

2026-09-23 Peter Blackwood-Barrytown Minerals Project Fast Track Consent Application- Advice on Fast Track Panel Questions 4 and 5

Kia Ora Rachel and Fast Track Panel. The below refers.

The questions are:

d) Consider what information should be certified and be in place before any waterbody is interfered with to ensure the progressive rehabilitation achieves a final waterbody morphology that is structurally and functionally appropriate and meets the aims of Figure 11 (Substantive Application, Appendix 6).

e) Assess the project's potential to materially interfere with natural waterbody hydrology and how any risks can be managed

The application includes five creeks that will be subject to diversion and reconstruction activities - being the Northern Creek, Central Creek, Clarke Creek, Wasabi Creek and Southern Creek. Other major enclosed streams including Canoe Creek (largely outside the block), Little Granite Creek and Granite Creek will not be diverted during the mining of the Southern Block.

In answering these questions I have considered the following information, submitted with the application:

1. *Barrytown Minerals Project Southern Block – Rehabilitation Plan*, Tai Poutini Resources, May 2006. In particular Section 6. Diversions and Streamworks;
2. *Barrytown South Mineral Sand Project – Hydrological Effects Assessment* (Report No.Z24011BTS-2), Rekker, J.H., Etheridge, Z.E., Prepared by Komanawa Solutions Ltd, 25 May 2026 Final-B;
3. *Barrytown Mineral Sands Project: Southern Block-Landscape Mitigation Package*, Glasson Huxtable Landscape Architects, May 2026 – Revision H. In particular 15.0 Landscape Rehabilitation – During Mining Section 2: Realigned Creeks;
4. *Barrytown Minerals Project Southern Block. Appendix P1 Proposed Resource Consent Conditions – District and Regional Council*, Taiko Critical Minerals West Coast New Zealand, May 2026; and
5. *Barrytown South Mineral Sand Project – Ecological Effects Assessment*, Ecological Solutions Environmental Consultants, 30 March 2026.

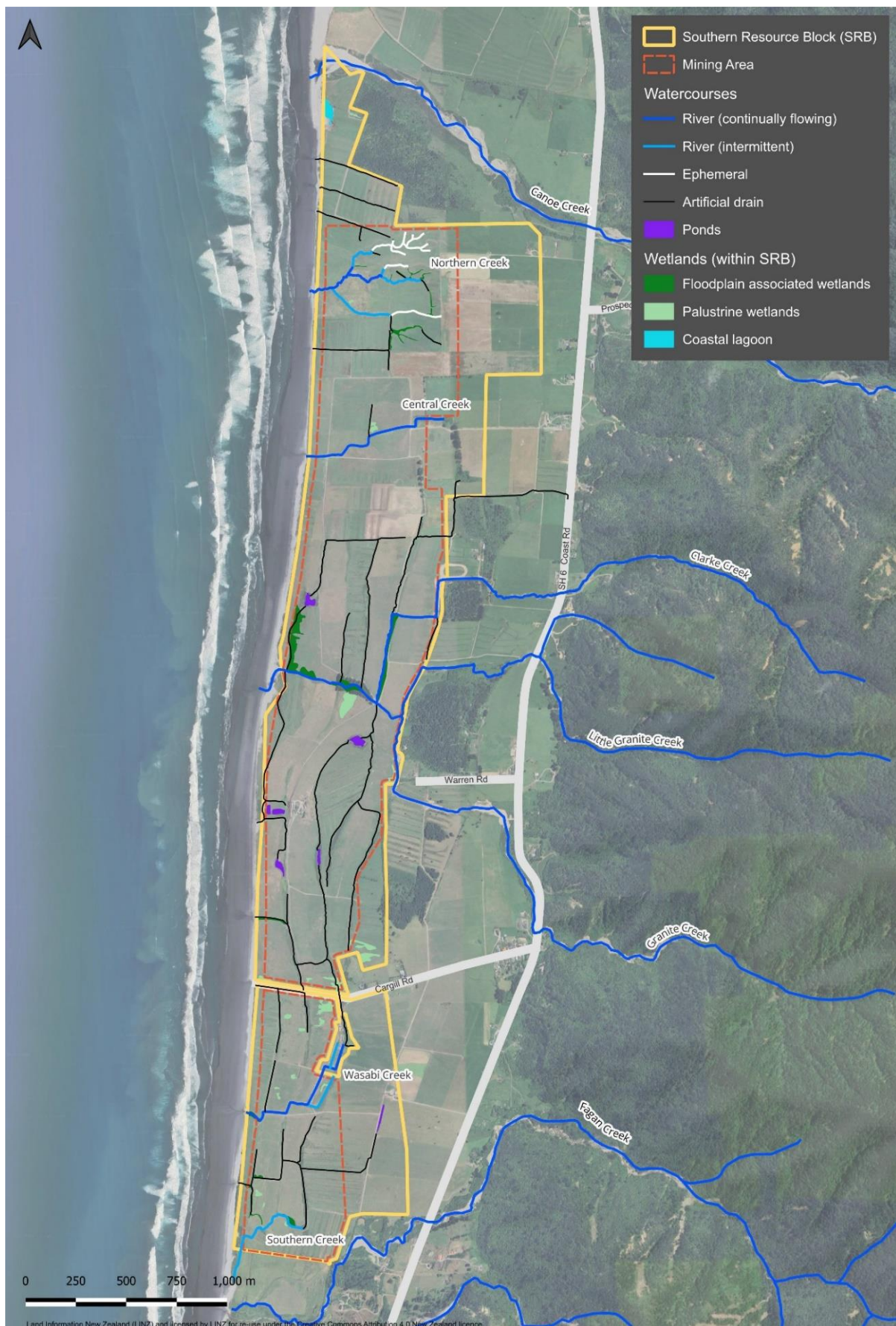
The location of the streams is shown in Figure 1 of reference 1 and is reproduced overleaf.

