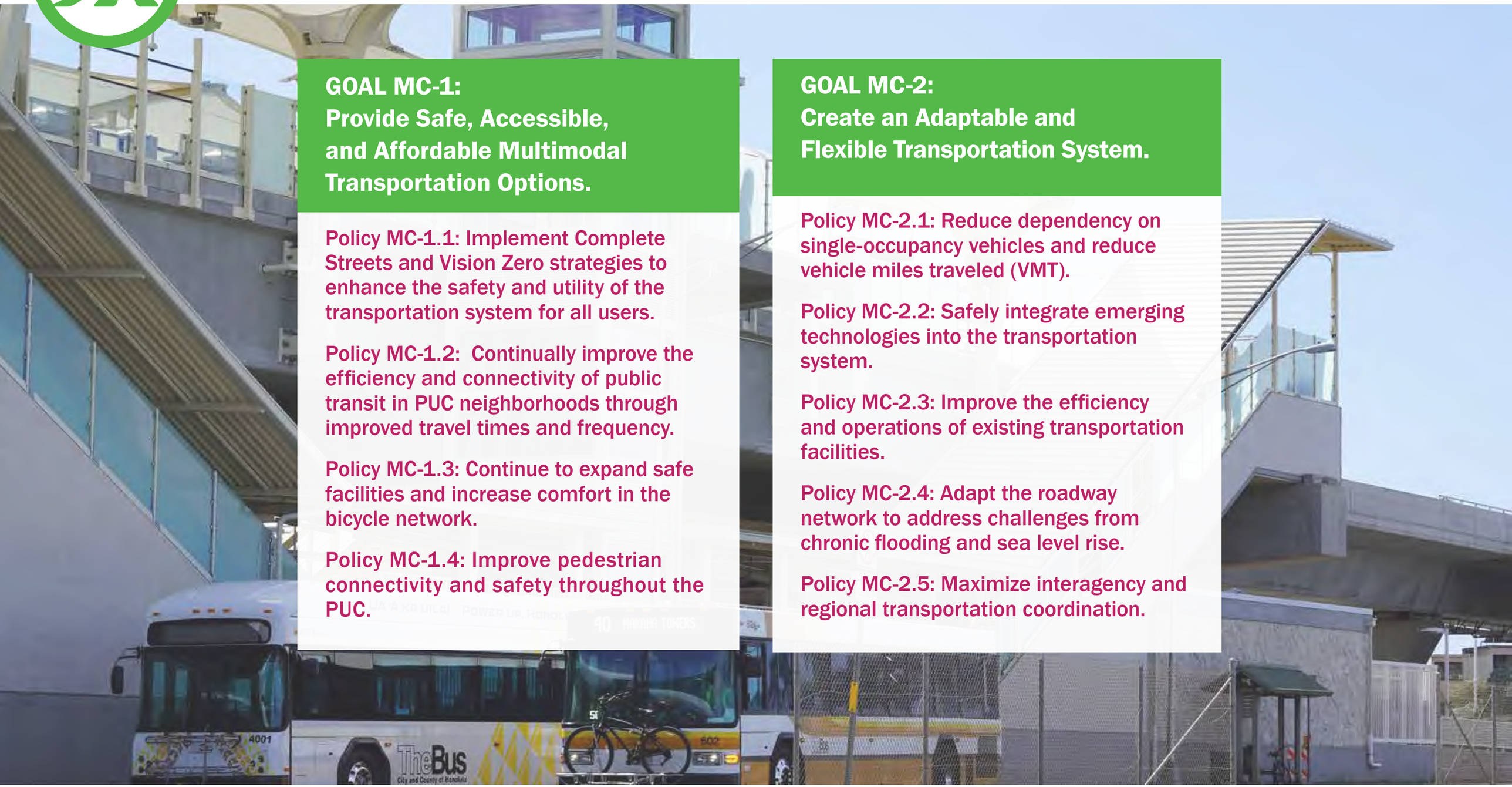
Mobility + Connectivity

Mobility + Connectivity



GOAL MC-1:
Provide Safe, Accessible, and Affordable Multimodal Transportation Options.

Policy MC-1.1: Implement Complete Streets and Vision Zero strategies to enhance the safety and utility of the transportation system for all users.

Policy MC-1.2: Continually improve the efficiency and connectivity of public transit in PUC neighborhoods through improved travel times and frequency.

Policy MC-1.3: Continue to expand safe facilities and increase comfort in the bicycle network.

Policy MC-1.4: Improve pedestrian connectivity and safety throughout the PUC.

GOAL MC-2:
Create an Adaptable and Flexible Transportation System.

Policy MC-2.1: Reduce dependency on single-occupancy vehicles and reduce vehicle miles traveled (VMT).

Policy MC-2.2: Safely integrate emerging technologies into the transportation system.

Policy MC-2.3: Improve the efficiency and operations of existing transportation facilities.

Policy MC-2.4: Adapt the roadway network to address challenges from chronic flooding and sea level rise.

Policy MC-2.5: Maximize interagency and regional transportation coordination.

Key Outcomes

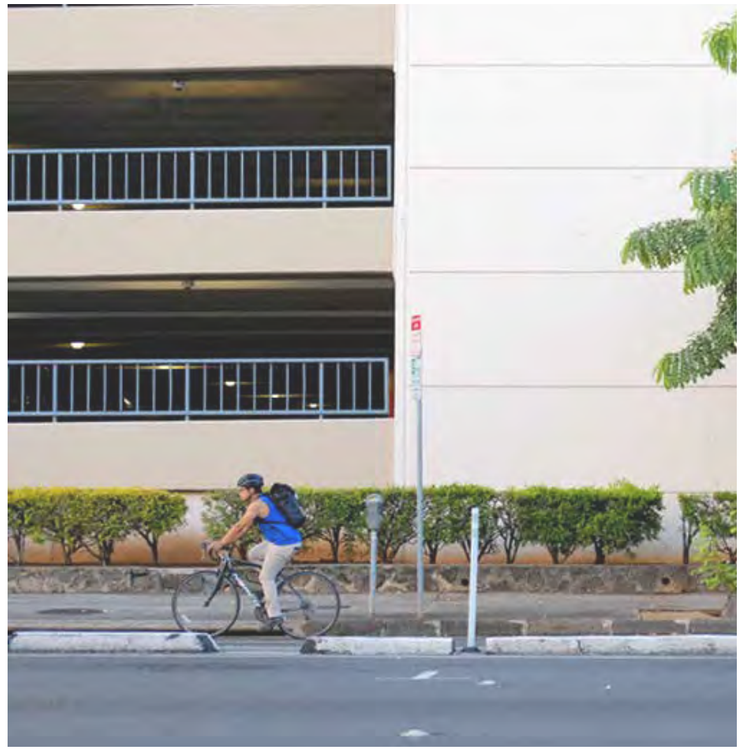
The transportation system in the PUC connects people to jobs, schools, workplaces, and services at the neighborhood and regional scale.

A well-connected transportation system plays a vital role in the local economy and quality of life through the efficient transport of people, goods, and services island-wide, and to destinations off-island.

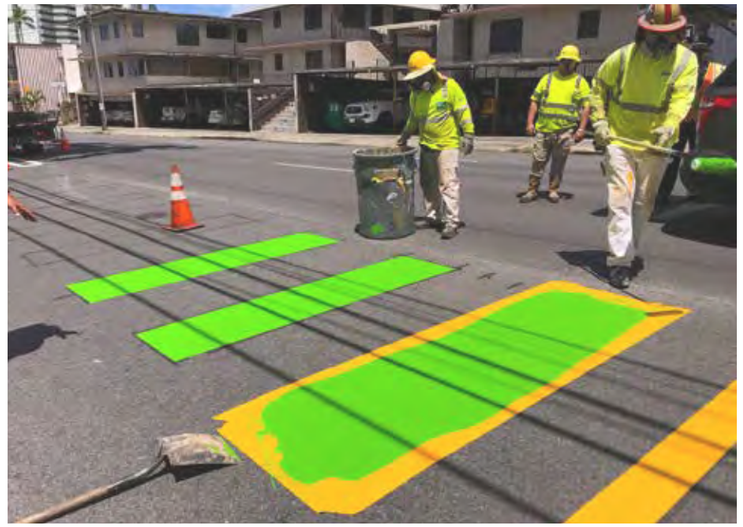
Continually developing and maintaining a balanced transport system that reduces reliance on cars, and is resilient to climate change, supports economic vitality and the long-term growth and development goals of communities in the PUC, and across O'ahu.

PUC DP policies for transportation emphasize increased safety, mobility, and a well-maintained, well-managed, efficient network of transportation facilities to ably serve daily needs.

Transportation-based planning in the PUC recognizes the role affordable transportation options play. From short local trips through to commuting, transportation modes must be affordable and accessible to those they are serving. In addition, increasing mode-choices serves as an organizing principle for meeting growth demand in urban neighborhoods.



King Street Cycle Track



Construction of the Pensacola Bike Lanes (source: DTS)



A Civic Center Biki station (source: DTS)

Setting the Stage

Transportation and Mobility in the PUC

The transportation network in the PUC touches all aspects of daily life, providing mobility to residents, workers, and visitors traveling throughout the region and beyond. Major City and State transportation infrastructure components in the PUC include roads and highways, airports, harbors, and the Skyline rail transit line. Transportation infrastructure in the PUC accommodates vehicles as well as a network of public transit, pedestrian, and bicycle facilities, and includes supporting infrastructure such as baseyards, parking facilities, and electrical vehicle charging stations. Major components of the City's public transportation system are its fleet of buses (TheBus), accessible vans (TheHandi-Van), and the first operating segment of the Skyline rail. In addition to maintaining municipal streets, roads, bicycle facilities, and the operations and maintenance of the Skyline, Honolulu is converting the City's entire fleet of vehicles to 100% renewable energy by 2035.

Streets and Roadways

Streets and roadways in the PUC range from an extensive highway system owned and maintained by the State of Hawai'i Department of Transportation (HDOT) to local arterials, collector roads and streets owned and maintained by the City. A small proportion of roads in the PUC are under federal and private ownership. Due to O'ahu's unique topography, much of the development in the PUC is spread lineally over the coastal plain. Most of the principal arterial roads in the PUC are oriented in the east-west (diamond head-ewa) direction with arterial and collector roads providing mauka-makai access to the ridge and valley communities. The primary arterials in the urban core include North/South King Street, North/South Beretania Street, Dillingham Boulevard, Moanalua Road, and Wai'alae Avenue.

Complete Streets

In 2012, the Honolulu City Council adopted a Complete Streets policy and ordinance to create a comprehensive, integrated network of streets that are safe and convenient for all people. The now well-established Honolulu Complete Streets program provides an overarching set of goals, principles, and design guidance for new streets and existing conditions upgrades. Complete Streets principles move away from streets designed with a singular focus on automobiles toward a design approach that is context-sensitive, multimodal, and integrated with the community's vision and sense of place. Complete streets elements may include sidewalk improvements, bikeway facilities, intersection improvements (such as roundabouts), and other features that support safe, equitable, and convenient travel. As of today, Complete Streets projects are ongoing across the island from roadway repaving or rehabilitation projects to standalone planning and design projects. Current project areas in the PUC include Pearl City, Kalihi, Liliha-Nu'uanu, Makiki, Waikīkī, Āliamanu-Salt Lake, Downtown, and University Avenue.



WHAT DO COMPLETE STREETS LOOK LIKE?

Complete Streets are streets that work for multiple travel modes, safely moving people while balancing the needs of all roadway users, such as pedestrians, bicyclists, transit riders, and motorists. Recognizing the unique characteristics of each community, planning for Complete Streets uses localized data and engages the community to deliver the most appropriate design improvements to streets.

Complete streets should be safe, convenient, and accessible for all, regardless of how one gets around, age, or ability.



Bus-Only Lane on King Street (top); The Alapa'i Transit Center (bottom)



The Joint Traffic Management Center

The Joint Traffic Management Center (JTMC)

The JTMC is a City facility that provides a hub for seamless coordination of traffic management and signal system and public safety coordination between the Department of Transportation Services, the Honolulu Police Department, Honolulu Fire Department, Emergency Services, and the Honolulu Authority for Rapid Transit. A relatively new facility (opened in 2020), the JTMC will continue to bring people, technology, and resources together to actively manage traffic and respond to incidents.

Pedestrian Facilities

Regional pedestrian networks connect neighborhoods throughout the PUC. In Waikīkī, Kakaʻako, Downtown, Chinatown, and other in-town neighborhoods, special pedestrian streets and districts connect residential blocks with parks and shopping areas. The continued development of transit-oriented neighborhoods, bicycle facilities, rail, and dedicated bus lanes will bring more focus to the pedestrian environment in proximity to transit, jobs, and housing.

The Oʻahu Pedestrian Plan is a long-term action plan to create vibrant, safe, and accessible streetscapes. The Oʻahu Pedestrian Plan inventories existing conditions, proposes pedestrian improvement projects and programs, and prioritizes those improvements facilitating multimodal travel consistent with the City's Complete Streets Ordinance. The plan focuses on identifying priority pedestrian networks, prioritizing missing walkway segments, and identifying high pedestrian-injury locations. Policy alignment and implementation of the O'ahu Pedestrian Plan is supported by the PUC DP.

In addition to safe and well maintained facilities, policies in the PUC DP and the TOD Neighborhood Plans call for greater attention to the quality of the pedestrian environment and street level connections in new development. Well-designed pedestrian environments offer opportunities for place-making features that add to neighborhood character and create vibrant community centers.



Joggers on the Ala Wai Canal Path



Biki bikes docked at the Blaisdell Center

Bicycle Facilities

At the last iteration of this Plan in 2004, the PUC had 24.8 miles of bikeways. Since then, the City has added and improved over 40 miles of bikeway facilities, including a well-used protected cycle track along King Street. Honolulu is also home to the Biki bikeshare system, opened in 2017, with over 1,300 bikes at over 130 stations, and operated by the non-profit Bikeshare Hawai'i. The City plans to add at least five miles of new bikeway facilities per year over the next several years with the goal of creating a robust bicycle network in Honolulu's urban core, as detailed in the *O'ahu Bike Plan.* The bicycle network is generally targeted to be implemented within existing roadway right-of-ways shared by the various travel modes. The *O'ahu Bike Plan* identifies specific projects and initiatives to expand facilities and bicycle ridership with a focus on the "interested but concerned" riders that research shows make up about half of the population. Appealing to this largest of the existing and potential ridership groups acknowledges that overall ridership will increase if safe facilities are readily available and supportive programs are in place that appeal to users of all ages and abilities. With this goal in mind, PUC DP policies support implementation of the Bike Plan, with the recommendation to create separated/protected bike lanes whenever feasible, promote the expansion of bikeshare near transit stations, and increase secure bike parking.

TheBus and TheHandi-Van

The City has a fixed-route bus transit (TheBus) and paratransit (TheHandi-Van) system. On the majority of streets, buses share the roads with other vehicles. Exceptions include along the Hotel Street Bus Mall where there is there a bus-only lane, and an additional bus-only lane has been put in place on King Street from Dillingham Boulevard to Alapa'i Street. Future streamlining of such spots and stretches to prioritize buses where appropriate, will help to improve trip performance and shorten commute times for riders. PUC DP policies support the continued roll out of "red carpet" bus-only lanes and bus prority planning in the urban core.



Bus passengers board near the Alapa'i Transit Center



Riders leave the Kulauao (Pearlridge) Skyline Station

Honolulu Rail Transit Project

The Honolulu Authority for Rapid Transportation (HART) is constructing the Honolulu Rail Transit Project (the Skyline). The Department of Transportation Services is in charge of operations and maintenance of the system, with a first segment in operation form East Kapolei to the Aloha Stadium. There are 21 total stations planned, built, or under construction along the partially completed elevated guideway. 15 of these stations are planned in the PUC: Waiawa (Pearl Highlands), Kalauao (Pearlridge), Hālawa (Aloha Stadium), Makalapa (Joint Base Pearl Harbor-Hickam), Lelepaua (Daniel K. Inouye International Airport), Āhua (Lagoon Drive), Kahauiki (Middle Street), Mokauea (Kalihi), Niuhelewai (Kapālama), Kūwili (Iwilei), Hōlau (Chinatown), Kuloloia (Downtown), Ka‘ākaukukui (Civic Center), Kūkuluāe‘o (Kaka‘ako), and Kālia (Ala Moana Center). Eventual expansion of the rail system to UH Manoa remains a long-term goal. Seamless integration between rail and other public transit modes is a major priority for the City transportation network.

Transit Oriented Development (TOD)

The City has a dedicated TOD program that seeks to coordinate the construction of the Honolulu’s rail transit system with the long-term growth and development goals of the surrounding communities. Eight Neighborhood TOD Plans articulate a vision for livable communities supported by a multi-modal transportation system with robust connections between bus, rail, and active transportation, and are supported by this Development Plan. A separate TOD Overlay Plan has been developed for the Kaka‘ako Community Development District under the jurisdiction of the Hawai‘i Community Development Authority (HCDA). More recently, the City initiated an infrastructure master planning process to support the TOD vision for the ‘Iwilei and Kapālama rail station areas. The planning process has been engaging public agencies and property owners to further plan for future development and infrastructure investments in the area. TOD requires ongoing dialogue between City and State agencies, development partners, and the community to deliver livable, walkable, and complete neighborhoods with a high-quality public realm.



The Hālawa (Aloha Stadium) Skyline Station.

State Transportation Facilities

Some transportation facilities in the PUC are under the jurisdiction of the State, such as highways, airports, and harbors. The coordination between the functional classifications of the State and City facilities is critical to ensuring the transportation network functions effectively and efficiently.

Highways—State roads provide regional connectivity within the PUC and beyond. The primary HDOT highways in the PUC include Interstate H-1 Freeway, H-3 Freeway (John A. Burns Freeway), Likelike Highway (Route 63), Nimitz Highway (Route 92), Pali Highway (Route 61), H-201 Freeway (Moanalua Freeway) and a portion of Kamehameha Highway (Route 99). Roadways in the PUC also serve as corridors for the movement of freight. Most of the important freight corridors in the PUC, such as H-1 and Nimitz Highway, experience significant congestion.

Airports—The main airport for the island of O'ahu and the State of Hawai'i is located within the PUC approximately five miles northwest of the Downtown area. The Daniel K. Inouye International Airport (HNL) serves as a major transport hub and plays host to more than 20 million travelers each year. The airport is owned and operated by the HDOT Airports Division and has four active runways, including the 12,000-foot Reef Runway which was the world's first major runway built entirely offshore. The HNL Airport like other coastal infrastructure will need to prepare to adapt to the impacts of climate change and sea level rise in the coming years.

Harbors—More than 80 percent of all goods consumed by Hawai'i residents and its visitors are imported to the islands and, of that, more than 98.6 percent flows through the Port of Hawai'i commercial harbor system. The landside of O'ahu's State-owned commercial harbors, Honolulu Harbor and Kewalo Basin, are located within the PUC. Honolulu Harbor is administered by the HDOT Harbors Division and serves as the primary port of entry for overseas cargo and the hub of the State's commercial harbor operations. It has over five linear miles of mooring space, 200 acres of container yards, and over 30 major berth facilities. Ongoing collaboration across agencies is needed to ensure improvement to public access to the waterfront and to maintain adequate industrial land uses for facilities operations and businesses. Kewalo Basin is under the jurisdiction of HCDA and is currently operated and managed by a third party, The Howard Hughes Corporation. The harbor at Kewalo Basin consists of 143 boat slips used for commercial and recreational purposes. Other recreational boating facilities in the PUC include the Ala Wai Harbor, Ke'ehi Small Boat Harbor, and Sand Island Launch Ramp. These facilities are under the jurisdiction of the State DLNR Division of Boating and Ocean Recreation.



The Daniel K. Inouye Inernational Airport (Source: HDOT)

O'ahu Metropolitan Planning Organization (OahuMPO)

MPOs work closely with large municipalities and state transportation agencies in planning for projects requiring Federal highway and transportation funds. The OahuMPO coordinates cooperative transportation planning between State and County agencies and transit operators and produces the O'ahu Regional Transportation Plan (ORTP). The OahuMPO is supported by a Technical Advisory Committee, Citizen Advisory Committee, and a Policy Board. The OahuMPO process allows State, City, and federal facilities to plan to shared goals for O'ahu's comprehensive transportation system.

How Does the Development Plan Get Us There?

Developing a high-quality transportation network that provides excellent mobility.

A balanced transportation system provides ready and excellent mobility for daily travels. Residents and visitors can access a network of complete streets, pedestrian friendly districts and thoroughfares, and connections to public transit. Hub and spoke buses and commuter express buses, and rail work together to provide easily accessible transportation. Coordinated transportation management aligns multiple agencies for traffic operations and public safety. Expanded bicycle storage and parking, wayfinding signage and pedestrian improvements will support PUC residents and frequenters with convenient and safe mode choices.

Implementing Complete Streets.

The street right-of-way has many demands on it: Accommodating car travel, safe bicycle and pedestrian facilities, parking areas, freight routes, emergency vehicles, pick up and drop off areas, ride-sharing services, landscaping, stormwater management, and utilities. Interagency collaboration and community-based planning is important for setting the priorities to plan street designs and improvements that are well suited to each location and its needs.

Closely coordinating land use and transportation planning.

Land use and transportation planning are closely connected. The car-focused transportation and land use patterns so common in many U.S. cities has tended to spread clusters of single-use districts across the landscape at considerable distances, reinforcing the need to travel by car. Cities across the country are responding to the increasing challenges of reducing greenhouse gas emissions, the impacts of urban sprawl and gridlocked commutes, in part by revisiting mixed-use development patterns. Neighborhoods that bring residences, jobs, and day-to-day services in close proximity are also those well served by public transit and active transportation for short trips. The effort to create these walkable, bikeable, and transit-friendly neighborhoods through changing development patterns is often termed transit-oriented development, or TOD. TOD planning is a major component of implementing Honolulu's rail system, including coordination of land use densities, supporting infrastructure investments, planning for neighborhood improvements such as parks, and increasing transportation modes and connections. Other future growth areas will be planned in coordination with bus transit along existing corridors. In addition, all PUC neighborhoods will benefit from increased bicycle facilities, increased car charging infrastructure, and improved parking management strategies.

Related Policies

Policy GD-1.1: Focus higher intensity mixed-use development and supporting public infrastructure around HART rail stations.

Policy GD-2.1: Support mixed-use infill redevelopment and increased bus service along key underutilized commercial corridors.

Policy PL-3.2: Support an attractive and pedestrian-friendly public realm along well-used PUC corridors.

Policy PL-3.4: Improve multimodal connections and pedestrian pathways within and between the PUC's mixed-use corridors, town neighborhoods, parks, and public institutions.

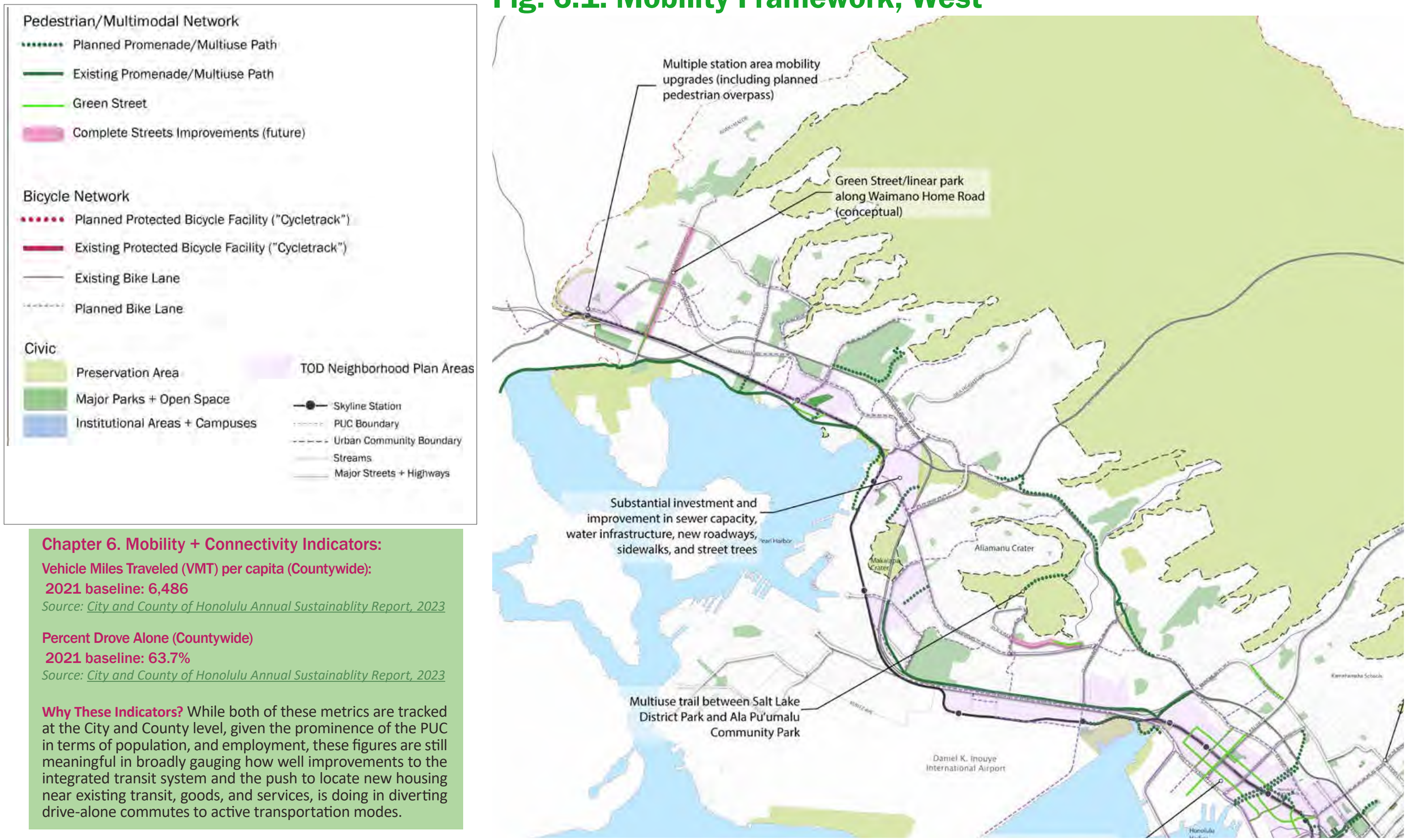
Policy PPOS-2.1: Create safe park-to-park connections through continuous and dedicated pedestrian/bicycle ways.

Policy PPOS-2.2: Use green streets to connect major recreation and public areas, provide missing green space, and beautify viewshed corridors.

Policy HC-2.3: Enhance safety, accessibility, and navigability in public gathering places and transportation networks.

Policy SLR 2.4: Incorporate sea level rise / coastal hazard considerations in the planning, design, and maintenance of facilities and infrastructure.

Fig. 6.1: Mobility Framework, West



Chapter 6. Mobility + Connectivity Indicators:

Vehicle Miles Traveled (VMT) per capita (Countywide):

2021 baseline: 6,486

Source: City and County of Honolulu Annual Sustainablity Report, 2023

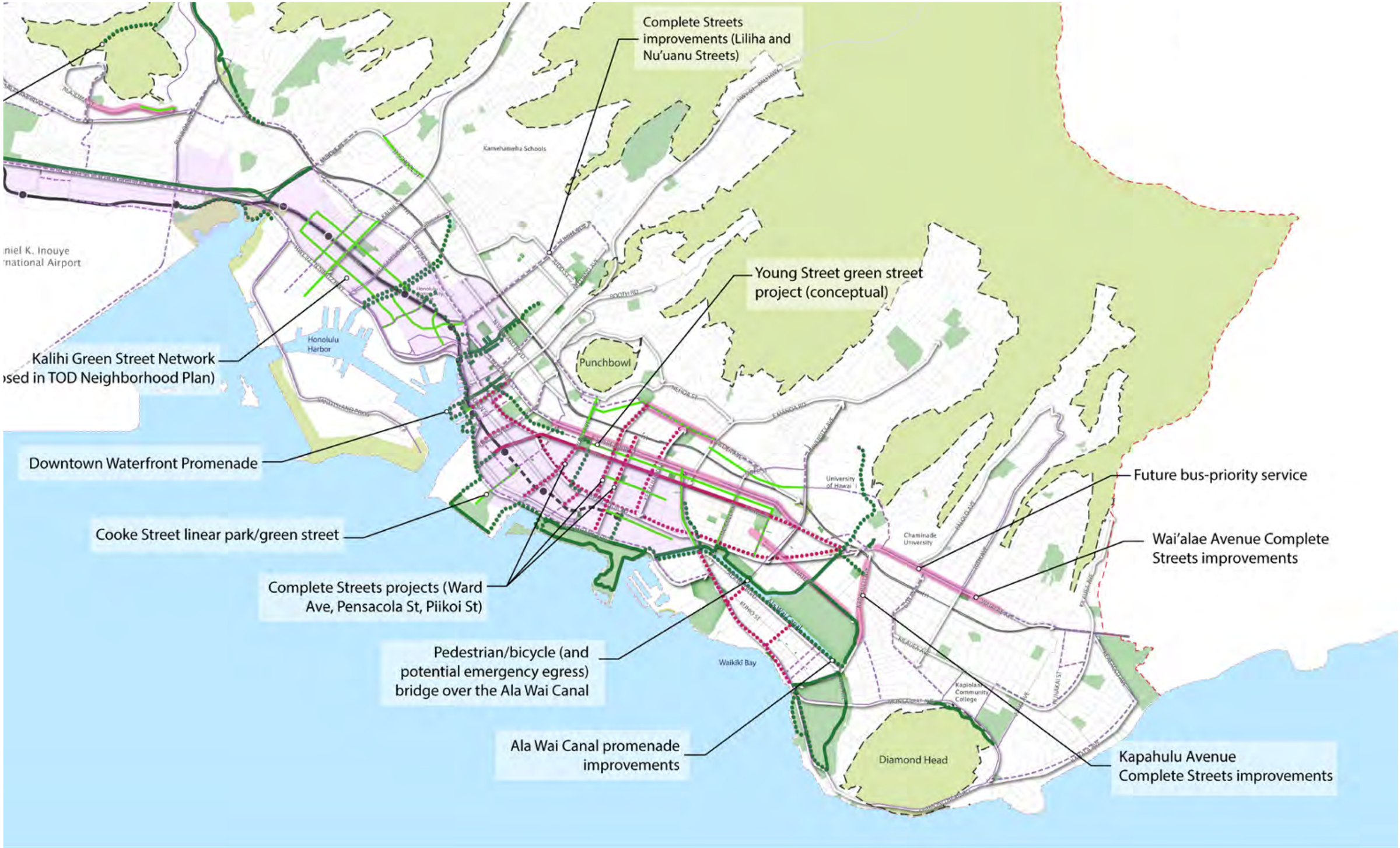
Percent Drove Alone (Countywide)

2021 baseline: 63.7%

Source: City and County of Honolulu Annual Sustainablity Report, 2023

Why These Indicators? While both of these metrics are tracked at the City and County level, given the prominence of the PUC in terms of population, and employment, these figures are still meaningful in broadly gauging how well improvements to the integrated transit system and the push to locate new housing near existing transit, goods, and services, is doing in diverting drive-alone commutes to active transportation modes.

Fig. 6.2: Mobility Framework, East



Goal MC-1: Provide Safe, Accessible, and Affordable Multimodal Transportation Options

Policy MC-1.1: Implement Complete Streets and Vision Zero strategies to enhance the safety and utility of the transportation system for all users.

Creating Complete Streets involves designing and operating a comprehensive, integrated network of streets that are safe and convenient for multiple modes of travel and that meet the specific conditions of each project location. There is no singular design prescription for Complete Streets; each one is unique and responds to its community context. Complete Streets in the heart of Downtown Honolulu will look differently from Complete Streets in the mauka residential neighborhoods of the PUC and projects can range from full street designs to small interventions. Continued implementation of Complete Streets can provide many benefits such as safety and mobility improvements, stormwater management improvements, and neighborhood beautification. The primary method of delivering Complete Streeets improvements is through periodic roadway repaving/rehabilitation.

Priority Actions:

Vision Zero Action Plan. Join the national network of Vision Zero cities by developing a Vision Zero Action Plan for creating safer streets in Honolulu. Implement Complete Streets projects in higher-risk areas. Develop solutions to reduce the severity and frequency of crashes at high pedestrian crash locations (such as curb extensions, bollards, eliminating right-turn on red, pedestrian scrambles, or an overcrossing).

Timeline:



Partners:

- DTS
- DDC
- DPP
- DFM

Community-based transportation planning. Support implementation of community-based Complete Streets planning and design efforts to serve the needs of residents in distinct locations. Emphasize outreach to residents and local businesses. Coordinate with other long-range plans.



Partners:

- DTS
- DPP
- DDC
- Community partners

Other Actions:

- *Identify opportunities for more safe crossings along long mixed-use corridors.*
- *Continue to provide and promote information/educational opportunities to residents and community groups to be involved in complete streets projects.*
- *Ensure that investments in Complete Streets projects are balanced and equitable.*
- *Work with property owners and businesses to incorporate transit facilities into design plans or "adopt" transit stops (i.e., clean and maintain transit stops fronting property).*



Pearl Harbor Historic Trail Crossing (Source: DTS)



A mini traffic circle calms a McCully intersection (Source: DTS)

Goal MC-1: Provide Safe, Accessible, and Affordable Multimodal Transportation Options

Policy MC-1.2: Continually improve the efficiency and connectivity of public transit in PUC neighborhoods through improved travel times and frequency.

TheBus service supports one of the highest transit ridership rates per-capita in the county. TheBus also has one of the lowest costs per passenger mile and lowest cost per boarding passengers of any system. This service is now supplemented by the first completed segment of the Skyline rail, offering commuters another convenient mode choice. Maintaining seamless connections between bus, rail, and active transportation modes will be essential to the functioning and ridership of rail, and to the efficiency and reliability of an affordable transporation network.

Priority Actions:

Improve transit wayfinding. Continue to enhance wayfinding and signage to increase readability and improve seamless connectivity between transportation modes. Implement the TOD Wayfinding Master Plan.

Timeline:



Partners:

- DPP
- DTS

Shared access card. Expand services linked to the "Holo" card that allows pre-payment across public transportation services using a single reloadable card.



Partners:

- DTS
- HART
- Bike Share

Plan for "Red carpet" bus only lanes and bus priority service along key infill corridors. Continue to enhance key corridors with sufficient planned or existing density to support high-frequency transit service and transit prioritization (e.g.,bus-only lanes, transit signal prioritization, and bus stop improvements).



Partners:

- DPP
- DTS
- DDC

Other Actions:

- *Invest in and implement projects with a focus on public transit safety and comfort as recommended by Age Friendly Honolulu initiative, such as:*
  - *TheBus and TheHandi Van schedules in different formats (e.g., Braille, large print);*
  - *Increase the number of clean and accessible restrooms at transit stops and stations.*



Holo card (Source: TheBus)



TheBus in service around O'ahu



Honolulu's new generation TheBus is electric (Source: DTS)

Policy MC-1.3: Continue to expand safe facilities and increase comfort in the bicycle network.

Expansion of bicycle facilities will help to ensure that a network of infrastructure is in place to make it a viable mode of travel for more people within the PUC. Bicycle infrastructure should be safe and comfortable to use. Key to this policy is implementing the recommendations of the O'ahu Bike Plan, expanding the network of separated and protected bikeways in the PUC, and providing sufficient bicycle parking in new development.



Bicyclists feel more secure on separated bikeways

Create a sheltered, low-stress cycle network. Prioritize construction of protected bike lanes along corridors identified in the O'ahu Bike Plan. Support expansion of bicycle facilities in the corridors identified in the Bike Plan to promote a greater share of trips taken by bicycle.

Timeline: ONGOING

Partners:
- DTS
- DDC

Greater traffic calming and bicyclist safety. Support the implementation of traffic calming measures and collaborate on interagency transportation safety efforts to support Vision Zero.

Timeline: ONGOING

Partners:
- DTS
- DDC

Bikeshed projects. Prioritize bicycle facilities improvement projects that are within the bike shed of high priority transit hubs. (approximately one mile).

Timeline: ONGOING

Partners:
- DPP
- DTS
- DPP

Other Actions:

- *Develop standards to increase integration of secure bicycle parking into development projects.*
- *Facilitate the permitting and construction of bike share stations near transit stations.*



Bike sharing provides quick, convenient transportation in busy districts like Waikīkī

Goal MC-1: Provide Safe, Accessible, and Affordable Multimodal Transportation Options

Policy MC-1.4: Improve pedestrian connectivity and safety throughout the PUC.

Honolulu has a favorable climate and topography for walking, which is beneficial to public health, the environment, and the overall quality of life in the city. However, the relatively large physical separation between walking destinations and variable sidewalk conditions discourage many people from walking in the PUC as one of their primary forms of mobility. Increased attention to the pedestrian environment is needed to improve accessibility and conditions and to encourage more walking within the PUC. Attention should be paid to connections between destinations in areas with already higher pedestrian activity, and to priority improvements such as filling in missing sidewalks near schools and transit stops. High volume streets with long distances between safe crossings reduces options for those with mobility challenges, and should be corrected.

Priority Actions:

Improve connectivity and safety in high pedestrian activity areas. Seek opportunities to improve connections and flow between sidewalks and areas of activity, transit stops, and public open space. Enable easier and safer pedestrian crossings of busy streets with additional protected crosswalks, shorter signal cycles, and automatic pedestrian recall.

Sidewalk reinvestment areas. Support City-funded construction of sidewalks in densely populated areas with limited existing facilities, based on the O'ahu Pedestrian Plan. Address unimproved sidewalks with a consistent and concerted approach.

Quick Builds. Deploy expedited, incremental or tactical projects in conjunction with the community to meet specific needs. Quick build projects improve safety and comfort for pedestrians through lower-cost and quickly deployed means such as striping, painting, and movable barriers. Quick build projects are suited to high levels of community involvement in both design and implementation.

Timeline:



Partners:

- DTS
- DDC



Partners:

- DPP
- DTS
- DDC



Partners:

- DTS
- DDC
- Community groups



Pedestrians crossing in Downtown Honolulu



A Quick Build project enhances crosswalk visibility near Kalihi H.S. (Source: Ulupono Initiative)

Other Actions:

- *Designate pedestrian-priority streets and focus areas that support safe, comfortable, and convenient walking environments, including seating and adequate shade.*
- *Support improvements in pedestrian-priority areas, by including private developers.*

Goal MC-2: Create an Adaptable and Flexible Transportation System

Policy MC-2.1: Reduce dependency on single-occupancy vehicles and reduce vehicle miles traveled. (VMT).

With limited options to increase the capacity of the existing roadway network, managing transportation demand along with implementing cost-effective operational improvements will continue to be key strategies in addressing congestion. Reducing dependency on single-occupancy vehicle trips and increasing the use of higher-efficiency options will also help the State achieve and maintain its greenhouse gas emissions goals, as will increasing programs and partnerships that encourage the use of public transit and active travel modes.

Priority Actions:

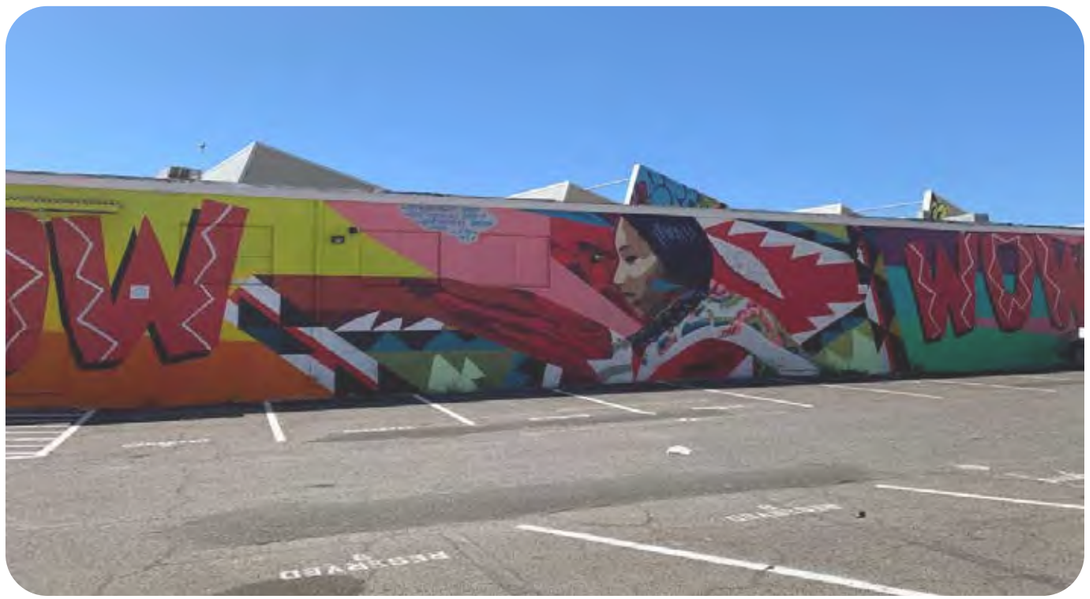
Modify parking regulations. Reduce off-street parking requirements to incentivize the use of travel modes other than single-occupancy vehicles. Pursue "unbundling" of residential parking for both rental and for-sale housing in new multifamily buildings or for commercial developments. Moniter parking pricing and availability in the PUC, and discourage oversupply in transit-rich pedestrian priority areas.

Timeline:



Partners:

- DPP
- DTS
- OCCSR



An off-street commercial parking lot

Transportation demand management. Support a wide variety of strategies to reduce single-occupancy travel, including carpool, vanpool, flexible schedules, remote work, transit passes, or similar.

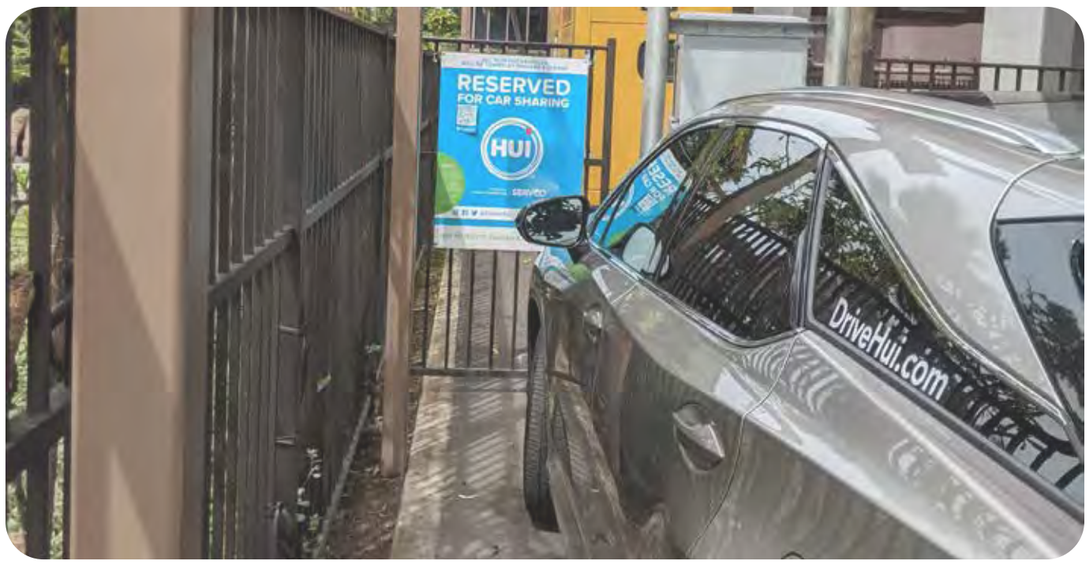


Partners:

- DTS
- OED
- OCCSR
- OMPO

Other Actions:

- *Work with property owners and businesses to ensure that existing private parking is available to the public when not needed for its primary commercial use.*
- *Implement a parking management plan for Downtown/Chinatown and other municipal parking areas to optimize use of existing parking assets.*
- *Price municipal parking according to market rates.*
- *Reduce vehicle ownership through shared mobility, mixed-use development, and/or frequent transit service.*



Carshare Hui at UH Mānoa

Goal MC-2: Create an Adaptable and Flexible Transportation System

Policy MC-2.2: Safely integrate emerging technologies into the transportation system.

Advancements in technology and societal shifts will continue to alter travel behavior and change demands on the transportation system. New technologies will continue to emerge and present both opportunities and challenges to the transportation system. It is vital to identify the specific needs of new transportation systems/technologies that are poised to become widespread to facilitate their incorporation into the existing transportation system safely into the future. New developments should be expected to consider appropriate design solutions for now common demands such as bikeshare stops and secure bike parking, ride-share drop areas, and expanded electric vehicle charging stations.

Priority Actions:

Public vehicle charging. Retrofit public parking garages with a percentage of Electric Vehicle (EV) charging stations and require EV stalls in new developments (inclusive of all housing types).

Timeline: 

Partners:
- DTS
- DFM
- DDC
- OCCSR

Renewable public vehicles. Support actions to transform the City's public fleet to 100% renewable energy by 2035.

Timeline: 

Partners:
- OCCSR
- Asset agencies

Develop an integrated micro-mobility plan. Develop strategies and public messaging to safely integrate alternative modes of micro-mobility such as scooters where appropriate, or incorporate these into the next O'ahu Bike Plan update.

Timeline: 

Partners:
- DTS
- DPR
- DPP

Plan for the deployment of autonomous vehicles. The fast moving technology of autonomous vehicles is poised to have a transformative impact on transportation systems. It will be important for cities to stay ahead of the curve to safely and equitably integrate the new technologies while

Timeline: 

Partners:
- DTS
- DPP
- DDC
- DFM
- HDOT
- OMPO

Other Actions:

- *Promote shared mobility programs at multiple scales that are safe and equitable.*
- *Encourage integration of ride-share facilities into new developments' ground floors.*



EV fast-charging station at the Hawaiian Electric lot



Solar panels over public parking

Goal MC-2: Create an Adaptable and Flexible Transportation System

Policy MC-2.3: Improve the efficiency and operations of existing transportation facilities.

