

## LEAMAN GEOPHYSICS

Survey Review, Specification, Reduction, Interpretation  
Wide Experience Most Methods  
Specialities- Gravity, Magnetica, Seismic Methods

89/7

INTERPRETATION STATUS  
AIRBORNE GEOPHYSICAL SURVEYS  
EL 34/86 GLADSTONE  
for  
Placeco Australia Pty Ltd  
by  
Dr D E Leaman

### GLADSTN

Placeco Australia Pty Ltd acquired detailed magnetic and radiometric data in mid 1987. Details of the survey, the data sets and qualitative observations on the results were given by Leaman (1987).

An interpretation was begun in September 1987 but was halted when collapse of financial markets in October 1987 restricted funding for the project.

Much had been achieved and with new work about to recommence it was suggested that an outline of the status of that interpretation be filed for reference.

These notes recover terminal points in the interpretation completed and represent some record of what was done. Many conclusions were crystallizing and results offer encouragement that the NE gold province can be rationally evaluated and explored. Some profiles and treatments are clearly at a preliminary stage but all models offer a platform for development or launching of new work.

The profiles were selected so as to sample various aspects of the magnetic field and to test their possible relationships (See Figures 1A, 1B).

### GLADW

This profile extends from the region of virtually exposed granodiorite across an area of "striped" anomalies within exposed Mathinna Beds. Figure 2A examines the subtler regional aspects of the profile to show that the gross anomaly trends are related to a moderate (non plutonic) thickness of granodiorite at acceptable contrast. Its shape must be tapered, however.

Figure 2B reviews the implications of the Mathinna Beds anomalies. It shows two things; specific units are magnetised with properties consistent with those observed around Portland Mine, and that those units are depth limited in a manner compatible with the granodiorite taper (+/- 100 to 200 m) and

virtually outcrop.

#### GLADS

This line through Gladstone samples various granitoids. Figure 3 shows that the eastern granodiorite is present but terminated and that a second body occurs west of Gladstone. The two are separated by a plug of tin granite whose upper surface is suggested by the termination of a Mathinna Beds member. The profile also reviews the response of a steel barn roof - several of these features were recorded in the survey.

#### GLADNS1

This profile (Figure 4) is parallel to strike of both Mathinna units and possible granodiorite as indicated in profiles to west and south. The granodiorite effects can be sustained by modelling but have been swamped by local 3D effects.

#### GLADCENT

This profile considers the implications of both the magnetised Mathinna Beds and the possibility of underlying granodiorite. It extends into the mapped metamorphic halo of the Gardens Pluton. Some twenty variations were tested but only a solution of the form of Figure 5 is satisfactory. Magnetic units are depth limited, the halo may be measurable as a non magnetic zone and the granodiorite is ubiquitous.

The model suggests a general halo effect (0.0002 cgs) up to 1000 m wide which, close to the granitoid, is destroyed. Particular susceptible lithologies within this halo are further altered, as near Portland Mine.

#### GLADNE

This profile reviews a number of features (Figure 6). The granodiorite is truncated by the Mt William Sheet; there is probably a non magnetic contact zone, above it some general alteration. Some extreme spikes may also reflect local skins of Tertiary basalt but all gross responses are from the granitoids and Mathinna Beds.

#### GLADNS2

Modelling of this profile (Figure 7) is affected by 3D effects but the truncation of granodiorite by the Rushy Lagoon Pluton is clear. The offset in position, and quiet magnetic zone, is consistent with property loss due to thermal metamorphism. The broad regional, more distant, alteration in Mathinna Beds is evident above the granodiorite to the south.

#### GLADG

This profile (Figure 8) is presented as an interim model. Although not refined it illustrates and repeats the features required of other profiles. Granodiorite is general as is the moderate alteration halo.

#### GLADB

This profile (Figure 9) demonstrates the depth limited character of the magnetic sources within the Mathinna Beds.

## GLADC

This profile (Figure 10) further tests depth limitation of Mathinna Beds sources. Compare integration into metamorphic halo - Figure 5.

## GLADD

Profile D (Figure 11) reinforces the conclusions evident in Figures 5 and 6.

