

BEFORE THE EXPERT PANEL

FTAA-2507-1089

UNDER
IN THE MATTER

Fast-track Approvals Act 2024
of the Bendigo-Ophir Gold Project

**STATEMENT OF EVIDENCE OF DR ALEXANDER MCALPINE ON BEHALF OF
SUSTAINABLE TARRAS**

Dated 07 September 2026

Julian Miles KC
Richmond Chambers
miles@richmondchambers.co.nz

SALLY GEPP KC

M +64 21 558 241 — SALLY.GEPP@MILLSLANE.CO.NZ
MILLS LANE CHAMBERS, 3 BROOKSIDE, NELSON 7010
PO BOX 537 SHORTLAND ST, AUCKLAND 1140. MILLSLANE.CO.NZ

TO THE EXPERT PANEL

1. My name is Dr Alexander McAlpine. I provided a statement of evidence dated 04 April 2026 on behalf of Sustainable Tarras Inc. in relation to various geoscience matters. My qualifications and experience were set out in that statement.
2. The purpose of this statement is to comment on the Applicant's Response to Minute 40 which addresses geotechnical matters raised by Commissioner Johnson.

Signed: 

Date: 07 September 2026

Summary

3. My April statement of evidence concluded the Applicant's Substantive Geotechnical Report to the Fast Track Application (*Ref. B.28 Peter O'Bryan & Associates Geotechnical Assessment Open Pit and Underground Mining - Rise and Shine Deposit, June 2025*) contained many references to further geotechnical data collection and analyses being required before the Project reached the Feasibility Stage.
4. I find nothing in the Applicant's subsequent response to Minute 40, or other RFIs, Joint Witness statements and Hearings submissions, to indicate the design of the proposed mine has yet progressed beyond the Pre-Feasibility Stage.
5. In particular, the proposed Bendigo Project has not yet undertaken sufficiently robust geotechnical and hydrogeologic modelling (either 2D or 3D) that incorporates:
 - a) realistic ranges of the magnitudes and orientations in-situ (tectonic) stresses;
 - b) bulk rock-strength properties and anisotropy;
 - c) geomechanical properties of the defining stratigraphic and structural boundaries/discontinuities;
 - d) hydrogeologic models that include scenarios for original, or induced, fracture permeability in low-permeability unweathered schist bedrock; and
 - e) benchmarking against publicly available reports, data, modelling results and learnings from various unexpected and problematic landslides and ground movements in the analogues Macraes open-pit and underground mines.
6. Consequently, I consider the Project insufficiently mature to enable meaningful consideration of most resource consents and conditions that are the subject of the Fast-Track Application.

Key Geotechnical concerns

7. The Applicant has currently only considered isostatic stress conditions at the proposed mine site, which is the most implausible and optimistic design assumption.
8. Natural earthquake activity indicates the shallow crustal rocks in West Otago are highly stressed and commonly reach critical failure conditions, as shown in **Figure-1** below.