An efficient transportation system supports the movement of a diverse set of people, goods, and services while reducing overall transportation costs. This policy is focused on improving travel times and reliability of the roadway network in the PUC, through addressing key bottlenecks and deficiencies in ways that are both reliable and safe.

Priority Actions:

Low-cost upgrades. Utilize low-cost, easy to install improvements such as signal optimization along long corridors (such as along Kamehameha Highway) or re-striping to enhance operational efficiency.

Timeline:



Partners:

- DDC
- DTS

Pursue congestion management strategies. Track and analyze traffic bottlenecks in real time during peak hours using the Joint Traffic Management Center (JTMC), and employ this data to develop operational solutions and alternatives to capacity expansion projects.

Timeline:



Partners:

- DTS
- JTMC partners
- HDOT

Identify and Implement Transportation Systems Management and Operations (TSMO). Utilize the JTMC to implement TSMO goals across transportation agencies, such as to coordinate maintenance, set and monitor performance goals, evaluate designs, and enhance safety.

Timeline:



Partners:

- DTS
- DDC
- DFM
- JTMC partners
- HDOT

Other Actions:

- *Conduct temporary, low-cost or tactical projects to demonstrate the efficacy of potential long-term operational or safety improvements in conjunction with the community.*
- *Convene a task force to analyze approaches to improving publicly accessed roads owned by adjacent private property owners. Identify potential low-cost treatments that could be collaboratively funded.*



An integrated transportation system requires real-time monitoring of multiple modes (Source: HART)

Goal MC-2: Create an Adaptable and Flexible Transportation System

Policy MC-2.4: Adapt the roadway network to address challenges from chronic flooding and sea level rise.

Integrating solutions to chronic flooding and rising water tables will be a challenge for some PUC roadways and will rely on coordinated solutions. Both short-term and longer term solutions will be needed, as well as sequencing plans to maximize efficiencies and the duration of investments.

Priority Actions:

Work across city agencies to address roadway flooding. Some roadways in the PUC will see worsening effects of chronic storm water and sea level rise-induced flooding. Meeting these challenges will require new levels of coordination between city, state, and federal agencies, private development, and community-based input to create equitable and effective means to plan for and fund mitigation projects.

Timeline:



Partners:

- DTS
- DPP
- BWS
- OCCSR
- ENV
- DPR
- DFM
- DDC
- HDOT
- HART
- OMPO

Create a framework for road raising. Complete a comprehensive strategy for where, when, and how to raise City-owned roads (including a cost/value methodology) and accompanying drainage improvement strategies.



Partners:

- DDC
- BWS
- DFM
- OCCSR
- ENV
- DTS
- DPP

Other Actions:

- *Consider establishing a "right-sizing" policy for addressing increased flooding in transportation facilities. Such a policy would establish a method for determining the cost-benefit for retaining (and/or decommissioning) transportation assests with an eye towards providing the optimal use and function of assets through an integrated needs-based analysis. This could be pursued as a larger context-setter for a road-raising framework (see above).*



Storm-flooded road in Mapunapuna industrial area (Source: SOEST King Tides Project)

Goal MC-2: Create an Adaptable and Flexible Transportation System

Policy MC-2.5: Maximize interagency and regional transportation coordination.

Interagency and regional coordination is necessary to establish consistent and cooperative plans, programs, and projects between state and local government agencies, the metropolitan planning organization, and other appropriate agencies to implement shared priorities for the transportation system in the PUC and beyond. Planned improvements should be coordinated with other infrastructure repairs and upgrades—water, wastewater, and storm drainage—whenever feasible, to efficiently use resources and limit construction disruptions to residents and businesses.

Priority Actions:

Implement regional transportation plans. Support implementation of the Transportation Improvement Program (TIP) and the O'ahu Regional Transportation Plan (ORTP). Continue to coordinate roadway and infrastructure planning with TOD planning, City projects and major development projects. Adopt a "dig-once" approach to infrastructure planning in the right-of-way.

Timeline:



Partners:

- DTS
- DPP
- HDOT
- HART
- OMPO

Balance multiple needs in the road right-of-way. Continue to prioritize commercial and passenger loading in Chinatown, parts of Ala Moana, Downtown, and Waikīkī. Incorporate freight considerations into the Complete Streets Design Manual and along mixed-use/commercial corridors with higher truck volumes. Update the planned street widening maps to be consistent with the current modal plans.

Timeline:



Partners:

- DTS
- DPP
- HDOT

Other Actions:

- *Support regional transportation needs assessments.*
- *Expand data collection to document conditions of existing transportation infrastructure, including documentation apps for the public.*
- *Coordinate project schedules and Identify opportunities to combine projects across city agencies.*



OMPO's regional transportation plan document is routinely updated.

Healthy Communities

Healthy Communities



GOAL HC-1:
Foster a healthy built environment in the PUC.

Policy HC-1.1: Encourage exemplary healthy ("green") building standards.

Policy HC-1.2: Promote strategies to increase energy efficiency and clean energy in buildings.

Policy HC-1.3: Avoid/mitigate the Urban Heat Island Effect and reduce heat stress.

Policy HC-1.4: Expand access to healthy foods from local growers and expand the community gardens program.

GOAL HC-2:
Shape an Age-Friendly community that responds to the needs of all PUC residents.

Policy HC-2.1: Encourage housing designed with kūpuna in mind, and in a variety of household sizes.

Policy HC-2.2: Design parks and open space to provide increased physical activity for all ages.

Policy HC-2.3: Enhance safety, accessibility, and navigability in public gathering places and transportation networks.

GOAL HC-3:
Support initiatives that improve community engagement, health, and equity.

Policy HC-3.1: Improve civic engagement in the planning process through increased community-focused initiatives.

Policy HC-3.2: Collaborate across City and state agencies, and partner organizations, to center equity in public infrastructure, programs, and services.

Policy HC-3.3: Increase community resilience and disaster preparedness.

Key Outcomes

Healthy Communities policies in the PUC DP are included to thoughtfully highlight linkages between building and land use policies, public infrastructure planning, and various City and State environmental goals with the broader goal of supporting public health.

This Chapter provides some general demographic information on health conditions in the PUC. It touches upon socioeconomic conditions, current health outcomes, physical activity levels, and access to transportation, housing, and health facilities, among other topics. By identifying distinct needs within the community, and gathering threads within the broad topic of public health, this chapter is intended to help policy makers and community members be better equipped to seek support, steer development, and direct public infrastructure resources in a manner that benefits all residents in the community.

A partial list of what planning for a healthy community in the PUC means in practical terms:

- Attention to protecting environmental quality;
- Safe routes for pedestrians of all abilities;
- Addressing the current and long-term effects of climate change;
- Encouraging universal and age-friendly design practices;
- Increasing parks access and amenities;
- Ensuring access to affordable transportation;
- Ensuring physical and financial access to locally sourced, good food;
- Investing in public infrastructure in an equitable manner;
- Seeking guidance from health agencies and supporting the state Department of Health in important public efforts and messaging.



The PUC provides a spectacular backdrop for many outdoor sports

Setting the Stage

Including a Healthy Communities chapter in the PUC DP and future DPs and SCPs will serve to identify linkages between policies that can better support public health (the promotion and protection of health of all people and their communities). The health of an individual is the result of a complex web of factors and events—some of which we can control as individuals, and some of which we cannot. Referred to as "social determinants of health", medical care is just one part of a picture that includes multiple factors such as where one lives, one's experience of poverty and financial stressors, access to education, and more.

For example, the design and condition of buildings, the urban street grid, and other physical characteristics of the built environment can have implications for the health of individuals, and more broadly, for public health. Most people are aware that reducing pollution and maintaining environmental quality is supportive of the community's health. But there are other factors to consider as well. Studies have found that living and working near transit, combined with other built environment factors such as a diverse mix of uses and higher densities, results in increased rates of physical activity, since transit riders typically walk more than those who drive to work or their daily activities. While urban design and planning policies are not the full picture of public health, many associated actions (such as building codes) are at their most basic, meant to enhance public health and safety. Likewise, looking at the broader range of community planning practices through the lens of public health is instructive in determining their utility and effectiveness.

Creating a healthy community in the PUC requires bringing the public health conversation into the planning and design of the built environment in a way that enhances the physical and mental well-being of the people who live, work, and play in the community. This includes such goals as strengthening and enforcing building standards for better accessibility, and cleaner indoor and outdoor environments. It also includes progarms for greater energy efficiency and the integration of cleaner energy sources; increasing access to parks and active spaces; and increasing the urban tree canopy as well as employing other means to reduce heat stress. It further includes ensuring an efficient and affordable public transit network with multiple mode choices, and promoting access to healthy food.

While many of these are ongoing goals of various City and State agencies, departments, plans, and initiatives, (and many active community groups and organizations), it is helpful to consider how all of these disparate goals fit together in the context of supporting public health in the PUC. The inclusion of this new content is a step toward creating a more robust public health conversation at the community level as it relates to the built environment and environmental health. To this end, it is important for agencies to continually improve engagement methods for participation in public processes. From providing multiple platforms (digital and in person) for community meetings, increasing offerings in language and accessibility services, and increasing engagement with existing community groups, the Healthy Communities policies include a focus on better engaging the whole community to work towards shared goals.



A morning surfer in Waikīkī

Note: Statistical data in this chapter is derived from the 2010 U.S. Census, the American Community Survey (ACS, interim U.S. Census data), and the Department of Planning and Permitting's FY2020 and FY2021 Annual Report on the State of Land Use (derived from ACS data).

The Aging Community

Like Hawai'i at large, the island of O'ahu is home to an aging population. On O'ahu, 27% of residents will be 65 years and older by 2040 as the large baby-boomer generation (born 1946-1964) ages. Within this context, the population of the PUC skews older than O'ahu as a whole: the 2020 median age in the PUC was 41, compared to 34 for O'ahu. These factors suggest a pressing need to expand quality, accessible, healthcare services for residents. It also calls for devising new strategies that allow PUC residents to meet changing housing needs, including more age-friendly design practices that can help people stay in their homes longer. Policies and Actions found in the PUC DP support and align with those in the *Honolulu Age-Friendly City Action Plan* (2015) that charts a course for a more inclusive and accessible urban environment, for kūpuna to keiki. Age-Friendly design refers to creating a more supportive and inclusive built environment with the widest possible ease of use for people of all ages and abilities.

Income and Poverty

Hawai'i often tops various lists for the nation's highest cost of living. As of 2020 the median estimated household income in the PUC was $75,164, however, there is considerable variation within the PUC. The PUC areas with the lowest median incomes were generally found in the central PUC coastal plains (mid-town). In addition, a small handful of 2010 Census tracts in the Kalihi-Pālama and Kalihi Valley neighborhoods had poverty rates exceeding 40% – a figure that is generally accepted as the threshold for concentrated poverty. As this Plan suggests, it is important to identify areas within the broader community that are facing these elevated financial hardships in order to better address issues of housing security, and to reduce barriers and increase opportunities for civic engagement in planning processes.

What is Cost Burden?

According to the United States Department of Housing and Urban Development (HUD), a household is considered "cost-burdened" if it pays more than 30% of income on housing. These high costs can exert significant pressure on households and cause them to cut down on or forego other important expenses, such as food, clothing, transportation, and healthcare. In 2015-2019 on O`ahu, households at 80% or below area median income (AMI) paid an average of 50% of income on housing, a severe cost burden.



The PUC is home to many kūpuna



A traffic circle calms residential streets

Housing Access

The large national cohort of residents that are employed yet struggling with basic costs of living is defined as "Asset Limited, Income Constrained, Employed" or "ALICE" households by the United Way. The Aloha United Way *ALICE in Hawaii Report* (2020) report found that there are more ALICE households statewide (33%) than households below the poverty threshold (9%), and that the ALICE households were growing at a faster rate. A supplemental analysis for the study that included COVID impacts pushed the numbers even higher. Per the 2017 American Community Survey, a full 40% of households in the PUC were "cost-burdened", or spending more than 30% of household income on housing. High rents or mortgage payments, especially for low- and moderate-income households, limit the amount that can be spent on other necessities, such as healthy food, transportation, child care and health care.

Households with access to affordable housing are less likely to move frequently, providing more residential stability for families with children and teens. Similarly, an adequate supply of affordable housing can also help to create a more stable platform for health care delivery and services for the elderly, and those with disabilities and chronic disease.

As was discussed in detail in Chapter 4, Housing, affordable housing is one of the single most pressing community challenges faced by residents in the PUC (and beyond). All available tools need to be employed in solving the housing crisis including inclusionary housing policies, incentives/exemptions for higher levels of affordability, direct public investment, gap financing, enforcement of short-term rental policies, and allowing for pilots of new housing types and models that bring costs down.

Parks Access

Proximity to parks has been associated with increased park usage, increased physical activity, and better overall health. Improving access to parks and green spaces can increase the amount of time spent exercising, reduce stress and fatigue, and promote well-being.

While O'ahu has outstanding beaches, recreation areas, and a climate for year-round outdoor activity, most PUC neighborhoods, with their high concentrations of residents in relatively small geographic areas, are underserved by public parks. Many of the densest PUC neighborhoods fall outside of a ¼ mile walk to a public park, and 14 of the 19 neighborhoods identified have less than 3 park acres per 1,000 people (a standard metric used to measure the quality of park service in communities). Policies in the PUC DP support increasing basic parks access, designing parks to serve all ages and abilities, and include strategies to increase usable open space in dense urban areas. Another central concern for parks access is safety and maintenance. Parks must be adequately serviced and maintained to encourage and support broad public use and to deter crime.

Healthy & Resource Efficient Buildings

According to the U.S. Environmental Protection Agency (EPA), we spend approximately 90 percent of our time indoors. Therefore indoor environmental quality is an important area of focus for promoting healthy communities, including, ensuring adequate HVAC systems, use of more healthful building materials, and monitoring the condition of aging buildings. The PUC DP promotes the use of, or reference to, industry-vetted specialized standards (e.g., Leadership in Energy and Environmental Design or Well Building Standard) for new construction. Incorporating such guidelines can help ensure a healthful indoor environment, as well as acheive greater resource efficiency measures.



Weekly concerts by the Royal Hawaiian Band on the Iolani Palace grounds are free to the community

Further, as it relates to efficiency, making strides in building efficiency is one of the single greatest means to close the gap between clean energy source capabilities and a reliance on fossil fuels. Healthy building design can also mean paying attention to the form and layout to create spaces that support the fitness, mood, and even sleep patterns or productivity of its occupants. For example, a health concious building design can promote physical activity through the placement of staircases and elevators, or boost mood and productivity through ensuring abundant natural light.

Increasing Opportunities for Healthy Foods

Poor nutrition and unhealthy eating habits are risk factors for many leading causes of disease. The topographical constraints in the PUC have resulted in the highest density of supermarkets in the central PUC area, with fewer full service supermarkets in the valley/ridge neighborhoods (the Salt Lake and Moanalua area are both particularly underserved by full-scale supermarkets). A healthy food environment should have a adequate access to fresh, affordable, and nutritious choices. However, perhaps the biggest challenge for the PUC and O‘ahu as a whole, is an over-reliance on imported food. It is estimated that more than 80% of Hawai‘i’s food is imported, and it is the State’s goal to at least double local production by 2030. As it relates to the PUC, the focus should be on continuing to provide more access points between farmers, local food producers, and local consumers. Increasing opportunities for Federal Nutrition Assistance Program-enabled farmer’s markets, open markets, community supported agriculture programs partnerships, and local purchasing are all means to increase these connections within the urban environment. Light industrial areas could also play a role in supporting the newer practices of indoor vertical and container (controlled environment) farming, as called for in the *O‘ahu Resilience Strategy*.

Chronic Disease and Access to Health Services

Most PUC neighborhoods have at least a 36% incidence of high cholesterol, 20% incidence of obesity, 10% incidence of diabetes, and 4% incidence of heart disease. In 2017, the percentage of adults (age 18-64) that were uninsured exceeded 10% in 16 of the PUC’s 19 neighborhoods – a concerning statistic given that only 8.8% of adults nationally were uninsured. This underscores the importance of encouraging the location of community health centers and service providers in the areas that need of them most, and partnering with community centers in disseminating important public health information to increase reach.



Enjoying a temporary closure of Kalākaua Avenue for recreation

How Does the Plan Get Us There?

Age-Friendly Communities & Urban Design

Creating places that accommodate people of all ages is an important component of a healthy community. The PUC is home to an aging population that needs safe and navigable environments, and forms of care that can respond to evolving needs. These considerations must inevitably extend to the city-building realm as well, including initiatives that range from barrier-free building design and retrofits, to age-appropriate streetscape enhancements. Many current City programs and policies are already working to advance healthy community planning goals, including Complete Streets, Age-Friendly Communities, TOD planning, and the *O'ahu Resilience Strategy*, to name a few. The City can build on these existing efforts to explicitly address the needs of the PUC's elderly population. Providing more affordable, accesible housing options, and encouraging age-friendly "universal" home and public space design (design features that are easy to operate for all ages and abilities), are measures that can help inscrease the security and ease the burden of day-to-day tasks for kūpuna and families.

Renewed Focus on Equity in Development

The PUC's neighborhoods with the most notable income and health disparities are generally clustered in the mid-town urban core, but may be found throughout the PUC. Current and future planning should continue to address common challenges faced by PUC residents such as housing and transit affordability, uneven park access, and missing sidewalks, and to seek to improve areas with ailing, aging, or missing, infrastructure. Targeted investments can help create a safer and more accessible public realm, to improve health and safety outcomes. Public agencies working in partnership with community groups can help to increase access to healthy eating and active lifestyles, and create spaces for farm-to-consumer transactions. Planners and developers should look to community members to determine adequate community benefits from new developments, and planners and community members should work with new developments to seek the inclusion of health-supportive uses. Community participation, engaging community champions, reducing barriers, and increasing inclusivity (including language services) are areas for continual improvement.

Environmental Protection

A key component of healthy communities is working to maintain and improve environmental quality. The PUC DP contains policies that support clean energy use, healthy buildings, watershed health, and mitigation planning for sea level rise and climate change, as well as other natural and manmade hazards. Timely updates to building codes and standards will ensure that buildings in the PUC (and across O'ahu) become more resilient to hazards, more resource efficient, and friendlier to the environment.

What is Universal Design?

Universal Design is a design approach that seeks to create spaces that have the widest possible utility for the broadest possible audience of users. The key principles include accomodating a wide spectrum of ability through flexible use, tolerance for error, and simple and intuitive design. Examples include wider doorways, zero-step entrances, easy to use lever handles, and curb cuts/sidewalk ramps at intersections. Incorporating such principles into original home designs also saves the need for costly retrofits later.

Related Policies

Policy H-1.1: Enable or incentivize residential infill development in transit-accessible planned growth areas.

Policy H-2.3: Preserve affordable housing options by encouraging reinvestment and redevelopment of aging multi-family housing and investing in public infrastructure.

Policy H-2.4: Expand homeless services and supportive housing in the PUC.

Policy PL-2.3: Actively pursue Honolulu's tree canopy goals, especially in interior neighborhoods lacking trees.

Policy PL-3.3: Ensure pedestrian-oriented design in all corridors and centers, especially in Town Corridor, Urban Corridor, Downtown, and Resort areas.

Policy PPOS-3.1: Invest in park facilities, equipment, and programs that serve all ages.

Policy PPOS-3.3: Promote parks that are safe for the community through environmental design strategies and after-hours activity.

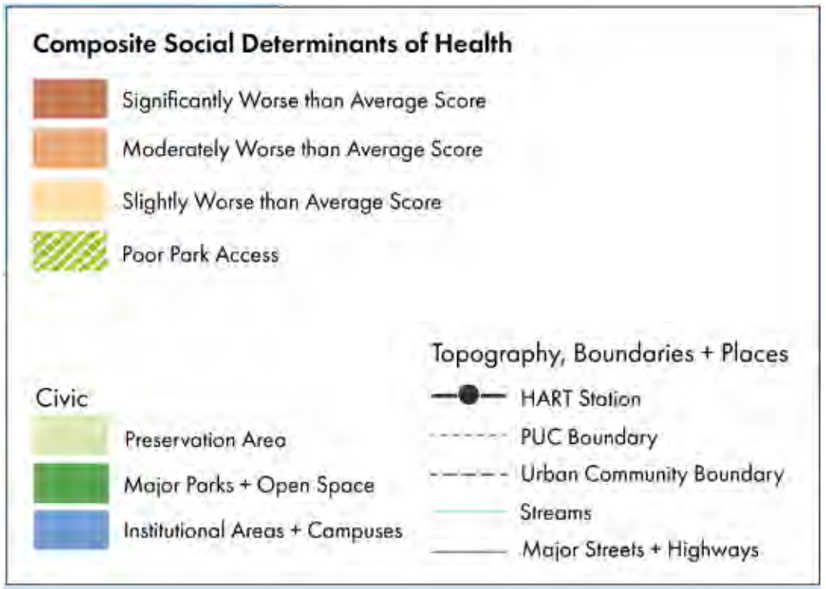
Policy MC-1.1: Implement Complete Streets and Vision Zero strategies to enhance the safety and utility of the transportation system for all users.

Policy WR-2.1: Protect drinking water aquifers, and surface and nearshore waters from contamination by developed land uses, urban runoff, underground fuel storage, and illegal dumping.



At a weekly farmer's market at Kapi'olani Community College

Figure 7.1: PUC Composite SDH Map, West





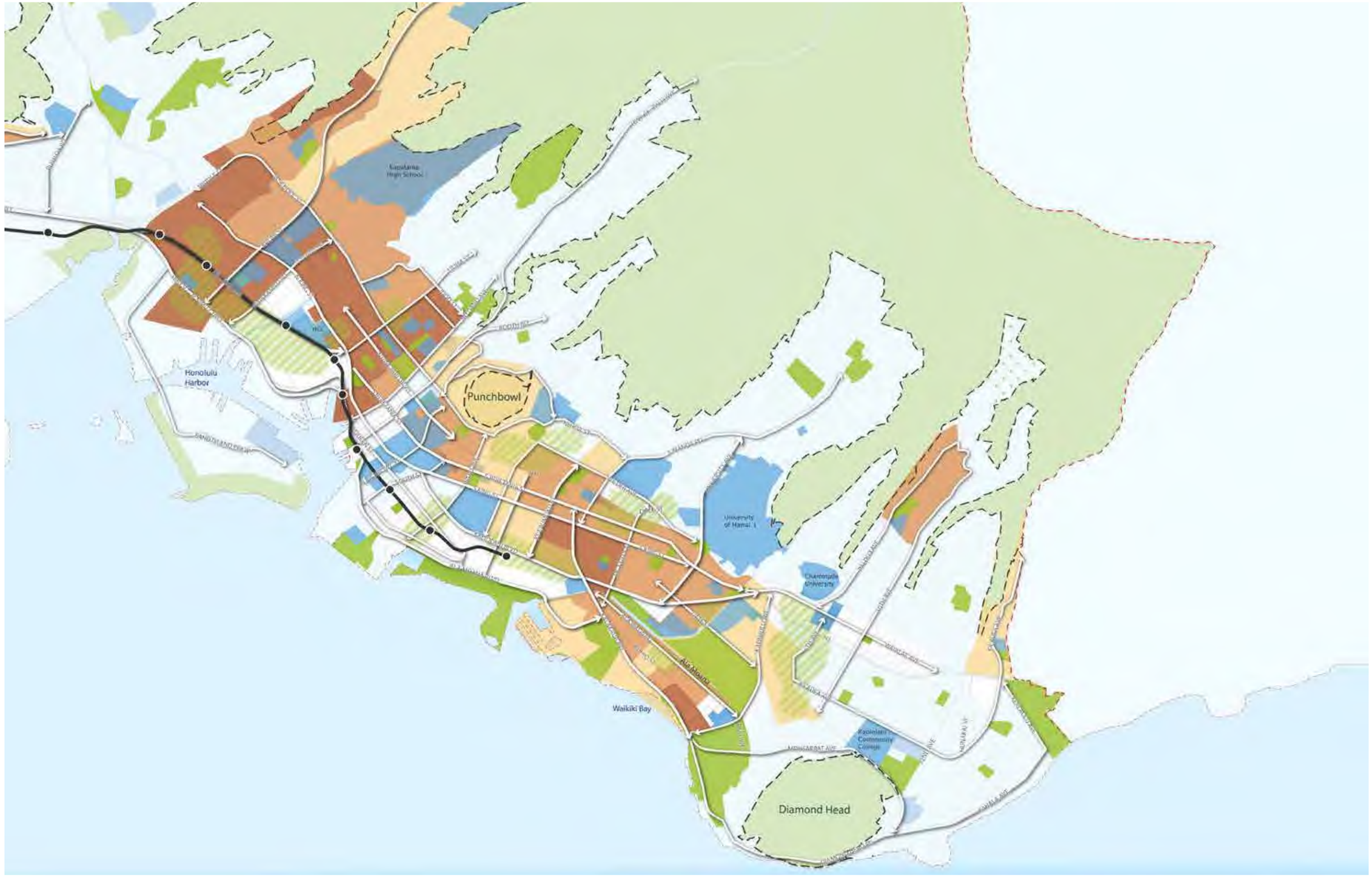
About this map: On average, the neighborhoods shown in darker colors for the "Composite Social Determinants of Health" experience greater socio-economic challenges. These are predominantly denser multifamily areas where a significant portion of the PUC's residents live. By combining this data with other planning factors (see the PUC SDH and Sea Level Rise Map on page 238 for an example), policy responses to specific issues can better serve the community.

The factors compiled in this map include:

- Age: Percentage of population over age 65 (very old) and the percentage of population under age 18 (very young)
- Education: Percentage of population over age 25 that did not graduate high school
- Employment Status: Percentage of unemployed workers age 16 and over
- Income: Household income
- Poverty: Percentage of population with income less than the Federal Poverty Level

This analysis is derived from the “Hardship Index” originally developed by the Neson A. Rockefeller Institute of Government to compare the economic conditions of one neighborhood to another (https://rockinst.org/issue-area/hardship-americas-cities-suburbs/). The Index uses six demographic and socioeconomic variables.

Figure 7.2: PUC Composite SDH Map, East



Goal HC-1: Foster a healthy built environment in the PUC.

Policy HC-1.1: Encourage exemplary healthy ("green") building standards.

This policy is to encourage and realize greener, more sustainable building practices in the PUC. While nationally recognized certifications and toolkits offer a comprehensive approach, there are also many smaller actions that can make new and existing buildings and developments cleaner and greener. Opting for energy efficient appliances and lighting, using sustainable and/or more environmentally friendly materials and products, water conserving design and landscaping, and improving indoor environmental quality should be considered in all projects. In addition, providing active spaces, bicycle parking or transit shelters to support active transportation modes, and outdoor spaces for relaxation, can help boost the mental and physical well being of building users and occupants.

Priority Actions:

Planning for healthy developments. Encourage major new developments to address community health and occupant well-being in their master plans and projects through the use of industry-vetted and evidence-based rating sytems, toolkits, and checklists. Continue to advance best practices for indoor environmental quality in all development/ retrofit projects.

Healthy buildings checklist. Develop a Healthy Building Checklist to speed up the process for voluntary sustainability measures for new construction and retrofits.

Timeline:



Partners:

- DPP
- OCCSR
- BWS
- DTS



Partners:

- DPP
- OCCSR
- BWS
- DTS

Other Actions:

- *Work with new building and renovation projects that wish to achieve high environmental performance through use of Whole Building Design, Net Zero, LEED, Living Building Challenge, or similar frameworks.*
- *Consider strengthening required mitigations for development near freeways, such as specialized HVAC, vegetative screening, and natural ventilation.*
- *Establish and/or identify tax credits, abatements, incentives, or other funding sources to encourage preferred green building practices.*
- *Establish guidelines for sustainable adaptive reuse of existing buildings to make use of existing resources and reduce carbon emissions.*



Projects large and small can help to move the needle toward more sustainable development.

Goal HC-1: Foster a healthy built environment in the PUC.

Policy HC 1.2: Promote strategies to increase energy efficiency and clean energy in buildings.

The City's Climate Action Plan (CAP) include actions to shift the island's energy use and supply toward renewable and locally-generated sources. At the commercial building and household level, opportunities exist to reduce overall energy costs and usage through energy efficiency improvements. Energy audits through the City's Better Building Benchmarking program helps building users to understand their energy use and how to better capture efficiencies. Subsidies and other incentives should be employed to help transition both residential and commercial buildings to cleaner energy sources, including multi-family housing and income-restricted housing.

Priority Actions:

Streamlined permitting for solar energy. Continue to implement streamlined permitting and approvals processes for commercial and residential solar installations, to further the reach of incentives offered by the public sector.

Timeline: SHORT

Partners:
- DPP
- OCCSR

Better building benchmarking program. Monitor the benchmarking program for large commercial buildings (including multifamily residential) that tracks and reports annual water, electricity, and gas use, creating a platform to inform better choices for resource efficiency and climate resiliency. Expand the program to smaller buildings in future.

Timeline: ONGOING

Partners:
- OCCSR
- BWS
- DPP
- Community partners

"EV Ready" construction. The City requires a certain percentage of new construction parking stalls to include capacity and a fully-wired conduit for the installation of an Electric Vehicle (EV) charging station.

Timeline: ONGOING

Partners:
- OCCSR
- DPP

Other Actions:

- *Work towards "PV Ready" standards and requirements for new commercial construction.*
- *Monitor the emergence of new solar-related technologies (such as battery storage, microgrid technology and grid integration technology) and ensure codes safely accommodate these new technologies.*
- *Maintain tax credits/exemptions, loan programs, and grants for solar installation.*
- *Consider requiring solar installation for city subsidized income-restricted housing.*





New developments are encouraged to include solar generation and electric vehicle (EV) chargers, or to be solar and EV 'ready' construction.

Goal HC-1: Foster a healthy built environment in the PUC.

Policy HC-1.3: Avoid/mitigate the Urban Heat Island Effect and reduce heat stress.

The Urban Heat Island Effect refers to the significant rise in surface and ambient temperatures that can be found in urban areas relative to outlying areas. According to the US EPA, urban landscapes absorb and re-emit more heat than natural landscapes. This increase is due to impermeable surfaces that interfere with evaporative cooling, the use of heat trapping materials in construction, and a lack of shading on buildings and streets. Other factors at play include the configuration of buildings, and waste heat from transportation and appliances. Adding increasing heat and extreme weather events due to global climate change to this equation makes clear the importance of putting urban cooling strategies into action.

Priority Actions:

Reduce permeable surfaces and boost tree canopy. Following best practices to reduce permeable surfaces not only aids in storm water management, but also helps allow natural evaporative cooling. Increasing tree cover helps lower temperatures by providing cooling shade. Identify candidate low-traffic streets in hot-spot neighborhoods for de-paving. Reduce impervious surfaces and create space above and below ground for trees.

Timeline:



Partners:

- DFM
- DPP
- DDC
- DTS
- OCCSR
- DPR

Cool pavements and rooftops as a resource. Provide resources and information to encourage the use of cool pavements that trap less heat on sidewalks, parking lots, and streets. Use reflective roofing to cut down on heat gain. Rooftops can also lower temperatures with green roof technologies, or add to overall carbon solutions with solar PV.



Partners:

- OCCSR
- DPP
- DTS
- DDC

Urban heat island solutions planning. Identify populations highly vulnerable to heat events, and overlay with urban hot-spots determined through Community Heat Mapping. Implement solutions for vulnerable populations such as Cooling Centers and adopt neighborhood-scale shading and tree master plans to ensure more coverage.



Partners:

- OCCSR
- DPP
- DFM
- DTS
- DPR



A building with landscaped area, a roof garden, and no surface parking.

Goal HC-1: Foster a healthy built environment in the PUC.

Policy HC-1.4: Expand access to healthy foods from local growers and expand the community gardens program.

A healthy food environment should include a diversity of fresh food options at affordable prices including grocery stores, farmers' markets, and other market places. New growth areas should be encouraged to include full-service grocery stores, flexible marketplaces for direct farmer-to-consumer transactions, and opportunities for local foods vendors. Expanding offerings in the City's Community Gardens Program will empower more residents to grow their own produce to supplement a healthy diet. Additionally, new agricultural business models such as urban vertical farming can help grow Hawai'i's agricultural self-reliance and improve the island's food security.

Priority Actions:

Incorporate new standards for urban agriculture. Update definitions and standards in the Land Use Ordinance for permitting processes.

Timeline: SHORT

Partners:
- DPP

Food action plan. Encourage the development of a Food Action Plan for O'ahu that clearly identifies steps to increase the island's food security, including needed infrastructure.

Timeline: SHORT

Partners:
- OCCSR

New community gardens. Plan and implement expansions to the community gardens program, such as installing new locations at underutilized mini-parks.

Timeline: MEDIUM

Partners:
- DPR
- CCSR
- DPP

Other Actions:

- *Encourage the expansion of facilities for local markets and vendors in the PUC, including at major transportation hubs.*
- *Work with developments that wish to include periodic night markets, market halls, farmer's markets, local food aggregation facilities (Food Hubs), or community supported agriculture drop-off points.*
- *Enable space at community markets for organizations to assist the community with federal benefit registration and renewal.*



A Community Garden in lower Nu`uanu.

Goal HC-2: Shape an Age-Friendly community that responds to the needs of all residents.

Policy HC 2.1: Encourage housing designed with kūpuna in mind, and in a variety of household sizes.

Providing senior housing and health care at affordable costs is important for Honolulu's residents and families. Senior housing should be located in areas with easy access to transportation and daily necessities, and integrating restricted-age housing into new growth TOD areas should be encouraged. In addition, new construction housing in transit-rich areas should be varied enough to accommodate a range of family sizes and designed with elders in the home in mind.

Priority Actions:

Strive to produce income-restricted and affordable units for a variety of household sizes and needs. Support the PUC's intergenerational households by providing affordable housing stock that is accessible and built for a range of family sizes.

Timeline: 

Partners:
- DPP
- State and non-profit partners

Support Age-Friendly and universal design guidelines. Encourage the use of Visitability and Universal Design best practices for major new residential construction and public gathering spaces.

Timeline: 

Partners:
- DCS
- DPP

Expansion of community health facilities. Encourage commercial and mixed-use developers to seek grants or partnerships to establish community health-serving spaces in key neighborhood centers. Consider inclusion of health services space as a community benefit in discretionalry permitting.

Timeline: 

Partners:
- DPP
- DCS

Other Actions:

- *Explore innovative approaches to combine senior housing with market-rate housing or provide assisted living in a co-housing format.*
- *Negotiate with developers to allow ADU/'ohana units within Homeowner Association conditions.*
- *Consider providing incentives for contractors and builders to become a National Association of Home Builders (NAHB) Certified Aging-in-Place (CAPS) specialists.*
- *Promote federal Housing Accessibility Assistance Grants (HAA).*



Senior housing units in Mānoa.

Building Better for Kūpuna

For many kūpuna, living well and healthier means living comfortably at home. As people age, however, physical challenges can make it hard to get around the house. Many seniors prefer to live in familiar surroundings as they grow older for as long as possible, and completing a home renovation—with an eye toward senior care needs—can help older residents maintain independence longer, while enjoying the comforts of home. City agencies can partner together to improve available information and incentives to encourage the inclusion of age-friendly design in new and redeveloped housing, for example, by expanding existing loan programs or developing pilot projects.

Goal HC-2: Shape an Age-Friendly community that responds to the needs of all residents.

Policy HC-2.2 Design parks and open space to provide increased physical activity for all ages.

Proximity to parks is associated with increased park usage, increased physical activity, and better overall health. Improving access to parks can increase the amount of time children exercise, decrease their risk of chronic diseases, and even reduce juvenile offenses. Adults who live closer to parks and green spaces report reduced stress and fatigue, improved mental health, better self-rated health, and reduced incidents of chronic diseases. Increasing opportunities for active and passive recreation and health-promoting connections to green spaces may include well designed indoor/outdoor spaces with seating, scent or pollinator gardens, and other places for relaxation in community gardens, parks, and public spaces.

Priority Actions:

Comprehensive recreational programming. Continue to work to align the parks and recreational programs with the needs of surrounding populations, including for new residents in growth focus areas. Conduct biennial resident surveys to refine programming.

Timeline: ONGOING

Partners:
- DPR

Continue to upgrade play equipment in City parks. Continue to build upon the success of the Kākou for Parks program to refurbish comfort stations, play surfaces, and play apparatus/ sports equipment in parks.

Timeline: ONGOING

Partners:
- DPR
- DFM
- DDC

Promote physical activity through design. Use the design of public spaces including parks, streets, and plazas to encourage physical transportation modes and a variety of physical activity.

Timeline: ONGOING

Partners:
- DPR
- DPP
- DTS



Residents meet for exercise at the Ala Moana Beach Park



Exercise equipment in public parks supports fitness and recreation

Other Actions:

- *Increase parks programing and events to improve safety and keep parks active.*
- *Add additional staff positions and/or a park ranger program to increase park safety.*
- *Partner with local neighborhood and community groups to install exercise equipment and upkeep in parks.*
- *Develop a Crime Prevention Through Environmental Design (CPTED) guideline document for public parks and gathering spaces.*

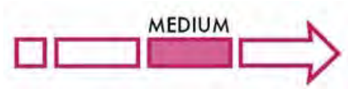
Policy HC-2.3: Enhance safety, accessibility, and navigability in public gathering places and transportation networks.

Walkable areas have a mix of neighborhood-serving land uses, connected streets, sidewalks in good condition, features that protect pedestrians from traffic, and pleasant scenery. Healthy communities support physical activity by making it easy and safe for all residents to walk, bike, or roll to access goods and services, employment, or daily activities. Multimodal connectivity in high-frequency transit areas, active uses, and good design, create memorable streets where people want to be out of their cars. Traffic calming and other interventions should be continually evaluated to improve safety for all modes.

Priority Actions:

Expanded pedestrian safety interventions. Support "Vision Zero" policies through targeted intersection improvements, crossing enhancements and traffic calming near schools, medical facilities, and other areas with high foot traffic.

Timeline:



Partners:
- DTS
- DDC
- DPP

Walkable design standards. Continue to implement active design standards to maximize activity and pedestrian comfort on Key Streets (identified in TOD Special District Plans) and mixed-use corridors to promote quality streetscapes.

Timeline:



Partners:
- DPP
- DTS
- DDC

Signage refresh. Replace, maintain, and update old, illegible signage, especially street and roadway signs. Expand transit and wayfinding signage in public hubs. Support the City's *Word on the Street* program to correct misspellings and add diacritical markings to Hawaiian language words on signage.

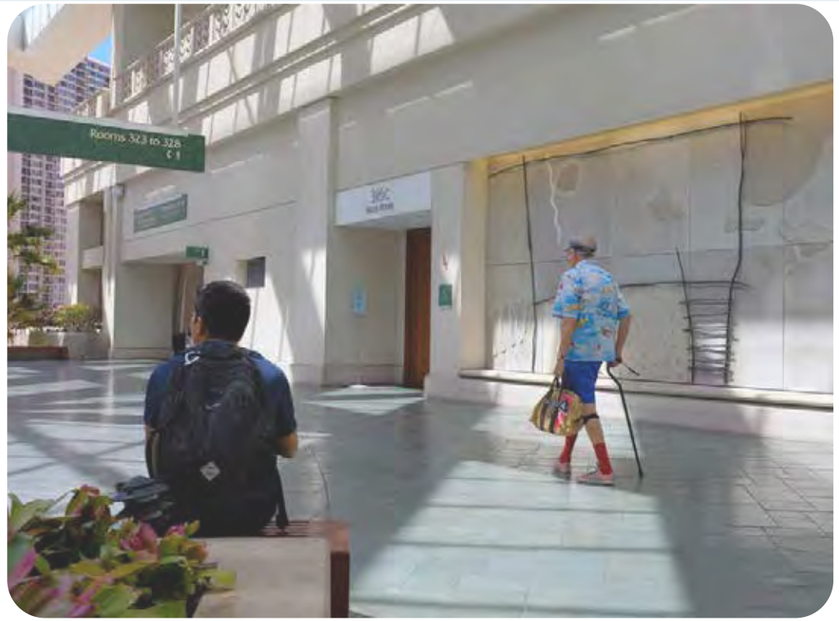
Timeline:



Partners:
- DTS
- DFM
- MOCA
- DPP
- State partners

Other Actions:

- *Upgrade pedestrian connections to rail transit station areas, enhance TheBus stations and nearby sidewalks, and ensure ride-share hailing spaces are provided at rail stations and major developments.*
- *Support the placement of bikeshare docking stations near and within large-scale developments.*



Public spaces should be navigable for users of all abilities.



A wide crosswalk and curb cuts add comfort for pedestrians.

Goal HC-3: Encourage initiatives that improve community engagement, health, and equity in the PUC.

Policy HC-3.1: Improve civic engagement in the planning process through increased community-focused initiatives.

Communities are strengthened when residents are empowered to take action, be it formally working through Neighborhood Boards or Commissions or informally through neighborhood groups, local organizations, and religious/educational institutions. Greater civic participation in planning processes and daily government operations creates community-driven outcomes. The City seeks to continually expand and improve modes of public outreach to empower all community members with the tools and resources necessary to work collaboratively on goals large and small that benefit the community.

Priority Actions:

Comprehensive engagement strategy. Develop and continually improve a coordinated civic engagement strategy to increase the public's ability to collaborate in City decision-making processes. Refine preferred strategies for virtual and online engagement.

Timeline:



Partners:

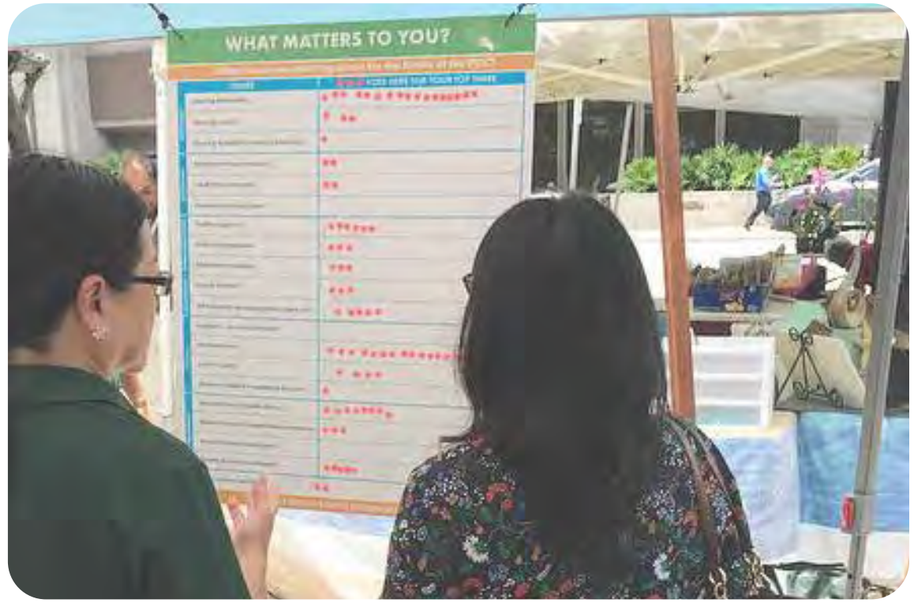
- CCSR
- DPP
- DTS
- DFM
- DPR
- CSD

Other Actions:

- *Promote expanded use of the Honolulu 311 app to report neighborhood nuisances.*
- *Increase partnerships with community and civic organizations, formal committees and/or local clubs, or similar, to organize clean-ups and beautification projects that promote safe and pleasant public spaces.*
- *Champion quick build and community based solutions for small scale local right-of-way improvements.*



Evening meetings provide a forum for in-depth discussion



Pop-up workshops meet community members in the places they already frequent

Goal HC-3: Encourage initiatives that improve community engagement, health, and equity in the PUC.

Policy HC-3.2: Collaborate across County and State agencies, and partner organizations, to center equity in public infrastructure, programs, and services.

The City should take a proactive role in improving quality of life for all residents by championing evidence-based community-driven planning, and collaborative partnerships between agencies and partner organizations. For example, analyses should include considerations such as cost burden, accessibility, and environmental conditions when planning for: transportation projects, new infrastructure investments, parks, city incentives and programs, designing and siting major facilities, and hazard mitigation planning.

Priority Actions:

Collaborate across agencies and organizations. Include use of the City's Social Vulnerability Index Map (SOVI map) /updated demographic information when evaluating new programs and services. Collaborate to improve services delivery for neighborhoods with higher vulnerability (such as prevalence of poverty, a high elderly population, or language barriers). Maintain current data layers.

Timeline:



Partners:

- OCCSR
- DPP
- DFM
- DTS
- DPR
- Other City and state partners

Ensure commensurate community benefits. Use community driven processes such as the TOD Neighborhood Plans and other Area Plans to determine appropriate commensurate community benefits in exchange for bonus height or density, where allowed by discretionary permits. Seek to standardize insofar as possible, clear definitions and parameters.

Timeline:



Partners:

- DPP
- DTS
- Public partners
- Community groups

Other Actions:

- *Incorporate vulnerability assessments into area or corridor transportation planning efforts.*
- *Partner with the State DOH to support their ongoing programs and initiatives that support improved health outcomes for residents (i.e. affordable and accessible preventive dental care services for low-income populations).*
- *Prioritize income-restricted (60% AMI or less) affordable housing in neighborhoods with high displacement risk.*
- *Adopt best practices developed by OMPO for equity in transportation planning.*



Pedestrian plaza at Dole Cannery

Goal HC-3: Encourage initiatives that improve community engagement, health, and equity in the PUC.

Policy HC-3.3: Increase community resilience and disaster preparedness.

