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Report to

TasEx Geological Services

**Review of Barnes Hill West Extension Grid Soil Geochemistry,
North Eastern Tasmania**

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SUMMARY

A review of geochemical analysis results from soil samples collected from the Barnes Hill Extension Soil Grid was made to assist in the interpretation of the results and determination of the significance of elevated Cu, Pb and Zn values determined from the survey.

Information forwarded with the geochemical data to assist with the assessment included, topography, TMI and 1VD magnetics and drainage and geology maps at 1:250,000 and 1:25,000 scale. A Google image of the sampled area was captured, georeferenced and used as an additional reference base for interpretation.

Results were plotted as thematic scaled coloured dot plots to highlight the spatial relationships within the data in relation to the topography, magnetic data and geology as mapped to aid interpretation. This approach highlighted a discrete region with significantly elevated anomalism in a range of elements occurring over folded and sheared basement Precambrian units in thrust or shear contact with Cambrian ultramafics. Additional processing was not considered warranted.

The source of the anomalism may however be associated with other mafic units incorporated along regional NE to NNE shears transecting the soil sample grid and coincident with anticlinal folding in the Precambrian units, based on the overall geochemical characteristics seen in the soil data and spatial relationships present. The shear zone is characterised in float by abundant quartz clastics as lag on the surface and Fe-oxide-rich veinlets and float occurring with low grade meta-sediments typical of basement lithologies.

The ultimate source of the anomalism is not resolved by the data at hand but the element suite is strongly reflective of a mafic source (Fe, Mn, Cr, Fe, Co, Ni, V, Mg, Ca \pm Cu \pm Zn). Associated dark and red brown soil colour at the south end of the anomaly suggests a different lithotype related to that section of the anomalous zone, but might also simply reflect organic content. At the northern end of the anomaly zone soil colours where noted are yellow and orange suggestive of more acid soil pH conditions perhaps due to sulphide or deeper weathering, but this is not clear.

Elements such as K, Ba appear to map lithofacies within the host basement metasediments and notably elevated Sb the likely location and trend of the shears through the grid area. The coincidence of a local discrete magnetic high in the TMI and elevated NE zone in the 1VD magnetic data reflect the likely location of the anomaly source and structural trend respectively.

The Cu-Pb-Zn values are not considered significantly elevated given the high associated values seen for Fe and Mn and are probably not unexpected given the interpreted mafic association, particularly values for Cu and Zn and association with a zone of shearing. Arsenic values appear to most likely relate to shears in the Cambrian ultramafics. Au is notably absent in the data.

There is merit in a brief field examination of the central part of the anomaly, essentially confined to a ridge line of several hundred metres length to confirm the nature of the geology and to the geology and determine the specific controls on the source of the higher base metal bearing soil samples.

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1. INTRODUCTION

The Barnes West Extension soil grid lies approximately 4 kilometres south west of the Beaconsfield Gold Mine in north eastern Tasmania. It covers moderately excised terrain which incorporates Lower Cambrian sequences including ultramafic bodies, in tectonic contact with Precambrian basement phyllite and psammite metasediments.

The location is shown in Figure 1.

An opinion was requested as to whether the soil results contained any anomaly and if any anomaly is present if it is significant and to suggest any recommendations for further work.

The supplied data included soil analytical data in an Excel file, 1:250,000 scale Tasmanian geology, 1:25,000 scale geology map sheets (Harford & Beaconsfield), topographic data, hydrology and road layers and TMI and vertical derivative magnetics files all with MapInfo tab files. In addition a Google image of the area was captured and georeferenced for the soil grid as an alternative plot base to aid interpretation. Location of the soil samples over this data is shown in Figures 2-6

The soil samples were sieved to -1mm and were collected from approximately 15cm below surface and were analysed by ALS Chemex Laboratories for Au (TL-43) and the other suite of elements using ME-ICP61 method. Results are shown plotted as thematic dot plots over geology in Figures 7-23. Figure 23 highlights the main zone containing anomalous values.

These notes represent a brief discussion of the data from the assessment.

2. COMMENTS ON THE GEOCHEMISTRY

2.1 General Comments

It is notable that the zone of high multi-element anomalism is a hill and ridgeline named Ironstone Ridge which might suggest it represents a mafic dyke or plug of which a number are recognised intruding basement rocks of the wider area. Alternatives might be Tertiary basalt flow remnant or be a mafic intrusive plug or fault slice at the site that has undergone lateritisation with related secondary concentration of some of the elements (Fe, Mn etc). It might also represent a sheared (thrust) hosted block of mafic rocks outcropping at the ridgeline. No float descriptions of rock float types are given so it is not clear what the local primary lithologies are and soil colour descriptions are limited. If the country rocks contained limestone or calcareous sediments, perhaps associated with a shear, these would serve to concentrate Fe, Mn, etc in their immediate vicinity.

It is clear that there is a strong focus of multi-element anomalism centred on a site as shown in Figure 23. This includes both major (Mg, Ca, Fe) and trace elements (Cr, V, Co, Ti etc.), that strongly reflect a mafic silicate and associated trace element assemblage. Cu and Zn also strongly associate with this zone which likely reflects a naturally elevated response in such rock types as well.

Magnetics suggest a discrete body (yellow coloured in TMI mag; Figure 5) may be the cause and source of the anomalism. It is notable the soils from the anomaly are logged as dark and red brown coloured in the south and orange yellow and yellow in the north suggesting a different lithotype sources to adjacent areas which are noted as more typically grey in colour. The brown colours suggests of a lack of Fe leaching and alteration (other than normal weathering processes) under neutral or mildly alkaline pH conditions from which one might infer a lack of sulphide associated with the immediate rocks and might suggests mafic rocks and having a higher more organic rich content. The yellow and orange colours at the northern end of the anomaly might suggest more acid and leached soils and perhaps more indicative of sulphide being present, but this is not entirely clear from information at hand. It might simply reflect different degrees of weathering and depth of exposure through the weathered profile.

2.1.1 Arsenic and Antimony

Sb is a relatively immobile element in the oxidised zone (relative to As for example) and can be a useful close to source vector. Sb is associated with the anomaly “centre” but its distribution (Figure 17) is suggestive of structural hosted source trending parallel to anticlinal folding and possibly shearing as shown in Figure 3. The Sb values and distribution appear to cross cut lithological boundaries indicative of being shear hosted.

The distribution of As is largely confined to areas away from the anomaly “centre” and its local elevation in the adjacent Cambrian ultramafics suggest it is sourced from local As+/-Sb+/- Pb bearing veins or shear zones within those units and also within the Precambrian units.

2.1.2 Base and Precious Metals

The tenor of the base metals is not high, such that it would be representing outcropping base metal gossan. Peak Cu values range between 100-150 ppm; Pb between 150-200 ppm; Zn between 200-415 ppm. The Pb distribution may be bimodal but may simply reflect a shear hosted source given the association with As and Sb in some instances. Au is notably absent in association with the anomalism and is largely absent from the entire data set. The high Fe and Mn in association with the base metals may account for the higher values.

2.1.3 Mafic Metal Association

As, V and Cr all reflect the Cambrian ultramafics but Ti, Ni, Co, Mg and a range of other elements do not strongly do so. This contrasts with the response seen for the anomalism along the ridge top target area defined by the geochemistry where the mafic suite (excluding As in this case) are strongly localised. The reason for this contrast is not clear. One implication from the geochemistry is that there is unrecognised mafic material in outcrop or subcrop at that site, as described in the general comments above. Chromite values tend to distribute toward the lower slopes suggesting that its distribution may be controlled by Cr-magnetite or chromite dispersed mechanically as a heavy mineral down slope in the soils. (Ba does this to some extent as well but the reason for this is less clear). The distribution is slightly different to that for the other mafic elements.

2.1.4 Potassium and Sulphur

Elements such as K and S seem to reflect the pelitic and psammitic rocks of the area and appear to be controlled by lithology. Sulphur is relatively depleted in the central anomalous area which might reflect lack of sulphide in the anomaly vicinity (weathered out) but this is speculative given the solubility of many sulphates. It does seem to be most elevated at the Cambrian ultramafic contact with the Precambrian.

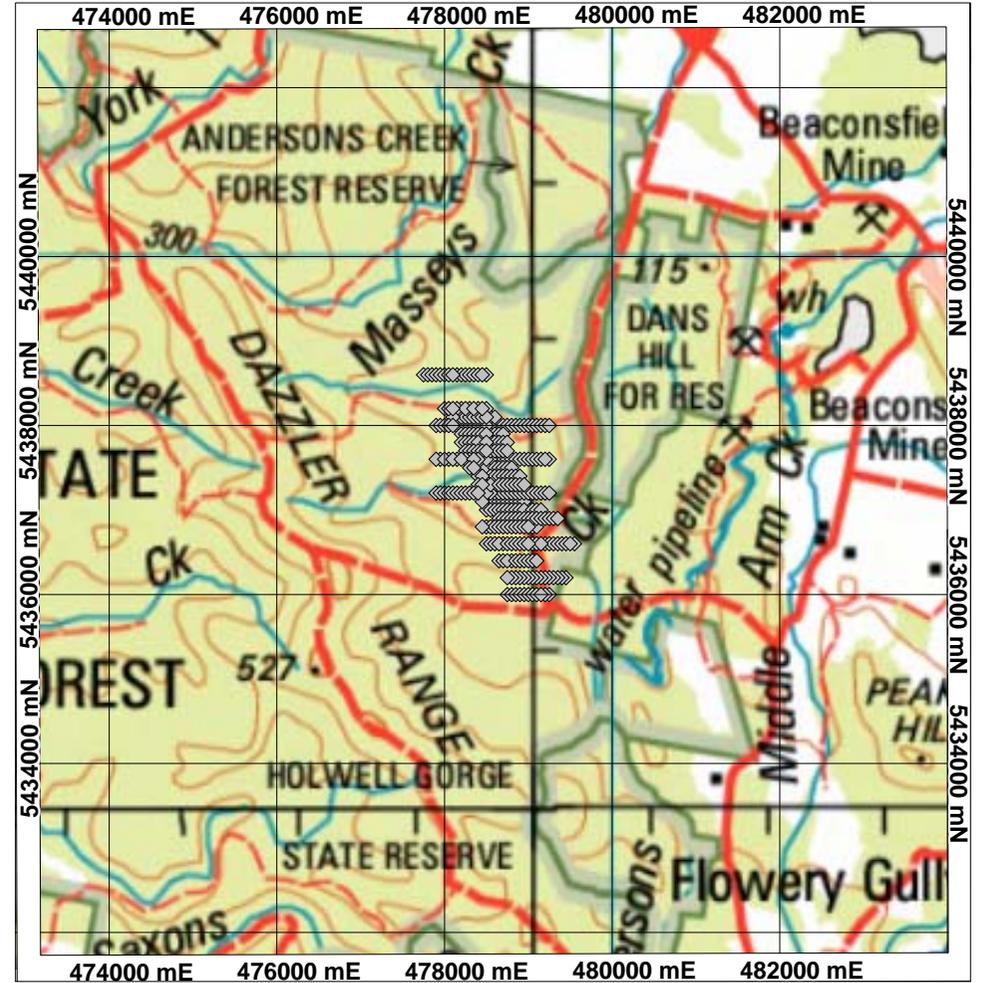
3. CONCLUSIONS AND RECOMMENDATIONS

I do not see any particularly features in the data I would consider related to significant base metal mineralisation. The single frequently anomalous sample traverse near the south of the grid (5436200N - line north of Tyndall label) is not accounted for but may relate to proximity of Cambrian ultramafics. The traverse has tracks across it suggesting frequent access at the site.

