

In the matter of an application for approvals under the Fast Track Approvals Act 2024

By **Tāiko Critical Minerals**

Applicant

**Statement of evidence of Jens Haaye Rekker in relation to Hydrology,
Hydrogeology and Water Management**

26 March 2026

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Introduction

- 1 My name is Jens Haaye Rekker.
- 2 My role in relation to the application by Tāiko Critical Minerals Limited (**the application**) for approvals relating to the Barrytown Mineral Sands – Southern Block Project (**the Project**) has been to provide expert advice in relation to Hydrology, Hydrogeology and Water Management, including water quality.
- 3 I prepared the “Barrytown South Mineral Sand Project – Hydrological Effects Assessment” (**Report**) which has been provided in support of the application.
- 4 The purpose of this evidence is to:
 - (a) provide my qualifications and experience relevant to the Report;
 - (b) confirm my compliance with the Code of Conduct for expert witnesses, contained in the Environment Court of New Zealand Practice Note 2023;
 - (c) provide a brief summary of my report and confirm its contents; and
 - (d) comment on the proposed conditions.

Qualifications and experience

- 5 I am currently employed as a Principal Hydrogeologist by Kōmanawa Solutions Limited and have held that position since January 2022.
- 6 I hold the qualifications of Bachelor of Science and Postgraduate Diploma in Science (with Credit) within the geoscience of geology, from the University of Otago.
- 7 I have 33 years of experience primarily as a hydrogeologist (or groundwater scientist) in a range of consulting, regional council and research institute roles.
- 8 My previous work experience includes five years at Otago Regional Council as Resource Scientist – Groundwater and a further year as Senior Catchment Modelling Scientist. I was tasked with groundwater basin sustainable yield assessments, water quality studies, assistance to water policy development and providing expert testimony for hearings, District Court or Environment Court.
- 9 From 1994 – 2008 and also since 2022, I worked in engineering and environmental companies on mining, water supply and hydrogeological impact studies, including groundwater quality.
- 10 I have been involved in the hydrological assessments of the Barrytown mineral sands proposals since late 2019, and the Application Site since July 2022. I have

inspected the Application Site, primarily in the central part, on three separate occasions for characterisation studies.

- 11 My role in relation to Tāiko Critical Minerals Limited's (TCM) application under the Fast-Track Approvals Act 2024 to establish and operate a mineral sands mine at SH6 Barrytown (Application and Application Site) has been to provide advice in relation to undertaking field investigations, develop a hydrological monitoring programme, prepare a conceptual model of Application Site hydrology and hydro chemistry, and to carry out environmental assessment.

Expert witness Code of Conduct

- 12 While this application is not being considered by the Environment Court, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and that I have complied with it when preparing this evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Summary of Report

- 13 Supplementary to more comprehensive reporting, I provide this brief summary of the report, including:
- (a) The key issues in relation to hydrology, hydrogeology and water management are as follows:
 - (i) The operational mining activity of sand extraction is rebalanced by the continuous return of non-ore sand and water circulating in the slurry lines between the dredge pond, Wet Concentrator Plant, and tailings deposition zone, which is located behind the dredge pond in the wake of mining;
 - (ii) The associated shallow groundwater system is closely tied to the surface water creeks and farm drains while the operational dredge pond water level will be allowed to rest at approximately the level of adjoining water table and surface water;
 - (iii) The water supply source for Wet Concentrator Plant would be drawn from the Canoe Creek infiltration gallery with the limit on peak daily rate of abstraction less than 10% of the Seven-day Mean Annual Low Flow (MALF_{7d}) statistic for that creek;

- (iv) Turbidity, dissolved metals, and nutrients would be released into water as a consequence of mining but primarily retained within mining materials circuits and the active dredge pond;
 - (v) The mobility and concentration of dissolved metals and possibly also nutrients would be reduced by the dosing with crushed limestone and the natural attenuative properties of the mineral sand groundwater system;
 - (vi) Overall hydrological function of the lowland creeks crossing the coastal flats, other than Granite Creek, would be maintained by a system of planned diversions around the travelling dredge pond;
 - (vii) The bed of Granite Creek, including the flows of Little Granite Creek and Clarke Creek, where it crosses the line of the mining area would not be mined;
 - (viii) Post-mining rehabilitation of land and water bodies would restore the creek and wetland network with an emphasis on restoring natural features and habitat for indigenous biota;
 - (ix) Creeks and wetlands would be restored, and in some cases amalgamated into fluvial and lacustrine wetland complexes with ecological values, at the conclusion of mineral sand mining;
- (b) The Southern Block (SB) mineral sand mining area has been characterised by the following techniques:
- (i) The mineral resource was defined by widespread and densely spaced drilling for acquisition of geological data;
 - (ii) Piezometers have been installed across the Application Site for the purposes of water level monitoring, groundwater sampling, and groundwater characterisation;
 - (iii) A series of first principles and empirical calculations of hydrological responses have been undertaken to confirm professional judgement as to existing conditions and prediction of water-related effects;
 - (iv) Bulk samples of mineral sand have been taken and subjected to geochemical analysis, including tailings lime dosing tests;
- (c) Net effects of mining, and restoration / rehabilitation effects include:
- (i) The passage of the active dredge pond leads to minor water table lowering due to flattening of hydraulic gradient plus evaporation of

ponded groundwater, although net surcharge of the dredge pond with water would in some circumstances oppose such lowering;

