

CUT-DOWN FLOOD MODEL AS A TOOL IN THE INITIAL DESIGN OF A RAIL PROJECT

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ABSTRACT

Understanding the existing flood risk and potential flood impact of any proposed development is paramount to achieving the required project objectives and compliance with the project and environmental requirements.

Aurecon has been commissioned to undertake a tender design for a rail project in Australia which is considered a State Significant Infrastructure. The project aims to alleviate constraints and increase the capacity of the freight rail network to meet existing and future demands.

The supplied Reference Design TUFLOW model formed the basis of the flood assessment for the initial design, however the model is relatively detailed covering multiple catchments. A single simulation takes approximately four days to complete, which is considered impractical for an initial design period. In order to overcome this limitation and to facilitate multiple model runs and iterations, the TUFLOW model was trimmed to cover critical areas of interest. Results were closely compared to the Reference Design with differences considered negligible.

A key requirement of the project is that flood immunity of the track be achieved for the 2% AEP event. On review of the Reference Design, several locations have been identified where the flood immunity criteria was not met. Several mitigation options have been conceptualised during the initial design and their effectiveness to provide solution without causing adverse impact to the surrounding environment have been ascertained using the cut-down model. The options investigated include cross-drainage pipe upgrade, construction of a flood wall, construction of a bund, cess drain widening or regrading, and formation of swales and open channels.

The presentation highlights some of the techniques used to effectively trim a large complex model in order to achieve design solutions within a tight timeframe, hence providing time and money savings. In addition, it also explores the development of flood mitigation options being investigated and how the TUFLOW model were utilised as a tool in the initial design stage of a multi-disciplinary project.

KEYWORDS

TUFLOW, rail, flood modelling; engineering options, trimmed hydraulic model