Most, if not all of these streams are highly modified streams (or drains). In terms of my area of expertise I agree entirely with the design principles listed in Section 5.3 of reference 1 (is actually section 6.3 for clarity). These are:

- a) *Maintain hydraulic capacity to convey design flows and prevent flooding;*
- b) *Minimise erosion and sediment generation;*
- c) *Promote stable channel forms and banks;...*

Furthermore:

“Diversion channels will be sized and aligned to accommodate expected flows and will incorporate gentle batters, stabilised beds and erosion-resistant materials where required”.



Section 5.4 (actually 6.4) of reference 1 describes the Diversion Sequence and Methodology. The third and fourth bullet points page 16 advises:

- “Stabilisation of the newly constructed diversion channel will be carried out to ensure it does not become a source of sediment. This may be achieved using natural materials such as coir matting, riprap material or rock armour;
- Once the diversion channel is fully stabilised, the downstream and upstream plugs will be removed to allow creek flows to enter the diversion channel”

The text furthermore describes the method of diversion (and fish removal), the buffer zone between the creek and drain systems and the mining activity, and the reinstatement of the channel to its original or new position.

This then leads to the Fast Track Panel’s questions d and e. There are a several unknowns that need tying down. This is addressed over the following summary sections:

Baseline Stream Morphology - Channel Form and Slope

Even though these channels are generally significantly modified, they would have largely achieved a shape (cross-section) and slope to harmoniously interact with the adjacent floodplain in the current streams morphology.

I have not seen any complaint about the current shape and slope. From inspection of Figure 12 of reference 2, the average slope of Granite Creek for the approximately 2km downstream of SH6 is around 2%, with slope greater than that near SH6 and lesser near the Tasman Sea. This appears to be a harmonious state and should be reproduced in the rehabilitated channel. I would expect the slopes to be similar for Clarke Creek. The other watercourses are all only in the lower floodplain, with lesser slopes.

A baseline survey of the stream inverts should be conducted; together with survey of the predominant channel cross-sections. Ideally this would be completed by a skilled drone operator, with representative cross-sections surveyed at regular intervals – maybe every 100m.

