

**Before a Hearings Panel Appointed by the  
Selwyn District Council and Canterbury Regional Council**

**Under**

the Resource Management Act 1991  
**(Act)**

**And**

**In the Matter**

an application under section 88 of the  
Act by Bathurst Coal Limited in  
relation to the completion of mining  
and closure and rehabilitation of the  
Canterbury Coal Mine in the Malvern  
Hills, Canterbury

**Summary Statement of  
James Andrew Griffiths (Hydrology)  
for Bathurst Coal Limited**

Dated: 26 October 2021

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## INTRODUCTION

1. My full name is James Andrew Griffiths
2. I have the qualifications and experience set out at paragraphs 2 - 4 of my statement of evidence dated 1 October 2021.
3. I reconfirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014.
4. In this statement, I provide a summary of the key points in my evidence and respond to the evidence provided for the Council which I have read.

## KEY POINTS

5. The area of natural surface water catchments that encircle the CCM site will be marginally different after mine closure compared to pre-mining conditions ( $< \pm 1\%$ ). There should be minimal volumetric change to flow inputs to the Waianiwaniwa and Selwyn River catchments.
6. The raised spring and seepage wetlands to the north of the MOA which have been flagged as 'at risk' have not to date been impacted by mining activities. The source of water to the raised spring and seepage wetlands is uncertain, but previous work suggests that the raised spring is fed by lateral hydrostatic pressure so could continue without impact.
7. Flow to the Tara Gulley from the MOA will be managed to meet minimum flows requirements after commissioning of the mussel shell reactor (MSR). It should be noted that natural catchment runoff will also contribute to downstream flows in the Tara gulley.

## HYDROLOGICAL IMPLICATIONS OF CLOSURE AND MANAGEMENT

8. I agree with the potential hydrological implications of mine closure on the hydrology of the CCM site as have been well documented within the Mine Closure Plan.<sup>1</sup> The aim of the plan is to ensure compliance with consent conditions, prevent or minimise concentration of surface water flows and associated soil erosion and sediment transport, and enable the staged dispersal of water to the surrounding catchments.
9. **Figure 2** attached at **Appendix 2** of my evidence dated 1 October 2021 illustrates the changes in surface water sub-catchments within which the CCM lies (and expected final catchment boundaries). Changes to all surrounding sub-catchments that overlap the mined area are small, range from 0.617% (Oyster catchment) to -0.307% (Bush Gully). Table 1 illustrates the changes in all catchment areas that are influenced by drainage from the CCM. Total change in area of the receiving Waianiwaniwa and Selwyn catchments are also shown. It can be seen that there is minor differences (all less than 1%) to all catchment areas.

Table 1 Final sub-catchment sizes.

Catchment	Before (Ha)	After (Ha)	Change (Ha)	% Change
Tara	192.1	192.8	0.7	0.364%
Bush Gully	898.1	895.3	-2.76	-0.307%
Oyster	372.9	375.2	2.3	0.617%
Surveyors Lower	321.2	320.9	-0.28	-0.087%
Waianiwaniwa River	9690.2	9690.5	0.28	0.003%
Selwyn River	30250.0	30249.7	-0.28	-0.001%

10. Impacts of the flow regime of the wider Selwyn Te Waihora catchment should be minimal after closure as the response of the landscape is

<sup>1</sup> Bathurst Resources Ltd, 2021. . Canterbury Coal Mine – Mine Closure Final Landform Surface Water Management Report.

expected to be close to that of the original but will include buffer ponds to reduce hydrograph peaks (and thus reduce the risk of flooding). The catchment area of Surveyors Gully will be reduced by 0.28 Ha so should not contribute to an increased risk of flooding.

## RESPONSE TO SECTION 42A REPORTS

11. The section 42A report from Environment Canterbury raises some issues that relate to hydrology, which I respond to below.

