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Shoalhaven City Council

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27th February 2023

Subject: RA21/1000 – Letter of Undertaking relating to an Adaptive Management Strategy - Geomorphology

Dear Justin,

This Letter of Undertaking is provided to Shoalhaven City Council as part of the assessment of RA21/1000. It is anticipated that consent for the proposed extension to dredge areas to the western end and northern side of Pig Island, adjacent to Lots 1, 2, 3 and 4 / DP 1184790 below Mean High Water Mark will be conditional, and include the preparation and implementation of an Adaptive Management Strategy that includes geomorphology. This letter provides an outline for the geomorphic content, performance measures and definitions that will be included in the Adaptive Management Strategy (the Strategy).

Adaptive Management Strategy Content

Purpose

The key purpose of the Adaptive Management Strategy will be to avoid significant impact to geomorphic processes and forms in the lower Shoalhaven River. Geomorphic forms include bed forms, bed material calibre, bed elevation, and the submerged and subaerial components of the bank, including constructed levees, especially the Riverview Road and Terara flood levees. Geomorphic processes include sediment transport and deposition, and bank stability. These are preliminary categories of relevant forms and processes. When preparing the Strategy, specific variables or indicators will be selected, and these will be reviewed after a period of implementation.

Monitoring

The geomorphic monitoring will involve regular bed and bank surveys. Bed surveys will be undertaken using sounding undertaken at sufficient intensity to characterise the morphology of the entire bed of the river from the downstream extent of dredging to an agreed upstream location, such as Nowra Bridge. The downstream extent of the survey should be adjusted as dredging proceeds. Bank surveys will be undertaken using an approved visual or ground measurement-based survey methodology, airborne sensor technology, or satellite technology, extending along bed left and right banks from the downstream extent of dredging to an agreed upstream location, such as Nowra Bridge. The downstream extent of the survey should be adjusted as dredging proceeds. When preparing the Strategy, specific measurement methodologies will be selected, and these will be reviewed after a period of implementation.

Performance measures

Performance measures will be developed by a geomorphologist, in consultation with relevant agencies, and will relate to variables or indicators remaining within tolerable limits, or expected range of variability. This

could involve statistical before-after and/or control-impact comparisons to determine whether the observed changes are statistically significant or within the bounds of natural variation. In this case, control sites might need to be monitored. The alternative approach would be to establish tentative expected tolerances, then review the tolerances as data are collected over time.

Triggers and Mechanisms

The key trigger for implementation of the Adaptive Management Strategy will be when a variable is observed to fall outside the agreed range of variability, as determined by suitable statistical tests. If triggered, the Adaptive Management Strategy will result in the immediate cessation of extraction. A root cause analysis will be conducted, involving relevant technical professionals. The root cause analysis will determine either:

- Exceedance of the range is a direct or indirect result of extraction.
- Exceedance of the range is not related to extraction and can be attributed to another pressure, or natural causes that are typical of estuarine systems.

If extraction has resulted in a geomorphic change, the Adaptive Management Strategy will require the proponent to seek approval from the consent authority prior to the resumption of extraction. If exceedance of the range is not related to extraction, then the acceptable range of variability will be reviewed.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Chris Gippel'.

Dr Christopher Gippel

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