Awareness and preparedness for disaster events from infrequent natural disasters such as hurricanes or tsunamis to more common episodic events such as storm-driven flooding or heat waves, is a key component to a resilient island community. With global climate change driving well-documented sea level rise and a host of new weather patterns, turning new attention to where we build, how we build, and what actions we take to improve safety and minimize damaging losses is only growing more urgent. This policy supports a closer link between preparedness planning and land use planning, as well as boosting community education and resources.

Priority Actions:

Funding for climate adaptation/mitigation. Work with all levels of government to fund development and implementation of area adaptation plans and infrastructure-specific climate adaptation and mitigation plans.

Timeline:



Partners:

- OCCSR
- DPP
- DEM
- DTS, DFM, ENV, BWS
- Other City and State partners

Integrate hazards and disaster planning more closely with other planning functions. Collaborate across agencies to include or strengthen pre- and post-disaster planning best practices into community-level planning documents.



Partners:

- OCCSR
- DEM
- DPP
- BWS

Empower residents with tools and resources for preparedness. Work to implement pilot community resilence hubs and increase available preparedness programs, tools, and resources.



Partners:

- OCCSR
- DEM
- DPP

Other Actions:

- *Plan for upgrades to 'last-resort' emergency shelters.*
- *Create and regularly update a dedicated Multi-Hazard Pre-Disaster Mitigation Plan. Include the use of emergency food preparedness concepts, such as Pre-covery Pods and suggested reserves of 14 day's worth of food and water.*

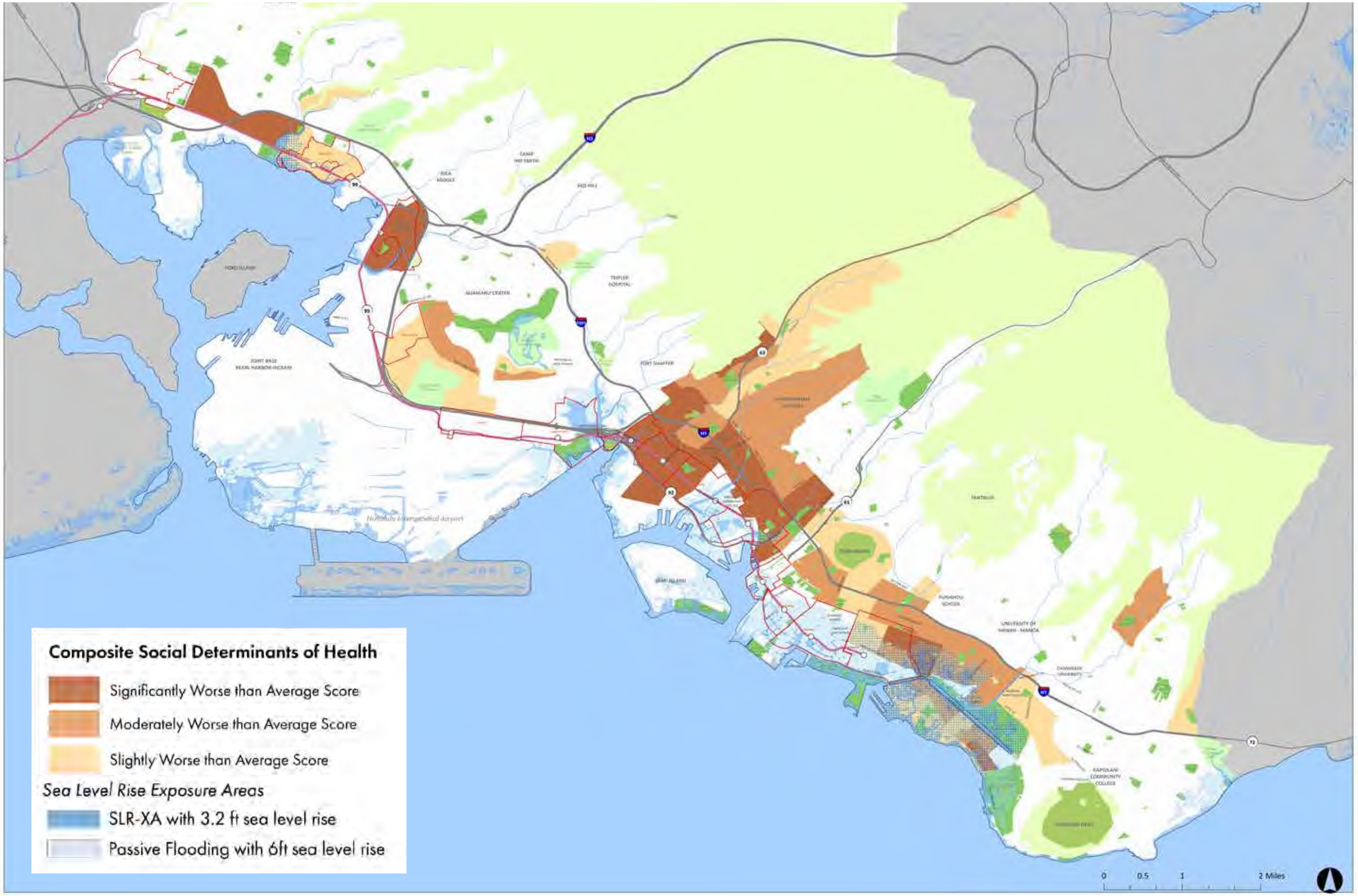


A 2019 assessment on O'ahu showed elevated temperatures in many urban areas.



Seasonal high tides cause coastal flooding that accelerates erosion.

Figure 7.3: Sea Level Rise Hazard Overlaid on PUC SDH Map



For more information see:

(A non-exhaustive list of the many resoures available on topics in this chapter).

PUC Demographic Information:

Healthy Communities 2018 topic paper prepared by Raimi + Associates for this PUC DP update:
https://www.honolulu.gov/dpp/planning/planning-documents/primary-urban-center.html

Department of Planning and Permitting Annual Report
https://www.honolulu.gov/dpppd/analytics.html

Environmental Health:

Hawai`i Department of Health
https://health.hawaii.gov/about/health-topics/#environmenta

Centers for Disease Control (CDC) Division of Environmental Health
https://www.cdc.gov/nceh/ehsp/default.html

Equity Topics:

CDC National Center for Chronic Disease Prevention and Health Promotion
https://health.hawaii.gov/about/health-topics/#environmental

Oahu Social Vulnerability Index Maps (custom for City and CDC)
https://resilientoahu.org/equity/data?msclkid=bee6288abadc11eca54cf459962ce163:

Age-Friendly Honolulu:

Honolulu Department of Community Services Elderly Affairs Division
https://www.honolulu.gov/dcs/aging-disability-resources.html

Urban Heat Island Effect:

U.S. Environmental Protection Agency
https://www.epa.gov/heatislands/heat-island-cooling-strategies

Energy Efficiency Programs:

Honolulu Office of Climate Change, Sustainability and Resilience
https://resilientoahu.org/energy

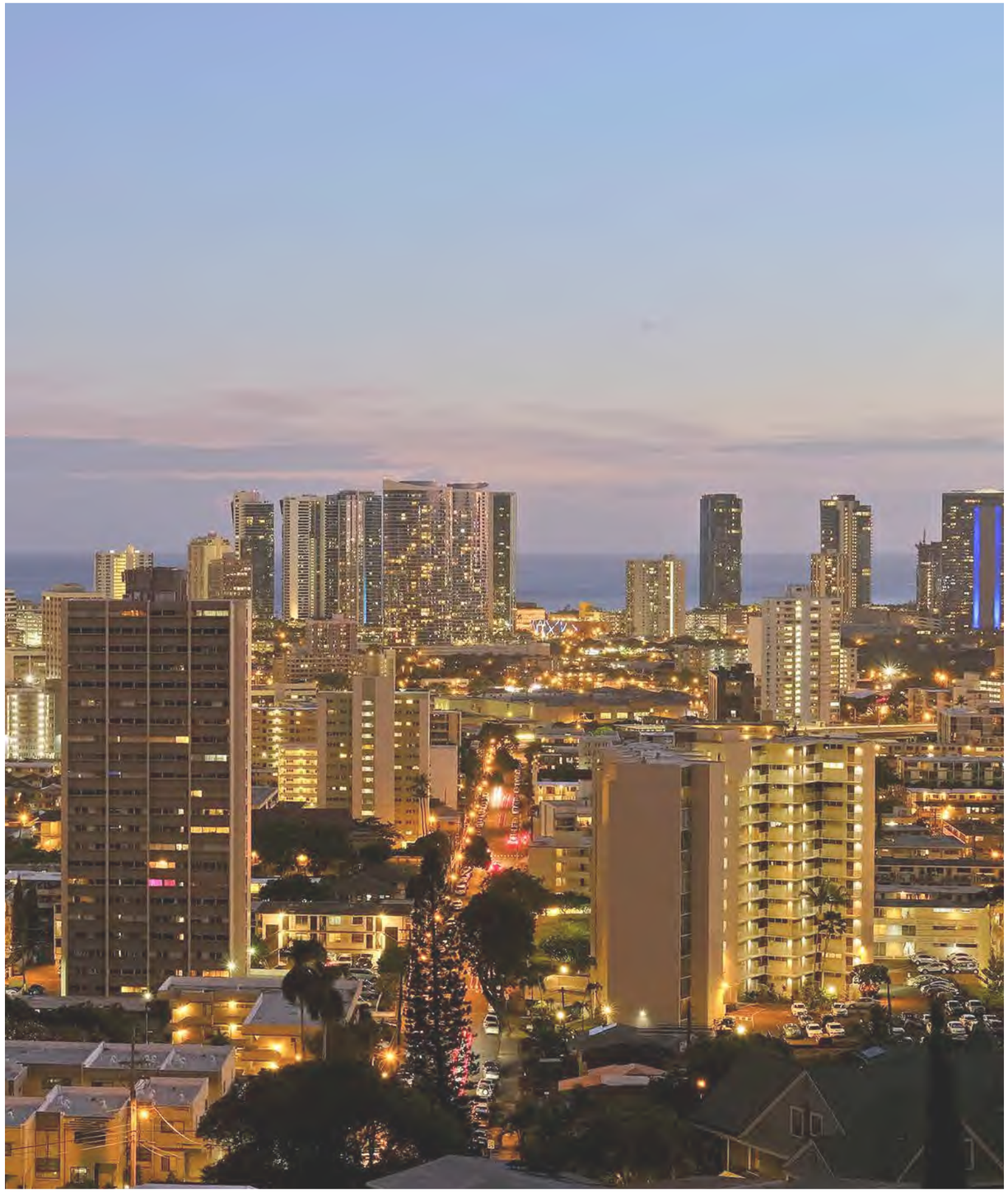
Water Conservation Programs:

https://www.boardofwatersupply.com/conservation

Resilience and Preparedness:

Honolulu Office of Climate Change, Sustainability and Resilience
https://resilientoahu.org/disasters

Honolulu Department of Emergency Management
https://www.honolulu.gov/dem



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Sea Level Rise + Coastal Hazards Planning

Sea Level Rise + Coastal Hazards Planning

GOAL SLR-1
Adapt Regulatory Standards to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.1: Utilize the SLR-XA as a tool for current zoning and permitting decisions and for siting critical infrastructure.

Policy SLR-1.2: Advance evidence-based sea level rise and resilience requirements, and time-based monitoring.

Policy SLR-1.3: Encourage voluntary adaptation measures in the SLR-XA that exceed statutory requirements.

Policy SLR-1.4: Consider the SLR-XA compound hazards individually and together to determine appropriate adaptation measures.

Policy SLR-1.5: Update shoreline regulations and development policies to reflect coastal hazard impacts and best available guidance on an ongoing basis.

GOAL SLR-2
Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience.

Policy SLR-2.1: Plan for priority growth outside of higher impact areas and vet proposed solutions for higher impact areas with the community.

Policy SLR-2.2: Address potential impacts to surrounding sites for project-level adaptation measures.

Policy SLR-2.3: Prioritize and fund community-level Area Adaptation Plans.

Policy SLR-2.4: Incorporate sea level rise / coastal hazard considerations in the planning, design, and maintenance of facilities and infrastructure.

GOAL SLR-3
Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR-3.1: Support collaborative resilience planning for new and existing infrastructure.

Policy SLR-3.2: Pursue a district-scale fee structure or other dedicated funding mechanisms for adaptation projects.

Policy SLR-3.3: Monitor ongoing impacts within the SLR-XA across infrastructure agencies to update development regulations that implement adaptation.

Policy SLR-3.4: Support State agencies in applying appropriate interventions and environmental measures for adapting/ preserving beaches and shoreline impacted by sea level rise and erosion.

Key Outcomes

The following chapter outlines policies and actions that will increase resilience to sea level rise (SLR) and coastal hazards in existing and new development. Strengthening project review procedures; encouraging or requiring adaptation for proposed developments in impacted areas; increasing long-range planning and coordination to address current and projected exposure; and implementing standards that address chronic flooding, will help protect the health and safety of residents as well as protecting beaches and coastal resources.

As the City is still in the early stages of contending with accelerating coastal nuisances and hazards that will be development considerations for a very long time to come, PUC DP policies maintain flexibility for future conditions and rules changes. Anticipating a dynamic policy environment at all levels of government, and a robust community and business sector suite of responses, such flexibililty will be needed.

PUC DP Policies support integrating SLR and coastal hazard concerns into the planning, design, and maintenance of City facilities and infrastructure, while concurrently utilizing the SLR-XA (see page 245 for a definition) as a tool to design and site new development. Enhanced agency collaboration for adapting to coastal hazards, regional and community-based adaptation planning, district-scale flood control projects and pilot adaptation projects will all be part of the multi-faceted solutions needed.

These strategies will be further supported by City and State adaptation guidance, infrastructure studies, agency partnerships, public engagement, and other measures as they evolve over time.

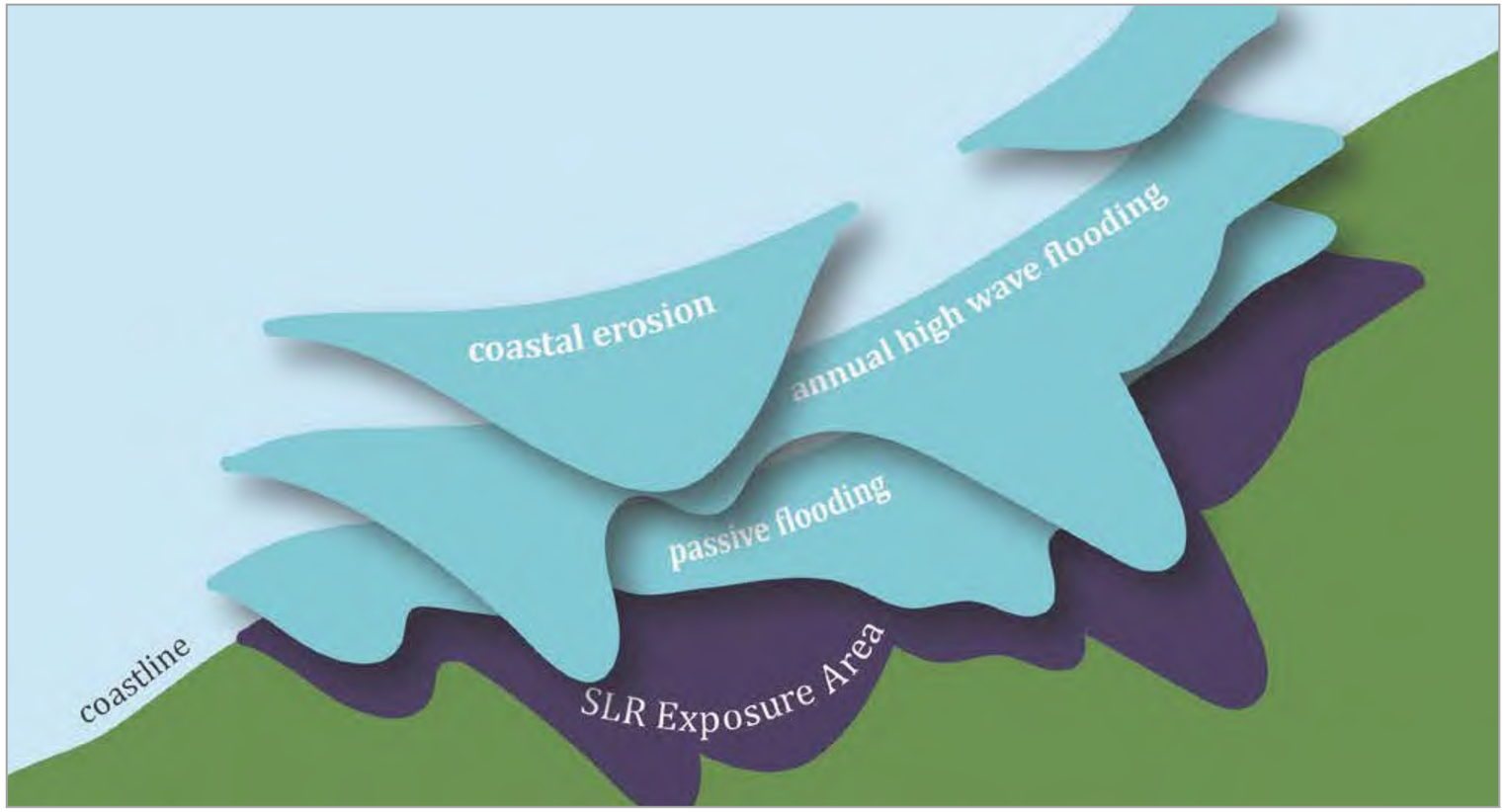


Image: See Romine et al. "Using SLRXA in Community Planning" on the State Climate Portal.



Green infrastructure to manage on-site flooding.



The Ala Wai Canal basin is at high flood risk.

Setting the Stage

Existing Coastal Hazards

O‘ahu’s PUC is uniquely vulnerable to a range of natural coastal hazards due to its remote location in the Central Pacific and dense concentrations of development on coastal and low-lying areas. Hazards of concern for the PUC, as elsewhere on O‘ahu, include coastal flooding from high wave events and extreme tides, rainfall flooding in steep watersheds and on low-lying coastal plains, tsunamis, coastal erosion, hurricanes, and high wind events. Climate change magnifies these hazards, increasing the frequency and severity of their impacts. Increasing proactive planning and adaptation measures for addressing sea level rise and coastal hazards will provide multiple benefits by making PUC communities more resilient to both the present-day impacts of climate change, and to the projected longer-term impacts.

Sea Level Rise Hazards & Vulnerabilities

According to the best available science, it is likely that we will see 3 feet or more of global mean sea level rise by 2100, and 6 feet or more of global mean sea level rise by the end of this century is physically plausible under some scenarios. High tide flooding and other passive flooding will increasingly affect low-lying coastal areas decades before global mean sea level reaches these benchmarks. The speed and severity of sea level rise experienced during this century will depend on global green house gas emmissions trends over the next few decades. The scale of expected sea level rise impacts in the PUC are disproportionately higher than elsewhere on O'ahu because of the area’s greater development density. In addition, much of the highest-value development and critical infrastructure for the region are located in vulnerable coastal areas of the PUC (including Waikīkī, Ala Moana/Kaka‘ako, Honolulu Harbor, and the Airport).

Sea Level Rise Planning Benchmarks

The sea level rise benchmarks used in this plan are consistent with the most current guidance from the December 2017 *Hawai‘i State Sea Level Rise Vulnerability and Adaptation Report* (State SLR Report) and the Honolulu Climate Change Commission Sea Level Rise Guidance (June 2018, Updated July 2022) (HCCC SLR Guidance). The goals, strategies, and policies outlined here are designed to plan for 3.2 feet of sea level rise in the second half of this century and 6 feet of sea level rise for critical infrastructure with long expected lifespans and low risk tolerance, in keeping with the HCCC SLR Guidance. However, both of these benchmarks come with the caveat that they should be used only as long as updated map data is unavailable. As conditons change or advance, it is expected that the preferred benchmarks will shift along with the best available science. In June 2018, Mayor's Directive No. 18-2 instructed all executive branch departments and agencies to use the most current versions of the HCCC SLR Guidance and the State SLR Report in their planning, programing, and capital improvement decisions to mitigate impacts to infrastructure and critical facilities subject to sea level rise.



Flooding in Māpunapuna (Source: UH SOEST King Tides Project)

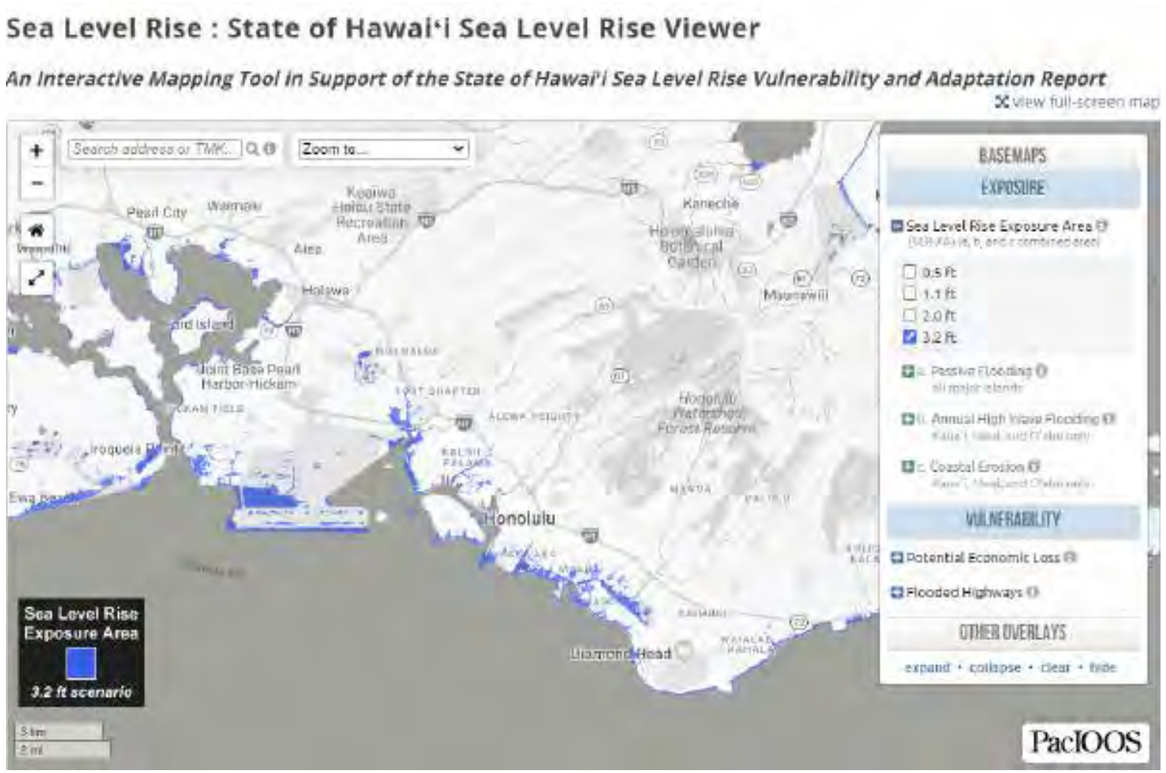
Current Benchmarks:

- **SLR-XA**: Refers to the Sea Level Rise Exposure Area (SLR-XA) mapped and modeled in the 2017 Hawai'i Sea Level Rise Vulnerability and Adaptation Report and its companion online Hawai'i Sea Level Rise Viewer. Currently modeled up to 3.2' and subject to change and updates as the science advances, the SLR-XA accounts for the combined impacts of passive floodng (i.e., still-water high tide), annual high wave flooding, and coastal erosion.
- **6' SLR**: 6 feet of sea level rise area as mapped and modeled in the National Oceanic and Atmospheric Association (NOAA) Sea Level Rise Viewer is recommended by the HCCC 2022 Guidance as a preferred minimum benchmark for infrastructure planning and long lived projects with little tolerance for risk. The NOAA viewer only accounts for passive flooding and does not include impacts from high wave flooding or coastal erosion.
- **Using the benchmarks**: For the purposes of this plan, it should be noted that the SLR-XA represents increasing impacts expected up to a 70+ year time horizon and is recommended for use as a current planning benchmark. It is recommended that new long-lived infrastructure and risk-adverse projects be built to an even higher standard (currently the 6' SLR).

City Policies

Honolulu formally adopted its first Climate Action Plan in June 2021. This Plan sets out key goals, targets, and actions to reduce carbon emissions (the main driver of global warming), and will be periodically updated. Additionally, the City's One Water Policy for climate change adaptation codified in the 2021 Revised Ordinances of Honolulu (ROH) §2-10.13, provides a platform for greater coordination across all City agencies that touch upon water management and infrastructure to maximize beneficial outcomes. The One Water panel of agencies is currently working towards a guidance document to identify and phase capital improvements for greater climate resilience.

The policies described in this chapter of the PUC DP reflect these initiatives and other programs that address the need to comprehensively adapt to and manage sea level rise and other coastal hazard impacts. Special emphasis is placed on strategies that provide multiple benefits, for example addressing sea level rise adaptation needs in coordination with State and City Hazard Mitigation Plans, during standard infrastructure improvement planning, within storm water management planning, as part of the BWS *Primary Urban Center Watershed Management Plan*, and while planning for the implementation of TOD and roadway projects.



Using the PacIOOS State of Hawai'i Sea Level Rise Viewer

The SLR-XA view can be found on the University of Hawai'i Pacific Islands Ocean Observing System's website here: https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/. While it is a projection, the results from the model have been vetted with high confidence.

Please see the "Hawai'i Sea Level Rise Vulnerability and Adaptation Report", Anderson et al. (2017), and the "Sea Level Rise & Climate Change" White Paper (2018) on the DPP website's (www.honoluludpp.org) PUC DP page, for more detail on the modeling methods employed to derive these exposure projections.

Additionally, see Romine et al. (2020) "Guidance for Using the Sea Level Rise Exposure Area in Local Planning and Permitting Decisions." Prepared by the UH Sea Grant College Program with the State DLNR OCCL for the Hawai'i Climate Change Mitigation and Adaptation Commission - Climate Ready Hawai'i Initiative (Sea Grant Publication TT-20-01; available at: http://climate.hawaii.gov/hi-adaptation).

How Does the Development Plan Get Us There?

Immediately incorporating sea level rise as a hazard consideration in planning.

Plan policies support moving cautiously on development within the SLR-XA and encourage the creation of Area Adaptation Plans for impacted subregions in the PUC. Implementation of TOD development plans will avoid intensification in the most sea level rise-impacted areas, and will incorporate infrastructure studies and adaptation planning requirements to mitigate effects in other areas. The City has also begun incorporating projected exposure into the review of permit applications for lots within the SLR-XA (all projects) and 6' SLR (currently used for infrastructure projects) to include addressing these risks in project planning and design proposals. Other key near-term strategies include infrastructure relocation and/or hardening where feasible when repairs and replacement are already needed, exploring use of the Complete Streets and the street rehabilitation process to incorporate low impact drainage solutions for storm flooding, and the creation of design guidelines and toolkits for a variety of development types.

Strengthening regulatory and adaptation strategies in the near- to medium-term.

As time progresses and impacts increase, infrastructure vulnerability assessments and coordinated planning among infrastructure agencies will develop more standard methods to integrate sea level rise adaptation into Capital Improvement Projects (CIP) budgets and operations. The City will identify priority adaptation actions and gradually begin developing Area Adaptation Plans, Infrastructure Studies, or Special Area Plans, according to need, in the PUC. Using observed inundation, projections, and benchmarks, it is anticipated that more specific and stringent policies and standards for all development in the SLR-XA, including the review of proposed site and building adaptation measures, will be warranted. Plan policies support ongoing interagency collaboration through the City's One Water Panel or similar to coordinate activities such as the raising of roads, hardening of utilities, and/or determining retreat pathways in instances where infrastructure inviability may be projected.

Increasing areawide resilience and adapting to/managing chronic and episodic flooding over the long run.

The PUC DP policies are also meant to help set the expectation for property owners. There will be a need to evaluate and adjust standards and requirements for development and redevelopment in sea level rise and erosion impacted areas on a rolling basis, based on evolving conditions and consistent with state guidance. Policies balance the overall development vision with long-term sea level rise planning by shifting greater density outside of the SLR-XA, and by completing infrastructure studies and adaptation plans in impacted TOD areas. New developments and redevelopments will need to buffer against flooding impacts by following best practices for resilient site and building design, and employing avoidance strategies whenever feasible. Similarly, regulations or restrictions for development in the Shoreline Management Area (SMA) and on shoreline lots is anticipated to increase over time. While this Plan identifies some of the more near-term strategies critical to adaptation, it may still be anticipated that there will be some locales where frequent flooding will become unavoidable into the future. In some instances, the planning of interim uses and managed retreat strategies should be explored and pursued.

Responding to Climate Change

This chapter of the PUC DP is concerned primarily with physical adaptation to coastal erosion, sea level rise, and passive flooding. However, it is important to recognize that the backdrop to this concern is an increase in global temperatures due to global greenhouse gas (ghg) emissions, and the scientific consensus that steep and quick reductions in ghgs are needed to stem the worst effects of climate change. Climate change is not limited to sea level rise impacts; adapting to increased extreme weather events, heat, drought, and wildfires are also concerns for a warming planet.

The City's Office of Climate Change, Sustainability, and Resiliency (OCCSR) has created a set of plans to help Honolulu in reducing greenhouse gas emmissions, eliminating fossil fuel use, and transition to a resilient and clean energy future. All are available at resilientoahu.org. These include:

- *O'ahu Resilience Strategy* (2019)
- *One Climate One O'ahu Climate Action Plan* (2020-2025)



Related Policies

Policy GD-2.3: Invest in long-term growth in commercial corridors and mixed-density neighborhoods outside of the SLR-XA.

Policy PPOS-1.5: Improve the ecological function of parks.

Policy MC-2.4: Adapt the roadway network to address challenges from chronic flooding and sea level rise.

Policy MC-2.5: Maximize interagency and regional transportation coordination.

Policy HC-3.3: Increase community resilience and disaster preparedness.

Policy WR-1.1: Collaborate across water quality and water infrastructure management departments and agencies.

Policy WR-1.3: Address chronic storm flooding issues through multiple solutions.

Policy ED-2.3: Continue to invest in the success of Waikīkī as the State's primary visitor destination/resort area and a livable neighborhood.

Policy PS-2.2: Strengthen community disaster preparedness.

Goal SLR-1: Adapt Regulations to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.1: Utilize the SLR-XA as a tool for current zoning and permitting decisions and for siting critical infrastructure.

Planning decisions made today will shape development projects with life spans extending into the latter half of this century and beyond. City policy calls for using the most current versions of the HCCC SLR Guidance, the Hawai'i Sea Level Rise Viewer and/or the Climate Ready O'ahu Web Explorer, and the Hawai'i State Sea Level Rise Vulnerability and Adaptation Report as informational resources for managing assets, reviewing permitting requests, and assessing project proposals. City departments are to refer to these resources in formulating plans, programs, and capital improvement decisions in order to mitigate impacts to infrastructure and facilities subject to sea level rise exposure. As of 2023 it is suggested that 3.2' of sea level rise may be expected by the latter part of this century, and is deemed a recommended benchmark for current planning and development. 6' of sea level rise is appropriate for infrastructure projects and other projects with long lifespans and low tolerance for risk. See https://resilientoahu.org/climate-change-commission (HCCC Sea Level Rise Guidance). This guidance is subject to change as consensus scientific research progresses.



A narrowing beach in Kāhala (Source: UH SOEST King Tides Project)

Priority Actions:

SLR-XA site screening. Use the SLR-XA as a hazard indicatior for new development and redevelopment projects, to disclose SLR to anyone seeking permits for impacted properties, and to seek adaptation or avoidance strategies.

Infrastructure planning. Utilize broader measures of SLR risk (as recommended by the Honolulu Climate Change Commission or site-specific analysis) as hazard indicators for long-lived infrastructure projects.

Other Actions:

- *Review and amend relevant planning and building standards on an ongoing basis to respond to impacts.*

Timeline



Partners:

- DPP
- OCCSR
- OPSD
- DLNR



Partners:

- DPP
- DDC
- DTS
- DFM
- ENV
- BWS
- OCCSR

Goal SLR-1: Adapt Regulations to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.2: Advance evidence-based sea level rise and resilience requirements, and time-based monitoring.

Sea level rise will exacerbate existing hazards such as erosion and coastal inundation, placing structures and supporting infrastructure within the exposure area at greater risk for damage and failure. As science and data regarding climate change impacts are continuously improved and updated, the PUC's infrastructure and building design standards need to evolve as well. New knowledge and understanding of impacts or adaptation practices often take time to integrate into formal land use regulations and rules. It is therefore important to put in place a framework to track and monitor impacts and repetitive events. Such an approach may consist of components such as decision trees to identify specific risk factors, project checklists, and impact benchmarks that "trigger" updates for increased development restrictions or identify needed adaptation actions.

Priority Actions:

Support implementation of mandatory seller disclosure law. Support the implementation of real estate disclosure for properties located in the SLR-XA by flagging impacted TMKs in permit tracking software, and/or providing this information in permitting reviews.

Develop a resilience checklist. Support development of a standard resilience checklist for planning staff review, applicable to projects in the SLR-XA. The checklist could be expanded into versions for infrastructure projects in longer-term exposure areas.

Incorporate SLR considerations into land use standards. As best practices are established, integrate reasonable adaptation standards as needed or required into the Land Use Ordinance and Chapters 21A, 25, and 26.

Timeline



Partners:

- DPP
- OCCSR



Partners:

- One Water Panel

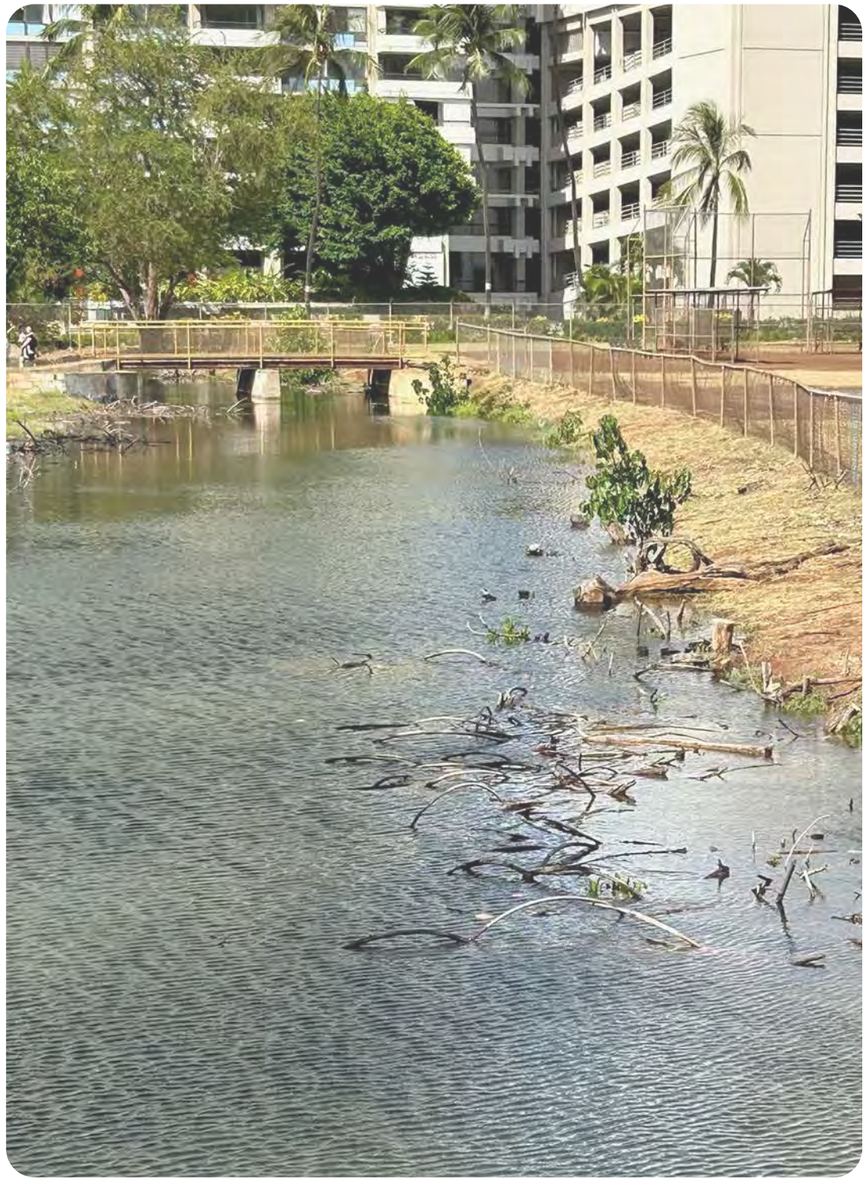


Partners:

- DPP
- OCCSR
- DLNR
- OPSD
- Community partners

Other Actions:

- *Include sea level rise considerations in future revisions to Chapter 16 Building Code, and other City regulations as needed to improve resilience.*



A king tide swells a stream feeding into the Ala Wai Canal

Goal SLR-1: Adapt Regulations to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.3: Encourage voluntary adaptation measures in the SLR-XA that exceed statutory requirements.

Promoting adaptation guidelines and best practices for development in impacted areas will support community safety and resilience, and protect environmental and physical resources. Initially, new adaptation measures should be incentivized for private development projects and demonstrated effective through pilot projects for City facilities. These forward-looking voluntary practices and pilot projects can serve as an important step to help the City incorporate adaptation-related design changes into development project requirements over time. It is therefore important to develop a flexible framework to consistently incorporate best available information on increasing heat, flooding, and sea level rise into project review practices, while also encouraging voluntary exceedence measures. Voluntary measures can help fill the gap between the time when new guidance is available and when cyclical updates of broader ordinances and building standards are revisited. Such an approach may consist of components such as decision trees to identify specific risk factors, project checklists, and impact benchmarks that "trigger" updates for increased development restrictions or identify needed adaptation actions.



Homes with elevated finished floor height.

Priority Actions:

Utilize climate adaptation guidelines. Encourage the use of guidance in the City's Climate Adaptation Design Principles for Urban Development (DPP TOD, December 2020) by private development located within the TOD Special District or other urban neighborhoods exposed to the SLR-XA.

Develop additional resilience and adaptation guidelines. Support ongoing development of well-sourced and industry-standard adaptation guidelines for a variety of resilient building design, site development, and environmental protections within the SLR-XA. Continue to develop additional City resources and best practices. Assist developers seeking information about resilience and adaptation where development/redevelopment is permitted, and where complete avoidance of impacts is not possible.

Create a voluntary exceedance process. Create a new permit classification or design review process to accommodate adaptation in the SLR-XA that voluntarily exceeds existing requirements. For example, qualified projects providing rigorous adaptation measures could opt for a consultation process wherein the DPP could offer limited standards exceptions to accommodate adaptive design (for example, additional height allowance to accommodate an elevated first floor).

Timeline



Partners:

- DPP
- ENV
- DFM
- DTS



Partners:

- OCCSR
- DPP
- DDC
- DFM
- ENV
- DTS
- DEM



Partners:

- DPP
- OCCSR
- One Water Agencies



LID projects can help to manage increased storm flooding.

Climate Resilient Urban Design Principles

Guidance in the City's *Climate Adaptation Design Principles for Urban Development* (2020) identifies recommended tools and best practices to consider in designing building sites and structures to be resilient to SLR, flooding, extreme heat, and groundwater inundation. The design principles document should be used as a resource to identify voluntary measures for property in TOD and other urban neighborhood areas that may be vulnerable to SLR and other climate change-related hazards.

Key Concepts:

1. *Provide an amenity-rich Resilient Streetscape Transition Zone (between the curb and the building facade), which includes salt-tolerant plantings, flood damage-resistant landscape materials, and green infrastructure.*
2. *Provide shade structures in the Resilient Streetscape Transition Zone and wide tree canopy in the planter strip zone between the road and sidewalk.*
3. *Provide sustainable roof systems, such as blue-green roofs, energy producing roofs, and reflective roofs. These systems can mitigate heat island effect; capture, treat and provide on-site reuse and release of stormwater; generate solar energy; and provide space for urban gardening and tenant amenities.*
4. *Provide systems for on-site water reuse which can aid in water conservation and flood mitigation through rainwater capture. Cisterns at the podium level can irrigate on-site and in the Streetscape Transition Zone.*
5. *Locate critical systems including Heating, Ventilation, Air Conditioning (HVAC), and power generators above the Base Flood Elevation (BFE) or Design Flood Elevation (DFE), such as on roofs and/or on intermediate floors.*



Resilient Streetscape Transition Zone Detail



All Resilient Transition Zones must be ADA compliant

The Climate Adaptation Design Principles for Urban Development is available on the TOD website: https://www.honolulu.gov/rep/site/dpptod/climate_docs/Climate_Adaptation_Design_Principles.pdf

Goal SLR-1: Adapt Regulations to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.4: Consider the SLR-XA compound hazards individually and together to determine appropriate adaptation measures.

The sea level rise exposure area (SLR-XA) is derived from the Hawai'i State Sea Level Rise Vulnerability and Adaptation Report (2017) and represents a modeled estimate of areas that will be impacted by sea level rise by or before late century. It is a composite of three distinct projections: passive flooding, annual high wave flooding, and coastal erosion. While the composite SLR-XA is an important tool to understand the extent of areas that are or will be prone to climate induced flooding, at the individual site level it is also important to know which type(s) of flooding are present or most prevalant.

The SLR-XA layers can be viewed separately or together in the Pacific Islands Ocean Observing System (PacIOOS) State of Hawai'i Sea Level Rise Viewer, or using county layers. The "passive flooding" layer includes direct marine flooding, groundwater inundation from rising water tables, and storm drain backflow. It does not include additional flooding from rainfall. "Annual high wave flooding" is based on mapping historical average wave heights plus sea level rise and does not include coastal erosion or storm event projections. The "coastal erosion" layer is based on measured historic erosion rates and does not include changes in behavior due to sea walls or coastal armoring. The SLR-XA represents a conservative best estimate of hazard exposure as it does not account for compounding impacts of the three hazards such as coastal erosion increasing the extent and severity of wave run-up.

Priority Actions:

Refine workflows. Create a workflow process to identify the individual and composite flooding hazards at the individual site level to require appropriate project design and to inform permitting decisions.

Timeline



Partners:

- DPP
- OCCSR

Tailor decision making to specific SLR-XA flooding exposure types. Gear allowable adaptation and mitigation measures to the present/expected SLR-XA hazard exposure type(s). As models improve, conditions change, and guidance is periodically updated, build flexibility into the review process to allow for the composite SLR-XA and individual layers to shift their extents.

Timeline

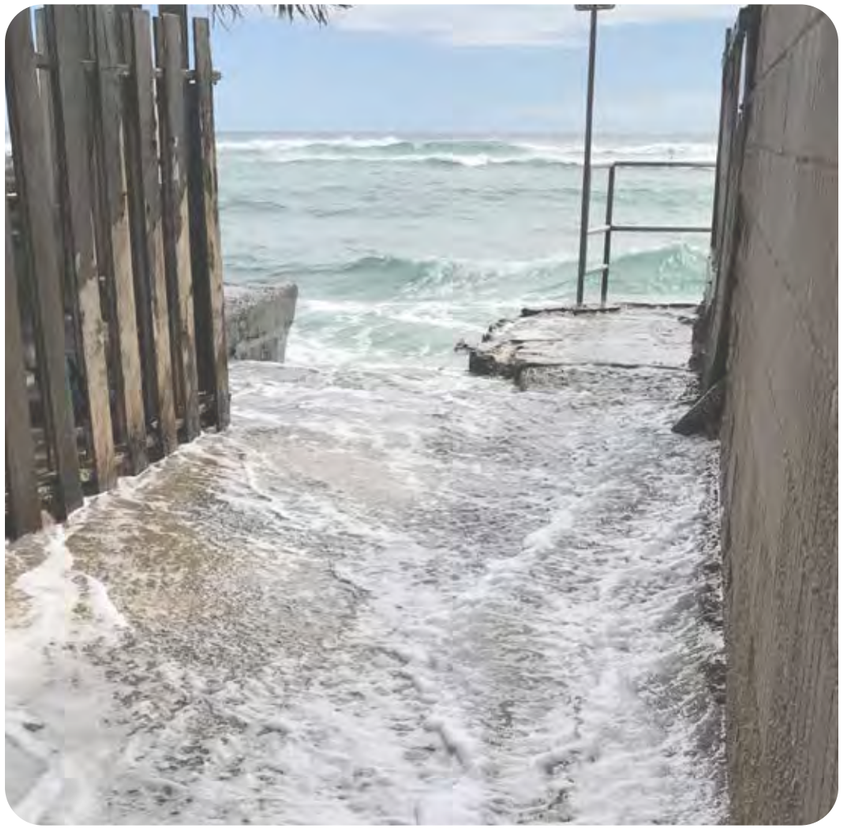


Partners:

- DLNR
- OCCL
- UH Mānoa
- DPP
- OCCSR

Other Actions:

- *Update SLR considerations in future revisions to the Revised Ordinances of Honolulu (ROH) Chapter 21A Flood Hazard Areas, Chapter 23 Shoreline Setbacks, Chapter 25 Special Managemet Area, Chapter 16 Building Code, and other City regulations as needed to improve resilience.*



An inundated beach access walkway (Source: UH SOEST King Tides Project)

The ***Guidance For Using The Sea Level Rise Exposure Area In Local Planning And Permitting Decisions*** (2020 Companion Report) prepared by UH Sea Grant and the State DLNR for the Hawai'i Climate Commission, is a supplement to the (State SLR Report). Since the State SLR Report was released, planning departments statewide have been engaged with the challenge of incorporating the evolving climate science into operations. Planning to the recommended SLR-XA benchmark is a challenge since the SLR-XA includes multiple factors, is not able to be captured in a smooth line, and can affect the whole, or just a part of a given parcel. The 2020 Companion Report helpfully lays out further guidance for working with this new class of information, including sample work flow charts like the one to the right.

https://climate.hawaii.gov/hi-adaptation/state-sea-level-rise-resources/

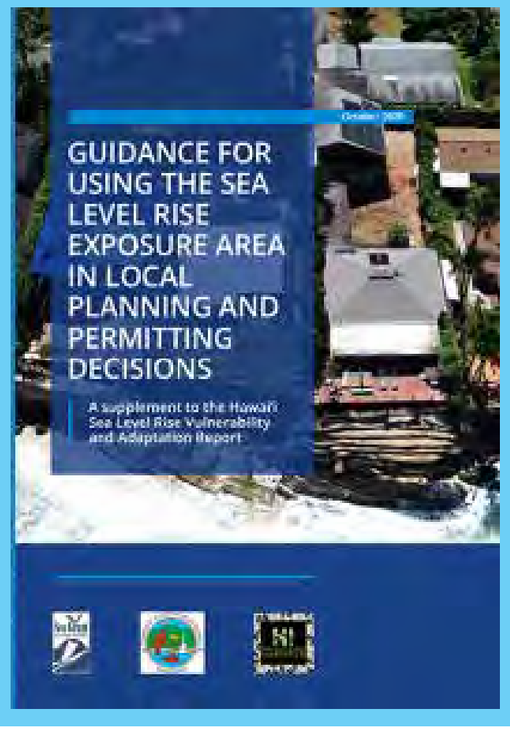


Figure 14.
Example workflow for planners to consider the individual SLR-XA model layers in planning and permitting decisions.



