3. STRUCTURES SOUTH OF BEN LOMOND, EAST OF ROSSARDEN

A significant, isolated, long wavelength anomaly has been observed southeast of Sphinx Bluff on the Ben Lomond plateau and east of Rossarden. It is shown in Figures 19 and 20. The observed feature extends beneath the plateau and the character of the anomaly is broken up by the interference from exposed Jurassic dolerite and nearby screes. The anomaly tapers rapidly southward toward the South Esk River and Ormley. The feature has an amplitude of about 100 nT, which is large for the region, and relatively smooth gradients, which indicate a minimum depth to source of about 700 metres on the western side and more than 1000 metres on the eastern side.

Near surface features are evident but all are small scale, localised and possess a relief of little more than 10 nT. This substantial feature has not been well defined in any previous survey but it is striking and apparent in the new survey.

Some explanations have been presented for test; including one which proposes that it is the effect of a metamorphic halo about a concealed extension of the local granites.

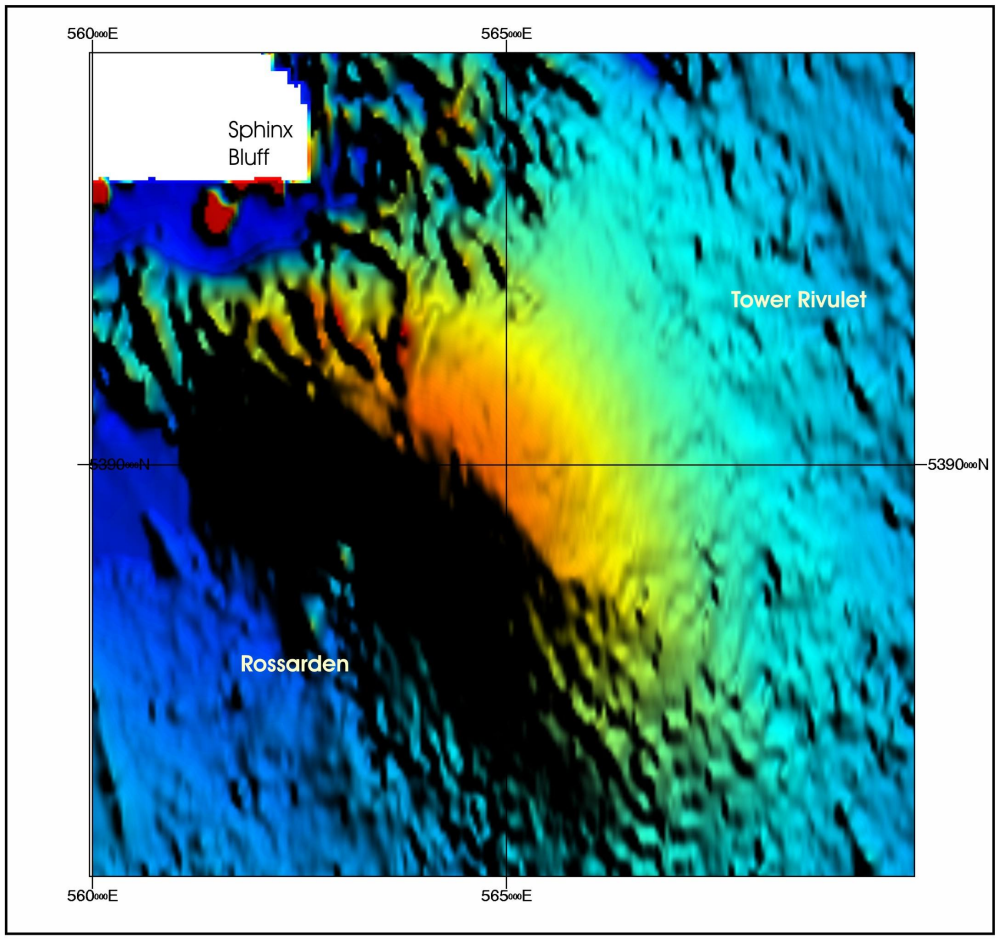

Figure 19. Image of Total Magnetic Field Intensity south of Sphinx Bluff and east of Rossarden. Note the disturbed character of the field to the northwest where scree fields interfere below the Ben Lomond plateau escarpment.