It is recommended that consideration be given to clarifying the characteristics of the lithotypes and geological setting in the field of the area about the anomalous source units.

I would also recommend the systematic logging of soil colour and rock float types observed in field records at or near each sample site as well as features such as relative quartz float abundance as these are useful parameters to aid interpretation of geochemical data.

FIGURES

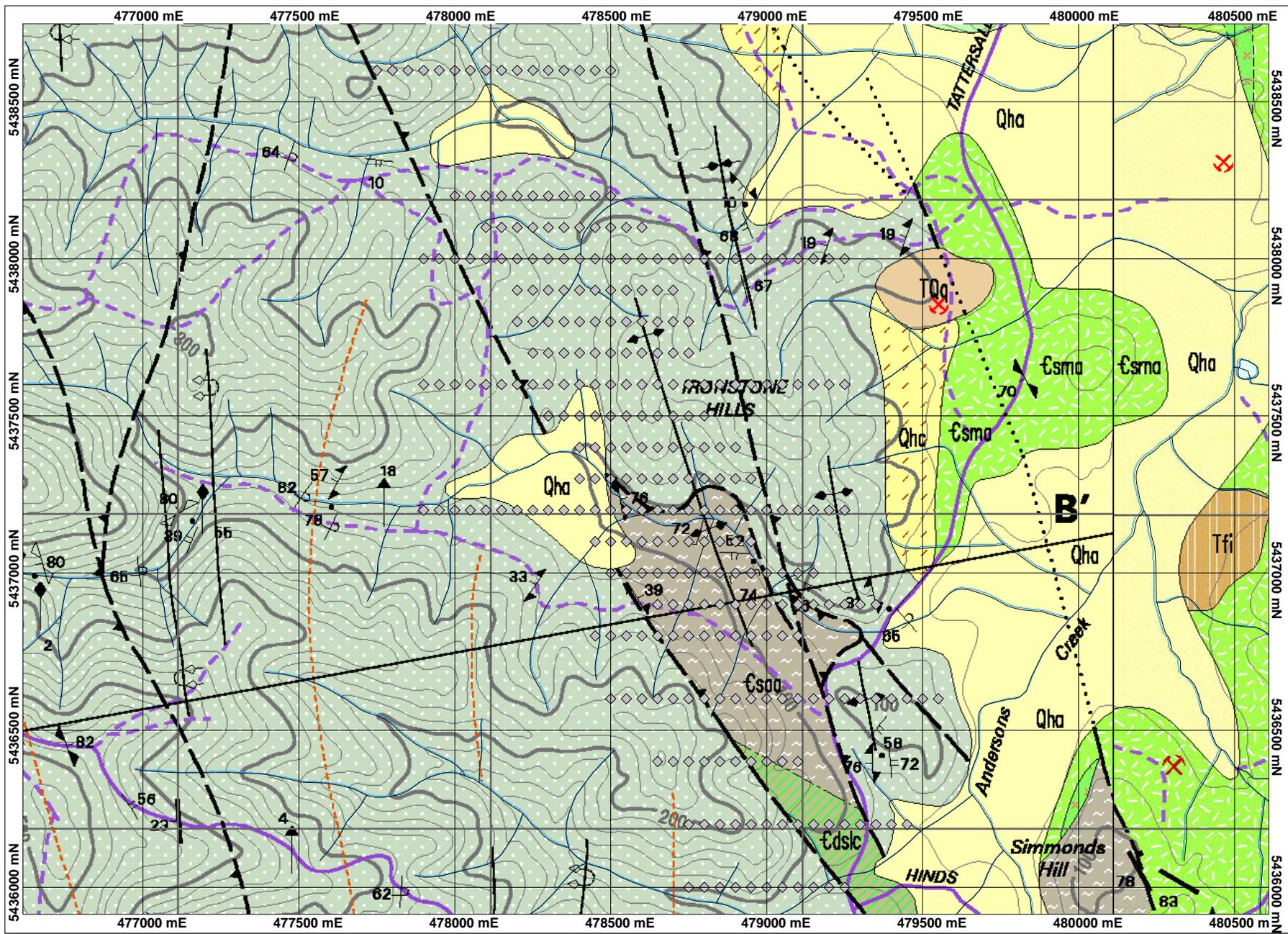


Barnes Hill West - EL53/2008 - Soil Sampling Program
 Location of Project Area

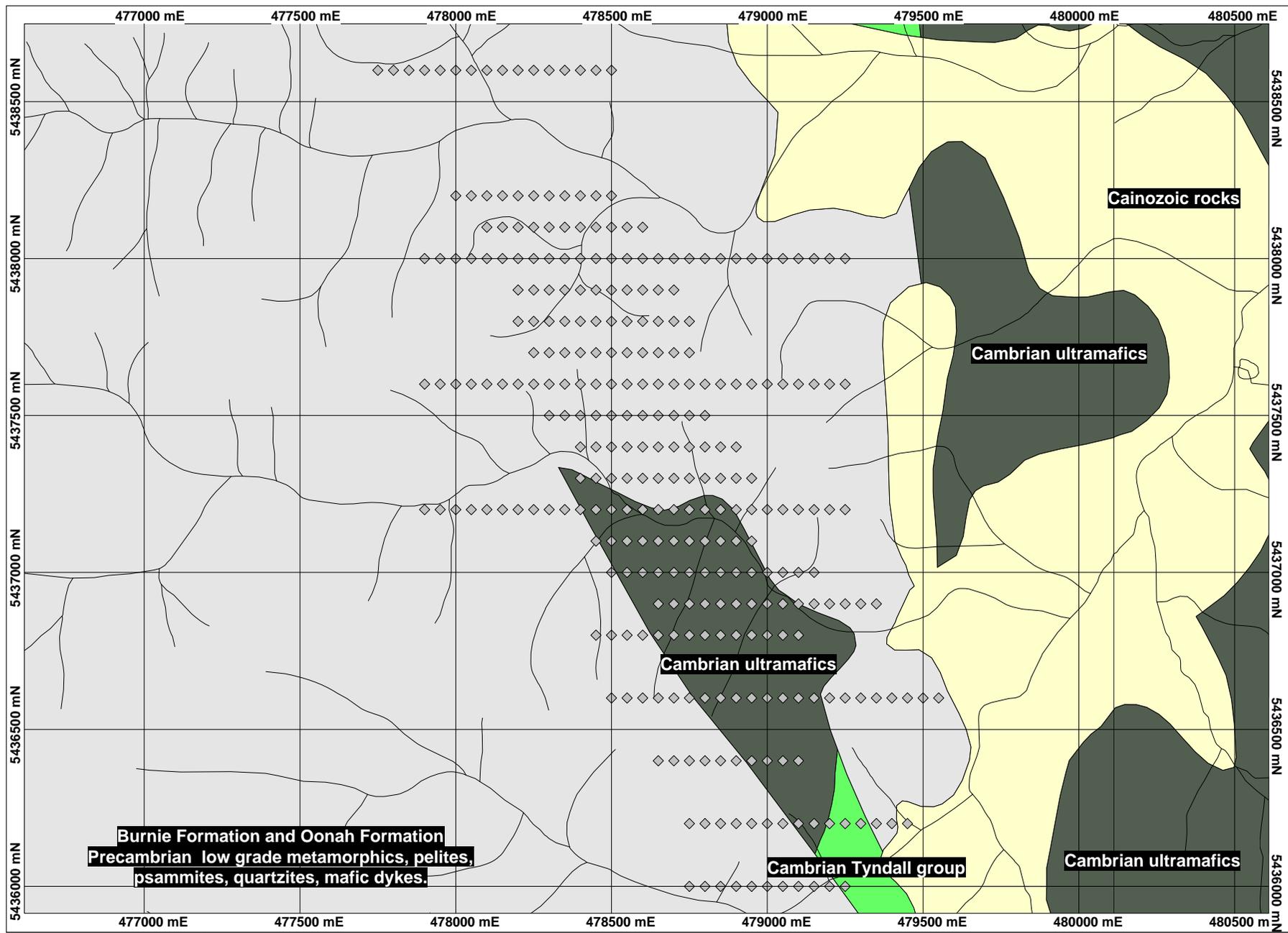
(Map: Tasmania North East ED4-2001 SK55-21 MGA Zone 55)