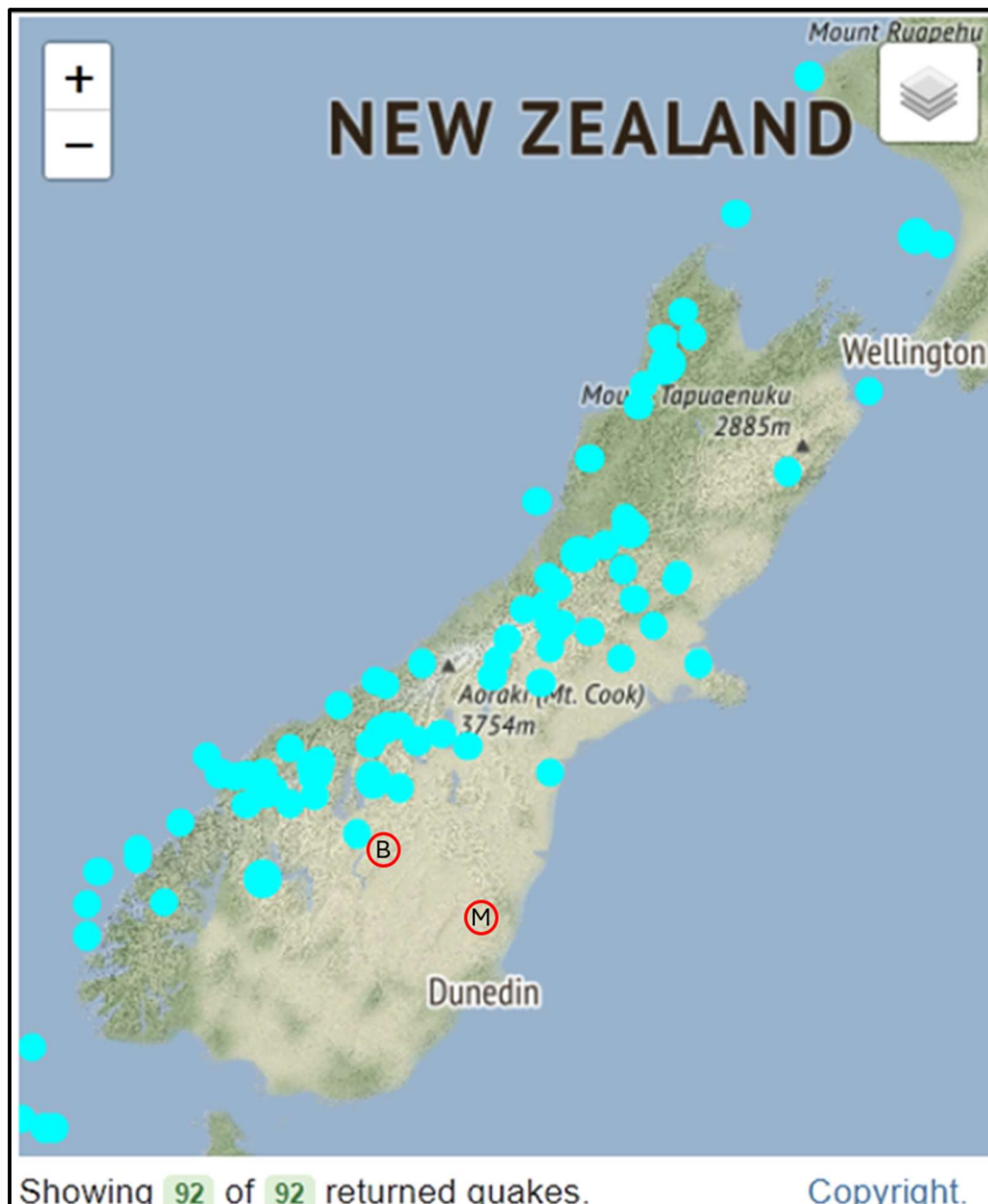


Figure-1: GeoNet locations of shallow (<3.5km deep) natural earthquakes recorded across the South Island from 01 May 2025 to 01 May 2026. Note the Bendigo Region (B) sits closer to edge of the active shallow earthquake zone than Macraes (M).

(Source GeoNet QuakeSearch website)

9. Additionally, the measured geodetic strain in Otago also increases towards the West, as shown in **Figure-2**. This further emphasises the importance of basing the Bendigo mine design on non-isostatic stress conditions.

