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RE: -Airborne and Ground Geophysics -Processing and Interpretation. - Portland and Golden Ridge Projects

1. Summary

Western Geophysics Pty Ltd (WGPX) has completed the processing, analysis and interpretation of magnetic and gravity data obtained from open file sources covering northeast Tasmania.

The aim of the work completed here is to process and interpret the airborne and ground geophysical data, improve geological interpretation at district and project scale and if possible determine the signature of existing mineralisation-alteration and, therefore determine the best way forward in future exploration work using additional geophysical surveys.

The approach and method used includes online data acquisition from federal and state web sites, data processing, imaging, data integration within ARCGIS including key geological elements and interpretation at regional, district and project scale.

Two compelling target areas are identified in this work. The targets are identified are coincident magnetic and sharpened residual gravity anomalies trending NNE-SSW in EL 11/2012 and, the extensive coincident magnetic and gravity anomalies within EL 18/2018 that are marginal and adjacent to the Eddystone batholith. The magnetic and gravity anomalies are interpreted as being due to magnetite and/or pyrrhotite alteration in fault and fold structures within the Mathinna formation.

Based on the magnetic and gravity data, targets within the Golden Ridge project are not so clear. Additional geophysical surveys are recommended to improve geological understanding and to refine interpreted alteration-mineralisation targets to guide drilling.

2. Introduction and Background

Pacific Trends and Kingfisher are in joint venture in two project areas in northeast Tasmania. The locations of the project tenements are shown on Figures 1 with gold and tin mineral occurrences.

The northern group of 3 exploration tenements near the town of Gladstone comprise the Portland project and the southern tenement is referred to as the Golden Ridge project.

Gold in quartz vein style deposits in north east Tasmania are hosted by the extensive folded and faulted turbidite sequences of the Mathinna Group (Figure 2). The Mathinna turbidites were deposited and deformed in the Ordovician and Devonian. The sequence is intruded by post orogenic Devonian granitoids. Some of the gold deposits are considered to be spatially and genetically related to the granitoid intrusions. At deposit scale, gold mineralisation within the Portland project area near Gladstone, occurs in anticlinal axis and is locally controlled by NW-SE trending faults (Roach -Phd. 1994).

The granitoids host primary tin deposits and these are the source for numerous colluvial and alluvial tin occurrences, small workings and mines. Intrusions are classified as I-type and S-type granites and, I-type granodiorites as shown on (Figure 2). The classification was derived from the ARCGIS database of the geology of Tasmania at 1:250,000 scale.

Physical property work by Roach(1994) show granites have a relatively low density, averaging 2.61 T/m^3 and are non-magnetic. Granodiorites have a mean density of 2.71 T/m^3. The Mathinna Group rocks have a mean density of 2.71 T/m^3. and are weakly magnetic (0.00019 SI units).

Therefore, there is a strong density contrast between the Mathinna group and the I type and S types granites but not with the granodiorites.

3. Geophysics Surveys and Data Processing.

Gravity Surveys, Data Processing and Interpretation

Gravity data covering northeast Tasmania were acquired via download from Geoscience Australia. Gravity stations are typically spaced 500m apart within both project areas (Figures 3 and 4). All data in Tasmania are terrain corrected which accounts for gravity variations due to topography.

Residual gravity has been derived by removing a regional field by calculating an equivalent layer in the depth range from surface to a maximum depth 2.0 km. The Fast Fourier Transform filter utilises frequency components of the Bouguer gravity data due to sources of laterally variable density within the specified layer. The longer wavelengths due to sources outside of the layer are excluded and the computed gravity anomalies are referred as residual (see Figure 5). At project scale, a sharpening filter has been applied to the residual gravity data to enhance local structure.

I-type and S-type granites produce residual gravity lows and, I-type granodiorites and Mathinna group turbidites produce gravity highs. Distinctive linear trends within the gravity are oriented NW-SE, NE-SW. Similar trend orientations are evident in the various gold fields, indicating a strong structural control on mineralisation.

Open File Mag-Spec. Surveys and Data Processing.

Open file, airborne magnetic and radiometric surveys cover the entirety of northeast Tasmania. The most useful data include a regional mag-spec survey by GPX Airborne Geophysics (200m line spacing) flown in in 2005 and, also a detailed survey flown by Austirex (125m line spacing) over the Portland project area and surrounds in 1987.The survey outlines are shown on Figures 2 and 3.
Total magnetic data (TMI) have been further processed by calculating the first and second derivatives of the TMI to produce grids and images of TMI and TMI1Vdand TMI2Vd.The radiometric data have processed to produce grids and images of potassium, uranium and thorium.
All images from the regional airborne surveys are supplied in Geotif format in the GDA94-MGA55 coordinate system.

