United Wambo Project:
Additional Groundwater & Surface water considerations

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Potential groundwater/surface water impacts: United Wambo expansion project

- Changes to groundwater-surface water interaction. E.g. reduction in baseflow to streams and reduced water availability in alluvial aquifers
- Groundwater quality impacts, and potential surface water impacts (through ground-surface water interaction).
- Impacts on groundwater dependent ecosystems due to water quality and/or quantity changes

Shortcomings/gaps in EIS & RTS (I)

- **No in-depth analysis of groundwater-surface water interactions at the local scale (e.g. through collection of field data such as EC & Radon time-series, detailed analysis of hydraulic gradients and streambed material characteristics)**
- Estimates of groundwater-surface water related impacts, such as changes to baseflow in Hunter River and Wollombi Brook, are based on results from a regional-scale groundwater flow model
- Problems with the use of such models in examining ground-surface water interaction are well documented. They are generally not the right tool for this job, and should only be used in conjunction with local scale modelling and field studies.

Shortcomings/gaps in EIS & RTS (II)

- **Very little understanding of important geochemical / water quality related issues from the site under current condition.**
- Almost no analysis of how groundwater quality relates to groundwater recharge, flow and interaction with the aquifers and/or mining activity and how this may affect surface water quality (through GW-SW interaction) or other receptors
- Issues such as very high Al and Mn concentrations in groundwater and (at times) surface water, not convincingly explained or analysed in detail

Independent Expert Scientific Committee
on Coal Seam Gas and Large Coal Mining Development

Advice to decision maker on United Wambo Coal Mining Project

IESC 2016-079: United Wambo Open Cut Coal Mine Project (EPBC 2015/7600; SSD 7142) – Expansion

Requesting agency	The Australian Government Department of the Environment and Energy and The New South Wales Department of Planning and Environment
Date of request	30 August 2016
Date request accepted	6 September 2016
Advice stage	Assessment

Context

The Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (the IESC) was requested by the Australian Government Department of the Environment and Energy and the New South Wales Department of Planning and Environment to provide advice on the United Collieries Pty Ltd (United Collieries) and Wambo Coal Pty Ltd (Wambo Coal) joint venture (collectively referred to as the proponent), the United Wambo Open Cut Coal Mine Project (the proposed project) in NSW. The proposed project is located in the Hunter Valley region.

This advice draws upon aspects of information in the Environmental Impact Statement, together with the expert deliberations of the IESC. The project documentation and information accessed by the IESC are listed in the source documentation at the end of this advice.

IESC comments on EIS (I):

“Relevant data and information: key conclusions:

