

## **Viability Study of an Artificial Surf Reef in S. Pedro do Estoril, Cascais, Portugal**

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### **ABSTRACT**

This paper describes the viability study of an artificial reef dedicated to improve the surf conditions in the São Pedro do Estoril Beach. This work is undertaken by the Instituto Superior Técnico and the National Laboratory of Civil Engineering, for the Cascais City Town.

The viability study is composed by two main components: a) the Numerical and Physical Modelling studies which objective is to analyze the hydrodynamics of the different geometries of the artificial reef, and to choose its best possible design; b) The impact environmental study to analyze the impact of the reef on the surrounding area.

**KEY WORDS:** Artificial Reef, Surf, Coastal Protection, São Pedro do Estoril, Numerical Modelling, Physical Modelling, Environment Impact.

### **INTRODUCTION**

The purpose of this project is to improve the wave conditions in the beach of S. Pedro do Estoril for surfers, and consequently, the economic development of Estoril. The beach of S. Pedro do Estoril, see Fig. 1, is part to the Council of Cascais, Portugal. It has good surf conditions for intermediate to experienced surfers, mostly during the fall, winter and spring. Historically, this is the first beach in Portugal where a community of surfers was established. Its surf club (Surfing Clube de Portugal) is 30 years old and it has produced several top national surfers in the sports of surf, bodyboard, longboard and skimmming.

Due to the importance of surfing in the Council of Cascais, the implantation of an artificial surf reef in the neighbourhood of the beach of S. Pedro do Estoril was proposed by the Municipality of Cascais.

The main objective of the surf reef is to improve the surf conditions, creating a surf wave, with international quality, for experienced surfers.



Fig. 1. Beach of São Pedro do Estoril and site of the artificial reef.

For this purpose, the Câmara Municipal de Cascais (CMC), the Instituto Superior Técnico (IST), the Laboratório Nacional de Engenharia Civil (LNEC) and the Faculdade de Ciências da Universidade de Lisboa (FCUL) agreed in a protocol to produce the necessary studies for the development of strategic projects in the coast of Cascais, including the present project of an artificial reef for the Beach of São Pedro do Estoril. In particular IST and LNEC were contracted to provide the Viability Study for an artificial reef dedicated to improve the surf conditions in the S. Pedro do Estoril beach. This Viability Study includes main components: the numerical and physical modelling and the Environment impact evaluation.

The numerical and physical modelling studies aims to establish the main characteristics (dimensions, orientation and location), of the artificial surfing reef for the S. Pedro do Estoril beach, Fortes *et al.*