

# **Abstract**

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## **Applying the Artificial Submerged Reefs techniques to reduce the Flooding Problems along the Alexandria Coastline**

Alexandria is one of the oldest cities on the Mediterranean coast, and is an important tourist, historical, industrial and economic centre. Alexandria suffers from erosion problems along its coastline, particularly in its beach areas and low-lying newer suburbs. Finding an adequate, but cost-effective means of protecting the city, is a matter of urgent concern to the city planners. A Reynolds Averaged Navier-Stokes (RANS) numerical model is employed to investigate the storm wave run-up and overtopping characteristics of existing defences, which are demonstrated to be inadequate for providing the required level of service. The option of raising the level of the defences is not feasible, both from the reduction in amenity and also the costs, as existing infrastructure would have to be sacrificed to accommodate larger defences. This leads to the proposed deployment of submerged offshore artificial reefs, to induce wave breaking and energy dissipation, to limit the wave heights reaching the beach. Preliminary results have shown that such a system will provide the required protection.