

ENVIRONMENTAL FEASIBILITY ANALYSIS: TRANSPORTATION PLAN AND FEASIBILITY STUDY FOR A BRIDGE BETWEEN CEIBA AND VIEQUES, PUERTO RICO

- Vieques series – This group accounts for approximately 26% of the total land surface area of the island. This series is typically shallow, and found in the upland regions of the island. The soil is dark brown in color, and has good drainage with moderate permeability.
- Coamo series - This soil makes up approximately 16% of the total land surface on the island. This soil is typically deep and well-drained in nature. The surface layer is very dark and slightly acidic to neutral. Agriculture can be maintained here along with xeric trees and brush.
- Rock Land area - This area accounts for approximately 8% of the total land area on the island. This area is label Rock land because either rock outcrops occur or loose boulders and stones are common. Volcanic rocks and limestone are the principal constituents of this area, with brush and shrubs as the only vegetation present.

The remaining 20% of the total land area of Vieques Island is divided into nine additional categories of lesser coverage: Ametia, Cartagena, Cataño, Coastal Beaches, Fraternidad, Jácana, Pandura, Paso Seco, Pancena and Pozo Blanco.

2.2 Oceanography

2.2.1 Bathymetry

According to NOAA's nautical charts the bathymetry of the Vieques passage ranges from 1 to 60 feet in depth (Figure 4). The depth around the coastline bordering the Former Naval Station Roosevelt Roads (FNSRR) ranges from 1 to 25 feet over the island's insular platform. The center of the Vieques passage, outside the Puerto Rico's insular platform, is characterized by depths around 30 feet with a minimum of 24 feet and a maximum of 60 feet. The insular platform of Vieques has depths ranging from 1 to 33 feet. Vieques' western coast line has depths ranging from 1 to 27 feet while the northwestern corner, where the sand bar known as Escollo de Arenas lies off Punta Arenas, ranges from 1 to 18 feet in depth. Depths in the vicinity of Mosquito Peer are around 1 to 33 feet.

2.2.2 Waves and Currents

Surface waves range from 3 to 5 feet (0.9 to 1.5 meters) in height in the Ceiba-Vieques Passage (NLMOC, 2000). Roughest seas occur from January through March when 10 to 20% of waves are greater than 8 feet (2.4 m) in height while the rest of the year approximately 10% of the waves reach that height.

Wave direction and sea surface transport is primarily driven by the Trade Winds out of the East and East-Northeast and secondarily by daily tidal currents. Local tidal surface currents travel at maximum speeds between 0.7 and 1.3 knots.

Tides along the southern coast of Puerto Rico and Vieques are mainly diurnal (Morelock et al., 2000). This diurnal band extends south across most of the Caribbean and is surrounded by areas where the semidiurnal tide are stronger as in the northern coast of Puerto Rico. Accurate numerical prediction of the oceanic tide close to the islands becomes rather difficult due to the steep bathymetry of the Antillean Island Arc (Morelock et al., 2000).

The surface tides in the region are of very small amplitude, on average less than 0.60 feet from the mean sea level (Fornshell and Spina, 2000). Data from NOAA Buoy 9752695 off the coast of Vieques indicate that the average difference between low and high tides is close to 1.2 feet.