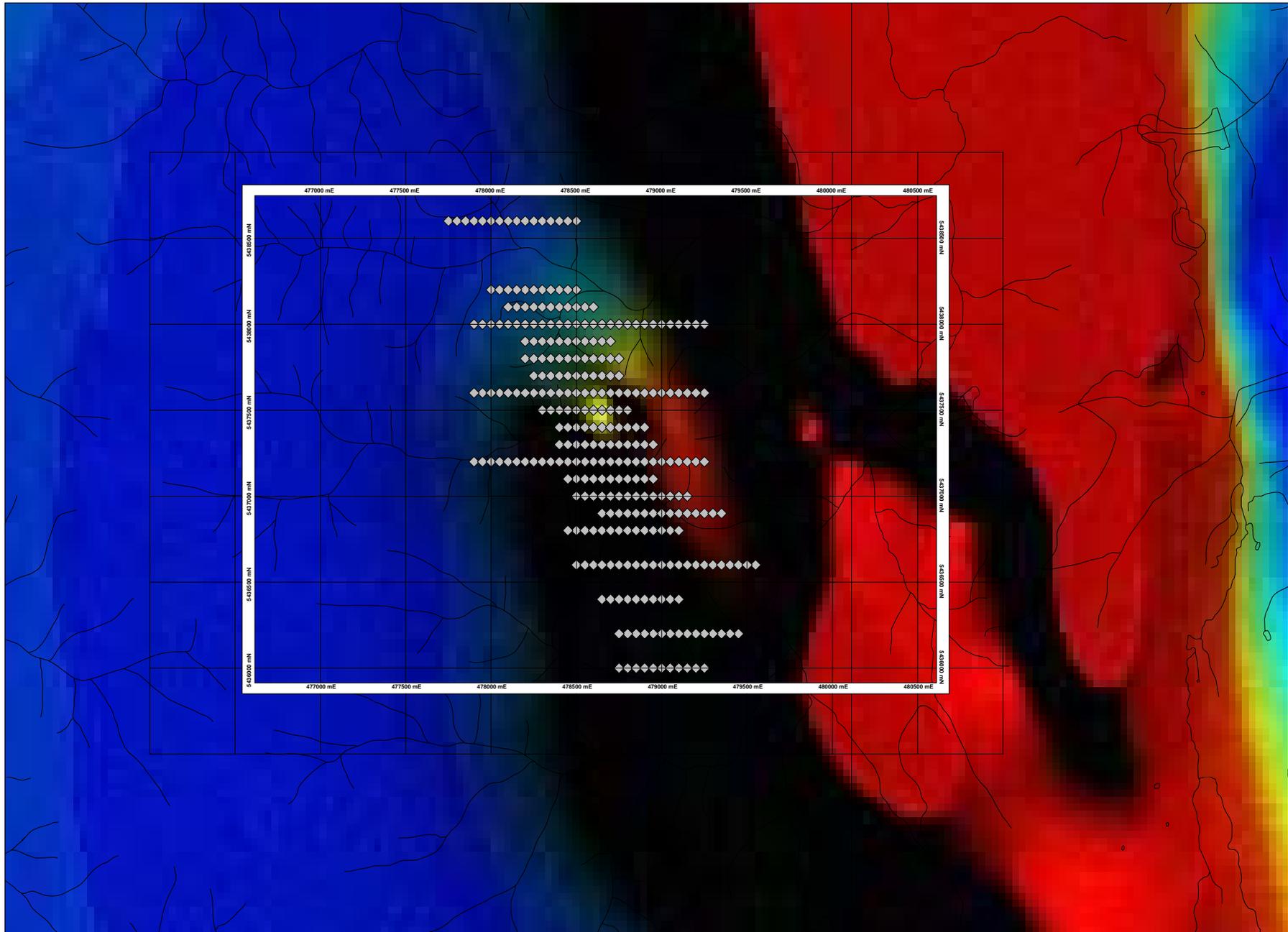
Barnes Hill West - Soil Sampling Program
Sample Grid over Google Image of Project Area



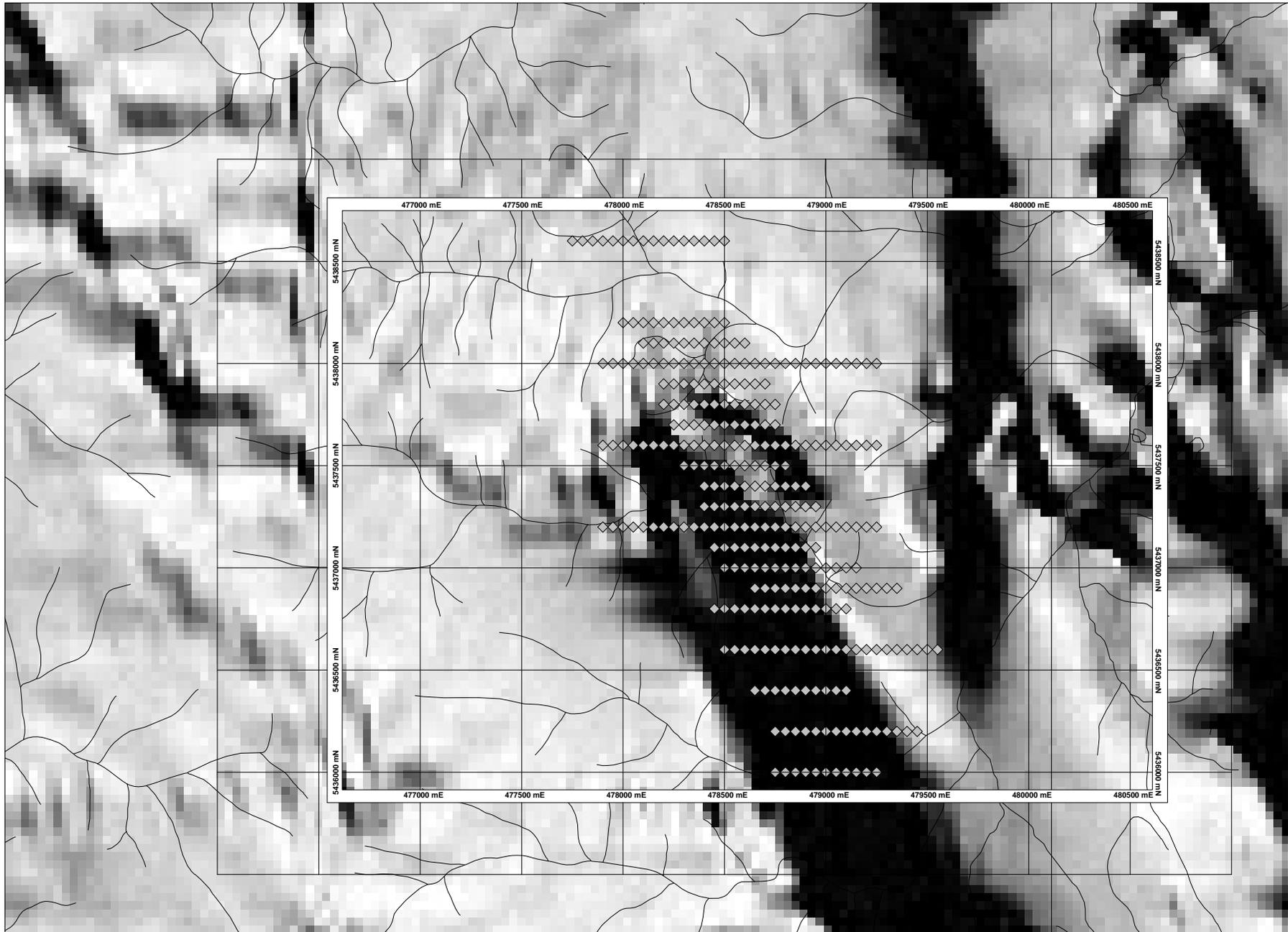
Barnes Hill West - Soil Sampling Program
Summary Geology 1:25,000 Scale



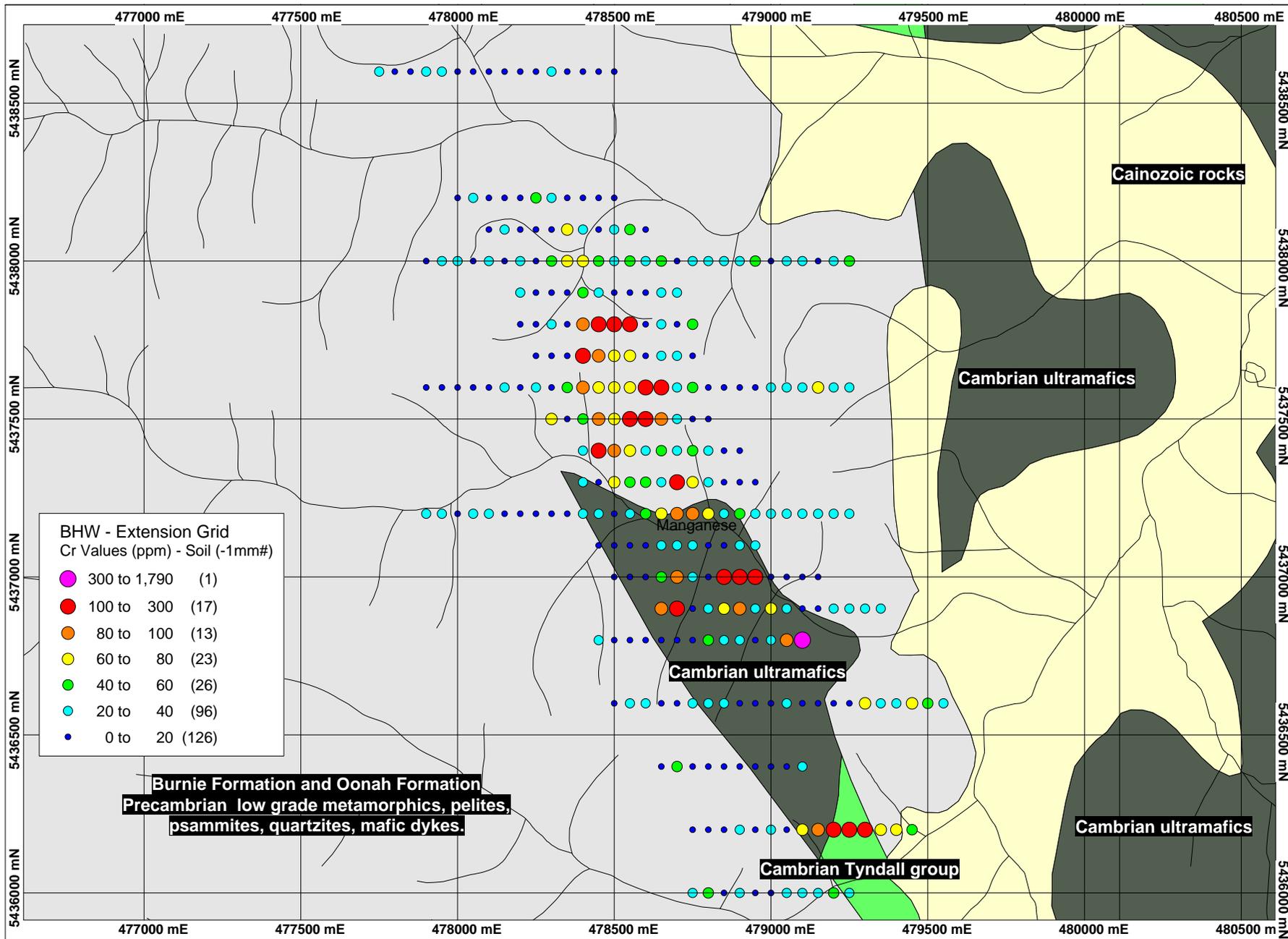
Barnes Hill West - Soil Sampling Program
 Summary Geology and Location of Soil Samples