4. Interpretation.

District scale images of residual gravity and magnetics covering both project areas are shown on Figure 6.
Within EL11/2012 and in the northern end of EL18/2016, gold occurrences in the Portland project area are aligned on NNE-SSW trends in the residual gravity and in the magnetics (Figures 6 and 7). The first vertical derivative of the higher resolution survey shows there is a good spatial correlation of gold occurrences to linear magnetic trends. The 1Vd image also shows distinctive NW-SE oriented linear structures that are interpreted as brittle faults with minor lateral displacement.
Given the Mathinna group is essentially non-magnetic, the evidence suggests the magnetic trends are probably due to structurally controlled alteration that includes pyrrhotite and/or magnetite.
Similarly, in EL18/2018, coincident magnetic and residual gravity anomaly trends occur within the Mathinna group adjacent and marginal to the Eddystone batholith. The magnetic and gravity anomalies are extensive, projecting into open ground a further 3-5 km to the north east of EL18/2018.
Radiometric potassium anomalies in the northern part of EL18/2016 coincide with gold occurrences and magnetic anomaly trends(Figure 7). This is almost certainly an alteration signature however most radiometric anomalies are interpreted as being associated with regolith cover within alluvial and colluvial settings.

There are several strong potassium anomalies within the I and S type batholiths. These may represent a more potassic phase within the intrusion history.

Primary tin deposits in EL18/2016 are associated with S type granites and secondary tin deposition is both colluvial and alluvial derived from these intrusions.

At the Golden ridge project, gold mineralisation occurs within the Mathinna group rocks near the contact with an I type granite. The gravity data indicate the gold occurrences may be associated fundamental NW-SE structural control however, NE-SW trending weak magnetic anomalies may indicate a secondary control in that orientation.

5. Conclusions and Recommendations.

The aim of the work completed here is to process and interpret the airborne and ground geophysical data, improve geological interpretation at project scale and if possible determine the signature of existing mineralisation and, therefore determine the best way forward in future exploration work using additional geophysical surveys.

Two compelling target areas are identified in this work (see Figure 8). The targets are identified as being areas of coincident magnetic and sharpened residual gravity trending NNE-SSW in EL 11/2012 and, the extensive coincident magnetic and gravity anomalies within EL 18/2018 that are marginal and adjacent to the Eddystone batholith. It is likely the magnetic and gravity anomalies are due to magnetite and/or pyrrhotite alteration in fault and fold structures within the Mathinna formation.

Additional infill gravity and airborne magnetic-radiometric surveys are warranted and recommended if budget permits. These surveys would be planned so lines would be located between existing flight lines (e.g. at 50m spacing) in the case of the airborne survey and additional gravity stations would be located where permissible access is available but generally at a station spacing of 200m. The aim of the work would be to more clearly define the anomalies already identified as targets and to be detailed enough to target these with drilling based on potential field modelling.

Based on the magnetic and gravity data, targets within the Golden Ridge project are not so clear. At Golden Ridge, I would recommend further gravity at this stage to infill the current survey with the aim of mapping structural trends and geology.

An alternative, lower budget program could be to complete detailed lines of ground gravity and ground magnetics over specific targets already identified within the larger target trends. These more focussed surveys would be modelled to determine the location and depth to magnetic and/or gravity anomaly sources for drilling.

FIGURES.