Goal SLR-1: Adapt Regulations to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR-1.5: Update shoreline regulations and development policies to reflect coastal hazard impacts and best available guidance on an ongoing basis.

The Honolulu Climate Change Commission's Sea Level Rise Guidance (2018, updated 2022) finds that rising seas threaten communities and natural ecosystems with increasing flooding across the shoreline due to wave run-up, saltwater intrusion of engineered drainage systems, and groundwater inundation that compromises infrastructure both above and belowground, creating new wetlands. Increased rainfall flooding (and more specifically increased drought followed by episodes of heavy rains) impairs drainage, and increases beach and land loss via coastal erosion. City departments have been directed to work cooperatively to implement land use policies and design and construction standards that mitigate and adapt to sea level rise. One result of this effort has been a round of updates to the Special Management Area Ordinance (Chapter 25) and Shoreline Setbacks Ordinance (Chapter 26), to better account for projected sea level rise in permitted projects.

Priority Actions:

Regularly update SMA and setback ordinances. Work collaboratively and on an ongoing basis to update Shoreline Setback and Special Management Area (SMA) regulations to incorporate projected sea level rise exposure. Periodically review and update shoreline policy with regards to the latest sea level rise and other coastal hazards modeling recommended by the Honolulu Climate Change Commission. Continue to refine SLR-XA depths and detailed impacts (high tide, high wave, and erosion). Ensure consistency with updates to the State Coastal Zone Management Act (HRS 205A).

Timeline



Partners:

- DPP
- OCCSR
- City and State Climate Commissions
- UH SOEST

Reform shoreline hardening policies. Based on guidance from the state, revisit policies for handling deteriorating or ineffective shoreline hardening on private residential properties that results in beach loss and impacts to public shoreline access. Avoid granting retroactive approvals for unpermitted seawall construction or repairs.



Partners:

- DPP
- OCCSR
- DLNR
- OPSD
- Climate Commissions
- UH SOEST



Shoreline hardening in the eastern PUC (UH SOEST King Tides Project)

Goal SLR-2: Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience Efforts.

Policy SLR-2.1: Plan for priority growth areas outside of higher impact areas, and vet proposed solutions for higher impact areas with the community.

It is important to identify and prioritize resilience actions that provide multiple benefits and strategically incorporate adaptation measures into ongoing planning efforts. For example, prioritizing areas outside the 3.2' SLR-XA as new growth and redevelopment areas is a “no regrets” approach to the long-term safety and economic viability of PUC communities. In addition, planning and implementing resilience measures such as adapting infrastructure in already impacted areas using a regional and long-term approach instead of solely on a case-by-case basis or when failures occur will leverage finite City resources more effectively and lead to more successful adaptation outcomes.

Priority Actions:

Plan for growth outside of the SLR-XA. Plan for long-term new growth in areas outside of the extent of the SLR-XA through regular updates to the PUC DP and related Special Area Plans, and via the City’s adaptation and resiliency planning efforts.

Timeline



Partners:

- DPP
- OCCSR
- ENV
- DFM
- BWS
- DTS
- DPR
- State Departments

Engage the community. Engage the community early and often for major engineered or managed retreat solutions. Focus on engaging the community in developing localized adaptation strategies. Implement demonstration and pilot adaptation projects for priority sites identified in this Plan and other City infrastructure and resilience planning. Managed retreat when and where warranted, should be carefully phased in through evidence-based mechanisms.

Timeline



Partners:

- DPP
- OCCSR
- ENV
- DFM
- BWS
- DTS
- DPR
- State Departments

Initiate a transfer of development rights (TDR) program. Begin developing the framework of a TDR program for wetlands, critical habitats, beaches, and coastal restoration areas.

Timeline



Partners:

- DPP
- OCCSR





Top and bottom: Pop-up events discussing sea level rise impacts in the PUC

Goal SLR-2: Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience.

Policy SLR-2.2: Address potential impacts to surrounding sites for project-level adaptation measures.

Effectively planning for coastal hazards and SLR requires considering flood risks and adaptation beyond the scale of a single property or site. Improvements to flood management should also be done at the corridor, neighborhood, and regional watershed scales to promote cost-efficient and holistic adaptation solutions. This applies to SLR induced flooding adaptations, as well as those for managing storm-induced flooding and coastal erosion. Site adaptations should be reviewed carefully to ensure that the measures are consistent with broader regional and sector-specific strategies, and that proposed measures will not increase flooding risks for neighboring properties and public infrastructure, or produce inequities. Joint efforts across properties will be key to developing resilient infrastructure strategies and phased adaptation approaches in SLR-XA areas.

Priority Actions:

Implement right-of-way green infrastructure projects. Construct public right-of-way green infrastructure/stormwater projects via Complete Streets and the Rehabilitation of Streets Program, such as low impact development (LID) features in medians and planting strips.

Develop a comprehensive plan for drainage and flood mitigation projects. Consistent with storm water master planning, develop and prioritize a list of drainage improvement and flood mitigation projects across all agencies, ranging from the neighborhood to the watershed scale, and considering all land uses in a comprehensive manner.

Other Actions:

- *Expand the physical radius for assessing the impacts of grading and other site/building improvements on runoff and flooding.*

Timeline



Partners:

- DFM
- DDC
- DTS
- DFM
- DPR
- DPP
- BWS



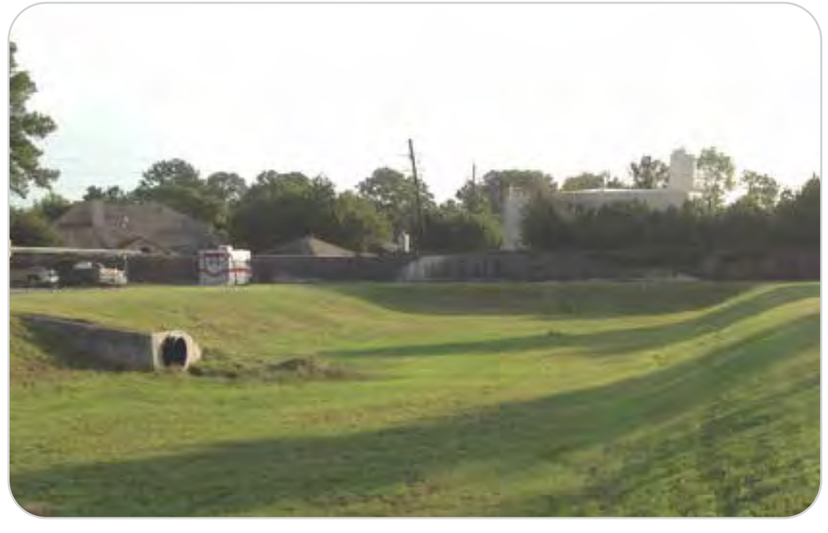
Partners:

- DFM
- DDC
- DTS
- DPR
- ENV
- DPP
- OCCSR
- BWS

Damage from nuisance flooding in high impact areas that are very low lying and subject to groundwater inundation may be difficult or even impossible to manage relying on conventional drainage solutions. It is important to identify these areas through efforts such as the Development Plans, Sustainable Communities Plans, Climate Action Plans, Watershed Management Plans, Stormwater master planning, and Hazard Plans. This creates ongoing conversations on adaptive measures, helps to identify benchmarks, expenditures, funding mechanisms, and phasing in as much detail as possible. Plan processes can also develop scenario alternatives and seek substantial public input for major public works.



Raising a road impacts adjacent businesses and residences



Example of a dry detention pond

Goal SLR-2: Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience.

Policy SLR-2.3: Prioritize and fund community-level Area Adaptation Plans.

Some areas of the PUC are particularly vulnerable to flooding exacerbated by sea level rise, and without adaptation measures will already be facing widespread chronic flooding by century's end if no action is taken. This includes some portions of TOD areas around the rail line, notably Pearlridge, Lagoon Drive, Middle Street, Kapālama, ʻIwilei, Civic Center, Kakaʻako and Ala Moana. Widespread chronic flooding will also occur around Waikīkī, the Ala Wai Canal, and lower McCully-Mōʻiliʻili. Areas such as Māpunapuna are already experiencing widespread chronic flooding, and these impacts can be anticipated increasingly in other areas as higher tides and impaired drainage will be felt decades before several feet of sea level rise occurs. High-resolution flooding data along with updated science on the timing and degree of sea level rise for specifice locales will allow for identification and application of appropriate responses from the regional scale, down to the corridor, block, and site scale. The PUC DP's Area Adatation Overviews at the end of this chapter are a first step to more targeted and finer-grained area adaptation planning that identifies conditions, impacts, and potentially appropriate adaptation options.



Beach nourishment in Waikīkī

Priority Actions:

Pursue community-level adaptation planning. Tie neighborhood or regional adaptation efforts to One Water efforts, stormwater master planning, the Honolulu Resilience Strategy, and other collaborative City resilience initiatives.

Timeline



Partners:

- All Agencies

Align resilience and disaster planning strategies. Work closely with emergency management agencies to understand escalating risks from climate hazards and increase disaster preparedness in the region. Establish post-disaster plans and policies related to reconstruction and redevelopment within the SLR-XA and other flood hazard areas should catastrophic damage occur. Following a disaster, require relocation where warranted, and incorporate design elements to enhance resilience to future impacts as part of rebuilding and recovery.



Partners:

- DPP
- OCCSR
- DEM

Climate equity and vulnerable populations. Develop mechanisms and strategies that provide equitable public funding and capital improvements in low-income areas and that identify vulnerable populations impacted by flooding, urban heat island, and other negative climate impacts (See also Policy HC 3.1 in Chapter 7, Healthy Communities).



Partners:

- DPP
- OCCSR
- DCS
- DEM
- DOH



Modifying roads is one strategy to address chronic flooding

Goal SLR-2: Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience.

Policy SLR-2.4: Incorporate sea level rise / coastal hazard considerations in the planning, design, and maintenance of facilities and infrastructure.

The PUC is exposed to impacts from sea level with significant, dense, urban development on low-lying coastal plains, much of which is below six feet of elevation. High tide flooding and groundwater inundation will affect underground infrastructure and utilities and compromise drainage systems before chronic above-ground flooding becomes critical. The City can help lead the way in preparing for these impacts with demonstration projects for resilient infrastructure design – particularly for public infrastructure projects with long life spans – and by incorporating sea level rise and other coastal hazard considerations into current planning and design to ensure long-term functionality. This includes taking advantage of scheduled upgrades or improvements to retrofit existing and viable infrastructure in the SLR-XA for enhanced resilience/adaptation, and prioritizing infrastructure expansion of new facilities and services that are not coastal dependent in areas outside of the SLR-XA.

Priority Actions:

Hazard overlays for infrastructure planning. Consider a minimum of the extent of the SLR-XA when developing and approving Capital Improvement Program projects, and consider 6' of SLR or current recommendations from the HCCC for critical infrastructure or major projects with low risk tolerance and/or expected lifetimes extending beyond 2100.

One Water guidelines and checklists. Create guidelines and/or develop a climate resilience checklist for infrastructure through the collaborative One Water agencies process to improve coordination and to inform CIP review. Include consideration of design impacts to surrounding sites.

Timeline





Partners:

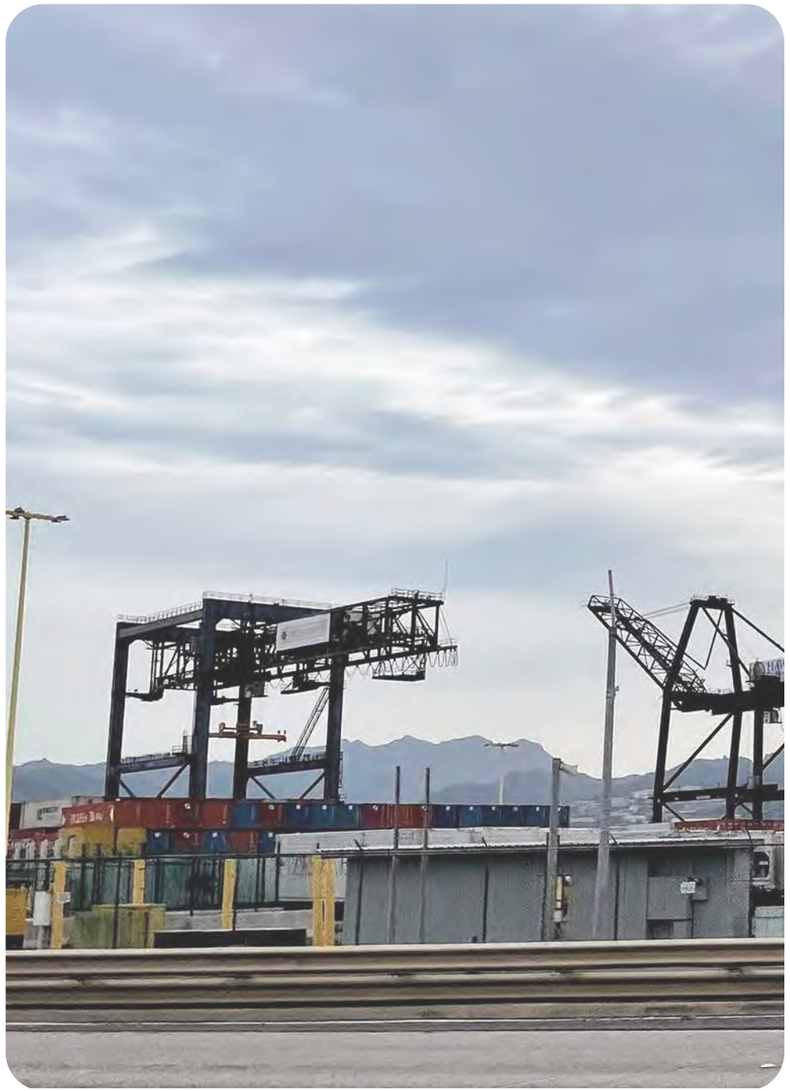
- City agencies
- State agencies
- Community partners

Partners:

- DDC
- OCCSR
- DFM
- ENV
- BWS
- DTS
- DPP

Other Actions:

- *Use tools such as a Plan Integration for Resilience Scorecard to periodically evaluate CIPs on progress towards reducing hazard vulnerability.*
- *Integrate adaptation strategies into infrastructure updates, retrofits, and renovations.*



A yard at the Honolulu Harbor.

Goal SLR-3: Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR-3.1: Support collaborative resilience planning for new and existing infrastructure.

Continued collaboration is essential across City infrastructure agencies, relevant State and Federal agencies and special district entities, including business improvement groups, in order to increase resiliency in infrastructure master plans and functional plans. Improved coordination among planning and infrastructure departments is needed to ensure progress toward common objectives and efficiency in capital improvement investments. The City can continue to build on ongoing cooperation through the One Water Panel agencies, and by coordinating other planning and infrastructure investments among public agencies. The City Resilience Team, One Water Panel, and other agency working groups should be on the lookout for cross agency collaboration opportunities for planned infrastructure upgrades and avoiding unplanned redundancies.

Priority Actions:

Inter-departmental climate adaptation working group. Regularly convene an inter-departmental working group to streamline coordination and promote collaboration in plan updates and infrastructure/CIP project review.

Timeline



Partners:

- All planning and infrastructure agencies

Create new sources of resilience funding. Support innovative funding mechanisms such as new impact fees, Public-Private Partnerships, Infrastructure Financing Districts, and Opportunity Zones grants to maximize resilience in capital improvement projects.



Partners:

- All planning and infrastructure agencies
- BFS
- Private partners

One Water resiliency planning. Coordinate on budgets requests for One Water climate resiliency efforts; collaboratively implement One Water demonstration projects, and refine best practices for City projects.



Partners:

- DPP
- OCCSR
- BWS
- DDC
- ENV
- DFM
- BFS

Other Actions:

- *Establish a resilient design review committee process.*
- *Align capital improvement planning with the City's Multi-Hazard Pre-Disaster Mitigation Plan.*
- *Adopt a "Dig-Once" approach to roadway infrastructure improvements to reduce adaptation cost.*



Ala Wai Canal overflow.



High wave overtopping at Kewalo Basin.

Goal SLR-3: Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR-3.2: Pursue a district-scale fee structure or other dedicated funding mechanisms for adaptation projects.

Flood control districts or similar special improvement entities are proven models for managing stormwater in complex urban regions around the country. Existing or future Special Improvement or Property/Business Improvement Districts (BID) can support adaptation to stormwater flooding and sea level rise impacts over the long-term. These focused programs or organizations can address and holistically manage resilience in limited areas. The City can work with or create these entities to foster coordination on infrastructure investment, align improvements for development projects, or engage in resilience planning, data collection, and developer education resources.

Priority Actions:

District-scale infrastructure and drainage adaptation strategies. Support special improvement district or property based business district entities in joint public-private efforts to develop neighborhood and district-scale resilience strategies for areas in the SLR-XA.

Impact fees for sea level rise improvements. Consider implementing an impact fee within the SLR-XA to pay for coastal hazard adaptation projects and other sea level rise improvements (perhaps as a function of a stormwater impact fee), for integrated planning projects.

Timeline



Partners:

- DFM
- DPP
- All One Water Agencies
- BIDs / Community Partners



Partners:

- DFM
- All One Water Agencies

Other Actions:

- *Conduct additional finer-grained (block-scale) hazard planning analyses in the PUC and beyond to understand future conditions.*
- *Commence systematized groundwater monitoring in the SLR-XA to enhance understanding of underground sea level rise impacts.*
- *Explore a conservation easement program.*



Areas experiencing chronic episodic flooding.



Sand nourishment in Waikīkī is funded in part by the Waikiki Business Improvement District Association (WBIDA).

Goal SLR-3: Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR-3.3: Monitor ongoing impacts within the SLR-XA across infrastructure agencies to update development regulations that implement adaptation.

It is expected that public agencies will need to continually monitor and evaluate adaptation measures against changing conditions on the ground and improved projections, and adjust best practices and standards as required. This will necessitate a flexible approach that involves: 1) designing and building current adaptation measures using the best available science, 2) performing iterative evaluation and tracking of adaptation outcomes, and 3), adjusting required adaptation measures accordingly based on new impacts and measured outcomes. Not knowing the precise adaptation solution that will be needed in the future should not be a rationale for delaying adaptation actions to known hazards today. Rather, public agencies can look towards adaptation approaches that can be modified, strengthened, added on to, or complemented such that they continue to perform well as future sea level rise unfolds.

Priority Actions:

Policy triggers for repetitive flooding. Consider adopting a set of cross-agency policy "triggers" applicable to major proposed developments in the SLR-XA or the SMA in order to reflect changing physical conditions and constraints. These triggers would result in escalating restrictions or modifications to allowed development activity and intensity in response to specific flooding benchmarks (frequency, duration, or severity). Such policies would need to be phased in over time based on measurable physical benchmarks, and could also be applied to post-loss reconstructions.

Timeline



Partners:

- DPP
- OCCSR
- BWS
- DTS
- ENV
- DFM
- DLNR
- OPSD
- DOT

Adaptation for minor development projects. Gradually adopt adaptation guidance and standards for advancing resilience in the course of minor repairs/rehabilitations of existing structures and infrastructure located in the SLR-XA/SMA. This would include guidance for addressing rehabilitation of non-conforming uses.

Timeline



Partners:

- DPP
- DDC
- OCCSR

Other Actions:

- *Encourage utilization of resilient design strategies that can be flexibly adapted over time to greater flood risks (rising seas, increased rainfall/erosion, stream overflow, groundwater intrusion).*
- *Incentivize retrofit of buildings (past a certain age) if they cannot be proven to meet specific health and safety standards related to flooding or urban heat impacts.*





Double sidewalks in Ward Village (with one raised above base flood elevation).

Goal SLR-3: Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR-3.4: Support State Agencies in applying appropriate interventions and environmental measures for adapting/preserving beaches and shoreline impacted by sea level rise and erosion.

Seasonal and chronic erosion is presently a problem at many of the beaches in the PUC, including at Waikīkī and Ala Moana. SLR will accelerate beach erosion in the near-term (through the life of this Plan) and may make some beaches unsustainable in the longer-term (later in this century). Preserving public access to beaches and shoreline is critical to supporting shoreline resilience, and highlights the importance of beaches to the local culture, lifestyle, and economy. The City can also actively support and initiate efforts for nature-based and green infrastructure solutions and wetland restorations to mitigate coastal inundation and erosion where conditions permit.



Public access to the shoreline is required by State law.

Priority Actions:

Support strengthened protections for beaches. Support strengthened regulatory protections for beaches and avoid variances granting shoreline hardening structures in the shoreline setback area (outside of engineered shoreline areas).

Timeline



Partners:

- DLNR
- OCCL
- DPP
- OCCSR

Maintain public access to shorelines and beaches. Strengthen along-shore and cross-shore shoreline access requirements in ordinance updates and planning review with consideration of changing sea level rise conditions (to preserve access in the future).



Partners:

- DPP
- DPR
- State Agencies

Support partnerships for beach management and restoration. Support innovative interagency and public-private partnerships (such as the state partnership with the WBSIDA) to maintain the long-term sustainability of the PUC's beaches and other coastal environments through coordinated management.



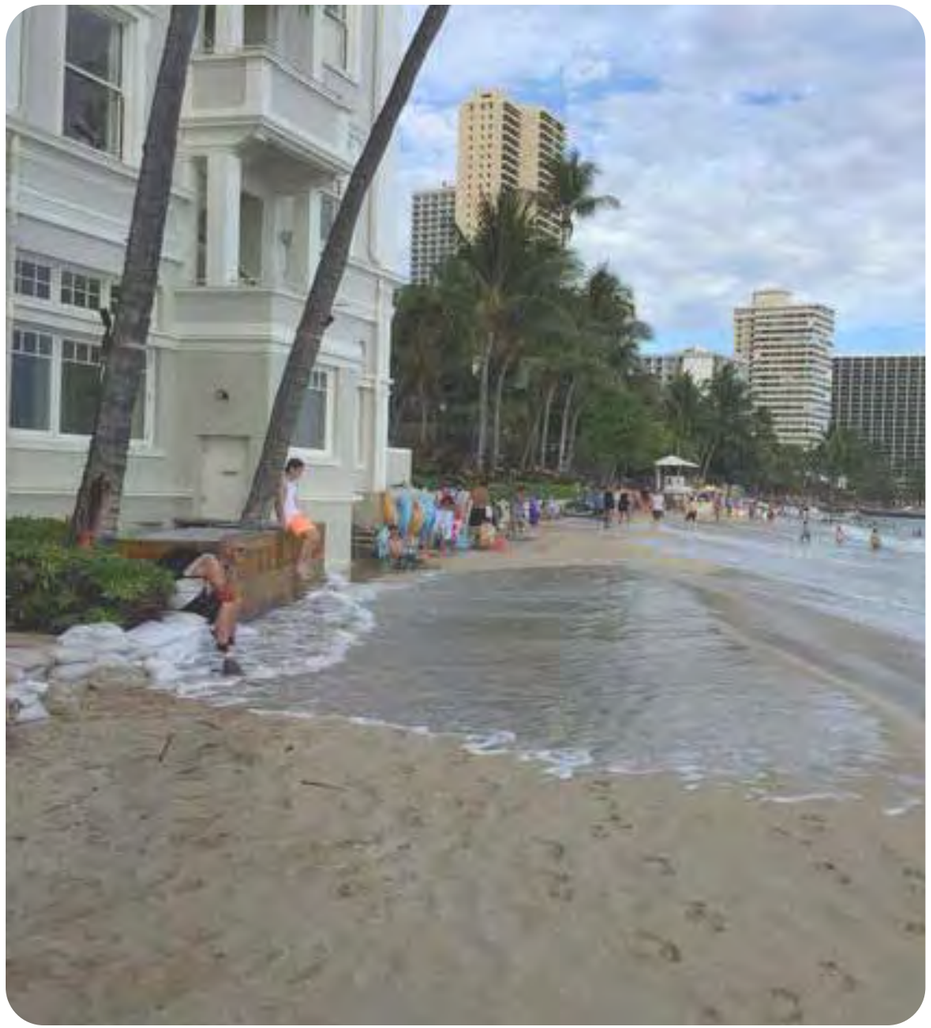
Partners:

- State Agencies
- DPP
- DPR
- DDC
- WBSIDA
- Private partners
- Community groups


Engineered beaches in the PUC require maintenance against erosion.

Other Actions:

- *Request (re)development projects on sandy shorelines to analyze alternatives such as placement of structures outside of the SLR-XA if feasible, or for erosion mitigation including beach restoration/nourishment.*
- *Request public and private projects on all back-bay shorelines (e.g. Ke'ehi Lagoon/Pearl Harbor) or stream mouths to assess alternatives to armoring (including living shoreline measures).*
- *In collaboration with state and private entities, the City may support geotechnical surveys to identify potential supplies of beach-quality sand that might be used for beach restoration projects.*
- *Utilize nature-based shoreline management approaches and encourage the integration of natural features in back-bay and stream mouth environments.*
- *Support collaborative efforts to reduce runoff and sedimentation based on strategies outlined in the PUC WMP and Stormwater Master Plan to improve water quality and coral reef health through continued improvements to regional wastewater and stormwater management.*





Map 8.1: PUC Adaptation Areas, West

HOW TO USE THIS SECTION

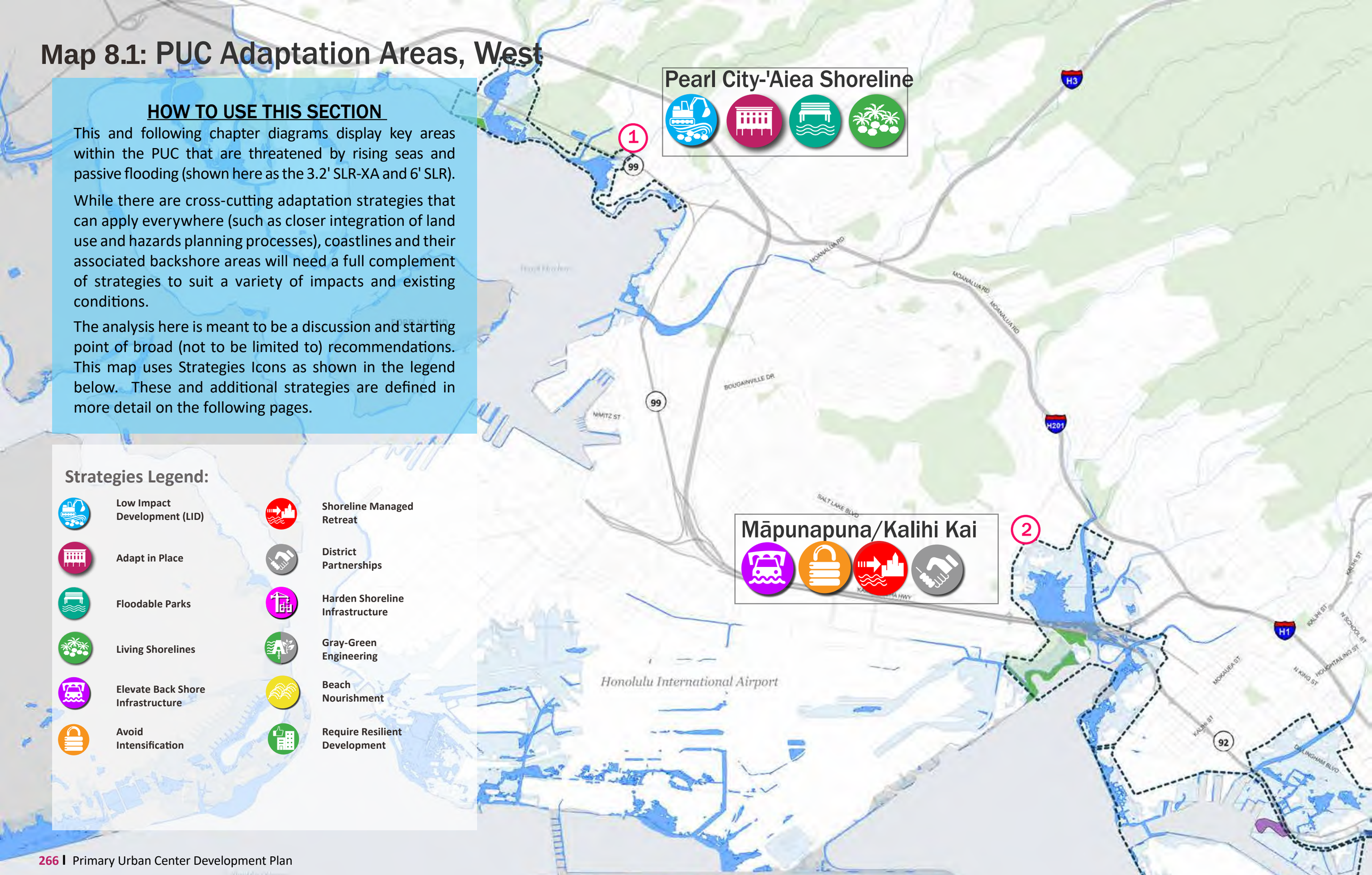
This and following chapter diagrams display key areas within the PUC that are threatened by rising seas and passive flooding (shown here as the 3.2' SLR-XA and 6' SLR).

While there are cross-cutting adaptation strategies that can apply everywhere (such as closer integration of land use and hazards planning processes), coastlines and their associated backshore areas will need a full complement of strategies to suit a variety of impacts and existing conditions.

The analysis here is meant to be a discussion and starting point of broad (not to be limited to) recommendations. This map uses Strategies Icons as shown in the legend below. These and additional strategies are defined in more detail on the following pages.

Strategies Legend:

- Low Impact Development (LID)
- Adapt in Place
- Floodable Parks
- Living Shorelines
- Elevate Back Shore Infrastructure
- Avoid Intensification
- Shoreline Managed Retreat
- District Partnerships
- Harden Shoreline Infrastructure
- Gray-Green Engineering
- Beach Nourishment
- Require Resilient Development



Map 8.2: PUC Adaptation Areas, East

Iwilei/Kapālama

Ala Moana/Kaka'ako

Sand Island/Harbor

McCully-Mōili'ili

Wai'alae-Kāhala shoreline

Waikīkī

Backshore
- SLR-XA with 3.2 ft sea level rise
- Passive Flooding with 6ft sea level rise
- Harbors and Infrastructure
- Parks and Open Space

Shoreline Adaptation Strategies

Cross-Cutting | All Areas

Preserve/Enhance Access to Shoreline

Actions to preserve shoreline access include prioritizing maintenance and repair of existing access facilities in order to minimize re-routing or closure, and creating temporary bridges, ramps or pathways to maintain safe access during flooding or King Tides.

Maintaining access to public beaches fronting privately owned properties must include enforcing prohibitions against new shoreline hardening structures. Shoreline public access is a commonlaw right in Hawai'i and important for fishers, gatherers, cultural practitioners, as well as sport and recreation.

This strategy is critical in the following shoreline types: Residential Mixed Beach, Engineered Beach and Natural Beach Recreation Areas, Waikīkī Management Areas, and portions of Honolulu Harbor and Kaka'ako Makai.

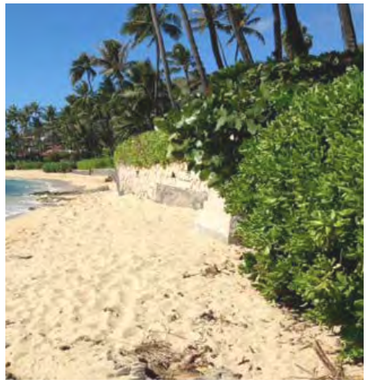


Comprehensive Shoreline Adaptation Planning

In addition to adapting coastal infrastructure in response to periodic inundation, properties on the shoreline will also be subject to direct coastal flooding and/or erosion.

Coastal armoring often has a "domino effect" of erosion on neighboring properties. Similarly, transitioning already hardened areas to softer nature-based solutions will need to be carefully planned across properties.

Comprehensive shoreline planning will be particularly essential for restoring or maintaining natural and engineered beaches, wetlands and other sensitive coastal habitats, and for adapting coastal-dependent infrastructure.



Harden | "Keep the Water Out"

Shoreline Hardening (NOT RECOMMENDED)

Although new seawalls are largely prohibited in Hawai'i due to the resulting erosion impacts, existing seawalls or other shore-parallel engineering fronts many shoreline properties in the PUC (concrete or basalt stone structures are commonly used in Hawai'i). Repair efforts should focus on increased use of soft alternatives and the phasing out and removal of shoreline hardening structures.

Related Considerations:

- Much of the PUC shoreline is engineered with significant areas of filled land;
- Shore-parallel armoring gradually but inevitably leads to beach loss along eroding coasts (e.g., Kahala);
- High construction costs;
- Causes environmental impacts beyond erosion, including loss of natural habitat;
- May diminish public access if not designed appropriately;
- Less effective on porous geology;
- May protect property behind the seawall from coastal erosion and wave overwash, but not from rising groundwater.

Harden/Elevate Critical Shoreline Infrastructure

Raising infrastructure is an intensive and complex effort. Critical shoreline infrastructure that will require adaptation includes State transportation facilities such as the Harbor and Airport, City owned streets and roads, waste water treatment plants, small boat harbors, and drainage systems.

Related Considerations:

- Adapts or redesigns existing infrastructure for improved resilience and extended lifespan;
- Disruptive and complicated process that requires intense coordination and redesign;
- Extreme cost. Must weigh costs and benefits over the useful life of the engineered intervention and incorporate future design options and phasing.



Avoid the Water

Shoreline Managed Retreat

Managed retreat allows shoreline environments to migrate naturally and be conserved by gradually relocating development out of the way, and by concurrently restoring ecological function to the coastline.

Mechanisms that can begin shifting development out of the path of coastal migration include: requiring new structures to locate outside of of the SLR-XA on existing parcels whenever that is an option; and updating development standards and restrictions based on escalating benchmarks. Tools for managed retreat include conservation easements, and transfer of development rights programs.

Related Considerations:

- Provides natural areas to absorb rising seas/storm surges;
- Preserves beaches and public access;
- Relatively few examples from other jurisdictions;
- Not very feasible in the near term in high density areas with many individual landowners;
- Flooding impacts may come earlier than projected on a planning timescale;
- Complicated to design and administer programs.

Adapt | "Work with the Water"

Beach Nourishment and Management

Beach nourishment is the practice of replacing sand on a beach to mitigate erosion and restore beach width using clean compatible sand, typically accomplished using heavy machinery. Engineered beach stabilization structures may also be employed. Beach nourishment is already a common practice in Waikīkī.

Related Considerations:

- Protects valuable beaches and backshore areas;
- Avoids most issues caused by walls/revetments and helps to preserve shoreline access;
- Requires significant dredging of sand (that typically comes from a nearshore deposit);
- Environmental risks to the nearshore marine ecosystem;
- Maintenance: continual nourishment is needed on a chronically eroding beach.



Nature-based "living" shoreline restoration

A living shoreline is a protected, stabilized coastal edge made of natural materials like plants and sand dunes. Unlike a concrete structure, which impedes the growth of plants and animals, living shorelines grow over time. Often referred to as 'soft armoring.'

Related Considerations:

- Accommodates natural erosion/ sea level rise over a longer term;
- Avoids most drawbacks that arise from hard armoring;
- Usually only suited to lower movement, back-bay, wetland or lagoon environments;
- On O'ahu, shoreline restoration can include fishpond restoration and other aquaculture.





Floodable Parks

A floodable park is created by re-purposing low-lying areas so they can be temporarily flooded during extreme rainfall events. These areas would be designed to absorb stormwater and/ or elevated groundwater, and decrease run-off or flooding by storing excess water and releasing it slowly. They can be a hard or soft engineered intervention.

Related Considerations:

- Leverages existing open space;
- Provides combined amenity, resilience, and biodiversity benefits;
- Parks are unusable for recreation during flooding;
- Need to address polluted water.



Mixed Green-Gray Engineering

A hybrid systems approach that combines elements of hardening with naturalized areas to mimic ecological processes. Often comprised of bioretention planters, permeable paving, or other infiltrative surfaces. Includes projects such as retrofitting or naturalizing coastal storm sewer outflows, rehabilitation of combined sewer pipes, and lateral cross-connection of pipes (to increase storage during storms).

Related Considerations:

- Appropriate in creeks/streams/ canals or marsh/vegetated/ wetland environments;
- High maintenance levels may be needed;
- Potential benefits for urban environments.



Strategies for Impact areas beyond the Shoreline

Beyond the immediate shoreline, whole neighborhoods will be impacted by the effects of increased flooding and coastal hazards. Many of the strategies on these pages will need to be applied in these areas.

Cross-Cutting | All Areas

Include Adaptation in Hazards Planning

A post-disaster recovery plan is a type of hazards plan that aids community recovery in the event of disaster. It can outline the manner in which damaged areas can be rebuilt after a disaster event to protect lives and property from exposure to recurring risks. Under such a plan, structures could be limited in where and how they are rebuilt, or could be required to use resilient building techniques. The City will look to incorporate post-disaster planning concepts alongside preparedness, mitigation, and response.



District Partnerships and Drainage Planning

In the most severely impacted SLR-XA areas, the City could consider creating drainage districts to help address impacts that cut across ownership and property lines, and disproprotionally affect certain areas. This approach requires robust outreach, on-going financing, and would be publicly led. Alternatively, the creation of BID-type infrastructure improvement districts could facililtated whereby property owners join together to formulate and fund collective projects that benefit the impacted area. A district-oriented strategy could successfully leverage private funding and would require public agency coordination.



Comprehensive Long-Term Adaptation Plans

The City is assessing vulnerability in SLR exposure areas for City infrastructure, assets, and assessing risks to developed areas. Planning long-term (beyond the standard 20 to 25 year planning horizon) for facilities, areas of growth, and public investments will help proactively reduce exposure to hazards. Completing longterm plans for exposed areas (Area Adaptation Plans) via a transparent public process will aid in setting clear expectations and feasibility of projects. Over time, these plans should lead to a greater equity of investment and also reduced exposure to extreme events and flooding hazards. However, any such plans for broad adaptation measures will be operating within market pressures, development interests, and private property concerns.



Adapt in Place

As flooding occurs more frequently and severely, private businesses may need to renovate, re-purpose, elevate, or abandon ground floors. Ground floors can be redesigned as parking, storage, or other nonhabitable space. Mechanical and electric facilities will need to be hardened and/or relocated. Adapting in Place will likely be the default strategy in densely developed areas until it is no longer possible or affordable to continue the investment.

Related Considerations:

- Allows continued use of existing development areas;
- Costly retrofits may be infeasible for many structures;
- Raised habitable space requires new connections and walkways to access street level;
- Doesn't address street level flooding or impacts underground.



Avoid Intensification

While it is not possible to easily "un-do" existing development in areas that will be impacted by rising water over time, it is vital that careful planning avoid worsening risks by adapting development standards, retreating where inevitable, and planning for new density outside of the worst impact areas. Over time, the City should set physical benchmarks (i.e. number/ frequency of flooding events or percentage of property lost) that trigger increased development requirements. Regional adaptation solutions including public works and regional drainage plans should also be applied. Redevelopments or developments will be increasingly subject to stricter zoning standards or restrictions in impacted areas over time.

Related Considerations:

- Reduces long-term loss of property;
- Reduces risk to private and public structures and infrastructure;
- Places limits on economic growth in impact areas.



Require Resilient Development

New design standards for impacted areas may include requirements for ground floor design, pumps, elevated mechanical equipment, and other adaptation-related improvements. Structures may also be subject to limits on armoring and new redevelopment standards.

Related Considerations:

- Ensures new buildings will be resilient to future decades of flooding impacts;
- Allows new development in impacted areas;
- Raises cost of new buildings in a context with already high construction costs;
- Introduces a new level of complexity in project review, and requires new types of staff expertise and programs.



Elevate Backshore Infrastructure

Raising infrastructure is an intensive and complex effort. For example, to raise a road, 3 to 6 feet (or more) of new fill is added, along with elevating nearby water and sewer pipes, or other nearby facilities. New drainage and green infrastructure features can be added to maximize performance benefits.

Related Considerations:

- Allows existing infrastructure to be salvaged and made resilient, providing decades of protection for individual properties or small areas;
- Essential strategy for intensively developed areas to adapt in place;
- Disruptive, complicated, and requires intense coordination;
- Necessitates redesign on the part of adjacent properties;
- May be a costly and only short-term; Can result in a patchwork of ground heights, public and private drainage infrastructure, and flooding impacts to neighboring properties;
- May induce more development in floodable or exposed areas.



Low Impact Development and Green Infrastructure

LID interventions such as swales, rain gardens, or retention areas reduce runoff and improve water quality by allowing stormwater to infiltrate slowly into the ground, or to evaporate and transpire. The goal of LID is to restore the natural ability of a developed site to absorb stormwater. Likewise, floodwater detention or retention projects are designed to hold riverine floodwater at bay on a temporary or ongoing basis, respectively, for infiltration or treatment. LID/Green Infrastructure projects can be very small (public or private) to very large public works.

Related Considerations:

- Reduces flooding and related costs;
- Can enhance community beautification and recreation;
- May disrupt natural areas/habitat;
- Erosion and sediment may be an issue;
- Must address pollutants in runoff.



Managed Retreat Areas

Intentionally deintensifying and eventually removing structures in a chronically flooded area can be termed "managed retreat". As part of a managed retreat scenario, coastal hardening features may also be removed, and green, or mixed green/gray engineering may be employed to buffer impacts. Projecting 30-50 years in advance in a managed retreat scenario would allow for interim adaptation measures, and interim uses. Retreat could necessitate negotation of rolling easements so that properties yield ground to wetlands or to beaches gradually migrating inland. Managed retreat would be necessary in areas that are not able to successfully adapt to flooding impacts or are in newly hazardous locations.

Related Considerations:

- Most complete impact avoidance approach and long-term solution;
- Provides new natural areas to absorb rising seas and storm surges;
- Not very feasible in areas with existing high density development;
- Politically difficult, legal challenges;
- Needs costly buy-outs or complicated transfer of development rights options;
- Flooding impacts may come earlier than anticipated/predicted.

Existing Shoreline Types: varying conditions along the PUC coastline

The coastline of the PUC is not uniform; there are a variety of conditions from natural environments, to manmade recreation areas and hardened shoreline of various types. The following pages are the general categories of coastal conditions in the PUC followed by some of the short and longer-term adaptation strategies that may be appropriate for each.

Recreation Area: Engineered Beach

This shoreline type includes Ala Moana Beach Park and Waikīkī, Beach. These beaches were expanded or constructed through past beach nourishment projects, are stabilized by groins, breakwalls, and other coastal engineering structures, and are backed by seawalls. Chronic beach erosion is an existing problem in most of these areas. Ala Moana and Waikīkī beaches are subject to ongoing beach restoration projects.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Ongoing beach management/restoration	
Maintain, improve, and raise shoreline engineering/breakwalls and groins	Increase gray-green solutions and/or Strategic retreat of portions of coastline

Recreation Area: Hard Shoreline

Beach parks and other shoreline-adjacent recreation areas are particularly exposed to sea level rise. Fields and grassy areas can be permanently damaged if flooded. Many landscaping plants can die if exposed to salinity and should be transitioned to salt-tolerant planting. Beaches that are already eroding will increasingly need to be actively managed. Sans Souci State Recreation Area (Diamond Head side of Waikīkī) and Sand Island are examples.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Floodable park areas	Floodable park areas
Soften hardened shoreline whenever feasible	Mixed gray-green shoreline engineering or Managed retreat (of hardening)

Recreation Area: Natural Shoreline/Beach

Natural shoreline parks such as Kuilei Cliffs Beach, Kaimana Beach, Ke'ehi Lagoon Beach Park, a portion of Sand Island Beach Park, 'Aiea Bay State Recreation Area, and Neil S. Blaisdell Park, can provide critical flood and stormwater management functions. Alternative landscape options to grass that are more resilient to flooding and salt water intrusion should be encouraged. These natural areas with soft edges are vulnerable to climate change, since elevations of tidal marshes will not naturally keep up with sea level rise, and there is very limited space for them to migrate inland.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Floodable park areas	"Living" shoreline restoration
Ongoing beach and wetland management/ restoration. Discourage new impervious surfaces	Mixed gray-green shoreline engineering or Managed retreat of natural shoreline

Wetland or Lagoon

Found along the Ke'ehi Lagoon and the mixed edge of East Loch between the Waimalu and Kalauao streams, this shoreline type is characterized by low muddy and/or rocky shorelines and thick shoreline vegetation such as mangroves. Living shoreline (nature-based) approaches and mixed green-gray engineered approaches may be effective for these shorelines in the near to mid-term. Managed retreat may become necessary for very low-lying areas.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Nature-based "living" shoreline restoration; Discourage new impervious surfaces	Mixed gray-green shoreline engineering or Managed retreat

Residential: Mixed Beach/Hardened

A mixture of shoreline types fronting private residences including: natural beach, beach backed by armoring (seawalls, revetments), and hardened shoreline with no beach. This type is found along the shoreline of the Gold Coast, the Diamond Head/Kāhala neighborhoods, and along a portion of the back bay/East Loch of Pearl Harbor. Coastal erosion and shoreline hardening has led to beach loss and reduced shoreline access in some areas, particularly in the west end of Kāhala. Long-term adaptation actions may come through neighborhood-scale planning and/or updates to zoning and coastal land use policies.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Small-scale beach restoration projects; Discourage new impervious surfaces	Conserve natural beach—restrict new shoreline hardening
Maintain existing shoreline and soften whenever feasible	Managed retreat of highly impacted residences

Small Boat Harbor

In the PUC, there are two state-run small boat harbor facilities (Ala Wai Harbor and Ke'ehi Harbor/Lagoon), as well as privately managed small boat harbors. Small boat harbors offer boat docking and access for seafaring recreational activities and are threatened by rising seas. These facilities are hardened with breakwalls, sea walls, bulkheads, and other marine infrastructure. Adaptation may be achieved by elevating structures and harbor facilities.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Maintain, improve, and raise shoreline engineering	Elevate key harbor facilities

Honolulu Harbor - Kaka'ako Makai

The PUC contains the island's essential logistics, trade, transportation, and tourism facilities, including the port, cruise ship terminal, airport, and an electrical power plant. These facilities are protected with extensive revetments, groins, and other structural elements. Adaptation for this critical infrastructure may be achieved by elevating structures and facilities, improving drainage, and elevating lands with fill.



