

# Stratford Extension Project Environmental Impact Statement

## ATTACHMENT 3

## PEER REVIEW LETTERS





**KALF AND ASSOCIATES Pty Ltd**  
**Hydrogeological, Numerical Modelling Specialists**

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23 April 2012

**Review of Heritage Computing  
Hydrogeological Assessment and Modeling  
Stratford Coal Project**

**Background**

On the 30 March 2012, I completed a review of a 'Draft' report prepared by Heritage Computing (HC) dated 21 March 2012 in which I identified 62 items for correction, modification of both the text and report figures. Subsequently prior to preparing this acceptance letter, a number of comments, suggestions and inclusions, for the HC 'Draft Final' report dated 19 April were also sent to the authors.

Those reviews, and opinions contained within them, and this acceptance letter are only based on reports and information provided by HC and Resource Strategies and do not include a detailed model audit investigation. A model audit is the direct examination of the computer model itself and generated calibration and prediction output. Hence this review is based on a desk study based on reported description of the hydrogeology, hydrographs, bore logs, water quality, model structure, parameters used, calibration and associated statistics and predictions.

**Report Assessment and Conclusions**

The report is now in my opinion comprehensive and completed in a professional manner. It covers the important issues regarding any likely impacts to the groundwater and surface water systems due to additional mining. Based on the evidence contained within the modelling consultants report I concur with the report conclusions and management and mitigation measures presented.

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F. Kalf, B.Sc. M.App.Sc. PhD.

T.A. (Tom) McMahon FTSE  
Professor Emeritus



Tony Dwyer  
Stratford Coal Pty Ltd  
3364 The Bucketts Way  
Stratford NSW 2422

Dear Mr Dwyer

I have completed my assessment of Stratford Extension Project Surface Water Assessment and my comments are set out below. My review process consisted of reading and commenting on a draft of the report Gilbert & Associates Pty Ltd (2012): *Stratford Extension Project Surface Water Assessment*. Mar-12-J020813.rm1c.docx emailed to me on 3 March 2012. Responses to my comments were provided to me.

Based on my reading of the report, I recommended a number of changes, and I can confirm that all these were adequately addressed. I have perused the final Report June-12 and I am confident that the surface hydrology assessment and water balance methodologies are appropriate and, within the limits of the available data, are scientifically defensible.

The Report consists of eight sections plus a section listing references and four attachments: Attachment BA - Water Quality Monitoring Data; Attachment BB - Fluvial Geomorphological Assessment for Stratford Extension Project EIS [Fluvial Systems, 2012]; Attachment BC – Schoeller Plots; and Attachment BD - Stratford Extension Project Geotechnical Characterisation of CHPP Rejects [Allan Watson Associates, 2012].

Following an introduction to the Project and the related area (Section B1.0) and some comments on the baseline hydrology and climate (Section B2.0), Section B3.0 considers the existing and proposed water management systems. Next, in Section B4.0 a water and salt balance analysis of the project area is reported on. Section B5.0 provides an assessment of the surface water impacts of the proposed mine operation expansion on the flows, water quality, and geomorphology, where appropriate, on the local creeks including Avondale Creek. Post-mining water management is discussed in Section B6.0 and the effects of climate change are addressed in Section B7.0. The Report concludes with Section B8.0 in which recommendations to expand the water-related monitoring programme are described.

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Section B2.0 covers the baseline hydrology with major sections dealing with climate, catchments and surface water resources, baseline geomorphology, runoff and flooding, surface water quality, and a discussion of the water sharing arrangements for the Lower North Coast unregulated and alluvial water sources. The material included in this section is an appropriate background for the analysis in the following sections of the Report. Although water quality analysis is not my expertise, I believe that the interpretations of the results in Section B2.5 are logical and the observations are appropriate.

In Section B3.1 the existing water management of the Stratford Mining Complex is comprehensively described and in Section B3.2 the proposed project water management system is set out. The approach to achieving the design criteria (integrity of local and regional water, no release of mine-related water offsite, separation of undisturbed site water from affected water, and reliable sources of water for mine operation) is detailed, logical and, based on the material in the Report, is complete.

