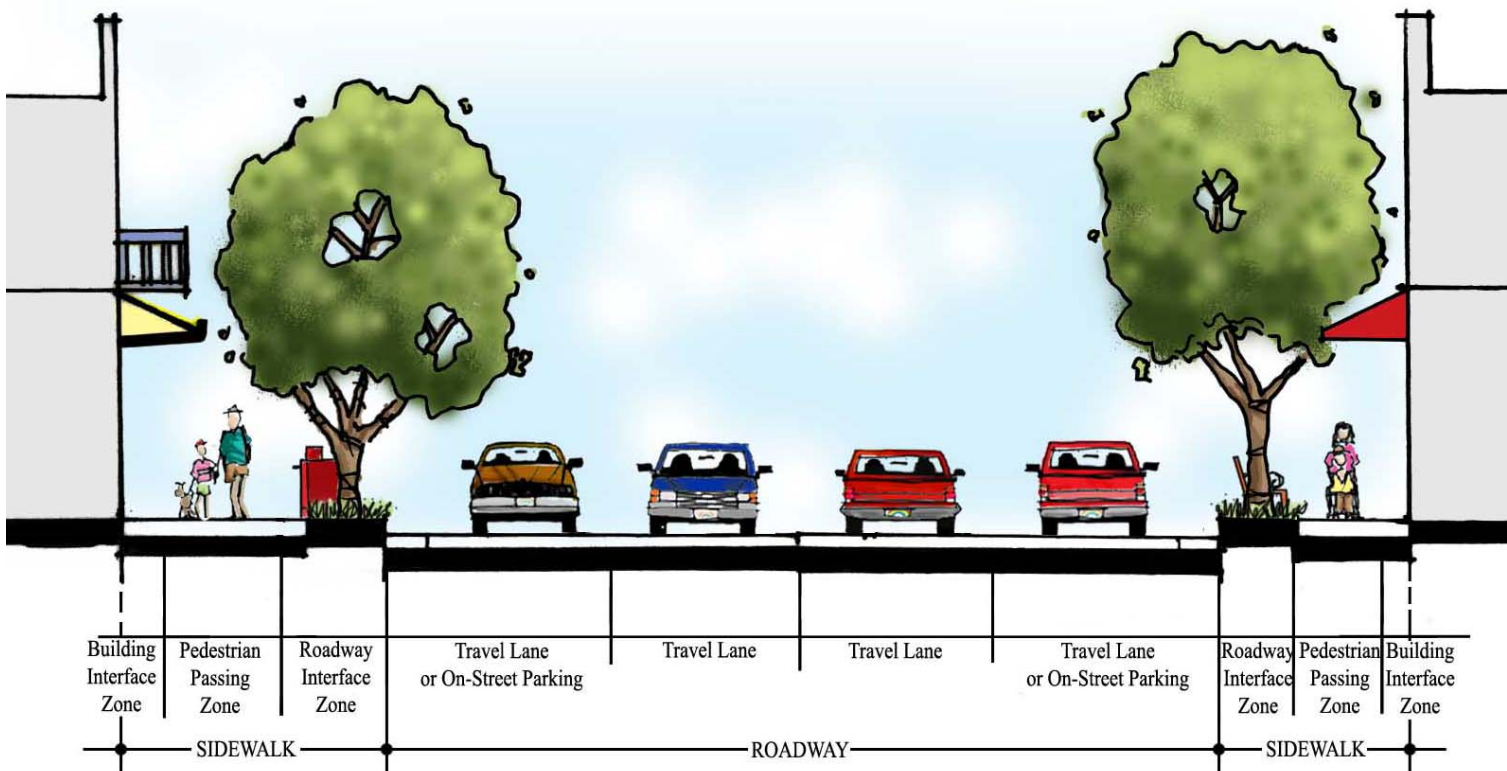


Figure 4-4: Street Section and Pedestrian Zones

- The **Building Interface Zone** is the area closest to building façades that serves as a transition between the pedestrian travelway and the commercial/residential activities occurring within buildings along the street. It extends at least a few feet into the sidewalk and can penetrate the building façade depending upon the design and use of the building edge. It is the zone where activities such as outdoor eating and window shopping take place as well as where sidewalk store displays are set up.
- The **Pedestrian Passing Zone** is an area relatively clear of any obstructions down the center of the sidewalk which allows for the most efficient movement of pedestrians along the sidewalk. Depending on its width and the number of pedestrians, movement through this zone can be congested
- The **Roadway Interface Zone** serves as a transition zone between the vehicular traffic in the roadway and pedestrian activity along the sidewalk. This zone serves to help buffer pedestrians from the vehicular traffic and noise associated with the roadway. Street furniture and landscaping such as street trees, seating areas, newspaper and brochure dispensers, trash receptacles, drinking fountains, street lighting, street signs, parking meters, bus stops, bicycle racks and art work (depending on its appropriateness and scale) are typically placed within this zone.





STAMPED CONCRETE CROSSWALK
WITH EMBEDDED CROSSWALKLIGHTS

- Except for crosswalks, the **Roadways** are primarily the realm of vehicles. **Crosswalks** are considered an extension of the pedestrian zone, providing a marked crossing from the sidewalk to the opposite side of the street. To improve safety, crosswalks should be highly visible using contrasting paving materials, paints, or lighted signals. Curb bulb-outs are encouraged at intersections and crosswalks to shorten the distance pedestrians must walk across roadways.



STREET FURNITURE
WITHIN A BULB-OUT

4.2.3 STREETScape DESIGN

Particularly within the Town Core, where pedestrian activity is emphasized and encouraged, elements that enliven the streetscape such as benches, signage, and other amenities should be provided.

- Street furniture and amenities should be placed at convenient locations along the street. Street furniture can include, but is not limited to benches, bike racks, trash receptacles, water fountains, informational signage, kiosks, lighting and landscaping.
- Coordinate the design style of the various street amenities to create visual unity within Līhu'e Town.
- Unique street amenities can be designed to incorporate Hawaiian motifs and other historical elements related to various time periods in Līhu'e's history. Create a unique yet recognizable Līhu'e Town plaque and/or graphics to



DIRECTORY WITHIN A BULB-OUT, BIKE RACK,
SEATWALLS, AND PATTERNED SIDEWALKS

commemorate and celebrate the Town's historic heritage. An example might be Hawaiian quilt patterns in sidewalks and crosswalks to set Lihū'e apart and make walking an experience.

- Incorporate landmarks and historic sites into a walking tour. Provide interpretive plaques, and wayfinding signs and markers such as the King Kamehameha signs and Boston's Freedom Trail pavers.
- Provide curb bulb-outs around on-street parking stalls, particularly at street corners. Bulb-outs serve multiple purposes—enlarging pedestrian waiting areas, narrowing crosswalk distances, and providing places for street amenities and landscaping.
- Provide locations for artwork by local artists along all major roadways within the planning area (see Figure 4-29), but with special focuses on Rice, Hardy, and 'Umi Streets and Kūhiō Highway.



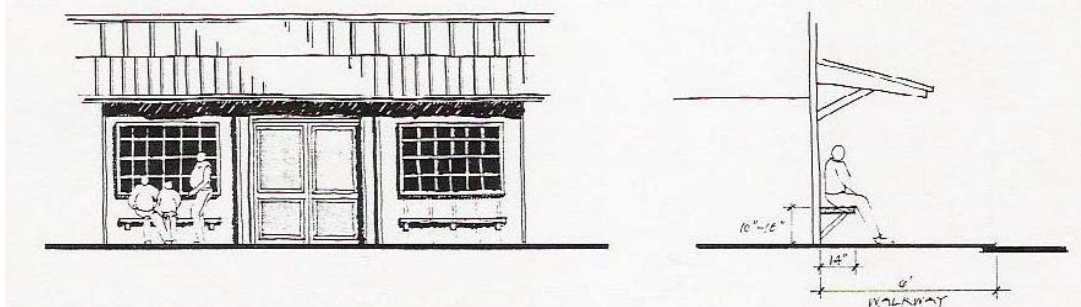
Example plaque (Chicago, IL)



Example banners on street lights (Pasadena, CA)

- Within the Town Core and surrounding the Civic Center, install street lights with hardware for hanging banners and event signage.
- Provide seating opportunities in the design of buildings and urban spaces through the use of ledges, steps, and seatwalls as well as space for moveable chairs and benches particularly near eateries with outdoor seating. Areas adjacent to the sidewalks from the street provide an appealing location for seating.

Example of seating incorporated into the building façade



4.2.4 PEDESTRIAN CIRCULATION PLAN

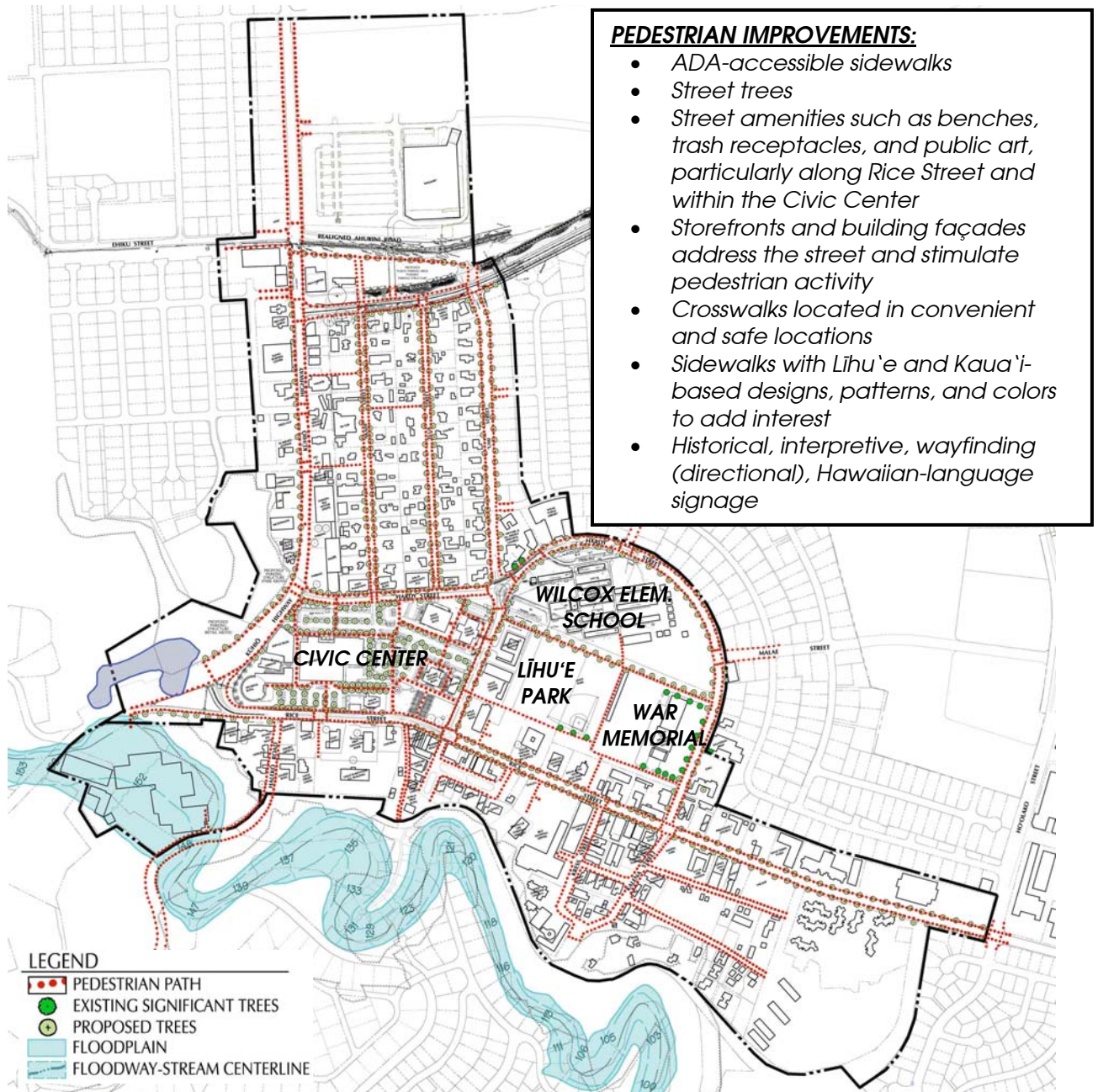


Figure 4-5: Pedestrian Circulation Plan

Figure 4-5 shows the proposed Pedestrian Circulation Plan for the Lihue Town Core. Pedestrian improvements are recommended along the major streets and include ADA-accessible sidewalks, street trees, continuous storefronts and street amenities. Pedestrian pathways are also recommended throughout the Civic Center Neighborhood to create a campus-like environment. Additional crosswalks are shown across Rice Street and Kūhiō Highway to improve connectivity. Many intersections already have traffic signals that will help pedestrians cross safely.

