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1987/63. A proposed drill hole at Miners Ridge, near Queenstown.

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Abstract

A deep, vertical, diamond-drill hole is proposed at a bend of Lynch Creek [CP80843662], or on the Huxley Track [CP80863622], within the core of a major anticline. This is probably the oldest exposed part of the Western Volcano-sedimentary Sequence (or Lynchford association) of the Mount Read Volcanics, and should provide valuable constraints on the tectonic interpretation of western Tasmania.

GEOLOGY

The Mt Read Volcanic belt (MRV) is cut obliquely by a major NNE-SSW trending structure, the Henty Fault Zone (HFZ). Similar, probably equivalent associations of plagioclase-phyric lavas, pyroclastic and intrusive rocks occur on both sides of the Henty Fault Zone and constitute the 'Central Volcanic Sequence' (CVS). North and west of the HFZ the predominantly sedimentary, Middle to Late Cambrian Dundas Group overlies the CVS; the contact is erosional and unconformable in places, but is a low angle (40°) thrust at Rosebery (Corbett and Lees, 1987).

South and east of the Henty Fault Zone the Central Volcanic Sequence (in this area termed the King River association by Calver *et al.*, 1987) is flanked to the west by the Western Volcano-sedimentary Sequence (WVSS; termed the Lynchford association by Calver *et al.*, 1987). The WVSS consists mainly of interbedded vitric tuff, crystal tuff, greywacke, mudstone, siltstone and sandstone, intruded by rhyodacitic to dacitic quartz-feldspar porphyry bodies (some of which also have extrusive phases), hornblende andesite, and feldspar-pyroxene-phyric basalt. North of Queenstown, the boundary between the CVS and the WVSS is poorly defined and probably interfingering, but south of Queenstown the WVSS dips and faces east, towards an abrupt contact, leading to the suggestion that it is, at least partly, older than the CVS (Corbett, 1979; Calver *et al.*, 1987).

Near Lynchford, rocks lithologically identical with the Comstock Tuff appear to conformably overlie the WVSS, as if they were part of the sequence. However, the Comstock Tuff is the lower unit of the Tyndall Group, which elsewhere unconformably overlies the Central Volcanic Sequence (including the Darwin granite) and passes conformably upward into the Late Cambrian-Early Ordovician Owen Conglomerate (e.g. Corbett, 1979; 1981; Calver *et al.*, 1987). These relationships, together with the lithological similarity of the WVSS and the Dundas Group and the geochemical similarity of igneous rocks within both sequences, led Crawford (1987) to suggest that the WVSS is a correlate of the basal Que-Hellyer part of the Dundas Group, and is therefore younger than the Central Volcanic Sequence.

The base of the WVSS is undefined and is apparently not exposed. South of Queenstown, the WVSS is faulted to the west against the Siluro-Devonian Eldon Group and against conglomerate, sandstone, siltstone and mudstone correlated with the Owen Conglomerate (Calver *et al.*, 1987). To the north-west of Queenstown, the WVSS generally faces west, although with some reversals of facing, until it is unconformably overlain by Owen Conglomerate at The Sisters (Baillie *et al.*, 1977; Calver *et al.*, 1987).

Because of the lack of suitable marker units, major structure is difficult

to determine in the WVSS. However south of Queenstown, in the vicinity of Miners Ridge, a distinctive Precambrian-derived quartzose sandstone unit, with pronounced topographic expression, delineates a major, gently north-plunging anticline. The anticline is cut by a NW-trending fault with an apparent dextral displacement of about 300 m. The eastern limb of the anticline can be followed south for about 6 km to the King River, but the western limb is thinner and appears to pinch out south of the fault. Ophitic-textured basalt occurs in the core of the anticline on both sides of the fault, and is flanked by interbedded tuff and sediments fairly typical of the WVSS, followed by the distinctive sandstone unit.

The basalts ('Miners Ridge Basalt') are tholeiites, quite different in chemistry (more mafic, high Ti/Zr, slightly light rare earth element depleted) than the nearby Lynch Creek basalts or indeed any other rocks known in the MRV belt (Crawford, 1986; 1987). Crawford (1987) suggests that "these lavas could represent the oceanic forearc substance upon which the Western Sequence accumulated in the Middle Cambrian".

The purpose of the drill hole is to determine the unexposed thickness of the Western Volcano-sedimentary Sequence, to define its base, and to determine what rocks underlie it.

