New SEDEX (?) and MVT Provinces discovered under shallow cover in the Southern Georgina Basin

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With thanks to SK Networks Resources Australia Pty Ltd and Central Petroleum Limited

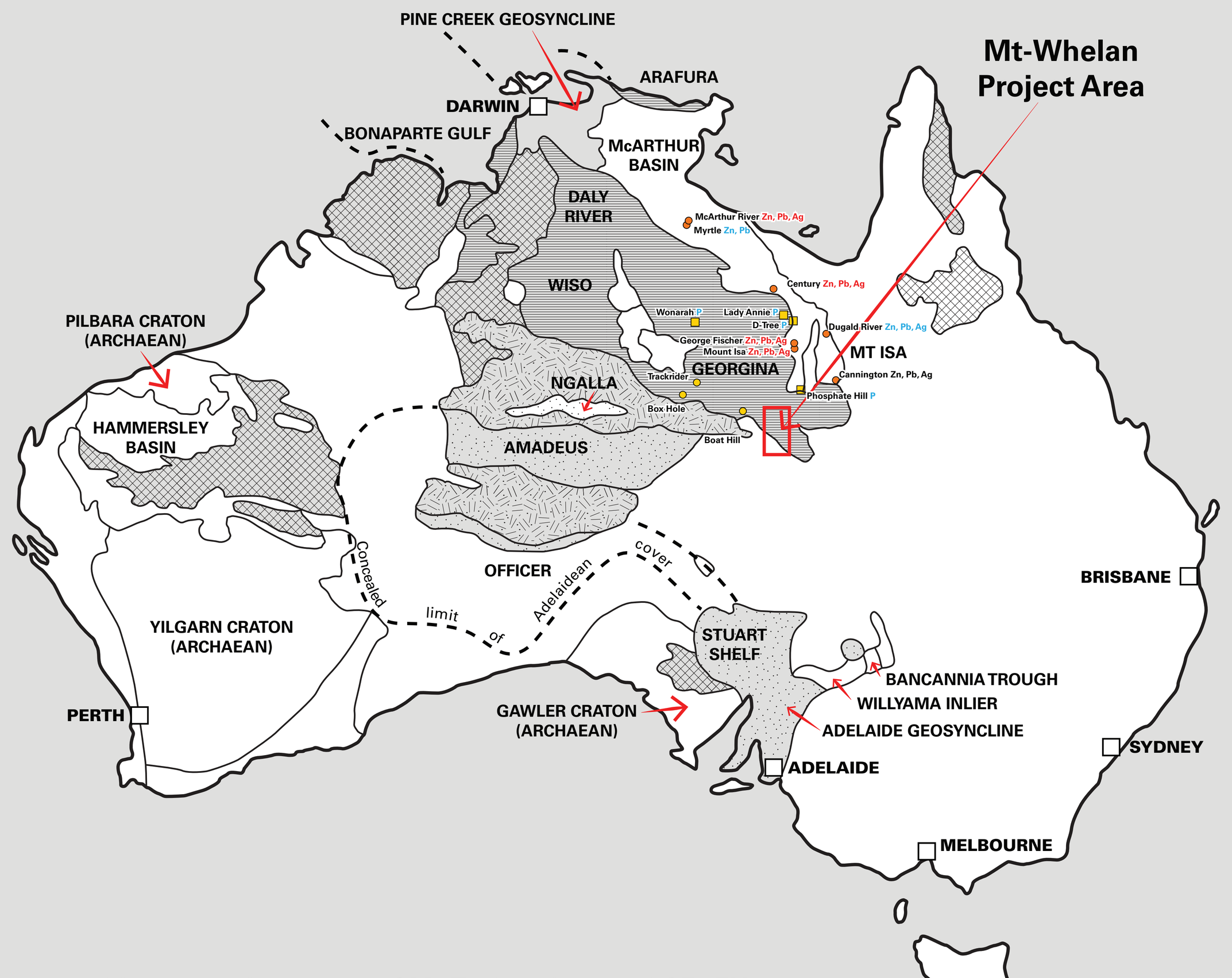


Figure 01: Distribution of MVT, Phosphate and SEDEX deposits in Australia

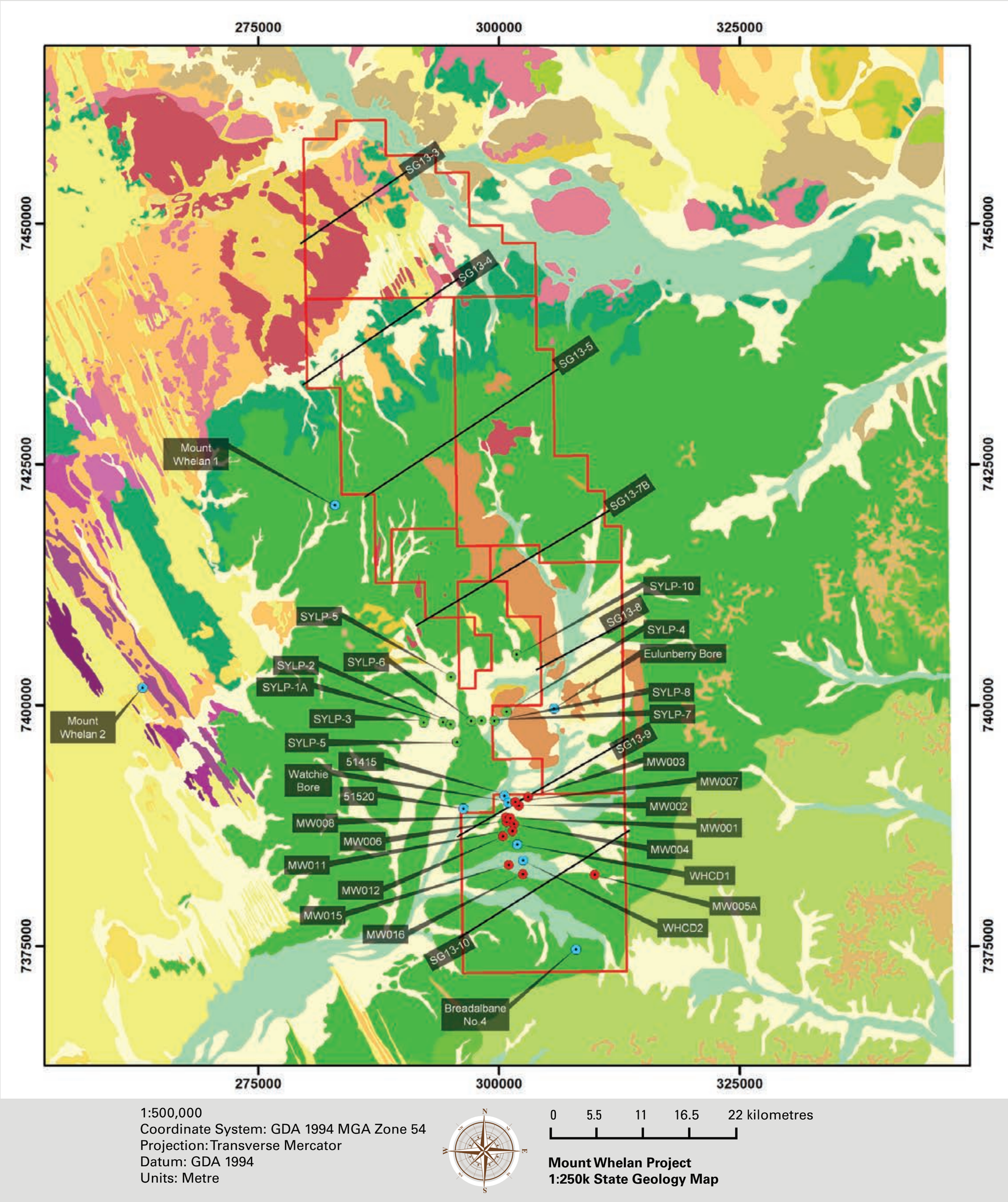


Figure 02: Digital 250k Geology of the Mt Whelan and Glenormiston Map Sheets; including drill hole and seismic line locations

Abstract

SK Networks Resources Ltd (SK) is currently exploring beneath shallow cover sequences within greenfield mineral tenure in the Southern Georgina Basin. A geological model has been developed of the Mt Whelan area highlighting two distinct geological domains separated by the Pippagitta Fault: 1) a western domain with the potential to be a new MVT province based on widespread elevated levels of Pb, Zn and Ag in drill assays; and 2) an eastern domain, which based on current interpretations has identified potential Mesoproterozoic sequences with SEDEX potential. These potential Mesoproterozoic sequences have not been previously identified and based on geophysical responses could be analogous to McArthur Basin or Lawn Hill sequences.

Initial reconnaissance drilling in 2011/2012 identified MVT-style (Pb, Zn and Ag) mineralisation and elevated phosphate within Middle Cambrian limestones of the Georgina Basin to the west of the Pippagita Fault along a basement high. The limestone units were tentatively correlated with the Thorntonia Limestone or equivalent e.g., Beetle Creek Formation and are considered to be prime host rocks for MVT-style mineralisation and/or phosphate in the right structural and palaeogeographic settings. While preliminary evaluation has highlighted a number of MVT-style drilling targets and a corridor for phosphate testing, the large extent of the tenure holding necessitates further exploration to assess its mineralisation potential.

A geological model was initially constructed using drilling, geological mapping and structural interpretations based on regional and high-resolution airborne magnetic datasets. An updated stratigraphic and structural interpretation and model was produced using additional 2D seismic data made available by a 2013 data exchange between SK and Central Petroleum who are exploring for unconventional oil and gas in the area.

The updated model maps the Thorntonia Limestone at depth with moderate to high confidence over a laterally continuous area of ~1,500 km². The interpretation and modelling has helped identify sub-cropping limestone within favourable structural (trap) settings both near surface and at depth over a broad elongated basement high to the west of the Pippagita Fault.

Nearly all drill holes have encountered elevated Pb, Zn ± Ag; maximum values encountered were 0.34%, 1.41% and 17 g/t respectively. The drilling results are highly suggestive of a fertile MVT-style system and reminiscent of early exploration results reported in other MVT provinces such as the Lennard Shelf.

Drill testing to the east of the Pippagita Fault has provided valuable stratigraphic information confirming a thick sequence of Neoproterozoic tillite the Yardida Tillite (previously the Field River Beds); which was previously unknown in the area. Unconformably (?) underlying the tillite sequence is a prominent sequence of seismic reflectors, which are potentially analogous to less deformed Mesoproterozoic-aged sequences found in the McArthur Basin and Lawn Hill region. The seismic profiles identify this prominent sequence of reflectors at shallow depths (<500 m) in some areas within SK's tenure amenable to drill testing.

The seismic data has also helped identify major, steeply dipping growth fault zones with multiple movement history. The discovery of new potentially Mesoproterozoic stratigraphy at shallow depths has positive exploration implications given the base metal mineral endowment of similar provinces of the North Australian Craton.