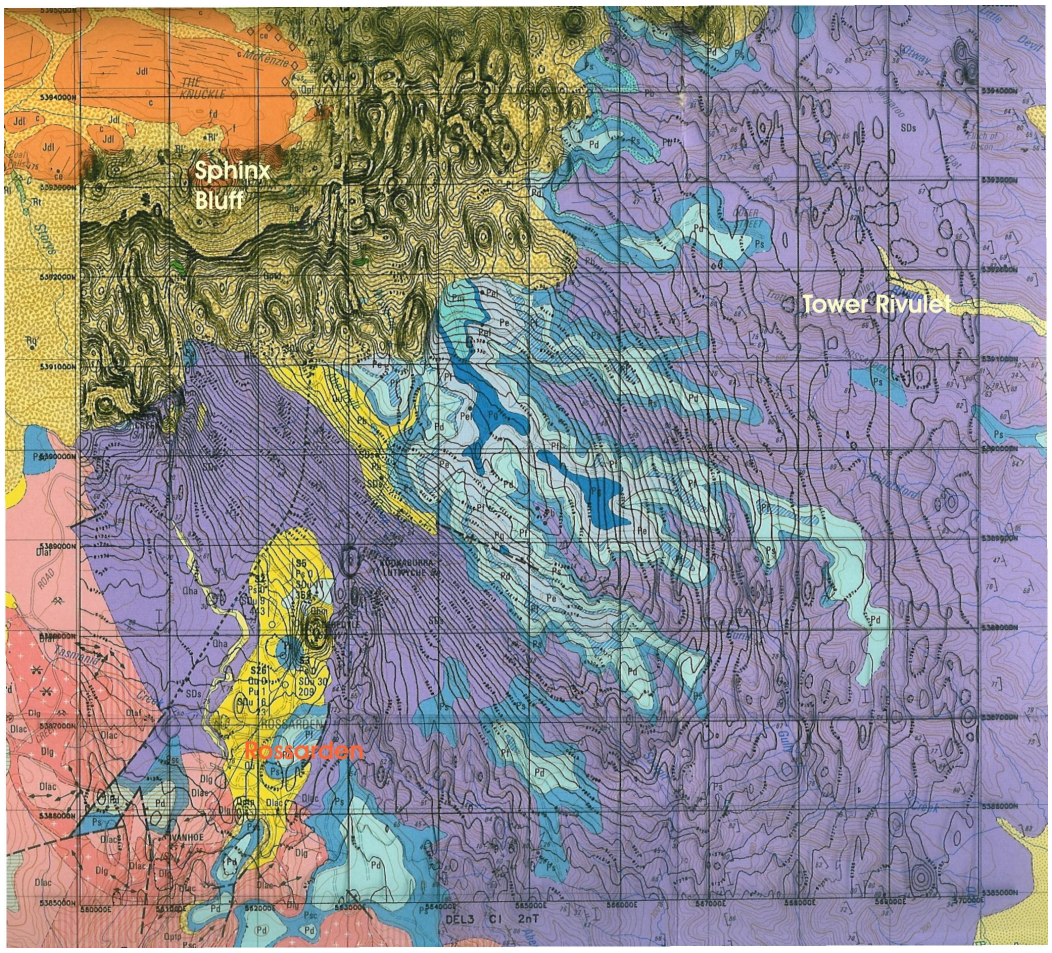

Figure 20. Magnetic anomaly and base map Ben Lomond.
Note that the feature is several kilometres removed from the mapped granite margin.

The anomaly is too broad and too large to be related to any exposed materials, including the local Mathinna Beds. The source is concealed.

There is no mapped suggestion of any thermal alteration halo east of the main granite contact near Rossarden although acceptance of the gradient depth indications could mean that any such alteration is also concealed. Most critically for the hidden cupola solution, however, is the lack of evidence in the extant gravity data. The gravity coverage east of Rossarden and east of the plateau (including on the plateau itself) is currently poor and in much the same state as defined by Leaman & Richardson (1981). The few stations that do exist lie on two traverses which cross this feature and they offer no suggestion of a significant granitic shallowing. They are not adequate, however, to completely preclude the possibility of a granodiorite presence.

The feature has been modelled in order to test various options but a halo type band source a few hundred metres thick cannot generate the effect required with contrasts and properties known to be normal elsewhere in northeast Tasmania for metamorphosed rocks.

Figure 21 offers two viable solutions using rocks and properties which may exist in the region, or which are known to outcrop nearby.
The first (upper sections) employs ultramafic slices which are known to exist west of this site (and northward toward Bass Strait – see Leaman & Webster, 2002 and Leaman, 1992 for example). The style is consistent with the structural models of Taylor (1992) and Keele *et al* (1994) in which east-facing thrusts in the western part of NE Tasmania oppose west-facing thrusts in the eastern part of the region (also see Scamander and Blue Tier discussions above).
The second (lower section) solution implies a detached and concealed, highly altered part of the Mathinna Beds. The volume is large. The general contrast required for this volume is 0.0065 SI and 0.0078 SI for the lesser facing zone. These are higher than any normal values for the Mathinna Beds but such contrasts do exist (see Cokers Ridge below).

