

# OLYMPIC DAM EXPANSION

DRAFT ENVIRONMENTAL IMPACT STATEMENT 2009

APPENDIX O

MARINE ENVIRONMENT VOLUME 2



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# MARINE ENVIRONMENT

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APPENDIX 011

# Hydrodynamic modelling



## **O11 HYDRODYNAMIC MODELLING**

### **O11.1 INTRODUCTION**

This appendix presents a series of reports that were developed over the past three years to assess the dispersion of desalination plant return water (being brine and anti-scalant) within Spencer Gulf.

BMT WBM Pty Ltd used computer modelling to predict the dispersion of desalination plant return water within 100 m of the outfall (near field model), within Upper Spencer Gulf (mid field model) and throughout Spencer Gulf (far field model). The development and calibration of the model is presented in Appendix O11.2.

Once calibrated, the model was used to predict dispersion of the return water from 11 potential outfall sites in Upper Spencer Gulf. Comparison of the model outcomes enabled informed choices to be made concerning acceptable locations for the return water outfall. The results of the initial model runs are presented in Appendix O11.3.

Having identified Point Lowly as the most acceptable location for the desalination plant return water outfall, additional model runs were undertaken to compare return water dispersion from four potential outfall locations off Point Lowly. Subsequently, numerous model runs were undertaken to investigate dispersion of return water discharged from the preferred outfall at three scales and under a variety of tide and wind conditions. The results of the model runs from the four acceptable outfalls, including the preferred outfall, are presented in Appendix O11.4. Additional information on Spencer Gulf flushing times and salt and water balance are included with Appendix O11.4.

The following pages provide letters of testimony from expert peer reviewers about the studies undertaken for the Draft EIS.

Our Ref LJ2594/L1323 :sge

Contact P.D. Treloar

11 September 2007

Ove Aurp Pty Ltd  
Level 4, Mincom Central  
192 Ann Street  
**BRISBANE QLD 4000**

Attention: Mr Iain Gunn - Associate, Maritime

Dear Sir,

**REVIEW OF WBM REPORT (THIRD DRAFT) PREPARED FOR  
BHP BILLITON/ARUP HYDRODYNAMIC AND WATER QUALITY MODELLING  
AT PORT BONYTHON: CALIBRATION REPORT**

Acting upon your email request of 4 September 2007, we have reviewed the third draft version of WBM's Calibration Report dated 29 August 2007.

Our letter L1167, dated 3 April 2007, provided our review comments for the second draft version.

The purpose of this letter is to report our review of the responses of WBM to our second set of review comments. In this process we have discussed some of the aspects of the report with WBM (Dr Michael Barry).

On this basis I consider the work to have been undertaken thoroughly and to a high technical level. The work is in line with normal industry practice and, to some extent, exceeds it.

I confirm that the work is acceptable for its intended purpose.

Yours faithfully,



*P.D. Treloar*  
**Manager - Coastal & Estuarine Studies  
for Cardno Lawson Treloar**



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**HR Wallingford**

David Wiltshire  
Arup  
Level 4 Mincom Central,  
192 Ann St,  
Brisbane  
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Australia

Your ref 85450/RAW  
Our ref EBM 5763

23 October 2008

Dear David

**Olympic Dam Expansion Project  
ODX Infrastructure – Hydrodynamic Modelling – International Peer Review**

Thank you for asking us to review the recent additions to the hydrodynamic modelling reports.

As you are aware, in 2007 HR Wallingford reviewed the WBM reports “Hydrodynamic and Water Quality Modelling at Port Bonython: Calibration Report” and “Hydrodynamic and Water Quality Modelling at Port Bonython: Modelling Assessments”, and the revised reports “Hydrodynamic and Water Quality Modelling at Port Bonython: Calibration Report” Revision 2, 29 August 2007 and “Hydrodynamic and Water Quality Modelling at Port Bonython: Modelling Assessments” Revision 3, 28 August 2007. Following this review we concluded that the reports were acceptable for use.

We have now completed the review of the further reports “Hydrodynamic and Water Quality Modelling at Port Bonython: Calibration Report, Revision 3” BMT/WBM, August 2008, “Additional Hydrodynamic Model Runs – ODX and SA Government, Revision 3”. BMT/WBM, August 2008 and “Olympic Dam Expansion: Draft Environmental Impact Statement”, Chapter 16, Arup, August 2008. Our review is presented in our Technical Note EBM5763-02.

We find that:

- The work described is relevant to the robustness of the predictions and appears to have been carried out methodically and rigorously. The conclusions increase confidence in the accuracy of the models.
- The results of the further investigations support the earlier conclusions rather than contradicting or modifying them.
- The relevant sections of the Environmental Impact Statement present the model studies correctly, present the data in a relevant and informative way, and draw appropriate inferences.

Yours sincerely

B R Wild  
Project Manager  
HR Wallingford

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Mr David Wiltshire  
Social & Ecological Assessment Pty Ltd  
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9<sup>th</sup> December 2008


Dear David

I have recently completed my third review (the first in late 2007) of the BMT WBM Hydrodynamic Modelling Calibration Report, as well as reviews of other documents associated with the draft EIS for the Olympic Dam Project. I have also taken part in some face-to-face discussions with the modelling staff of BMT WBM Pty Ltd at various times during 2008.

As I have indicated in my reviews, I believe the Calibration Report has progressed greatly due, from my perspective, to the diligence of BMT WBM staff and the quality of their interactions with your team. Many of my concerns associated with modelling the long-term, large-scale salt balance of Spencer Gulf, expressed in my initial report, have been appropriately and professionally dealt with. A combination of additional model runs, and substantial BMT WBM time and expertise in generating visualisations of model results, has provided me with significant confidence that their far-field model does provide useful and valid representation of Spencer Gulf hydrodynamics and salt mixing mechanisms. These judgments are based on my considerable experience and knowledge of Spencer Gulf oceanography, and its salt discharge behaviours.

While I have expressed continuing concerns with the validation of currents in the near vicinity of Port Bonython, I understand these will be addressed in ongoing work. I am optimistic, given the commitment and professionalism of all concerned, that these will also be addressed in due course.

Yours sincerely

A handwritten signature in black ink, appearing to read 'R. A. Nunes-Vaz', written in a cursive style.

Dr Richard Nunes-Vaz