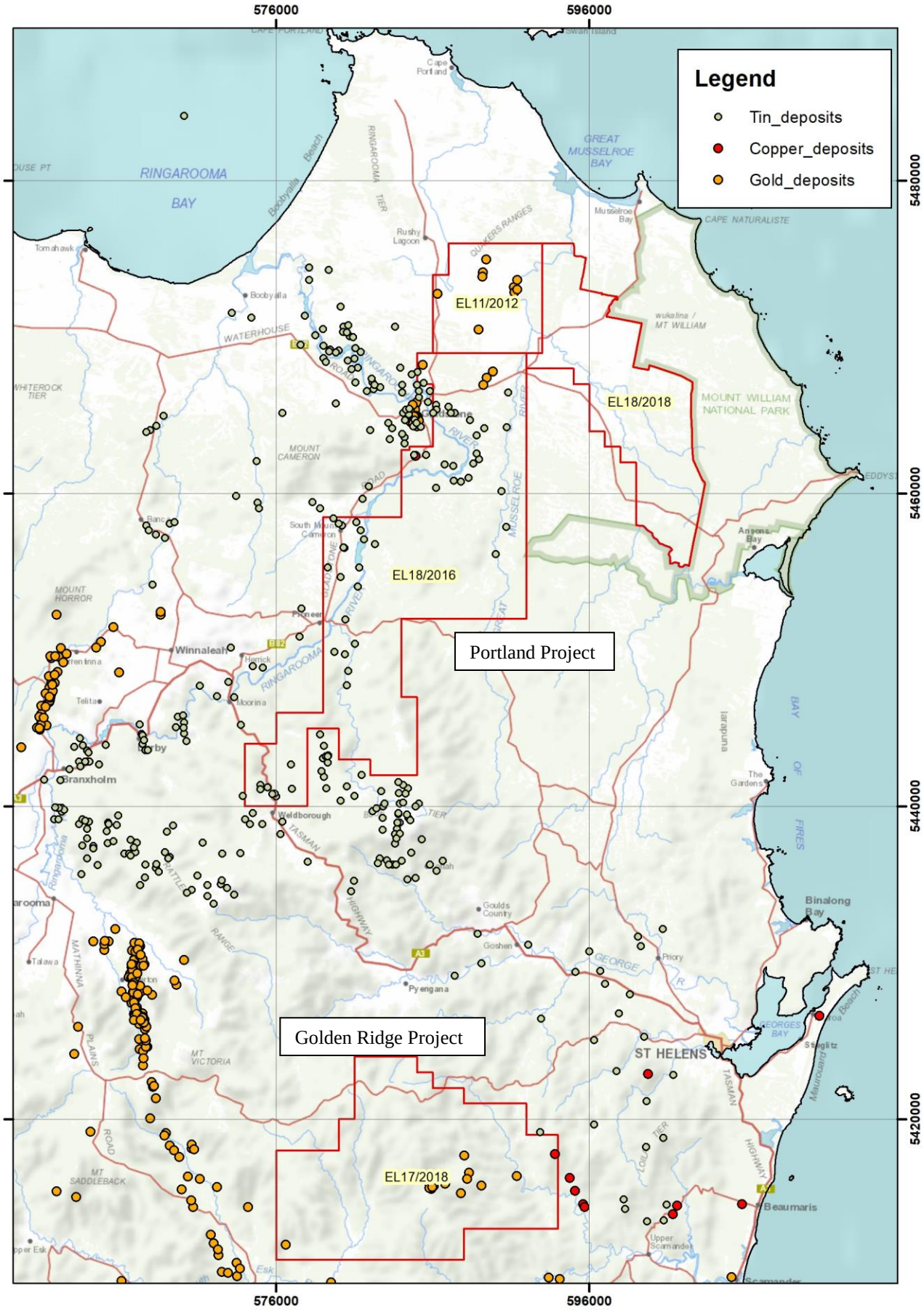

Figure 1. Northeast Tasmania project tenements (red outlines) and mineral deposit locations.