Section B4.0 describes the daily water balance model for the Stratford Mining Complex, its calibration, its application to the site, and a sensitivity analysis. The water balance is driven by 123 sequences, each 13 years in length, of historical daily rainfall and pan evaporation data. The model incorporates the Australian Water Balance Model to simulate runoff, and sub-models that estimate CHPP make-up water, dust suppression and irrigation demands. Model calibration was based on comparing cumulated monitored inflows to the BRNOC and the Roseville West Open pits with modelled inflows. From the comparison one is able to conclude that the estimated runoffs for the site are realistic. The salt balance analysis presents simulated median electrical conductivities (EC) of water in the contained water storages over the Project life, based on estimated EC values assigned to runoff from each water balance model sub-catchment area and other sources (e.g. groundwater and CHPP rejects). I am satisfied that the approach adopted in the salinity balance analysis is appropriate.

The potential operational impacts of the Project on local and regional surface water resources are described in Section B5.0. Based on information in the Report, I believe that the potential impacts identified in Section B5.0 have been dealt with satisfactorily.

Two issues, namely the drainage of the rehabilitated waste rock emplacement and the water management of the final void, are dealt with in Section B6.0. While I have little experience in the design of drainage systems, the proposed approach incorporates the key components that need to be considered: berm drains designed to discharge 100-year storm, appropriately designed drop-structures and stilling basins, flow spreaders and non-eroding drainage lines. I endorse the approach.

With regard to the final void, a water balance and a salt balance were carried out which I consider appropriate. While there will always be some uncertainty about the values of the model parameters for such long-term projections, a sensitivity analysis was carried out. Based on the water and salt balances and the sensitivity analysis, I believe the conclusions reached in the Report regarding the final void water levels and salinity levels are appropriate.

The conclusions reached in Section B7.0, which briefly reviews the effects of climate change on predicted surface water impacts, are appropriate and are not inconsistent with the broad observations noted by others dealing with the impact of climate change on future hydrology.

Section B8.0 offers comments on monitoring of surface water flows, surface water quality, site water balance and up-catchment diversions which I fully endorse.

In summary, I conclude that overall the study detailed in the Report *Stratford Extension Project Surface Water Assessment* was completed in a professional and detailed manner, and the conclusions in the Report are appropriately supplemented by the field and modelling studies carried out by the authors.

A handwritten signature in cursive script that reads "Thomas A. McMahon".

8 June 2012

18 June 2012

610 09020 Peer Review 201200618

Stratford Coal Pty Ltd  
c/- Resource Strategies Pty Ltd  
PO Box 1842  
MILTON QLD 4064

**Attention: Mr Mark Jacobs**

Dear Mark

## **Stratford Extension Project - Noise and Blasting Assessment Peer Review**

As requested, I have reviewed the SLR Consulting Australia Pty Ltd 610.09020-R1 "*Stratford Extension Project - Noise and Blasting Assessment*". This report has been prepared by Glenn Thomas and checked by Yang Liu and I have reviewed the technical content in accordance with relevant guidelines.

This review has been undertaken independent of the preparation of the report. As you are aware, I am highly experienced in the field of noise and blasting assessment, with over 35 years relevant experience. Relevant noise and blasting assessments that I have previously directed include:

- Donaldson Coal Mine
- Glennies Creek Coal Mine
- Parkes Gold Mine
- Mount Arthur North Coal Mine
- Cadia Gold Mine
- Dartbrook Coal Mine
- Mount Owen Coal Mine
- Lake Cowal Gold Mine
- Bellbird South Coal Mine
- Peak Hill Gold Mine
- Camberwell Coal Mine
- Duralie Coal Mine
- Mt Thorley Coal Mine
- Lihir Gold Mine

As noted within, the Noise and Blasting Assessment has been prepared in accordance with appropriate guidelines, including:

- The *NSW Industrial Noise Policy* (NSW Environmental Protection Authority [EPA], 2000);
- *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC, 1990);

- *NSW Road Noise Policy* (EPA, 2011);
- *Environmental Assessment Requirements for Rail Traffic Generating Developments* (Office of Environment and Heritage, 2011); and
- The *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009).

This review confirms that the Noise and Blasting Assessment conforms to the abovementioned relevant guidelines, is comprehensive and has been undertaken in a professional manner.

