

CASE STUDY

YERBA BUENA ISLAND SLOPE STABILIZATION

Slope Stabilization
San Francisco, CA

PROJECT SUMMARY

Yerba Buena (YBI) is a natural island located in the San Francisco Bay. It's adjoining island, Treasure, is a man-made island that was built in the 1930s. The City of San Francisco and private developers have been planning a \$1.5 billion redevelopment of the two islands, which spans 405 acres. The project embraces the quintessential California lifestyle, incorporating homes, public transportation, parks and open spaces, public art, hotels and restaurants.

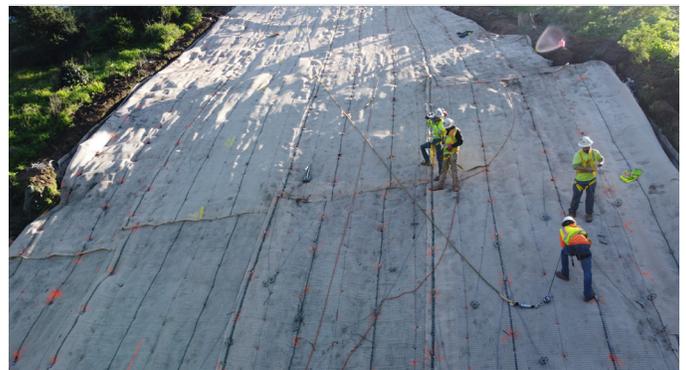
The first phase of the project included construction of residential condominium, located on the northeast-central side of YBI between I-80 and Macalla Road. Construction of the multimillion-dollar complex required infrastructure improvements and upgrades to Macalla Road.

During a heavy precipitation event in Fall 2021, stormwater runoff built up within the gravel encasement surrounding the stormwater piping beneath Macalla Road. The buildup of stormwater resulted in an increase in pore pressure below the subsurface, resulting in slope failure on the north side of the road. The heavily eroded slope was 67°, 120 feet long, and consisted of silty sandy soil. Adding complexity to the project, a sanitary sewer line and primary natural gas line were located within the slope face.



PROBLEM

A slope failure adjacent to a new condo was threatening an adjacent road and nearby utilities.



SOLUTION

ARMORMAX was selected to provide surficial slope stabilization, provide vegetated reinforcement and improve the factor of safety.



ARMORMAX[®]

Engineered Earth Armoring System

PropexGlobal.com/Armormax

FEATURES & BENEFITS

- Provides permanent erosion protection for up to 75 years
- Withstands hydraulic and non-hydraulic stresses
- Ease of installation reduces time and labor costs
- Reinforces vegetation
- Promotes infiltration of surface water
- Outlasts other slope reinforcement methods yielding significant cost savings
- Highly UV stabilized for applications with little or no vegetation
- Lightweight and easily transported into areas with access challenges

ENGEО, a geotechnical engineering firm, contacted Propex to help engineer a solution providing slope stability and erosion protection of the slope while also protecting the underground utilities. Incorporating the design factor of safety (FoS) for static and seismic conditions, ENGEО and PROPEX determined that the ARMORMAX® system was the best solution. ARMORMAX is a solution for surficial slope stabilization that provides vegetated reinforcement, improves the factor of safety, and significantly reduces the probability of failure. The system is composed of Engineered Earth Anchors that are designed and tested for compatibility and performance with PYRAMAT® 75 High Performance Turf Reinforcement Mat (HPTRM) to increase slope stability. Six foot, B3 anchors on a 5' x 4' spacing with 1,200 pounds of anchor pullout capacity met the design FoS.

Upon approval from all environmental agencies and the City of San Francisco, the slope was rebuilt and ARMORMAX was installed in February 2022 by Selby's Seed & Erosion Control. Due to the steepness of the slope, installers used harnesses and ropes tethered at the crest of slope for safety. After installation the HPTRM was sprayed with a bonded fiber matrix containing native seed to establish vegetation. Due to the construction techniques used, no additional construction equipment was required, and no road closures or traffic control were required for Macalla Road.

ENGEО was pleased with the success of this project, and has identified additional ARMORMAX installations on the Treasure Island/Yerba Buena Island Development Project.



PERFORMANCE

The geotechnical engineering firm was so pleased with the success of ARMORMAX that it has identified additional projects where ARMORMAX will be used.

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