Although this study remains incomplete the results have been summarised (Map 1 - folder) in terms of probable underlying granodiorite surface.

Several issues raised by Leaman (1987) have been resolved. The magnetic character observed is related to bulk regional metamorphism; where thermal metamorphism is extreme there is contrast loss. Some members of the Mathinna Beds have been more susceptible to low intensity alteration.

There are some absorbed relicts in the younger, more siliceous granites.

Gold-bearing sites are roughly associated with cupola-like structures and are offset by about 1 km. It is unclear how much this association reflects structural control or usage and passage of fracture-controlled fluids or is directly related to granitoid intrusion and form.

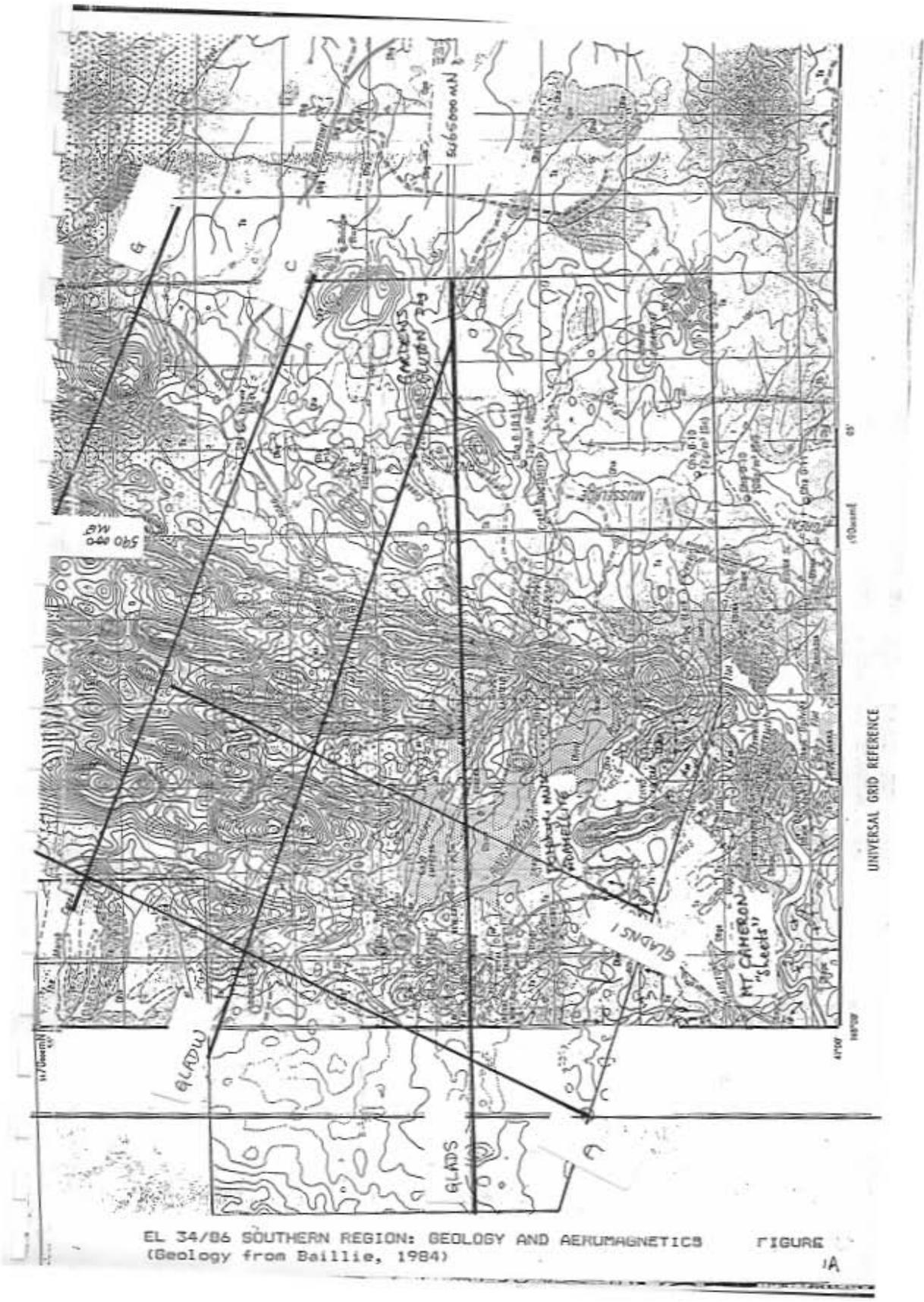
There is clearly scope for refinement. Further magnetic work should be largely three dimensional. Other methods, especially gravity, would offer improved and independent perspective on all relationships.