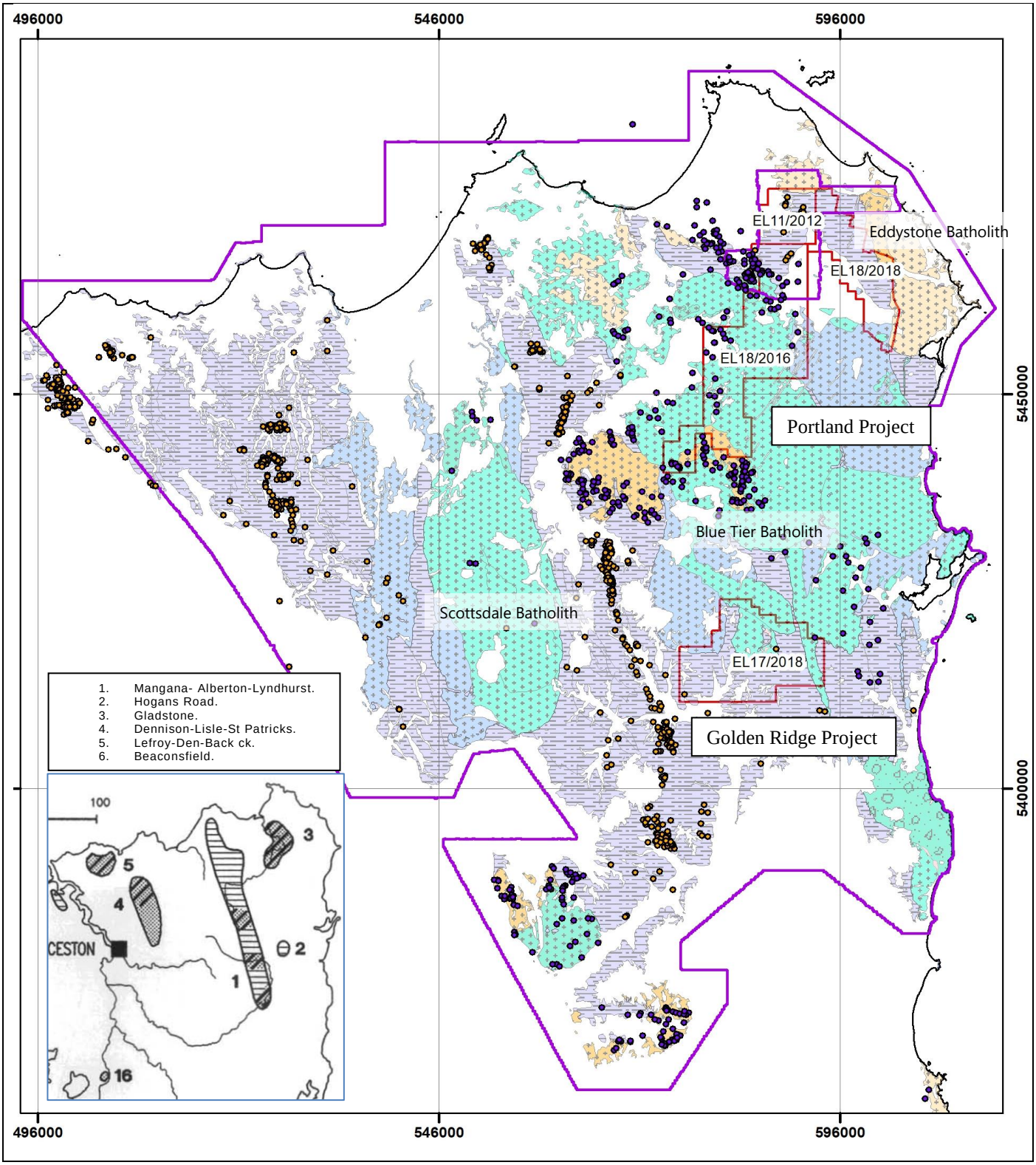

Figure 2. Northeast Tasmania project tenements (red outlines), and goldfields. Regional and detailed mag-spec. survey areas (purple outlines). Gold and Tin mineral occurrences are coloured yellow and blue respectively. Paleozoic rocks shown on the map include, I-type and S-type granites (green and brown), and, I-type granodiorites. Mathinna group turbidites are coloured blue -grey respectively.

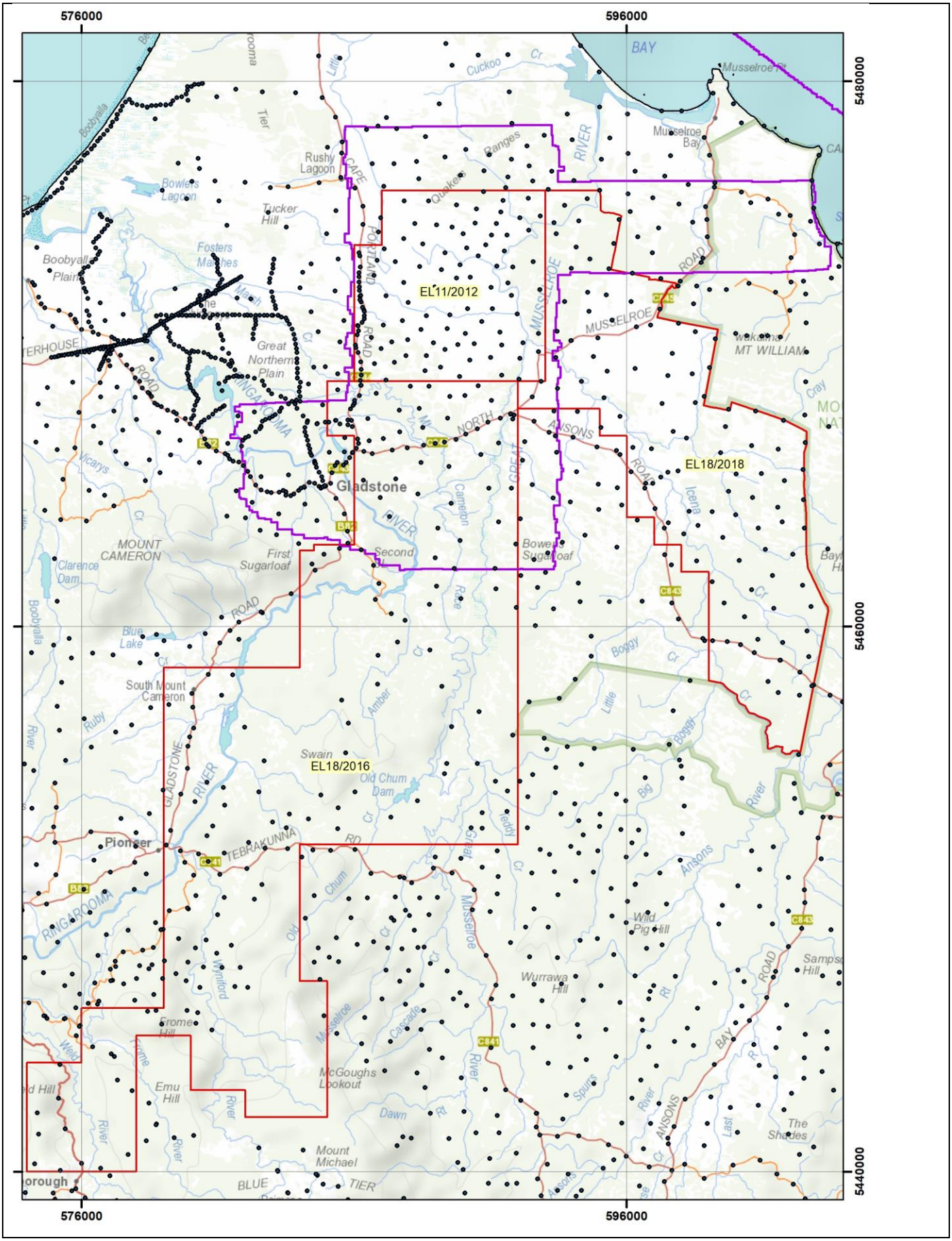

Figure 3. Gravity stations and aeromagnetic -spectrometer surveys within and surrounding the Portman project area.