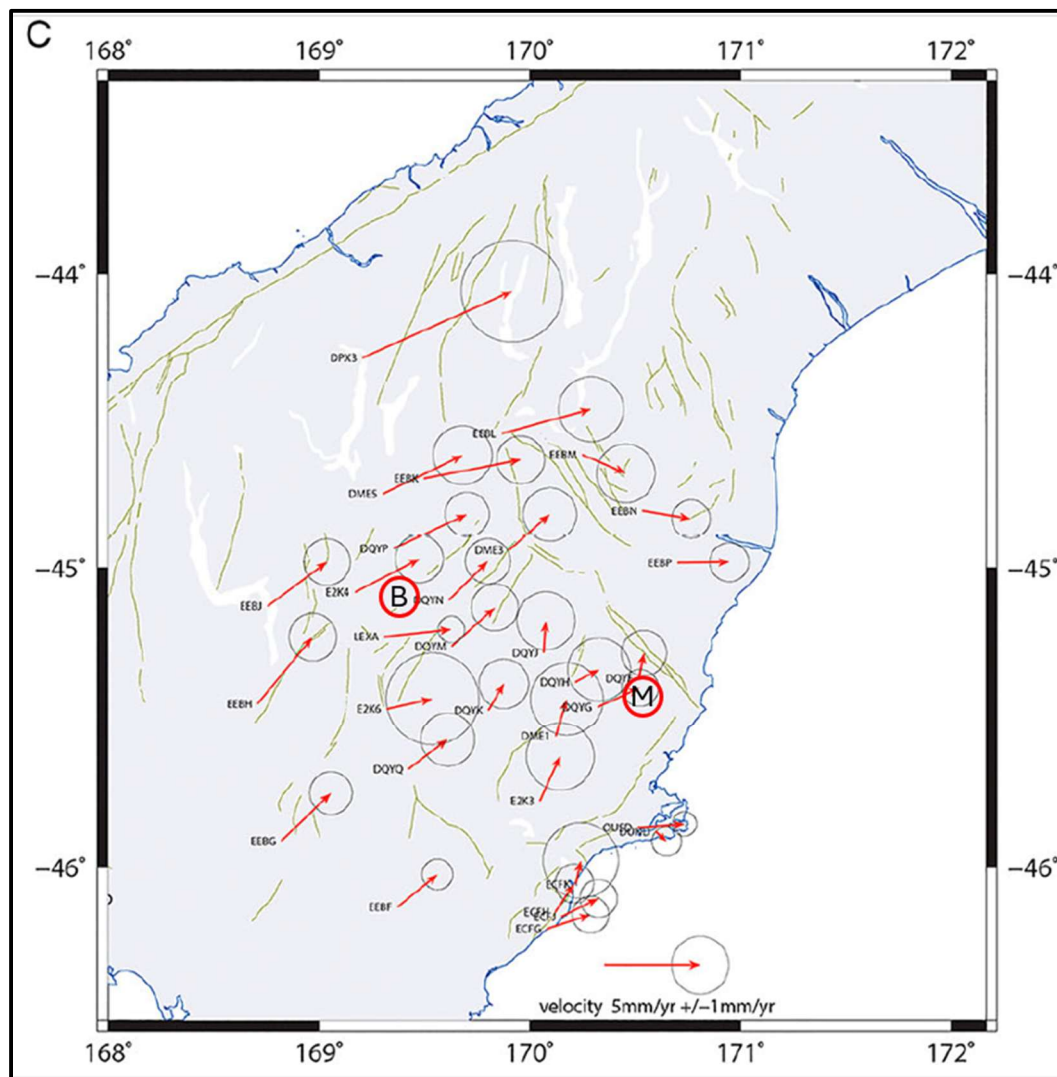


Figure-2: Geodetic Strain Velocity Field in Otago (rotated to Pacific Plate fixed system). Error ellipses are at the 1-sigma level of confidence. Velocity field derived using data after the Dusky Sound 2009 earthquake. Note the Bendigo Region (B) sits in an area of greater tectonic strain than Macraes (M).

(Modified from Denys et al, 2016)

10. Detailed data for the crustal stress vectors in the Otago Region is provided by Williams, et al., 2026. See **Figure-3** for illustration.