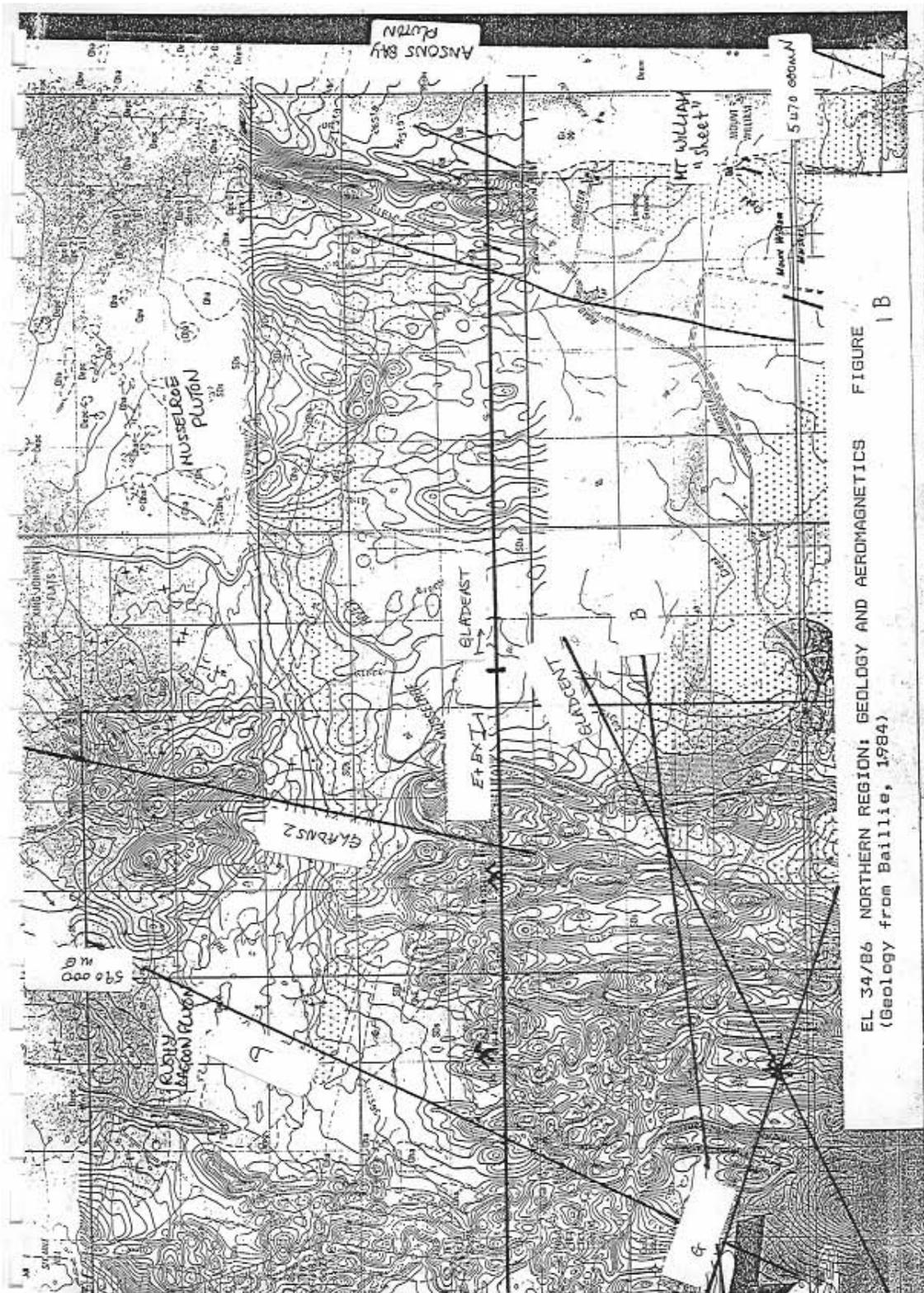
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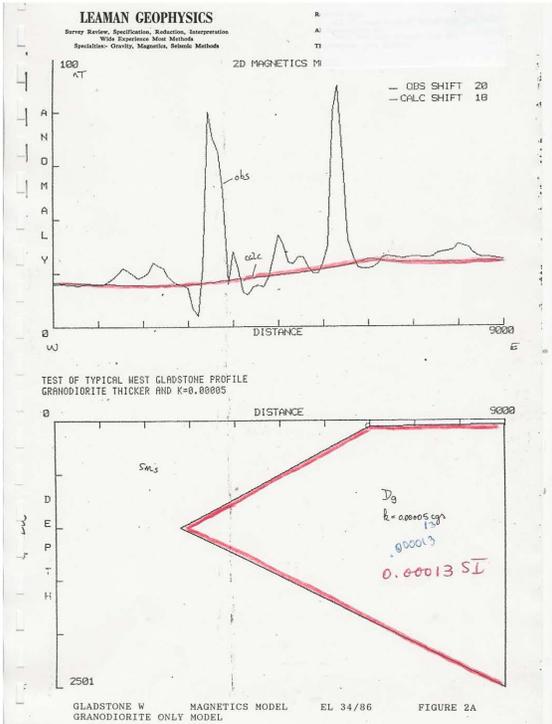
June 1989

