

Further information:

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Project Description number:

EVY0399

Project Type

Flood Risk/Consequence Assessment

Flood Forecasting

Detailed Design

Calibration & Optimisation

Flood Map Challenges

Scour & Geomorphology

Water Framework Directive

Environmental Impact Assessment

Training

Key Words:

Scour Protection Design

Hydraulic Modelling – TUFLOW FV

Rip-rap design

Client and other Organisations:

Weetwood Services Ltd.

Kirkstall Forge, Scour Assessment

Edenvale Young Associates were commissioned to undertake an analysis of the potential for scour of the reach in Kirkstall Forge site (a former industrial site on the banks of the River Aire) near Leeds and advise on and develop an outline design for scour protection sufficient to ensure the structural integrity of the new road and road bridge.

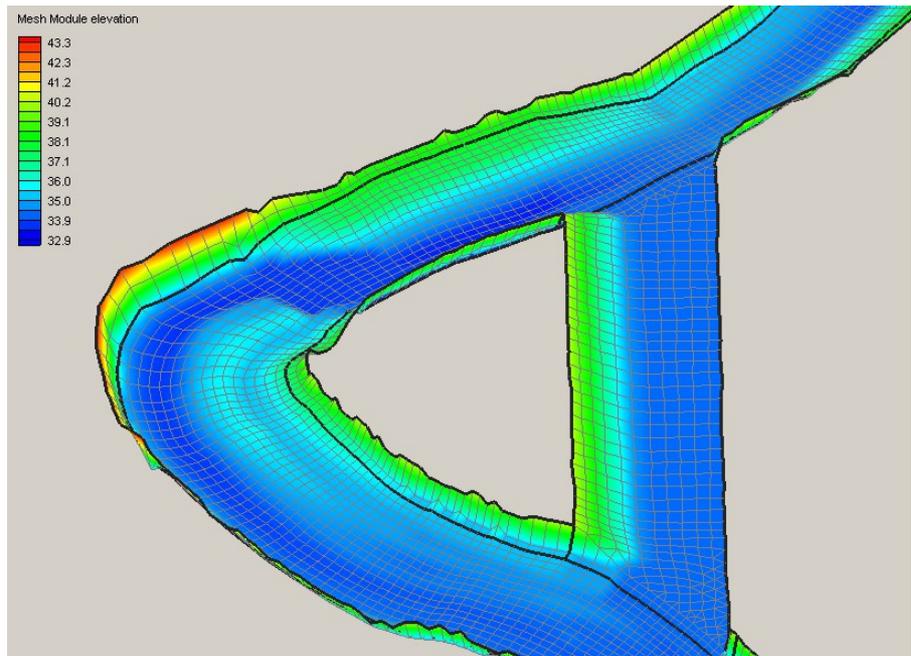


Illustration 1: Meander bend with flood relief channel, TUFLOW FV mesh

Project Details

As part of the redevelopment of the site, new bridges and bank protection walls on the banks of the Aire are to be constructed alongside with a new flood relief channel to bypass the meander.

It was decided to model the reach in the TUFLOW FV two-dimensional finite-volume solver. This code allows water levels and velocities to be represented on a grid of cells (mesh) making up the channel. This allows the representation of the riverbed surface and scour forces.

Coupled hydraulic and geotechnical models have been constructed using the TUFLOW FV model and the most up-to-date survey and drawings available for the site. Results from these models indicate that the previously designed reinforced earth walls would be at risk of scour and that this risk would increase due to construction of the flood relief channel.

Due to the difficulties involved in retrofitting scour protection to the Stitch Bridge, it was

recommended that the scour protection is designed to also mitigate the increased scour risk associated with the flood relief channel.

A baseline scour protection design is proposed using rip-rap along the toes of both reinforced earth (RE) banks.