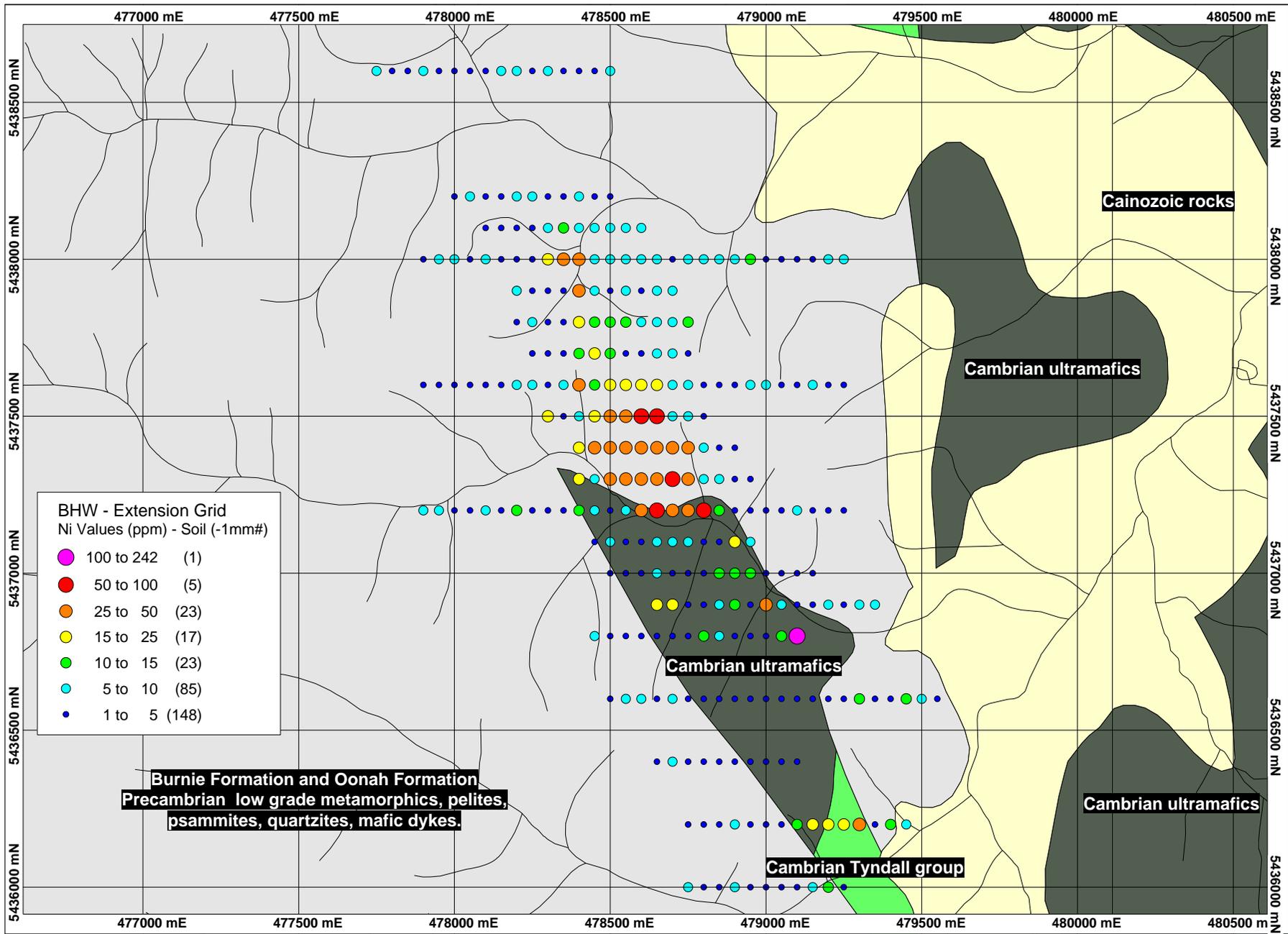
Barnes Hill West - Soil Sampling Program
 Sample Grid over Regional Magnetics (TMI)



Barnes Hill West - Soil Sampling Program
Sample Grid over 1VD Magnetics

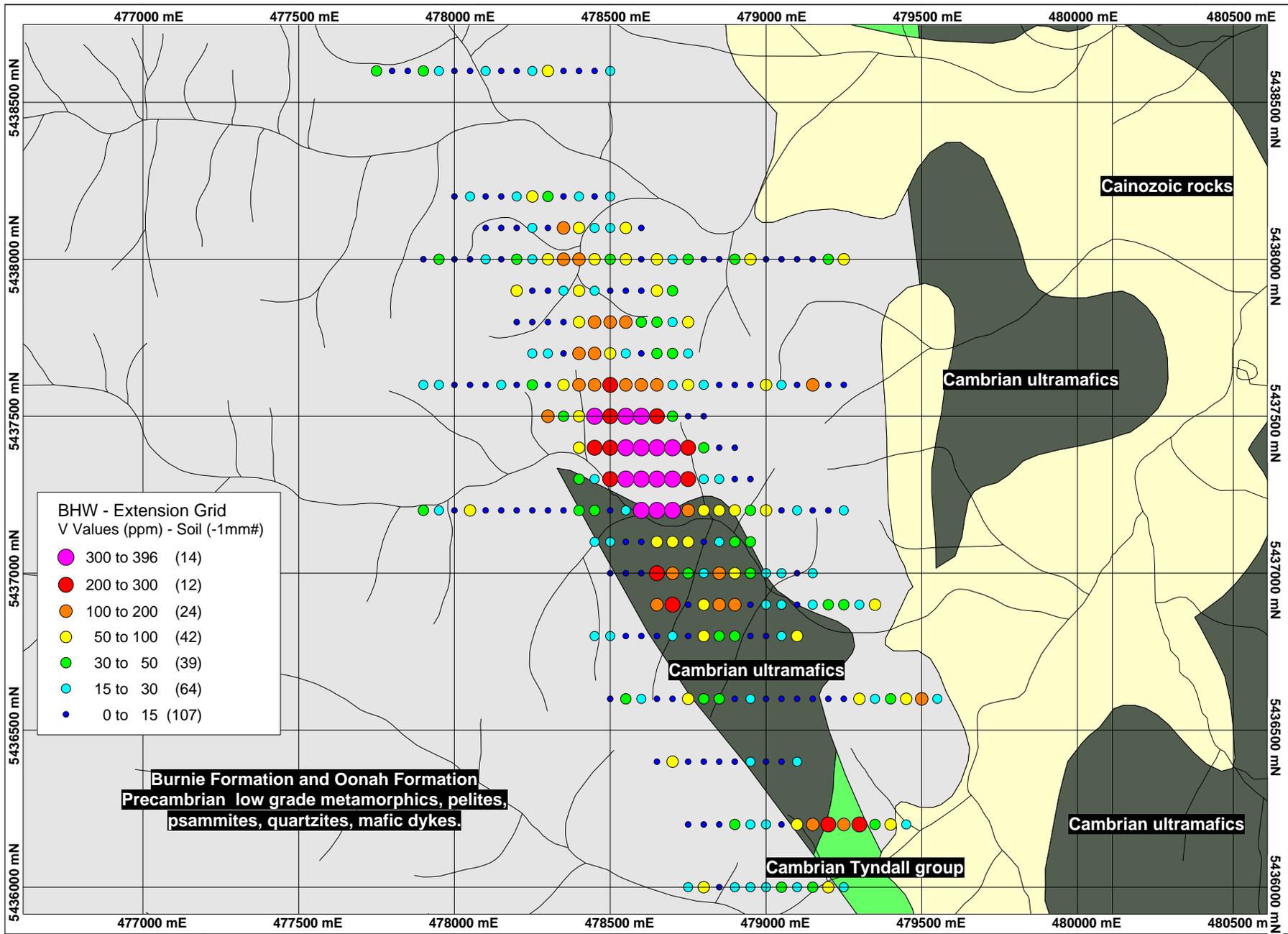


Barnes Hill West - Soil Sampling Program
Chromium Values (ppm) - Partial digestion only.

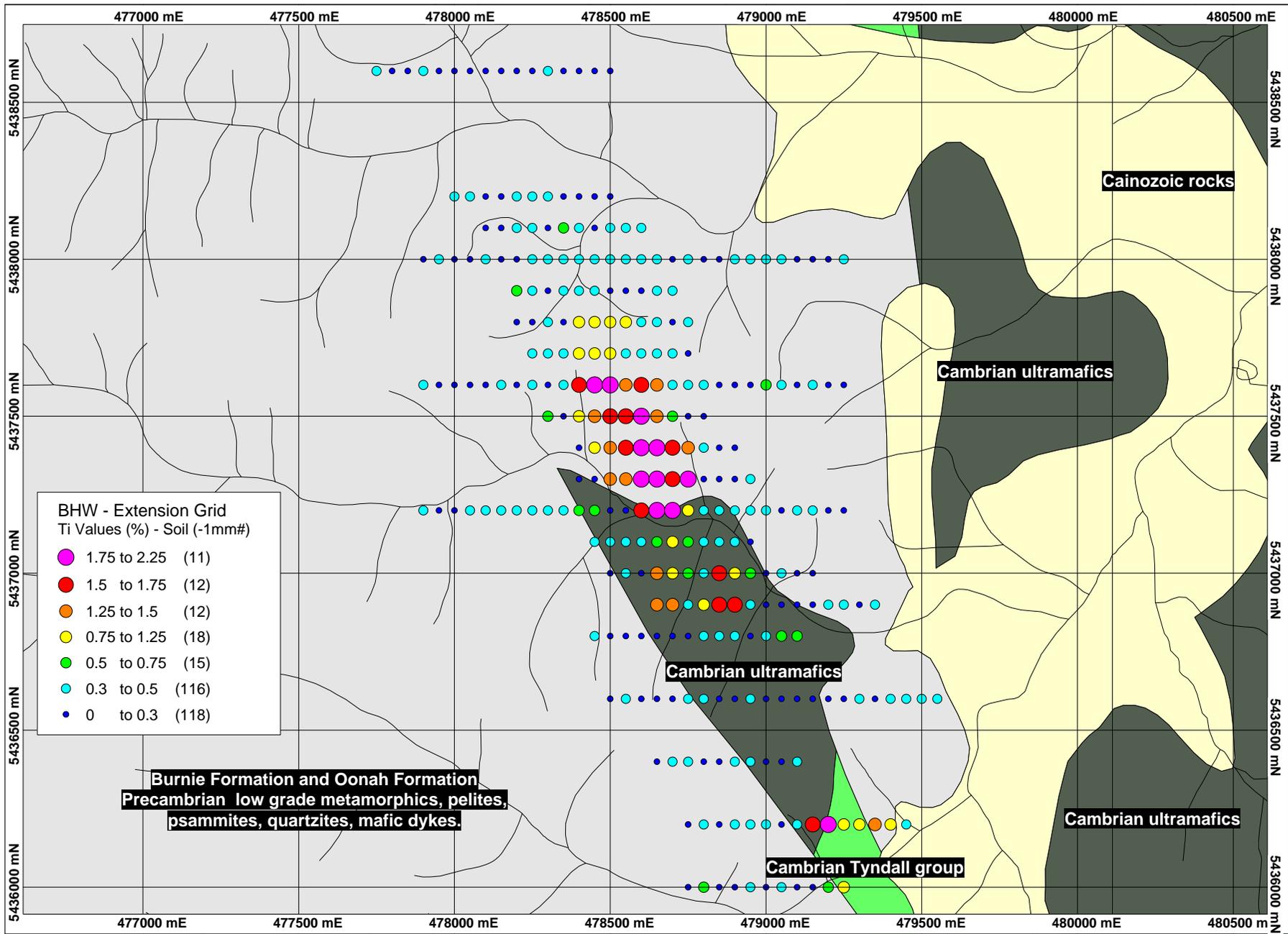


Barnes Hill West - Soil Sampling Program
Nickel Values (ppm)