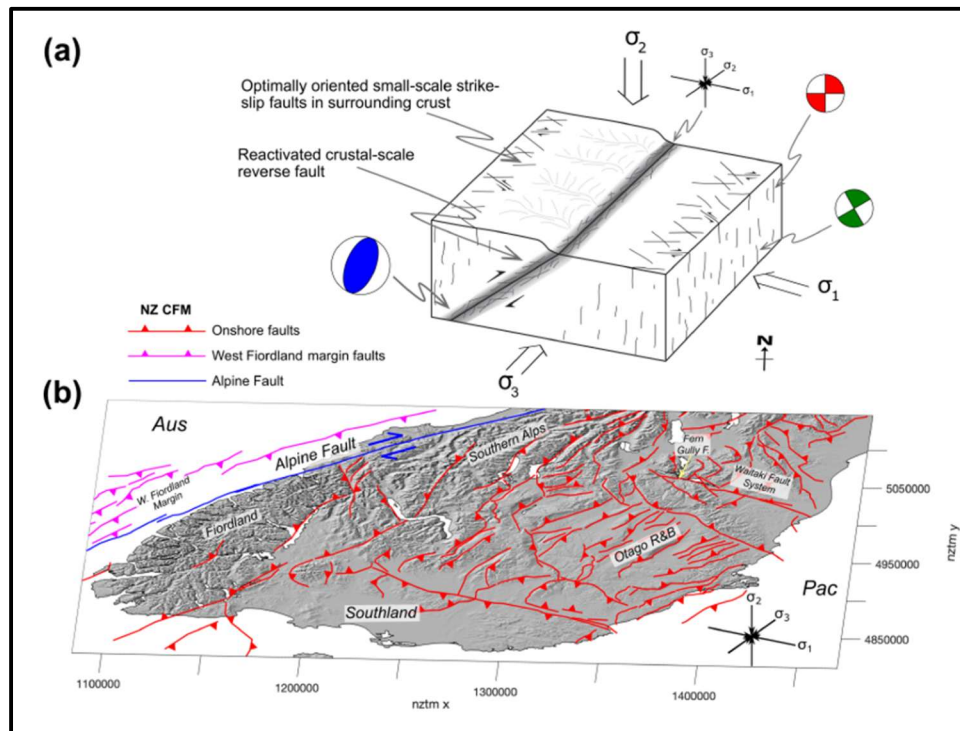


Figure-3

(a) Schematic representation of scale dependent fault kinematics in the southeastern South Island. The first motion focal mechanisms predominantly sampled slip on small-scale (rupture radius 0.04-0.5 km) favourably oriented strike-slip faults. By contrast, the surface expressions of faulting in this region indicate slip on NE-striking reverse faults, and which we infer formed due to stress rotations within reactivated fault zones.

(b) Oblique perspective of faulting across the Australian-Pacific plate boundary in the southern South Island, as indicated by the New Zealand Community Fault Model.

(From Williams, et al., 2026)

11. Stress-vectors at the Bendigo and Macraes areas in Otago are both similarly orientated (with the maximum stress vector being approximately horizontal). In-situ stresses are probably lower at Macraes than at Bendigo but nevertheless still appear to be associated with significant induced pit-slope and fault-plane instabilities (See Figures-4 &-5).



Figure-4: Photo-mosaic showing approximate outline of 2014 collapse of West Wall of Frasers Open Pit, Macraes Mine, Otago). The slide mass was estimated to be 20Mm³ (Modified from PSM Consult Pty, 2024a)



Figure-5: North Wall of Frasers Open Pit, Macraes Mine, Otago. Caving of near-surface stopes highlighted (orange). Dilated structures associated with rock-mass relaxation visible above (blue). The rock mass is expected to maintain elevated secondary permeabilities along dilated geological structures and open or caved stopes. (After PSM Consult Pty, 2024a)

12. PSM Consult Pty has provided mine engineering services at Macraes for many years - covering early design to mine-closure stages. Document "PSM Consult Pty (2024a)" provides comprehensive geotechnical data for the Macraes Mine, which is conceptually similar to the proposed mine at Bendigo and is available to guide and benchmark Bendigo mine design and feasibility studies.
13. The PSM Consult Pty document (2024b) provides a draft pre-feasibility study for the Bendigo project that was provided to the Fast Track Panel following an RFI. Whilst the document appears to be missing key drawings and appendices, the conclusions of the report are clear and presumably fairly reflect both the company's interpretation of the missing Appendices and Drawings and its extensive prior experience in the area.
14. I consider that chapters 11, 12 & 13 in the PSM Consult Pty document (2024b) fairly summarise the: PSM Consult Pty document (2024b): future work requirements; and conclusions and recommendations of the Pre-Feasibility Study.
15. In view of the magnitude of the potential adverse risks and effects identified in the Pre-Feasibility Study I do not believe it appropriate for mining preparations at Bendigo to continue until Feasibility Studies commensurate with the Pre-Feasibility Study recommendations have been completed and peer reviewed.

References Cited:

Denys, P., Pearson, C., Norris, R. & Denham, M. (2016) A geodetic study of Otago: results of the central Otago deformation network (2004–2014). NEW ZEALAND JOURNAL OF GEOLOGY AND GEOPHYSICS, VOL. 59, NO. 1, 147–156

PSM Consult Pty Ltd (PSM) (2024a) Macraes Phase-4 Open Pit Stability Assessment for Frasers TSF - <https://www.orc.govt.nz/media/jrendyh2/appendix-7-psm-2024b-macraes-phase-4-consenting-project-element-432-open-pit-stability-assessment-for-frasers-tsfc.pdf>

PSM Consult Pty Ltd (PSM) (2024b) Bendigo-Ophir Gold Project Pre-Feasibility Geotechnical Assessment Report PSM5131-003R DRAFT, dated 31 July 2024

Williams, J., Eberhart-Phillips, D., Bourguignon, S., Stirling, M., Reyners, M., & Upton, P. (2026). Focal mechanisms in the southeastern South Island of Aotearoa New Zealand indicate scale-dependent partitioning of transpressional strain. *Seismica*, 5(1). <https://doi.org/10.26443/seismica.v5i1.1839>