

Tarrawonga Coal Project

Environmental  
Assessment

ATTACHMENT 4

PEER REVIEW  
LETTERS



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**Review of Tarrawonga Coal Project  
Groundwater Assessment and Modelling  
By Heritage Computing and Allan Watson Associates  
- Reviewed by Dr Frans Kalf**

**Background**

I have previously reviewed a first draft of both the Heritage Computing hydrogeological and modelling report and a two-dimensional finite element seepage analysis described in particular sections of a draft report by Allan Watson Associates. On the basis of those reviews a number of comments, suggestions and recommendations were made. These suggestions and recommendations have now been included satisfactorily in both reports.

The reports are now well presented and I believe cover the important issues regarding any likely impacts to the groundwater and surface water systems due to additional mining. Both reports have been completed and presented in professional manner in my opinion.

**Conclusion**

Based on the evidence presented and the modelling conducted I concur with the report conclusions and management and mitigation measures presented.

F Kalf B.Sc, M. App. Sc, Ph.D.

A handwritten signature in cursive script, appearing to read 'F Kalf'.

25 October 2011

# FLUVIAL SYSTEMS

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Dr Christopher J Gippel, PhD

Director

Mr Danny Young  
Whitehaven Coal Limited  
PO Box 600  
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Dear Danny,

I have now completed my review of the report, dated 11 October 2011, prepared for the Tarrawonga Coal Project by Gilbert & Associates, titled "Appendix B, Tarrawonga Coal Project, Surface Water Assessment", prepared for Whitehaven Coal Pty Ltd. The main focus of my review is Chapter 6, titled "Proposed Permanent Goonbri Creek Alignment", and the supporting "Goonbri Creek Stream Condition Survey Report" in Attachment B, although other sections of the report were read where they were relevant to the fluvial geomorphological assessment and creek design.

The review process consisted of: an initial review of all relevant documentation (draft "Proposed Permanent Goonbri Creek Alignment", "Goonbri Creek Stream Condition Survey Report", regulatory correspondence, and other publicly available literature); a site inspection undertaken on 22/08/2011, which included additional geomorphologic observations and making a photographic record; and, provision and incorporation of initial review comments/recommendations in the draft Surface Water Assessment prepared by Gilbert & Associates.

During my field inspection, I walked the entire length of the creek from the Leard State Forest to the downstream limit of the proposed Goonbri Creek re-alignment. I was accompanied by Josh Peters, of Resource Strategies.

In my initial report I listed seven recommendations:

1. One of the key recommendations made here is for a hydraulic model of the current Goonbri Creek. This is separate to the recommendation by Gilbert & Associates (2011) for a 2-D model for the area where the creek merges onto the alluvial flats.
2. Development of a hydraulic model first requires a detailed survey of the creek and floodplain. Gilbert & Associates (2011) also recognised the need for such a survey. They suggested a LiDAR survey, which would be adequate for the floodplain. It might also be suitable for the channel, provided it was at high resolution (i.e. flown at low altitude), and provided enough ground strikes could be made through treed areas. Otherwise, some on-ground survey of the channels might be required. This would involve cross-sections and a long profile (in any case, NOW requested a long profile survey be undertaken).
3. The characterisation of the fluvial geomorphology can be improved through utilisation of a hydraulic model of the creek. The stability of the creek should be defined in terms of modelled

shear stress, and critical shear stress of the bed and bank material. This will require some additional (more detailed) particle sizing of the bed and bank material.

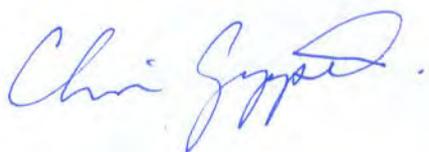
4. The characterisation of the fluvial geomorphology can also be improved by classifying the reaches according to stream type. This need not be exactly the same as River Styles (to avoid Trade Mark and certification issues), but a scheme can be devised that is compatible with River Styles.
5. The diversion design should be compatible with any change in stream type that occurs within the current creek. If two natural stream types are present in the current creek, then these should be represented in the creek diversion.
6. The diversion design could be improved by including more detail on depth variation, width variation and large woody debris.
7. Monitoring of physical form will require definition of the bounds of natural variability in channel form and process over time.

I can confirm that all of my recommendations were adequately addressed in the report dated 11 October 2011. Some of my recommendations concerned suggestions for work that would not necessarily be undertaken at this stage of the process, but would be recommended to be undertaken in the future. The report included these suggestions in its own list of recommendations. In this respect, the main recommendation was for development of a detailed hydraulic model of the existing creek for the purpose of the final engineering design, once detailed topographic survey [e.g. LiDAR] data are available. Notwithstanding, the report satisfactorily made use of all existing data, and the geomorphological interpretations and creek design work that followed was in accordance with the available information.

I believe that, based on the available data, the report addresses all of the requirements set out by the regulatory authorities. Knowledge of some aspects, such as the hydraulic characteristics of the creek, will improve when a hydraulic model of the creek is developed.

The design concept for the permanent course of Goonbri Creek is in accordance with world's best practice, as I understand it. The proposed creek will present minimal risk to human and ecological assets, and it should provide superior physical habitat conditions than does the existing, disturbed creek.

In summary, I conclude that overall, the fluvial geomorphology aspects of the study detailed in the Surface Water Assessment report were completed in a professional and detailed manner. The conclusions reached, and the creek design that was informed by these conclusions, were appropriately supported by the field investigations, data analysis, and modelling work carried out by the authors.



Dr Christopher Gippel

26 October 2011