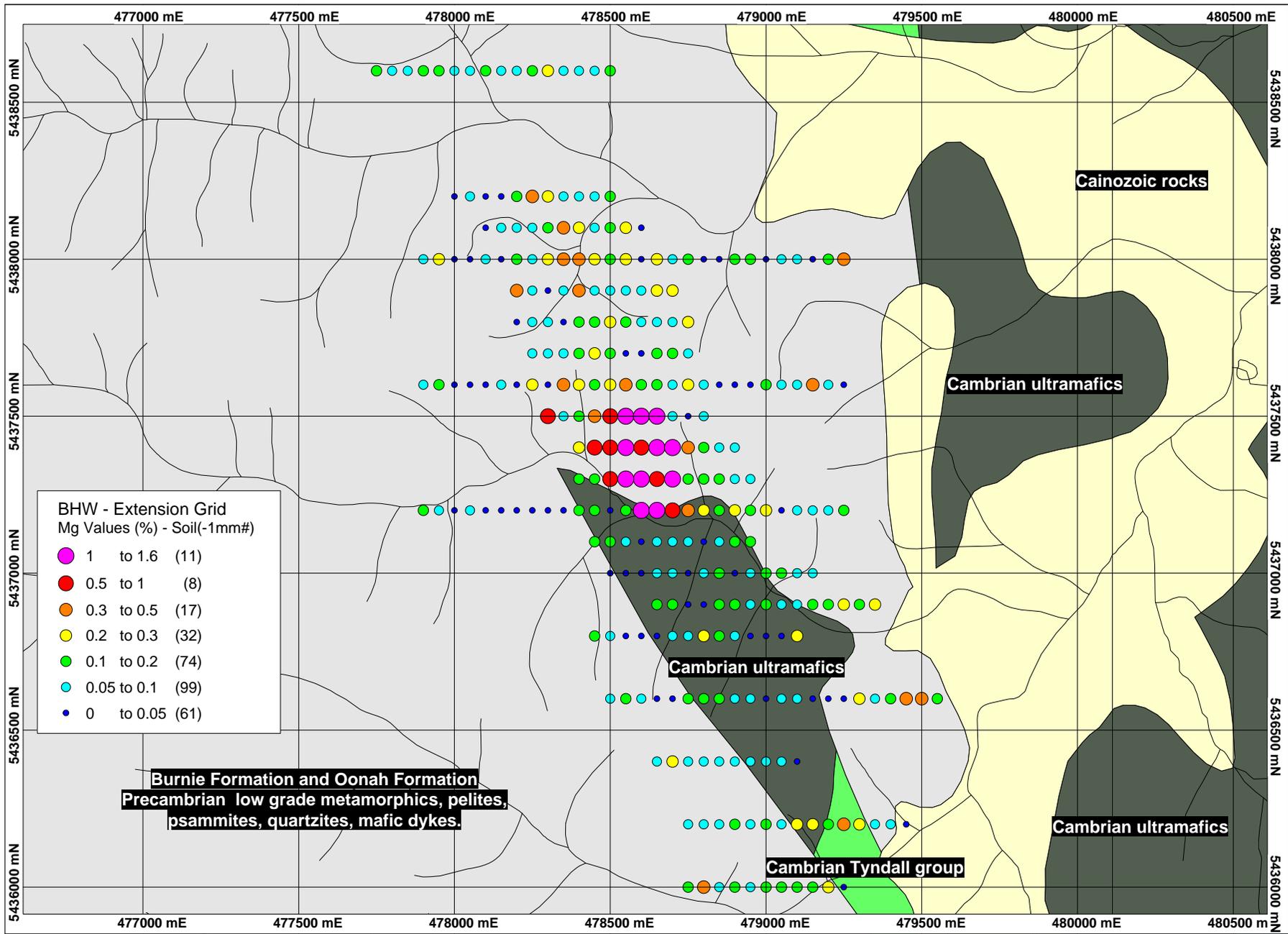
Figure 8



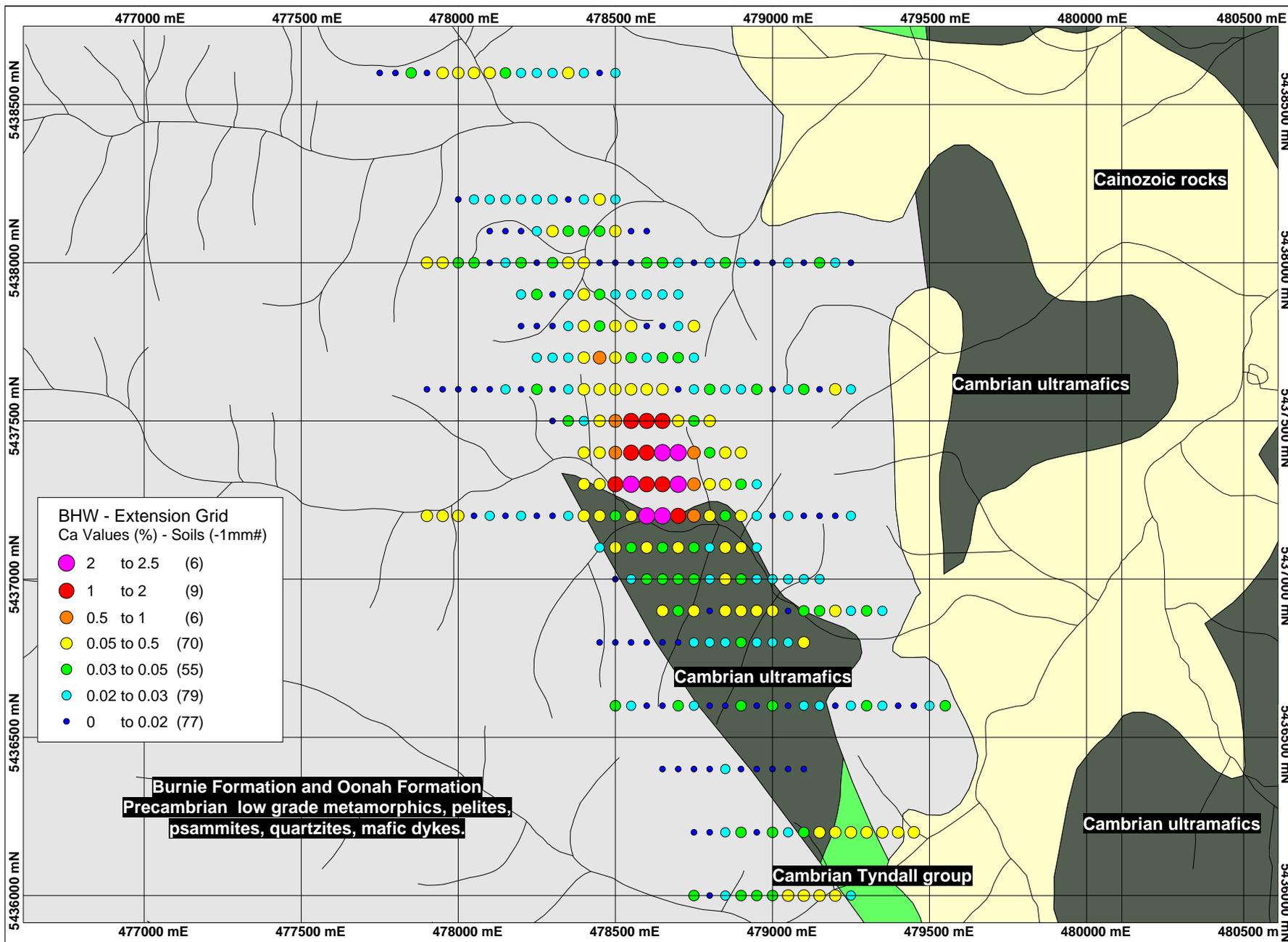
Barnes Hill West - Soil Sampling Program
Vanadium Values (ppm) - Partial digestion only.



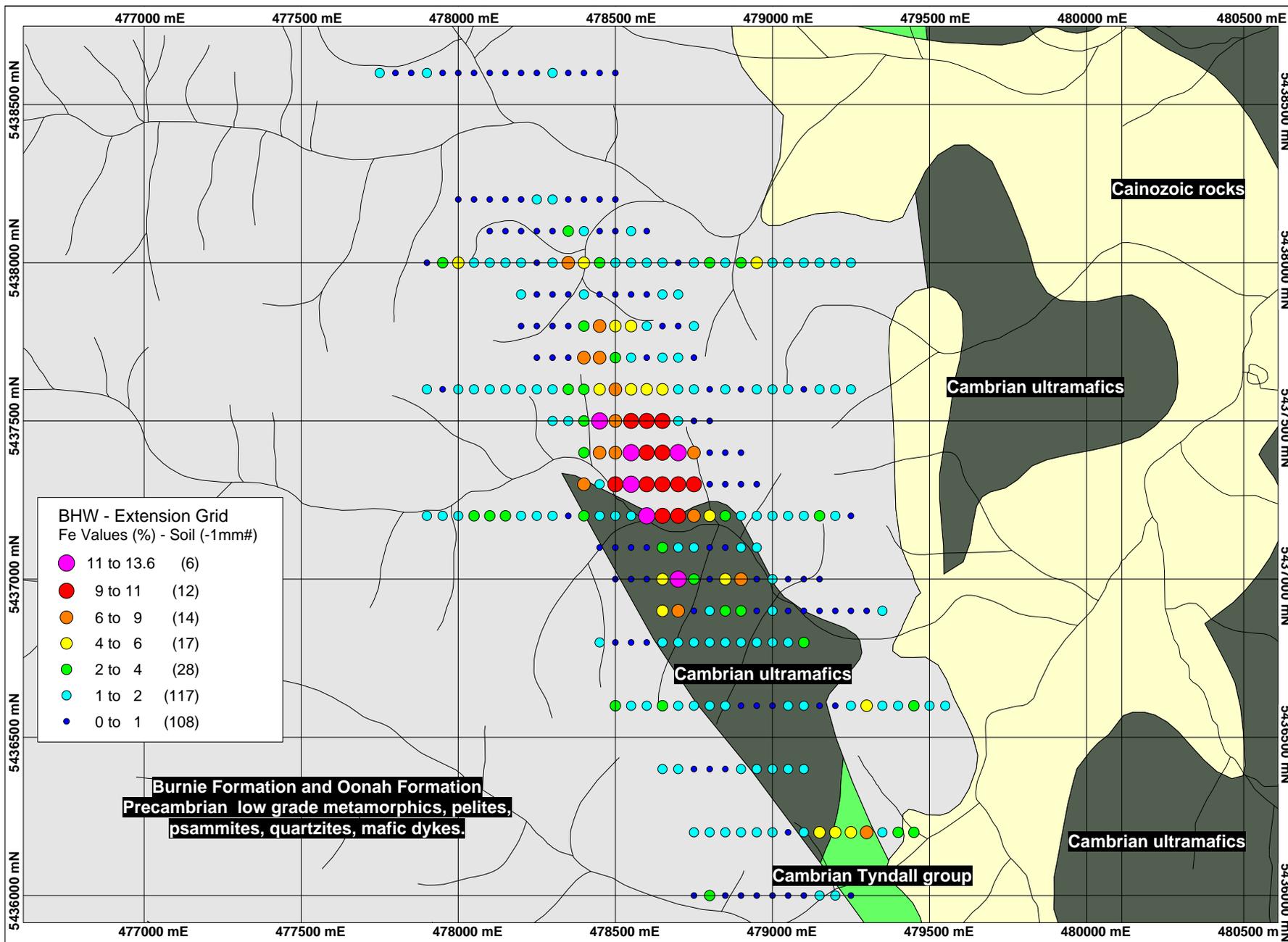
Barnes Hill West - Soil Sampling Program
Titanium Values (%).