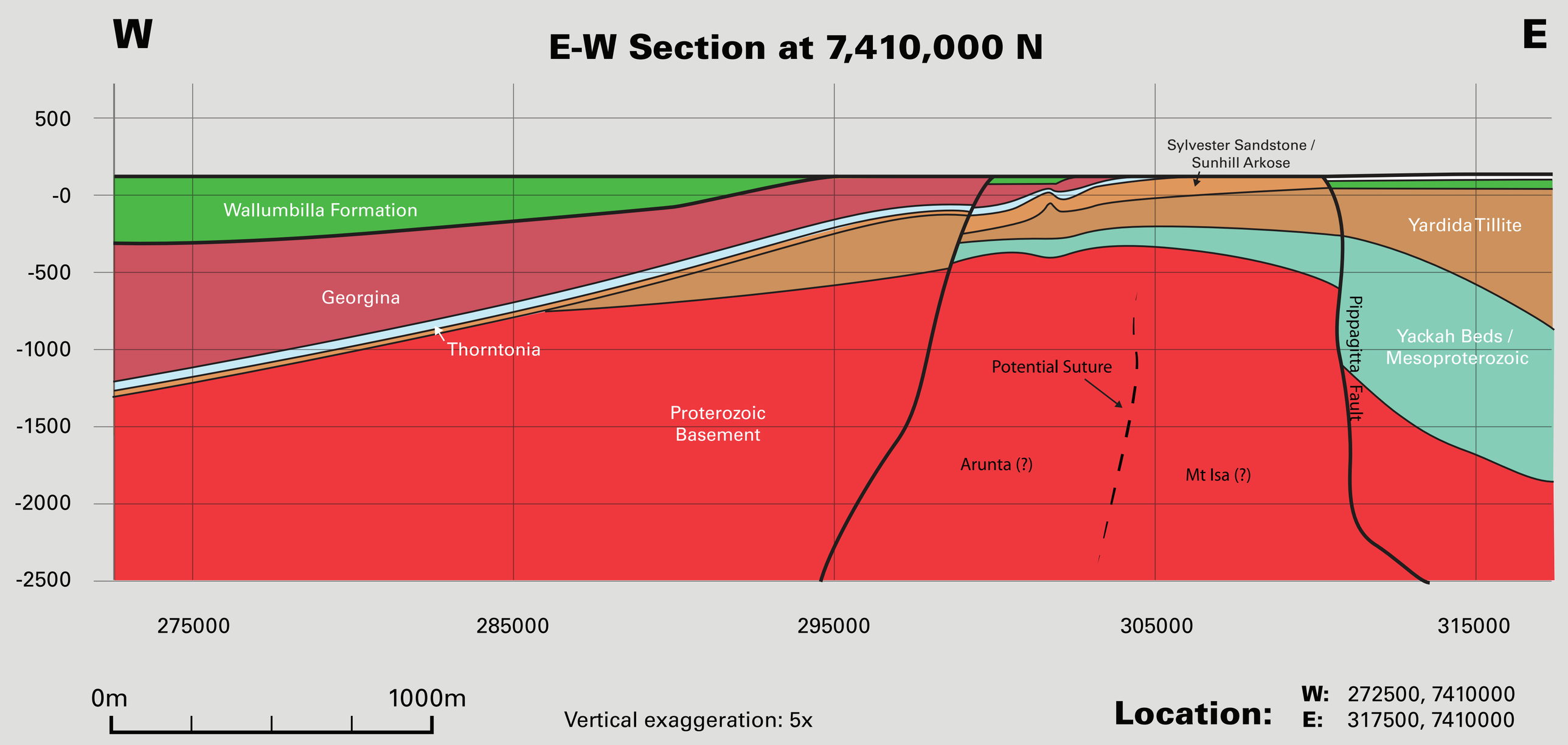


Figure 07: E-W at 7,410,000

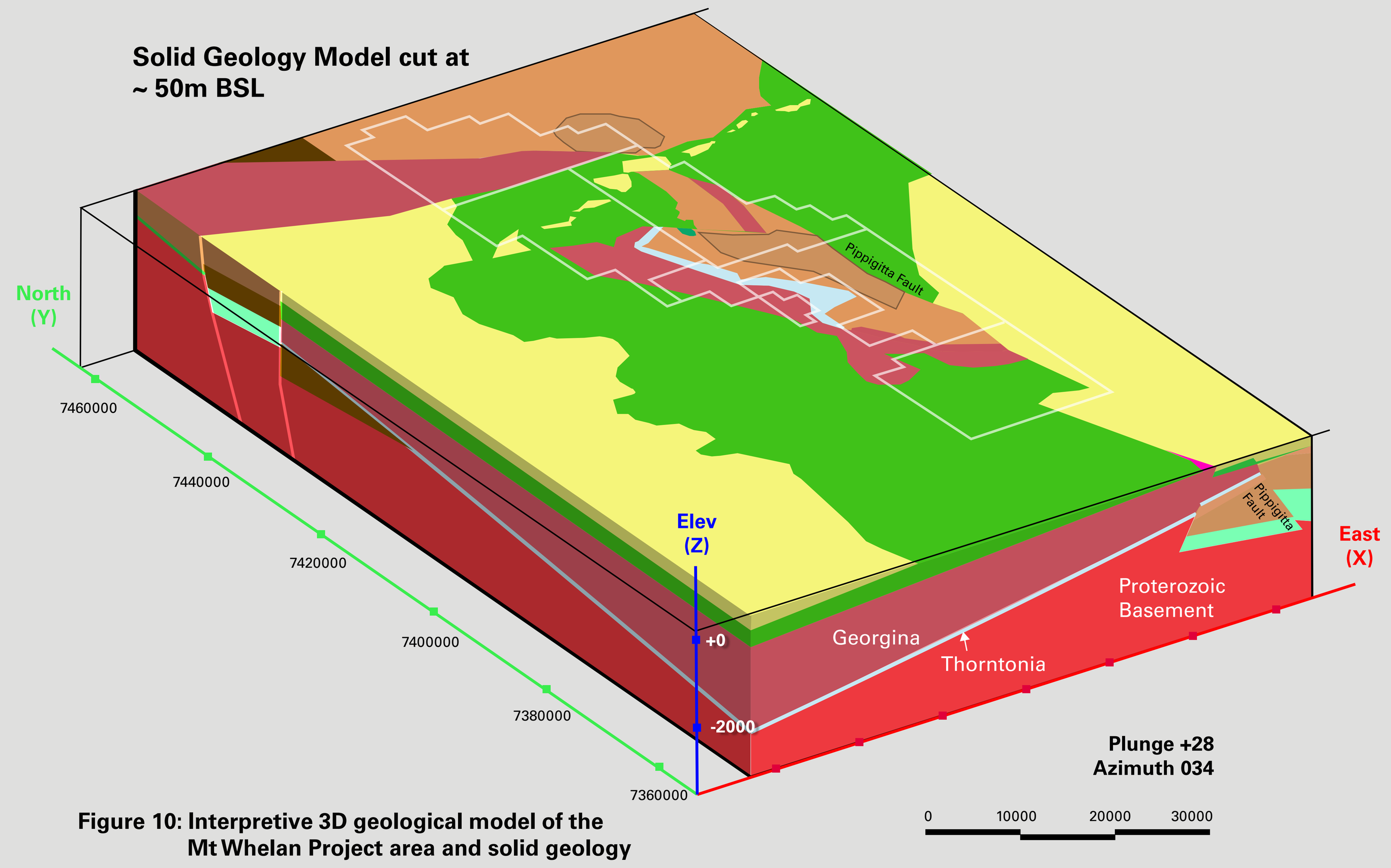


Figure 10: Interpretive 3D geological model of the Mt Whelan Project area and solid geology

