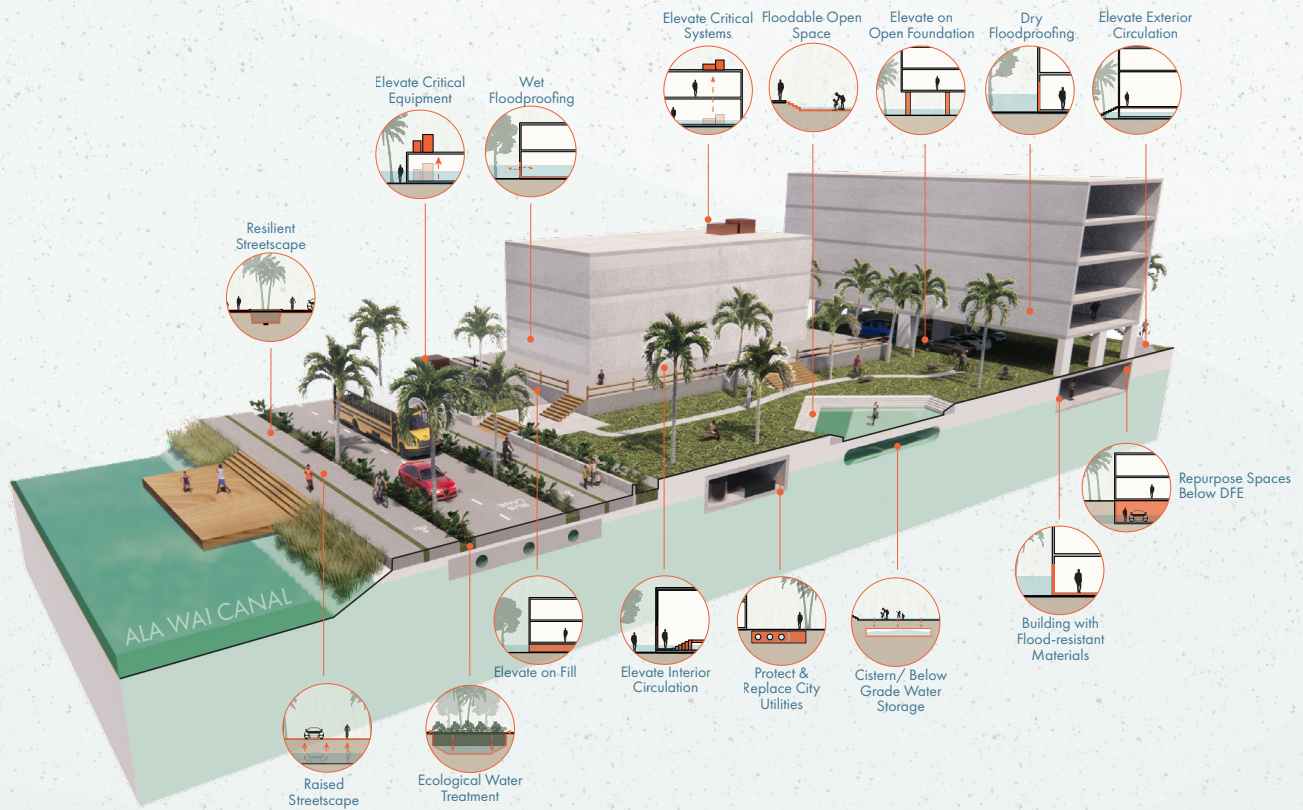


Envisioning In Situ Sea Level Rise Adaptation Strategies for a Densely Developed Coastal Community, **Waikiki**



Project Summary

Waikiki serves as a tourist destination in Honolulu and is the economic hub of the tourism industry in Hawai'i. However, due to its proximity to the ocean, Waikiki is vulnerable to flooding from rising sea levels, high tide flooding, high wave events, and precipitation. These hazards will require adaptation strategies to protect the Waikiki community. Over the past two years, an interdisciplinary project at the University of Hawaii has been exploring in-place adaptation strategies to address sea-level rise in Waikiki. The goal of this effort is to help visualize place-based flood adaptation strategies and encourage the development of new design guidance, flood mitigation policy, and pilot projects.

Faculty and students researchers from the University of Hawaii (UH) School of Architecture and UH Sea Grant College Program have reviewed emerging flood resilience guides and case studies to inform the project's methodology. Site selection criteria identified high-rise and low-rise residential, commercial, retail, and hospitality buildings at risk of flooding soonest from sea level rise using the latest sea-level rise science from the UH School of Ocean and Earth Science Technology (SOEST). The best available data was used to create Honolulu-specific sea level rise-informed design flood elevations (DFE) for building adaptation. Of these areas, several sites representing diverse building typologies were selected to be reimagined for sea level rise scenarios in 2050 and 2100. A series of workshops were held in the Summer of 2020 to solicit feedback from a wide range of local stakeholders with the goal of identifying flood adaptation strategies relevant to Waikiki. The strategies deemed by stakeholders to be locally-relevant were applied by student fellows to architectural renderings. The resulting visualizations re-envision two sites in Waikiki.