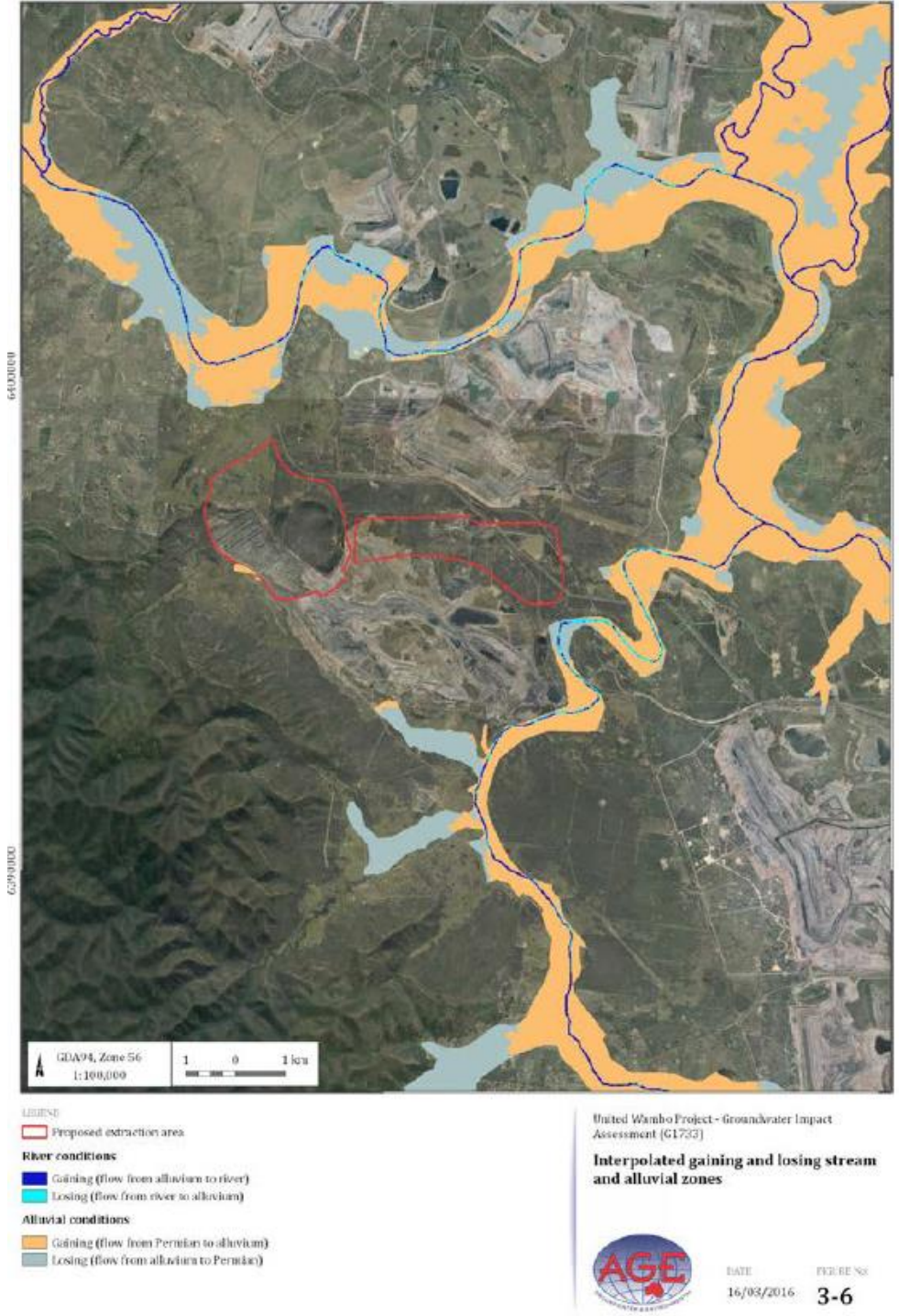
The water quality data provided in the assessment documentation for both groundwater and surface water was limited in spatial and temporal representation, preventing a clear identification of baseline conditions and potential impacts offsite. This is particularly the case for metals and nutrients. Water quality data was compared to some ANZECC guidelines, though comparison to existing site-specific trigger values was limited. The sole downstream monitoring site used to determine potential impacts of mine discharge was located well downstream of the licenced discharge point and could be affected by discharge from other activities. **As a result, the proponent’s conclusions regarding the lack of downstream impacts could not be substantiated. A geochemical assessment was not included in the assessment documentation, which limits the ability to evaluate potential water quality impacts**.” -IESC, 2016.

IESC Comments on EIS (II)

“**The numerical modelling and analysis presented in the assessment documentation do not provide reasonable estimates of the likely impacts of the proposed project on water resources.** Further consideration of the following is needed to better understand the nature and magnitude of impacts to water resources and GDEs:

c. Groundwater dependent ecosystems:

i. Potential combined effects on GDEs due to groundwater drawdown and a reduction in surface water flows. For example, the effects of reduced baseflow on low-flow conditions and aquatic biota in Wollombi Brook.”



Example: Ground-surface water interaction

- From the EIS:

"While there are contributions of alluvial groundwater to the major rivers, losing conditions can also occur in different areas and at different times, due to both natural and anthropogenic processes. Figure 3-6 shows estimated areas of losing and gaining conditions within the major rivers, as well as within the alluvium. **Figure 3-6 is based on interpolated water levels within the alluvium, as well as regional topographic surface. As a result the losing and gaining segments are considered indicative only.**"

Water quality / Ground-surface water interaction: two related issues:

- Potential impacts on surface water quality and GDEs associated with the near-stream alluvial aquifers can’t be definitively resolved until both of the issues discussed above are more clearly documented – e.g. processes driving groundwater quality changes & the nature of ground-surface water interactions

Response to IESC (proponent's RTS):

- There was some limited additional data collected & reported to address IESC's concerns regarding groundwater and surface water quality, and ground-surface water interaction.
- However, in my view, many of their concerns **were not** addressed in RTS
- For example, very limited additional water quality data provided in response.