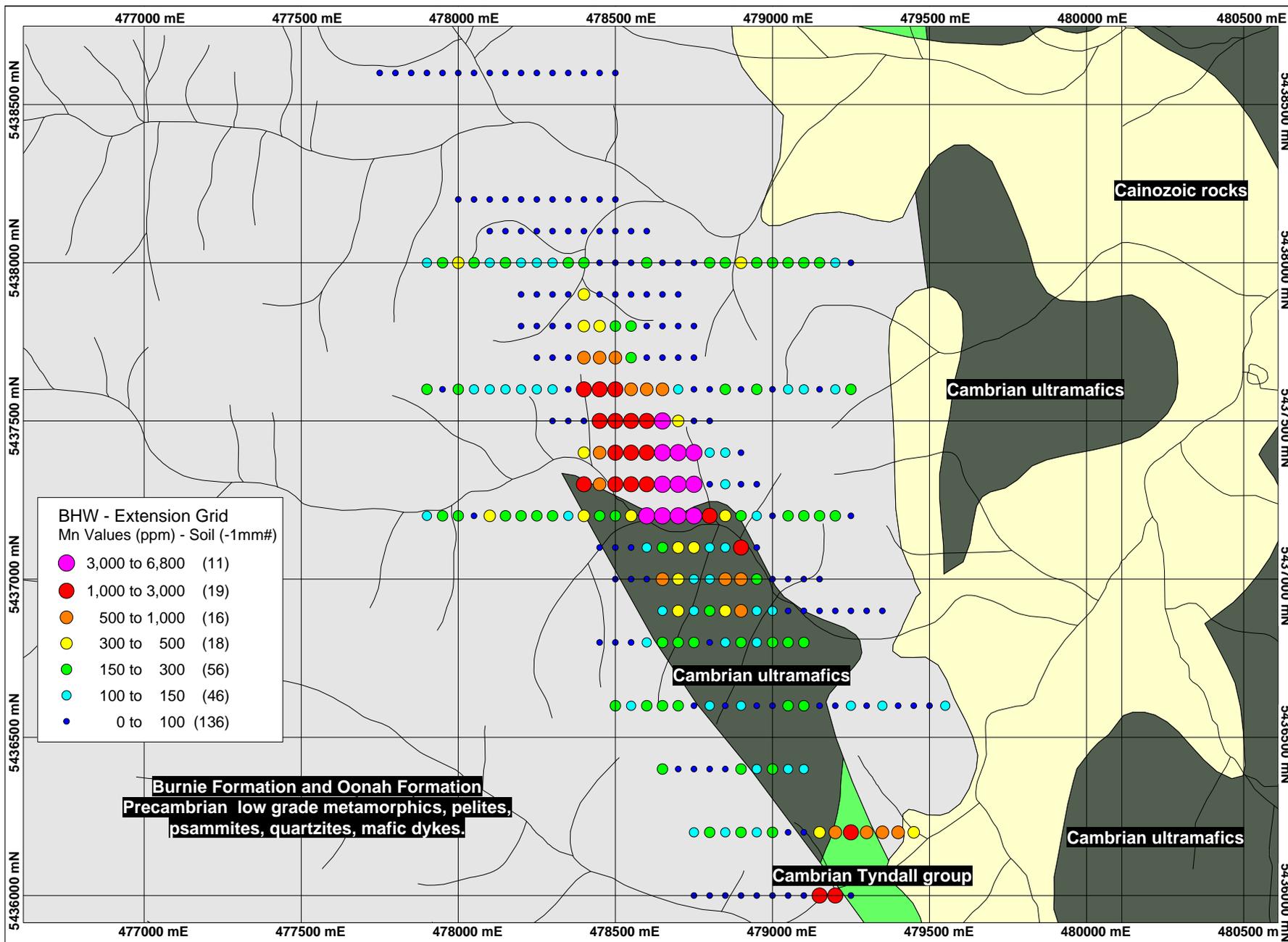
Barnes Hill West - Soil Sampling Program
Magnesium Values (%).



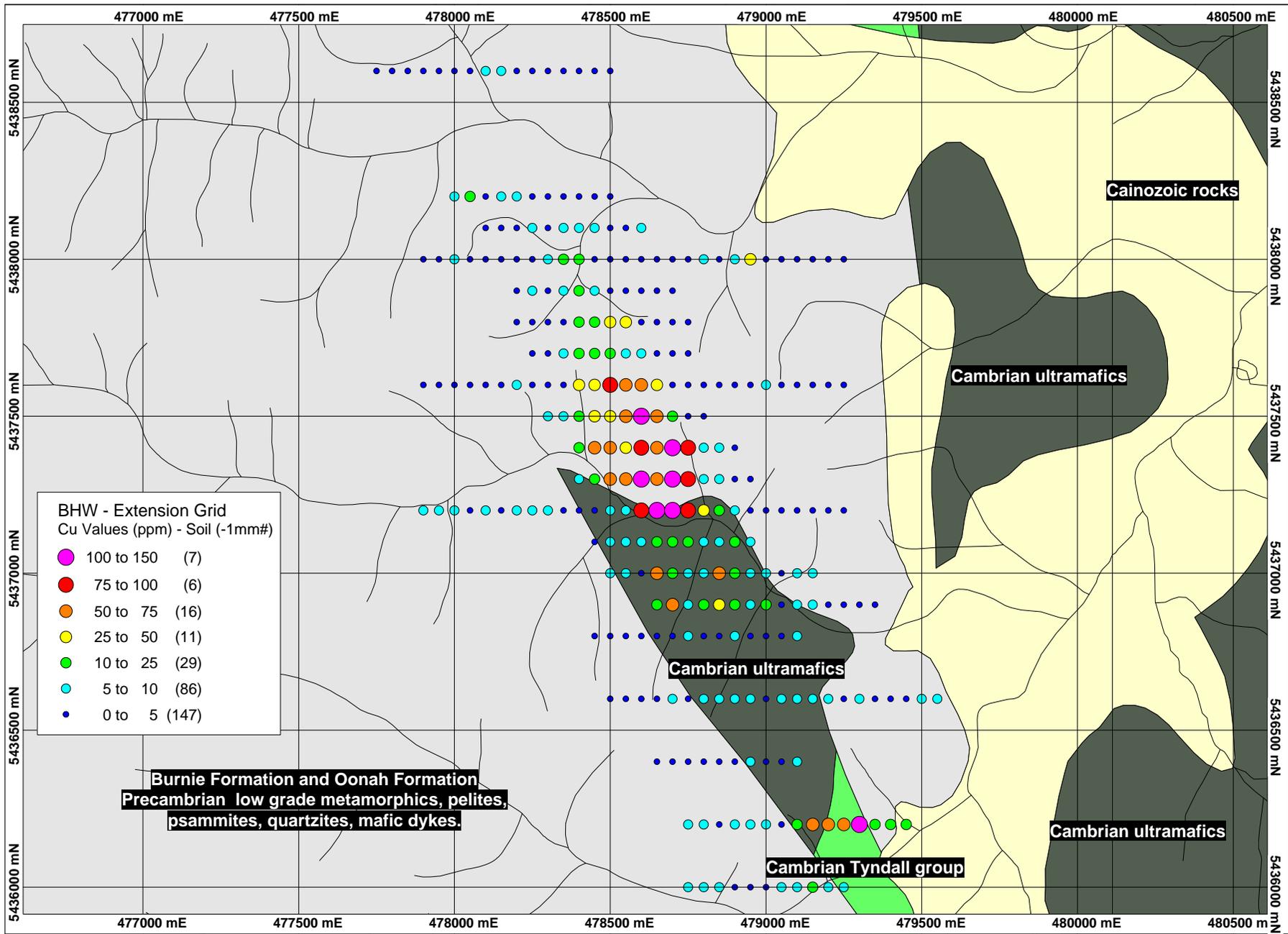
Barnes Hill West - Soil Sampling Program
Calcium Values (%).