4.2.5 BICYCLE CIRCULATION PLAN

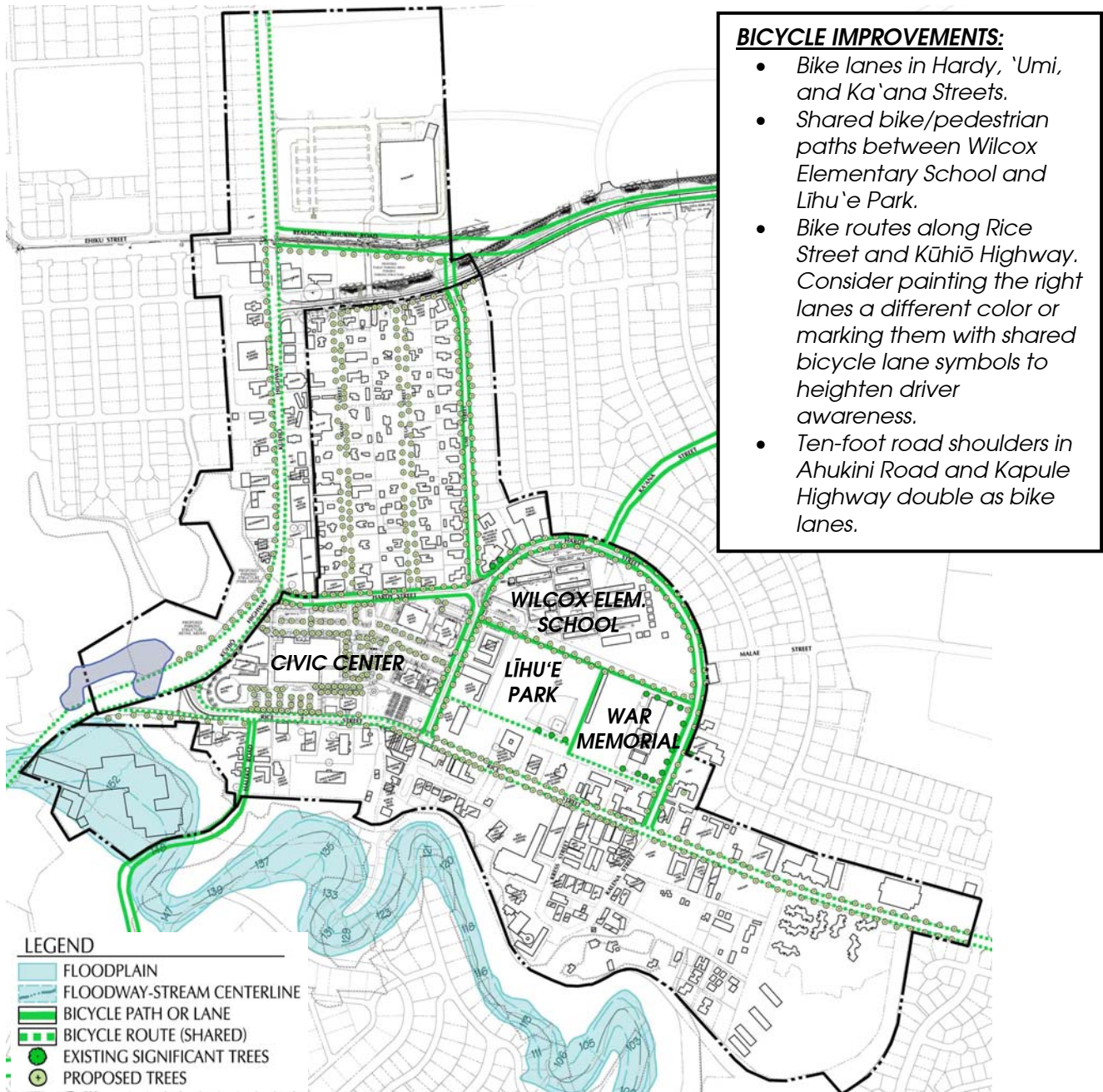


Figure 4-6: Bicycle Circulation Plan

Figure 4-6 shows the proposed Bicycle Circulation Plan for the Town Core. Striped bicycle lanes are proposed for 'Umi, Hardy and Ka'ana Streets. Shared bike/pedestrian paths will cut between Wilcox Elementary School and Līhu'e Park. Rice Street and Kūhiō Highway are designated as bicycle routes (shared right lane, painted for driver awareness) since there is insufficient space for a separate bike lane without acquiring additional land from adjacent property owners and encroaching on buildings and sidewalks. On Ahukini Road and Kapule Highway, bicycles will be able to ride comfortably in the ten-foot wide shoulders.

4.2.6 DETAILED STREET DESIGNS

4.2.6.1 Ahukini Road and Kapule Highway

These two roadways are the major entry points for Līhu'e Town and the gateway to the airport. In order to maintain the vision of Kaua'i as the Garden Isle for residents and visitors alike, these roads are envisioned as four-lane divided roadways with generous landscape buffers on either side of the roadway and landscaped center medians. Because they are primarily a high volume vehicle travelways with bicycle lanes, no sidewalks are recommended; however, crosswalks should be provided at every intersection that has traffic signals.

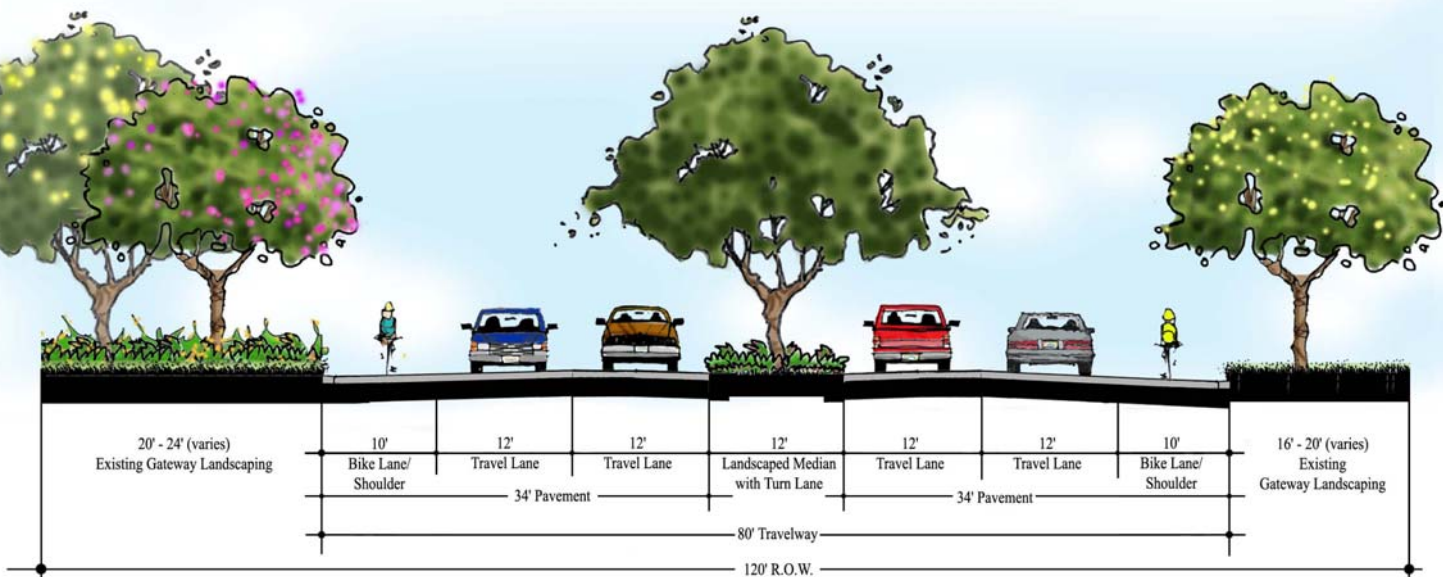


Figure 4-7: Proposed Street Section for Ahukini Road and Kapule Highway

Travel lanes: Four twelve-foot travel lanes, two in each direction. Ten-foot striped bike lanes/road shoulders are also provided within the travelway (Figure 4-7). The center medians will narrow where left turn queue lanes are required at intersection approaches. If additional left-turn queue lanes are needed, such as the approaches to Kūhiō and Kapule Highways, portions of the gateway landscaping could be narrowed or removed since there is ample space within the 120-foot right-of-way. The right-of-way on Kapule Highway varies and may not be wide enough to accommodate a center median along certain stretches.

Landscape Buffers: The roadway design should maintain the landscape buffers on the outside edges of the right-of-way to soften the view of the adjacent buildings particularly near the airport. Additional landscaping should be planted as needed to provide continuity. Since there are no sidewalks planned for these roadways, the landscape buffers could be designed as bioswales to assist drainage and filtration of road runoff. If

the underlying soils have adequate drainage capacity, the shoulders could be paved with permeable materials to improve percolation.

Utilities: The overhead utility lines should also be relocated underground at the same time the roadways are widened to four lanes.

4.2.6.2 Rice Street

Rice Street is the heart and “main street” of Līhu’e Town. It is where the island’s major parades and celebrations are held but it is also a major collector road. There are two different street sections proposed for Rice Street.

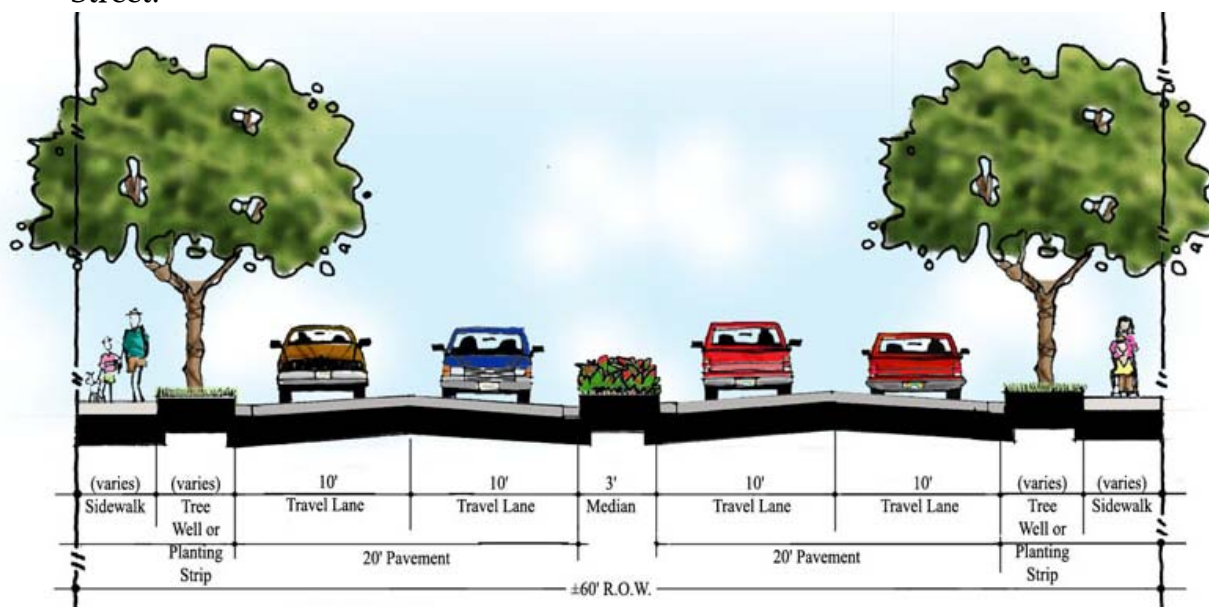


Figure 4-8: Upper Rice Street Section

Upper Rice Street: The design for the first section originates from the Līhu’e Civic Center Master Plan and describes the stretch of Rice Street between Kūhiō Highway and ‘Umi Street (see Figure 4-3 and Figure 4-8).

Because there is sufficient right-of-way, the section includes a small landscaped median and four travel lanes—two in each direction. There are wide sidewalks with tree wells or planting strips (minimum four feet wide) and overhead utility lines are relocated underground. The traffic study prepared for the Līhu’e Civic Center Master Plan recommends installing a traffic signal at the intersection of Rice and Kele Streets to make the pedestrian crossing safer and is illustrated to the left.

Figure 4-9: Rendering of Kele and Rice Street Crosswalks



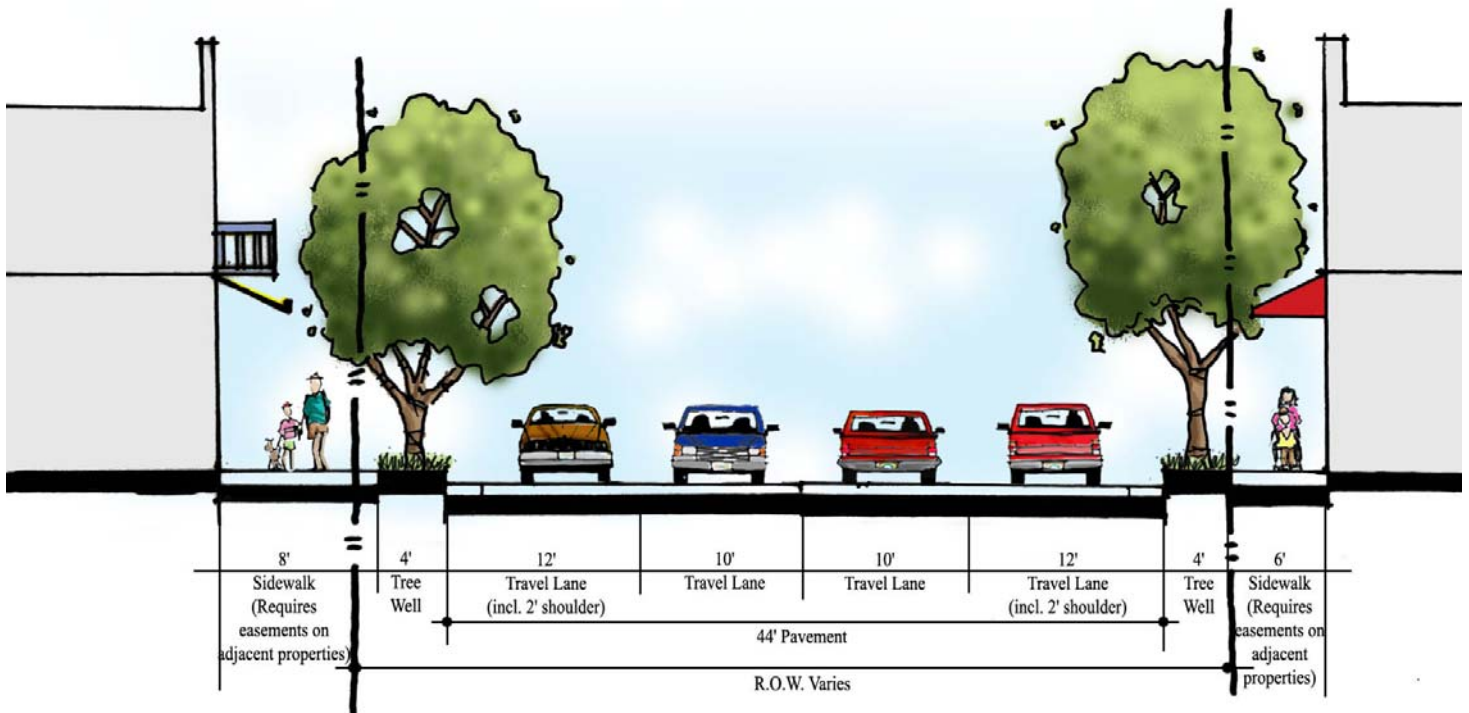


Figure 4-10: Lower Rice Street Section

Lower Rice Street: For the remaining length of Rice Street between 'Umi Street and Kapule Highway, the road right-of-way width varies but is too narrow to include a center median. The County previously acquired land

to widen Rice Street to four lanes so there are sections where the sidewalk is narrow and uncomfortable to walk. In order to make the sidewalks safer for pedestrians, the proposed roadway section includes four-foot tree wells to improve the health and growth of the trees and to provide a wider buffer for pedestrians from the travel lanes. Overhead utility lines are relocated underground. In addition, wider sidewalks, a minimum 6 to 8 feet, are recommended (Figure 4-10). These improvements would be required as easements on the adjoining properties. Awnings and canopies are also required for buildings fronting Rice Street to shelter pedestrians and to create a pleasant walking environment.