POTENTIAL SHORT-TERM OPTIONS	POTENTIAL LONG-TERM OPTIONS
Maintain, improve, and raise shoreline engineering; Harbor dredging	Elevate key harbor facilities

1 Adaptation Area Overview: Pearl City + 'Aiea



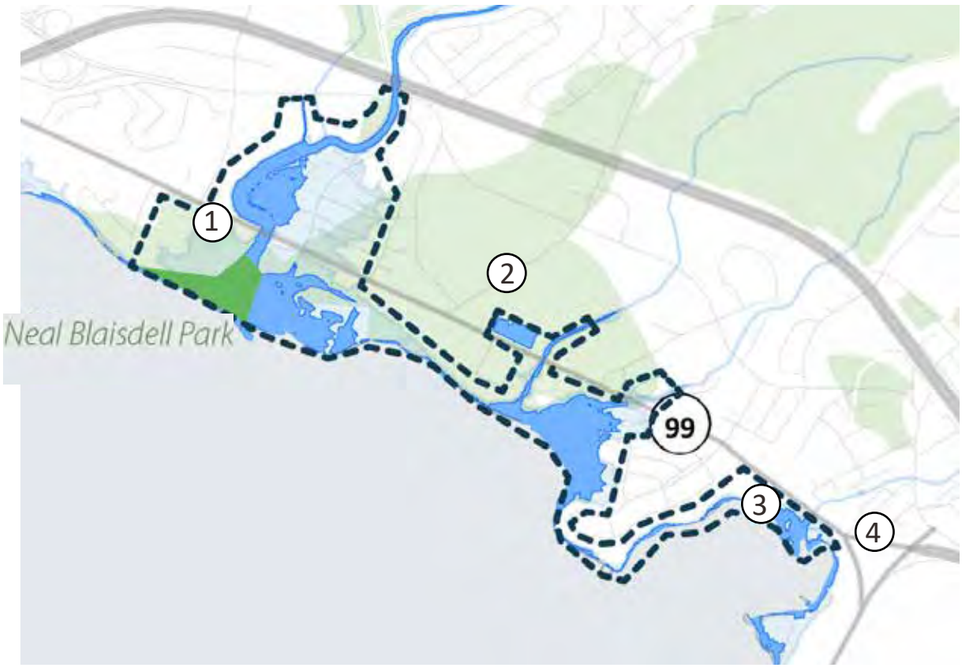
Current and Projected Impacts

- Chronic flooding of beach parks
- Chronic flooding of housing + businesses
- Stream overflows during storms
- Ponding along streets and parking lots

Priority Strategies

The Pearl City-'Aiea Shoreline from Pearl City Peninsula to McGrew Point, has business and residential development and spotty SLR-XA exposure along a coastline of natural beach, wetland, and hardened shoreline. The Kalauao (Pearlridge) rail station and TOD Neighborhood Plan area that is roughly bounded by the Neal S. Blaisdell Park, Kalauao Stream, and Moanalua Road, is largely outside of the SLR-XA, however, there are some peripheral conditions to be addressed through regulation and adaptation measures. The most notably impacted locales in the larger region are the stream mouth areas of the Waiawa, Waimalu, and Kalauao streams. Projects addressing stream conditions would benefit this entire area. Other opportunities include the potential for retention or nature-based solutions along the park, beach, and wetland shoreline areas that can also positively impact water quality.





Shoreline Strategies

Wetland or Lagoon

- Nature-based "living" shoreline restoration; Discourage new impervious surfaces
- ! or
- Mixed gray-green shoreline engineering
- Managed retreat

Residential Mixed Beach/Hardened

- Small-scale beach restoration projects
- Maintain existing shoreline and soften where feasible
- Conserve natural beach—restrict new shoreline hardening
- Managed retreat of highly impacted residences

Recreation Area: Natural Shoreline/Beach

- Floodable park areas
- Ongoing beach/wetland management and restoration Limit new impervious surfaces
- ! or
- "Living" shoreline restoration and gray-green shoreline engineering
- Managed retreat of shoreline

Backshore Strategies

SHORT-TERM STRATEGIES	LONG-TERM OPTIONS
Adapt in Place	**Potential managed retreat**
Protect and enhance public beaches	**Greater development regulations/restrictions**
	Catalytic stream projects

Proposed or Conceptual Adaptation Opportunity Projects

- *#1: Neal S. Blaisdell Park retention basin study (conceptual)*
- *#2: Multiple locations: Pearl Harbor Watershed Based Plan (PUC WMP, BWS)*
- *#3: 'Aiea Bay Living Shoreline, conceptual (South Shore Study, UH CDC)*
- *#4: Hālawa Stream Recreation & Improvements (Halawa Area TOD Plan, DPP)*

*See page X for Shoreline Strategies

2 Adaptation Area Overview: Māpunapuna + Kalihi Kai

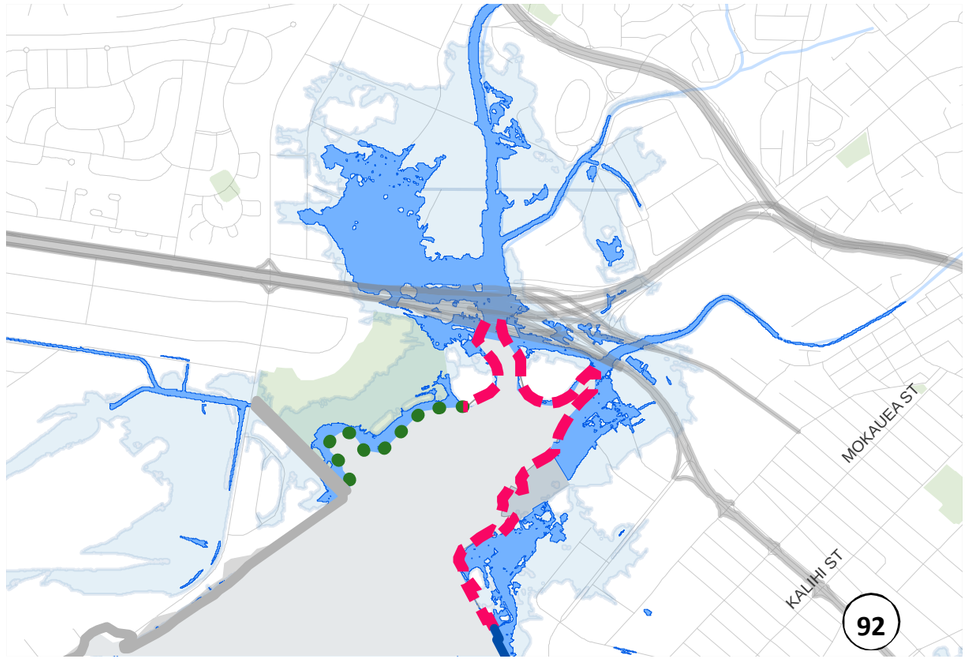


Current and Projected Impacts

- Chronic flooding of beach park
- Chronic flooding of streets + businesses
- Deterioration of marsh/wetland shore
- Stream overflows during storms

Priority Strategies

The industrial area of Māpunapuna and the ewa edge of Kalihi Kai are adjacent to Ke'ehi Lagoon near the terminus of Moanalua Stream and the Kapālama Canal, respectively. Both areas are low-lying and subject to storm-induced drainage issues and Māpunapuna in particular suffers from widespread nuisance flooding. Studies of the area are ongoing, and comprehensive adaptation planning should be a top priority as rising sea levels will exacerbate an already pronounced issue. The bulk of the flooding can be expected from passive (i.e. groundwater) flooding, inundating infrastructure and affecting roads and utilities. The feasibility and cost-benefit of adaptation efforts including road raising, adaptive uses or interim uses leading to long-term managed retreat, and pollution control, should all be considered for Māpunapuna. The Āhua (Lagoon Drive) and Kahauiki (Middle Street) rail stations should be used as a catalyst of any transformative adaptation design solutions.





Shoreline Strategies

Wetland or Lagoon

- Nature-based "living" shoreline restoration; Discourage new impervious surfaces
- ! or
  - Mixed gray-green shoreline engineering
  - Managed retreat

Recreation Area: Natural Shoreline/Beach

- Floodable park areas
- "Living" shoreline restoration efforts
- Ongoing beach/wetland management and restoration Limit new impervious surfaces
- ! or
  - Mixed gray-green shoreline engineering
  - Managed retreat of natural shoreline

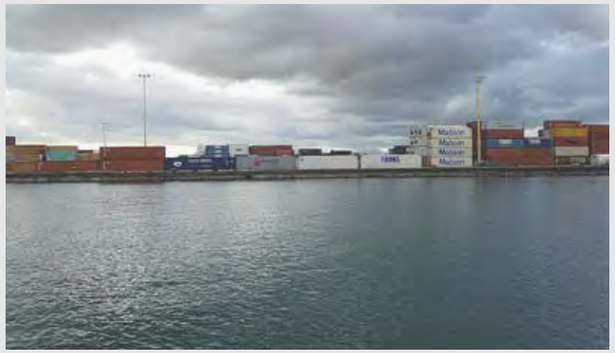
Backshore Strategies

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
Adapt in Place	Potential managed retreat
Encourage adaptation for developments	Require adaptation for all developments
Plan for deintensification	Greater development regulations/restrictions
Flood and pilot infrastructure projects	District infrastructure raising

Proposed or Conceptual Adaptation Opportunity Projects

- *#5: Moanalua Stream Restoration/Flood Control (West Honolulu Watershed Study, BWS)*
- *#6: Māpunapuna drainage district study (conceptual)*
- *Not shown: SLR pollution abatement study (various south shore industrial sites, conceptual)*
- *#7: Marsh restoration & water quality improvements (various)*
- *#8: Kalihi Kai Stream Restoration/Flood Control (West Honolulu Watershed Study, BWS)*
- *#9: Kalihi Cooling & Resilience Hub (Resilience Strategy, OCCSR)*

3 Adaptation Area Overview: Iwilei + Kapalama

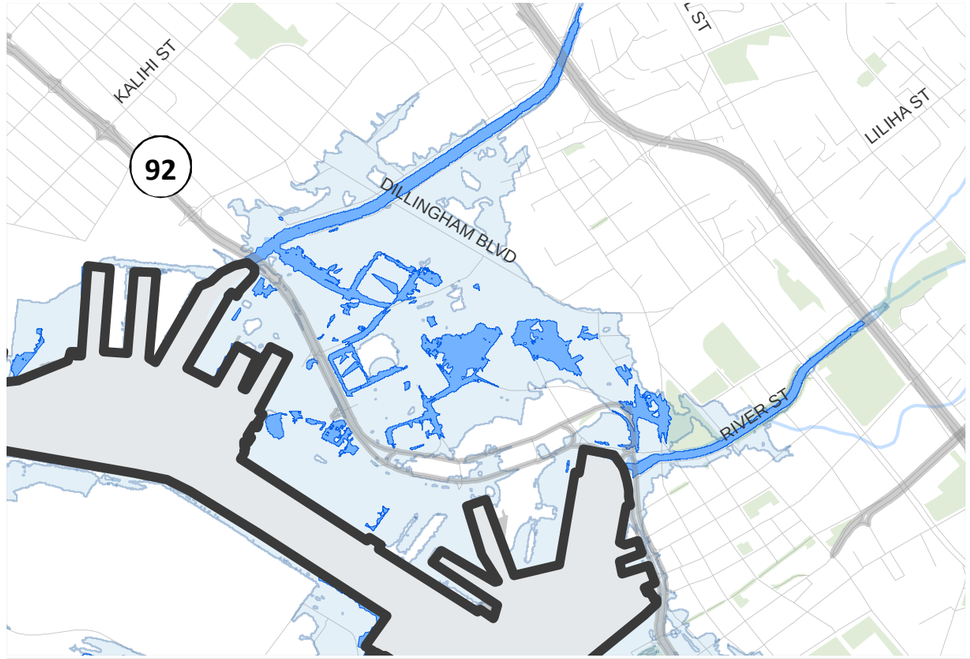


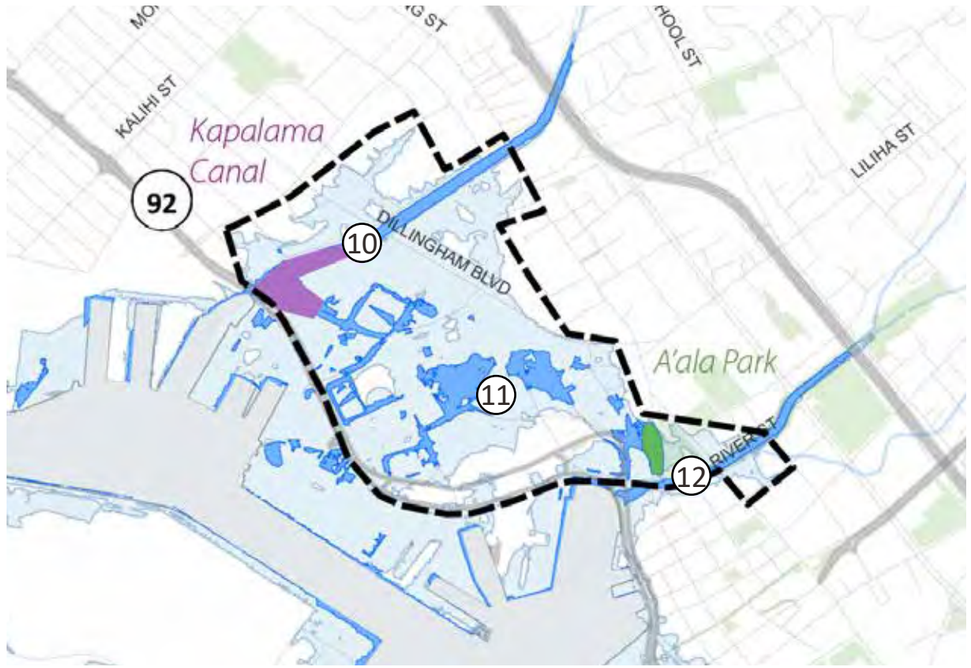
Current and Projected Impacts

- Chronic flooding of businesses, streets, and parking lots
- Sewer + pipe overflows during storms
- Frequent ponding in parking lots

Priority Strategies

The Iwilei/ Kapālama area is mauka of the Honolulu Harbor, adjacent to the Kapālama Canal, and bounded on the diamond head side by the River Street Canal (Nu'uanu Stream). While the area is projected from some inundation (at the 3.2' SLR-XA level), it is dramatically more affected at a 6' SLR projection, making long-term planning a critical issue. The area is already the subject of the *Iwilei/Kapālama Infrastructure Master Plan* that is looking to address drainage, sewer, and electric utility deficiencies in anticipation of significant redevelopment. Pursuing redesigns of the makai segments of the Kapālama and River Street canals would also provide the opportunity for flood protection, beautification, and recreation improvements. Because of the growth potential and development interest in the area, an integrated adaptation plan and feasibility studies need to be pursued.





Shoreline Strategies

Honolulu Harbor - Kaka'ako Makai

- Maintain, improve, and raise shoreline engineering (Harbor dredging)
- Elevate key harbor facilities

Backshore Strategies

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
	Adapt in Place
Require adaptation for certain developments	**Require adaptation for all developments**
Update development regulations	**Greater development regulations/restrictions**
Begin elevating exposed infrastructure	**Elevate critical infrastructure**
Catalytic and pilot projects	**Coordinated district projects**

Proposed or Conceptual Adaptation Opportunity Projects

- *#10: Kapālama Canal revitalization project (TOD)*
- *#11: Iwilei/Kapālama Infrastructure Master Planning (TOD)*
- *#12: River Street & Nu'uanu Stream Corridor Promenades (TOD)*

4 Adaptation Area Overview: Sand Island + Harbor



Current and Projected Impacts

- Chronic flooding of businesses, streets, and parking lots
- Chronic sewer and pipe overflows
- Storm surges into oceanfront and beach areas
- Interruptions to water/sewer operations

Priority Strategies

Honolulu Harbor is operated by the state Department of Transportation (HDOT). Sand Island is just offshore of the Honolulu Harbor and includes a large container terminal for the Harbor, the Sand Island Waste Water Treatment Plant (SIWWTP) and other industrial uses, a U.S. Coast Guard Base, and the Sand Island State Recreation Area. The Harbor is essential infrastructure for the state, and the SIWWTP is essential infrastructure for the region. The HDOT has completed its Honolulu Harbor 2050 Master Plan that includes planning considerations for 3.2' of SLR by 2060. Facilities at the SIWWTP operated by the City Department of Environmental Services are currently at 8' above sea level and new building foundations and equipment will be built higher as they are replaced.



Shoreline Strategies

Honolulu Harbor - Kaka'ako Makai

- Maintain, improve, and raise shoreline engineering (Harbor dredging)
- Elevate key harbor facilities

Recreation Area: Natural Shoreline/Beach

- Floodable park areas
- "Living" shoreline restoration efforts
- Ongoing beach/wetland management and restoration
- Mixed gray-green shoreline engineering
- ! or
- Managed retreat of natural shoreline

Backshore Strategies

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
	Adapt in Place
Incorporate adaptation into critical infrastructure projects	Require adaptation for all developments
Begin elevating exposed infrastructure	Elevate critical infrastructure
Flood control projects	Coordinated/district floodwater projects

Proposed or Conceptual Adaptation Opportunity Projects

- *#13: Harbor Modernization (Honolulu Harbor Master Plan, HDOT)*
- *#14: Sand Island WWTP adaptation planning (ENV)*

5 Adaptation Area Overview: Ala Moana + Kaka'ako

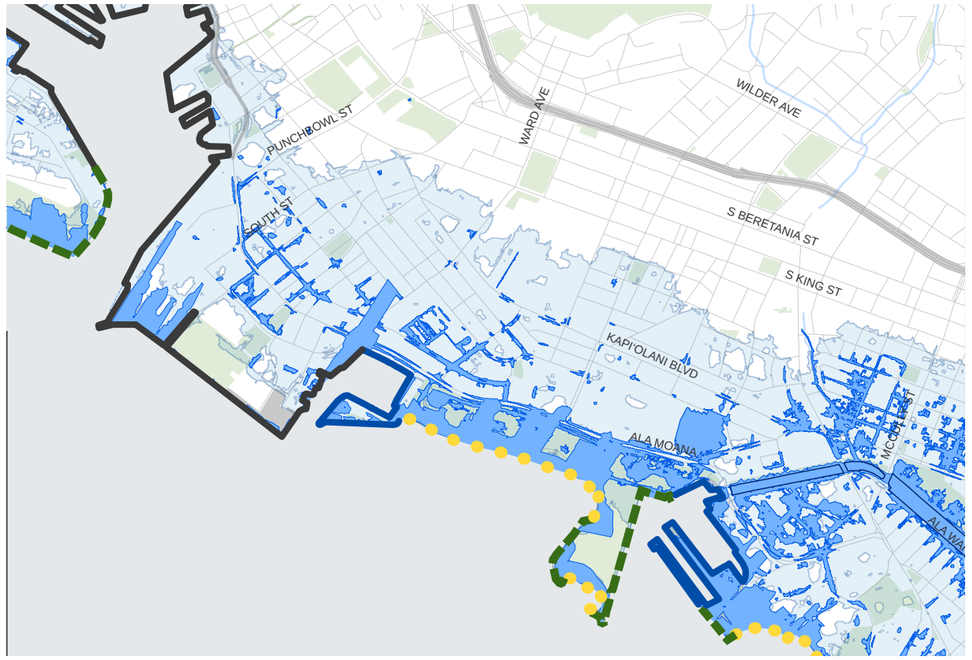


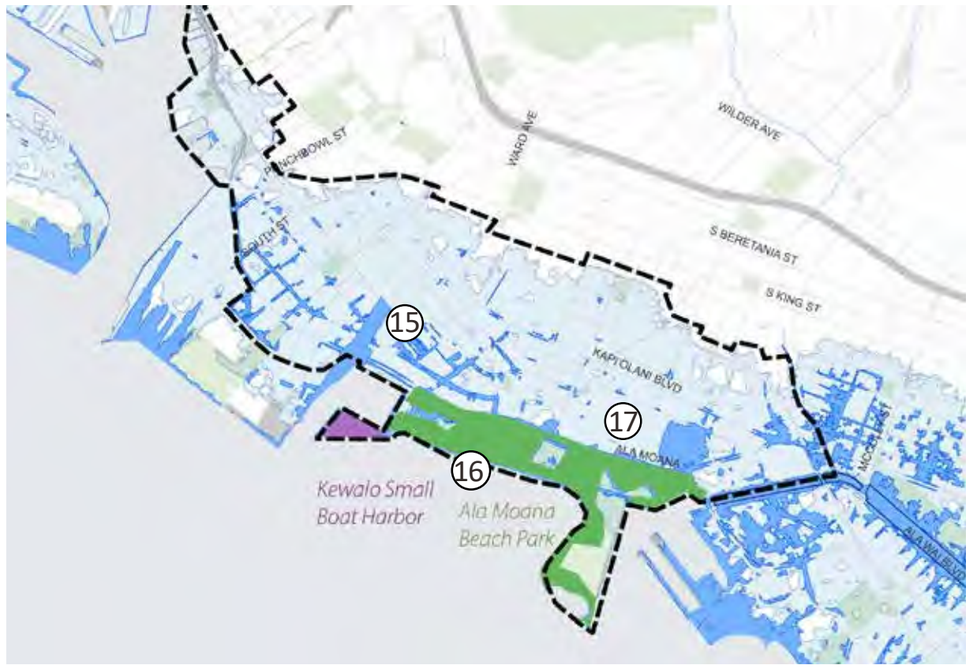
Current and Projected Impacts

- Chronic flooding of housing, streets, and ground floor businesses
- Sewer and pipe overflows during storms
- Groundwater intrusion beneath Mall

Priority Strategies

Ala Moana and Kaka'ako have been the fastest growing regions of the PUC in recent years with an ongoing construction boom. State efforts to redevelop Kaka'ako from a largely low-rise industrial area to a mixed-use urban neighborhood with many towers of high-rise housing is nearly complete. However, the area can expect increased passive flooding and inadequate drainage as sea levels rise. It will be important for development in these areas to proactively take steps such as those outlined in the City's Climate Adaptation Design Principles for Urban Development to ensure that this development is resilient to increased flooding and heat conditions, while still providing comfort and safety for residents and building users. In addition, regional drainage master planning that goes beyond strategies that can be achieved at the individual site scale should be pursued by the City, in partnership with major landowners.





Shoreline Strategies

Recreation Area: Engineered Beach

- Maintain, improve, and raise shoreline engineering/groins
- Ongoing beach restoration and management projects
- ! or
  - Increase nature-based solutions
  - Strategic retreat of portions of coastline

Recreation Area: Natural Shoreline/Beach

- Floodable park areas
- Soften hardened shoreline whenever feasible
- Mixed gray-green shoreline engineering and floodable areas

Small Boat Harbor

- Maintain, improve, and raise shoreline engineering
- Elevate key harbor facilities

Backshore Strategies

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
	Adapt in Place
Require adaptation for certain developments	**Require adaptation for all developments**
Begin elevating exposed infrastructure	**Elevate critical infrastructure**
Catalytic and pilot projects	**Coordinated/district floodwater projects**

Proposed or Conceptual Adaptation Opportunity Projects

#15: Ala Moana and Kaka'ako Drainage Plans or District (Storm Water Management Plan, DFM)

#16: Ala Moana Park Improvements (DPR)

#17: Implement Climate Adaptive Design Guidelines for Urban Areas (DPP)

6 Adaptation Area Overview: McCully + Ala Wai

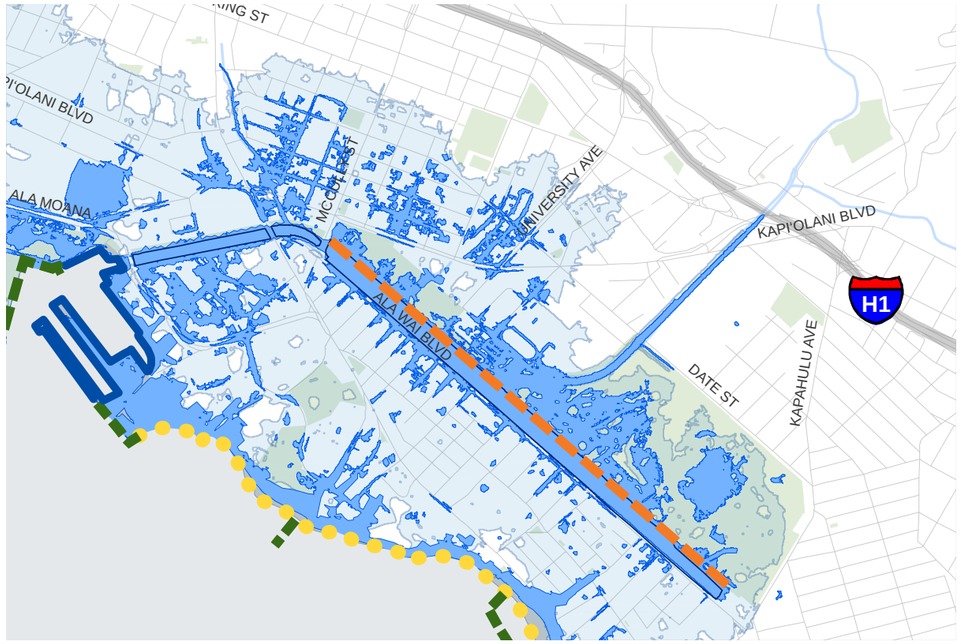


Current and Projected Impacts

- Occasional ground floor apartment flooding
- Groundwater intrusion
- Frequent ponding along streets
- Chronic flooding of golf course
- Stream overflows during storms

Priority Strategies

The backshore neighborhood of McCully sits mauka of the Ala Wai Canal with Waikīkī on the makai side. The Ala Wai Canal was completed in the 1920's, a project that drained and filled the wetlands and aquaculture areas of Waikīkī which were fed by streams from Mānoa, Pālolo, and Makiki. The canal enabled increased development in Waikīkī in the decades since, becoming the resort and apartment districts we see today. The Ala Wai Canal is regulated by the state and still requires periodic dredging to manage flooding. However, with increasing climate change the whole basin is increasingly vulnerable to inundation from both coastal flooding and flash flooding from the upper watershed. The U.S. Army Corps of Engineers is working with City and State agencies, elected leaders, and the community on a new design for a system of debris catchment and detention basins and a canal wall to manage these risks.





Shoreline Strategies

- Recreation Area: Hard Shoreline
- Recreation Area: Engineered Beach

- Floodable park areas
- Soften hardened shoreline whenever feasible
- Mixed gray-green shoreline engineering and floodable areas

**Note: See Waikīkī Adaptation Area (7) for Beach*

Backshore Strategies

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
Encourage adaptation for all developments	Adapt in Place Require adaptation for all developments
Strengthen current zoning regulations	Greater development regulations/restrictions
Catalytic and pilot projects for flooding	Coordinated/district floodwater projects

Proposed or Conceptual Adaptation Opportunity Projects

- *#18: Mō'ili'ili Community Resilience Hub (Resilience Strategy, OCCSR)*
- *#19: Upper stream detention/ green infrastructure for Ala Wai Flood Control (USACE)*
- *#20: Ala Wai tributary (various) flood control (PUC WMP, BWS)*
- *#21: Ala Wai Golf Course floodable park (various)*
- *#22: Army Corps Ala Wai Canal Flood Control Project: flood walls, dredging, pumps (USACE)*
- *#23: Pilot water reclamation plant (conceptual, BWS)*

7 Adaptation Area Overview: Waikīkī

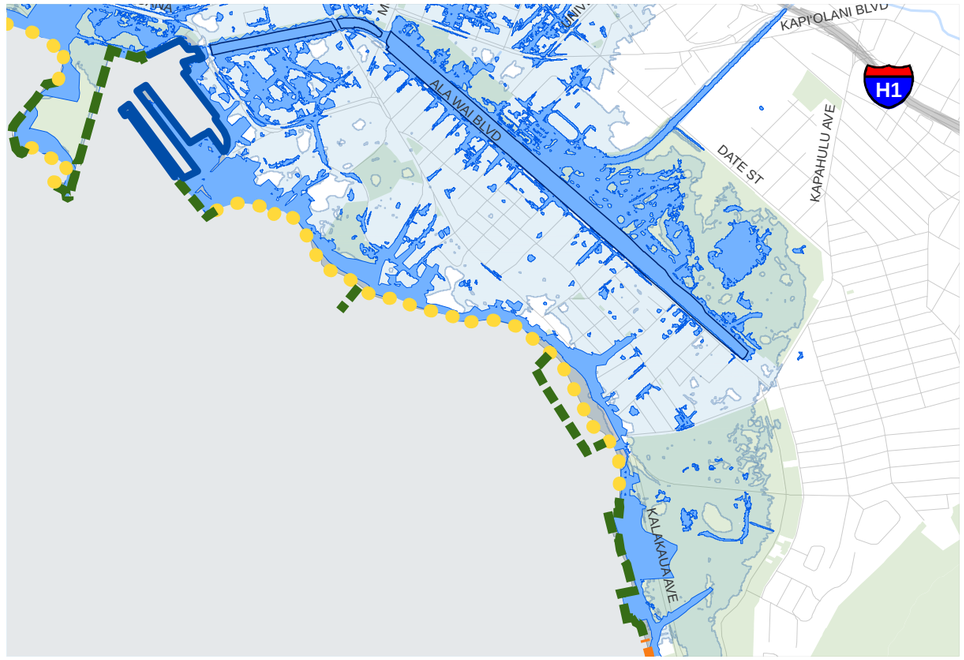


Current and Projected Impacts

- Chronic ground floor flooding
- Sewer/pipe overflows during storms
- Groundwater intrusion
- Over-topping of harbor breakwalls onto roads
- Constant erosion of beach sand

Priority Strategies

While beach nourishment programs continue indefinitely, pilot redevelopment projects for adaptation design for private projects should be allowed and encouraged in Waikīkī proper. As potentially the most impacted region of the PUC, a comprehensive adaptation plan for the entire area should be pursued with some urgency. The Ala Wai Golf Course is the only large open space next to the Ala Wai Canal, and as such is a precious resource for potential long-term adaptation solutions including wetland restoration or flood control functions. LID solutions, adaptive design requirements, and infrastructure hardening should be pursued for flooding control.





Shoreline Strategies

Recreation Area: Engineered Beach

- Maintain, improve, and raise shoreline engineering/groins
- Ongoing beach restoration and management projects

! or

- Increase nature-based solutions
- Strategic retreat of portions of coastline

Recreation Area: Natural Shoreline/Beach

- Floodable park areas
- Soften hardened shoreline whenever feasible
- Mixed gray-green shoreline engineering and floodable areas

Small Boat Harbor

- Maintain, improve, and raise shoreline engineering
- Elevate key harbor facilities

SHORT-TERM STRATEGIES	LONGER-TERM OPTIONS
Adapt in Place	
Encourage adaptation for all developments	Require adaptation for all developments
Begin elevating exposed infrastructure	Elevate critical infrastructure
Catalytic and pilot projects (floodwater and pumping)	Coordinated/district floodwater projects

Proposed or Conceptual Adaptation Opportunity Projects

- *#24: Hobron District drainage planning (Storm Water Management Plan, DFM)*
- *#25: Adapt Waikīkī 2050: Special Area Plan (DPP)*
- *#26: DeRussy Park adaptation effort (berming, cobble groin)*
- *#27: Royal Hawaiian Groin project (WBDSIDA/DLNR)*
- *#28: Nourishment/restoration Waikīkī Beach (WBDSIDA/DLNR)*
- *#29: Beach nourishment/ stabilization/ maintenance Kūhio Beach (WBSDIA/DLNR)*
- *#30: Waikīkī Cooling & Resilience Hub (Resilience Strategy, OCCSR)*
- *#31: Natatorium salt water pool conversion (DDC)*

8 Adaptation Area Overview: Kāhala



Current and Projected Impacts

- Chronic flooding of beach parks
- Chronic flooding of houses
- Infrastructure impacts
- Road facility impacts

Priority Strategies

The Kāhala shoreline is made up of natural sandy beaches backed by mostly low-density residential development. Like other beachfront locales around the island, shoreline hardening from residential development, mainly in the form of private sea walls, has prevented natural beach migration and worsened coastal erosion and beach loss. Clear policies and enforcement of Hawai'i's seawall laws should be applied, and the City must follow the State's lead on the issue. The City's interest is in advancing protections for beaches as a public trust, while also acting in the interest of safety, and while respecting property rights. However, it is clear that the mechanics of such a balance is still very much in flux and should be studied at the State level for a consistent framework.





Shoreline Strategies

Residential Mixed Beach/Hardened

- Small-scale beach restoration projects; no new impervious surfaces
- Conserve natural beach—restrict new shoreline hardening
- Maintain existing shoreline and soften where feasible
- Managed retreat of highly impacted residences

Natural Rocky Shoreline

No Adaptation Required

Backshore Strategies

SHORT-TERM STRATEGIES	LONG-TERM OPTIONS
Adapt in Place	Potential managed retreat
Protect and enhance public beaches	Greater development regulations/restrictions
	Catalytic stream projects

Known or Proposed Adaptation Projects

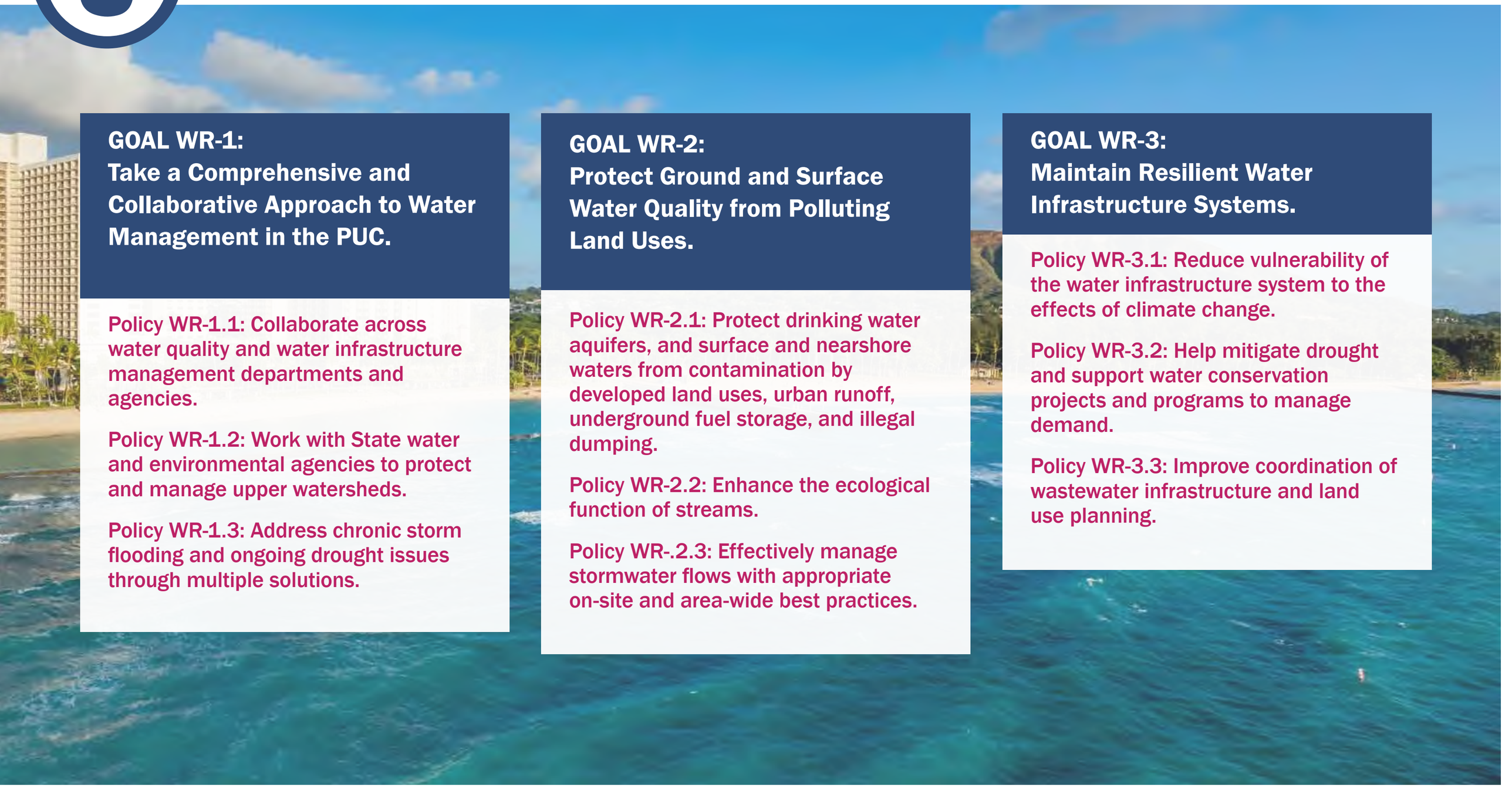
#32: Wai'alae stream bank stabilization

#33: Small-scale restoration/nourishment and stream bank stabilization at Wai'alae Beach Park

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Water Resources

Water Resources



GOAL WR-1:
Take a Comprehensive and Collaborative Approach to Water Management in the PUC.

Policy WR-1.1: Collaborate across water quality and water infrastructure management departments and agencies.

Policy WR-1.2: Work with State water and environmental agencies to protect and manage upper watersheds.

Policy WR-1.3: Address chronic storm flooding and ongoing drought issues through multiple solutions.

GOAL WR-2:
Protect Ground and Surface Water Quality from Polluting Land Uses.

Policy WR-2.1: Protect drinking water aquifers, and surface and nearshore waters from contamination by developed land uses, urban runoff, underground fuel storage, and illegal dumping.

Policy WR-2.2: Enhance the ecological function of streams.

Policy WR-.2.3: Effectively manage stormwater flows with appropriate on-site and area-wide best practices.

GOAL WR-3:
Maintain Resilient Water Infrastructure Systems.

Policy WR-3.1: Reduce vulnerability of the water infrastructure system to the effects of climate change.

Policy WR-3.2: Help mitigate drought and support water conservation projects and programs to manage demand.

Policy WR-3.3: Improve coordination of wastewater infrastructure and land use planning.

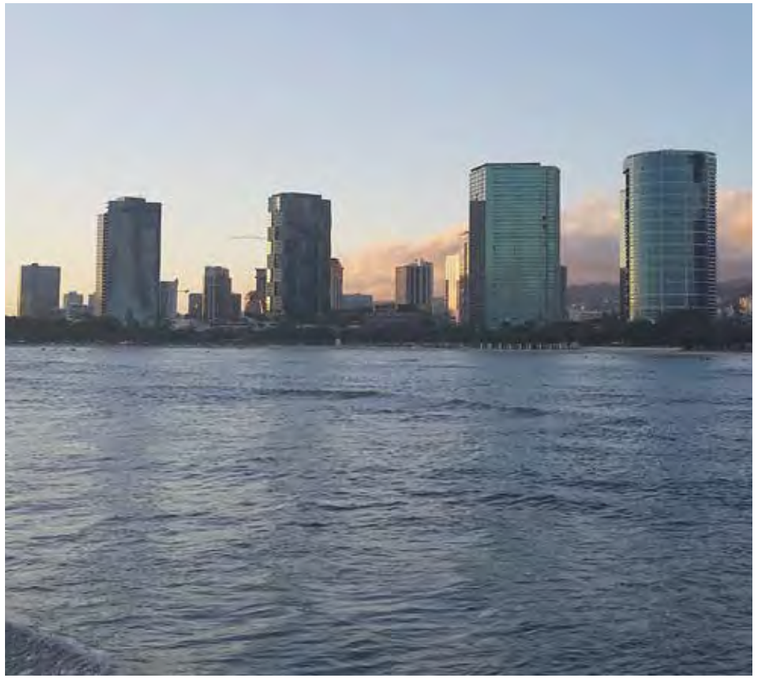
Key Outcomes

Honolulu, part of an island community, is unusual for a major city in that it draws the majority of its potable water supply from within City limits. This geographic isolation lends special meaning to the Honolulu Board of Water Supply (BWS) motto, Ka Wai Ola or “Water for Life”. It is critically important to protect our water supplies through effective conservation and management. We cannot pipe water from very long distances like most U.S. cities do. Potable wells within the PUC and around O‘ahu draw high-quality ground water from fresh water aquifers formed naturally within the island's basalt rock structure. The forested upper watersheds play an essential part in recharging these aquifers, and ensuring that Honolulu continues to have a clean and natural source of drinking water.

BWS and other City agencies responsible for water use and wet infrastructure have formalized a One Water framework to align planning for climate change related impacts. These include increased drought, stronger storm flooding, and sea level rise. Broadly, a One Water framework or approach sees water as a precious resource in all phases of the water cycle, and takes a holistic view of its management. It may integrate conservation, treatment, infrastructure (potable, wastewater, and flood control) and green infrastructure assets as whole to streamline systems and produce environmental benefits.

The policies in this Plan support and promote a One Water approach and reflect the need for increased agency collaboration to meet future challenges. A continued policy focus on forest and watershed health, stormwater management, and infrastructure improvements are also featured to help ensure that Honolulu's water supply remains clean and viable into the future.





PROJECT HIGHLIGHT: THE IWILEI/KAPALAMA TRANSIT-ORIENTED DEVELOPMENT (TOD) INFRASTRUCTURE NEEDS ASSESSMENT

The City and County of Honolulu has conducted the Iwilei/Kapālama TOD Infrastructure Needs Assessment to identify and advance improvements needed to support new development around the future Iwilei and Kapālama rail transit stations in the heart of the City Center segment of the Honolulu Rail Project. As envisioned in the Downtown and Kalihi Neighborhood TOD Plans, the area will grow into an urban mixed-use neighborhood with housing, jobs, shopping, and services within easy walking distance of the rail stations. This transformation will require improvement of current infrastructure to support more transit-oriented land uses and higher densities.

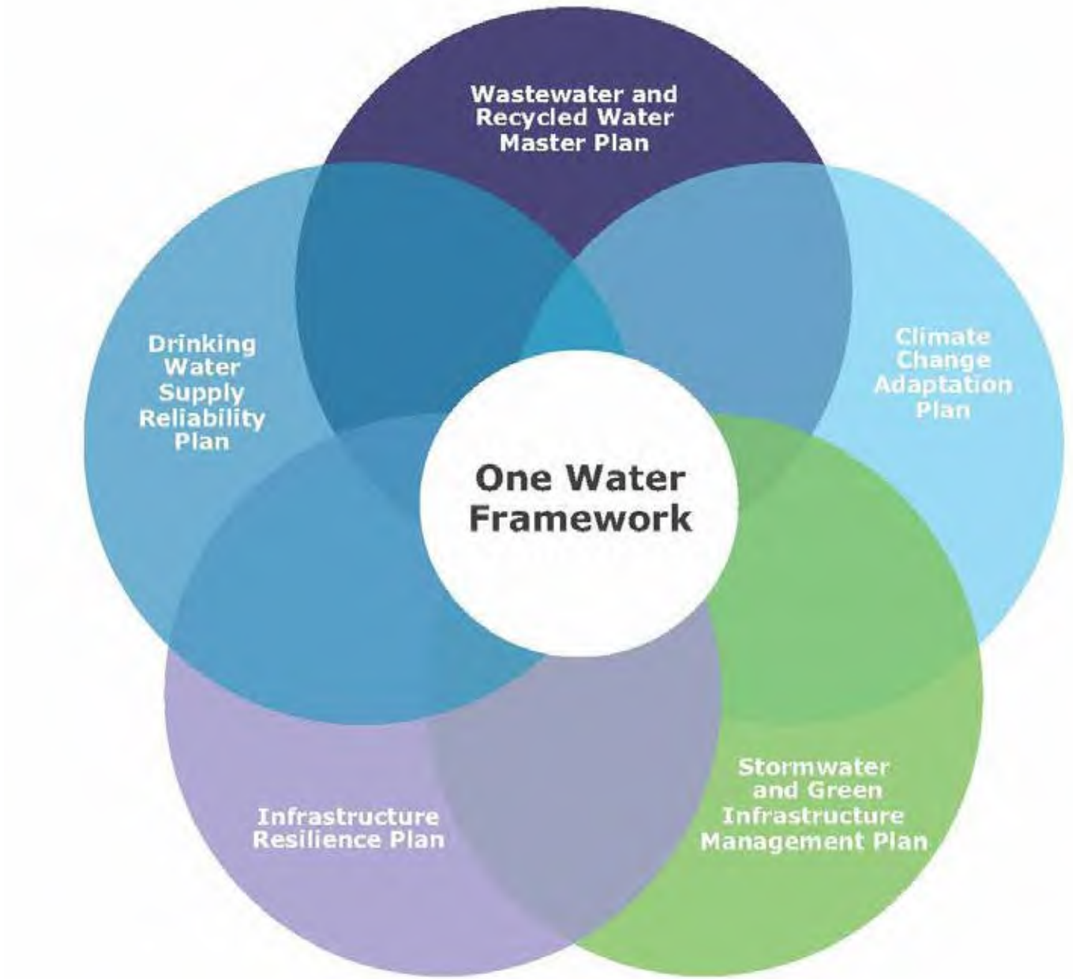
Setting the Stage

Potable Water

Hawai‘i has an integrated resource model for managing water supplies through partnership between State and City agencies. O‘ahu’s freshwater municipal resources and management is carried out by the semi-autonomous Board of Water Supply (BWS) with oversight from the State Commission on Water Resource Management (CWRM). The six key functions of BWS are to sustain, capture, treat, move, store, and deliver, safe, dependable, and affordable water to O‘ahu’s residents now and into the future. Most of the PUC’s water supply is provided by the Honolulu aquifer for areas to the east, and the Pearl Harbor aquifer for areas to the west.