PRACTICALITIES

The preferred site for the drill hole is at CP80843662, at an elevation of about 240 m, inside a sharp loop on the left (south) bank of Lynch Creek. The site is a fairly flat, cleared area measuring about 30 m x 20 m, known as 'Helipad E', and lying about 25 m on the ESE side of a well-defined cut line, marking the route of the proposed Hydro-Electric Commission Farrell-King transmission line. The cut line lies between CP8102437054 and CP7872932296, and has been surveyed by the Commission. Unless new tracks have been bulldozed since the site was visited in December 1986, it will be necessary to bulldoze an access track from the Huxley Track, probably from about 400 m away near CP80953620, as shown on the attached map. The proposed route is on fairly even ground of moderate slope, covered with tea-tree regrowth 5-10 m high with a dense fern and sedge undergrowth, but no large trees.

An alternative site is on the Huxley Track at CP80863622, just west of a small track cutting. No new access track would be required at this site, but it is located within about 100 m of the major NW-trending dextral fault, of unknown dip.

Because the underlying stratigraphy is unknown it is impossible to estimate the required depth of the hole, and information obtained at the limit of the rig could be useful. Bedding in the immediate vicinity is steep, and usually nearly vertical with probably small-scale tight folding, so a stratigraphic section *sensu stricto* will not be obtained. A vertical hole is suggested.

The area is about 4 km south of Queenstown, at about a distance of 3.5 km along the Huxley Track. This track is much better than it was formerly and should pose no problems, except possibly the ford over Lynch Creek after heavy rain.