Figure 4-11: Rendering of Lower Rice Street

4.2.6.3 Kūhiō Highway

Kūhiō Highway is a major arterial for island-wide traffic but it runs through a busy commercial area in Līhu'e Town. As a result, the design for the roadway needs to balance regional traffic throughput with safe and easy access to the businesses by pedestrians. The proposed section maintains four lanes of traffic as it exists today, but includes street trees to shelter pedestrians and provide shade. A minimum sidewalk width of four feet (ideally eight feet) should be provided. In order to accomplish this, some areas of Kūhiō Highway will require an easement for the sidewalk since the right-of-way varies in width and the alignment of

travel lanes within the right-of-way is not consistent (Figure 4-14). There are certain areas on the mauka side of Kūhiō Highway where the setback is twenty feet and these easements can easily be established. If the Līhu'e Bypass is built and through traffic on Kūhiō sufficiently reduced, Kūhiō Highway should be further redesigned with wider sidewalks, reduced traffic lanes and striped bike lanes to further prioritize pedestrians within the Town Core.



Figure 4-13: Rendering of Kūhiō Highway

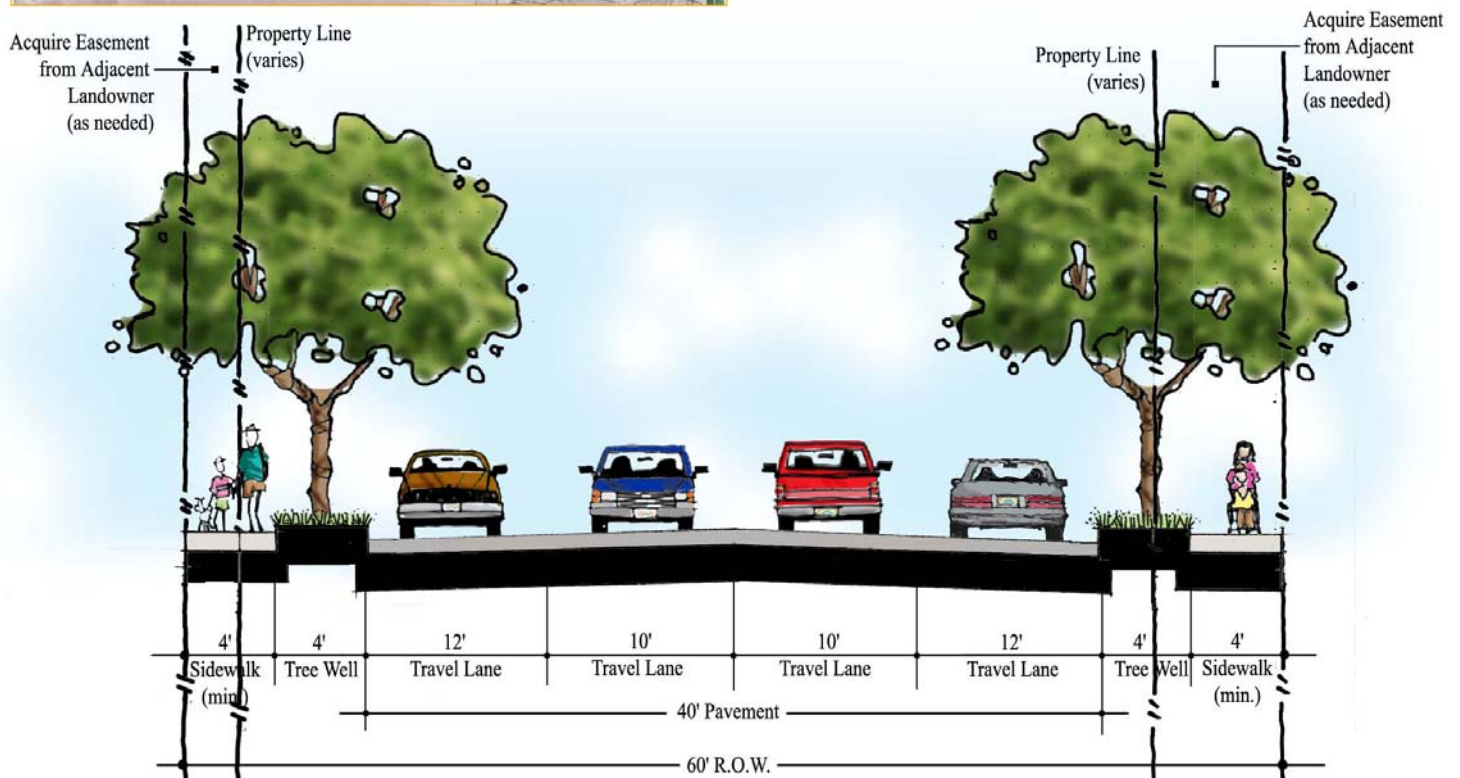


Figure 4-14: Kūhiō Highway Street Section

4.2.6.4 Hardy Street

The proposed design for Hardy Street between Kūhiō Highway and 'Umi Street is taken from the Līhu'e Civic Center Master Plan report. Hardy Street is envisioned to have bike lanes and a landscaped center median with turn lanes or breaks in the median for left turns (Figure 4-15). This roadway section could be extended past 'Umi Street to the Līhu'e Public Library so that the center median could provide a safe refuge for children crossing the street from Wilcox Elementary School. Overhead utility lines should be relocated underground. For the remaining length of Hardy Street, the center median is eliminated from the roadway section but the bike lanes are continued to Rice Street and parallel parking is provided on both sides of the street. Landscaped bulb-outs are provided at intersections and regularly spaced along the length of the street.

Figure 4-15:
Hardy Street
Section
Adjacent to
Civic Center

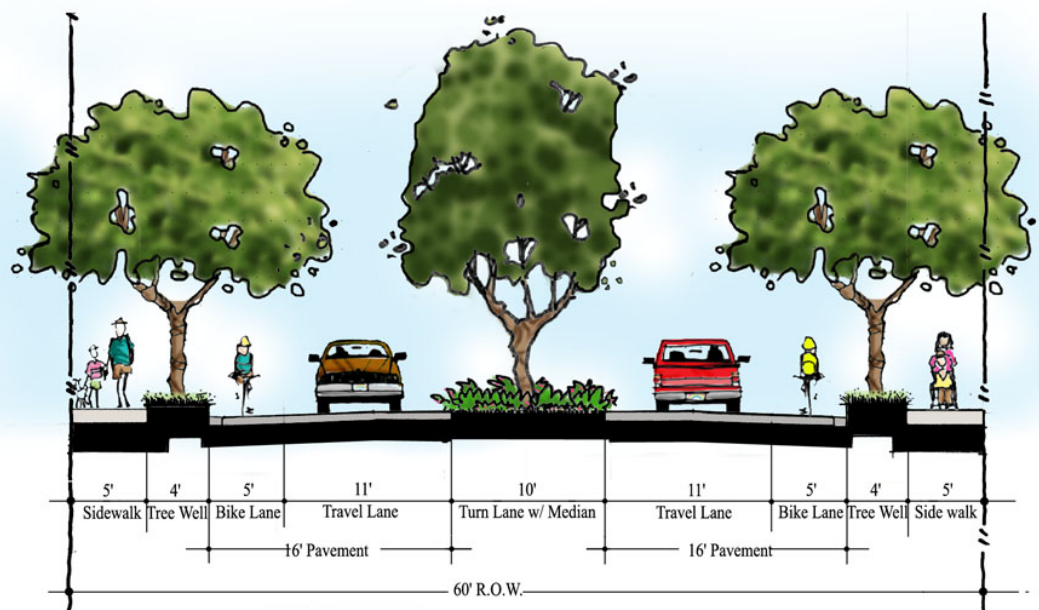
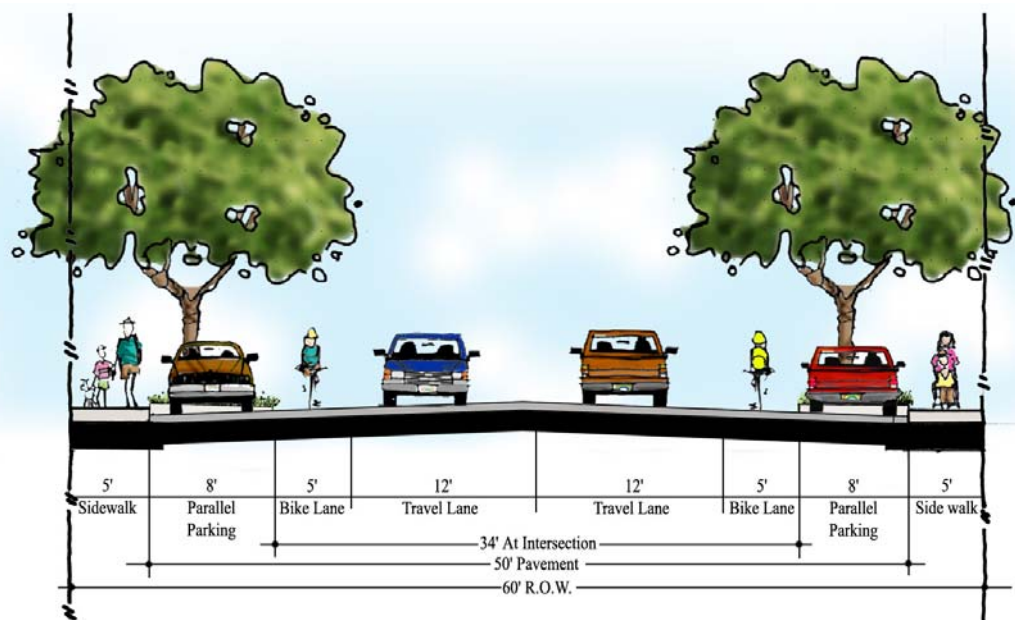


Figure 4-16:
Hardy Street
Section
between 'Umi
and Rice
Street



4.2.6.5 'Umi Street

Adjacent to the Civic Center, 'Umi Street is envisioned to have two twelve-foot travel lanes, on-street parking and bike lanes (Figure 4-17). Landscaped bulb-outs are provided at intersections and regularly spaced along the length of the street. The remaining length of 'Umi Street north of Hardy Street runs through a residential neighborhood. Based on community feedback, on-street parking is not required nor wanted in this area so the driving lanes are wider (Figure 4-18) but could be added at a later time if desired. 'Umi Street will be extended north to the realigned Ahukini Road. The intersection would remain unsignalized until traffic increases warrant signalization.

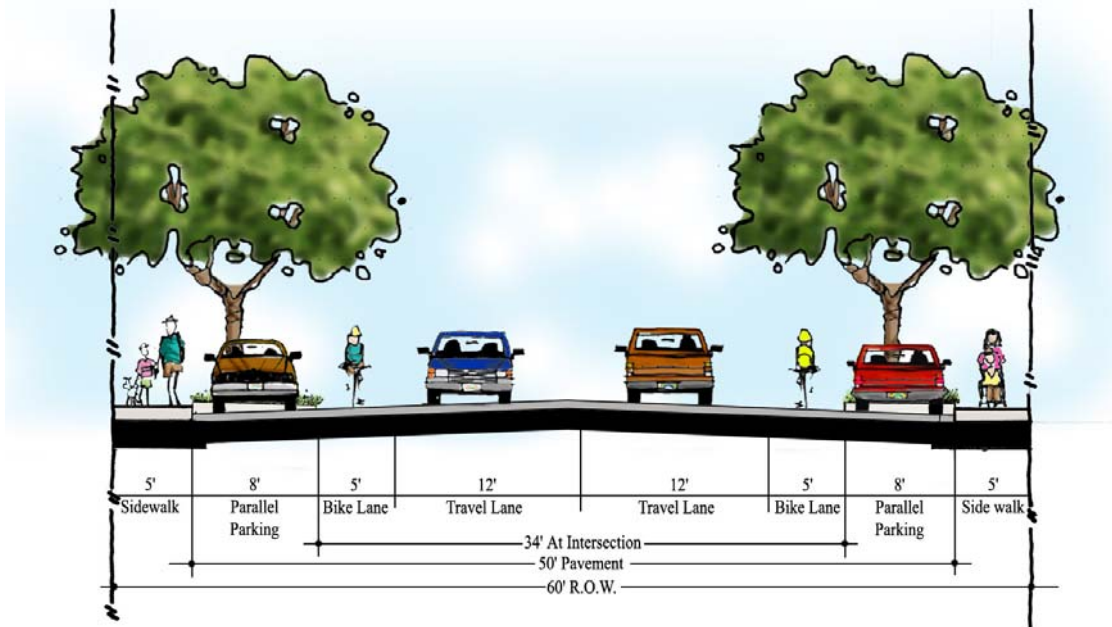


Figure 4-17:
'Umi Street
Section
Adjacent to
Līhu'e Civic
Center with
On-street
Parking

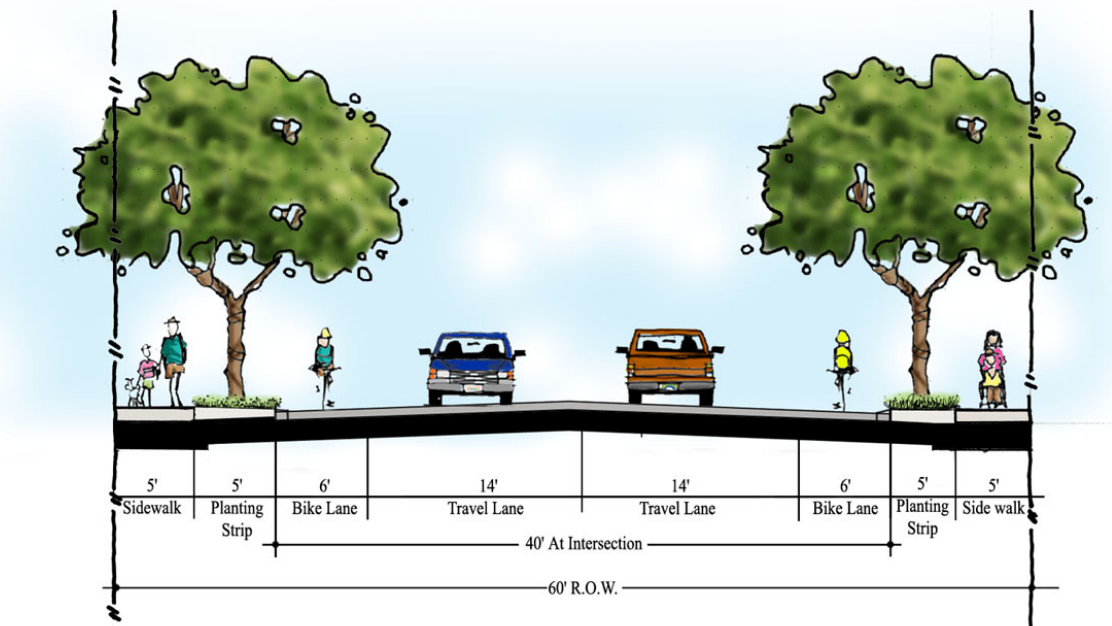


Figure 4-18:
Residential
'Umi Street
Section

4.2.6.6 'Akahi and 'Elua Streets

Because 'Akahi and 'Elua Streets were historically designed as residential streets, the right-of-ways are narrow 40-foot widths and there are no sidewalks. However, as the land uses change from residential to commercial, safe, ADA-accessible access to the businesses will be required. The street sections proposed for these streets include four-foot sidewalks and four-foot planting strips on both sides of the ten-foot travel lanes. Parallel parking will be provided on one side to the roadway (Figure 4-19). In order to slow traffic and discourage cut-through traffic especially on 'Akahi Street once the County driveway is realigned at Hardy Street, the on-street parking could switch sides every so often so that the travel lanes meander in a chicane pattern (Figure 4-20). Care should be taken to preserve or replant existing front yard hedges and garden walls that border the property line to maintain street character.