As required by the State Water Code, the BWS prepares Watershed Management Plans (WMPs) that are consistent with state provisions and in coordination with the policies and projections of the Department of Planning and Permitting’s eight land use planning regions. As of 2023 at this writing, the PUC WMP, the seventh of the eight plans, is in draft development. The WMPs take a holistic look at water resources and infrastructure, supply, demand, and watershed health. The BWS’s stated goals for the WMPs are to: promote sustainable watersheds; protect and enhance water quality and quantity; protect Native Hawaiian rights and traditional customary practices; facilitate public participation, education, and project implementation; and meet future water demands at reasonable costs.

Based on historical trends and future implementation plans for water conservation programs, the BWS projects that future per capita demand rates in the PUC will continue to go down as conservation programs expand. However, future scenario planning must also include population fluctuations and the effects of climate change. In addition to the BWS delivery system, water in the PUC is distributed by several smaller systems, including federal facilities, and owners of individual wells.



Source: One Water Framework Plan, Honolulu Board of Water Supply.

Drainage and Stormwater

The PUC has 17 watersheds extending from Lēʻahi Crater (Diamond Head) in the east, to Kahe Point in the west. The majority of the PUC's watersheds drain via natural drainageways and streams into Māmala Bay, with the most eastern end of the PUC draining into Maunalua Bay. The three major western PUC drainageways that flow into Pearl Harbor's East Loch are Waiawa Stream, Waimalu Stream, and Hālawa Stream. Central PUC sections are drained by the Moanalua and Kalihi Streams that flow into Keʻehi Lagoon, and by the Kapālama Canal and Nuʻuanu Stream that flow into Honolulu Harbor. To the east, the Mānoa, Pālolo, and Makiki Streams drain into Māmala Bay via the Ala Wai Canal; The Waiʻalae Nui stream watershed drains in part across the eastern edge of the PUC into Maunalua Bay, as does the non-perennial Kāhala stream.

Stormwater infrastructure in the PUC consists of various Federal, State, City, and private systems. Many lower reaches of the major streams in the PUC have been channelized for the quick transport and disposal of runoff from urban areas. In general, however, stormwater infrastructure is tied to individual projects and is constructed by developers according to City standards. The City's Stormwater Quality Division housed in the Department of Facilities Maintenance (DFM) develops requirements for the management of on-site stormwater, and provides resources on Low Impact Development (LID) best practices to manage stormwater, reduce flooding and erosion, and reduce polluted runoff. The DFM is overseeing a process exploring the creation of a stormwater utility for Oʻahu to further its management at the municipal level (see stormwaterutilityoahu.org for further details), and is also leading a stormwater master planning effort.

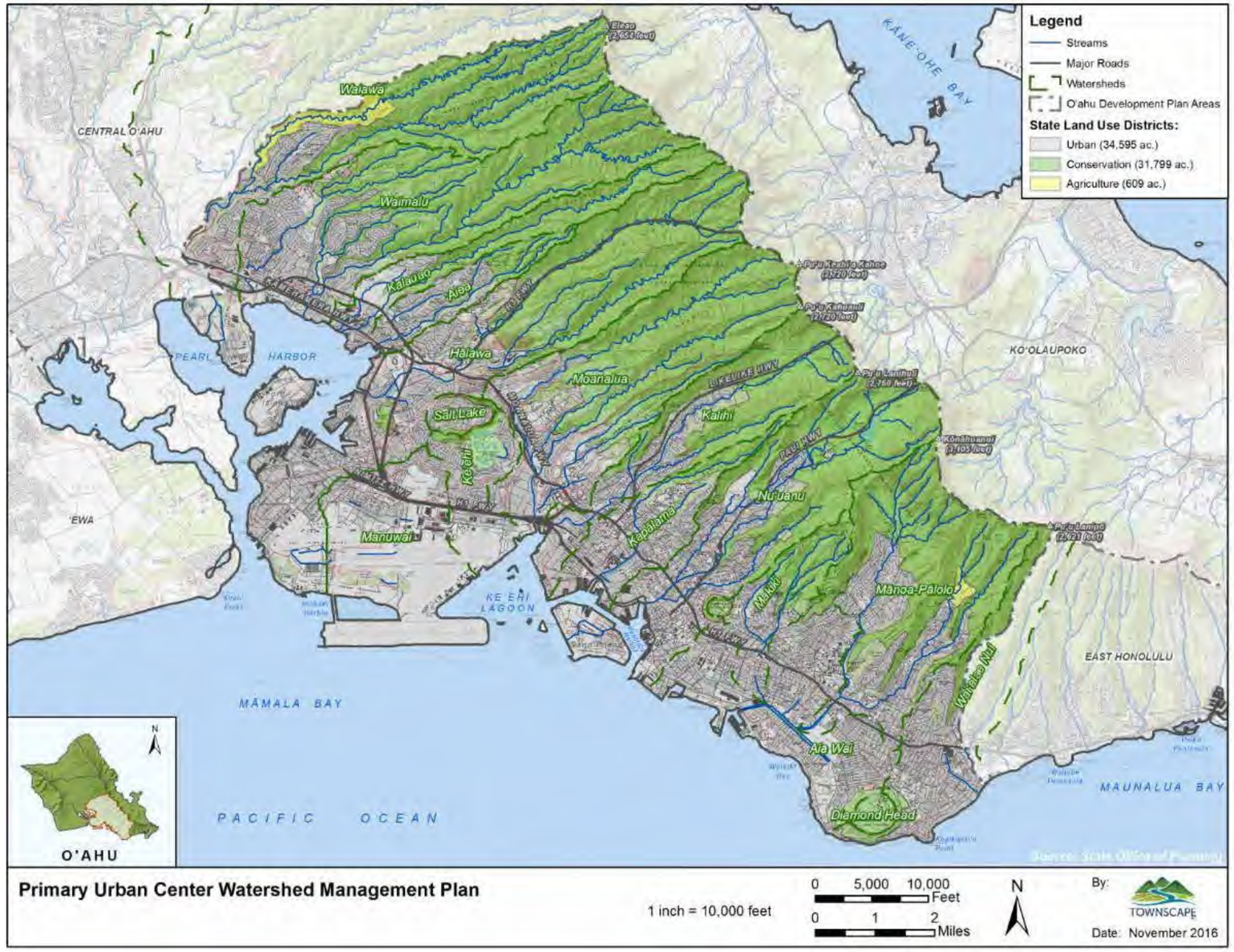


Diagram of the PUC's watersheds (Primary Urban Center Watershed Management Plan, Honolulu Board of Water Supply).

STORM WATER MANAGEMENT PROGRAM PLAN

A National Pollutant Discharge Elimination System (NPDES) permit is required for the City and County of Honolulu (City) to discharge storm water into receiving State water bodies. This requirement is regulated by the Clean Water Act (CWA) (33 United States Code [U.S.C.] 125 1 et. seq.; the "Act"); Hawaii Revised Statutes (HRS), Chapter 342D; and Hawaii Administrative Rules, Department of Health (DOH), State of Hawaii, Chapters 11-54 and 11-55, as amended.

The Storm Water Management Program Plan (SWMPP) is updated and modified per the requirements of the City's Municipal Separate Storm Sewer System (MS4) NPDES Permit No. HI S000002 every five years.

The City's SWMPP is designed to address the requirements of the Permit and reduce, to the Maximum Extent Practicable (MEP), the discharge of pollutants to and from its MS4 to protect water quality and to satisfy the appropriate water quality requirements of the CWA.

The SWMPP provides information for each of the following program components:

- **Public Education and Outreach**
- **Illicit Discharge Detection and Elimination**
- **Construction Site Runoff Control**
- **Post-Construction Storm Water Management in New Development and Redevelopment**
- **Pollution Prevention/ Good Housekeeping**
- **Industrial and Commercial Activities Discharge Management Program**
- **City Industrial and Other Facilities**
- **Monitoring Requirements**

Wastewater

The PUC is served by the City's Māmala Bay Sewerage District and administered by the Department of Environmental Services (ENV). The Māmala Bay Sewerage District is divided into the East Māmala Bay and West Māmala Bay subdistricts. Most of the PUC, from Kāhala to Hālawa, is within the East Māmala Bay service area collected by the Sand Island Wastewater Treatment Plant (WWTP). The remainder of the PUC, Hālawa to Pearl City, is within the West Māmala Bay service area collected at the Honouliuli WWTP in Ewa. Also within the PUC is the Joint Base Pearl Harbor-Hickam (U.S. Navy) Fort Kamehameha Wastewater Treatment Facility.

Capacity of the existing wastewater system is evaluated using the City's InfoWorks flow model. InfoWorks analyzes the hydraulic performance of the existing system under a range of storm conditions using updated flow data. Results from InfoWorks are then used to predict locations of capacity-related overflows or capacity deficiencies in the existing wastewater system.

A general assessment of the condition of the major trunk lines in the existing system identified several key areas in the PUC where capacity issues exist. These areas include portions of Waikīkī, McCully-Mōʻiliʻili, Kakaʻako, Kapālama, ʻIwilei, ʻAiea, and Pearl City. However, it should be noted that the models are continually in flux as projects continue to come on-and-offline, impacting localized systems.

Infrastructure to Support Growth and Development

Infrastructure systems (water, wastewater, and drainage) play a key role, supporting essential public services, urban development, and economic growth in the PUC. The community relies on the steady service, cost-effectiveness, and capacity of these systems to meet their daily needs. Continual maintenance is needed to provide a highly functioning system while upgrades must consistently be performed to support areas of growth.

Areas that have seen major development in recent years include the TOD station areas surrounding the rail corridor, the Kapiʻolani corridor, Kakaʻako and Waikīkī. With the goals of limiting disruption and burden on the user, finding the right balance to support both areas of growth and stability with public projects can often be a challenge that must be managed through effective land use planning and functional planning working together. Publicly led projects from the ENV should be employed to correct system deficiencies that cannot be handled by individual project developers and in keeping with overall facilities planning goals.

How Does the Development Plan Get Us There?

Expand a collaborative "One Water" framework.
A One Water framework is helping the PUC and O'ahu prepare to manage climate change and SLR. Building new cross-agency protocols capture the benefits of planning for flooding solutions, infrastructure resilience, and environmental quality. A One Water approach not only values water as a resource but also provides a platform for building agency partnerships on projects with common goals, and communicating and engaging with the community.

Effectively manage stormwater for watershed health.
Watersheds that contain many paved surfaces and hardened stream channels- like most urban environments- can worsen flooding and water pollution issues over time. The streams of the PUC area have been impacted by urbanization and the degrading of mauka forested lands. Moreover, O'ahu's lack of stream setbacks or formal buffers can complicate stream maintenance and management by resulting in structures that are too close to sensitive and floodable areas. Agency and public collaboration is encouraged to find a path forward for new development and redevelopment that improves stream health and natural function. Community groups, individuals, and not-for-profits should be encouraged and supported to conserve, care for, and steward the environment through programs and partnerships with relevant agencies. Continuing to build upon the City's improved project guidelines and standards for managing stormwater is an area of opportunity, especially in thinking beyond the individual property scale for City initiated projects. Another key goal that will take wide coordination and partnership is the conversion of existing cesspools and septic systems in the PUC to better protect groundwater quality.

Ongoing coordination with land use policies.
Plan policies include a longstanding Urban Growth Boundary that supports watershed and environmental health by firmly reducing urban sprawl to avoid disturbance to preservation areas. Meanwhile, it is also important that directed land use policies like TOD be coordinated with the capacities of water and wastewater infrastructure throughout, to support those areas planned for higher densities. Equally important is the ongoing maintenance, function, and resilience of water systems in the many PUC areas not expected to see much growth during the Plan horizon but which may need upgrades to aging infrastructure.

Related Policies

Policy GD-3.4: Improve infrastructure capacity planning for areas of low to moderate growth to meet demand for ADUs and modest infill development.

Policy GD-4.2: Decrease building and structure encroachments on streams and wetlands (except for those essential to flooding control).

Policy PL-2.1: Incentivize sustainable building and site design practices that respond to the tropical climate.

Policy PPOS-1.5: Improve the ecological function of parks.

Policy PPOS-2.2: Use green streets to connect major recreation and public areas, provide missing green space, and beautify viewshed corridors.

Policy MC-2.4: Adapt the roadway network to address chronic flooding and sea level rise.

Policy SLR 3.1: Support collaborative resilience planning for new and existing infrastructure.

Policy SLR 3.2: Pursue a district-scale fee structure or other dedicated funding mechanisms for adaptation projects.

Policy SLR 1.5: Update shoreline regulations and development policies to reflect coastal hazard impacts on an ongoing basis.

Conservation and Watersheds

- City & County Preservation Land
- State Managed Land
- Major Urban Parks and Open Spaces
- Ahupua'a Boundaries
- Wetlands
- Perennial Streams with Buffer

Constraints

- Pass/No Pass Line
- 100-Year FEMA Flood Zone (A, AE, AO, AH)
- Coastal high hazard /Storm Surge areas (VE)

(waste disposal facilities)

Chapter 9. Water Resources Indicator:

Completion of a One Water Master Plan

Why This Indicator? A One Water Master Plan will allow City agencies to adapt infrastructure in a coordinated fashion in response to climate driven impacts. The plan will benefit residents and businesses by identifying critical needs and priorities to improve future resilience and protection of fresh water resources.

Figure 9.1: Water Resources Diagram, West

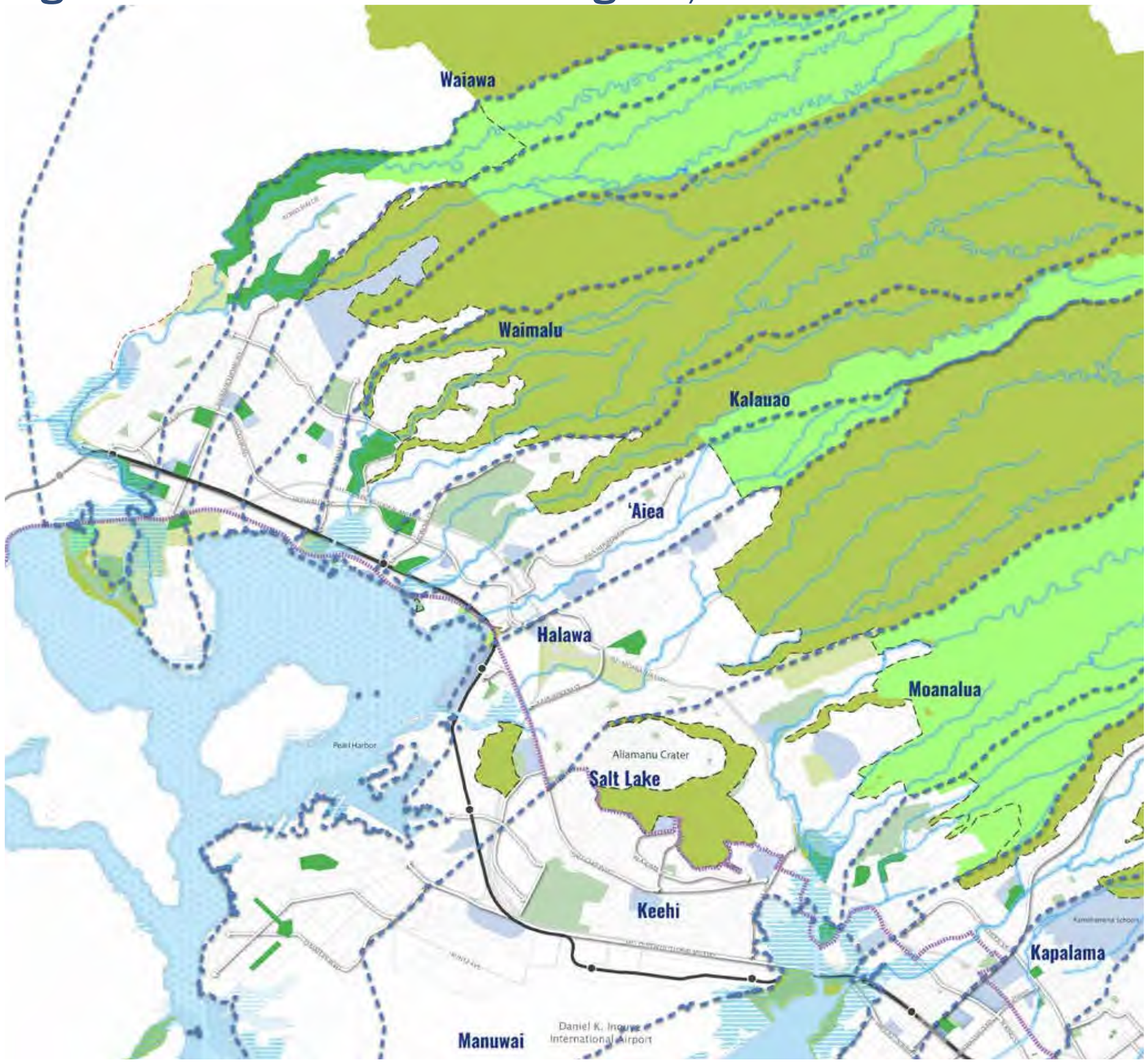
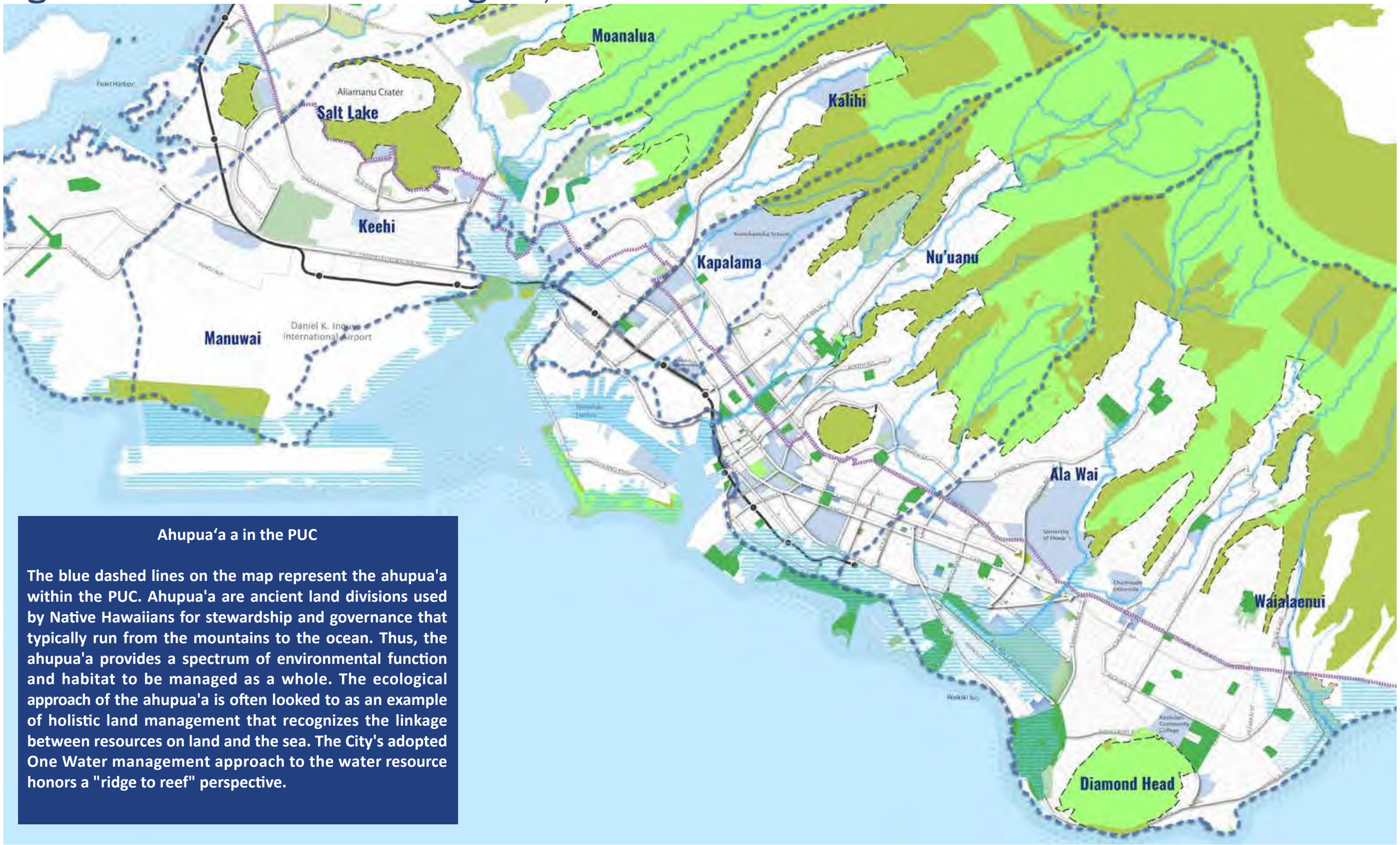


Figure 9.1: Water Resources Diagram, East



Ahupua‘a a in the PUC

The blue dashed lines on the map represent the ahupua'a within the PUC. Ahupua'a are ancient land divisions used by Native Hawaiians for stewardship and governance that typically run from the mountains to the ocean. Thus, the ahupua'a provides a spectrum of environmental function and habitat to be managed as a whole. The ecological approach of the ahupua'a is often looked to as an example of holistic land management that recognizes the linkage between resources on land and the sea. The City's adopted One Water management approach to the water resource honors a "ridge to reef" perspective.

Goal WR-1: Take a Comprehensive and Collaborative Approach to Water Management in the PUC.

Policy WR-1.1: Collaborate across water quality and water infrastructure management departments and agencies.

Adequate infrastructure systems provide a critical health function and are essential to everyday life, economic development, and growth. We continually rely on water, wastewater, and drainage systems to meet our basic human needs even as new communities are developed and infrastructure systems near the end of their serviceable life. Given the challenges that arise with public-budget constraints and long timelines for major projects, focus should not only be on constructing new assets, but also on improving the efficiency and longevity of existing infrastructure by optimizing operations and maintenance and planning for climate resilience.

Priority Actions:

Implement a One Water framework. Adopt a guiding One Water plan to identify and phase projects to effectively manage climate resilience actions for water resources.

Support One Water pilot projects. Proactively coordinate with One Water partners to realize pilot watershed restoration, water quality improvement, and other water management projects in the PUC and beyond. Promote a collaborative approach to water infrastructure delivery.

Timeline





Partners:

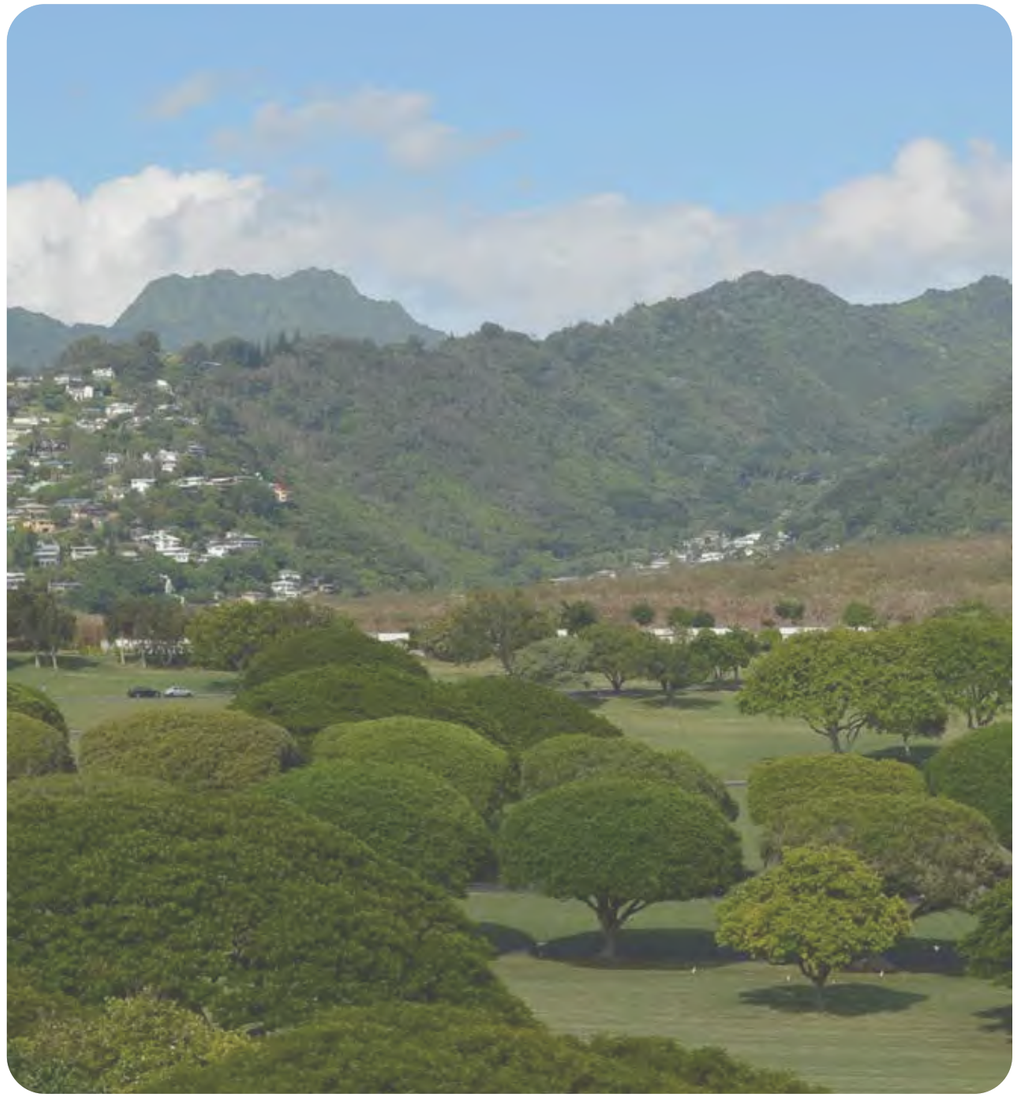
- OCCSR
- BWS
- DDC
- DTS
- DFM
- DES
- DPP
- DPR

Partners:

- OCCSR
- BWS
- DDC
- DTS
- DFM
- DES
- DPP
- DPR

Other Actions:

- *Align City projects with One Water principles and develop checklists and procedures to incorporate One Water goals into capital budgeting and work flows.*
- *Reduce demand on existing water infrastructure systems through integrated systems*



Looking mauka up the Moanalua watershed.

Goal WR-1: Take a Comprehensive and Collaborative Approach to Water Management in the PUC.

Policy WR-1.2: Work with state water and environmental agencies to protect and manage upper watersheds.

Conservation lands play an important function in the hydrological cycle and in creating sustainable watersheds in the PUC. The forest canopy "catches" precipitation and fog drip, allowing water to percolate into the ground and feed the island's drinking water aquifers and stream ecosystems. A healthy forest enhances ground water recharge. Increased coordinated management and restoration efforts are needed to address the degraded condition of most of the forest lands in the PUC area, restore and enhance stream health, and support the health of the whole watershed. Working to implement conservation measures is essential to protecting and managing these mauka forests and the PUC's watersheds.

Conservation plans. Support the creation of Conservation Plans for mauka lands controlled by the City (i.e., Clean Water and Natural Land Fund projects), and identify agency and community partners for watershed management projects and programs.

Timeline



Partners:

- DLM
- BWS
- DLNR
- Community partners

Restoration projects. Support catalytic forest, stream, and shoreline restoration projects identified in the Primary Urban Center Watershed Management Plan (PUC WMP), including planning and permitting of flood retention basins and increasing resilience to the impacts of drought.



Partners:

- DLNR
- BWS
- DFM
- Community partners



The health of upper forests is important for water quality.

Other Actions:

- *Partner with State DLNR to provide technical support and funding assistance to entities engaged in forest restoration projects and programs within the PUC.*

Goal WR-1: Take a Comprehensive and Collaborative Approach to Water Management in the PUC.

Policy WR-1.3: Address chronic storm flooding and ongoing drought issues through multiple solutions.

The City requires and continues to pursue best practices for capturing stormwater on individual sites. However, runoff and storm flooding (such as on street right-of-ways) can still happen when both individual and municipal drainage systems are overwhelmed during storm events. In addition, escalating climate change effects can include both drought *and* more intense storm events, both of which can exacerbate the potential for flooding. Accordingly, site-level stormwater management and the existing municipal drainage system should be supplemented opportunistically with a variety of solutions to infiltrate, treat, or capture stormwater. Such interventions can increase water use efficiency, reduce nuisance flooding, and avoid polluting runoff. In a highly urbanized area like the PUC, hybrid solutions which integrate nature-based and traditional engineering approaches can be effective at meeting these goals. These may include municipal non-potable reuse systems, increasing green streets and street trees to capture and infiltrate stormwater, or incorporating constructed LID drainage solutions into parks and open spaces.



A rain garden treats runoff in a commercial parking lot (Source: Smart Trees Pacific).

Priority Actions:

Storm water utility user fee. Implement storm water drainage system user fees to promote holistic stormwater management and flooding reduction. Fees can be used towards maintenance and upgrades of the drainage system.

Timeline



Partners:

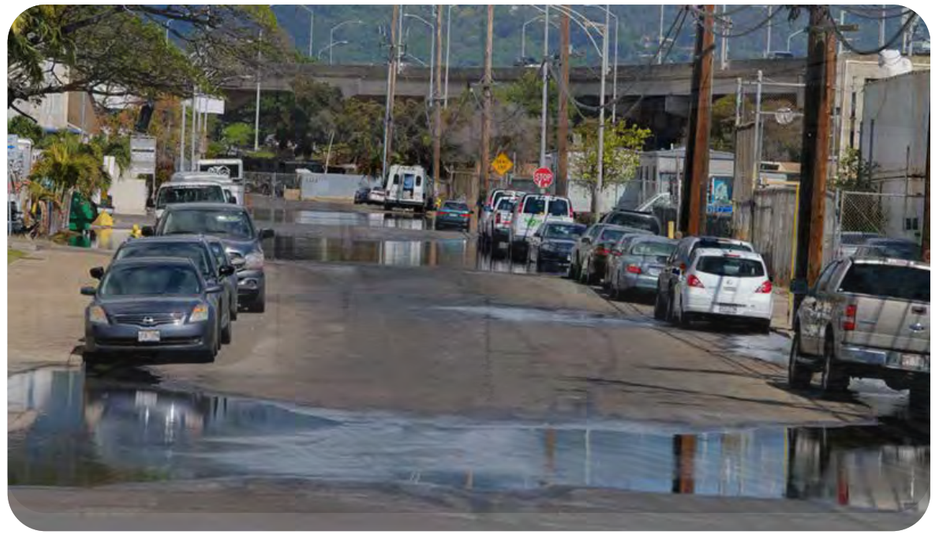
- DFM
- DPP
- BWS

Regional drainage planning. Encourage preparation of regional drainage plans in areas at risk for chronic flooding (through combined efforts of the City, property owners, and residents). Proactively plan for drainage solutions at the block and district scales. Candidates for public-led plans include Waikīkī, McCully, and Māpunapuna (and building off the Iwilei/Kapālama Infrastructure Master Plan precedent).



Partners:

- DFM
- ENV
- DDC
- OCCSR
- DPP
- DPR
- DTS
- BWS



Some streets experience chronic flooding (Source: SOEST King Tides Project).

Other Actions:

- *Strategically utilize urban green space for flood mitigation. Identify existing parks, open spaces, or golf courses that can support flood mitigation or stormwater capture for reuse.*
- *Prioritize flood prone areas for acquiring new parklands and incorporating constructed solutions.*

Goal WR-2: Protect Ground and Surface Water Quality from Polluting Land Uses.

Policy WR-2.1: Protect drinking water aquifers, and surface and nearshore waters from contamination by developed land uses, urban runoff, underground fuel storage, and illegal dumping.

Ground water quality in Hawai'i is generally very good, but contamination from agricultural, underground fuel storage and distribution, and urban activities can occur. Pesticides, herbicides, and other chemicals associated with agricultural run-off are common ground water pollutants. Contamination could also result from on-site sewage disposal systems, such as cesspools, and from other human activities, such as illegal dumping. Water quality sampling data collected from PUC wells have detected several different contaminants in recent years, and in all cases the levels of contaminants detected are fully compliant with all applicable regulations and standards. However, maintaining the quality of the PUC's surface water and water resources requires continued proactive efforts to reduce polluted runoff, including sediments, nutrients, pesticides, trash, and other pollutants.

Priority Actions:

Urban growth boundary. Continue to limit development from encroaching beyond the established Urban Growth Boundary.

Timeline: ONGOING

Partners:
- DPP

Reduction in cesspools and septic systems. Incentivize and prioritize conversion of septic systems within the SLR-XA to the City's municipal water system. Prohibit new septic systems within the SLR-XA. Ensure that federal law is followed regarding required connections to municipal wastewater systems when properties are redeveloped or improved.

ONGOING

Partners:
- BWS
- State DOH
- ENV
- DPP

Military impacts. Monitor the safe defueling of the underground fuel storage tanks at Red Hill and press the Navy-operated system to eliminate further contamination risks. Support the BWS in alternate source planning as needed.

ONGOING

Partners:
- BWS
- DOH
- CWRM
- All public agenices
- Community partners

Other Actions:

- *Proactively enforce post-construction best management practices (BMPs) for sediments, nutrients, pesticides or other toxic chemicals and trash.*
- *Support provisions for the health of Maunalua Bay (a portion of the Wai'alae Nui watershed is in the PUC) as called for in the East Honolulu Sustainable Communities Plan.*



Volunteers create a chalk mural for water awareness near the Ala Wai canal (Source: DFM).



Adopt-a-Stream clean-up in Mānoa (Source: DFM).

Goal WR-2: Protect Ground and Surface Water Quality from Polluting Land Uses.

Policy WR-2.2: Enhance the ecological function of streams.

The PUC has nearly a dozen perennial streams. However, many of these have been severely impacted by urbanization, diminishing their ecological ability to provide natural drainage for adjacent areas and viable habitats for native plants and animals. Degradation is a major threat to water quality, instream habitat, and overall stream health. While the City's Storm Water Quality Branch has an "Adopt-A-Stream" program where community members can steward a designated stretch, the majority of past work has focused on limited stream cleanups and not more permanent solutions. A broad range of stream restoration initiatives are needed, such as removal of invasive species, adding outplanting with native plants, debris clearing, and installing erosion control devices to address eroding stream banks.

Priority Actions:

Establish stream buffer zones. Establish setbacks for all perennial streams to prevent the encroachment of buildings and structures within a buffer zone, other than for drainage, flood control, recreation, or maintenance purposes (applicable to new development and redevelopment/renovations).

Timeline



Partners:

- DPP
- DFM
- DLNR

Complete needed maintenance of streams. Develop strategies to complete needed maintenance of waterways and channels to keep them clear of large debris and sediment build-up.



Partners:

- Community partners
- DFM
- Private owners
- DLNR

Protect freshwater resources. Maintain healthy aquifer levels and support the establishment of instream flow standards for ecological maintenance and the protection of freshwater and marine habitats.



Partners:

- CWRM
- BWS
- DLNR
- DOH



Example of a stream treatment in Kailua to improve infiltration and riparian habitat.

Other Actions:

- *Support the ENV's "Adopt-a-Stream" program to provide regularly scheduled community-wide stream maintenance.*

Goal WR-2: Protect Ground and Surface Water Quality from Polluting Land Uses.

Policy WR-2.3: Effectively manage stormwater flows with appropriate on-site and area-wide best practices.

The PUC experiences local areas of flooding during significant storm events due in part to stormwater runoff exceeding the capacity of the existing drainage system. Runoff from urban development can also degrade surface water quality. Effectively managing stormwater flows can help to mitigate some of these flooding and water quality impacts. Capturing and infiltrating the stormwater on-site with LID measures through development requirements and voluntary best-practice measures is one important strategy pursued by the City. Larger, public stormwater capture projects can also include other objectives such as providing treated recycled water for non-potable uses (irrigation for instance) or LID strategies to help improve street drainage and infiltration in floodable areas.

Priority Actions:

City Green Infrastructure projects. Include LID/green infrastructure in new City projects or redevelopment of existing publicly-owned buildings/properties. Follow appropriate measures where polluted runoff or roadway flooding is a concern.

Private Green Infrastructure projects. Include LID/green infrastructure in new private development projects or redevelopment of existing buildings. Follow appropriate measures where polluted runoff or roadway flooding is a concern.

Timeline



Partners:

- DTS
- DDC
- DFM
- DPP



Partners:

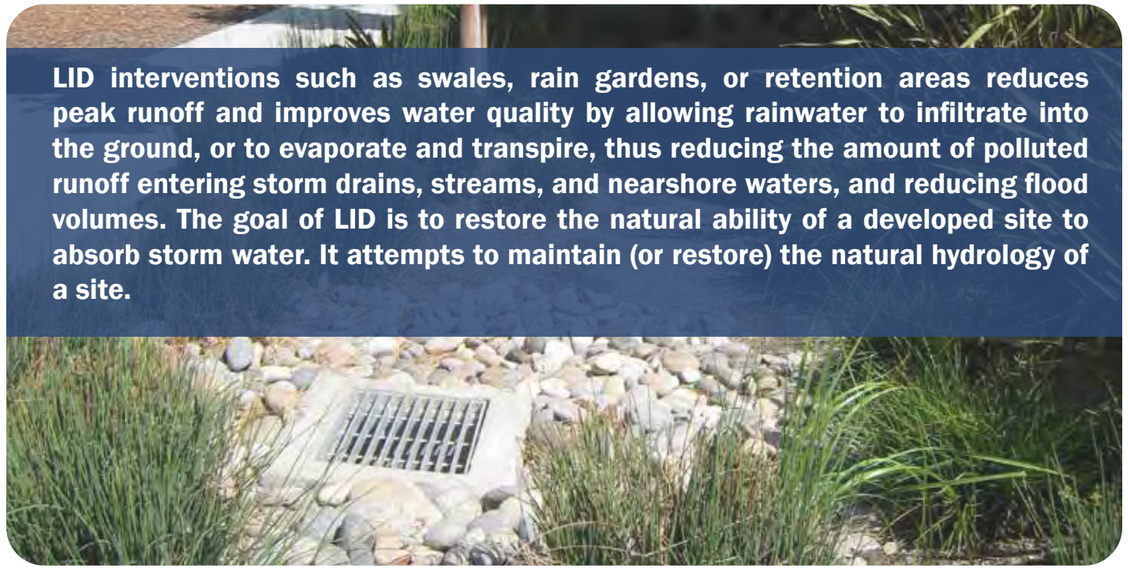
- DFM
- DTS
- DPP
- Private partners

Other Actions:

- *Build community capacity to address stormwater management issues in residents' own neighborhoods or commercial districts through shared systems where desired and feasible.*
- *Consider regional drainage districts in future refinements of system user fees and functional planning.*



Top and bottom: Examples of LID in the right-of-way.



LID interventions such as swales, rain gardens, or retention areas reduces peak runoff and improves water quality by allowing rainwater to infiltrate into the ground, or to evaporate and transpire, thus reducing the amount of polluted runoff entering storm drains, streams, and nearshore waters, and reducing flood volumes. The goal of LID is to restore the natural ability of a developed site to absorb storm water. It attempts to maintain (or restore) the natural hydrology of a site.

Goal WR-3: Maintain Resilient Water Infrastructure Systems.

Policy WR-3.1: Reduce vulnerability of the water infrastructure system to the effects of climate change.

Maintaining resilient water infrastructure includes improving the efficacy and reliability of existing systems and preparing them for projected climate change driven impacts, including groundwater inundation from sea level rise (raising groundwater levels) and drought conditions, placing stress on freshwater resources. Existing infrastructure systems should be made resilient in areas that are most at risk from climate change impacts to limit disruptions in service and to protect public health and safety. A multi-faceted approach is recommended to reduce vulnerability to climate change and build in flexibility over time. Resilient systems that are planned strategically and account for potential climate and disaster risks will allow communities to be proactive in facing potential impacts from both chronic and episodic climate events. These investments should be aligned with the City's climate change mitigation and adaptation strategies.

Priority Actions:

Perform Regular Vulnerability Assessments. Ensure regular infrastructure assessments and planning is conducted to manage system and public facility hazard vulnerabilities.

Raise or Relocate Low-Lying Infrastructure. Develop a methodology for prioritizing the elevation of low-lying coastal transportation and utility infrastructure above DFE (design flood elevation) to account for SLR, flooding, and higher groundwater. Support infrastructure relocation or hardening projects based on projected climate change impacts. Relocate low-lying infrastructure facilities with high SLR risk farther inland where feasible.

Timeline



Partners:

- OCCSR
- ENV
- DFM
- DDC
- BWS



Partners:

- DPP
- OCCSR
- DFM
- State DOT
- ENV
- BWS

Other Actions:

- *Design gravity wastewater and drainage systems to be easily converted to closed pressurized systems.*
- *Support preparation and implementation of an updated Wastewater Facilities Plan in consideration of the entire PUC sewerage district.*
- *Prepare coastal wastewater pump stations such as at Waikīkī and Kāhala, and determine the viability of decentralizing services and building more smaller plants upstream.*
- *Revise shoreline setback and coastal zone management policies that conflict with implementation of desired resilient infrastructure improvements.*



Hawai'i Convention Center 'Intensive' Green Roof (Source: Hawai'i Convention Center).



Waves washing over protective sand bags (Source: Hawaii Sea Grant King Tides Project).

Goal WR-3: Maintain Resilient Water Infrastructure Systems.

Policy WR-3.2: Help mitigate drought and support water conservation projects and programs to manage demand.

The PUC depends on precipitation and underlying aquifers for potable water, some of which are already over-allocated or over-pumped. As an isolated island, "importing" water from another district like most U.S. cities is not an option. Thus, responsible use of potable water is critical. The BWS has been promoting water conservation in schools and homes and other public facilities for over 40 years, and these best practices can be supplemented with demand-side programs to reduce customer water use and efforts to provide a greater diversity of water sources.

Priority Actions:

Rainwater capture network. Support implementation of large-scale rainwater harvesting projects in the PUC through utilization of abandoned infrastructure and pipes.

Timeline



Partners:

- BWS
- DFM
- ENV

Expand municipal treatment and reuse projects. Pursue "gray water" reuse for State and City facilities in accordance with State law and update the plumbing codes to reflect advances in water conservation.

Timeline



Partners:

- BWS
- State DOH
- State DOA
- DPP

Encourage water-wise landscaping. Property owners can pursue landscape designs that require less water for irrigation such as less lawn area and more drought tolerant plantings.

Other Actions:

- *Promote water conservation programs offered by the BWS.*
- *Incentivize homeowners to capture stormwater such as though the BWS Residential Rain Barrel Rebate program.*



Example of a rain garden under construction at Windward Community College.

Policy WR-3.3: Improve coordination of wastewater infrastructure and land use planning.

Adequate wastewater flow can be a constraint for new development in the PUC. Costs to upgrade the sewer system may be passed on to the developer, and oftern small projects cannot fulfill improvements alone. Improved coordination between infrastructure and land use planning agencies and communication with the development community can help to ensure that adequate infrastructure better serves the demands of both smaller infill and major directed growth areas.

Priority Actions:

Improve coordination of capacity, hydrologic, and land use planning models. Continue to integrate directed growth policies and specific policies such as density bonuses in capacity modeling.

Timeline



Partners:

- DPP
- ENV

Optimize sewer connection application process. Review the 2-year capacity hold policy for approved sewer connection applications. If appropriate, change policy to require shovel-ready status or to require prepayment of fees.

Timeline



Partners:

- DPP
- ENV

Interagency coordination. Proactively coordinate with the State Office of Planning and Sustainable Development (State OPSD), Hawai'i Housing Finance and Development Corporation (HHFDC), Hawai'i Community Development Authority (HCDA), and HART to deliver infrastructure for major State-led development (facilitate the master planning of State-owned sites between Chinatown and the Kapalama Canal).

