Vegetated Dune and Buried Revetment: Maui, HI

Region: Hawaii and Pacific Islands
Coastal Risks Addressed: Erosion, wave runup, flooding

The Wailuku-Kahului Wastewater Reclamation Facility on the island of Maui is critical infrastructure for the local public. Certain parts of the facility were in danger of failing or being seriously compromised within a 1- to 10-year timeframe because of chronic shoreline erosion. Failure of the injection wells and a chlorine tank would have resulted in a substantial environmental disaster for the County of Maui and a major impact on their wastewater services.

The county opted for a nature-based solution to provide risk-reduction benefits for the facility (Boudreau et al. 2018). The preferred design at this site included a buried revetment, some beach nourishment, dune restoration, and vegetative plantings. The revetment will protect the reclamation facilities against shoreline retreat. Simultaneously, the dune and vegetation reduce the frequency and magnitude of wave-induced flooding (from wave runup) while also providing sandy beach habitat. This nature-based solution provides shoreline protection for critical public infrastructure and incorporates multiple adaptation strategies to provide resilience from future sea level rise. For example, the county opted to give up land by placing the buried revetment well landward, thereby increasing the amount of time until future shoreline retreat would intercept the protective feature. In addition, the beach nourishment project advanced the shoreline seaward, further increasing its resilience to erosion, flooding from wave runup, and sea level rise impacts.

Three years of monitoring data illustrate that the nature-based solution performed well and accomplished its goals of stabilizing the shoreline position. Seasonal shoreline fluctuations remained stable and were consistent with pre-project values. The shoreline position has advanced seaward in portions of the project area with accretion occurring over some of the beach nourishment profiles. This accretion has led to a temporary reduction in the annual erosion rate.

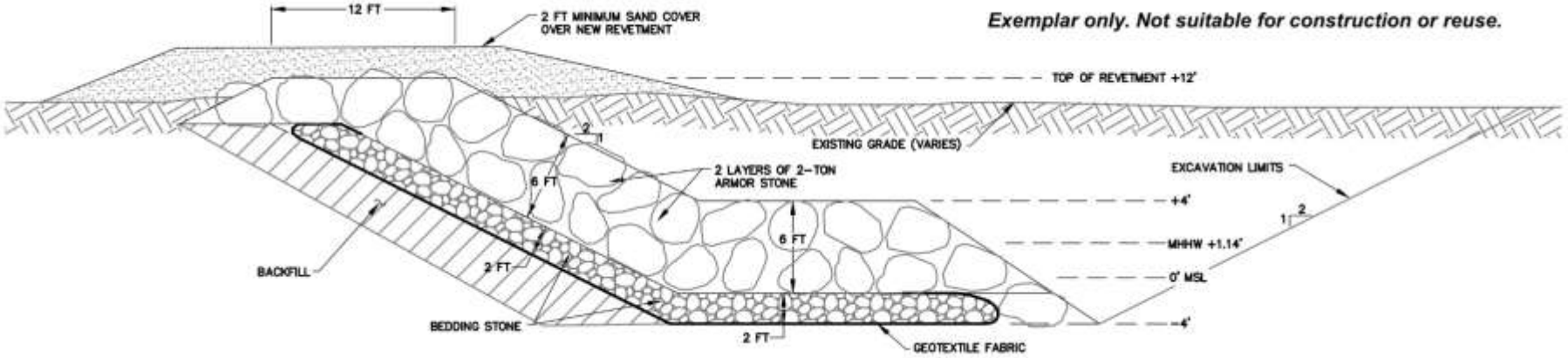

Figure 5-28. Sample cross-section of buried revetment and dune restoration (Boudreau et al. 2018).