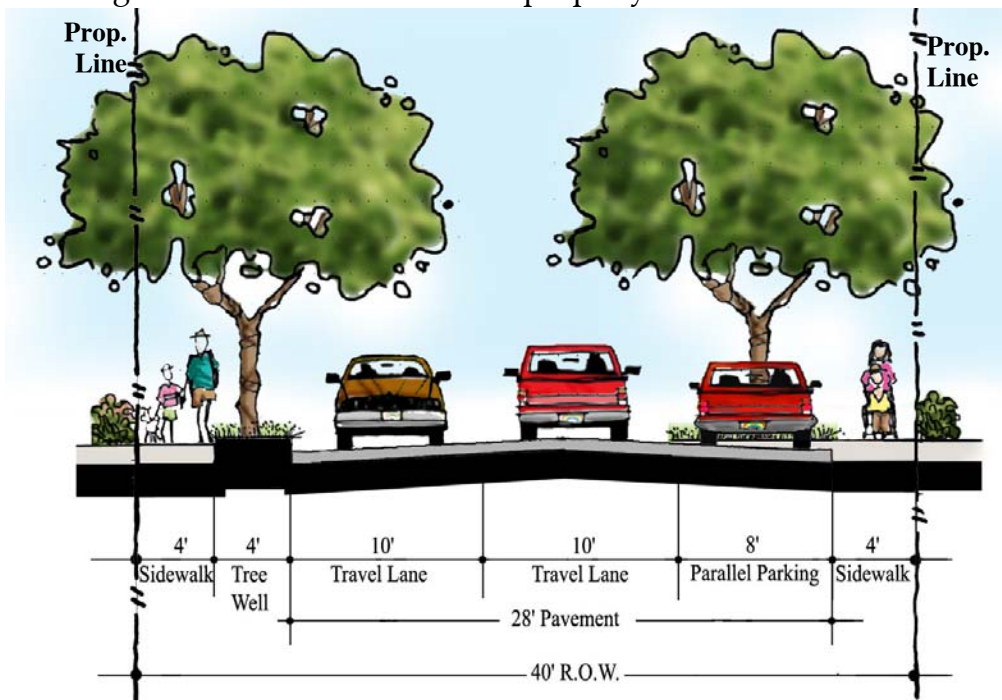
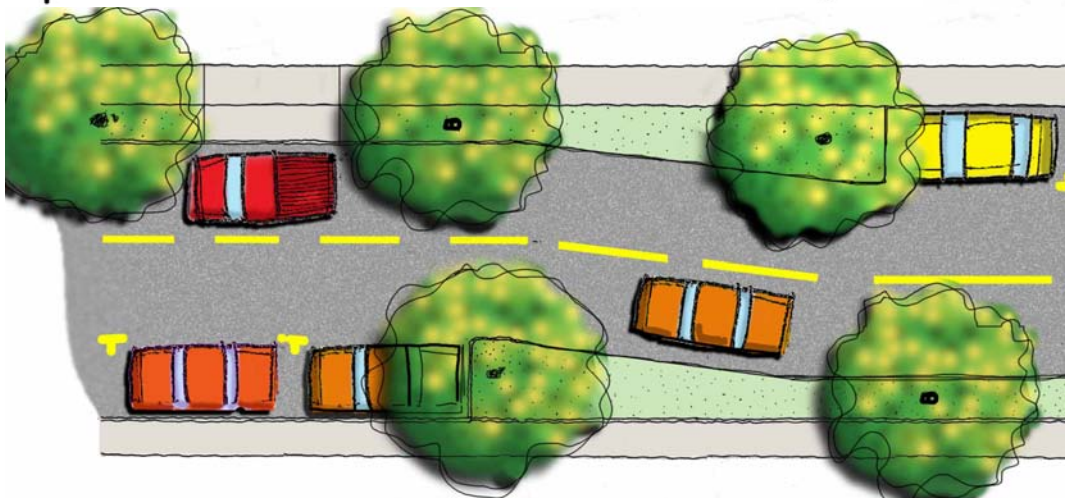


Figure 4-19:
'Akahi and 'Elua Street Section

Figure 4-20:
Chicane on 'Akahi and 'Elua Streets



4.2.6.7 Halekō Road

Because of its historic importance, Halekō Road is recommended by the CAC to be maintained as a two-lane roadway. With the State DOT planning to widen Kaumuali'i Highway between Puhi and Rice Street, the need to widen Halekō Road to four lanes is reduced. Roadway improvements should include installing sidewalks with curbs or contrasting



paving at least on one side of the roadway since pedestrians are known to use Halekō Road (Figure 4-21). Interpretive signage with historic information about the road should be installed and tied in with Līhu'e Mill improvements. If space permits, bicycle lanes should be striped or allowed to share the road shoulders. At a minimum, Halekō Road should be designated as a bike route.

Figure 4-21: Pedestrian on Halekō Road

4.2.6.8 Realignment of Ahukini Road with 'Ehiku Street and the Proposed Līhu'e Bypass Road

The realignment of Ahukini Road with 'Ehiku Street has been on the County planning books since the 1970s. Visibility is difficult at its current intersection with Kūhiō Highway due to the proximity of buildings along the street. The realignment would follow an existing cane haul road and connect mauka to the proposed Līhu'e Bypass Road. The State DOT's Kaua'i Long Range Land Transportation Plan listed the realignment of Ahukini Road as a Phase 2 (Year 2001-2005) project and the bypass as a Phase 3 (Year 2006-2020) project. With the growing traffic on Kūhiō Highway and nearly 80 percent of survey respondents supportive of the Līhu'e Bypass Road, the DOT should consider initial planning for the improvements. Most of the land required for the realignment and bypass belong to either the Grove Farm or Weinberg family of companies (see Figure 3-28).

4.2.6.9 Existing Ahukini Road

Even with the realignment of Ahukini Road as described above, the existing road would remain to provide local access to 'Akahi, 'Elua, and 'Umi Streets. Its intersection at Kūhiō Highway and Oxford Street is

recommended to be changed from a full access intersection to one where no left turns are allowed. Also, the traffic signals should be removed.

4.2.6.10 Ka'ana Street

Ka'ana Street will eventually be connected between the Civic Center and the new Judiciary and Police Station on Kapule Highway. This will provide an important secondary connector between the historic Civic Center and the new Wailani development² and civic uses along Kapule Highway. The design of the street section is dictated by the Līhu'e-Hanamā'ulu Urban Design Plan (LHUDP, August 1995) which was adopted by Ordinance No. PM 326-96. Any amendment to the LHUDP requires approval from Planning Commission.

The original street section required for Ka'ana Street in the LHUDP is shown in Figure 4-22. Within the commercial areas, thirteen-foot wide sidewalks (included five-foot setbacks on the commercial properties and eight feet within the street right-of-way with four-foot tree wells) were required. However, the roadway consisted of two travel lanes with two additional lanes for on-street parallel parking during non-peak traffic hours and no bicycle lanes.

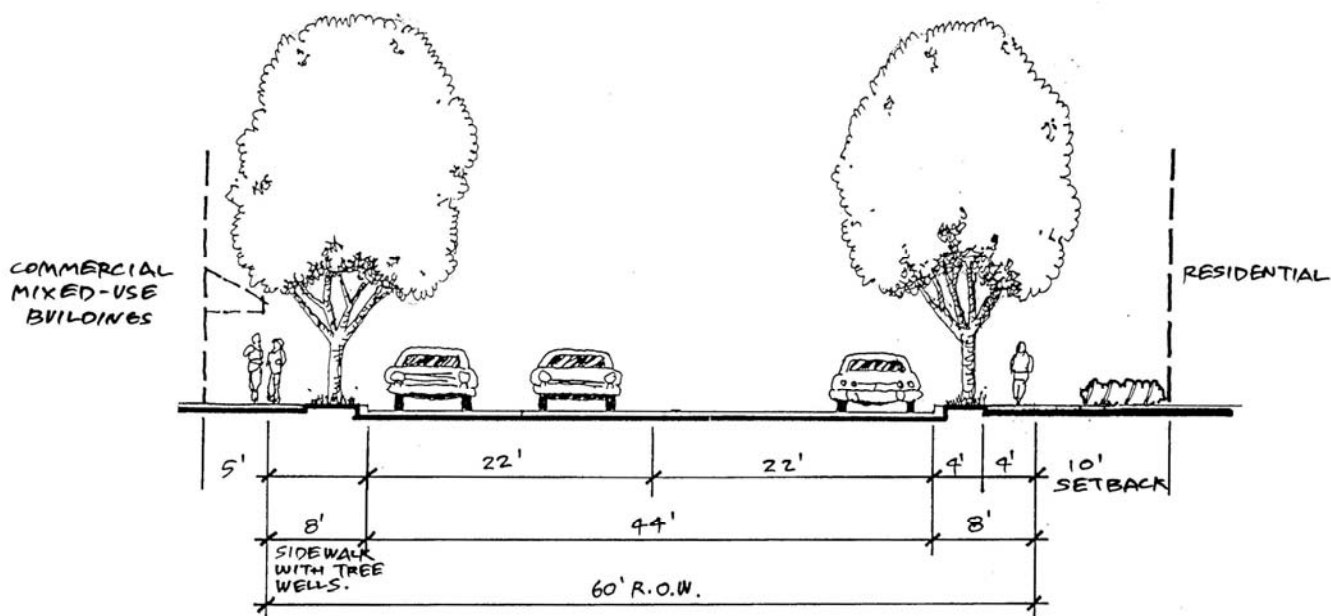


Figure 4-22: Ka'ana Street Section (from Līhu'e-Hanamā'ulu Urban Design Plan, August 1995)

² The Wailani project is a portion of the original Līhu'e-Hanamā'ulu Master Plan project area being developed by Ha'ili Moe/Grove Farm.

Since then, the County of Kauaʻi has constructed the portion of Kaʻana Street between Kapule Highway and the new police station. It includes two travel lanes (one in each direction), four-foot sidewalks, a planting strip with kou trees, and striped bicycle lanes (see Figure 4-23). The County DPW also initiated planning for the Nāwiliwili-Ahukini Shared-



Use Path Project and requested that the bicycle lanes be continued through the Wailani project on Kaʻana Street.

Figure 4-23: Existing Kaʻana Street Adjacent to the New Judiciary and Police Station (View looking towards Kapule Highway)
(Photo courtesy of James Niermann/RM Towill Corporation)

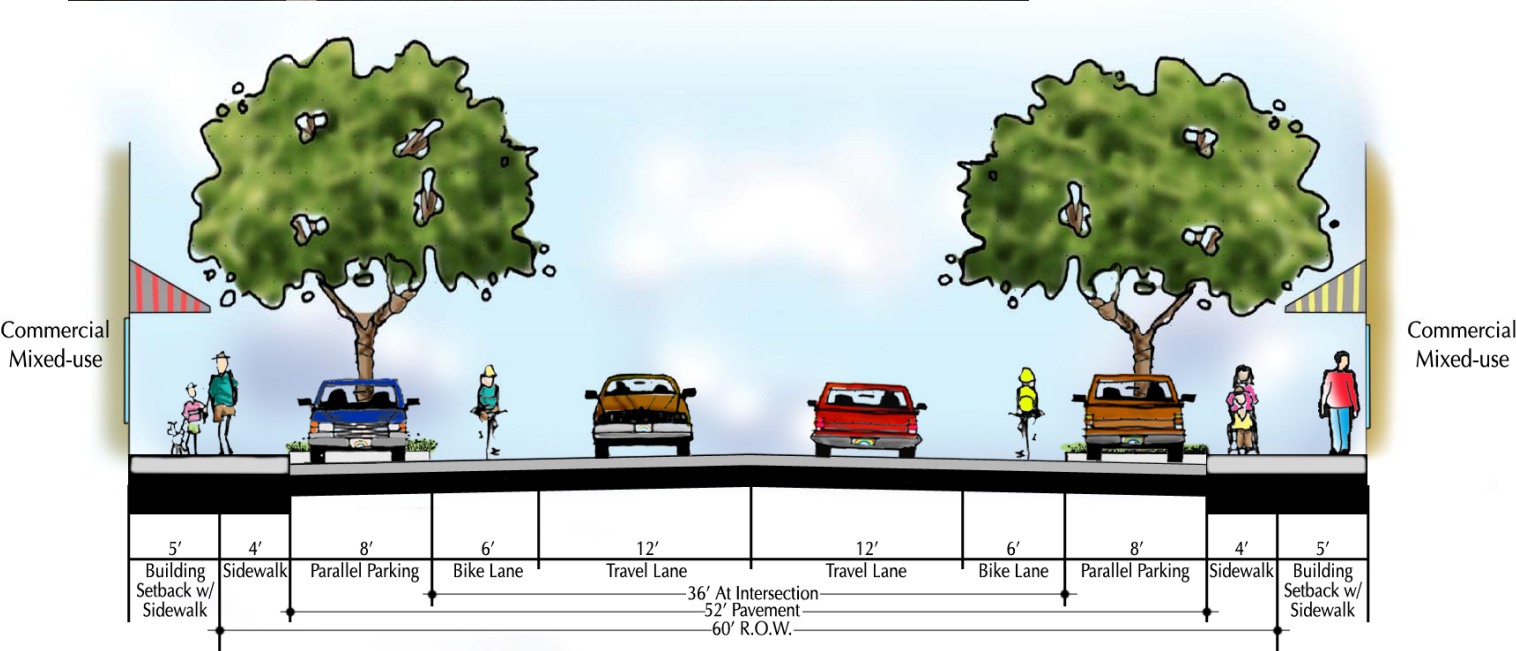
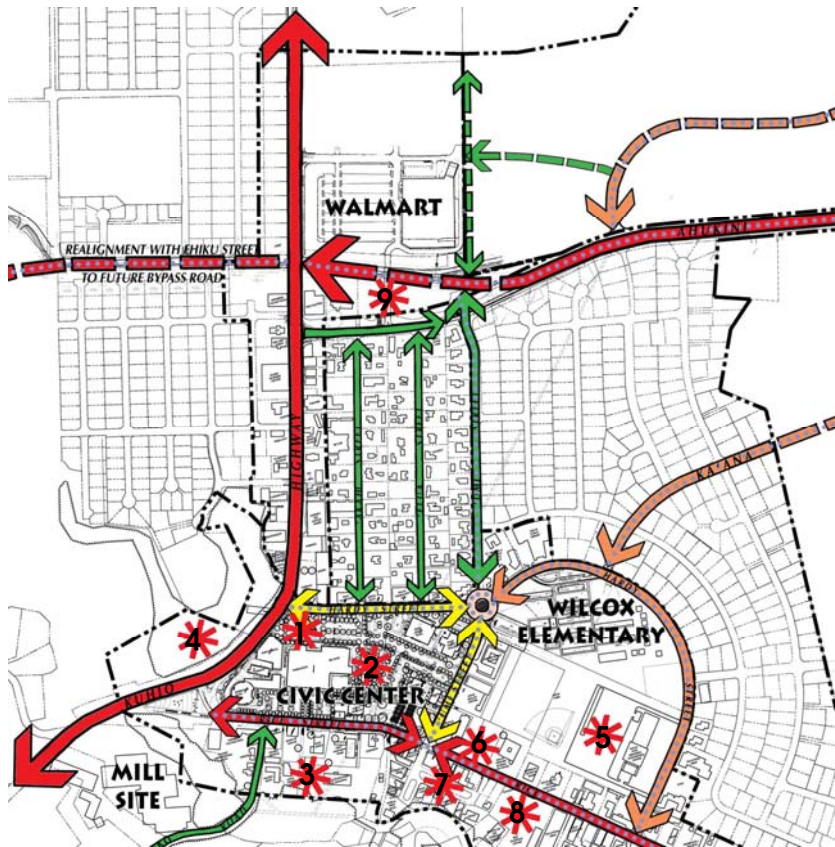