➢This would be best assessed by the IESC themselves (noting IPC's recommendation 43 on this issue)

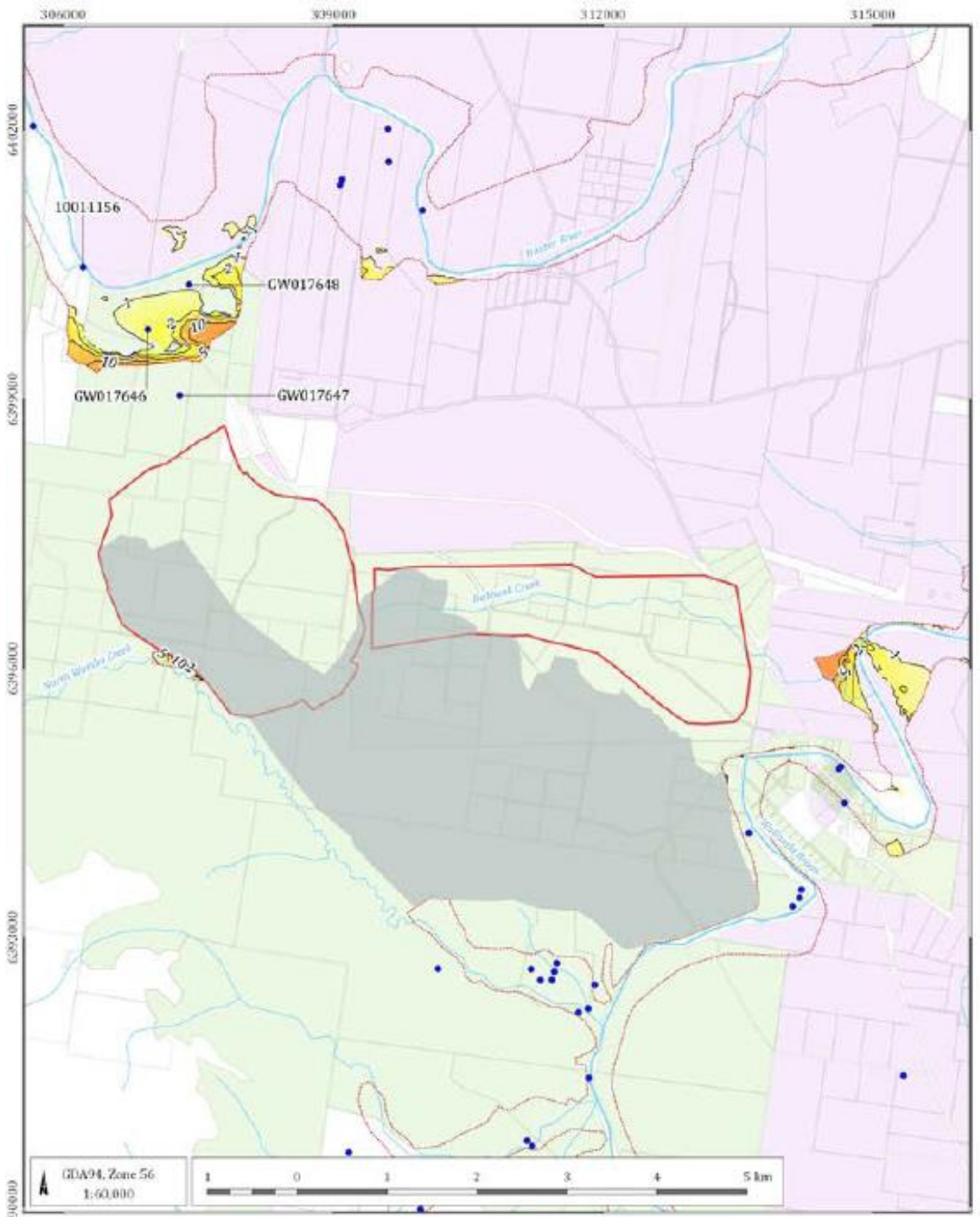
Monitoring program

- Issues:

a) Limited spatial coverage (e.g. groundwater monitoring bore network) to accurately map and observe impacts

b) Assessment of impacts / placement of monitoring bores based on model results and these are in themselves somewhat uncertain