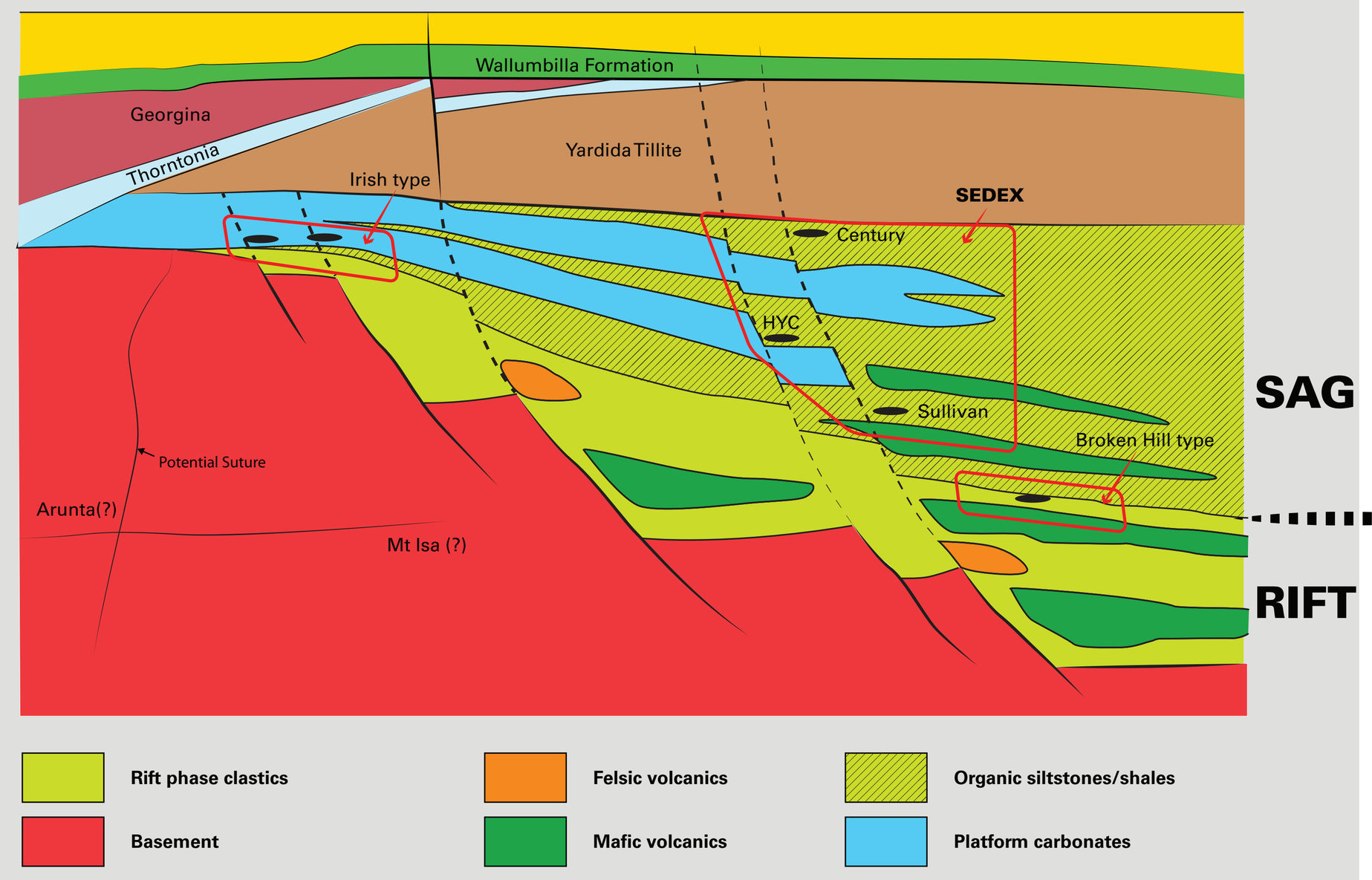


Figure 05: Potential Sedex Exploration Model at the Mt Whelan