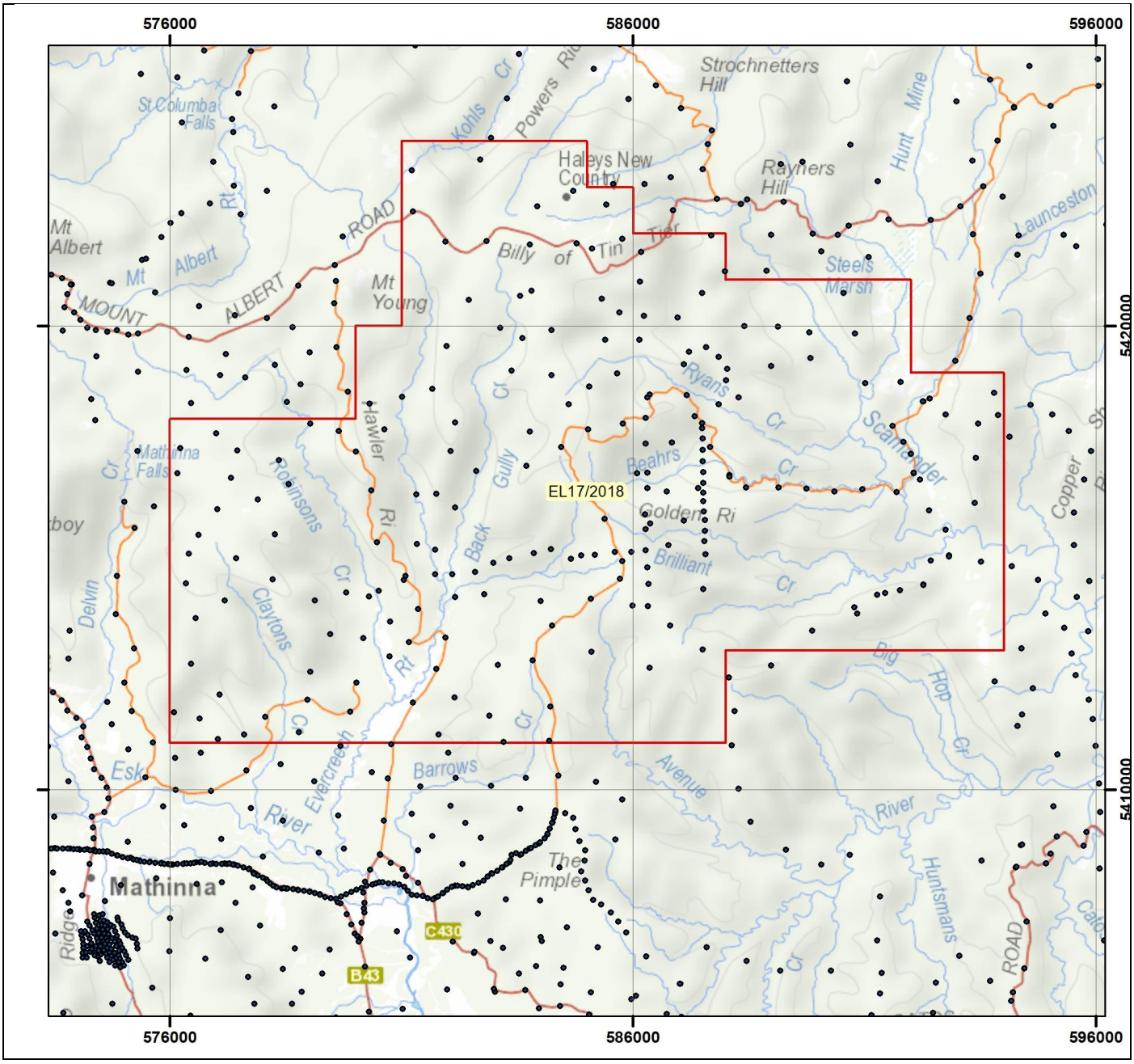

Figure 4. Gravity stations within and surrounding the Golden Ridge project area.