## References:

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- Leaman, D.E., 1987. Acquisition report, airborne geophysical surveys. EL 34/86 Gladstone, Sept, 1987.

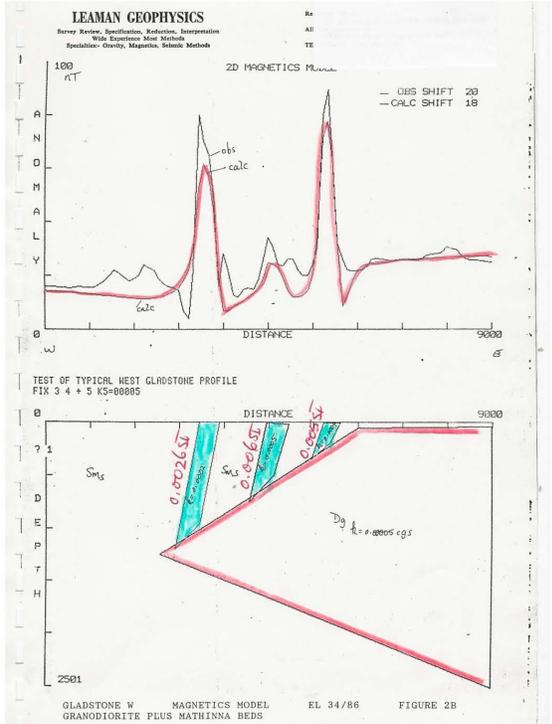