Basement High

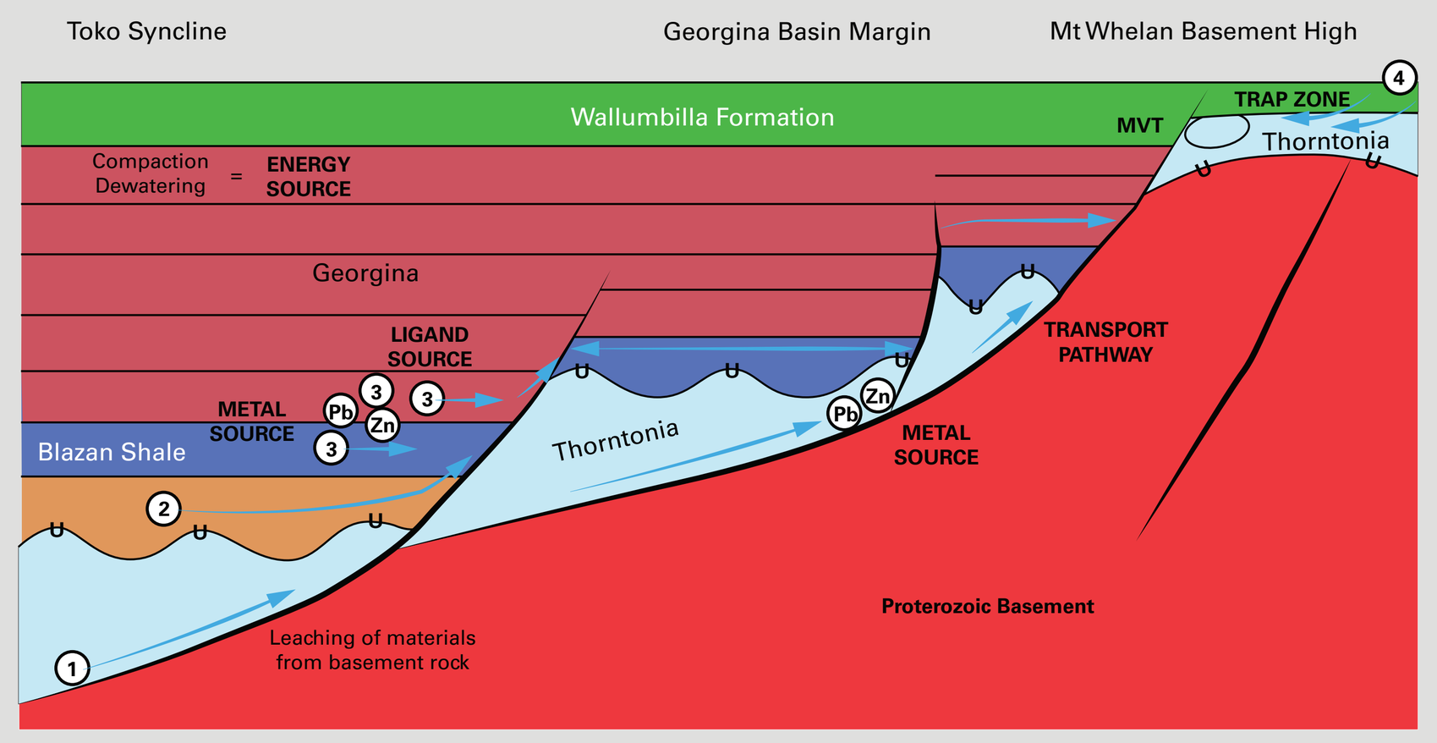
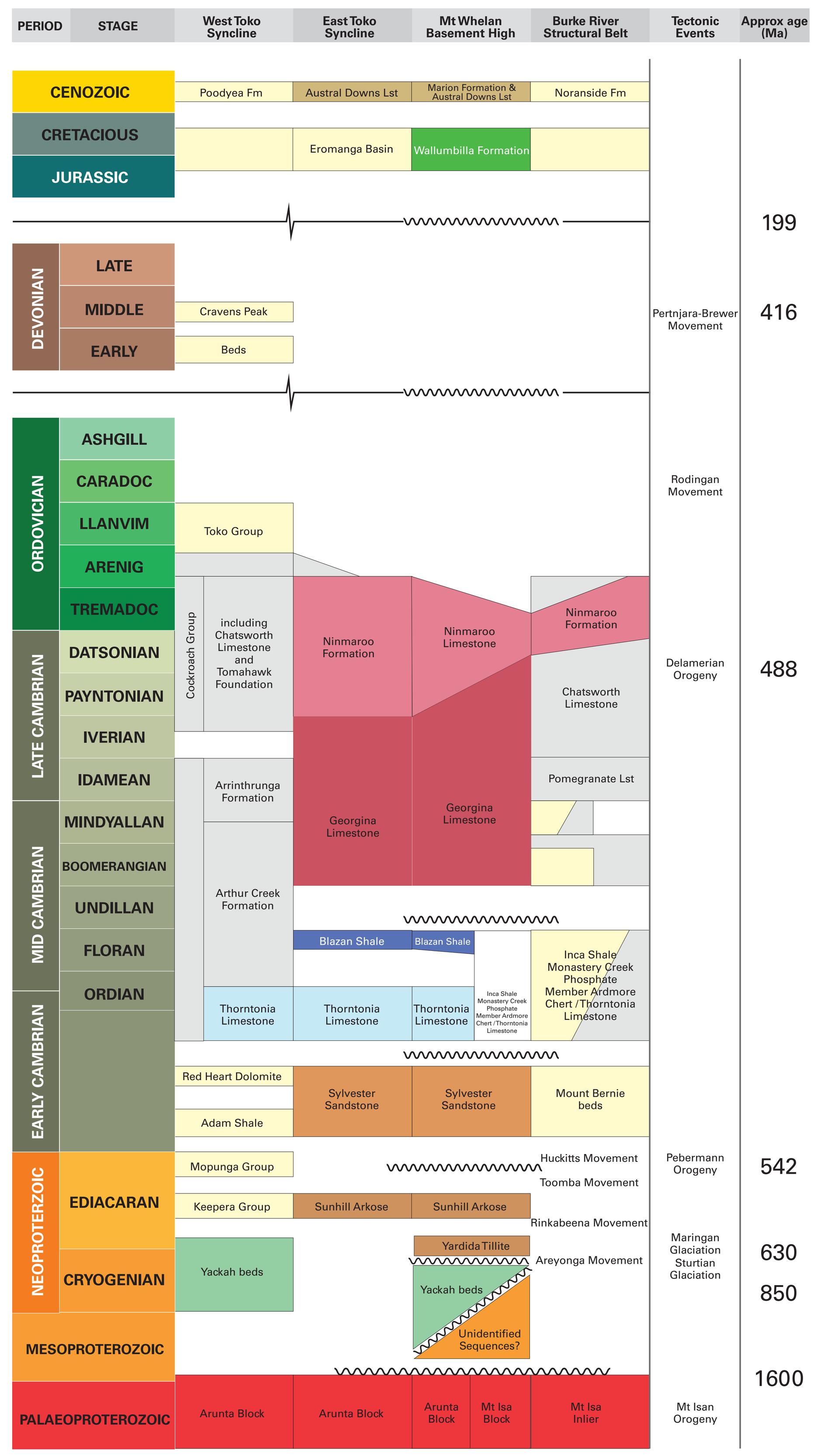


