



## Scouring Velocity out of Waterway Design: Time to Cleanup Design Guidelines

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### Overview:

Waterway scour is a direct result of the hydrodynamic shear stresses acting on the bed and banks. However, many applicable scour assessment and design guidance within Australia commonly adopt a peak velocity approach or minor design storm event differences as a proxy for scour potential.

This paper will present a number of case studies with scenarios of high bed shear stress and corresponding relatively low velocity magnitudes. These occurrences can result in unforeseen problem areas and/or insufficient waterway protection design when a peak velocity approach alone is adopted. Conversely, case studies of high velocity and low bed shear stresses will be presented highlighting over-designed erosion protection.

Recent advancements in hydraulic software capabilities have enabled the direct output of bed shear stresses for analysis of scour potentials. Therefore, practitioners can adopt a bed shear stress method as easily as former velocity based assessments. Over time this change should also be integrated into applicable literature, guidelines and development codes.

### Objectives:

The main objective is to encourage designers and assessors to move away from velocity based criteria or minor design storm event differences in order to determine scour potential within waterways in favour of more accurate (but just as readily accessible) bed shear stress analysis.

### Method:

This will be accomplished by providing hydraulic modelling examples where velocity approaches can both under- and over-estimate scour potential of waterway areas, leading to insufficient consideration or excessive protection design. Bed shear stress analysis of these areas will illustrate scour assessments can be more efficiently and effectively conducted.

\*it is anticipated that examples of actual scour instances and hind-cast comparisons of each approach will also be included in the final paper\*

### Results:

Hydraulic model result maps, sections and animations will be predominately used illustrate the effectiveness of both approaches.

\*it is intended that a comparison with actual observed scour will also be included in the final paper\*

Conclusion:

Based on the above case studies results, applicable literature, guidelines and development codes should be updated to reference more accurate bed shear stress approaches.