Site 1:



Figure 1: Site 1 retrofit for 2050 including building, transportation and open-space adaptation strategies with approximately 2'8" SLR.

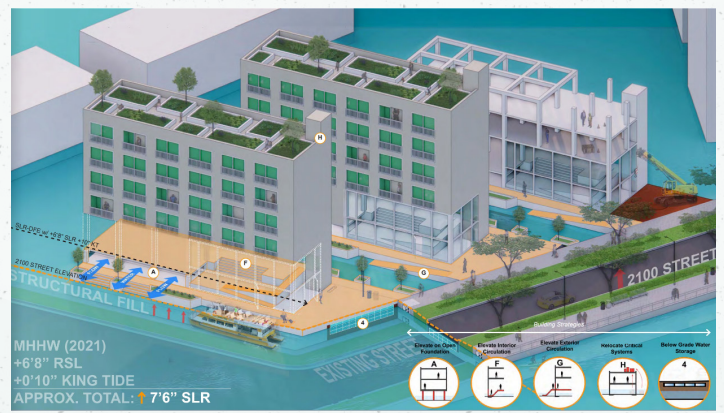


Figure 2: Site 1 retrofit for 2100 including building, transportation and open-space adaptation strategies with approximately 7'6" SLR.

Location: 1627 Ala Wai Blvd

Selection Criteria: Aging Mid-Century Construction (1950), Inhabited Residential Units at Ground Level, Low-rise Walk-up

Adaptation Strategies Applied for 2050: Option 1- Elevate on Fill, Elevate Exterior Circulation, Relocate Critical Systems, Below Grade Water Storage, Option 2- Repurpose At-Grade Spaces, Relocate Ground Floor Use, Elevate Exterior Circulation, Relocate Critical Systems, Wet Floodproofing, Rainwater Collection

Adaptation Strategies Applied for 2100: New Construction- Elevate on Open Foundation, Elevate Exterior Circulation, Relocate Critical Systems, Below Grade Water Storage

Site 2:



Figure 3: Site 2 retrofit for 2050 including building, transportation and open-space adaptation strategies with approximately 2'8" SLR.

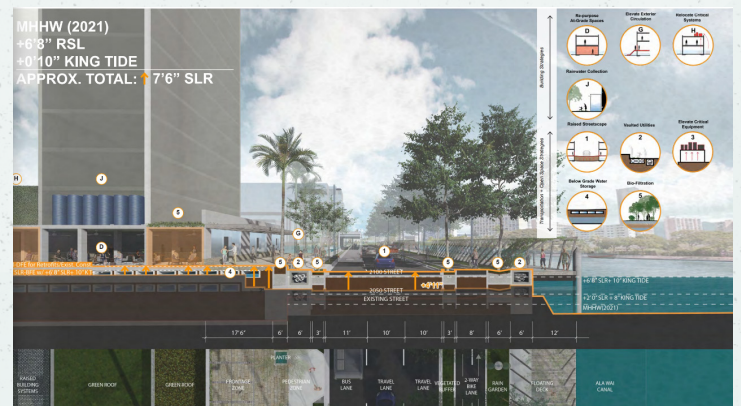


Figure 4: Site 2 retrofit for 2100 including building, transportation and open-space adaptation strategies with approximately 7'6" SLR.

Location: 2085 Ala Wai Blvd

Selection Criteria: Below-Grade parking lot, High-rise residential building

Adaptation Strategies Applied for 2050: Repurposing Below-Grade Spaces, Exterior Circulation, Relocate Critical Systems, Rainwater Collection, Raised Streetscapes, Vaulted Utilities, Elevate Critical Equipment, Below-Grade Water Storage, Biofiltration

Adaptation Strategies Applied for 2100: Repurpose At-Grade Spaces, Elevate Exterior Circulation, Relocate Critical Systems, Rainwater Collection, Raised Streetscapes, Vaulted Utilities, Elevate Critical Equipment, Below-Grade Water Storage, Biofiltration

Next Steps:

The project team, including three new graduate assistants: an architect, a landscape architect, and a coastal processes student, are currently assessing adaptation options for a beachfront condominium located at 2161 Kālia Rd. With updated DFE and sea level rise projections, the project will create flood adaptation renderings focusing on streetscape, open space, and shoreline adaptations and continue to explore in-place adaptation strategies for the Waikiki community.