Figure 04: MVT Mineralisation Model within the Southern Georgina Basin and along the Mt Whelan Basement High



Modified from Carr (2012) and Greene (2010)

Figure 06: Stratigraphy of the Southern Georgina Basin andattempted correlation with surrounding regions

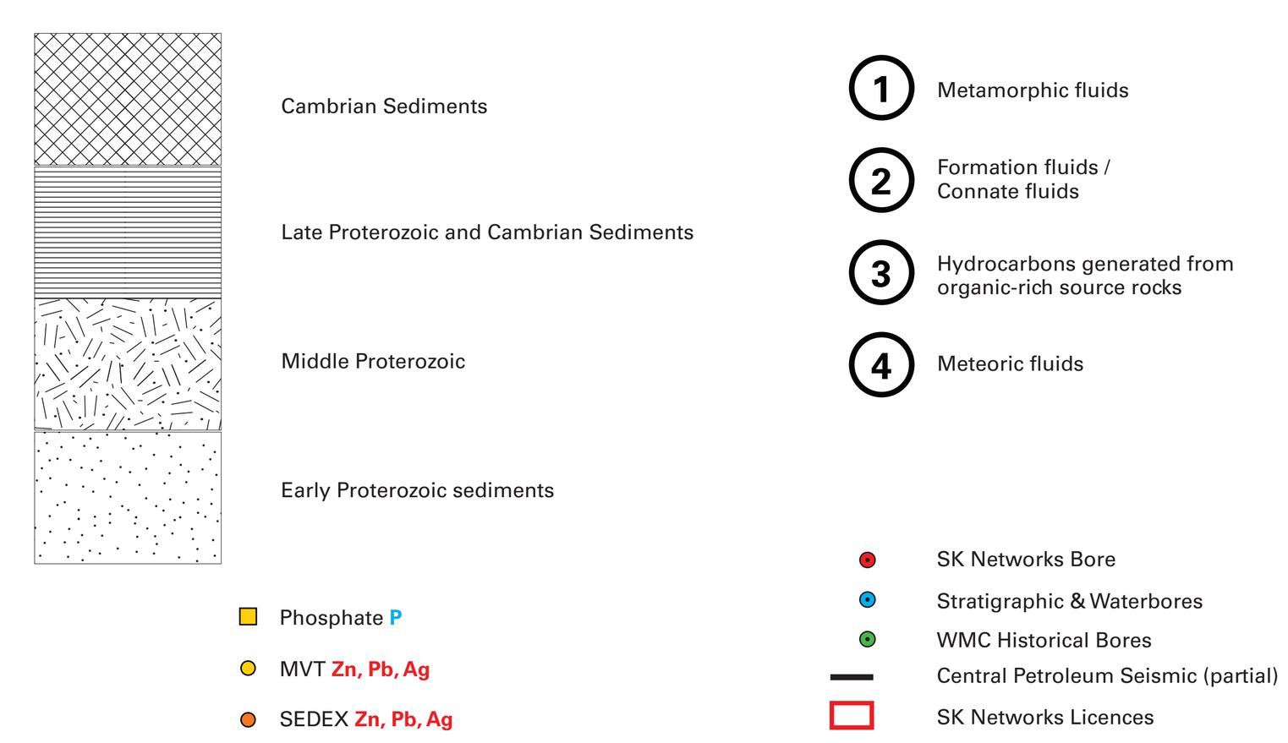