This would define the baseline stream morphology. It obviously has to be completed prior to the waterbody being interfered with.

Flood Hydrology and Erosion

A very comprehensive hydrological effects assessment has been produced. However, the peak flow estimates are anomalous in Section 2.7.3.4 pages 26-27. This refers to application of the rational method with a runoff coefficient of 0.15. In Table 7 HIRDS rainfall intensities have been applied to give, for example on the Granite catchment, a 1 in 100 year 1 hour rainfall of 57.4mm and peak flow of 13.31m³/s. For a catchment area of 3.1km² (Figure 8, reference 2) the flood flow would be 7.4m³/s. Therefore, maybe a higher value of C was used.

However, a value of 0.15 is far too low for a catchment where the rainfall intensity is over 50mm per hour. Based on the MWD Culvert Manual the component for rainfall alone is 0.15 (for all intensities of 25-50mm per hour) and taking the minimum component for surface retention, infiltration and cover yields a net value of 0.35. Adjustment for flat slope yields 0.3.

I have also checked further by applying Table 1, (Estimation of Catchment Factor C_m for use in the rational method) of the much more recent publication “*Estimation of Mean Annual Flood in*

New Zealand”, George Griffiths and Alistair I. McKerchar, NIWA, Journal of Hydrology (NZ) 51 (2)” 111-120, NZ Hydrological Society 2012. Applying the minimum factors for relief, surface and subsurface storage, infiltration and vegetation, gave a runoff coefficient of 0.30. This is a very considered publication and thus a value of at least 0.30 should be applied.

The next question is what return period flood should be accommodated in the channel. Generally channels of this size will accommodate the 2 to 5 year flood before spilling overbank. A sum must be provided of the calculated flood capacity or all the channels being interfered with. I would expect this to be within the bounds of a 2 to 5 year flood. This will set the minimum design of the future rehabilitated channel.

Erosion Protection

The erosion protection must be designed to cope with firstly, the array of flood flows likely within the mining period, and secondly those within the rehabilitated state. It is hard to be precise, but I would recommend that the velocities in the 5 year return period flood be assessed and the appropriate channel stabilisation be determined – whether it be coir matting, riprap material or rock armour, or even an appropriate geotextile. This must be designed prior to the works.

Potential to Materially Interfere with the Natural Waterbody Hydrology and Risk Mitigation

This is a good question to consider. Provided the conveyance (flood carrying capacity) of the stream channels during mining and after rehabilitation is at least equivalent to that existing now, then there should be no problems. However, I would recommend that at all bends, the banks and streambed be armoured with designed rock. The normal standard would be to withstand without damage, velocities in a 20-year (5% AEP) flood. I have also suggested a catchall condition to remedy any unforeseen damage.

Recommended Consent Conditions

1. Prior to any waterbody is interfered with a formal survey shall be completed of the channel invert level and regular cross-sections, at a minimum of 100 metre intervals. This survey shall commence at least 100 metres upstream of the proposed new channel and terminate 100 metres downstream of the channel.
2. Prior to commencing these works, the estimated channel capacity of the existing stream channels shall be reliably calculated to the satisfaction of the WCRC Principal Compliance Officer or Delegate.
3. Further to (2) the constructed channel slope and dimensions must be surveyed to confirm compliance with the required dimensions.
4. The stream channels constructed to convey the streams during mining shall have at least the same channel capacity as the natural stream channels. Furthermore, have suitable passage for fish.
5. At all bends on the newly constructed channel that is in place during mining, or the rehabilitated channel post-mining the banks and streambed must be capable of withstanding without damage, velocities in a 20-year (5% AEP) flood.
6. Any erosion resulting from the exercise of this consent shall be remedied to the satisfaction of the WCRC Principal Compliance Officer or Delegate within 10 working days of being instructed to repair the damage;

A handwritten signature in black ink that reads "Peter Blackwood". There are three red dots placed on the signature: one on the 'e' in "Peter", one on the 'c' in "Blackwood", and one on the 'o' in "Blackwood".

Peter Blackwood

Chief Engineer | West Coast Regional Council



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