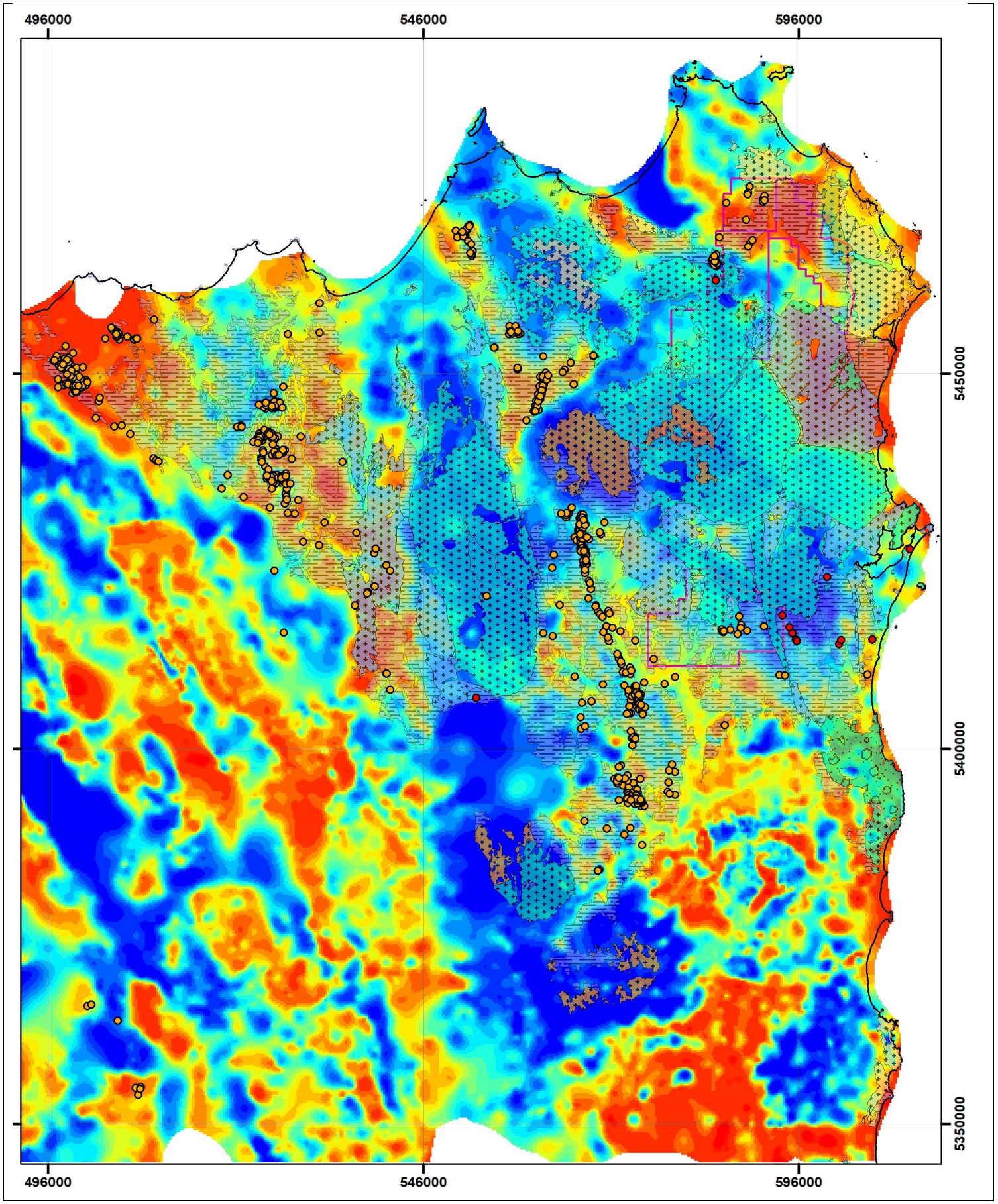

Figure 5. Northeast Tasmania residual gravity image, granitoids Mathinna group turbidites and mineral occurrences. I-type and S-type granites produce residual gravity lows and, I-type granodiorites and Mathinna group turbidites produce gravity highs. Distinctive linear trends within the gravity are oriented NW-SE, NE-SW. Similar trend orientations are evident in the various gold field, indicating strong structural control.

