



## MATHEJA CONSULT

Königsberger Str. 5  
30938 Burgwedel / OT Wettmar  
fon: +49 5139 / 402799 - 0  
fax: +49 5139 / 402799 - 8  
mobil: +49 / 1607262809  
email : kontakt@matheja-consult.de  
www.matheja-consult.de

# Morphodynamics and Scour Protection of Osborne Bridge at Five Cowrie Creek (Lagos / Nigeria)

**Client:** Bilfinger & Berger Nigeria GmbH

**Location:** Lagos, Nigeria

**Construction:** Osborne Bridge / Five Cowrie Creek

**Scope of Work:** Setup of a 2D morphodynamic model, simulation of bridge scour (longterm)

**Methodology:** Numerical 2D sediment transport model with tidal boundary conditions

## INTRODUCTION

Five Cowrie Creek has undergone considerable changes due to dredging, refilling, widening and fixing of channel banks. We were conducted for a study on morphodynamics in the vicinity of Osborne Bridge (Fig. 1, Fig.2).



Figure 1: Osborne Bridge at Five Cowrie Creek

## METHODOLOGY

The bathymetry for a 2D sediment transport model (Fig. 3) was derived from also contracted echo soundings in March 2009. A calibration of model parameters was performed using ADCP measurements and water levels at five gauges from the same campaign.

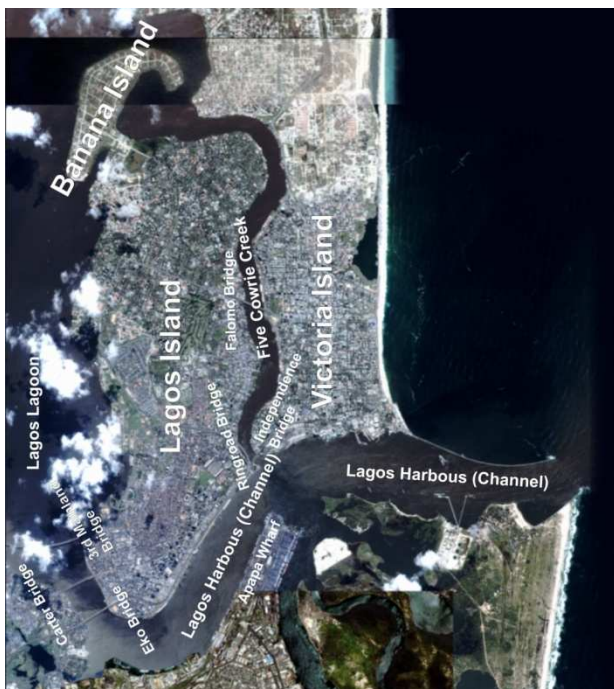


Figure 2: Lagos Harbour Channel, Five Cowrie Creek and Location of Osborne Bridge

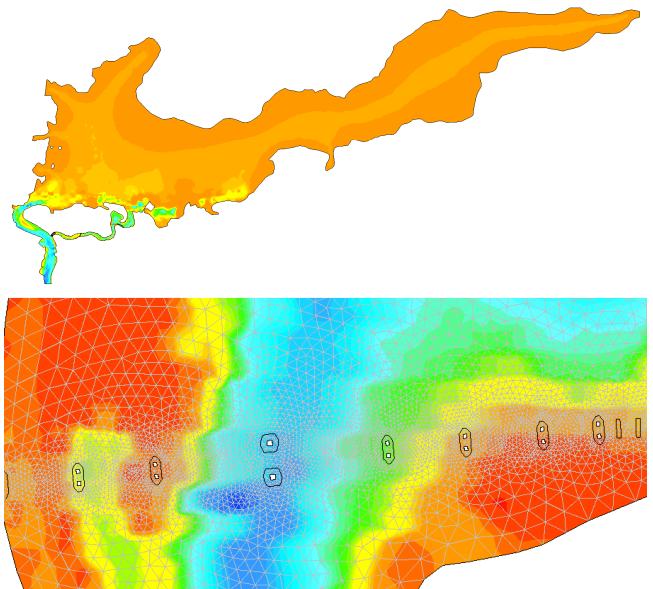


Figure 3: Morphodynamic Model of Lagos Harbour and Lagoon (above) and Mesh near Osborne Bridge

## RESULTS

Numerical simulations have shown, that long-term scour near bridge piles can be calculated by numerical simulations using tidal boundary conditions (mean Neap-Spring-Tide Cycle with morphodynamic superelevation).

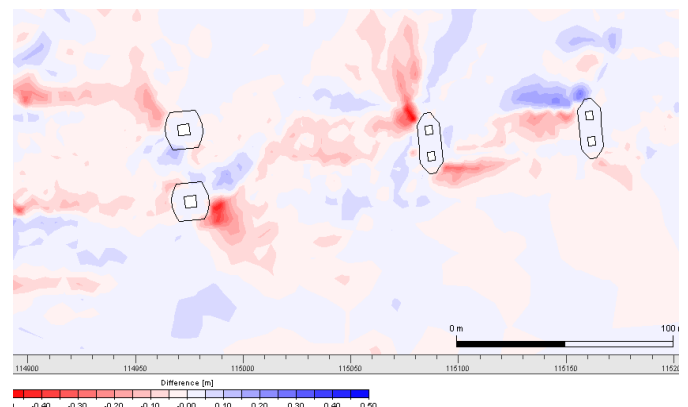


Figure 4: Scour near Pile Axes 400, 410 and 420

Simulations have also shown that scour is acceptable during all phases of construction.