Which solution should be preferred?
Both geological styles are either known to exist, or could exist, within the sequences exposed. The following section of this report examines magnetically extreme members of the Mathinna Beds.
It can be stated, however, that no skin effect anomaly source such as an alteration halo about a concealed pluton can generate the pattern and no such source seems justified by the depth range to top of potential sources, exposure, or limited gravity data.
The shallowness of penetration of any sliver of ultramafics may rule against this solution although, of course, such materials come to surface along the northern Tamar region.
Within the structural environment of the entire region, which includes the ultramafics, a structurally-confined section of the Mathinna Beds is possible. Magnetically equivalent portions of these rocks do appear elsewhere and such rocks may prove to be stratigraphically important.

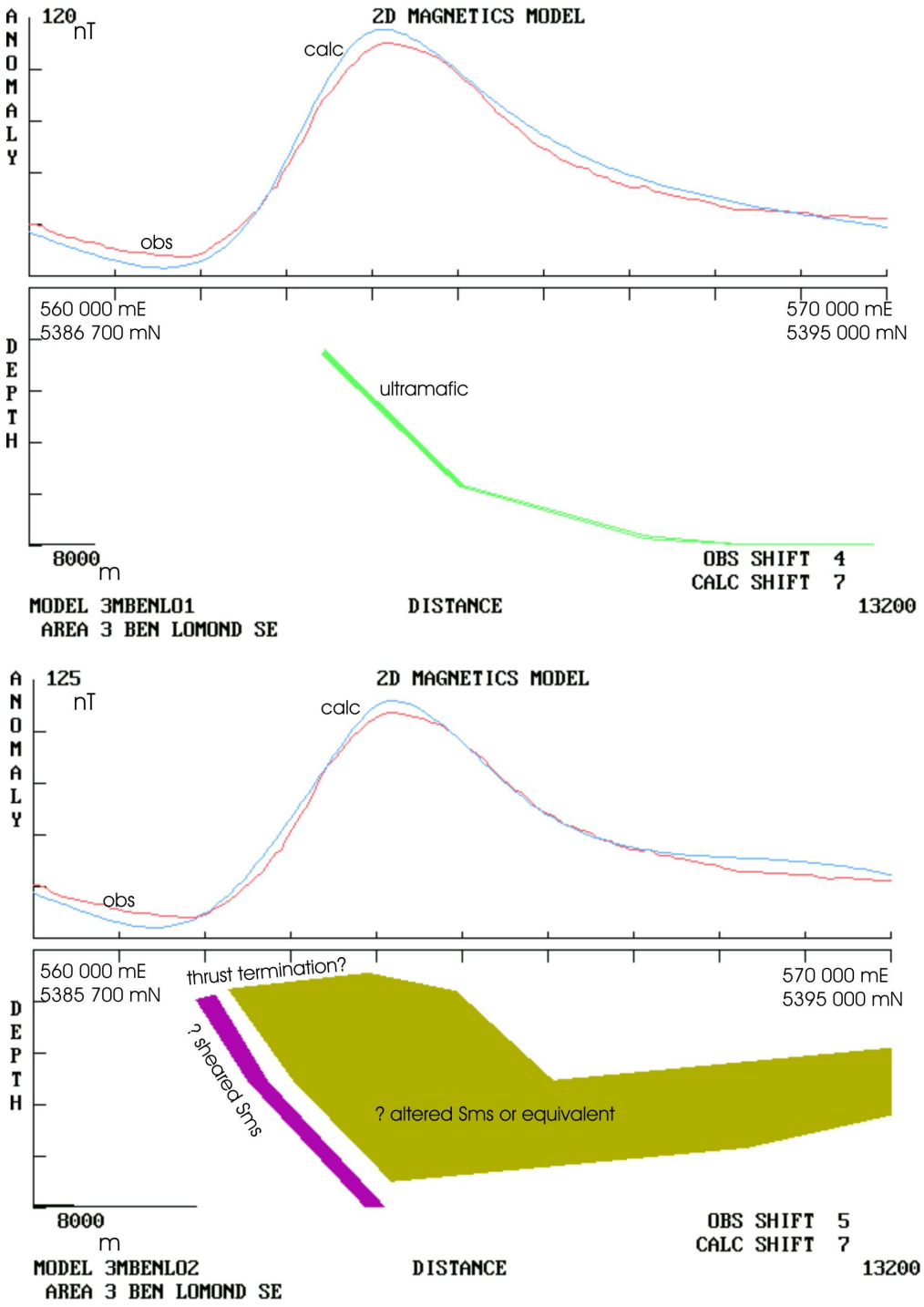

Figure 21. Possible solutions for the east Ben Lomond anomaly. Ultramafics or structurally-confined Mathinna Beds.