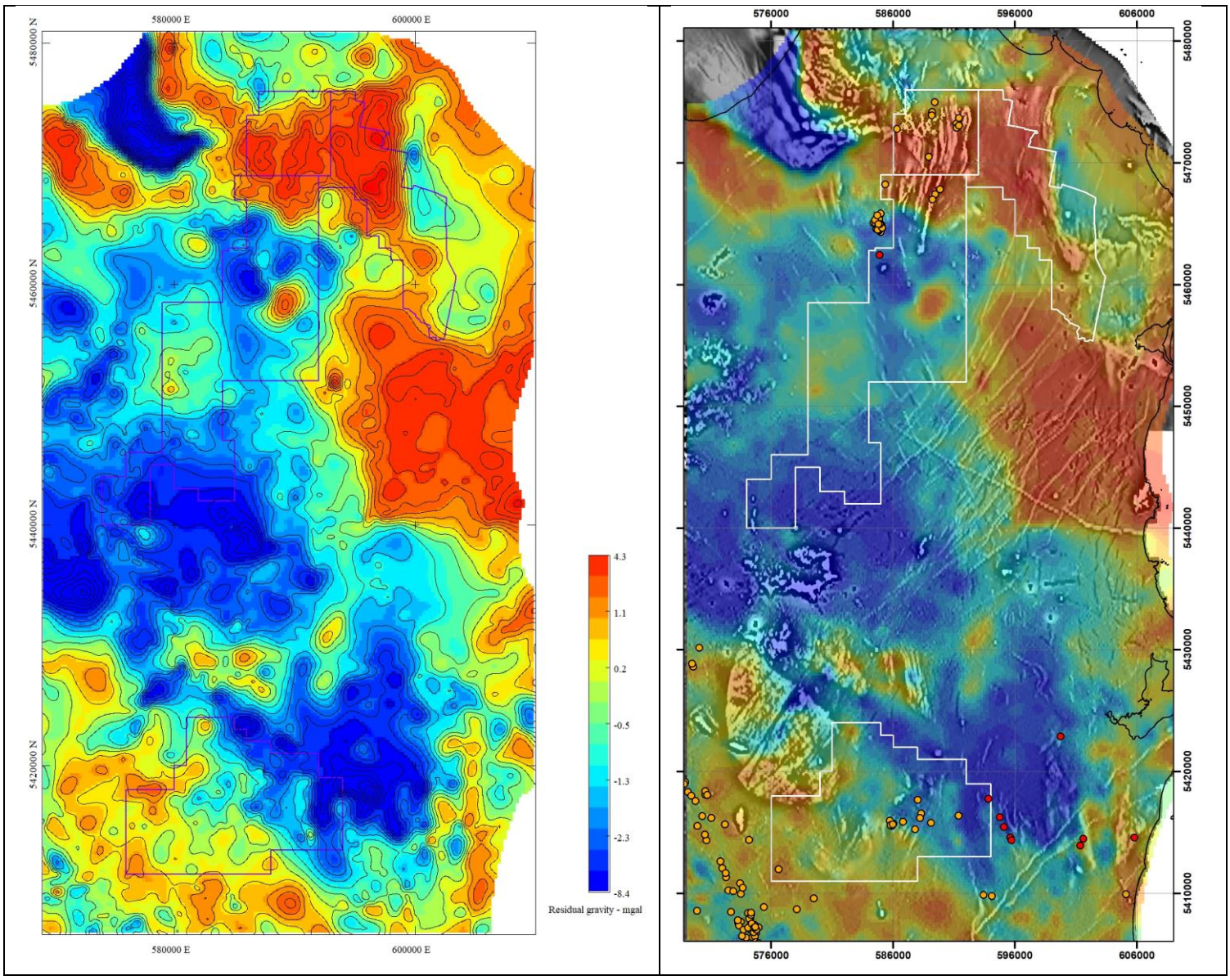

Figure 6. North east Tasmania project areas. Images of district scale residual gravity (Left) and residual gravity and greyscale 1Vd magnetics (right).