Figure 03: MVT style mineralisation in MW001

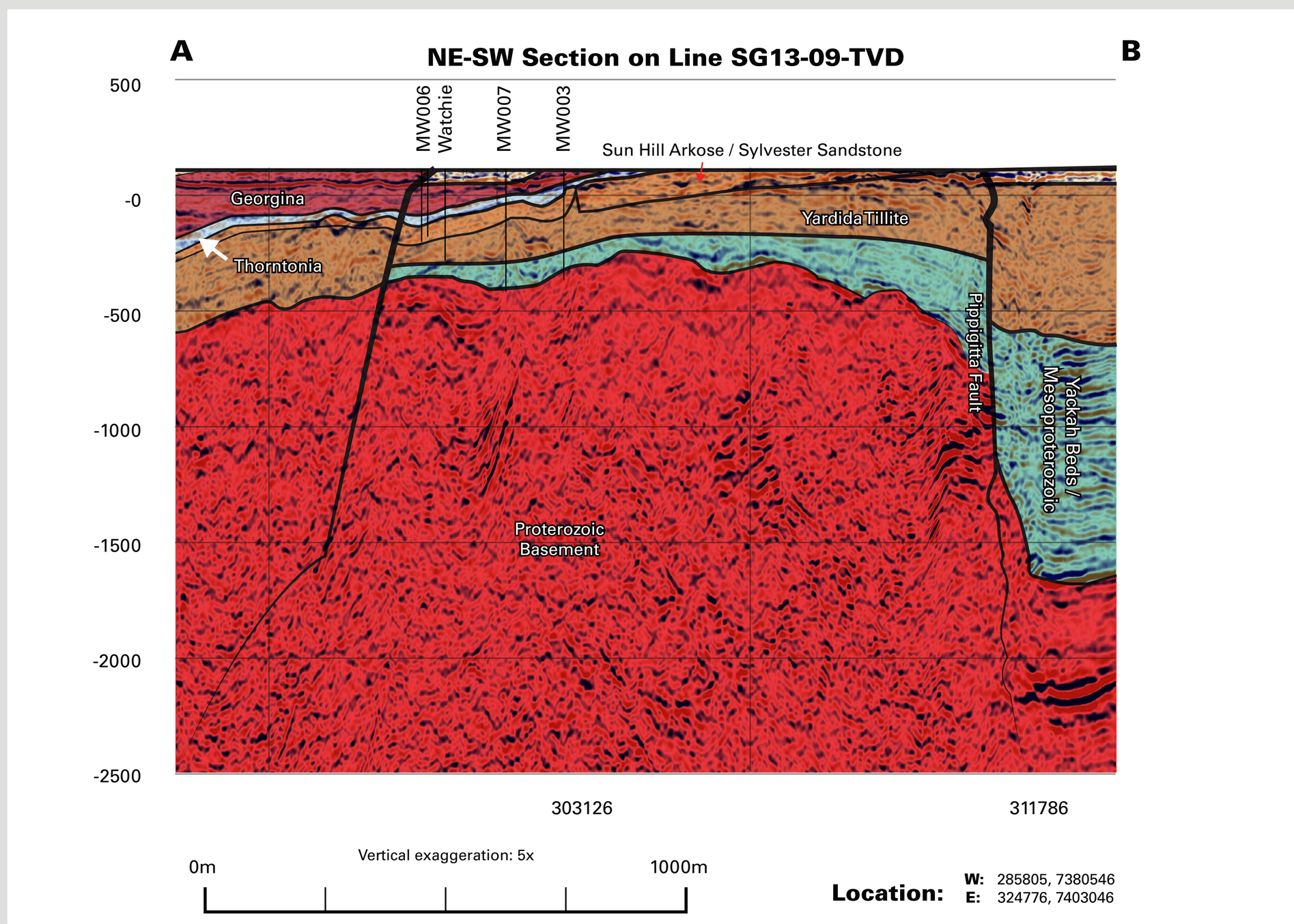


Figure 08: Seismic Interpretation (SG13-09) and geological model overlay indicating potential of eastern margin

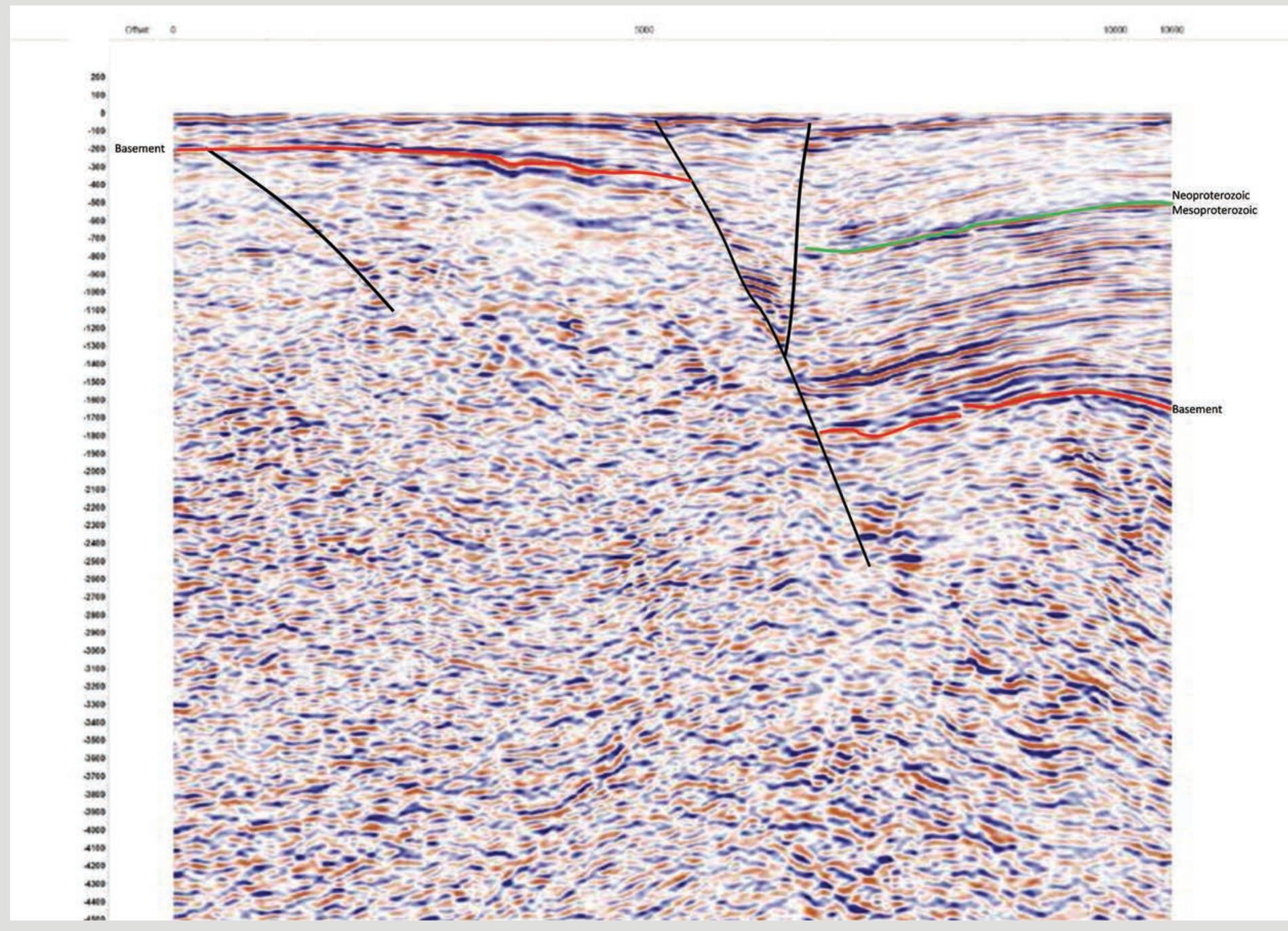


Figure 09: Seismic line and interpretation (SG13-08)