Timeline

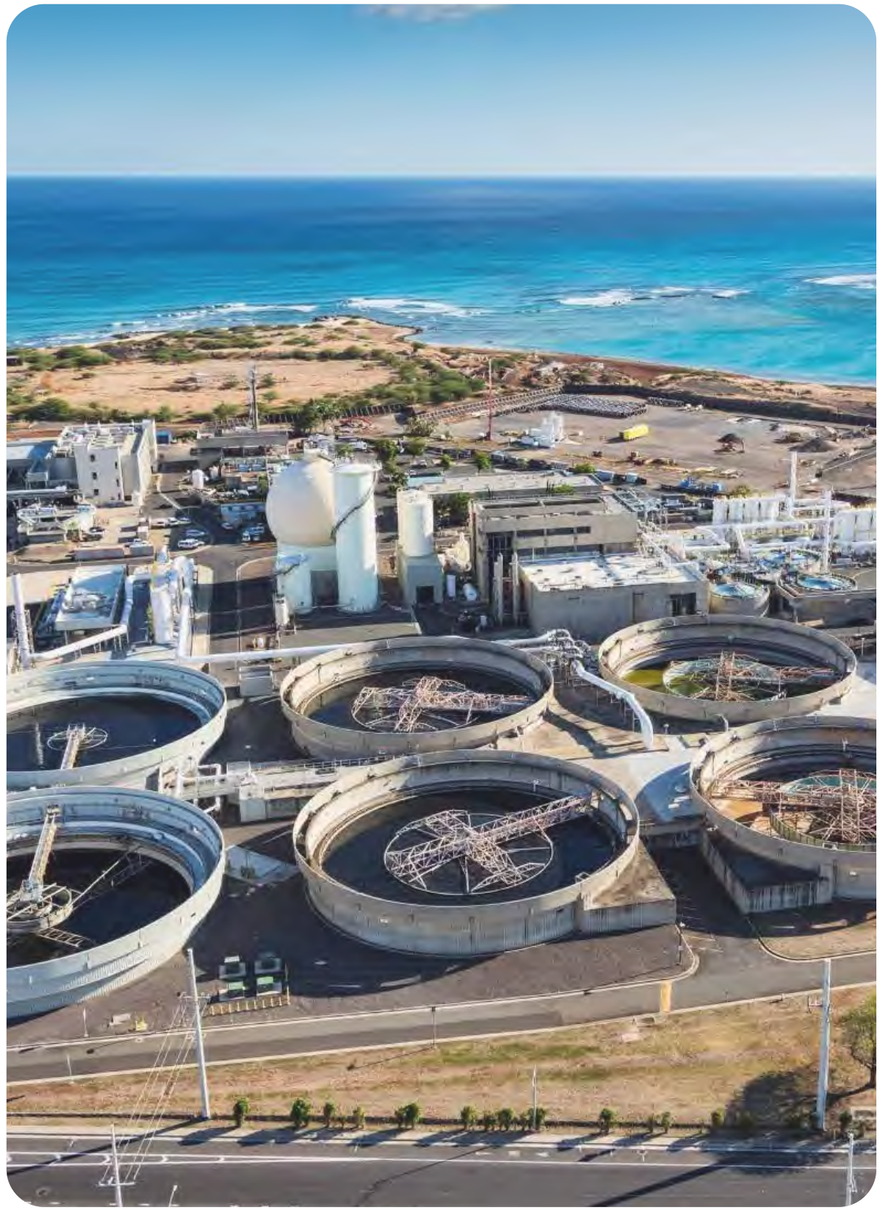


Partners:

- State OPSD
- HHFDC
- HCDA
- DPP
- ENV
- HART

Other Actions:

- *Engage in proactive sewer infrastructure planning (and needs assessments) in anticipated areas of growth, and allocate funding to long-range capacity improvements.*



Sand Island Wastewater Treatment Plant.

Economic Development

Economic Development

GOAL ED-1:
Support Employment and Business Growth in the PUC's Transit-Rich, Mixed-Use, and Industrial Areas.

Policy ED-1.1: Accommodate and encourage commercial job growth in dense, transit-rich locations.

Policy ED-1.2: Enhance the ability of new and small businesses to thrive and grow in the PUC.

Policy ED-1.3: Maintain industrial use as the primary land use in key PUC locations with easy access to the port and airport.

Policy ED-1.4: Support varied business uses in light-industrial and mixed-use areas.

GOAL ED -2:
Create a Balanced and Diversified PUC Economy.

Policy ED-2.1: Support growth in key industries such as information and technology, green industries, education and training, creative media, made in Hawai'i products, and other sectors identified by City or State Economic Development initiatives.

Policy ED-2.2: Grow resident workforce skills by supporting State investments in K-12 and higher education facilities and jobs training.

Policy ED-2.3: Continue to invest in the success of Waikīkī as the State's primary visitor destination/resort area and a livable urban neighborhood.

Policy ED-2.4: Maintain a productive relationship with the military to broaden its contributions to the PUC.

GOAL ED-3:
Ensure City Services and Infrastructure Support Broad Economic Prosperity.

Policy ED-3.1: Support small property owners and their redevelopment, infrastructure, and funding needs through process streamlining and enhancements.

Policy ED-3.2: Ensure major public infrastructure needs are funded equitably, including with contributions from new developments.

Key Outcomes

The PUC is the most significant center of economic activity on O'ahu and is also a major contributor to the State's economy. A more robust and diversified economy will lay the foundation for future prosperity, job creation, and workforce development. PUC DP policies support employment and business growth by accommodating new office and R&D growth in dense, transit-rich locations, and by preserving critical industrial uses near the port, airport, and distribution centers.

Development Plan policies focus on bolstering small businesses, encouraging non-traditional and flexible working spaces, and accommodating telework. Plan policies support a balanced and diversified economy by encouraging growth of information, technology, and creative industries, investing in the continued success of tourism and tourism-dependent industries, and supporting efforts to prepare the resident workforce through investments in K-12, higher education, and skills training.

Successfully navigating changes in the local and global economies will require increased flexibility. Policies and actions taken by the public sector can help to support businesses and workers moving into the post-pandemic economy, the technology economy, and in transitioning to a greener, more sustainable economy.

City projects and services will be funded equitably through fair assessments and fees on new development projects, use of new district-based funding, financing tools, and partnerships.

Setting the Stage

Well over half of Honolulu's civilian jobs are located in the PUC according to the U.S. Census. Jobs in the PUC are distributed along major thoroughfares and concentrated in areas such as Downtown, Kalihi-Pālama, Ala Moana-Kaka'ako, Waikīkī, and the airport. It is anticipated that the PUC will continue to grow and remain O'ahu's principal employment center even as job growth ticks upward in West O'ahu, bringing more live work balance to that region. Economic diversification that shifts some focus away from continued high growth of the tourism industry and towards a greater array of local industries will improve the economy's resilience to sudden economic shocks and downturns, and also assist Hawai'i residents looking for more varied job opportunities.

The Jobs-Transit Connection

With so many of O'ahu's jobs in the PUC, transportation conditions are key to the functioning of the local economy; Because of the high concentration of the island's jobs not only in the PUC, but also within small, focused areas, like Downtown, Waikīkī, and Civic Center, creating and maintaining ease of access to these areas through enhanced transit and mobility options is an important piece of the overall land use picture as it relates to the economy.

High levels of public transit and bike-and-pedestrian friendly streets both efficiently support commutes to jobs and enable the dense concentrations of jobs within these centers. Public transit is highly effective for regular, predictable, trips like going to work, and these trips provide the greatest benefits to users who can then bypass congested roads, time consuming commutes, and high parking prices.

Navigating Industry Changes in the PUC

Since the last PUC DP update in 2004, many changes have taken place, such as rapid technological advances, the internet boom, globalization, evolving population trends, and accelerating global climate change. All have had profound impacts on our infrastructure and industries. Along with the shifts and new trends, come new challenges and opportunities for all sectors of our local economy, from retail to hospitality, construction, utilities, and more.



Industries in Flux in the PUC

Tourism and Hospitality Industries

The PUC is the site of major visitor infrastructure and destinations, including the Daniel K. Inouye International Airport, Honolulu Harbor cruise terminals, the Waikīkī resort district, Ala Moana Center, Honolulu Convention Center, and Pearl Harbor. O'ahu's tourism industry, centered in Waikīkī's resort district, is one of the key employment sectors for the region and plays a major role in the State economy as well. However, Hawai'i's tourism is also vulnerable to global economic fluctuations, competition from emerging destinations, and, as a beach state, worsening coastal hazards attributed to climate change. O'ahu has already seen the temporary yet virtual industry standstill brought on by the COVID-19 pandemic, and it remains a challenge to predict with certainty where the uneven highs and lows of the recovering "post-pandemic" economy will lead.

However, the visitor industry is robust and will remain a vital and integral part of the PUC's and Hawai'i's economy. There is a need for reinvestment and modernization of existing hotels, and a general need for tourism-related infrastructure investments that reflect visitor demand for access to natural areas, group accommodations, and a wider variety of mobility and transportation options. Visitor habits have been shifting over time with the rise of social media platforms that popularize once less-trafficked natural areas, and hosting websites that fuel the proliferation of short-term rentals. Both of these trends are taking a toll on the PUC's neighborhoods and sensitive conservation areas, and both require ongoing solutions. PUC DP policies support the increasing momemtum toward sustainable tourism models, closer management of natural areas, and the strict enforcement of short-term rental rules and regulations. An opportunity also exists to reimagine redevelopment in the resort area of Waikīkī as it adapts to sea level rise. The timely creation of a Special Area Plan for the whole of Waikīkī to help envision long-term adaptation pathways, beyond the nearer-term recommendations of this DP, is a key Plan action to be initiated as a community-based effort. For more detail on Waikīkī, see pp 82-87 in Chapter 3, Focus Areas.

The Evolution of Retail

The PUC has numerous existing retail centers including three large regional malls. Looking ahead, the PUC can expect to follow national trends as online shopping continues to drive brick and mortar shops toward more "experiential" niche retail and expanded dining destinations. For example, some malls may choose to integrate more grocery and food retail, local products and pop-up shops, or to incorporate lodging, or even residential units. DP policies call for a flexible approach to uses and redevelopment for large and older retail centers. The PUC will also see additional retail development in areas more recently pegged for mixed-use growth. Recent changes made to the PUC's retail centers reflect these shifts, with a greater emphasis on food retail, dining and beverage, entertainment, local businesses, high-quality public space, and niche stores. For example, SALT at "Our Kaka'ako" and South Shore Market at Ward Village emphasize public social space and feature a tenant mix focused on food, drinks, and local boutique businesses. Online shopping at local stores for pickup



is another trend that is likely here to stay, and retailers may find that also means an adjustment to their operations and physical configurations. Outside of compact commercial centers, commercial corridors should continue to support and build pedestrian-friendly, neighborhood-serving retail. PUC DP policies encourage the reintegration of neighborhood-serving "main streets" along mixed-use corridors by directing infill development to these areas with attention to a high-quality public realm. This will allow more residents to live and work in proximity to everyday essentials and friendly neighborhood spaces.

Education Sector

The PUC's schools and higher education institutions have a critical role to play in enhancing educational attainment and supporting research and economic diversification in Honolulu. Honolulu schools and campuses should be supported in their efforts to reinvest in and improve facilities and auxiliary uses. Major university campuses in the PUC include the University of Hawai'i (UH) at Mānoa, the UH medical campus, Hawai'i Pacific University, and Chaminade University of Honolulu. There are also two community colleges in the PUC, Honolulu Community College (HCC), and Kapi'olani Community College (KCC). At the K-12 level, existing public schools are likely to experience reinvestment and possible reorganization in order to address needs or facilities deficiencies—including opportunities to implement public-private partnerships intended to generate private revenues for reinvestment in school facilities.

Health Care Industry

The island's health care industry is heavily concentrated in the PUC and is likely to undergo significant growth as O'ahu's population of older residents continues to increase. Department of Business, Economic Development & Tourism (DBEDT) projects rapid growth in the health care industry as Hawai'i's population ages, creating increased need for medical office space and expansions of major hospitals and care facilities. The PUC DP policies also call for increased integration of health care services into planned developments and neighborhood commercial centers, the expansion of housing options for kūpuna, and prioritizing the location of such housing in key transit-served areas.

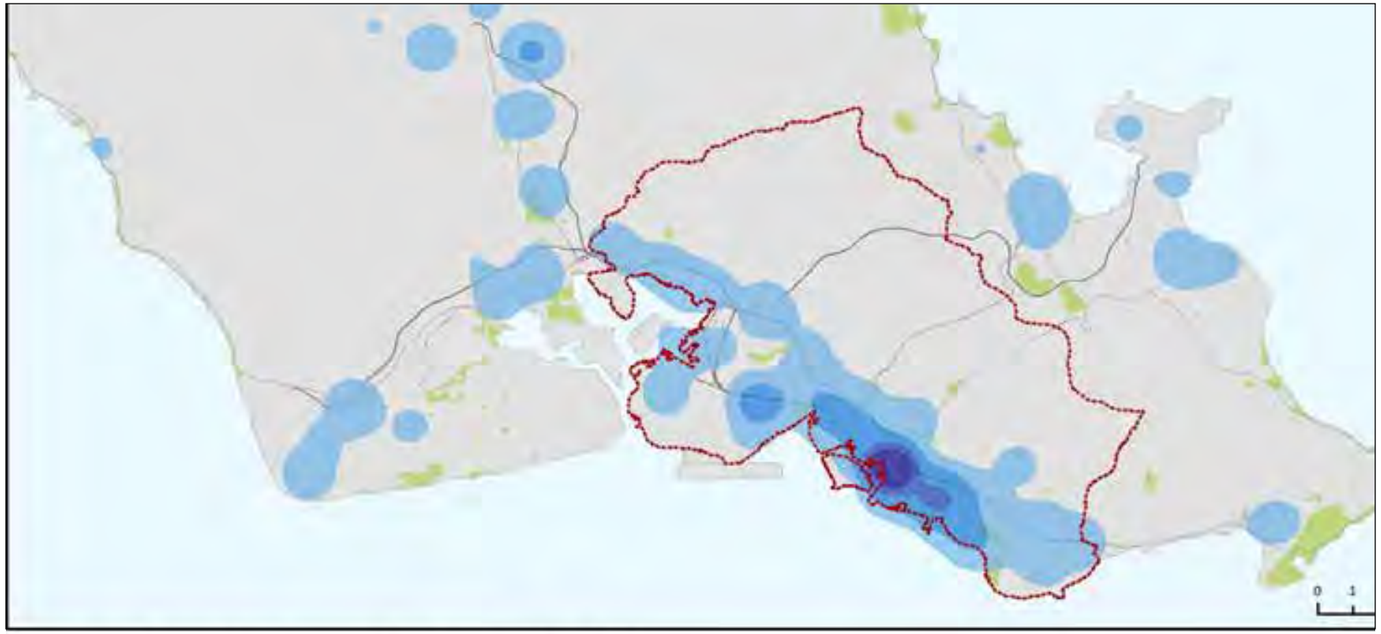
Military

The military exerts an enormous economic impact in Hawai'i and the PUC, but future changes in military spending and staffing are unpredictable. The PUC itself includes several major military installations, including Fort Shafter and Joint Base Pearl Harbor-Hickam. The PUC DP policies call for maintaining a productive relationship with the military to encourage its positive contribution to residents, shared environmental protection goals, and the integration of military housing with surrounding neighborhoods. As an island community it is important that the military demonstrate the great care needed for natural resource preservation and stewardship of the land.

Economic Diversity, Innovation, and Technology

State and City efforts to encourage growth in innovative and creative industries generally favor the land, infrastructure, and institutional assets available within the PUC. The PUC is therefore poised to capture a high share of statewide growth in industries and activities such as science, energy, marine research, communications, media, and technological innovation, and it has the State's largest concentration of jobs in largely "knowledge-based" industry sectors. The COVID-19 pandemic has shown the viability for many workers to telework remotely on a part-time or full-time basis. PUC DP policies look to address continued shifts in innovation industries and the continuance of some remote work by encouraging more live/work options, co-working spaces, shared facilities and "maker spaces", and flexibility in uses for large office buildings as appropriate.

Parallel priorities include the transition to carbon free transportation and a renewable energy infrastructure in alignment with State and City climate goals. The Plan's policies promote the expansion of public car charging facilities and the preservation of industrial lands, including near the port and airport.



Sources: U.S. Census Longitudinal Employer Household Dynamics, 2015; Strategic Economics 2017.



UH Mānoa is strategically modernizing its campus to meet current and future needs.

Office Uses

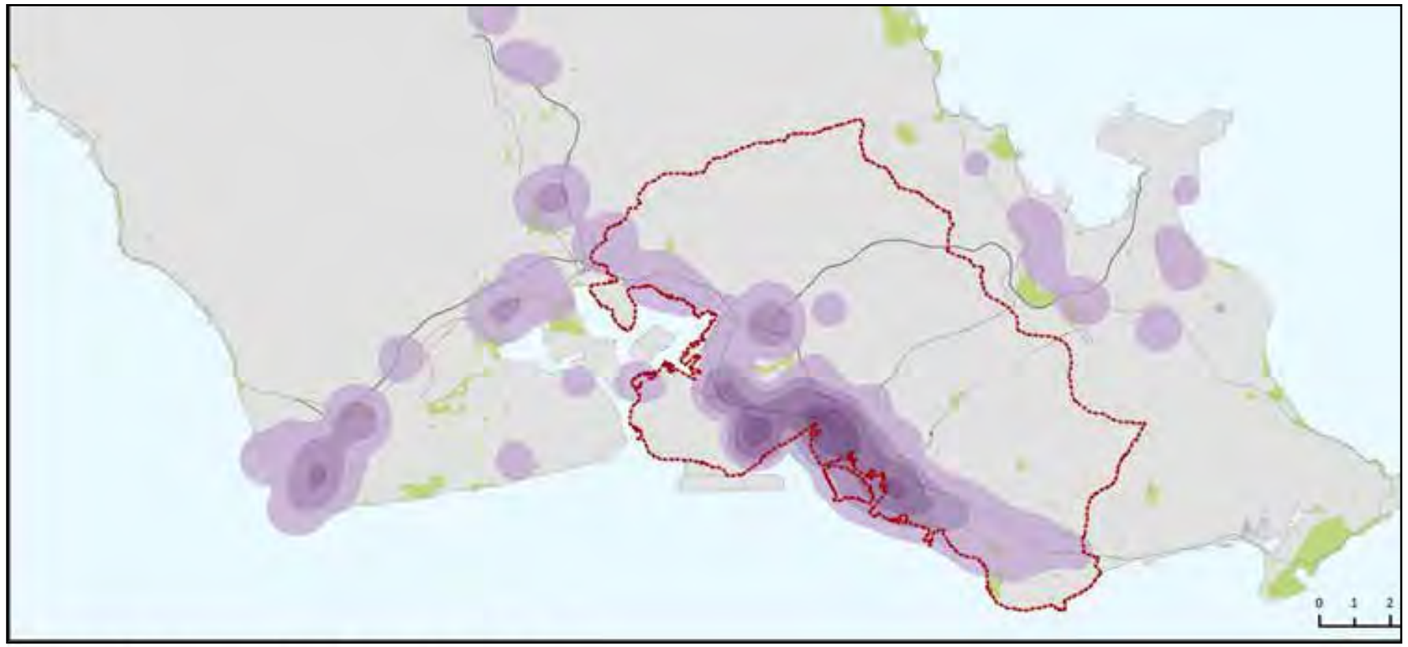
The PUC includes the overwhelming majority of Honolulu's office space. Colliers International estimates that the PUC constitutes nearly 91 percent of the island's office inventory. While the Downtown is the primary office district, other locations in the PUC also include small pockets of office, flex, and mixed-commercial buildings/spaces. This type of development is encouraged especially near the rail line and other transit-accessible commercial corridors to allow for as-needed and where-needed additions to the PUC's office inventory. In response to new workplace trends and the changing demand for traditional office space, this Plan suggests residential conversions or mixed uses be allowed/facilitated for large office towers that meet the requisite features for livable space. Increasing the residential population in the Downtown would also boost foot traffic and viable hours for neighborhood serving businesses, creating a more vibrant "day and night" neighborhood.

Preserving Industrial Land Use in the PUC

Demand is strong for industrial land in the PUC, yet many industrial districts may experience inventory declines due to redevelopment pressures to convert to higher value uses (such as near the rail stations). Escalating flooding risks in low lying industrial areas such as Māpunapuna and Kalihi Kai are also a concern. Despite the strong demand, industrial users generally cannot compete with the higher attainable values from redevelopment for high-intensity residential and retail uses in a "mixed-use" zoning scenario.

As a result, industrial lands are likely to gradually undergo redevelopment pressure throughout the PUC, particularly as ground leases expire, and unless tailored protections are maintained through zoning (as this Plan suggests). The conversion process is well underway in Kaka'ako, and pressure for conversion is likely to occur in other locations near future rail stations, including Kalihi/ Kapālama and the Airport/Māpunapuna area. Therefore, most new industrial space is likely to be developed in the Kapolei area instead of the PUC.

The Plan's policies call for the retention of many existing industrial lands in essential gateway areas, such as near the port and airport, because of the important function that they play. In addition, floodable and sea level rise impacted industrial areas of the PUC such as Māpunapuna and Kalihi Kai should not intensify beyond existing uses without significant sea level rise adaptation and flood mitigation planning. Polluting uses should be controlled in the SLR-XA and frequently flooded areas. These issues are covered in more detail in the Sea Level Rise (Chapter 8) and Focus Areas (Chapter 3) sections of this Plan.



Sources: U.S. Census Longitudinal Employer Household Dynamics, 2015; Strategic Economics 2017.



Remaining industrial areas in the PUC should be preserved.

How Does the Development Plan Get Us There?

Enhancing the ability of new and existing small businesses to thrive.

The Plan seeks to address potential ongoing displacement pressures, grow small and local businesses, and retain longstanding businesses, as development activity in Honolulu increasingly reorients toward infill locations in existing business districts. New resources, streamlined approval processes, and expansion of incentive-based density bonuses in the PUC can encourage developers to contribute toward providing affordable space for existing and small businesses. New mixed-use areas allow intensification and infill development of retail, small office uses and shared commercial spaces in Transit-Oriented Development (TOD) rail station areas and other major corridors and centers. Additionally, the PUC DP policies emphasize the need to create flexibility in shifting public resources to create timely programs and policy responses for businesses and workers in the face of disasters or emergencies.

Preserving sufficient industrial uses in key PUC location.

While some industrial lands are targeted for redevelopment, most PUC locations with easy access to the port, airport, and commercial markets will remain zoned primarily for industrial uses. Maintainig a sufficient amount of industrial land near the PUC's population base and transportation centers supports light industrial jobs and helps with efficient goods movement, worker jobs access, and accommodates skilled jobs that pay a livable wage. Another related strategy is to permit major existing commercial centers the flexibility to introduce residential, light industrial, or other non-retail commercial uses into their programming to adapt to changing retail demand, and to further preserve existing industrial lands for uses that are not readily accommodated elsewhere.

Promoting sustainable tourism practices and management.

The PUC's resort area of Waikīkī is well known around the globe and continues to draw visitors without the need for a heavy marketing presence. By the same token, contiual high growth in the industry pre-pandemic, and a quick snap-back after travel restrictions eased, has prompted calls to shift from a growth model to a sustainable management model that addresses some of the increasing impacts of tourism on neighborhoods, natural areas, infrastructure, and other public services. The Hawai'i Tourism Authority's 2020 Strategic Plan aligns with this shift with its "four pillars" focusing respectively on natural resources, Hawaiian culture, enriching interactions between visitors and communities, and positive contribution from the industry. The PUC DP policies wholly support a shift toward sustainable tourism practices and also call for renewed focus on adapting Waikīkī for current and future climate change impacts. In addition, small pockets of lodging such as in the Convention Center district and new lodging planned for the New Aloha Stadium Entertainment District will provide travelers with options, while tightened restrictions on short-term rentals will will reduce disturbance to PUC neighborhoods.



Downtown Honolulu is the largest business hub for the island.

Creating a resilient economy.

The Plan's policies support a diversified and resilient economy by encouraging growth of innovative, technology-focused, sustainable, and creative industries. Matching resident workforce skills to new emerging industry sectors by supporting the state in its investments in K-12 and higher education facilities throughout the PUC, and by investing in jobs training and internship programs, will allow new industries to take root and flourish. Encouraging and allowing business incubators, co-working spaces, shared production spaces, multi-user office space, and industrial space for small-scale fabrication supports small businesses and entrepreneurs. In addition, changes to allow more flexibility in home occupations will help ensure that remote work remains a viable option for more residents.

Expanding as a leading center for education and innovation in the Pacific.

The PUC has a wealth of educational institutions, vocational training, top-notch academic research, an ocean-centered community and working harbor, a talented resident workforce, and visiting residents and scholars. The Plan calls for showcasing this strength through supporting facilities improvements, creating vibrant public spaces on and near campuses with easy transportation access, and encouraging shared-use facilities or programming to enrich the community wherever feasible.

Meeting uncertainty with flexibility.

The themes in this chapter can be summarized as meeting uncertainty with flexibilty. The Plan's policies call for ensuring the region is well poised to excel in the technology of the future through responsive and flexible uses where needed, preparing for economic shocks through a more diversified economy, supporting local businesses as they meet new challenges and opportunities, and by protecting precious natural resources for future generations.

Related Policies

Policy GD-1.3: Facilitate the evolution of shopping malls & big box retail near rail from single-use centers into true gathering places.

Policy GD-2.3: Invest in long-term growth in commercial corridors and mixed-density neighborhoods outside of SLR-XA.

Policy H-1.3: Encourage a greater variety of housing types including low or middle-density multi-family housing, ADUs and 'ohana units, mid-rise apartment buildings and share housing models.

Policy H-2.1: Expand the supply of income-restricted affordable housing through requirements, incentives and public-private partnerships.

Policy PPOS-1.3: Seek opportunities to create new parks in growing areas of the PUC.

Policy MC-2.1: Reduce dependency on single-occupancy vehicle miles traveled.

Policy MC-2.2: Safely integrate emerging technologies into the transportation system.

Policy SLR 2.3: Prioritize and fund community-level Area Adaptation Plans.

Policy HC-1.1: Encourage exemplary healthy (“green”) building standards.

Policy WR-1.3: Address chronic storm flooding issues through multiple solutions.

Policy CIV-1.2: Assist the State in providing a high-quality environment for public schools and educational institutions in the PUC.



Figure 11.1: Economic Development Locations Diagram, West

Economic Development

Employment Core / Key Economic Anchors
Critical districts that support the employment and economic vitality of the PUC, including Downtown and Chinatown, Ala Moana Mall, and resort areas of Waikiki.

Preservation of Industrial/Flex Land Use
Key districts to continue serving as production, warehousing, distribution, flex uses, light industrial, makerspaces. Mostly near the airport and port.

State-Owned Development Opportunity Site
Parcels owned by the State that have been identified as major potential opportunities for mixed-use redevelopment.

Enterprise Zones
EZ Partnership Program gives State & County benefits to companies to stimulate business activity, job preservation, and job creation in most needed areas.

Federal Opportunity Zone
Officially designated by the federal government as an economically distressed community where new investments, under certain conditions, may be eligible for preferential tax treatments.

TOD Neighborhood Plan

Civic

Preservation Area

Major Parks/Open Space

Institutional Areas + Campuses

Topography, Boundaries + Places

Skyline Station

PUC Boundary

Urban Community Boundary

Streams

Major Streets + Highways

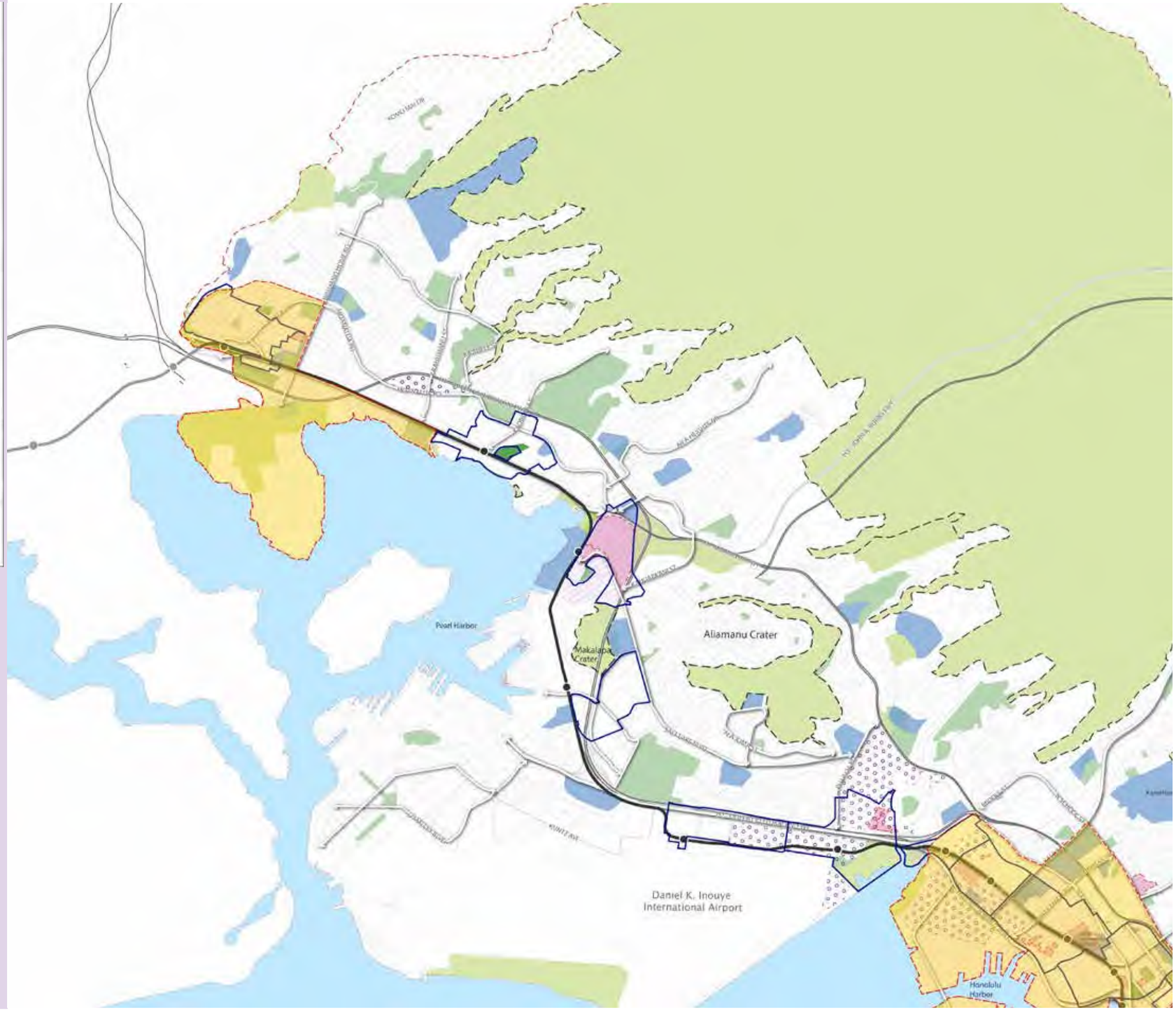
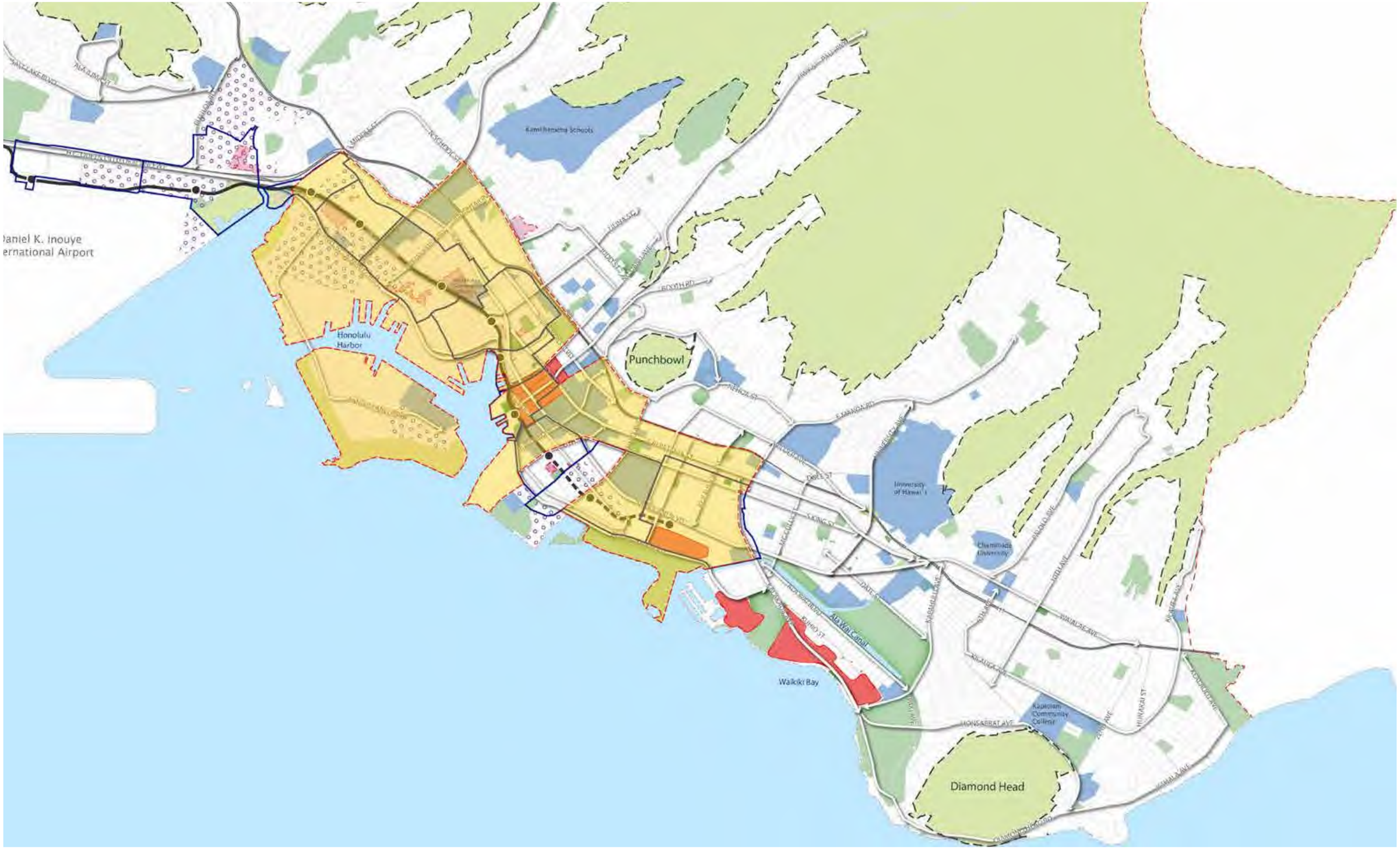


Figure 11.2: Economic Development Locations Diagram, East



Goal ED-1: Support Employment + Business Growth in the PUC's Transit-Rich, Mixed-Use, & Industrial Areas.

Policy ED-1.1: Accommodate and encourage commercial job growth in dense, transit-rich locations.

Continued economic and jobs growth in the PUC's jobs-rich areas promotes efficient use of existing infrastructure, and accelerates innovation and economic expansion. Growth in infill locations leverages past investments in public infrastructure— water, wastewater, stormwater, roads, and transit—to serve additional businesses, while some additional infrastructure upgrades are still required. PUC residents and the regional economy derive benefits from increased employment density, as higher job densities in metropolitan areas are linked to greater productivity, economic growth, and job mobility. Supporting employment growth in the PUC requires a two-pronged approach of preserving employment land uses while also ensuring that reinvestment and intensification of commercial uses can proceed. As industry demands shift over time, it is important to create strategies to allow a more flexible mix of uses in office and commercial centers.

Priority Actions:

Implement TOD zoning. Complete adoption process for TOD zoning to create broader mixed-use districts that allow office and R&D land uses, and other higher-intensity commercial development.

Timeline:



Partners:

- DPP

Flexible and innovative office and retail development. Support businesses in configuring for remote working/coworking and other flexible employment practices. Work with major property owners to effectively integrate office and flexible uses into TOD redevelopment projects, especially within close proximity to rail stations. As part of the review process for proposals with commercial uses, evaluate adherence to the design/character goals and principles of the applicable TOD Neighborhood Plan and the PUC DP's Place Types.

Timeline:



Partners:

- DPP
- Private developers

Other Actions:

- *Facilitate the addition of office, health care, and other community serving uses at existing retail centers and shopping malls near frequent transit.*
- *Explore regulatory changes or incentives to facilitate active ground floor/residential development projects and conversion of excess office or retail space into housing, where habitability requisites are met.*



Downtown Honolulu commercial office buildings.



Busy shopping area in Ala Moana Center.

Goal ED-1: Support Employment + Business Growth in the PUC's Transit-Rich, Mixed-Use, & Industrial Areas.

Policy ED-1.2: Enhance the ability of new and small businesses to thrive and grow in the PUC.

Fostering a friendly environment for all kinds of new and small businesses in the PUC simultaneously grows the economy and boosts other supporting businesses. Innovation and expansion of the PUC economy requires entrepreneurs who continue to see value in operating businesses connected to the PUC's economic strengths and resources.

Strategies and incentives should be employed to address potential displacement pressures on small businesses as commercial and residential development activity in urban Honolulu increasingly reorients toward infill locations and mixed uses at higher densities, especially in the TOD corridor and any bus rapid transit (BRT) corridors. Expansion of incentive-based zoning or community benefit requirements in such areas in the PUC could be used to encourage developers to contribute toward providing affordable space for existing and new small businesses. Small businesses on all commercial corridors should be supported in making façade improvements, and in contributing to an inviting streetscape in high foot-traffic areas.



The PUC is attractive to locally-owned storefront businesses.

Priority Actions:

Small business retention. Consider subsidized retail spaces as a community benefit to incentivize below-market spaces for small, local businesses. This action is appropriate on a case by case basis in commercial/mixed use areas of the TOD Special District.

Expand business use of outdoor spaces. Create destination commercial areas by expanding allowable outdoor dining and seating areas, and by selectively allowing businesses to operate temporarily on public spaces/rights-of-ways (for instance, for night markets or street food events).

Facilitate the revitalization of Chinatown. Long a priority for City administration and residents, the revitalization of Chinatown is important for local business, as a center for arts and tourism, and as the most historic urban neighborhood of the PUC (see also Chapter 3 Focus Areas pp 120-123).

Timeline:



Partners:

- DPP
- OER



Partners:

- DPP
- DTS
- DDC
- DLM
- Private businesses

Other Actions:

- *Develop and maintain a list of offline and online resources for small businesses.*
- *Explore ways to reduce financial burden on small, local businesses through certain fee waivers s and other incentives.*



The revitaliztion of Chinatown is a longstanding community priority.

Goal ED-1: Support Employment + Business Growth in the PUC's Transit-Rich, Mixed-Use, & Industrial Areas.

Policy ED-1.3: Maintain industrial use as the primary land use in key PUC locations with easy access to the port and airport.

As the PUC continues to grow and change it is important to preserve adequate industrial lands in the PUC for fulfilling production, distribution, repair uses, and also providing opportunities for a variety of businesses requiring light industrial space. The PUC's industrial lands accommodate buildings that serve a valuable role for the economy's shipping, distribution, manufacturing, and service needs. However, the PUC's inventory of industrial space is diminishing due partly to redevelopment pressures for conversion to higher-value uses.

Priority Actions:

Industrial land use supply assessment. Regularly assess the industrial land supply across the PUC, with a goal of preserving adequate industrial zoned land. Within Industrial and Flex Place Types, maintain restrictions on non-industrial uses to support industrial as the principal use.

Timeline:



Partners:

- DPP
- community partners
- State agencies

TOD industrial use monitoring. As growth occurs in TOD areas, monitor the relative increases or decreases in office, R&D, industrial, and housing uses; track significant losses of industrial land use, and consider adjusting requirements if industrial square footage is noticeably diminished year over year. Encourage projects that mix light industrial, commercial, and/or civic uses.



Partners:

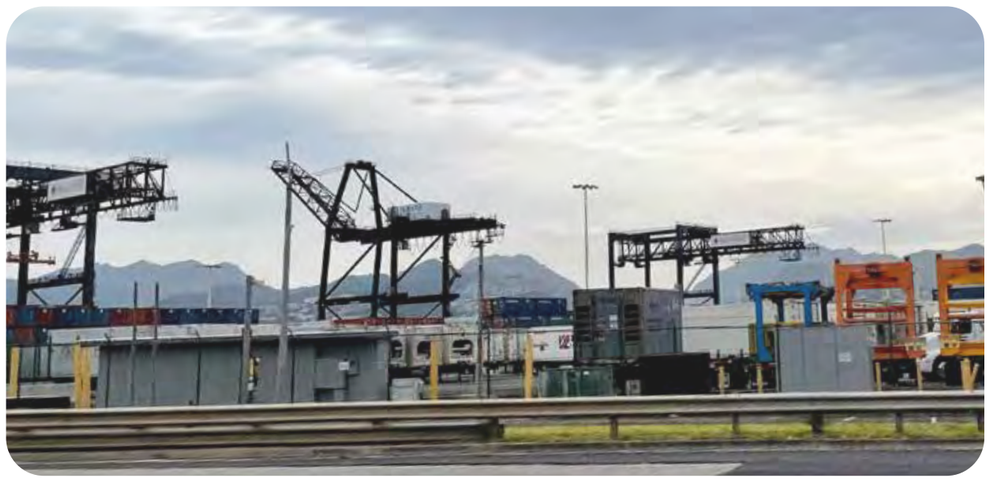
- DPP
- HCDA

Other Actions:

- *Support modernization efforts at Honolulu Harbor and retain existing industrial zoning to support efficient, ongoing port operations.*
- *Support the access needs of long-term industrial uses during street capital improvements.*
- *Reduce/restrict heavily polluting uses, especially in the SLR-XA.*



Cement mixing plant in Kalihi Kai.



Shipping container cranes on Sand Island.

Goal ED-1: Support Employment + Business Growth in the PUC's Transit-Rich, Mixed-Use, & Industrial Areas.

Policy ED-1.4: Support varied business uses and flexible spaces in light-industrial and mixed-use areas.

Mixed-use and light industrial areas provide opportunities for a flexible building stock and development type that can accommodate creative and innovation-focused businesses. Examples include shared-use facilities (such as commercial kitchens or manufacturing space), arts and design businesses, live-work configurations, small-scale production or prototyping companies, and other research and development. Businesses that do not generate significant negative noise, odor, or pollution impacts on their neighbors are appropriate within mixed-use districts.

Priority Actions:

Zoning for innovation. Establish conditional uses to facilitate shared facilities, flex space, and live-work uses in Flex and Near-Town Corridor Place Types.

Timeline:



Partners:
- DPP

Explore vertical warehousing. Review IMX zoning for regulations that prevent higher density industrial development (multilevel/vertical warehousing). Support pilot vertical warehousing projects.



Partners:
- DPP
- Private businesses

Address flooding in PUC industrial areas. Develop policies and guidance to enable existing industrial structures to effectively adapt to current and near-term sea level rise and increased flooding concerns, and review long-term options for land uses, infrastructure, and services in impacted areas.



Partners:
- DPP
- ENV
- DDC
- DTS
- DFM
- BWS
- OCCSR
- Private businesses

Other Actions:

- *Provide strategies for new developments with industrial mixed-use uses to meet active design guidelines (bike lanes, pedestrian orientation) while also permitting adequate loading and truck circulation space.*
- *Review standards to ensure that developments in mixed-use districts follow requirements for separation and buffering between residential and noxious uses in mixed light industrial areas.*



Industrial flex uses in Kaka'ako.



SALT shopping center mixes retail, dining, office, and arts/event spaces.

Goal ED-2: Create a Balanced and Diversified PUC Economy.

Policy ED-2.1: Support growth in key industries like information and technology, green industries, education and training, creative media, made in Hawai'i products, and other sectors identified by City and State economic initiatives.

The PUC is ideally positioned to attract innovative, creative, and technology-focused businesses since the area includes a high concentration of Hawai'i's major educational and research institutions and activities, as well as a relatively diverse existing concentration of businesses. Expanding technology-focused and creative industries in the PUC requires space for these businesses to grow. This space could take the form of renovated buildings, or new developments with commercial and industrial spaces. Office and R&D use should also be located in existing employment districts and near major educational institutions to create synergy.

Priority Actions:

Business incentives program. Support the City's Office of Economic Revitalization (OER) in introducing a Business Incentive Program for Honolulu to create and retain quality jobs and capital investments with a particular emphasis in low- and moderate-income communities.

Timeline:



Partners:

- OER
- DPP
- Business groups

Reduce barriers for emerging industries. Work with potential new commercial and industrial uses to accommodate needs within the existing regulatory framework. Add uses to the LUO, as needed, tailored to new industries such as e-commerce, last-mile delivery, robotics, indoor agriculture, and integrated work spaces.

Timeline:



Partners:

- DPP
- OER
- Business groups

Other Actions:

- *Support businesses' capacities for remote work and staggered schedules.*
- *Promote spaces in new/renovated buildings for film, media, and design-oriented uses, i.e. by working with owners of vacant storefronts or warehouses to permit and develop artist spaces, exhibition spaces, or content production venues.*



An indoor hydroponic farm in the PUC.

Goal ED-2: Create a Balanced and Diversified PUC Economy.

Policy ED-2.2: Grow resident workforce skills by supporting State investments in preschool, K-12, and higher education facilities and jobs training.

Diversification of the PUC's economy requires not only new industry opportunities, but a workforce with diverse skills. Education institutions at all levels need to be equipped to prepare elementary and secondary students, college students, and adult workers of all ages to navigate a changing workforce and transforming occupations. The PUC's K-12 schools and higher education institutions require continual reinvestment to remain competitive. Although the City's direct role in K-12 schools and higher education institutions is limited, the City can serve as a partner to help the school districts meet their long-term development needs as facilities are updated, repurposed, or newly constructed and in working with institutions to facilitate adjacent and supportive uses.

Priority Actions

Expanded educational spaces. Support expansion of office and R&D space associated with major academic institutions, including Downtown, at Aloha Tower, and at HCC/Kapālama Station.