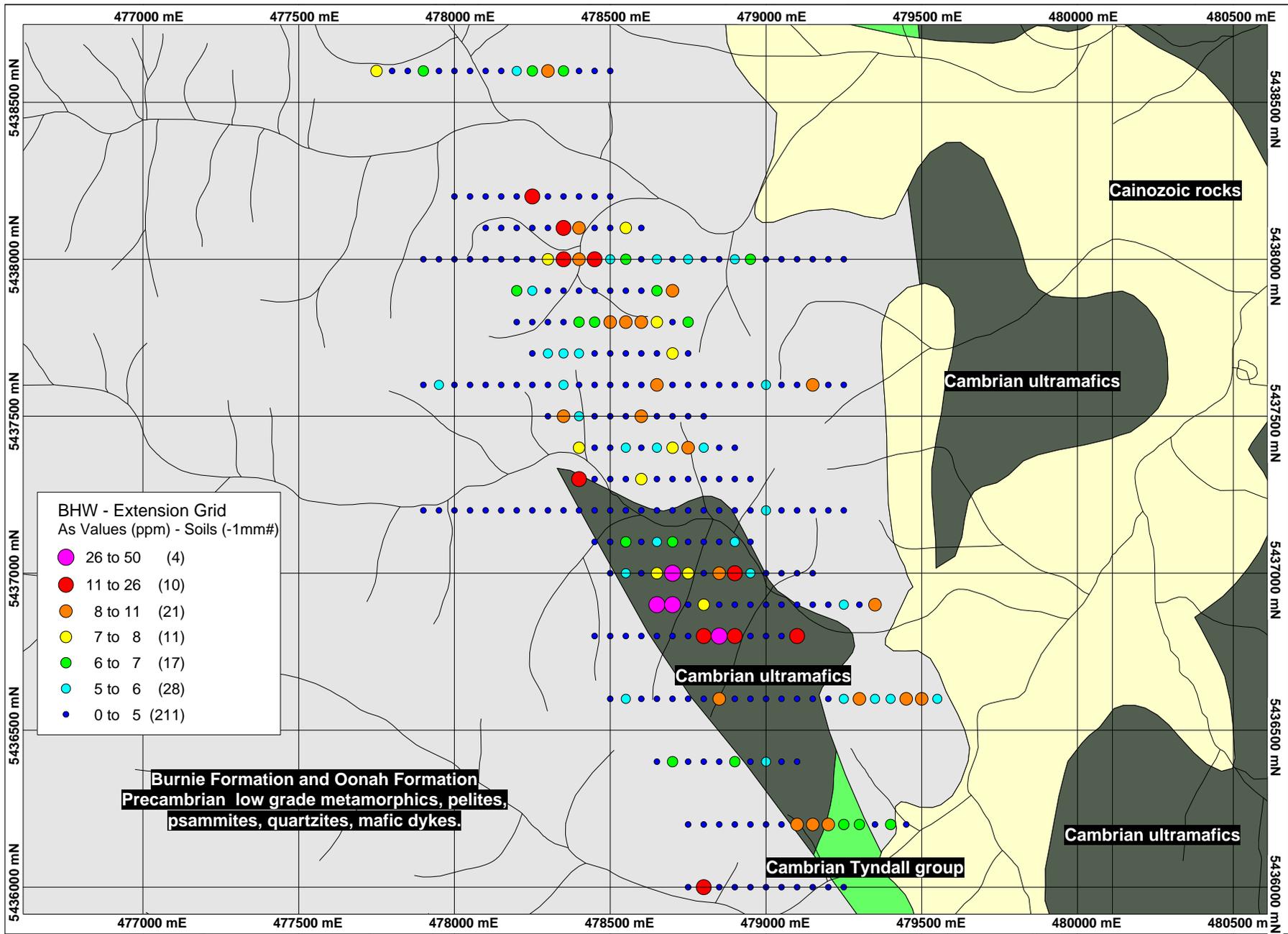
Barnes Hill West - Soil Sampling Program
Iron Values (%).



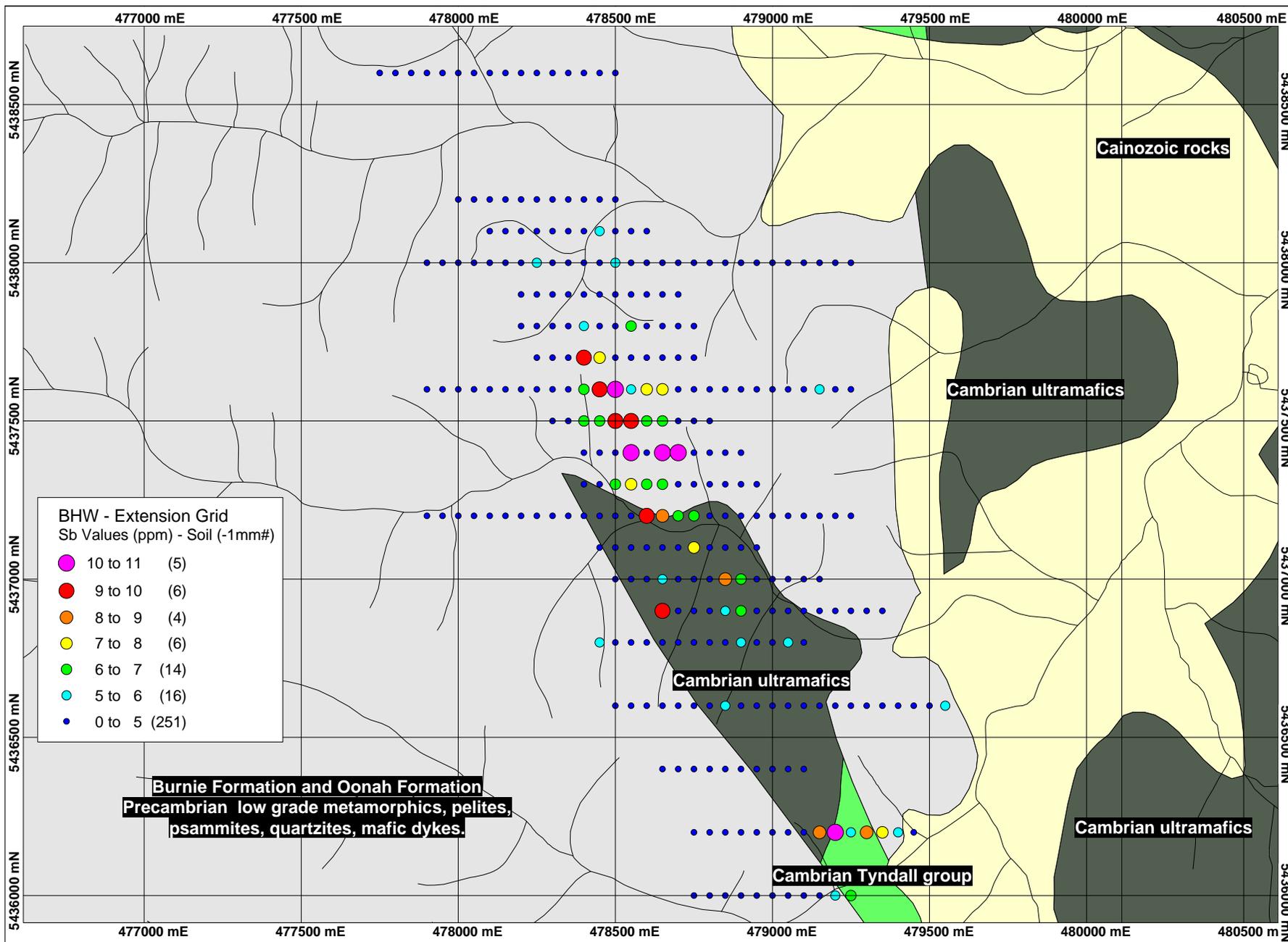
Barnes Hill West - Soil Sampling Program
Manganese Values (%).



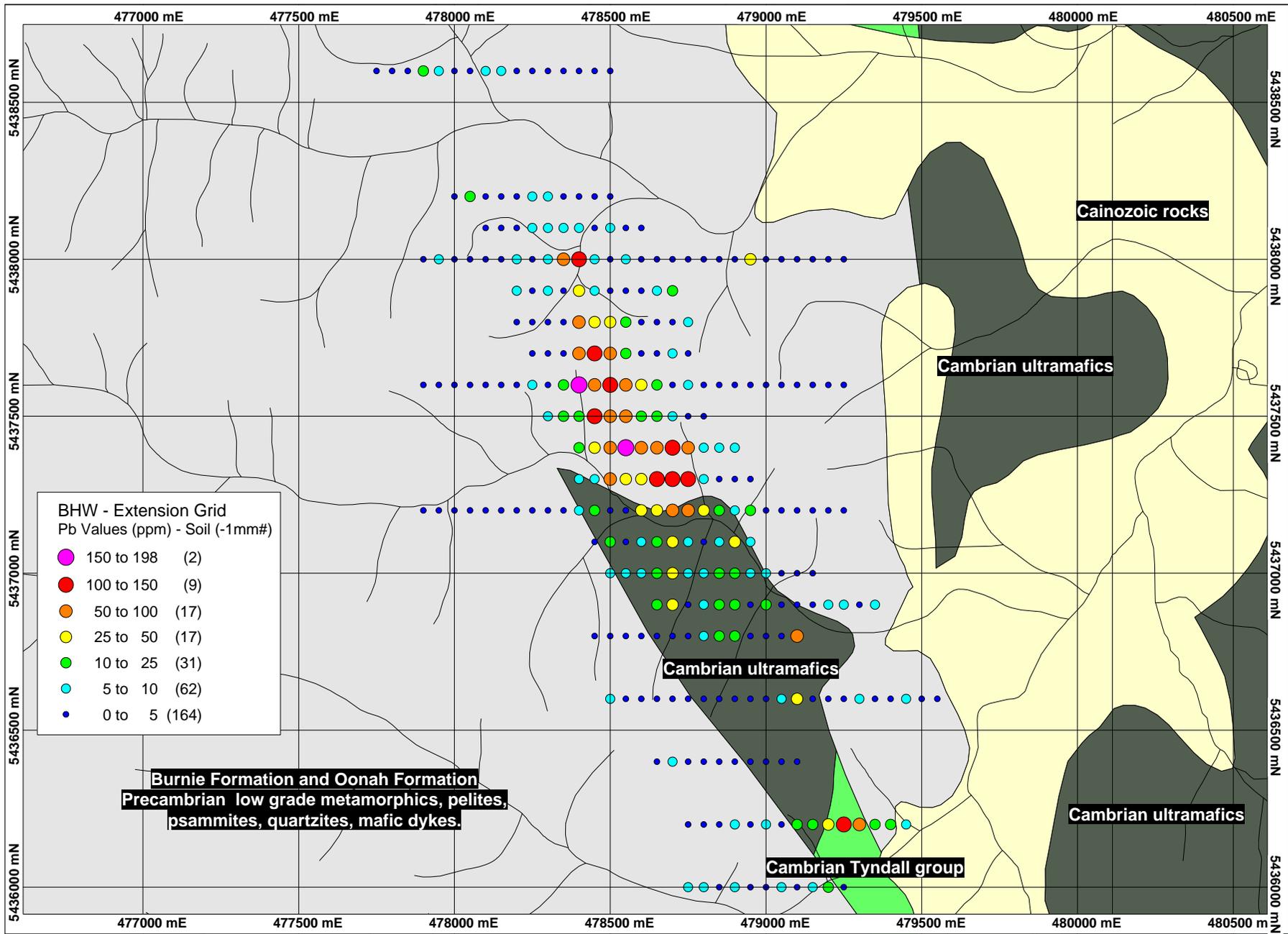
Barnes Hill West - Soil Sampling Program
Copper Values (ppm).