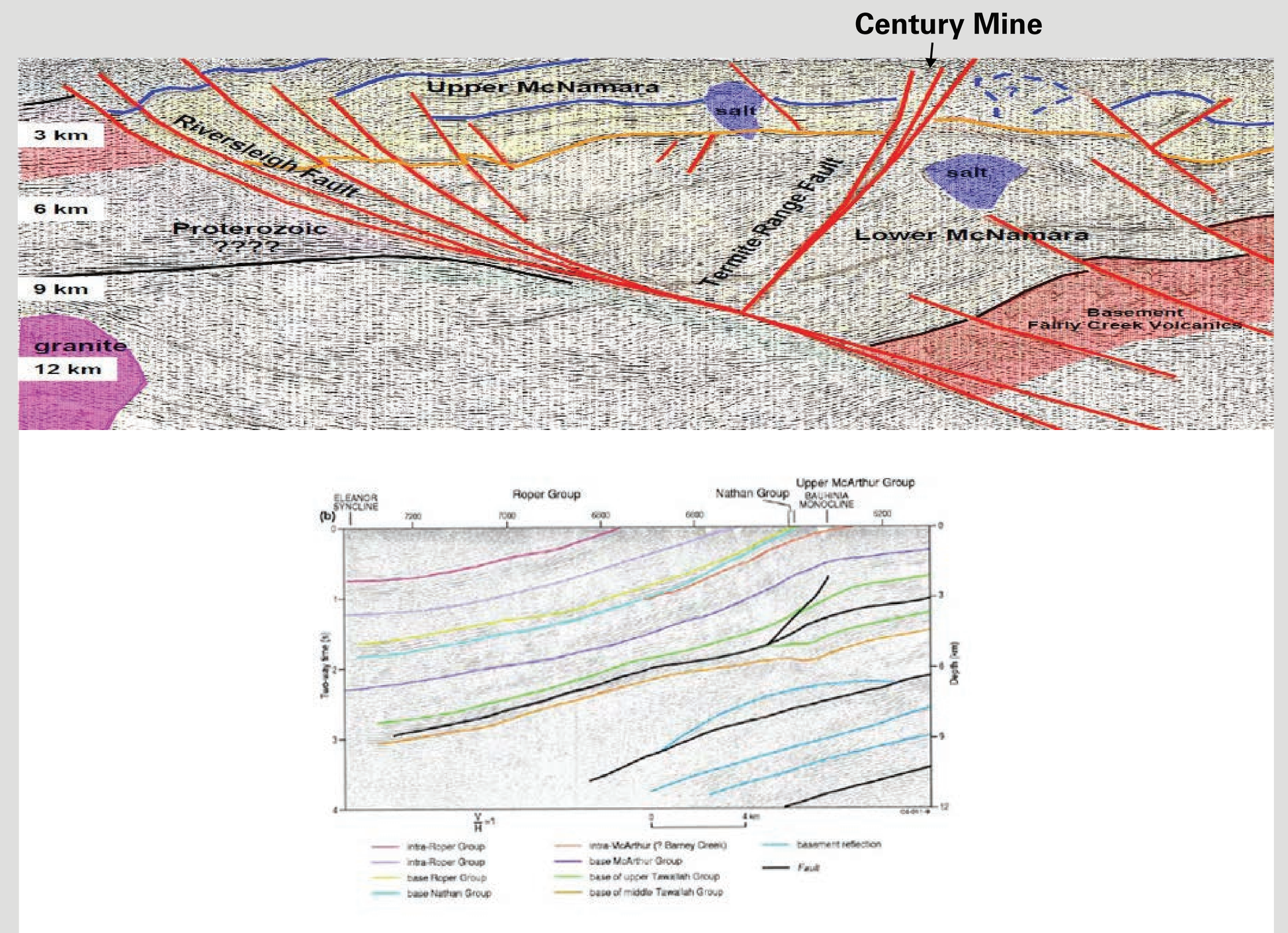


Figure 11: Examples of Mesoproterozoic Sequences of North Queensland and the Northern Territory
A) Example of regional faulting and structure
B) Example of Mesoproterozoic reflective package similar to that identified at depth in Central Petroleum's seismic

Historical Mineral Exploration

Previous exploration within and around SK's tenure is extremely limited; with only a handful of company exploration reports found that directly relate to SK's exploration area.

Early Exploration was conducted in the early 1970s by Aquitaine Australia Minerals; this consisted of unsuccessful surface sampling (85 chip samples), mapping and 2 drillholes, which targeted outcropping Late Cambrian to Early Ordovician limestone's (paleo- kart surface) now identified as the Ninmarroo Formation and located to the north of SK's current tenure.

Surface sampling in the mid-1970s by CRA identified and collected a single anomalous silver (Ag) sample of 74 g/t and multiple anomalous Fluorine (F) samples (8400, 400 and 1600 ppm). Whilst the samples were ascribed to younger Late Cambrian and Ordovician rocks, the descriptions are more consistent with the Lower to Middle Cambrian limestones.

The most comprehensive local historical exploration was conducted by WMC in the 1980s. Importantly WMC reports name a number of drillholes that are not listed in the public drillhole database hosted by the Queensland (QLD) government. Significantly, these boreholes (12 in total) of which 9 drillholes encountered Lower to Middle Cambrian Limestones described as recrystallised dolomitic vuggy limestone. This unit variably contains traces of galena (up to 0.16% Pb), sphalerite (up to 1.09% Zn) and silver (up to 7 g/t Ag). Similarly, WMC investigations of these Lower to Middle Cambrian units in the stratigraphic petroleum hole GSQ Mt Whelan 1, also describe similar lithologies; which notably contained elevated Pb, Zn and F.

There is also 1 known historic working, which has highly elevated Pb (up to 3.5%) and Zn (up to 1%) hosted in vein quartz within the Sylvester Sandstone between the WMC drilling and more recent SK's drillholes.

MVT Potential

Recent drilling by SK has further intersected, identified and more comprehensively sampled these Lower to Middle Cambrian Units in 13 holes targeting structures and anomalies interpreted from a high resolution airborne magnetic and radiometric survey acquired in 2011. SRK now considers these units to be correlatives of the QLD's Beetle Creek and Monastery Creek sequences in the QLD stratigraphic sequence and the Thorntonia Limestone, which is recognised in both QLD and the Northern Territory's (NT) recognised stratigraphic sequences.