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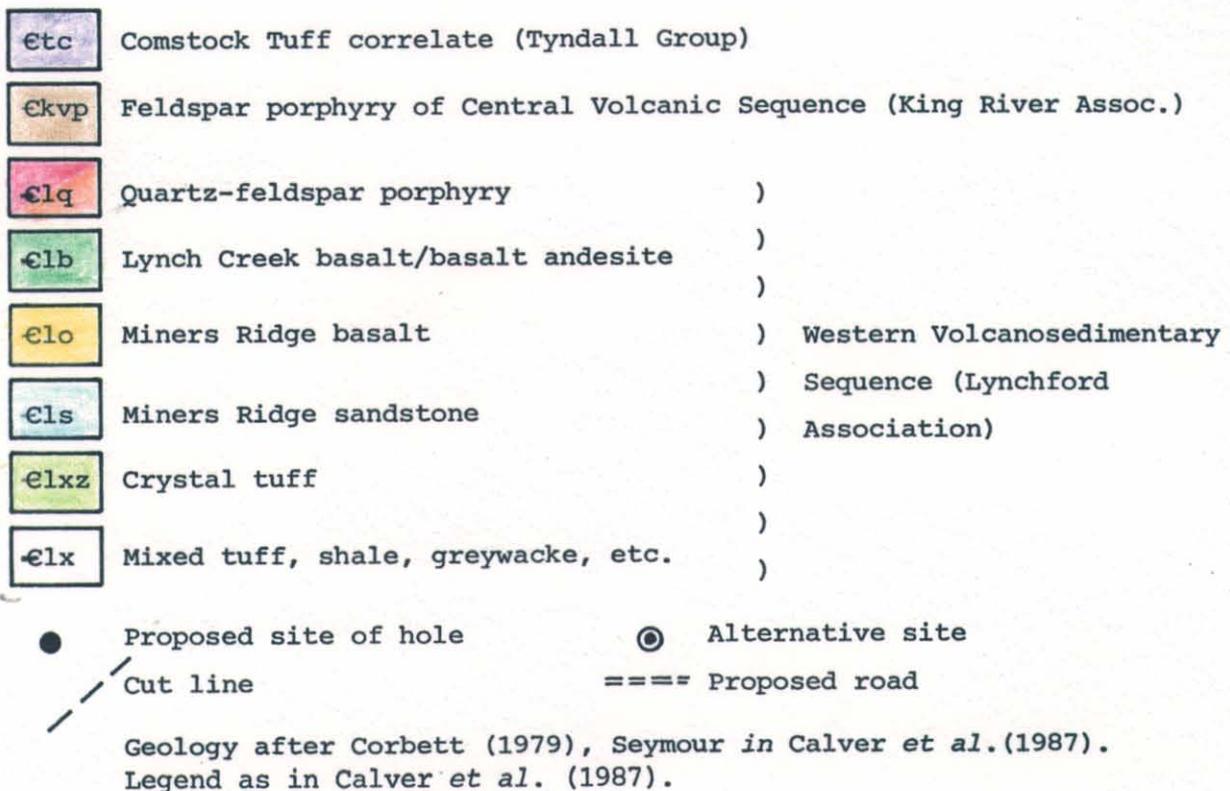
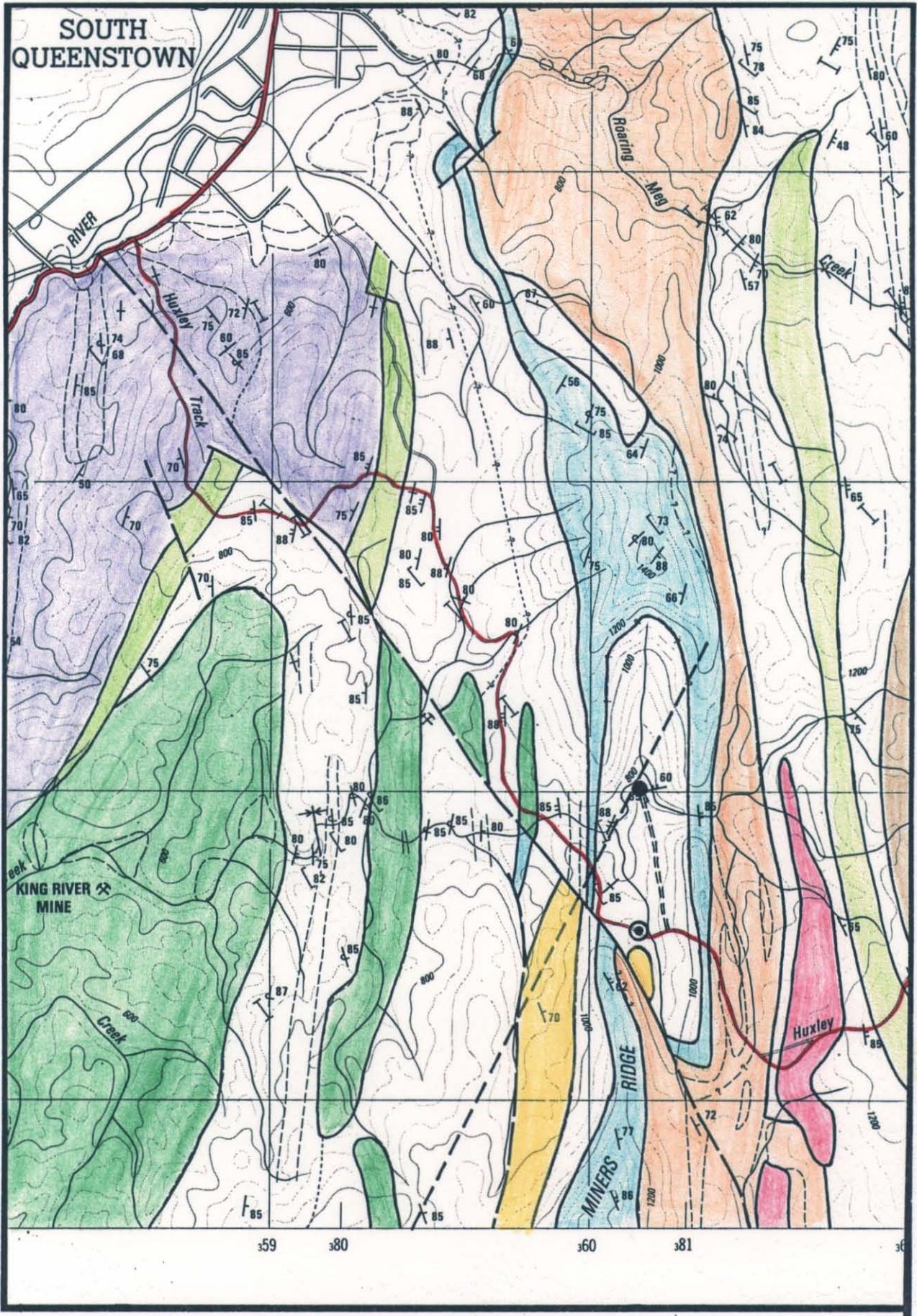


Figure 1. Preferred drill hole site and geology.

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