c) Often groundwater impacts are not (rapidly) reversible - e.g. if an unexpected decline in baseflow occurs, remedial action such as halting excavation/de-watering may not be able to reverse the impact. Due to inherent inertia in these systems (Barlow and Leake, 2012).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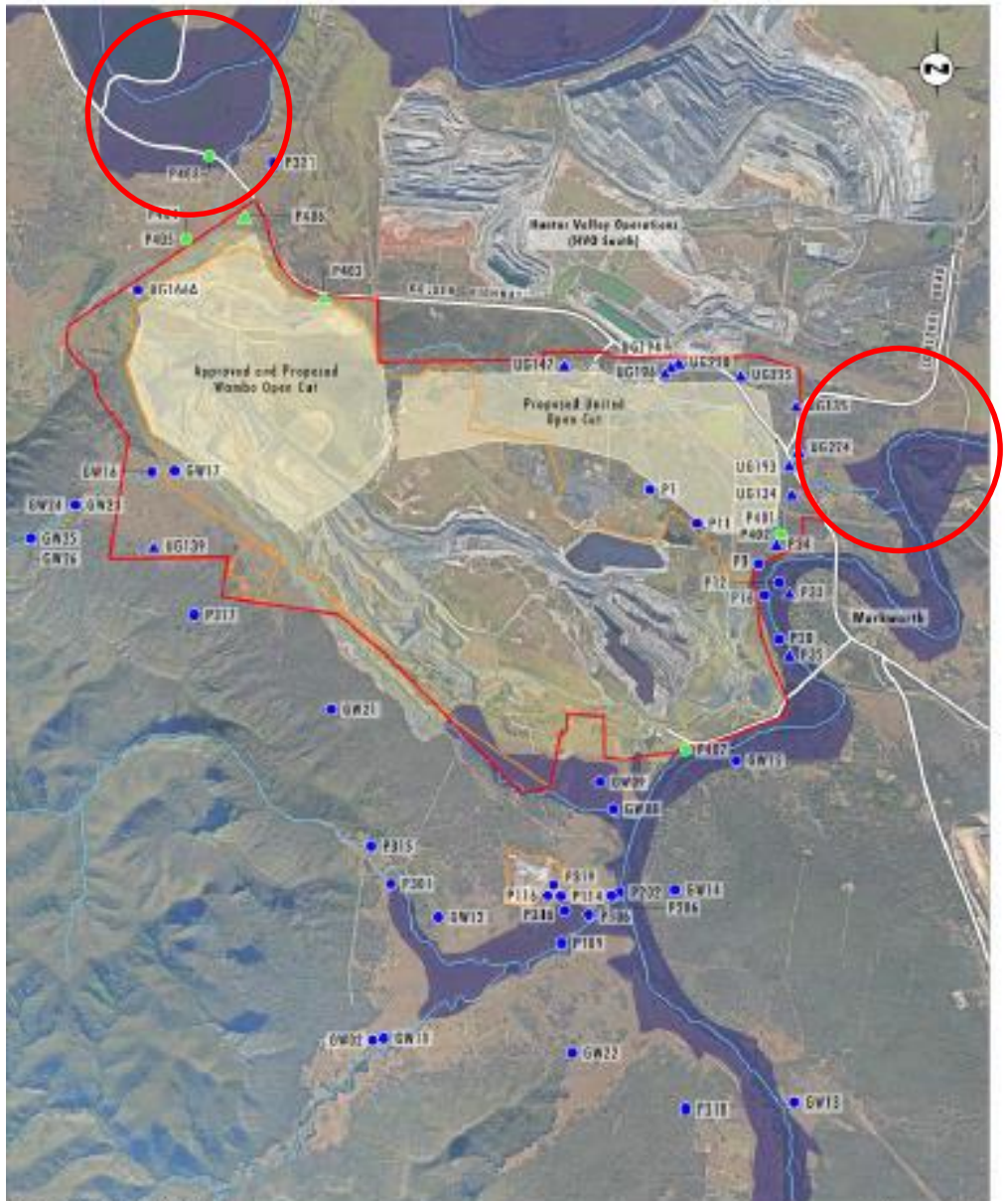
Hunter Valley Operations (HVO South)
Approved and Proposed Wambo Open Cut
Proposed Belford Open Cut
Warkworth
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IESC advice re: proposed management/mitigation strategies

"Question 3: Has the applicant provided reasonable strategies to avoid, mitigate or reduce the likelihood, extent and significance of impacts? And if not, why are the strategies unsatisfactory?

Response:

The proposed strategies were not able to be assessed due to the lack of information provided on these strategies in the assessment documentation. The water management plan (WMP) is the central element of the proposed mitigation and management measures. This document has not been finalised and was not provided with the assessment documentation. Therefore the IESC is unable to determine if the proposed strategies are reasonable."

- Without the details of the WMP, proper impact assessment & assessment of proposed mitigation/remediation options can't be completed. Stakeholders with an interest in the environmental values and water resources in the area should be afforded opportunity to scrutinise these plans before an approval decision is made.