Figure 4-24: Proposed Kaʻana Street Section

As a result, a new street section for Kaʻana Street adjacent to the Wailani project has been developed by Grove Farm and the County and is shown in Figure 4-24. It includes two travel lanes, six-foot bicycle lanes, on-street

parking with bulbouts for street trees, and nine-foot wide sidewalks (four feet within the street ROW and five-foot setbacks fronting the commercial buildings. A similar street section would continue through the Wailani development adjacent to the residentially-zoned areas. The only exception would be the inclusion of ten-foot building setbacks from the ROW (similar to the original 1995 required street section) instead of the five-foot setbacks within the commercial areas.



4.3 PUBLIC PARKING

Although a detailed parking study for Lihue Town is outside the scope of this project, potential locations for public parking lots were identified based on site observations and community input. They are indicated as red stars in Figure 4-25.

Figure 4-25: Public Parking Opportunities

These parking facilities could be built either at-grade or in structured parking depending on available funding and the number of parking spaces

needed to support nearby businesses, government, offices and residences. A detailed parking study to determine the need, site suitability and potential construction costs is recommended before undertaking the construction of additional parking facilities.

The proposed sites are numbered in Figure 4-25 and include the following:

- **Sites 1 and 2:** As proposed in the master plan for the Lihue Civic Center, two underground parking structures are proposed in order to create a campus-like environment for the Civic Center while providing adequate onsite parking (see Figure 4-3).
- **Site 3:** Preliminary discussions with the owner of the Lihue Plantation Building indicate that he is willing to contribute land behind the



Līhu'e Post Office if the County and neighboring businesses partnered to build a parking structure. The stalls would be split pro-rata based on each participant's contribution.

- **Site 4:** As noted earlier in the report, the land opposite Kūhiō Highway from the Civic Center was identified by the community as a potential site for a parking structure to supplement Civic Center parking needs as well as any development at the mill site. The site is located in a gulch and would allow the parking decks to be hidden from view along Kūhiō Highway. The cost to construct such a parking structure, however, may be high since the parking decks would need to address the potential flooding. Further engineering studies should be completed to determine the feasibility and cost of the parking structure. Extensive landscaping should also be considered on the mauka side of the potential structure since it would be highly visible from eastbound traffic on Kaumuali'i Highway. A commercial use could also be built on the top level at-grade with Kūhiō Highway to help defray costs.



- **Site 5:** The existing at-grade parking lot at the Kaua'i War Memorial is an ideal location for a public parking lot or supplemental parking for the Civic Center since it is owned by the County and is typically empty during the work day. It fills only when there are events at the War Memorial. When no events are scheduled at the War Memorial, it could be opened to the public to serve nearby businesses as well as park goers at Līhu'e Park. There are over 250 existing stalls. A deck could easily be added to increase the number of parking stalls if needed.



- **Site 6:** Although this site is located across 'Umi Street, it is close to the Civic Center and central business district of Lihue Town. There are usually cars parked in the lot, but it is rarely filled to capacity and may be underutilized. The County could negotiate with the land owner whether or not they would be willing to lease excess parking spaces for public use or consider partnering to build a parking structure at the location. The parking structure's façade on Rice Street should be designed to incorporate liner shops or offices or landscaped with shade trees in order to maintain a pedestrian-friendly streetscape in this location near the center of town.



- **Site 7:** 'Ewalu Street is actually a one-way loop around a center island of 60 angled parking stalls (see Figure 3-38). It would be difficult to build a cost-effective parking structure at this location since the buildings are too close together (~80 feet between buildings face-to-face) and it would hide several storefronts. However, a potential reconfiguration of the parking area could be done to provide continuous sidewalks and improve the pedestrian environment in the area. In the proposed layout, the number of marked parking stalls would increase by one compared to the existing parking. A sketch of the plan is provided in Figure 5-4.

- **Site 8:** The Rice Shopping Center has a large parking lot fronting Rice Street. On a typical day, the lot is mostly empty but it can fill up when there are tournaments at the bowling alley. However, the area is not designed to be pedestrian-friendly. The site is large enough to allow public parking for other nearby businesses if an agreement



could be arranged or encouraged by the County with incentives such as a property tax breaks. Another option if additional parking is needed is to partner with the County to build structured parking and wrap it with liner shops and/or offices on Rice Street. See proposed plan for Lower Rice Street in Figure 4-12 and rendering of streetscape in Figure 4-11.

- **Site 9:** Site 9 is owned by HRT, Ltd. and occupies a remnant piece of land between the existing Ahukini Road and the proposed realignment. It is an ideal location for a public parking lot since it is within walking distance to the Kūhiō Highway and 'Akahi/'Elua Streets Neighborhoods and can supplement the parking needs of the businesses and residences in the area. It also has easy access from Ahukini Road which is planned as a major arterial road. The parking lot could be designed as an infiltration bed topped with a porous pavement to aid drainage in the area. Subsoils should be tested for adequate permeability and the infiltration basin should be designed so as not to affect neighboring properties. The edges of the site should be landscaped to match the existing gateway landscaping and to shield the parked cars from view. This will provide continuity along the old and new alignments for Ahukini Road. Bioswales could also be designed as part of the landscaping to help filter runoff.



4.4 PUBLIC TRANSIT

With nearly a quarter of Līhu'e's population under the age of 18 and another quarter of the population over the age of 65, there are many people in the community who do not drive but need a convenient way to travel around town. Public transit systems such as the County's Kaua'i Bus serve those who are not able to drive and provide an alternative for those who can. They also help reduce traffic by reducing the number of vehicles on the road and the need for those of driving age to shuttle elderly family members or young children around town.

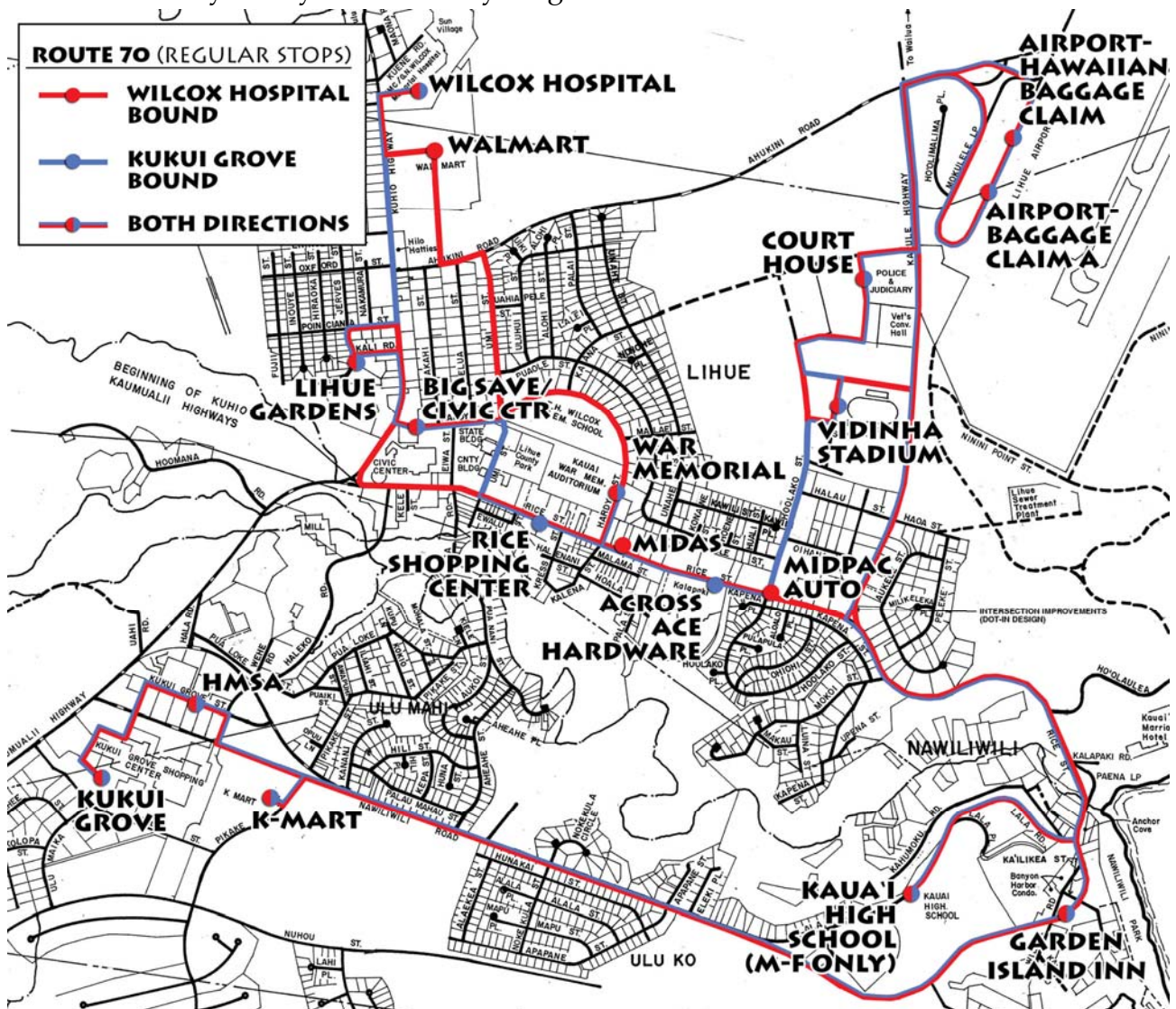


Figure 4-26: Līhu'e Route 70, The Kaua'i Bus

4.4.1 EXISTING SERVICE

The Kaua'i Bus currently runs Monday through Saturday between Kekaha and Hanalei with stops in Līhu'e Town. There is also a Līhu'e only route (Route 70) which operates Monday through Saturday. Route 70 runs

between Kukui Grove Shopping Center and Wilcox Hospital via the airport and courthouse and has several stops around Līhu'e Town including Wal-Mart and Big Save/Civic Center (see Figure 4-26). It also stops at Kaua'i High School

Transit service within Līhu'e has expanded since this project began and a separate, shorter Līhu'e Lunch Shuttle route has been added. It runs between 10:30 AM and 2:00 PM and fares are significantly cheaper at 50 cents for the general public and 25 cents for seniors (60+ years) and youth (7-18 years). As previously recommended in the Līhu'e Civic Center Site Improvements Master Plan, it runs between the Civic Center, Kukui Grove Shopping Center, Wal-Mart/Wilcox Hospital, and the new Courthouse. It was designed to be a shorter, more convenient transit route to serve the lunchtime increase in trips in and around the Civic Center during workdays (Monday through Friday). Should some of the parking recommendations from the Civic Center Master Plan be initiated by the County, the hours of operation of this shuttle route will need to be expanded to include mornings and afternoons and a stop at the War Memorial parking lot will need to be added. However, other than that, the existing stops could remain the same. Figure 4-27 shows the existing and proposed stops and route.