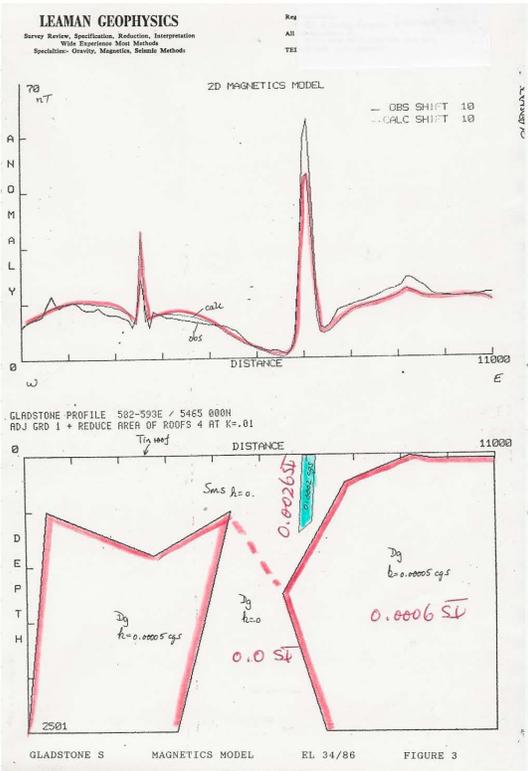


2A

GLADSTONE W

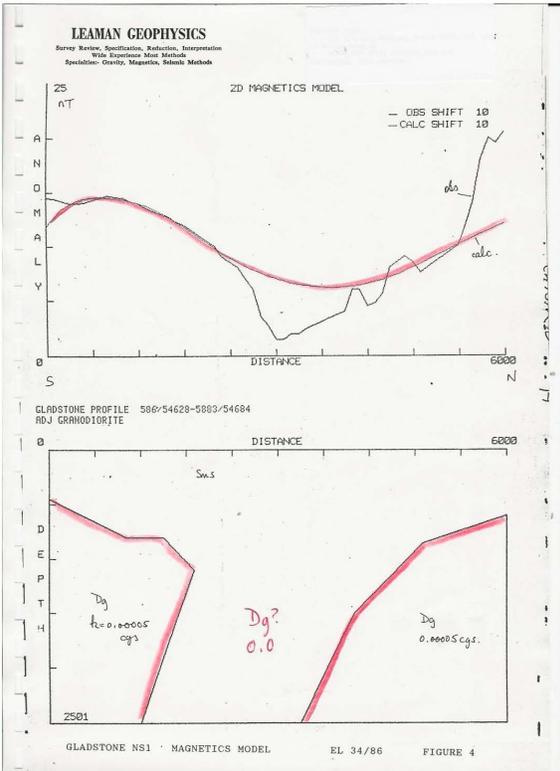


2B



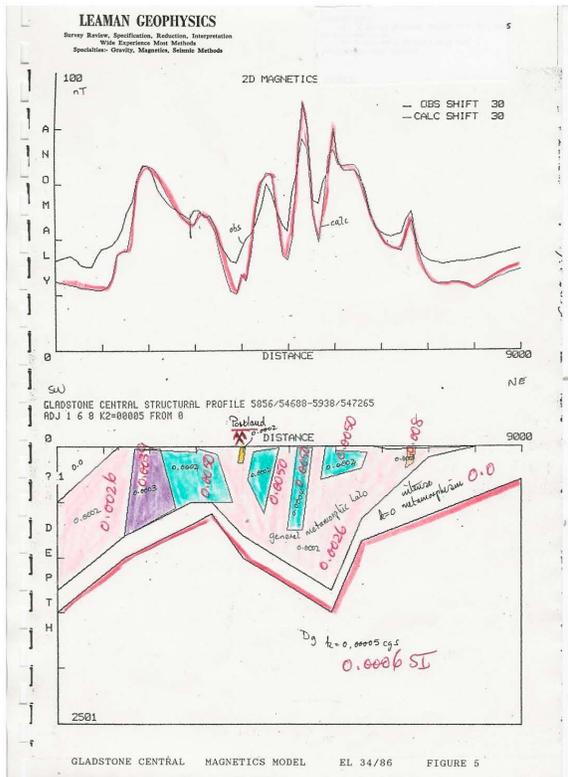
GLADSTONE S

3

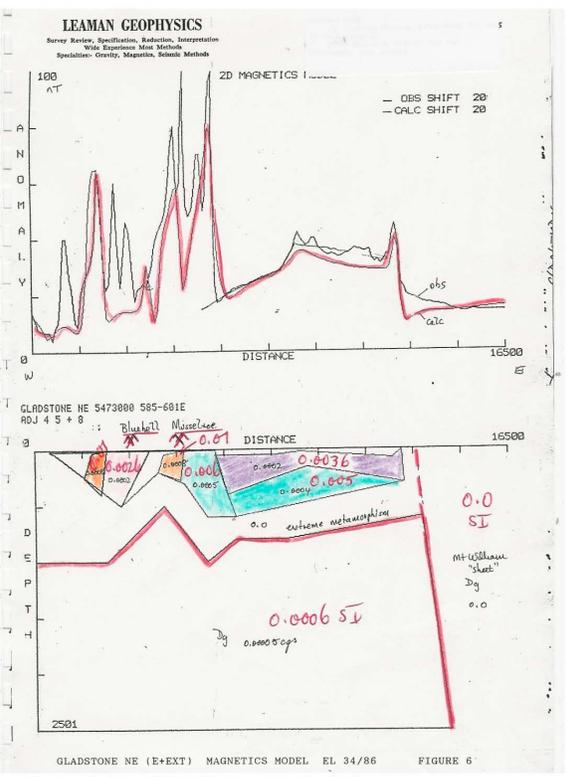