### *Seepage areas outside the MOA Boundary*

12. Concerns have been raised about the impacts of the closure plan on the raised spring and seepage wetlands outside of the MOA.<sup>2</sup> Ms Dawson raises concerns about the changes to the hydrology on the north west slopes due to the landform not being reinstated to its original form. Ms Dawson states that this is due to the contributing hydrological catchment for surface water and shallow subsurface water flow being reduced by half. For the reasons outlined below I disagree with this assessment.
13. Previous hydrological work indicated that the seepage wetlands are most likely sustained by shallow or superficial groundwater movement in a downslope direction<sup>3</sup>. In addition, the deeper groundwater movement is controlled by preferential permeability along the strike of the strata (i.e., in the east-west) direction rather than the dip (south-north) direction
14. For wetlands outside the MOA, I consider it unlikely that the planned closure works would disrupt existing groundwater patterns as no additional excavation work will take place and final landscape will be designed to replicate surface properties of surrounding landscape. Seepage

<sup>2</sup> Section 42A Officers Report of Ms Dawson at paragraph 492.

<sup>3</sup> Bathurst Resources Ltd – Further Information Response. [03\_01 Final Bathurst RFI 19Dec19\_SUBMITTED.pdf]

contributions to wetland areas as surrounding catchments areas will be largely the same as pre-mining conditions.

15. The seepage/spring area which provides wetland habitat on the north-west side of the mine includes a distinctive raised spring area. The ridge on the northern margin of the MOA has been removed during mining so that the surface water contributing area above the raised spring has been reduced. As part of the mine closure planning, the quarried ridge on the northern margin of the MOA will not be reinstated. As a result, surface water run-off that previously drained north into the Bush Gully, will drain towards the proposed N02 pond to the south of the original catchment divide. As the spring is suspected to depend on sub-surface hydrostatic pressures as opposed to surface water drainage reduction of the surface water catchment up-gradient of the spring should not impact its flow.
16. The seepage areas and wetlands on the north side of the MOA boundary (draining into the Bush Gully Stream) have continued to exist despite a reduction in the surface water catchment area (due to the expansion of the MOA). It has also been noted that during site visits that flows from the spring continue to be unaffected by the reduced surface water catchment even in summer (thus confirming its sub-surface origins). These seepages and flow from the raised spring were still evident in a site visit made on 15<sup>th</sup> September 2021.

***Catchment drainage, sub-catchment hydrology and ecosystems***

17. A key concern raised by Ms Dawson is the impact of the storage ponds on future flows to the Tara Stream. On entering the post closure phase, the Tara



Pond pumps will be decommissioned, and the Tara Pond will spill through a constructed drain to the Tara Wetland.<sup>4</sup>

18. Using the method of Jens Rekker, Ms Dodson has calculated the potential impact of sub-catchment area changes on MALF (+0.394% in Tara Stream; -0.299% in Bush Stream) [Appendix 4; para 26]. I agree that the method is an appropriate way to estimate MALF and related changes caused by change in catchment area.
19. It is noted that the estimated MALF7d of 0.08 L/s to the Tara gully from CC02 will be maintained by the system which has been designed to produce dilution flows in the range of 0.48 to 0.18 post.<sup>5</sup>
20. It should be noted that the Tara Pond will operate at a full level and with a spill threshold so that the volume outflow from the pond to the Tara Stream will equal the volume inflow. This means that any runoff produced by 'small fresh summer rainfall events' within the Tara catchment will drain to the Tara Pond and thence down to the Tara Stream without obstruction.
21. It should also be noted that in addition to 6.56 Ha of runoff directly into the Tara Pond and 12.9 Ha of runoff into of N02, an additional 20 Ha of runoff will feed into the Tara stream from the natural catchment outside of the MOA (13 Ha) and 6.46 Ha from Frew Hill (4.81 Ha) and other minor drainages (0.79+0.86 Ha) from the MOA upstream of CC02\_tele (area shown on **Figure 4 Appendix 1** to my evidence dated 1 October 2021).
22. I also note that, the proposed consent conditions include demonstration and checking of the new hydrological boundaries after completion of landform

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<sup>4</sup> Section 42A Officers Report of Ms Dawson at paragraphs 310-315.

<sup>5</sup> As described in the Statement of Evidence of Paul Weber, 1 October 2021, at [107]-[108].

changes; monitoring of N02 and Tara pond spillways (as stated in the MCMP); and inclusion of a monitoring weir to allow monitoring of flows from the Tara Pond (to the Tara Stream). In my view, the conditions (or equivalent) are appropriate to ensure sufficient flows are released from the Tara pond to maintain the integrity of the downstream wetland.



**James Andrew Griffiths**

**26 October 2021**