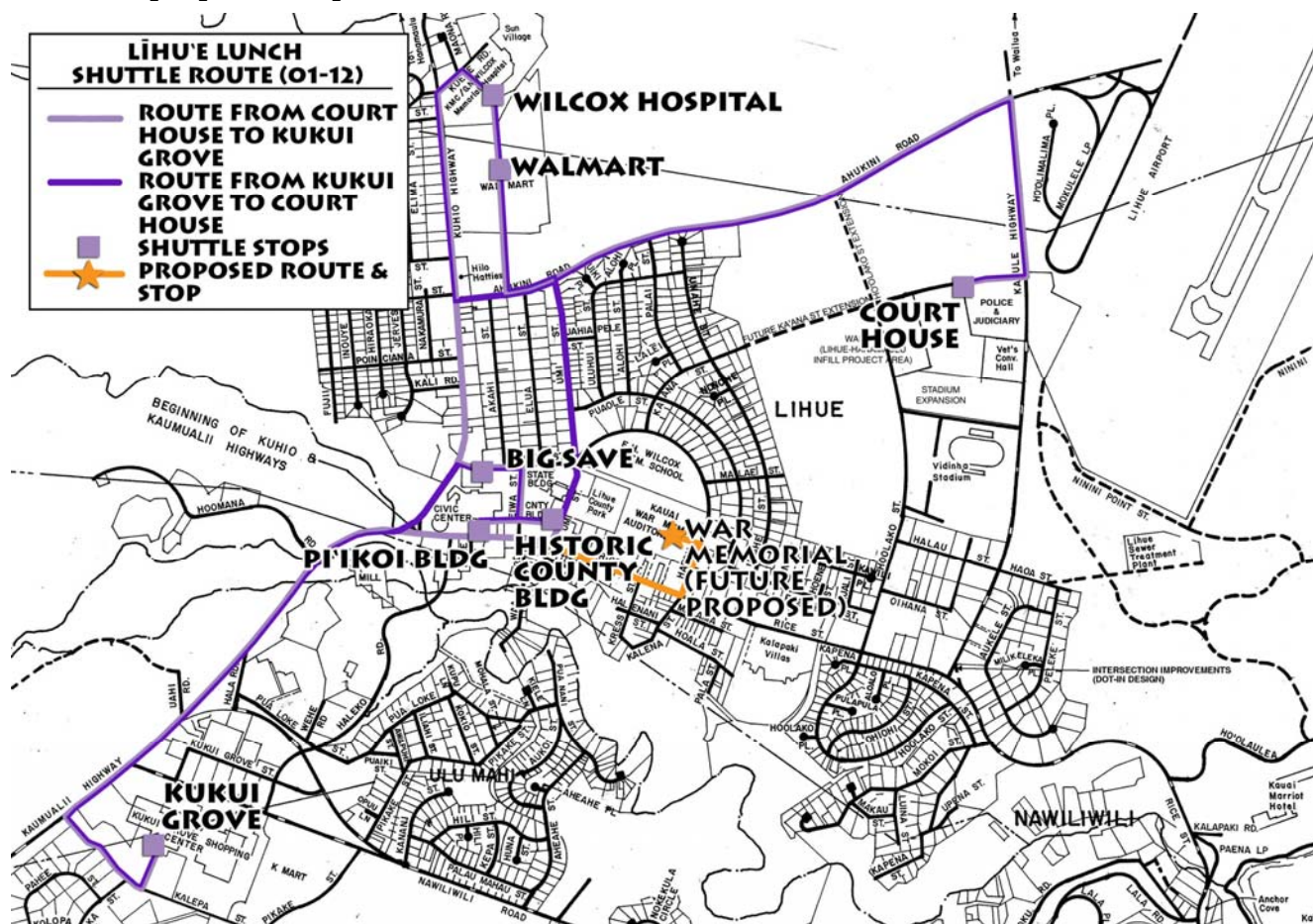


Figure 4-27: Līhu'e Lunch Shuttle

4.4.2 ADDITIONAL STOPS FOR ROUTE 70

As the Puhi residential areas near the Puakea Golf Course and Wailani mixed-use infill area between the Lihue Civic Center and the airport is developed, new stops should be added to Route 70 as the need arises. Initial discussions have been held with the County Transportation Agency and DOE Student Transport Services for the proposed stops in Puhi along the Nūhou Street extension. Within Wailani, the proposed stops will connect the old town core with this new activity center. The Nāwiliwili Harbor stop will better serve arrivals and departures by ship. The proposed stops are illustrated in Figure 4-28 and listed below:

- Wailani (Līhu'e-Hanamā'ulu) Town Center
- Nāwiliwili Harbor (coordinate with arrival/departure schedules)
- Puhi neighborhoods (along Nūhou Street extension)

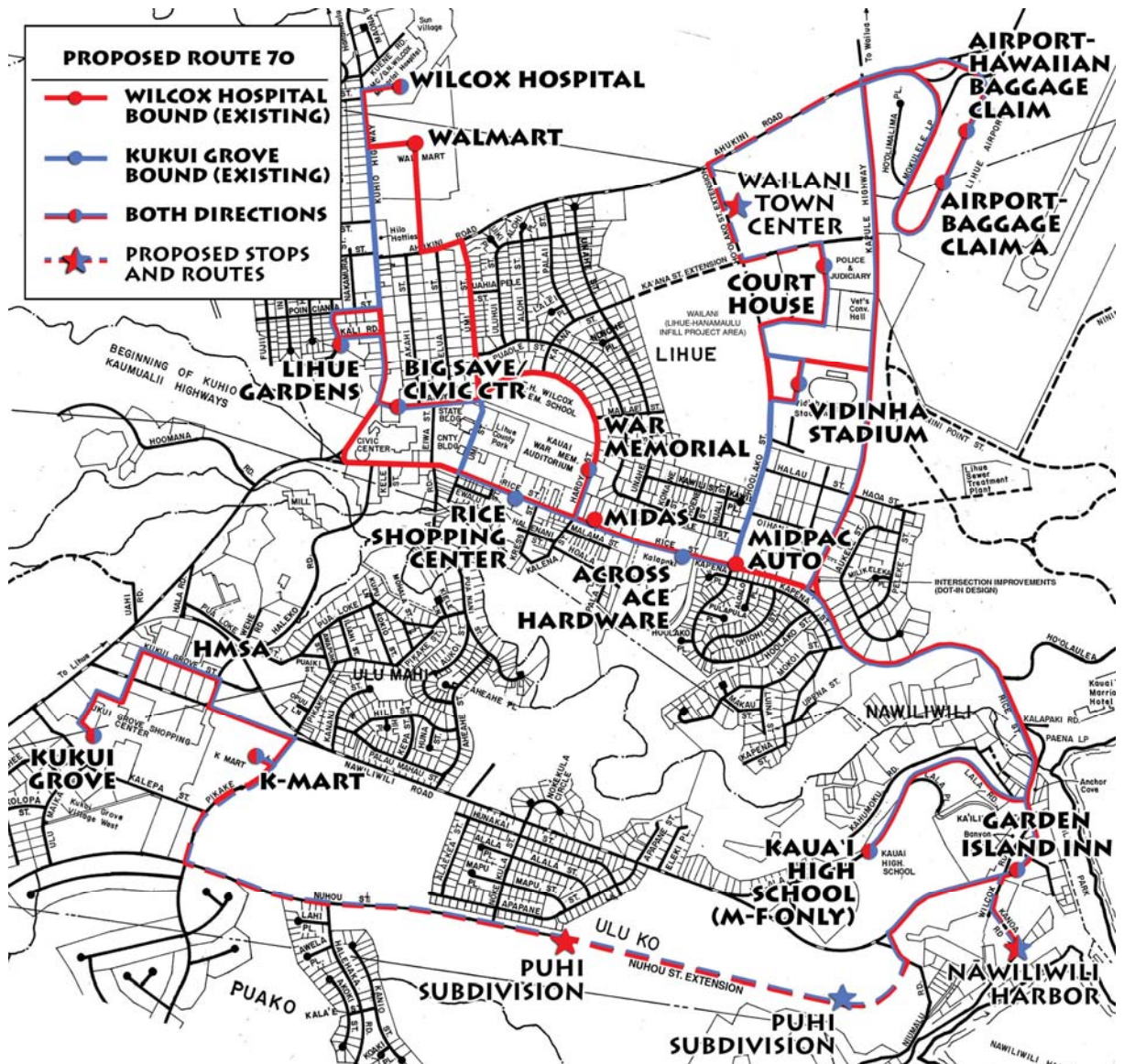


Figure 4-28: Proposed Additional Stops

4.4.3 GENERAL DESIGN PRIORITIES AND GUIDELINES

The design of public transit routes and facilities in Līhu'e Town should include:

- Convenient routes and stops
- Frequent departures
- Low fares
- ADA accessible bus stops
- Amenities such as covered seating areas, trash receptacles, and telephones (where space permits)
- Bus pullout areas where feasible, to avoid blocking traffic while at a stop (pullouts should not be provided if they reduce the adjacent sidewalk to a width less than 4 feet)
- Renewable fuels and environmentally friendly vehicles
- Special event shuttles (offer charters for festivals, celebrations, sports events and after-school activities)

4.4.4 BUS STOP SHELTERS

Bus stop shelters should be designed for ADA accessibility and to provide shelter for waiting passengers. The minimum guidelines include an eight-foot wide paved, level surface and a sheltered bench if space permits.



Front entry pads should have a minimum street frontage of five feet and should be clear of any obstacles, landscaping, or street furniture such as trash receptacles and informational signage. All bus stop amenities should maintain a minimum clearance of three feet wherever possible and a minimum of five feet between bus stop components and fire hydrants. Sight lines for approaching buses and waiting passengers should be maintained at the stop. Additional technical guidelines are available from the Kaua'i Transportation Agency.

- **Opportunity for Community Involvement:** The bus shelters should be designed to reflect Līhu'e's unique character. The designs could be integrated with public art projects or community design competitions. An example of a well-established transit public art program is Seattle's Bus Shelter Mural Program. Examples from the program are shown in the following sidebar.

BUS SHELTER MURAL PROGRAM (SEATTLE, WA)

Initiated in 1989 by the King County Department of Transportation Metro Transit Agency, the Bus Shelter Mural Program has installed over 850 murals in bus shelters. Metro Transit has involved local students, artists, seniors, and community groups. They have also commissioned artists for specific projects. For more information, contact Program Manager, Dale Cummings, (206) 684-1524 and visit their website at: http://transit.metrokc.gov/prog/sheltermural/shelter_mural.html. All photos courtesy of Metro Transit.

STUDENT VOLUNTEERS:



Island Park Elementary Students



University Prep School Students

VOLUNTEER ARTISTS:



Nhon Nguyen



Campbell Hill Neighbors

COMMISSIONED ARTWORK:



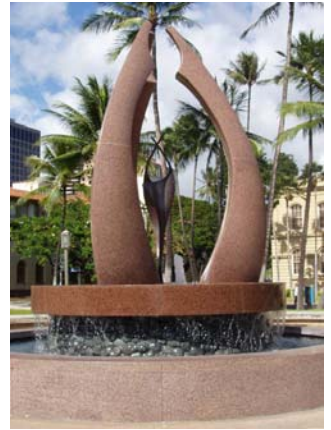
Ballard Hub Stops by Steve Gardner



UW Bothel Campus by Pam Beyette

4.5 PUBLIC ART

Public art can come in many forms—sculptures, murals, water features, and even street furniture. As an example, Downtown Honolulu’s bike racks have become evolving public art pieces that are repainted every so often with new designs. Regardless the shape or form, public art was voiced as an important element to include in the Līhu‘e Urban Design Plan during the CAC and public meetings. The illustration in Figure 4-29 shows potential opportunities for major art installations around Līhu‘e Town. Other initiatives for public art installations are listed below.

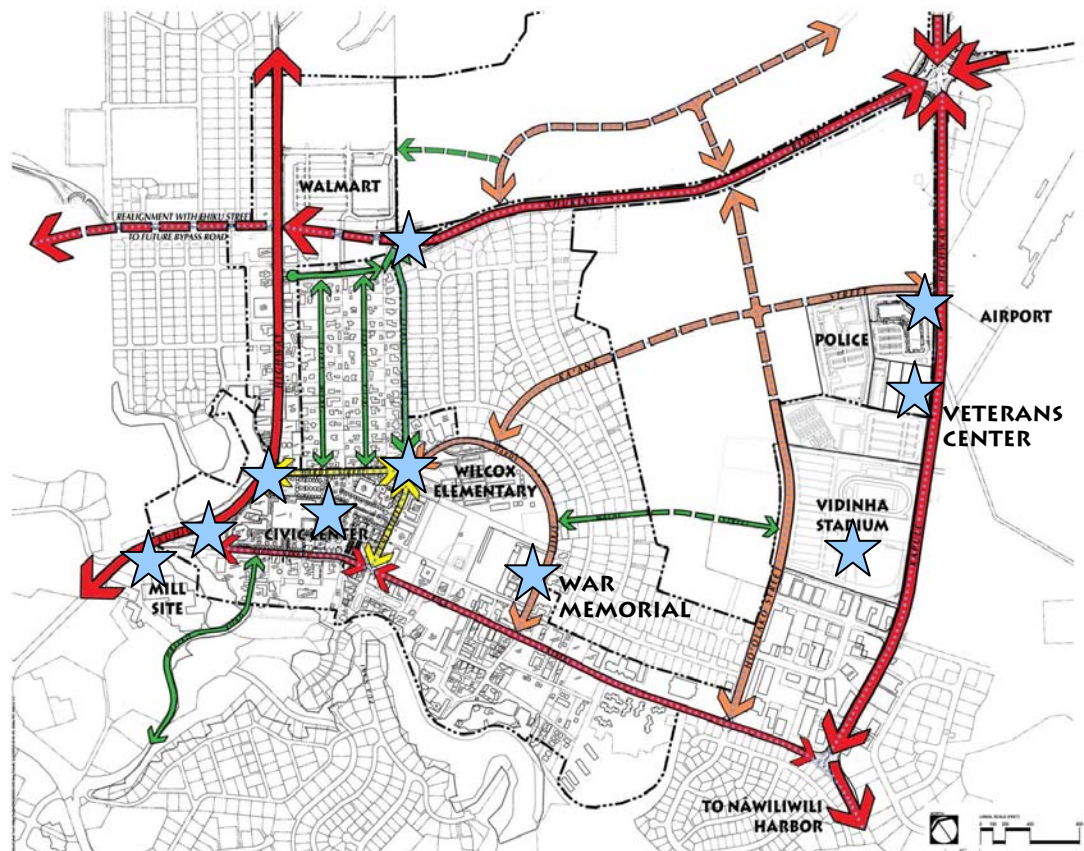


4.5.1 DESIGN PRIORITIES, CONCEPTS AND OPPORTUNITIES

- Incorporate themes and images representative of Kaua‘i and Hawai‘i into the designs
- Integrate art into streetscape elements—crosswalks, bus shelters, benches, seatwalls, banners, streetlights, trash receptacles, etc.
- Encourage community participation—hold design contests, have local students participate
- Follow-up on the momentum initiated by Ke Kumu Ike to develop a sculpture for Līhu‘e as the welcoming gateway to Kaua‘i
- Create an interpretive tour map, coordinated with historic sites



Figure 4-29:
*Potential Locations
for Major Works of
Art in the Līhu‘e
Town Core*



4.6 LANDSCAPE GUIDELINES

The following landscape guidelines provide recommendations for both public spaces and private properties within the Līhu'e Town Core. Within the public realm, these guidelines reinforce the organization and hierarchy of landscaping along roadways and open spaces. They also seek to establish an environment that is uniquely representative of Līhu'e and reinforces the image of Kaua'i as the Garden Isle. Within private properties, the landscape guidelines provide environmentally responsible options that can help cool buildings, shade parking areas, reduce and filter runoff, and improve site drainage. These guidelines also recommend street tree themes for the major roadways in Līhu'e and future public spaces such as parks and pedestrian promenades.