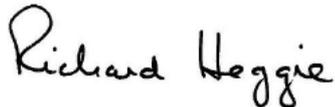
Notwithstanding, a number of issues and points of clarification were identified by the review. As a result of this, the issues that were identified in the draft document and then subsequently addressed in the final Report included:

- Simplification and increased clarity and consistency of expression of technical terminology.
- Improvements in the readability of tables, particularly to the lay person.
- Clearer description of project features and operational processes.
- Identification of instances where discussion of and analysis impacts had been overlooked.
- Improved consistency in referring to types of public roads.
- Correction of minor grammatical typographical errors.
- Correction of an extrapolation error associated with safe blasting distances and livestock.
- Improved interpretations and descriptions of the likely subjective perceptions of emission levels and their potential impacts.

In summary, I conclude that the report "Stratford Extension Project – Noise and Blasting Assessment" conforms to the relevant guidelines, is comprehensive and has been undertaken in a professional manner.

Please do not hesitate to contact the undersigned if you should have any queries.

Yours sincerely



RICHARD HEGGIE  
Director

# NH2 Dispersion Sciences

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30 May 2012

Attention: Mark Jacobs

Dear Mark,

## **Draft Review of PAEHolmes' Air Quality Assessment for Stratford Extension Project**

I have reviewed the Final Draft of the PAEHolmes air quality assessment for the Stratford Coal Mine Extension Project.

Most of the comments I made on the first draft have been implemented. I met with PAEHolmes to discuss my comments on the first draft; in particular to discuss the assessment of 24-hour PM<sub>10</sub> concentrations in consideration of background contributions. Demonstrating that a project will comply with the 24-hour PM<sub>10</sub> concentration limit of 50 µg/m<sup>3</sup> referred to in the Environment Protection Authority (EPA)'s *Approved Methods* (NSW EPA, 2005) is often difficult. The reasons primarily come down to the fact that 24-hour PM<sub>10</sub> concentrations can exceed the 50 µg/m<sup>3</sup> assessment criterion even if the project makes no contribution and the data record of background PM<sub>10</sub> concentrations needed to support the preferred assessment methodology is generally not available. This means that in practice the approach suggested in the *Approved Methods* for dealing with this matter cannot be applied to many situations.

In the case of the Stratford Coal Mine (SCM), although there is an extensive record of PM<sub>10</sub> concentration data recorded by High Volume Air Samples in a one-day-in-six cycle, the required continuous data (one year of continuous 24-hour PM<sub>10</sub> concentrations at the relevant receptors) do not exist. To overcome this PAEHolmes has applied a statistical analysis of available data (what they refer to as a "Monte Carlo" method), which is considered to be a valid approach in the absence of continuous data in the locality.

Their assessment shows that there is a small probability that the 50 µg/m<sup>3</sup> criterion could be exceeded. I suggest that the EIS proposes a real-time monitoring approach where in situations where monitoring shows that the 24-hour PM<sub>10</sub> concentration is likely to exceed 50 µg/m<sup>3</sup> at any privately-owned receiver; mitigation measures will be applied to reduce emissions from mining to the minimum levels practically achievable. In practice this will probably mean ceasing or relocating any active mining operation that is potentially contributing to PM<sub>10</sub> concentrations at the nominated receiver(s). This would have to be done using a real-time TEOM monitor (or equivalent) in the Craven area and a wind speed and wind direction monitor and an appropriate protocol. It might also be appropriate to tie this in with the proposed predictive meteorological forecasting as referred to in Section 7.1.2 of the PEAHolmes report and the Director-General's Requirements (DGRs).

From my review, the matters raised in the DGRs and EPA's letter have been addressed. I do not see any major deficiencies or omissions in the assessment and provided a satisfactory method for dealing with 24-hour PM<sub>10</sub> concentrations is described as suggested above; I believe that the air quality assessment is satisfactory.

Yours faithfully  
NH2 Dispersion Sciences

A handwritten signature in black ink that reads "N.E. Holmes." The signature is written in a cursive style.

Nigel Holmes PhD  
Atmospheric Physicist

## **Works Cited**

NSW EPA. (2005). *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. 59-61 Goulburn Street, Sydney, NSW: Office of Environment and Heritage.