Key intercepts and grades from SK's drilling are highlighted in Figure 05 with maximum values of 0.47% Pb, 0.31% Zn and 17 g/t Ag. In addition, the cored interval of MW001 from 210-215 m (Figure 03) drilled in 2012 by SK confirms an MVT like texture and habit of mineralisation.

Whilst drilling information is still considered to be limited as intersections are widespread, notably nearly all show occurrences of elevated Pb, Zn ± Ag consistent with other known prospective areas of the Georgina Basin (Figure 01) in the NT and Northern QLD. SRK considers that these values are highly suggestive that a fertile potentially mineralised system is or was in place. SRK has derived an MVT exploration model for the Southern Georgina Basin (Figure 04) based on known examples in the Georgina Basin and areas such as the Lennard Shelf.

SRK's regional geological model highlights the various structural controls and settings that appear to be unique to this area and along the Mt Whelan Basement High. In the context of this regional setting and proximity to regional faulting coupled with the addition of a modern seismic dataset across the area, SRK considers this area to be highly prospective for identification of numerous structural (trap) settings prospective for MVT mineralisation at depths amenable to exploration.

3D Geological Modelling of sequences under cover

The geological model initially developed by SRK was constructed using stratigraphic/SK drilling, geological mapping and structural interpretations based on regional and high-resolution airborne magnetic datasets. This initial model allowed broad targeting of a structural corridor for further desktop analysis studies and the application of additional tenure over prospective ground. Subsequent to the application of these additional application licences, SRK managed the negotiation of a data share with Central Petroleum; for 2D seismic data acquired in 2013 in exchange for access to SK's drill core. The receipt of this data made available during late 2013 enabled an updated stratigraphic and structural interpretation of the broader region. Subsequently an updated structural and geological model was produced, which is considered to be robust and closely reflects mapped surface geology.

The updated model maps the Thorntonia Limestone at depth with moderate to high confidence over a laterally continuous area of ~1,500 km². The interpretation and modelling has also helped identify sub-cropping (Thorntonia) limestone within favourable structural (trap) settings both near surface and at depth over a broad elongated basement high (the Mt Whelan Basement High) to the west of the Pippagita Fault.

In addition, the seismic has imaged a previously unknown graben structure to the East of the Pippagitta Fault. This graben trends NW-SE and extends along the eastern sub-cropping margin of the Toko Syncline (Willink, 2015). To date, the drilling by SK and seismic acquired by Central Petroleum represents the best known evidence and interpretation of the Neo to Meso (?) Proterozoic sequences located in the Southern Georgina Basin (the eastern domain) and invoked by Greene, 2010.

Phosphate mineralisation

During the Cambrian-Ordovician, sedimentation within the Georgina Basin was dominated by marine carbonate platform sequences. Locally preserved representations of these carbonate formations include the Thorntonia Limestone, which disconformably (?) underlies the Georgina Limestone.

Known phosphate resources predominantly occur within near-basal Cambrian carbonate-rich rocks. Deposits are developed in restricted shallow marine environments, such as in embayments, which were separated from the open sea and/or carbonate banks adjacent to a seaway, with minimal terrigenous sedimentation input (GSQ, 2011). Typically, the phosphate-rich zone consists of a repeating units of phosphorite, phosphatic limestone and organic rich shales (GSQ, 2011). More specifically, the larger phosphate deposits are believed to have either formed near to historic shorelines within these embayments e.g., the world class Phosphate Hill deposit and the DTree and the Paradise deposits, or in shallow marine waters over basement highs separating the open sea from shallower embayments e.g., Wonarah deposit.

Historical exploration by WMC did not test the Middle Cambrian for phosphate; however, the drilling encountered stratigraphy similar to recent drilling by SK. Drilling by SK has identified a discrete phosphate zone, which occurs in carbonate-rich rocks (Thorntonia Limestone or equivalent) at the base of the Georgina Basin sequence along and marginal to a palaeotopographic (or basement) high. The broad phosphate zone, encountered to date lies at depths between 50-200 m across the northern half of the EPM17518 permit area is interpreted to extend both north (WMC's MVT drilling) and south and is modelled to shallow and sub-crop to the north and east.

Drilling by SK suggests that typically within this phosphate zone, there is a 2-3 m thick horizon of elevated to low grade (>background up to 5.0% P_2O_5) phosphoritic rock at the top of the Thorntonia Limestone (equivalent of the Beetle Creek Fm?) with an elevated (between 1.30-2.04% P_2O_5) phosphoritic zone up to 15 m thick extending down to a second but more sporadic 1-2 m wide lower grade zone (>2% P_2O_5).

SRK notes that these values are consistent with intervals in the north and NE margins of the Georgina Basin and around Mt Isa; based on a similar interpreted palaeo environment and structural setting, along a long lived basement high. It is therefore reasonable to assume that these rocks are equally as prospective for phosphate occurrences as the known and established corridors to the north and therefore warrant further exploration.

Neoproterozoic Sequences

Current tectonic interpretations such as Greene (2010) invoke the presence of Neoproterozoic rift basins beneath the Southern Georgina Basin. These rift basins are a result of the Neoproterozoic rifting phase associated with the breakup of Rodina.

Previously there was only one known historical drill intersection to the east of the Pippagitta Fault and at 143.9 m the depth is not sufficient to penetrate the NeoProterozoic sequences.

To date the only known drill intersection within the graben is MW005a, which was drilled to test a deep magnetic anomaly to the east of the Pippagita Fault by SK in 2012. This hole encountered ~525 m of the Neoproterozoic Yardida Tillite sequence (previously Field River Beds) from 300 m to EOH 828 m.

Sedex Potential

The glacial sequences encountered in MW005a are correlated with the Yardida Tillite and are currently interpreted as Marinoan in age. T here are a set of prominent reflectors lying unconformably beneath the tillite sequence within the graben structure. The provenance of the unconformable sequence hosting the prominent seismic reflectors is currently being debated and there are 2 leading suggestions from the interpretive work to date.

One interpretation suggests these units could be a correlative of the Yackah Beds; therefore early Early Crogenian or Sturtian in age and potentially similar to the sequences identified in the Adelaide Geosyncline.

Alternatively the seismic profiles show similarities with seismic lines from the McArthur Basin and Lawn Hill Platform. In a regional sense this graben lies directly south and along trend from the McArthur Basin and Lawn Hill Platform and may represent an undercover extension of Mesoproterozoic aged sequences therefore suggesting a Mesoproterozoic age. An example of regional seismic lines from the Lawn Hill platform is presented in Figure 11A and 11B. Whilst not diagnostic there are a number of similarities in the style of the reflectors (11B) and structural setting (11A), which suggest that these sequences and setting could be similar and warrant definitive stratigraphic drill testing.

Based on the modelled depths this unconformable deeper sequence represents an attractive target with potential for Mesoproterozoic SEDEX mineralisation or Neoproterozoic sediment hosted gold/copper subject to the age of these sequences.

Key References

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