

# MANOEL ISLAND MASTERPLAN

## WAVE AND WATER CIRCULATION STUDY

Marsamxett Harbour is a natural harbour on the east side of the island of Malta and is the main yachting harbour. Manoel Island is located inside Marsamxett Harbour for which the Masterplan is developed. Svašek Hydraulics conducted a study to analyse the impact of the Masterplan on the local wave climate and on the currents and water circulation in Marsamxett Harbour.

The main characteristics of the Manoel Island Masterplan are the new breakwater and marina on the south side of the island and the land reclamation of the northwest side.

The basis for the wave penetration study is the wave climate just outside Marsamxett Harbour. This 'offshore' wave climate is established with a SWAN numerical wave model of the Mediterranean Sea. In this model a 20 year time series of hindcast wind fields (CFRS) is used to determine the 'offshore' wave climate.

Then the 20 year time series of the wave climate outside Marsamxett Harbour is transferred into the natural harbour using the numerical wave model HARES. For this purpose a 3D transfer matrix has been set up for many conditions of wave heights, wave periods and wave directions (for various output locations). These HARES calculations include both direction and frequency spreading. The calculations are performed for the present situation and the situation

with the Manoel Island Masterplan.

With the 3D-matrices the wave time series outside Marsamxett Harbour are transferred by interpolation or extrapolation to various output locations inside the harbour area. The results are used to establish the local wave climate and to analyse the influence of the Masterplan on the wave conditions inside Marsamxett Harbour.

The water circulation is modelled with the numerical flow model FINEL. The relevant physical processes included in the model are:

- Astronomical tide;
- Seiches;
- Wind-driven circulation;
- Temperature-driven circulation.

The conclusion of the studies was that the implementation of the Masterplan provides excellent wave conditions in the new marina and that the water circulation (and quality) in the waters around Manoel Island will improve significantly.

CLIENT

Midi Plc.

LOCATION

Marsamxett Harbour, Malta

DATE

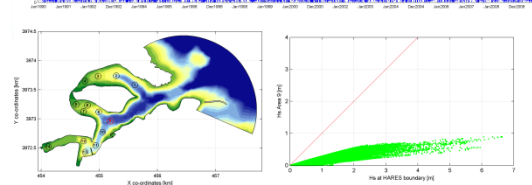
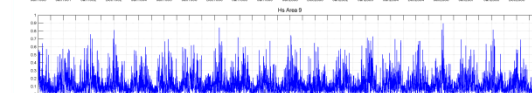
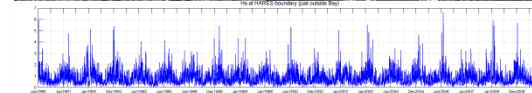
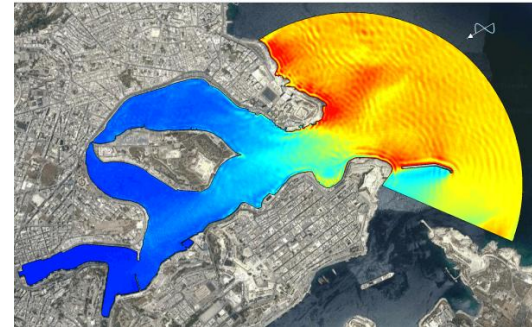
2018

SERVICES

SWAN wave modelling

HARES wave penetration modelling

FINEL water circulation modelling



# SVASEK

## HYDRAULICS

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