GLADSTONE NS1

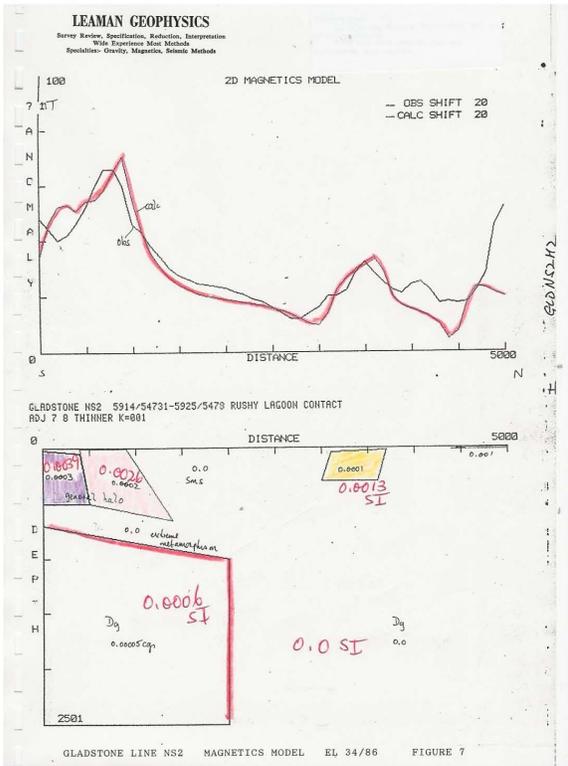
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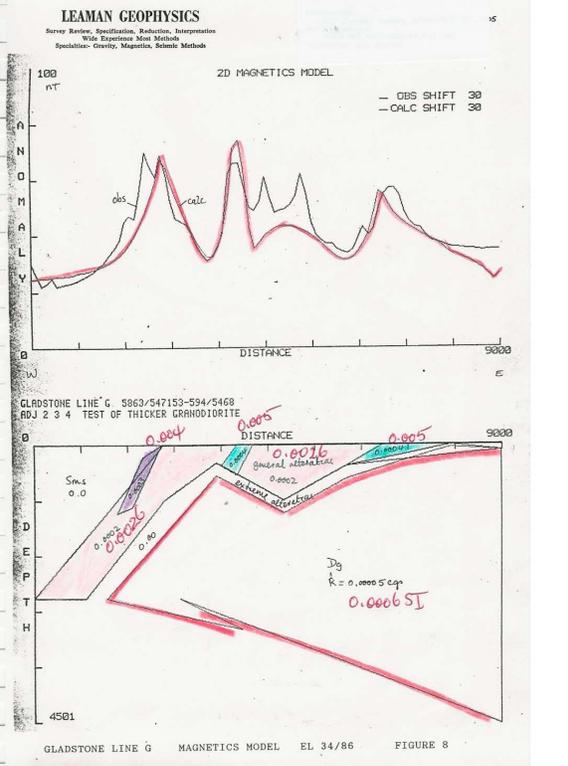
GLADSTONE CENTRAL 5



GLADSTONE NE 6



GLADSTONE NS2 7



GLADSTONE G 8