- (ii) Cross-cutting truncation of surface water courses during mine operations will be managed with the provision of diversion channels and temporary bunds to temporarily bypass the dredge pond;
- (iii) The Granity Creek main stem, Cargill Road and the Wasabi springs will not be included in mine paths, and offset distances from the coastline MHWS (50 metres), external property boundaries, Granite Creek and Significant Natural Area PUN-049 (all 20 metres) will be observed in recognition of values and heightened environmental sensitivity;
- (iv) Each of the three SB mining sections would involve temporary diversions of creeks classed as 'rivers'. As operational mining is concluded, water courses and wetland landforms will be restored and rehabilitated;
- (v) The taking of water from the Canoe Creek infiltration gallery would not exert depletion effects on the adjoining surface water for any more than 10% of the applicable $MALF_{7d}$, which limits the water resource and ecological effects of the abstraction to less than minor;
- (vi) The penetration of fine suspended sediment making up dredge pond turbidity is projected to be attenuated by filtration through tailings and be limited to a maximum of 50 metres from the edge of pond or tailings deposition zone;
- (vii) The management of dissolved metals elevation would include the co-deposition of small quantities of hydrated lime to adjust pH and remove geochemical conditions for metals mobility.

Proposed conditions

14 I have reviewed the proposed conditions at Section 6.3 of the Report as they relate to my area of expertise. I consider they are appropriate:

- (a) Groundwater level monitoring will be undertaken at the Canoe Creek water supply gallery and at four monitoring bores (PZ-1 to 4) to be installed along the Pakiroa Beach coastline. Ground water quality monitoring will be undertaken at the same coastal monitoring bores (PZ-1 to 4);
- (b) Surface water quality will be monitored at four creek sites near to significant creek mouths or hāpua along the Pakiroa Beach coastline at Northern

Creek, Central Creek, Granity Creek, Unnamed tributary north of Cargill Road, Wasabi Creek, and Southern Creek;

- (c) Threshold concentrations, after correction for dependencies, will be compared against the results of monitoring of groundwater and any exceedances notified and response plans developed for effects management;
 - (d) Water flow rates will be gauged or metered at Canoe Creek at SH6, Clarke Creek Upstream and metering of water take at the Canoe Creek alluvium infiltration gallery.
- 15 The Water Management Plan and Monitoring & Effects Management Plan contain additional management measures. These plans are specified by conditions 6.1 to 6.9, including certification by the Consent Authority.
- 16 In my opinion implementing the Erosion and Sediment Control Plan (ESCP) prepared by Ridley Dunphy Environmental Ltd will ensure that the overall level of effect of the proposed earthworks on turbidity and water quality following proposed minimisation and remedies will be low.

Conclusions

- 17 Each of the principal effects attached to the proposed activities have been assessed and a level of effect assigned:
- (a) The water take, sand mining, backfill with tailings and water contamination activities all have less than minor levels of effect, after attenuation and limestone dosing in the case of water contamination;
 - (b) The removal of wetlands and creek courses after the application of restoration and post-closure rehabilitation have a low level of effects once these remedies are applied in the shape of channel diversions, rehabilitation of an expanded wetland complex, and rehabilitation of the final creek network.
- 18 The Effects Mitigation Hierarchy (avoid, minimise or remedy) was also included in the Water Management Plan, and Monitoring & Effects Management Plan.
- (a) Once the mining plan determined there was a functional need for the surface mining of mineral sands in the Southern Block, mine-path measures to (as far as practicable) avoid mining through wetlands were employed;

- (b) For those remaining wetlands surrounding the mine path, a mining method was selected that minimised dewatering and the consequent altering of groundwater levels and/or creek flow disruption;
 - (c) Sand dredging with a travelling dredge pond would minimise any lowering of the water table and minimise realignment of surface water flows through targeted diversions;
 - (d) For those wetland fragments within the mine path that would be mined out, rehabilitation remedying this loss by restoring a larger extent of the post-mining wetland complex has been considered and will be implemented as part of a rehabilitation plan;
 - (e) The creek network following wetland rehabilitation would need to mesh with a partly artificial set of creek alignments and profiles. These residual effects would be remedied by rehabilitating creek alignments and channel morphology to a more natural character with enhanced habitat and amenity values, but in a way which retains existing hydrological functioning.
- 19 The following levels of certainty that are held for the existing environment, potential effects and remedial measure assessments may be summarised as follows:
- (a) The existing environment characterisation and hydrological conceptual model has allowed a **high level of certainty** to be obtained for the affected surface water and groundwater systems;
 - (b) The compilation of assessments was feasible for all potential effect classes with a **moderate to high level of certainty**;
 - (c) The evaluation of remedial measures in managing the effects also had a **moderate to high level of certainty**.

Jens Haaye Rekker

26 March 2026