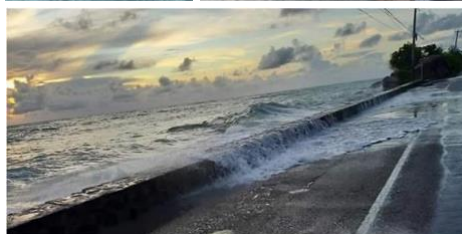
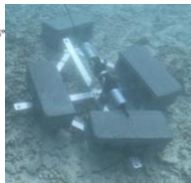


# REDUCING WAVE DRIVEN OVERTOPPING AND MANAGING COASTAL EROSION

AU CAP, SEYCHELLES



(L to R) Location of Au Cap on Mahé Island, the Aquadopp current meter deployed offshore Au Cap dangerous overtopping onto the highway, architects rendering of the proposed sea wall.

## PROJECT INFORMATION:

**Location:** Au Cap, Seychelles

**Client:** Government of Seychelles

**Project Date:** 2024-2026

## SCOPE OF WORK:

- Field data acquisition and analysis
- Numerical Modelling
- Engineering Design
- Detailed Reporting

## PROJECT DESCRIPTION:

ORCAS Consulting was contracted by the Government of Seychelles (GoS) to conduct the necessary studies for the design of a coastal structure intended to reduce overtopping and mitigate shoreline erosion along three sections of the Au Cap shoreline. This project built upon our previous experience in Seychelles but was augmented with a field data collection campaign whereby two Aquadopp current and wave meters were deployed in the lagoon offshore of Au Cap. The measured data was then used to accurately calibrate the numerical models providing confidence in our overall assessments. We then used long term (~40 years) wind and wave hindcast data to drive wave, hydrodynamic and sediment transport models, which were then used to explain the observed flooding and erosion that has occurred in recent years. An extreme value analysis defined wave heights at return periods of 10, 50, 100 and 500 -years while a Monte Carlo analysis was used to assess the combined effects of tide level, water level set up, wave runup in conjunction with the extreme wave conditions. Wave and wind effects were analysed as a function of the monsoon season, and each beach was assessed relative to the season in which it is most exposed to flooding and/or erosional hazards. The deterministic modelling of extreme events was able to reproduce the observed effects in terms of coastal flooding and erosion at the study site.

Ultimately, we recommend a sloped rock revetment with a pre-cast concrete parapet wall. The parapet wall should be positioned a minimum of 2 m seaward from the existing roadway. This will allow for a decent sidewalk/path along the foreshore connecting the two bus stops. We have chosen 2 m of reclamation as a minimum amount. If the project sponsors wish to make it wider, that could be accommodated simply by acquiring more fill material. The structure could be built up to 8 or 10 m seaward of the existing wall/roadway without altering any fundamental hydrodynamics or sediment transport in the lagoon. The only consideration is cost with a larger reclamation costing more in materials. Using a sloped revetment and setting the wall crest height to +3.2 m MSL will greatly reduce wave overtopping under present day typical storm wave conditions as well as extreme events. Moving the structure 2 m (or more) offshore will ensure that whatever overtopping that does occur will land in the space between the new wall and the road and will not adversely affect traffic flows. The new structure will be equipped with drains to allow any overtopping water to run back into the sea.