4.6.1 DESIGN CONSIDERATIONS

- **Hierarchy:** Landscaping should follow an appropriate hierarchy based on its location and function. Use plant material and planting design to develop a sense of order and reinforce the hierarchy of spaces and buildings; to articulate the vehicular and pedestrian circulation network; and to emphasize important buildings and outdoor spaces. Shrubs and hedges should be used as spatial reinforcement, screens, and accents.



Simple landscaping and shaded benches along a pedestrian path in Honolulu. Rhythm created by light posts, trees, and shrubs.

- **Repetition, Rhythm, and Simplicity:** Planting arrangements should use repetition, rhythm, and simplicity to create a sense of continuity and order. Repetition can be achieved through the consistent use of a

species-specific tree or shrub. Rhythm can be achieved through the regular spacing of trees or shrubs. Simplicity can be achieved through the careful selection of a limited planting palette as opposed to plantings consisting of one of every plant type (which leads to fragmented composition). Together, these elements emphasize a sense of place and create unity, and are especially

effective in articulating main circulation routes through tree plantings.

- **Themes:** Areas with a common focus, such as pedestrian malls, plazas or streets should be planted with the same species of trees. These theme plantings will create a strong focus and make those areas readily identifiable. Plants should also be used in formal patterns where they complement the layout of the buildings, entries, gateways, and commercial destinations. Street tree themes for the major roadways and pedestrian paths are provided in Table 4-1.
- **Accent Plantings:** Use accent tree plantings and flowering ornamental shrubs to highlight entries, major plazas, open spaces, buildings, and circulation paths.
- **Parks and Open Spaces:** Informal arrangements of trees can be placed in parks and open areas between buildings and residential locations, creating a softer character more conducive to relaxation and informal gathering.



- **Erosion Control and Biofiltration:** Use plant materials to control erosion and slow and filter runoff. Natural Drainage Systems (NDS) such as bioswales and should be considered along parking lots and roadways and integrated into site drainage plans to improve runoff quality as well as beautify the site.

• **Native Plants:** Incorporate native Hawaiian plants, particularly those native to Kaua'i or important to the Lihu'e area, into the landscape whenever possible. Table 4-2 below provides a list of Kaua'i natives.

- **Amenities and Street Furniture:** The consistent use of a unique palette of paving materials, site furniture, public art, bus shelters, lighting, trash receptacles, bicycle racks and plant materials will create a strong sense of place and unique identity for Lihu'e.



- **Education:** Opportunities for interpretive and educational themes and related signage should be considered throughout the Town Core.
- **Passive Cooling:** Where appropriate, consider placing trees on the south and west sides of buildings, particularly those with a large expanse of windows. This will allow for the shading of windows and walls during the afternoon sun, helping to lower the building temperatures and decrease the use of air conditioning.



- **Buffers:** Use landscaping to buffer noise and to help mitigate visual impacts of unsightly views. However, special consideration during design and installation should be taken to ensure that do not create dangerous conditions (i.e. hedging in areas where someone could hide).

4.6.2 PARKING LOT LANDSCAPING

Off-street parking areas should be located at the rear of lots whenever possible. If located adjacent to a public street or thoroughfare, they should be screened from view with plant materials, berms, attractive fencing or low walls, or a combination thereof. Large canopy trees should be planted to provide shade in larger lots.

- To reduce the overall visual impact of parking from public streets, off-street parking areas should be located in the rear of properties, hidden from view of the public thoroughfare. Parking in front yards is highly discouraged.
- As required by the CZO, parking areas visible from public thoroughfares should be screened by a fence, wall or plant screen four (4) feet high, provided that the screening height is lowered to the standards as required under the County Traffic Code or to the standards of the Department of Public Works, at street corners, driveway intersections, and other locations. The setback area between the parking area paving and the public right-of-way should be planted and shall not be paved.

- Parking lots with 5 or more spaces should be landscaped with a minimum 5-foot wide landscape strip adjacent to any adjoining public right-of-way. The landscape strip should be planted with a continuous screening hedge at least 42 inches high. A fence or wall of equal height may be used in substitution of the hedge. If a fence or wall is used, vines or shrubs should be planted at the base, along the side fronting the public right-of-way (ROW).

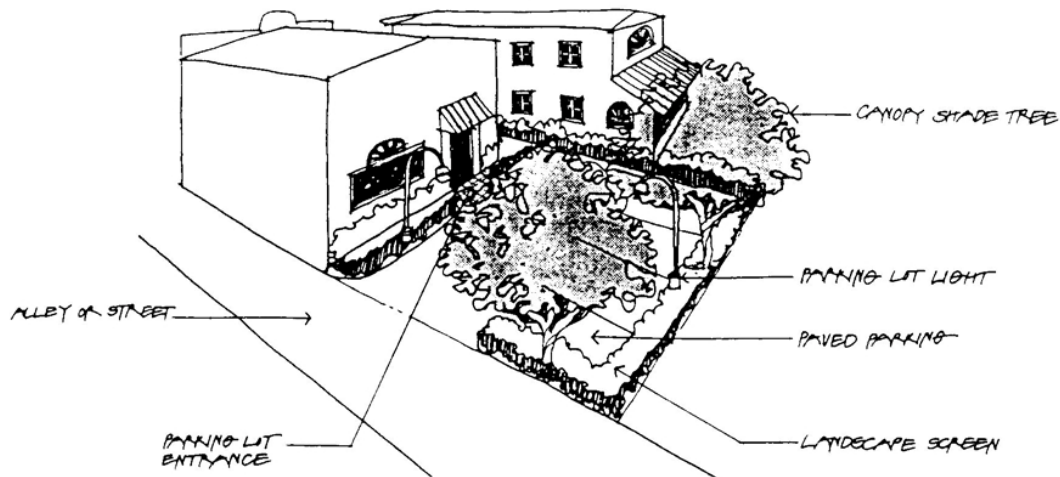
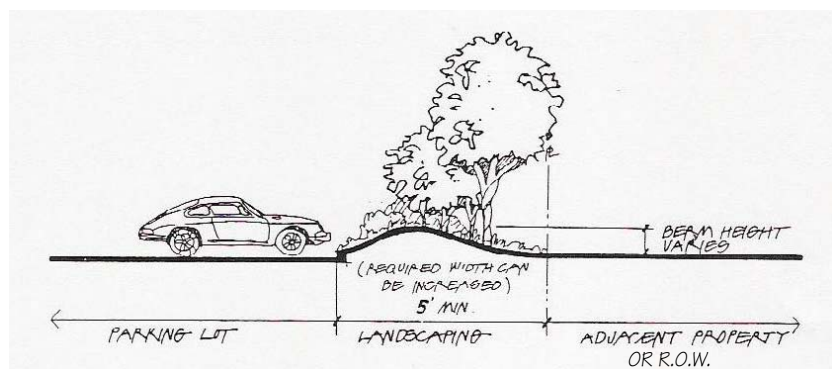


Figure 4-30: Off-Street Parking

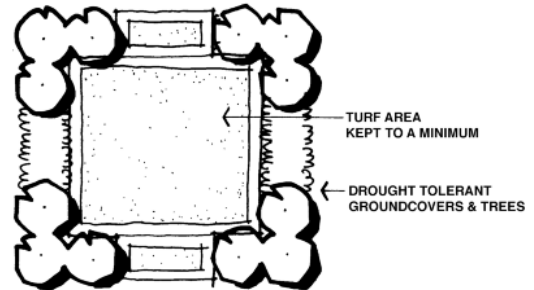
- Parking lots with more than ten (10) parking stalls require one canopy tree for every ten stalls. Installed trees should be a minimum 25-gallon size. The tree well or planting area for the tree should be no less than 9 square feet in area or a minimum of 3 feet wide in any direction and should be adequately sized for larger canopy trees. For example, monkey pod trees should have a planting strip of at least 8 to 10 feet. Trees should be sited so as to evenly distribute shade throughout the parking lot.
- If wheel stops are provided, continuous plantings with low ground cover and tree wells at the corners of the parking stalls may be located within the 3-foot overhang space of the stalls.
- Consider designing planting strips as bioswales and incorporating them into the site drainage system to improve runoff quality through biofiltration. Innovative designs are encouraged.



4.6.3 XERISCAPING AND WATER-EFFICIENT DESIGN CONSIDERATIONS

Utilize drought-tolerant plant material and practices that promote the conservation of water. Xeriscaping is the concept of water conservation in the landscape, which can also reduce operational costs. Also consider using non-potable water or rainwater catchment systems for irrigation.

1. Use water-efficient, drought-tolerant and brackish water tolerant plants in the landscape design.
2. Limit the extent of high water demand turf areas to a functional minimum.



3. Develop planting designs that group plant species in zones of similar water needs and emphasize the use of low water demand species for large spaces.
4. Develop irrigation systems zoned for water delivery in accordance with plant and microclimatic requirements. Use drip irrigation, rainwater catchment systems, non-potable water sources and other water-efficient irrigation systems wherever feasible.
5. Develop plant palettes that provide for a maximum of aesthetic character and function but require minimal supplemental watering following establishment.
6. Provide for an appropriate level of maintenance to limit water waste, line breaks, leaks, and malfunctioning electronically activated water control systems, and to assure continued health and vigor of plants.

4.6.4 PLANT MATERIALS

Plant selection should consider form, ultimate size, color, and texture. Form refers to the shape and size of the plant material. Ultimate size refers to the height and spread of the canopy of a particular plant material. A recommended plant list for the major street trees pedestrian promenades and public spaces is discussed in Section 4.6.5 and summarized in Table 4-1. Native Hawaiian plants, particularly those native to Kaua'i, should also be considered. A list of Kaua'i natives is provided in Section 4.6.6 and Table 4-2. Other plant selection considerations include the following.



- **Color:** Color improves the appearance of an area by providing contrast and interest to the landscape. Large masses of a single color are generally more satisfying than a heterogeneous blend of many colors.
- **Texture:** The texture of a plant material can be either coarse or fine, depending on the relative texture of plants immediately adjacent to it. Rough or thorny textures in a screen or hedge planting can serve a functional use when the hedge serves a security purpose. However, they should be avoided in areas where people congregate or near areas of high activity such as sidewalks, bus stops, benches or pedestrian malls.
- **Native plants:** Plantings should incorporate the use of native plant materials that are appropriate and well adapted to Līhu'e's climatic conditions. Also, select plants that are appropriate for the amount of sunlight, shade, and wind they will be exposed to within its particular microclimate. Include signage with botanical, interpretive and historic information as appropriate.
- **Invasive plants:** Avoid plants that are listed as pest plants or highly invasive to native Hawaiian forests and ecosystems. These lists are provided by the State Department of Land and Natural Resources Division of Forestry and Wildlife and the University of Hawai'i Department of Botany at their respective websites: <http://www.state.hi.us/dlnr/dofaw/hortweeds/specieslist.htm> and <http://www.botany.hawaii.edu/faculty/carr/aliens.htm> or http://www.botany.hawaii.edu/faculty/cw_smith/aliens.htm.

4.6.5 STREET TREES AND ACCENT TREES

Along the major roadways and pedestrian paths within Līhu'e, street tree themes should be established to provide uniformity and create a visually



unique identity for each travel corridor. The recommended tree selections are summarized in Table 4-1 and are based on appropriate size trees for the proposed locations as well as incorporating existing plantings to reduce the need for removal or transplanting and historically significant trees for the area. Alternative tree selections are also provided in case the recommended trees are not available.

Consistency: Trees should be consistent along the respective roadway or pedestrian path to provide visual continuity and a consistent tree canopy.

Tree Wells & Planting Strips: Tree wells ideally should be a minimum of 4-feet by 4-feet but no smaller than 3 feet in any width. If trees are located in landscape strips, they should similarly be a minimum of 3 feet in width.

Tree Protection: Planters, tree grates, permeable pavers, mulch or other protective measures should be provided around the base of trees to allow air and water to circulate to tree roots and reduce compacting of the soils around the tree base due to pedestrian traffic. Consider incorporating creative design elements to these details such as Hawaiian motifs. Another option for low traffic areas is to mulch or plant colorful shrubs at the tree base rather than grass to improve moisture retention and root protection and avoid tree injury



due to mowing and trimming. Shrubs should have root systems that do not compete with the trees.

Irrigation: Street trees and landscaped areas should be irrigated to ensure the health of the plants. Consider using non-potable water sources, drip irrigation systems, moisture sensors, and other water efficient methods to reduce potable water demand for irrigation. Other shrubs or groundcovers should be similarly coordinated.

Table 4-1: Recommended Street Trees and Accent Trees

LOCATION	SIZE/TYPE	COMMON NAME	BOTANICAL NAME	ALTERNATIVES
Ahukini Road	Large canopy Medium canopy Accent trees	Narra Hong Kong Orchid Loulu	<i>Pterocarpus indicus</i> <i>Bauhinia blakeana</i> <i>Pritchardia hardyi</i> , <i>P. minor</i> , <i>P. napaliensis</i> , <i>P. viscosa</i> , <i>P. waialealeana</i>	True Kamani Rainbow Shower Jatropha Fern Tree
Kapule Highway	Large canopy Medium canopy Accent trees	True Kamani Kolomona Loulu	<i>Calophyllum inophyllum</i> <i>Senna gaudichaudii</i> <i>Pritchardia hardyi</i> , <i>P. minor</i> , <i>P. napaliensis</i> , <i>P. viscosa</i> , <i>P. waialealeana</i>	Kukui Plumeria Jatropha
Rice Street	Medium canopy	True Kou	<i>Cordia subcordata</i>	Silver Trumpet
Kūhiō Highway	Medium canopy Large canopy (only along mauka side of the street in 20-ft setback)	True Kamani Koa'ia Ho'awa Monkey pod	<i>Calophyllum inophyllum</i> <i>Acacia koaia</i> <i>Pittosporum kauaiense</i> <i>Samanea saman</i>	Hong Kong Orchid Rainbow Shower Fern Tree
Hardy Street	Large canopy Medium canopy	Royal Poinciana Alahe'e	<i>Delonix regia</i> <i>Psydrax odorata</i>	Giant Crape Myrtle Rainbow Shower
Ka'ana Street (coordinate w/Wailani project)	Medium canopy	True Kou or Gold Tree	<i>Cordia subcordata</i> or <i>Tabebuia donnell-smithii</i>	Silver Trumpet
'Akahi, 'Elua, 'Umi Streets	Medium canopy	Lonomea Gold Tree Shower Tree	<i>Sapindus oahuensis</i> <i>Tabebuia donnell-smithii</i> or <i>Cassia</i> spp.	Rainbow Shower
Pedestrian Malls, Promenades	Medium canopy	'Ōhi'a Giant Crape Myrtle	<i>Metrosideros polymorpha</i> <i>Lagerstroemia speciosa</i>	Jacaranda Plumeria
Park Specimen Trees	Large canopy Medium canopy	Monkey Pod True Kamani Koa Papala Kepau	<i>Samanea saman</i> <i>Calophyllum inophyllum</i> <i>Acacia koa</i> <i>Pisonia</i> spp.	Gold Tree Yellow Trumpet
Parking Lots	Large canopy	Monkey Pod	<i>Samanea saman</i>	Rainbow Shower

4.6.6 KAUA'I NATIVES AND PLANTS SIGNIFICANT TO LĪHU'E AND

Hibiscus clayi



KAUA'I

The following table is a list of plants native to Kaua'i. They are listed in alphabetical order by their botanical name. Plants marked with an asterisk are endangered and may require special handling and labeling.

