

To: Epic Environment

Date: 18 February 2016

Attn: Mark Breitfuss

From: Silver Yance / Ian Varley

RE: REVIEW OF LAKE TAMAR FLOOD MODELLING REPORT

On behalf of Epic Environment, WREMA Pty Ltd has provided a high level assessment of the hydraulic modelling studies undertaken for Tamar Lake and reported in the following document:

- BMT WBM Letter of 13 November 2014, Ref No LM20391.002, "Lake Tamar Flood Modelling".

The aims of the flood modelling were:

- To calculate the drawdown time of the lake from 0.9m AHD to 0m AHD, and
- To undertake the flood impact assessment under a number of scenarios, including:
 - Existing conditions;
 - With the barrage in place being operated to provide flood buffering;
 - With the barrage in place with the gates fully closed (worst case scenario).

The scenarios above were assessed for the 1 in 10, 20, 50, 100 and 200 year Annual Exceedance Probability (AEP) flood events under both current and future sea level conditions. The future condition assumed that sea levels would increase by 0.8m.

After the review of the documents the following comments are provided.

- The TUFLOW hydraulic model of the Tamar River was calibrated as part of a 2008 flood study. The flood study report was not provided and so the model calibration was not assessed. It appears that calibration focused on the upper reaches of the river near Launceston.
- Similarly, the design flood hydrographs were derived as part of the earlier flood study and we were not able to assess the suitability of the input hydrographs.
- The drawdown operation of the gates was undertaken assuming a spring tide. A sensitivity run using the highest astronomical tide level (HAT) may be useful in showing the variation in tide levels and the effect that this may have on draw down behaviour.
- The behaviour of the model for the drawdown analysis appears reasonable. Under current sea level conditions, the lake can be drawn down from 0.9m AHD to 0.0m AHD in approximately 4 hours, during a single low tide cycle. However, should sea levels rise by 0.8m then the drawdown may take 14 hours, involving two low tide cycles. It is assumed that draw down is required prior to the onset of a major flood. The report did not indicate if modelling allowed for any low flows during the draw down period. It is assumed that typical low flows would not be sufficiently large to influence the results. Nevertheless,

this should be addressed by comparing the 50th percentile Tamar River flows with the flows through the barrage during draw down.

- Modelling showed that the barrage would reduce flood levels upstream of the barrage for all events up to and including the 1 in 100 AEP flood for both existing and future sea level conditions. The benefit (or reduction in flood levels) is larger for smaller, or more frequent, floods and larger for future increased sea levels.
- There are maps that show changes in flood levels, but no discussion about what it means in terms of reductions in flood affected houses and flood damages. Some indicative assessment would be useful to indicate the benefit of the barrage in providing flood mitigation.
- It is noted that there was an increase in flood levels for the 1 in 200 AEP event. It is assumed that the barrage structure constrains flows during this event, creating afflux. The effect is in the reach immediately upstream of the barrage and is negligible at Launceston. A comment on whether this has an impact on flood damages should be made. Also the model should be used to determine the impact the barrage may have on larger floods.
- It is considered to be wise to investigate the impact of failure of the barrage gates. The modelled scenario assumes failure of all gates, which is a very unlikely scenario as the barrage will include multiple gates with redundant controls and power sources. With the barrage fully closed (failure of all gates) the increase in flood levels is significant and probably unacceptable. Therefore, the next step is to consider appropriate mitigation measures in a risk based assessment.

We trust the comments provided are what you are looking for, if you have any queries please do not hesitate in contacting us.

Sincerely yours,



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