Timeline:



Partners:

- DPP
- Educational facilities

Grow State partnerships. Expand the City's role in enabling educational public-private partnerships with the State DOE to help it meet land use and property development goals.



Partners:

- DPP
- Private businesses
- State DOE

Other Actions:

- *Engage with UH Mānoa, Hawai'i Pacific University, community colleges, and other higher education institutions to support their programs and goals through careful consideration of adjacent uses, transportation access, and shared public spaces.*



Hawai'i Pacific University campus at the Aloha Tower Marketplace.



Conceptual rendering for an UH Mānoa expansion on University Avenue.

Goal ED-2: Create a Balanced and Diversified PUC Economy.

Policy ED-2.3: Continue to invest in the success of Waikīkī as Honolulu's primary visitor destination, resort area, and a livable neighborhood.

Tourism remains a primary and economically significant industry in Hawai'i, and the PUC includes many of the most popular visitor facilities, including O'ahu's primary (and the PUC's only) resort area of Waikīkī. Reinvestment in infrastructure, mobility choices, and amenities in Waikīkī should remain a priority. A modern, safe, high-quality public environment will encourage repeat visitation and greater spending by visitors. Expanded mobility options—including on-demand transport such as bike rentals, public transit options, and corresponding infrastructure improvements—is essential in providing opportunities for tourists to circulate within and between destinations. These options create a more robust connection between Waikīkī and the growing mixed-use and shopping attractions in the Ala Moana-Kaka'ako area.

Redevelopment of Waikīkī hotel properties will help to reinforce the area's statewide significance in attracting visitors and leverage existing investments in infrastructure and amenities. Redevelopment in Waikīkī should contribute to and be coordinated with preparing the area for current and projected sea level rise impacts. At the same time, the apartment precinct of Waikīkī (generally the area above Kūhio to the Ala Wai, with some exceptions) is home to many PUC residents. A large part of Waikīkī's identity and character is in ensuring that both of these uses are in balance. A sustainable management model should be employed to ensure that tourism remains a suportive and lively industry and not unduly burdensome to area residents and resources.



Waikīkī Beach is a focus of the resort district.

Priority Actions:

Waikīkī business needs assessment. Engage business owners and representatives in Waikīkī and Ala Moana to gauge regulatory, infrastructure, mobility, and amenity needs. Partner with local property owners and businesses to assist in providing public amenities.

Timeline:

ONGOING

Partners:

- DPP
- OER
- State agencies
- Community partners

Adapt Waikīkī to sea level rise hazards. Work with property owners, residents, agencies, and business organizations to prepare a Special Area Plan for Waikīkī with a focus on pathways for climate change adaptation. See Chapter 3 & 8 for additional detail.

ONGOING

Partners:

- DPP
- OCCSR
- BWS
- ENV
- DTS
- DFM
- State agencies
- Elected officials
- Community partners



Waikīkī commercial area

Other Actions:

- *Support smaller/boutique hotels in the Convention Center area/ Ala Moana, Downtown, Aloha Stadium District, and by the Airport, to serve business or family travelers.*
- *Support a high level of ongoing maintenance and management for public spaces in Waikīkī to maintain a safe experience for large numbers of residents and visitors.*
- *Implement mobility improvements including pedestrian and bicycle connections within and between Ala Moana and Waikīkī, and expand bike share between tourist destinations from Diamond Head to Chinatown.*

Goal ED-2: Create a Balanced and Diversified PUC Economy.

Policy ED-2.4: Maintain a productive relationship with the military to broaden its contributions to the PUC.

The military is one of the more significant drivers of economic activity in Honolulu, with PUC facilities including installations such as Fort Shafter and the Pearl Harbor-Hickam Naval Base. The City has little direct influence over the military's land use, staffing, and facilities decisions. However, a productive relationship and dialog with the military allows the City to anticipate changes and leverage any new opportunities for mutual benefit. Given its significant presence, it is also desirable that military land uses are blended into the larger community where feasible, such as housing areas, and that county, state, and military agencies cooperate on shared goals relating to employment, environmental protections, and public open space.

Priority Action:

Protect Honolulu's drinking water supply. Support the Board of Water Supply, State agencies, community groups, and elected officials in calling for strict safeguards for the PUC's drinking water aquifer.

Timeline:



Partners:

- BWS
- State DOH
- One Water agencies
- City and elected officials
- U.S. Navy
- Federal partners

Seamless communities. To the extent possible seek better integration of military-owned land uses with the larger community fabric, for instance in mixed housing developments or neighborhoods. Provide continuity to adjacent neighborhoods through design of roadways, bikeways and walkways, landscape features, or architectural scale and character.



Partners:

- City, state, and federal partners



Military family housing should be well integrated into surrounding neighborhoods.

Other Actions:

- *Maintain regular meetings to coordinate with local military leadership regarding issues and opportunities impacting the PUC as related to long-range plans and projects.*

Goal ED-3: Ensure City Services and Infrastructure Support Broad Economic Growth Prosperity.

Policy ED-3.1: Support small property owners and their redevelopment, infrastructure, and funding needs through process streamlining and enhancements.

Owners of smaller commercial and industrial properties in the PUC have different interests, needs, and financial capacity compared to owners of large properties or multiple properties. For example, small property owners may have less economic incentive to redevelop their properties and may be concerned about how to maintain their existing operations. At the same time, small property owners interested in redeveloping will have less capacity to fund needed infrastructure improvements and to navigate the permitting process, and thus may give up on improving their properties individually. A small property owner may see significant benefit in broader areawide funding mechanisms that allow such owners to band together for infrastructure improvements, and this policy suggests that such a framework be established. However, without an established network, engagement with smaller property owners is relatively more challenging than with large commercial developers. Therefore, a more deliberate outreach and communication effort is needed to understand interests and concerns, and to build capacity among small property owners for shared action and advocacy.



Small mixed-use building.



Small-scale projects have different needs than large-scale developments.

Priority Actions:

Infrastructure huis. Create a pathway for small lot owners to create huis for infrastructure upgrade costs associated with redevelopment projects. Huis would be small, ad hoc groups of landowners that are formed to improve local infruastructure through shared funding which allows for smaller scale improvements.

Timeline:



Partners:

- DPP
- OER
- ENV
- BWS
- DTS

Other Actions:

- *Regularly engage with small property owners in the PUC's focus areas (especially those projected for growth) to share City plans and to understand these owners' interests and concerns regarding future redevelopment and infrastructure needs.*

Goal ED-3: Ensure City Services and Infrastructure Support Broad Economic Growth Prosperity.

Policy ED-3.2: Ensure major public infrastructure needs are funded equitably, including contributions from new developments.

Taxes and fees used to implement public infrastructure and facilities improvements should be aligned with fair assessments and fees on new development projects. This approach is particularly relevant to sea level rise adaptation efforts, in which properties impacted by sea level rise will receive the most benefit from adaptation improvements. However, all Honolulu residents and businesses will benefit to some extent from these improvements since they will allow continued economic activity to occur and enhance public safety. Equity considerations should be incorporated into DPP financing structures or programs, especially in TOD or other large redevelopment areas where the displacement of existing residents or businessess is a concern.

Priority Actions:

Equitable funding strategies. Ensure development contributes a fair and equitable share to City infrastructure. Consider a "commercial linkage fee" that would charge a housing impact fee per square foot of future hotel and condohotel development to support City efforts to develop affordable housing.

Timeline:



Partners:

- DPP
- BFS

Adaptation project cost-sharing. Study and test potential approaches for ensuring new development projects and/or property owners in areas vulnerable to climate change impacts and localized hazards contribute a fair share of funding for future adaptation projects.



Partners:

- DPP
- DFM
- ENV
- BWS
- DTS
- DEM
- DPR
- OCCSR
- BFS
- Community partners

Other Actions:

- *Consider progressive fee structures for building and permitting charges, increasing rates for offshore or absentee owners and decreasing rates for locally-based owners.*
- *Implement new tools to fund sea level rise adaptation (i.e. district-based entities, public-private partnerships, or federal matching grants).*



Public infrastructure investments should serve the interests of all residents.



Chronic flooding of business areas should be addressed through coordinated efforts.

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Public Services

Public Services

GOAL PS-1:
Support Civic and Public Institutions in the PUC.

Policy PS-1.1: Provide for adequate civic and public safety facilities and essential services in the PUC.

Policy PS-1.2: Assist the State in providing a high-quality environment for public schools and educational institutions in the PUC.

GOAL PS-2:
Plan for Emergency Management and Hazard Mitigation in the PUC.

Policy PS-2.1: Increase resilience to disruptive hazard events through coordinated effort.

Policy PS-2.2: Strengthen community disaster preparedness.

GOAL PS-3:
Maintain Efficient Energy and Telecommunications Systems in the PUC.

Policy PS-3.1: Site energy and telecommunications systems appropriately to avoid hazards and adverse visual impacts.

Policy PS-3.2: Increase production of renewable energy at the building and community scale.

GOAL PS-4:
Provide Increasingly Efficient Solid Waste Services for PUC Residents.

Policy PS-4.1: Efficiently and sustainably manage the region's solid waste system.

Key Outcomes

The PUC DP's policies are designed to support civic and public institutions in the PUC that provide for a high quality of life for residents and meet the needs of the area's many visitors. These goals will be met by providing adequate and responsive levels of service for public safety agencies; navigable and transparent civic services and public information; high quality public recreation facilities, and well-considered city programs and initiatives that engage the community.

Maintaining efficient energy and telecommunications systems is a top priority in a highly populated and economically active region like the PUC. Demand and service allocation/provision must be balanced with impacts on the environment and community, and pursuit of strategies to achieve higher levels of energy resource efficiency, conservation, and renewable production capacity should be bolstered.

Source reduction and efficient and reliable solid waste removal is imperative in reducing adverse effects of waste on the environment and on human health. The City will continue to streamline efforts to manage the amount of material in Honolulu's waste stream through source reduction and recycling.

In the age of climate change, planning for increased hazards requires adaptation, coordinated action from planning and infrastructure agencies, city leaders, and the public. Preparation for natural and human caused disasters is increasingly central to long range planning, including for civic services and utilities, and must be pursued alongside increasing public awareness of hazard mitigation and community preparedness for health and safety.

Setting the Stage

Public facilities in the PUC support basic services and resources for its residents, businesses, and visitors. These include civic facilities, educational institutions, public safety facilities, and vital utilities and infrastructure such as energy, telecommunications, and solid waste management. (Other utilities and infrastructure such as parks, transportation systems, and water resources, can be found respectively in Chapters 5, 6, and 9 of this plan). The majority of these public facilities, institutions, resources, and essential services, are developed and maintained by city and state agencies, while others, such as electricity, require coordination with the private sector to ensure adequate service is provided. Assuring that public facilities and programs align with future commercial and residential development is crucial to maintaining adequate levels of public services.

The PUC's demand for redeveloped and new public facilities and services corresponds with its increased development demand, particularly in developing rail station areas. Maintenance of existing public facilities is central to current resident quality of life, and also a key to the adequate provision of services for future infill growth.

Public facilities are increasingly challenged by the impacts of natural hazards such as sea level rise and other indicators of climate change, while at the same time, City budget constraints necessitate prioritization. Equitable development of public facilities and essential services to best serve the whole community and balance costs, is a key consideration and focus for new facilities and maintenance alike. Improved functional planning by the City's infrastructure agencies will result in increased transparency and efficiency, and should be guided by the vision of the City's long range development plans as an iterative process and incorporated through the City's annual budget process.

Because the PUC is largely "built out", meaning there are not large areas of undeveloped land outside of conservation and preservation areas, development mainly takes place in the form of new infill, redevelopment for modernization, and redevelopment for greater density. These demands must be met in a balanced way with utilities upgrades, conservation measures, and new technologies and services for greater efficiencies and higher environmental standards. Similarly, growth areas necessitate nimble, inclusive, and strategic planning from public safety agencies and public service agencies, and institutions to meet demand, and provide adequate levels of accessible services on multiple platforms.

Goal PS-1: Support Civic and Public Institutions in the PUC

Policy PS-1.1: Provide for adequate civic and public safety facilities and essential services in the PUC.

Providing needed levels of essential City services must be supported by adequate facilities and staffing. Expansion of public services in growing areas as well as the right-sizing of services in areas that are experiencing minimal growth is necessary to meet the needs of PUC residents and steward public resources. Additionally, making available alternatives to traditional in-person interactions and paper forms is necessary to increase the reach and accessibility of these services while enhancing efficiency. Continuing to modernize systems and provide more options for basic customer services should remain a top priority. As population within the PUC continues to shift in the TOD areas and other growth corridors, the location of public facilities and levels of services for public safety will need to be evaluated on an ongoing basis through functional planning.

Priority Actions:

Improve staffing and access for basic services. Provide adequate staffing and improve access to basic government services at the Civic Center Campus, satellite city halls, and other city service providers in the PUC.

Expand Kiosk DMV services in the PUC. Meet the needs of PUC residents using modernized system, especially in under-served core neighborhoods. neighborhoods.

Timeline:





Partners:

- All City agencies

Partners:

- CSD
- Location partners



DMV Kiosk



Satellite City Halls and DMV Services

Satellite city halls within the PUC are located at Ala Moana, Downtown, Kapālama, and Pearlridge, and offer vehicle registration, titling, driver's licenses and State ID services, TheBus pass sales, and other licensing and tax and fee services, depending on location.

Driver Licensing Centers offer additional services: Kapahulu offers reconstructed vehicle inspections; Kapālama offers driver's license testing, license renewals, and all State ID services; Pearl City offers commercial driver licensing and driver's license services.

Self-Service Motor Vehicle Registration Kiosks became available on O'ahu in early 2019, and are available 24 hours a day, 7 days a week.

Priority Actions (continued):

Improve functional planning coordination. Coordinate the expansion of public safety operations such as fire, police, and emergency services with areas of population growth for adequate coverage.

Facility co-location. When appropriate, co-locate civic facilities to maximize resources utilization.

Timeline:





Partners:

- HFD
- HPD
- DCS
- ESD
- DTS
- DFM
- DLM
- DPP
- DDC

Partners:

- All City agencies as feasible

Public Safety Agencies

Public safety facilities in the PUC are overseen by city agencies that specialize in emergency management, fire protection, law enforcement, and emergency medical and rescue services. These departments coordinate with city, state, and federal agencies to plan, support, and execute vital services for the benefit of public health and safety. These services help to maintain a safe and secure environment for residents and visitors.

- **Firefighting services in the PUC are provided by the Honolulu Fire Department (HFD). HFD also provides rescue and emergency medical and hazardous materials response services for the City. The HFD services the City with 44 stations, 10 of which are in the PUC.**

- **Law enforcement services in the PUC are provided by the Honolulu Police Department (HPD). Stations located within the PUC are the HPD Headquarters, district stations located in Kalihi and Pearl City, and police substations located in Waikīkī and Chinatown.**

- **Emergency medical services and a comprehensive ocean safety program in the PUC is provided by the Honolulu Emergency Services Department (HESD). The HESD divides the island into three districts for its emergency medical services provided via 21 ambulance units. Districts 1 and 2 cover areas of the PUC. The HESD Ocean Safety Headquarters are located in the PUC, along with one Ocean Classroom Training Center, one District Operations Base Station, one Reserve Craft Operations Base, and Lifeguard Towers located at Both Ala Moana Beach Park and Waikīkī Beach.**



Honolulu Fire Department Headquarters.

Goal PS-1: Support Civic and Public Institutions in the PUC

Policy PS-1.2: Assist the State in providing a high-quality environment for public schools and educational institutions in the PUC.

The PUC encompasses three out of the four Hawai'i State Department of Education (State DOE) school districts on O'ahu, with nearly 80 public schools and 40 independent schools. Creating a safe and supportive environment for students is an important consideration for streets surrounding school facilities. The City can play a role by enhancing street design and safety and introducing traffic calming elements near schools and campuses. Supporting the State's efforts in the development, maintenance, and reinvestment of high quality schools and educational institutions is an important quality of life issue, and contributes to the ability of the region to attract families that want to live and work in the PUC. In addition, the City should continue to work with the DOE on shared use recreation facilities under joint use agreements, when feasible and beneficial.

Priority Actions:

Expand the Complete Streets network. Support implementation of Complete Streets and Safe Routes to Schools, in order to complete the pedestrian network and other public safety enhancements and mobility improvements near schools.

Timeline:



Partners:

- DTS
- DDC
- DPP
- DOE
- Community partners

Look for opportunities to maximize the use of school recreational facilities. Support joint-use agreements for recreation facilities especially, on City-owned properties.

Timeline:



Partners:

- DPR
- State DOE



Pedestrian safety improvements near a school in the Punchbowl neighborhood (Source: DTS).

Goal PS-2: Plan for Emergency Management and Hazard Mitigation in the PUC

Policy PS-2.1: Increase resilience to disruptive hazard events through coordinated effort.

Identification and holistic assessment of the PUC's hazard-vulnerable infrastructure will allow for better long-range planning and allocation of resources. Regular holistic assessments will also allow for coordinated planning efforts across city and state agencies to effectively manage and adapt infrastructure that is essential for the PUC's daily functioning. Focusing on strong disaster preparedness at the community scale to protect lives and property, and improving the resilience of infrastructure, can help to reduce impacts and aid recovery from a disruptive hazard event.

Priority Actions:

Improve pre-disaster planning and resilience. Improve holistic and watershed-based resilience planning for hazard-vulnerable coastal areas in the PUC, including Waikīkī and the PUC's South Shore. Coordinate across city and state agencies to effectively assess and respond to hazards vulnerabilities.

Integrated infrastructure planning. Create integrated plans for adapting infrastructure to the increased prevalence of extreme weather events. Plan capital improvements that protect critical facilities, infrastructure, utilities, and vital supply chain assets from the effects of climate change and extreme weather hazards. Look to the long-term when establishing guidelines for rebuilding damaged property and for identifying areas of future growth and change. Avoid and address areas that are, or are projected to be, experiencing the greatest impacts.

Implement a Climate Adaptation Strategy. Incorporate priority actions from the City's Climate Adaptation Strategy (CAS) into future updates to the City's Pre-Disaster Multi-Hazard Mitigation Plan for ongoing hazard mitigation planning that identifies and addresses top climate change hazards and their impacts.

Timeline:



Partners:

- DEM
- OCCSR
- BWS
- ENV
- DPP
- DTS
- All City agencies
- State partners



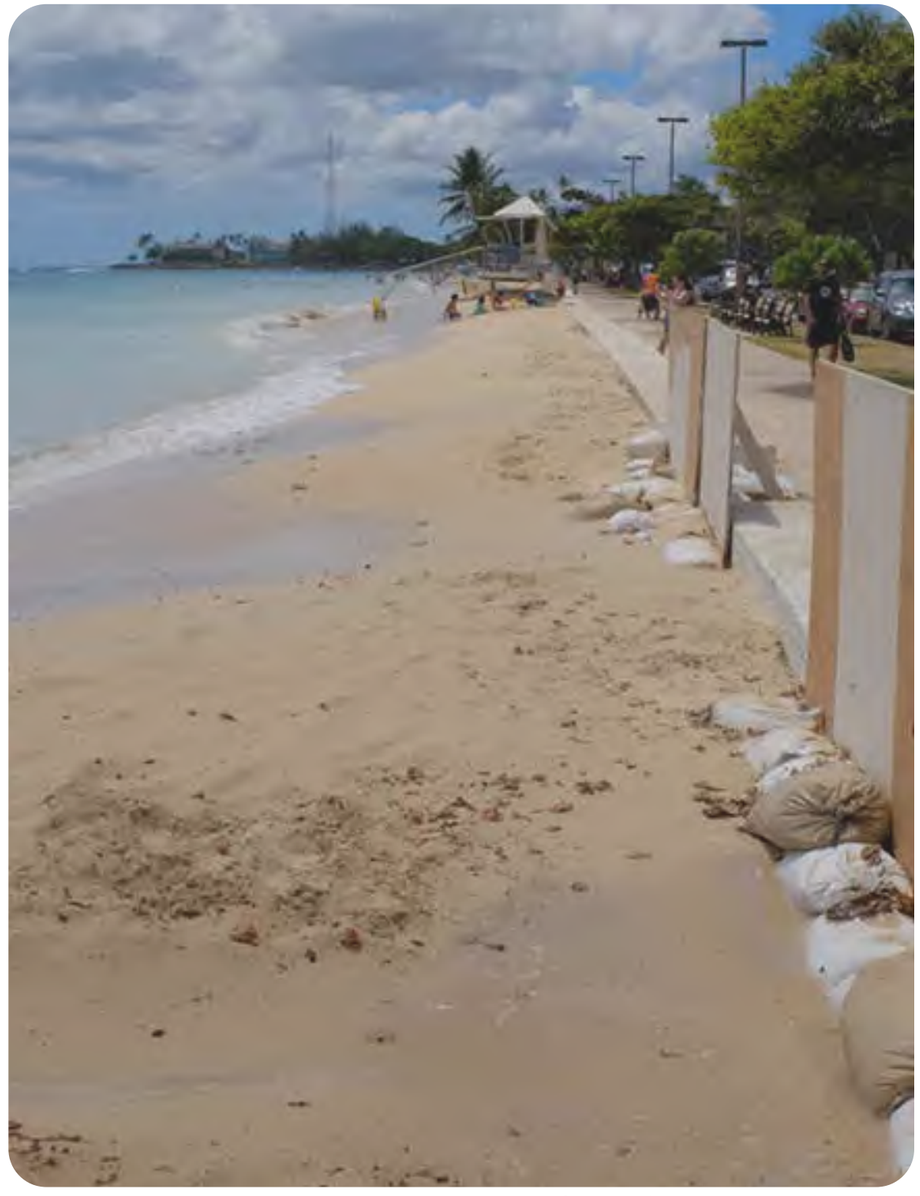
Partners:

- DEM
- OCCSR
- DPP
- All infrastructure agencies
- State partners



Partners:

- OCCSR
- DEM
- All agencies



Temporary erosion protection at Ala Moana Beach Park.

Goal PS-2: Plan for Emergency Management and Hazard Mitigation in the PUC

Policy PS-2.2: Strengthen community disaster preparedness.

Encouraging and supporting communities to build capacity for self-reliance in times of disaster is vital to recovery efforts for the PUC and beyond. As an island community that may be subject to disrupted supply chains or impassable roads in the event of an emergency, it is especially important to emphasize preparedness at the local level. Fostering communities that have the ability to build networks that can both prepare for and organize in the aftermath of disruptive hazards is critical for relief and recovery. Community resilience and preparedness in the PUC can be supported through initiatives that share information about natural hazards and critical resources at the neighborhood level.

Priority Actions:

Resilience Hubs. Support establishment of Resilience Hubs defined by and for individual communities that can support local resident needs and coordinate resource distribution and services during disaster response and recovery. Resilience Hubs can also provide other services and community benefits year-round. Some hubs provides basic food and emergency medical supplies, while others serve as a physical gathering place and centralized location for coordinating aid and distributing essential goods and critical services to a larger area.

Improve emergency management infrastructure. Improve warning systems, physical shelters, and regularly adopt progressive building codes to adequately prepare new infrastructure for natural disasters.

Timeline:



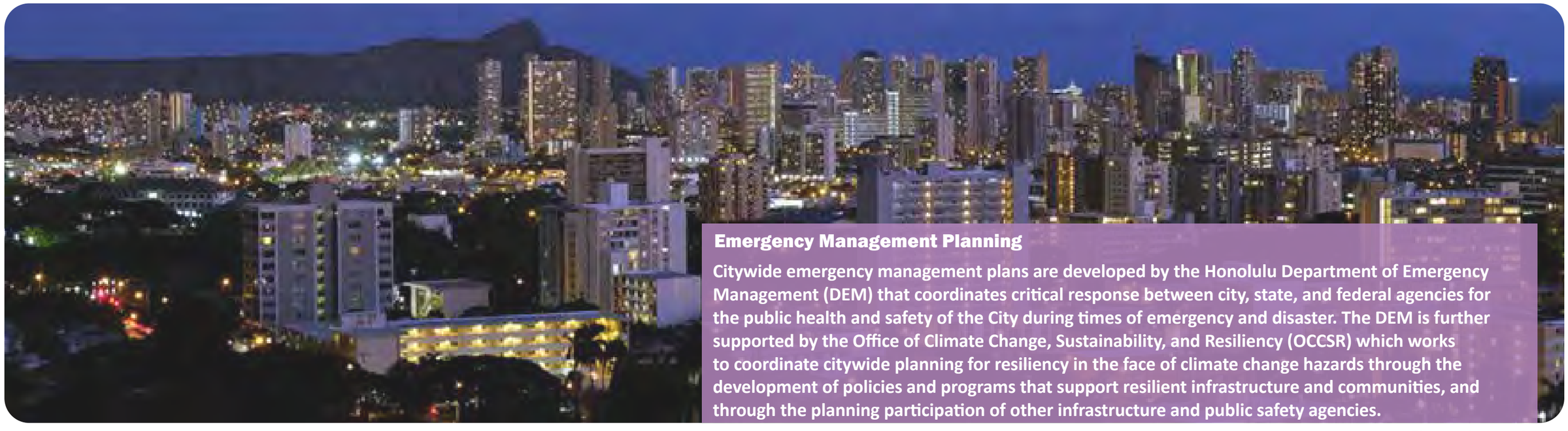
Partners:

- OCCSR
- DEM
- EMS
- HFD
- HESD
- Community partners



Partners:

- DEM
- OCCSR
- DDC
- DPP
- State agencies



Emergency Management Planning

Citywide emergency management plans are developed by the Honolulu Department of Emergency Management (DEM) that coordinates critical response between city, state, and federal agencies for the public health and safety of the City during times of emergency and disaster. The DEM is further supported by the Office of Climate Change, Sustainability, and Resiliency (OCCSR) which works to coordinate citywide planning for resiliency in the face of climate change hazards through the development of policies and programs that support resilient infrastructure and communities, and through the planning participation of other infrastructure and public safety agencies.

City skyline at night.

Goal PS-3: Maintain Efficient Energy and Telecommunications Systems in the PUC

Policy PS-3.1: Site energy and telecommunications facilities and equipment appropriately to avoid hazards and adverse visual impacts.

To preserve public views and neighborhood character, telecommunication upgrades and new facilities are encouraged to minimize the impacts of visually intrusive components and equipment. In addition, private energy providers of all types are encouraged to work closely with communities in the siting of new facilities and equipment to mitigate any adverse impacts.

Priority Actions:

Facilities siting. Encourage improved community vetting of commercial energy facilities and avoid or mitigate adverse impacts to scenic or natural resources. Provide guidance so that private energy providers can improve community vetting of new facilities and equipment installations, and adhere to environmental protections.

Timeline: ONGOING

Partners:
- DPP
- State agencies
- Private utilities

Minimize visual impacts. Avoid harsh visual impacts from new and modified infrastructure facilities. Use screening, landscaping, setbacks, architectural modifications, or similar design treatments to minimize visual impacts of towers, panels, and other infrastructure, and to "blend in" with surroundings. Options to place transmission lines underground should be considered.

Timeline: ONGOING

Partners:
- DPP
- Private utilities
- Individual facilities

Support facilities master planning. Coordinate on the orderly roll out of energy and telecommunications services to new development project areas. Coordinate on the planning of conservation efforts and clean energy facilities to meet state and city environmental and greenhouse gas emissions reduction goals.

Timeline: MEDIUM

Partners:
- OCCSR
- DPP
- State agencies
- Private utilities

Resolve 5G requirements. Actively support an orderly roll out of 5G telecommunications facilities, and in compliance with FAA requirements. Support equitable access to broadband for all residents.

Timeline: SHORT

Partners:
- DPP
- State agencies
- Private utilities



Flat rooftop solar array (Source: Hawai'i State Energy Office).

Goal PS-3: Maintain Efficient Energy and Telecommunications Systems in the PUC

Policy PS-3.2: Increase renewable energy production & infrastructure at the building and community scale, and reduce energy demand by increasing energy efficiency.

Honolulu's first *Climate Action Plan* or "CAP" (2020-2025) includes strategies to increase energy efficiency, maximize renewable energy throughout City operations and assets, expand renewable energy planning and expedite permitting.

Like the concept of "source reduction" for solid waste, energy efficiency measures allow for a smaller ecological footprint for buildings by reducing the amount of energy needed in the first place. Therefore, efficiency is an important piece of moving towards closing the gap between demand and overall loads that renewable energy will need to serve. City actions can help to improve energy efficiency through timely building code updates, and other standards and guidelines.

Renewable energy generation in urban Honolulu is mainly in the form of rooftop solar. Community-scale solar projects require more land, but generate mid-range energy production compared to the two traditional energy-scales of massive utility-scale and individual-scale roof-top solar programs and can often be purchased as credits by off-site users. The City can help facilitate the transition to more solar generation- especially needed in larger numbers for multi-family housing- through permits, programs, and standards. The City can also proactively engage with the State and other partners on planning for additional utility-scale renewable energy projects of all types, as called for in the CAP.



Surface parking lot with a fast charger.



Parking facility with electric vehicle charging stations.

Priority Actions:

Regularly modernize building codes. Support timely and regular building code updates to improve energy efficiency requirements and reduce greenhouse gas emissions in the building sector.

Timeline: ONGOING

Partners:
- DPP
- OCCSR

Enable more rooftop solar. Incentivize and/or streamline permitting for rooftop solar installations, especially for multi-family housing and commercial installations.

Timeline: ONGOING

Partners:
- DPP
- OCCSR

Employ conservation as a first strategy towards efficiency. Encourage efficient appliance and lighting upgrades, and other renewable and energy efficiency projects for both owner-occupied and rental properties.

Timeline: ONGOING

Partners:
- OCCSR
- DPP
- BWS

Goal PS-4: Provide Increasingly Efficient Solid Waste Services for PUC Residents.

Policy PS-4.1: Efficiently and sustainably manage the region's solid waste system.

Honolulu's *Climate Action Plan* also addresses waste reduction, resource recapture, and other efficiencies for the solid waste sector. Key actions that are especially applicable to development policies and regulations for the PUC include expanding the location of public drinking fountains and retrofitting existing ones to refill cups, flasks, and containers; continuing the reduction of single-use plastics in commercial use, and better managing bulk waste to avoid trash pileups in neighborhoods. In general, the City encourages reducing the waste stream whenever possible through recycling and reuse, and the use of alternate, cleaner, waste disposal technologies to reduce depencies on landfills. Promoting public recycling by expanding neighborhood convenience centers is also a goal.

Priority Actions:

Reduce sidewalk dumping. Require multi-family apartment developments over a certain size to provide larger bulk storage areas on site. Dumping of bulky and non-bulky residential waste on sidewalks is regrettably a common sight in front of multi-family structures that lack adequate disposal storage. City development standards should revisit the optimal space requirements for such areas.

Timeline:



Partners:
- DPP
- ENV
- OCCSR

Account for volume. Revamp waste pickup/disposal to account for volume pricing. The City should continue to evaluate a waste retrieval program that includes volume pricing to encourage recycling and less waste production.



Partners:
- ENV
- BFS
- OCCSR

Develop end-of-life requirements for solar PV. Solar photovoltaics are currently a key piece of the clean energy puzzle, however, clean generation does not translate into an entirely "green" footprint for the product's lifecycle. PVs, like other sorts of batteries, should not be landfilled in large numbers. Widespread adoption of the technology must consider the end of life disposal requirements and look to efficiencies and recycling strategies.



Partners:
- ENV
- OCCSR
- State agencies



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Appendix I:
All Policies Summary

Growth + Development

GOAL GD-1:
Direct Higher Density Growth to Mixed-Use Transit Oriented Development (TOD) Areas.

Policy GD-1.1: Focus higher intensity mixed-use development and supporting public infrastructure around rail stations.

Policy GD-1.2: Create mixed-use TOD neighborhoods with meaningful character and a sense of place.

Policy GD-1.3: Facilitate the evolution of shopping malls and big box retail near rail stations from isolated single-use centers into true gathering places.

Policy GD-1.4: Refine the discretionary TOD permitting process to balance higher-density entitlements with commensurate community benefits.

GOAL GD-2:
Invest in Bus Transit-Supportive Corridors and Adjacent Mixed-Density Neighborhoods.

Policy GD-2.1: Support mixed-use infill redevelopment and increased bus service along key underutilized commercial corridors.

Policy GD-2.2: Promote moderate-scaled residential infill while preserving affordability in mixed-density neighborhoods.

Policy GD-2.3: Invest in long-term growth in commercial corridors and mixed-density neighborhoods outside of the Sea Level Rise Exposure Area (SLR-XA).

Policy GD-2.4: Provide green space and landscaping improvements in mixed-density in-town neighborhoods, especially those lacking parks.

GOAL GD-3:
Plan for Context-Appropriate Infill and Redevelopment in Lower-Density Places.

Policy GD-3.1: Allow gradual addition of house-form multi-unit dwellings and small apartment buildings near lower-intensity commercial corridors.

Policy GD-3.2: Continue to improve multimodal access and connectivity in lower-density neighborhoods.

Policy GD-3.3: Maintain the lower intensity character of valley/ridge and near-town neighborhoods.

Policy GD-3.4: Improve infrastructure capacity planning for areas of low to moderate growth to meet demand for ADUs and modest infill development.

GOAL GD-4:
Avoid Development in Sensitive or Protected Areas and on Steep Slopes.

Policy GD-4.1: Continue to discourage new development beyond the Urban Growth Boundary and on very steep slopes.

Policy GD-4.2: Decrease building and structure encroachments on streams and wetlands (except for those essential to flooding control).

GOAL GD-5:
Manage Growth and Public Investment for the Benefit of all PUC Residents.

Policy GD-5.1: Make equitable public investment a priority in all functional planning through ongoing evaluation of corridors and neighborhoods with deficiencies in basic services and amenities.

Policy GD-5.2: Manage the broader, indirect impacts of high-density development and growth on adjacent communities through focused effort and sustained attention.

Policy GD-5.3: Support and maximize high-quality affordable housing on public lands.

Policy GD-5.4: Align infrastructure expansions with growth areas.

Placemaking + Character

GOAL PL-1:
Enhance the PUC's Unique Places.

Policy PL-1.1: Encourage development projects and a public realm that reflects Hawai'i's culture and arts.	**Policy PL-1.2:** Improve the sense of entry at key gateways in the PUC by aligning public improvements and private development.	**Policy PL-1.3**: Protect and care for historical structures in the PUC.	**Policy PL-1.4**: Preserve cultural and archaeologically significant resources in the PUC.	**Policy PL-1.5**: Continue to preserve significant panoramic public views of natural landmarks through Special District provisions.	**Policy PL-1.6**: Enhance key mauka-makai view corridors.

GOAL PL-2:
Promote Excellent Building and Site Design that Responds to Honolulu's Climate and Environment.

Policy PL-2.1: Encourage sustainable building and site design practices that respond to the tropical climate.	**Policy PL-2.2:** Integrate greenery and green infrastructure into new developments, especially large sites.	**Policy PL-2.3:** Actively pursue Honolulu's tree canopy goals, especially in interior neighborhoods lacking trees.

GOAL PL-3:
Support Vibrant Commercial/Mixed Use Corridors and Neighborhood Centers in the PUC.

Policy PL-3.1: Activate "main street" corridors with pedestrian amenities, frequent gathering places, and expressions of community identity.	**Policy PL-3.2:** Support an attractive and pedestrian-friendly public realm along well-used PUC corridors.	**Policy PL-3.3:** Ensure pedestrian-oriented design in all corridors and centers, especially in Town Corridor, Urban Corridor, Downtown, and Resort areas.	**Policy PL-3.4:** Improve multimodal connections and pedestrian pathways within and between the PUC's mixed-use corridors, town neighborhoods, parks, and public institutions.	**Policy PL-3.5:** Conduct focused corridor and area planning to guide improvements.

Housing

GOAL H-1:
Encourage Development of a Wide Range of Housing Types in Proximity to Transit.

Policy H-1.1: Enable or incentivize residential infill development in transit-accessible planned growth areas.	**Policy H-1.2:** Refine the desired residential land use mix in TOD and key focus areas.	**Policy H-1.3:** Encourage a greater variety of housing types, including low or middle-density multi-family housing, ADUs and ‘ohana units, mid-rise apartment buildings, and shared housing models.

GOAL H-2:
Expand the Availability of Quality Affordable Housing for PUC Residents.

Policy H-2.1: Expand the supply of income-restricted affordable housing through requirements, incentives, and public-private partnerships.	**Policy H-2.2:** Produce new income-restricted units through public sector development and non-profit partnerships.	**Policy H-2.3:** Preserve affordable housing options and improve conditions by encouraging reinvestment and redevelopment of aging multi-family housing and investing in public infrastructure.	**Policy H-2.4:** Expand homeless services and supportive housing in the PUC.

Parks & Public Open Spaces

GOAL PPOS-1:
Provide Adequate Parks Coverage to meet Resident Needs.

Policy PPOS-1.1: Pursue a long-term vision and strategy for the PUC parks and open space network.	**Policy PPPOS-1.2:** Implement a "10-minute walk" standard for park accessibility in the PUC.	**Policy PPOS-1.3:** Seek opportunities to create new parks in high-density and growing areas of the PUC.	**Policy PPOS-1.4:** Find creative opportunities in the urban context for a greater variety of park and open space types.	**Policy PPOS-1.5:** Improve the ecological function of parks.

GOAL PPOS-2:
Increase Connectivity and Access to and between Parks, Beaches, and Trails.

Policy PPOS-2.1: Create safe park-to-park connections through continuous and dedicated pedestrian/bicycle ways.	**Policy PPOS-2.2:** Use Green Streets to connect major recreation and public areas, provide missing green space, and beautify viewshed corridors.	**Policy PPOS-2.3:** Better connect residents to the beaches and trails in the PUC, such as through an enhanced beach access program.

GOAL PPOS-3:
Provide High-Quality Parks for all PUC Residents.

Policy PPOS-3.1: Invest in park facilities, equipment, and programs that serve all ages.	**Policy PPOS-3.2:** Support park revitalization with additional funding for maintenance, partnerships, and staff.	**Policy PPOS-3.3:** Promote parks that are safe for the community through environmental design strategies and after-hours activity.	**Policy PPOS-3.4:** Expand existing programs that advance shared use and park stewardship efforts.	**Policy PPOS-3.5:** Ensure long-term maintenance/preservation of open spaces in subdivisions, cluster housing, and master planned developments.

Mobility

GOAL MC-1:
Provide Safe, Accessible, & Affordable Multimodal Transportation Options.

Policy MC-1.1: Implement Complete Streets and Vision Zero strategies to enhance the safety and utility of the transportation system for all users.	**Policy MC-1.2:** Continually improve the efficiency and connectivity of public transit in PUC neighborhoods through improved travel times and frequency.	**Policy MC-1.3:** Continue to expand safe facilities and increase comfort in the bicycle network.	**Policy MC-1.4:** Improve pedestrian connectivity and safety throughout the PUC.

GOAL MC-2:
Create an Adaptable and Flexible Transportation System.

Policy MC-2.1: Reduce dependency on single-occupancy vehicles and reduce vehicle miles traveled (VMT).	**Policy MC-2.2:** Safely integrate emerging technologies into the transportation system.	**Policy MC-2.3:** Improve the efficiency and operations of existing transportation facilities.	**Policy MC-2.4:** Adapt the roadway network to address challenges from chronic flooding and sea level rise.	**Policy MC-2.5:** Maximize interagency and regional transportation coordination.

Healthy Communities

GOAL HC-1:
Foster a healthy built environment in the PUC.

Policy HC-1.1: Encourage exemplary healthy ("green") building standards.	**Policy HC-1.2:** Promote strategies to increase energy efficiency and clean energy in buildings.	**Policy HC-1.3:** Avoid/mitigate the Urban Heat Island Effect and reduce heat stress.	**Policy HC-1.4:** Expand access to healthy foods from local growers and expand the community gardens program.

GOAL HC-2:
Shape an Age-Friendly community that responds to the needs of all PUC residents.

Policy HC-2.1: Encourage housing designed with kūpuna in mind, and in a variety of household sizes.	**Policy HC-2.2:** Design parks and open space to provide increased physical activity for all ages.	**Policy HC-2.3:** Enhance safety, accessibility, and navigability in public gathering places and transportation networks.

GOAL HC-3:
Support initiatives that improve community engagement, health, and equity.

Policy HC-3.1: Improve civic engagement in the planning process through increased community-focused initiatives.	**Policy HC-3.2:** Collaborate across City and State agencies, and partner organizations, to center equity in public infrastructure, programs, and services.	**Policy HC-3.3:** Increase community resilience and disaster preparedness.

Sea Level Rise + Coastal Hazards

GOAL SLR-1:
Adapt Regulatory Standards to Improve Resilience to Climate Change and Coastal Hazards.

Policy SLR 1.1: Utilize the SLR-XA as a tool for current zoning and permitting decisions and for siting critical infrastructure.	**Policy SLR 1.2:** Advance evidence-based sea level rise and resilience requirements and time-based monitoring.	**Policy SLR 1.3:** Encourage voluntary adaptation measures in the SLR-XA that exceed statutory requirements.	**Policy SLR 1.4:** Consider the SLR-XA compound hazards individually and together to determine appropriate adaptation measures.	**Policy SLR 1.5:** Update shoreline regulations and development policies to reflect coastal hazard impacts and best available guidance on an ongoing basis.

GOAL SLR-2:
Conduct Long-Range Planning to Increase Area-Wide Adaptation and Resilience.

Policy SLR 2.1: Plan for priority growth outside of higher impact areas, and vet proposed solutions for higher impact areas with the community.	**Policy SLR 2.2:** Address potential impacts to surrounding sites for project-level adaptation measures.	**Policy SLR 2.3:** Prioritize and fund community-level Area Adaptation Plans.	**Policy SLR 2.4:** Incorporate sea level rise / coastal hazard considerations in the planning, design, and maintenance of facilities and infrastructure.

GOAL SLR-3:
Coordinate Infrastructure Planning for Sea Level Rise Across Agencies.

Policy SLR 3.1: Support collaborative resilience planning for new and existing infrastructure.	**Policy SLR 3.2:** Pursue a district-scale fee structure or other dedicated funding mechanisms for adaptation projects.	**Policy SLR 3.3:** Monitor ongoing impacts within the SLR-XA across infrastructure agencies to update development regulations that implement adaptation.	**Policy SLR 3.4:** Support State agencies in applying appropriate interventions and environmental measures for adapting/ preserving beaches and shoreline impacted by sea level rise and erosion.

Water Resources

GOAL WR-1:
Take a Comprehensive and Collaborative Approach to Water Management in the PUC.

Policy WR-1.1: Collaborate across water quality and water infrastructure management departments and agencies.	**Policy WR-1.2:** Work with State water and environmental agencies to protect and manage upper watersheds.	**Policy WR-1.3:** Address chronic storm flooding and ongoing drought issues through multiple solutions.

GOAL WR-2:
Protect Ground and Surface Water Quality from Polluting Land Uses.

Policy WR-2.1: Protect drinking water aquifers, and surface and nearshore waters from contamination by developed land uses, urban runoff, underground fuel storage, and illegal dumping.	**Policy WR-2.2:** Enhance the ecological function of streams.	**Policy WR-.2.3:** Effectively manage stormwater flows with appropriate on-site and area-wide system best practices.

GOAL WR-3:
Maintain Resilient Water Infrastructure Systems.

Policy WR-3.1: Reduce vulnerability of the water infrastructure system to the effects of climate change.	**Policy WR-3.2:** Help mitigate drought and support water conservation projects and programs to manage demand.	**Policy WR-3.3:** Improve coordination of wastewater infrastructure and land use planning.

Economic Development

GOAL ED-1:
Support Employment and Business Growth in the PUC's Transit-Rich, Mixed-Use, and Industrial Areas.

Policy ED-1.1: Accommodate and encourage commercial job growth in dense, transit-rich locations.	**Policy ED-1.2:** Enhance the ability of new and small businesses to thrive and grow in the PUC.	**Policy ED-1.3:** Maintain industrial use as the primary land use in key PUC locations with easy access to the port and airport.	**Policy ED-1.4:** Support varied business uses in light-industrial and mixed-use areas.

GOAL ED -2:
Create a Balanced and Diversified PUC Economy.

Policy ED-2.1: Support growth in key industries such as information and technology, green industries, education and training, creative media, made in Hawai'i products, and other sectors identified by City or State Economic Development initiatives.	**Policy ED-2.2:** Grow resident workforce skills by supporting State investments in K-12 and higher education facilities and jobs training.	**Policy ED-2.3:** Continue to invest in the success of Waikīkī as the State's primary visitor destination/resort area and a livable urban neighborhood.	**Policy ED-2.4:** Maintain a productive relationship with the military to broaden its contributions to the PUC.

GOAL ED-3:
Ensure City Services & Infrastructure Support Broad Economic Prosperity.

Policy ED-3.1: Support small property owners and their redevelopment, infrastructure, and funding needs through process streamlining and enhancements.	**Policy ED-3.2:** Ensure major public infrastructure needs are funded equitably, including with contributions from new developments.

Public Services

GOAL PS-1:
Support Civic and Public Institutions in the PUC.

Policy PS-1.1: Provide for adequate civic and public safety facilities and essential services in the PUC.

Policy PS-1.2: Assist the State in providing a high-quality environment for public schools and educational institutions in the PUC.

GOAL PS-2:
Plan for Emergency Management and Hazard Mitigation in the PUC.

Policy PS-2.1: Increase resilience to disruptive hazard events through coordinated effort.

Policy PS-2.2: Strengthen community disaster preparedness.

GOAL PS-3:
Maintain Efficient Energy and Telecommunications Systems in the PUC.

Policy PS-3.1: Site energy and telecommunications systems appropriately to avoid hazards and adverse visual impacts.

Policy PS-3.2: Increase production of renewable energy at the building and community scale.

GOAL PS-4:
Provide Efficient Solid Waste Services for PUC Residents.

Policy PS-4.1: Efficiently and sustainably manage the region's solid waste system.