Table 4-2: Kaua'i Native Plant List

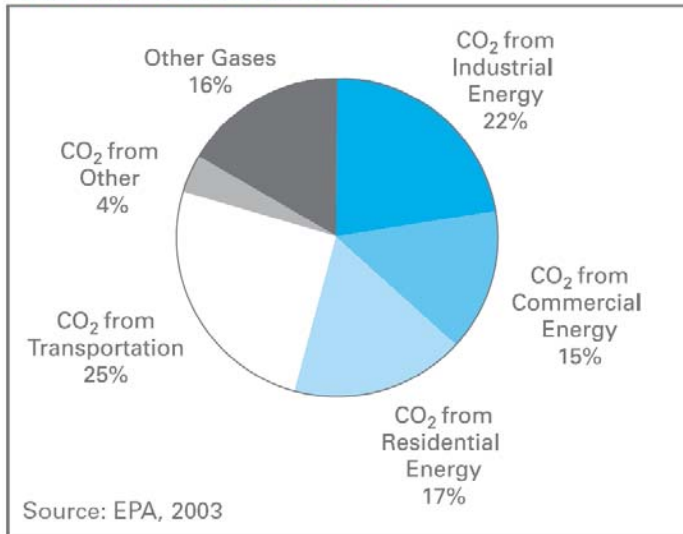
COMMON NAME	BOTANICAL NAME
PALMS	
Loulu	<i>Pritchardia hardyi</i> , <i>P. minor</i> , * <i>P. napaliensis</i> , * <i>P. viscosa</i> , <i>P. waialealeana</i>
TREES	
Koa	<i>Acacia koa</i>
Koai'e (Koai'a)	<i>Acacia koaia</i>
True Kamani (Lihu'e historic tree)	<i>Calophyllum inophyllum</i>
Kou	<i>Cordia subcordata</i>
'Ōhi'a Lehua	<i>Metrosideros polymorpha</i>
*Munroidendron	* <i>Munroidendron racemosum</i>
Papala Kepau	<i>Pisonia</i> spp.
Ho'awa	<i>Pittosporum kauaiensis</i> or <i>napaliensis</i>
Alahe'e	<i>Psydrax odorata</i>
Lonomea	<i>Sapindus oahuensis</i>
*'Ohai tree	* <i>Sesbania tomentosa</i>
**Wiliwili (Nāwiliwili namesake)	<i>Erythrina sandwicensis</i>
SHRUBS	
Po'olanui	<i>Bidens cosmoides</i>
*'Alula	* <i>Brighamia insignis</i>
'Akoko	<i>Chamacyse celastroides</i>
*'Oha wai	* <i>Delissea rhytidosperra</i>
'A'ali'i	<i>Dodonea viscosa</i>
*Na'u	* <i>Gardenia brighamii</i>
Hau Kuahiwi	<i>Hibiscadelphus distans</i>
Native Hibiscus	<i>Hibiscus kokio saintjohnianus</i> <ul style="list-style-type: none"> • St. John's • Yellow St. John's <i>H. waimeae</i> , * <i>H.w. spp. Hanerae</i> , * <i>H. immaculatus</i> , * <i>H. clayi</i> , <i>H. kahilii</i> , <i>Kokia kauaiense</i>
Nehe (native that looks like shrubby wedelia)	<i>Lipochaeta succulenta</i>
*Kulu'i	* <i>Nototrichium diveracatum</i>

COMMON NAME	BOTANICAL NAME
Mokihana (Island Flower)	<i>Melicope anisata</i>
Naio	<i>Myoporum sandwicense</i>
'Ulei	<i>Osteomeles anthylidifolia</i>
Alahe'e	<i>Psydrax odorata</i>
'Iliau	<i>Wilkesia gymnoxiphium</i>
GROUND COVERS	
'Uki'uki	<i>Dianella sandwicense</i>
Pa'u o hi'iaka	<i>Jacquemontia ovalifolia</i> subsp. <i>sandwicensis</i>
VINES	
'Awikiwiki	<i>Canavalia kauaiensis</i>
GRASSES	
'Ahu'ana	<i>Cyperus javanicus</i>
Makaloa	<i>Cyperus laevigatus</i>
Pili	<i>Heteropogon contortus</i>
Akiaki	<i>Sporobolus virginicus</i>
FERNS	
'Ihi'ihilauakea	<i>Marsilea villosa</i>
Palapalai	<i>Microlepia strigosa</i>
Kupukupu	<i>Nephrolepis cordifolia</i>
*Note: endangered species.	
**Currently not recommended due to Gall Wasp infestation.	

4.7 SUSTAINABLE OR GREEN DESIGN

Any future development within Līhu'e, whether it is a renovation project or new construction, should strive to incorporate sustainable or green building design and construction methods, technologies and materials wherever possible. Commercial and residential buildings in the US

U.S. GREENHOUSE GAS EMISSIONS



consume 62.5 percent of all electricity generated, produce 30 percent of all greenhouse gas emissions, and use 12 percent of all potable water in the US (USGBC 2004). On Kaua'i, heating water can account for more than 50 percent of residential electric bills (KIUC 2006). All construction projects are encouraged to minimize their impact on the environment wherever possible.

4.7.1 DEFINITION

Sustainable or green design involves construction projects that seek to reduce

impacts to the environment. There are several ways in which this can be accomplished and they are organized into the following topic areas:

- Site Design and Planning
- Water Resources and Water Efficiency
- Energy Efficiency and Renewable Energy
- Material Choice and Resource Conservation
- Waste Management
- Wastewater Management
- Kaua'i and Līhu'e-Specific Concerns

4.7.2 DESIGN CONSIDERATIONS

All aspects of the project—from site design to the design of the building envelope down to the selection of light bulbs and water fixtures—can help make a difference in reducing the impact of buildings on the environment. The following list describes several ways designers can incorporate sustainable design into a project. It is organized by the above topic areas. The list is not meant to be comprehensive but describes simple design concepts that can help reduce the environmental impact of development.

Site Design and Planning

- Preserve natural features.
- Develop a compact site plan.
- Locate buildings close to existing infrastructure.
- Reduce the amount of grading and clearing.
- Avoid sensitive areas (natural habitats, drainageways, historic resources and archaeological sites, steep slopes, etc.).
- Reduce the amount of impervious surfaces.
- Use permeable paving for parking lots, pathways, and other hardscape areas.
- Use natural features for stormwater management (bioswales, bioretention, infiltration beds, landscaping, etc.).
- Encourage alternative modes of transportation by providing secure bicycle racks/storage, pedestrian-friendly site plans and amenities, priority parking for carpools, electric, hybrid, alternative fuel vehicles, and convenient locations and adequate space for bus/shuttle stops.
- Develop housing incentive for government employees/managers in the Town Core.

Water Resources and Water Efficiency

- Minimize irrigation requirements by planting natives and xeriscaping.
- Use non-potable water sources or catchment systems for irrigation.
- Use drip irrigation system or other low-flow systems.
- Install rain sensors with automatic irrigation systems to shut them off when ample rainfall occurs.
- Install water-efficient, low-flow fixtures.

Energy Efficiency and Renewable Energy

- Design the building envelope and landscaping to minimize solar heat gain and maximize natural ventilation, reducing the need for air conditioning.
- Maximize daylighting (technique of using indirect sunlight to light interiors rather than electric lights without glare or heat gain).
- Install energy-efficient equipment, HVAC and lighting systems (off-peak chillers, compact fluorescents, Energy Star products, etc.).
- Use solar hot water heaters and photovoltaics.
- Provide individual room controls for temperature, humidity, and ventilation .
- Install motion sensors for lights in low-traffic areas.

Material Choice and Resource Conservation

- Use recycled construction materials (manufactured remotely or salvaged from onsite/existing structures).
- Use materials with high recycled content.
- Use materials with low volatile organic compounds.
- Use locally manufactured materials.
- Select materials produced from highly renewable resources (bamboo, cork, materials certified by the Forest Stewardship Council, etc.).

Waste Management

- Recycle construction waste.
- Restore or reuse existing structures as much as possible rather than demolish them.
- Balance cut and fill during grading.
- Provide recycling bins next to trash receptacles in public spaces.
- Include a central collection space within building floor plans or site plans where recyclables can be sorted and picked up.

Wastewater Management

- Install low-flow fixtures.
- Filter site runoff with bioswales.
- Install catchment systems for irrigation or other non-potable water uses.
- Limit the use of chemical-based fertilizers and pesticides.

Kaua'i and Līhu'e Town Specific Concerns

- Reduce light pollution – use fully shielded light fixtures for outdoor lighting.
- Design appropriately along Nāwiliwili Stream – development adjacent to the stream should address the stream and use innovative ways to mitigate runoff, provide connections, and integrate the stream into the design of the project.
- Preserve and protect all historic trees. Wherever possible, preserve trees with a caliper of 18 inches or greater, or a height of at least 20 feet, unless it is an invasive species³ or has become a safety hazard.
- Preserve historic buildings, structures, and other resources.
- Incorporate culturally significant elements into the design as appropriate.

³ Reference DLNR's list of "Hawai'i's Most Invasive Horticultural Plants" (<http://www.state.hi.us/dlnr/dofaw/hortweeds/specieslist.htm>) or the University of Hawai'i's Botany Department's list of "Pest Plants of Hawaiian Native Ecosystems" (http://www.botany.hawaii.edu/faculty/cw_smith/aliens.htm).

4.7.3 POTENTIAL COSTS

Although initial installation costs for green technologies can be higher than traditional materials, the savings from long-term operation and maintenance costs such as Kaua'i's high electricity rates, water bills, and occupant health and productivity can quickly recapture the difference in initial costs. As the technologies have been improving and gaining market acceptance, the cost differences have also been decreasing and recent projects are beginning to show that green buildings can actually be built at the same or even lower cost than conventional buildings. Information gathered by the USGBC and Davis Langdon in their study, "Costing Green: A Comprehensive Cost Database and Budgeting Methodology," shows that "...a majority of the buildings studied were able to achieve goals for LEED certification (a national program, see below) without any additional funding.... Additionally, the analysis suggested that the cost per square foot for buildings seeking LEED certification falls into the existing range of costs for buildings of similar program type" (Davis Langdon 2004). The key is to make green goals a part of the project program from the very beginning rather than adding it on late in the process.

4.7.4 RESOURCES

There are several well-established national and local programs that offer information and provide guidelines on building sustainable and green structures. Some programs and certify projects based on the level of sustainability or green design incorporated into the development.

4.7.4.1 National Programs

- **Leadership in Energy and Environmental Design (LEED) Certification:** One of the most widely recognized and accepted national certification programs developed by the US Green Building Council. It is a voluntary, consensus-based standard for developing high-performance, sustainable buildings. (Website: <http://www.usgbc.org>)
- **Green Communities Initiative:** Provides funding and support for the development of green affordable housing (Website: <http://www.greencommunitiesonline.org>)
- **Energy Star:** Joint program between the US Environmental Protection Agency and US Department of Energy that rates

products, homes and commercial building performance based on energy efficiency. (Website: <http://www.energystar.gov/>)

4.7.4.2 Local Programs

- **Kaua'i Energy Conservation Ordinance:** Specifies the minimum energy efficiency requirements for new buildings and new construction within existing buildings. Exempts certain buildings such as manufacturing and processing facilities and buildings under a certain size (less than 100 square feet gross floor area and low occupancy buildings). (KCC Section 12-6)
- **Hawai'i BuiltGreen™ Program:** A statewide program developed by builders for builders and sponsored by the Building Industry Association (BIA), State Department of Business and Economic Development and Tourism (DBEDT), and Hawaiian Electric Company. Provides support for builders and homeowners to design and build energy- and resource-efficient homes in Hawaii. Self-certification program for homes (Website: www.hawaiibuiltgreen.com)
- **Hawaii Commercial Building Guidelines for Energy Efficiency:** Developed by Eley Associates (a.k.a. Architectural Energy Corporation) for DBEDT, provides guidelines on energy-efficient commercial buildings in Hawai'i (Website: <http://www.archenergy.com/library/general/hawaiigl/>)
- **State and Federal Tax Credits:** The State currently offers income tax credits up to 35 percent of the installed cost (up to stated limits and subject to reductions) of renewable energy equipment such as solar hot water heaters, photovoltaics and wind systems (Website: <http://www.hawaii.gov/dbedt/info/energy/renewable/>). The IRS also offers homeowners income tax credits for the installation of energy efficient improvements such as insulation systems, solar equipment, and fuel cells to their primary residences (Website: <http://www.irs.gov/newsroom/article/0,,id=154657,00.html>). The IRS also offers business investment credits (Form 3468 and instructions) for the rehabilitation of historic structures, use of renewable energy and alternative fuels (Website: <http://www.irs.ustreas.gov/formspubs/index.html>)
- **Kaua'i Island Utility Cooperative (KIUC) Rebates:** KIUC also offers rebates for the replacement of certain household appliances with more energy efficient ones. To date, rebates for water heaters

and refrigerators are offered. (Website:
<http://www.kiuc.coop/indexenergy.htm>)

- **HI-Light:** Lighting analysis software developed to help designers and consumers select lighting reduce energy while still having attractive, comfortable, and well-lit residential and commercial spaces (Website:
<http://www.hawaii.gov/dbedt/info/energy/efficiency/>)