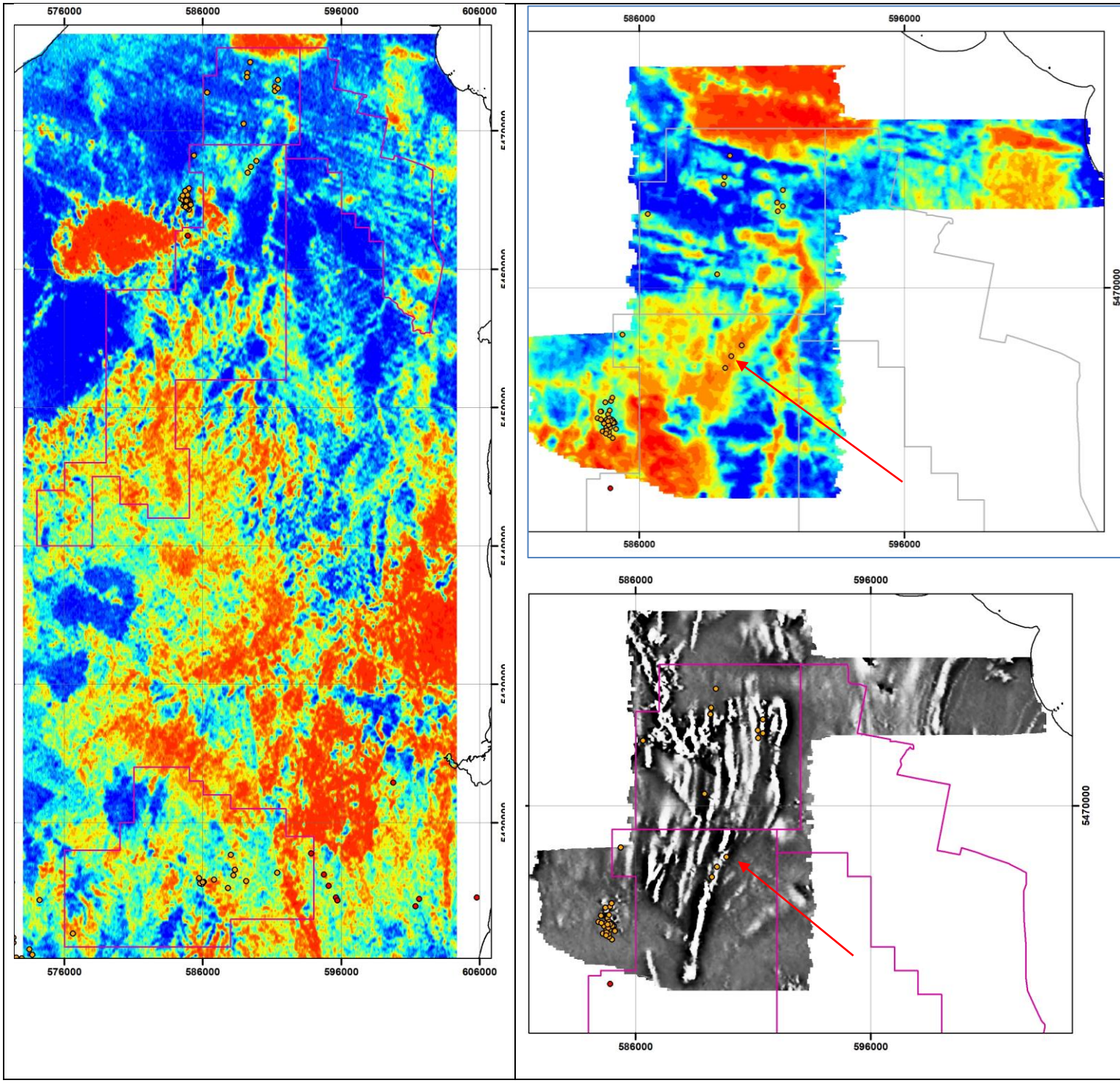

Figure 7. Potassium images derived from the regional (left) and Portman surveys (top right) and the first vertical derivative image from the Portman project area (bottom right). The red arrows point to coincident gold, potassium and magnetic anomalies.

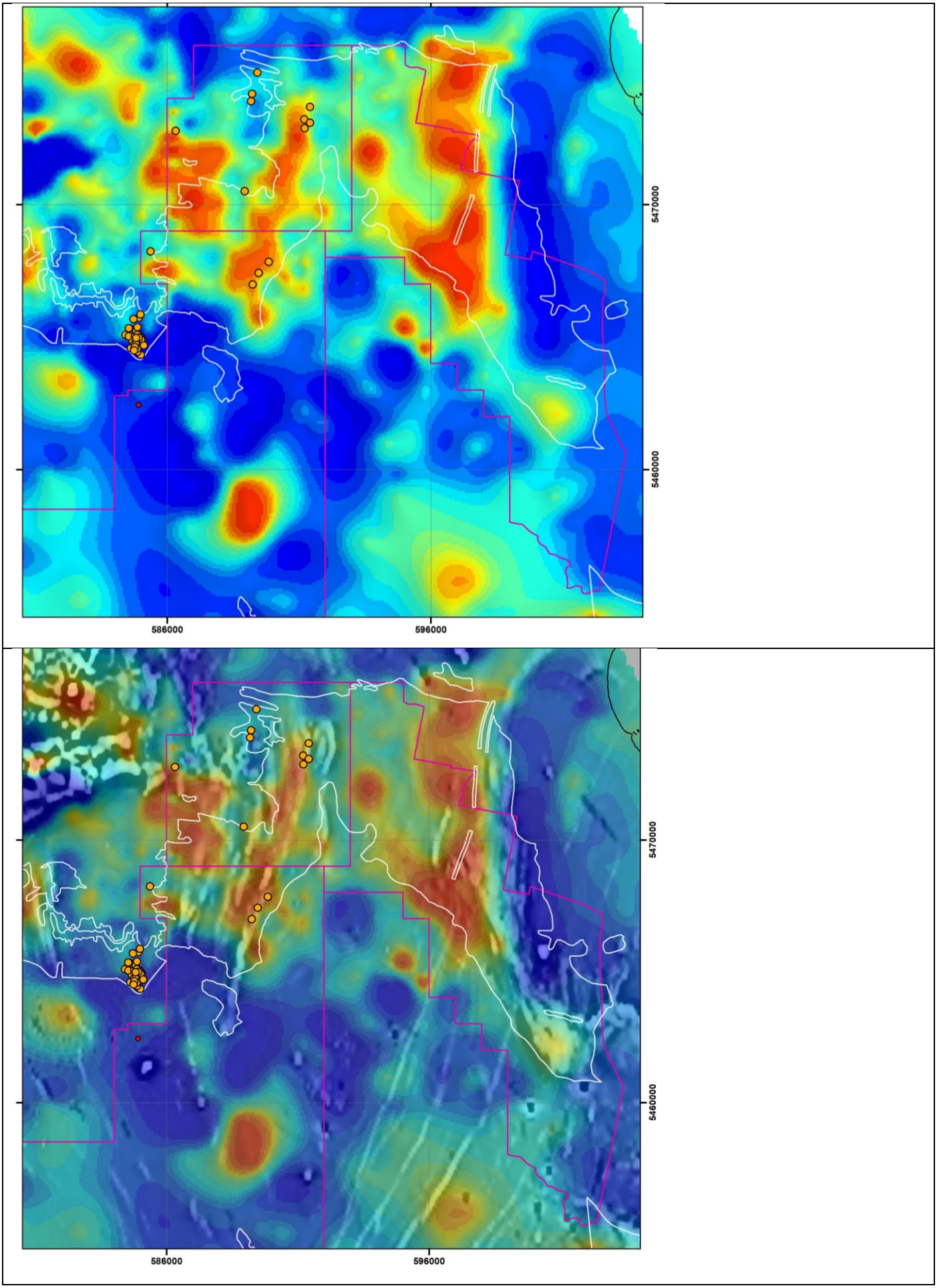

Figure 8. Portman project target signatures and gold occurrences. Coincident sharpened residual gravity(top) and the gravity merged with 1Vd magnetics (bottom). The Mathinna host rock is shown in white outline.