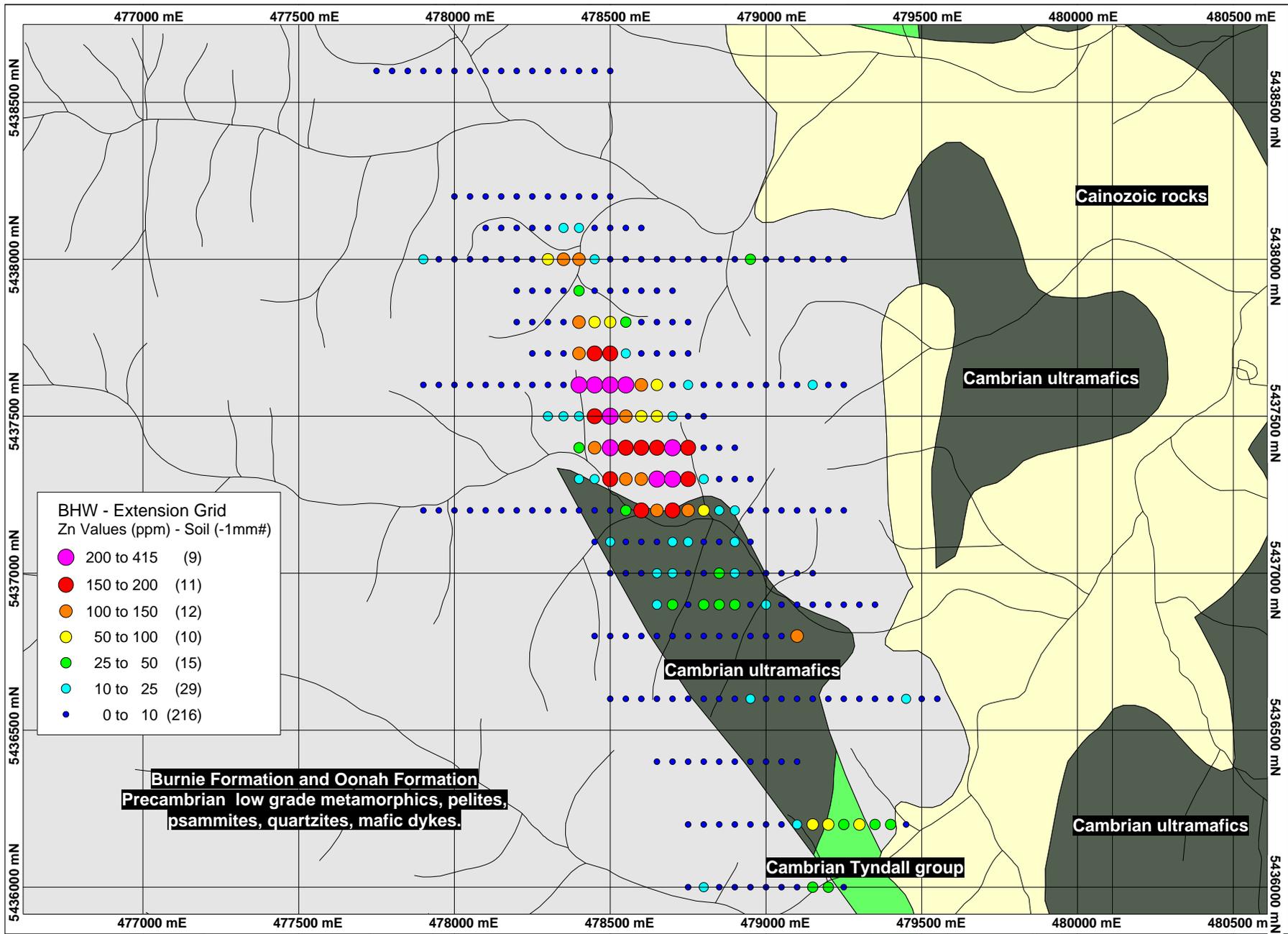
Barnes Hill West - Soil Sampling Program
Arsenic Values (ppm).



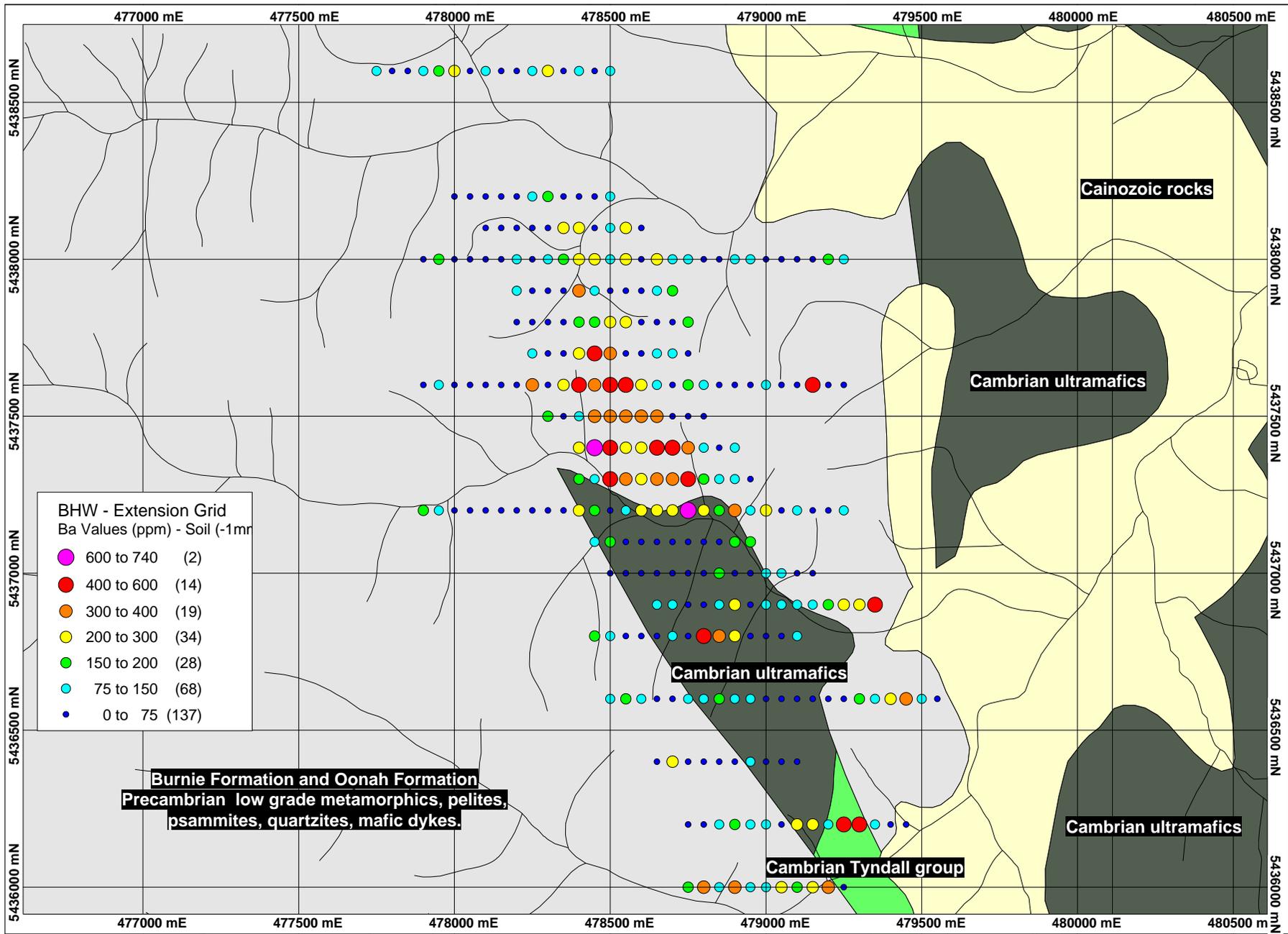
Barnes Hill West - Soil Sampling Program
Antimony Values (ppm).



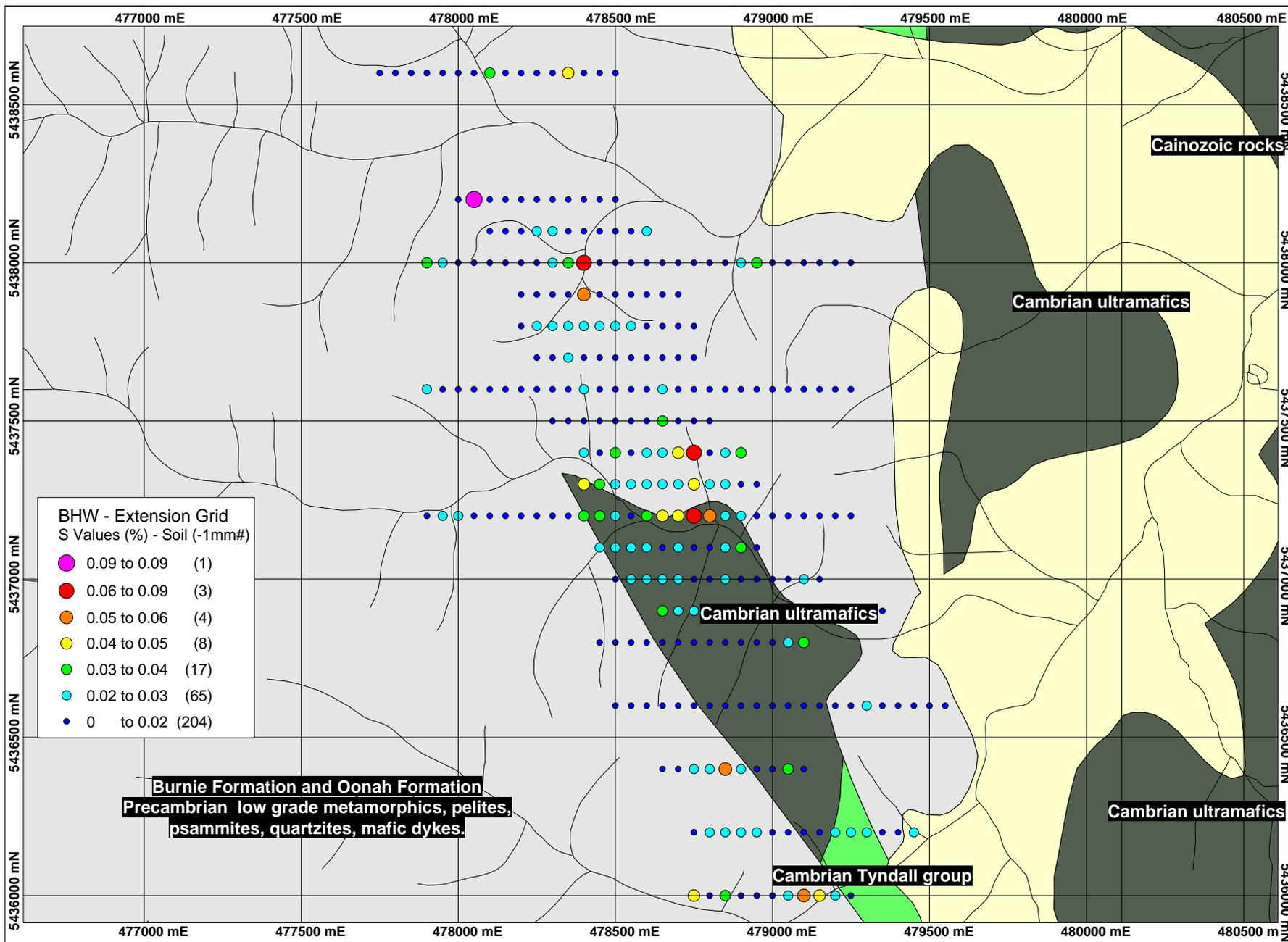
Barnes Hill West - Soil Sampling Program
Lead Values (ppm).



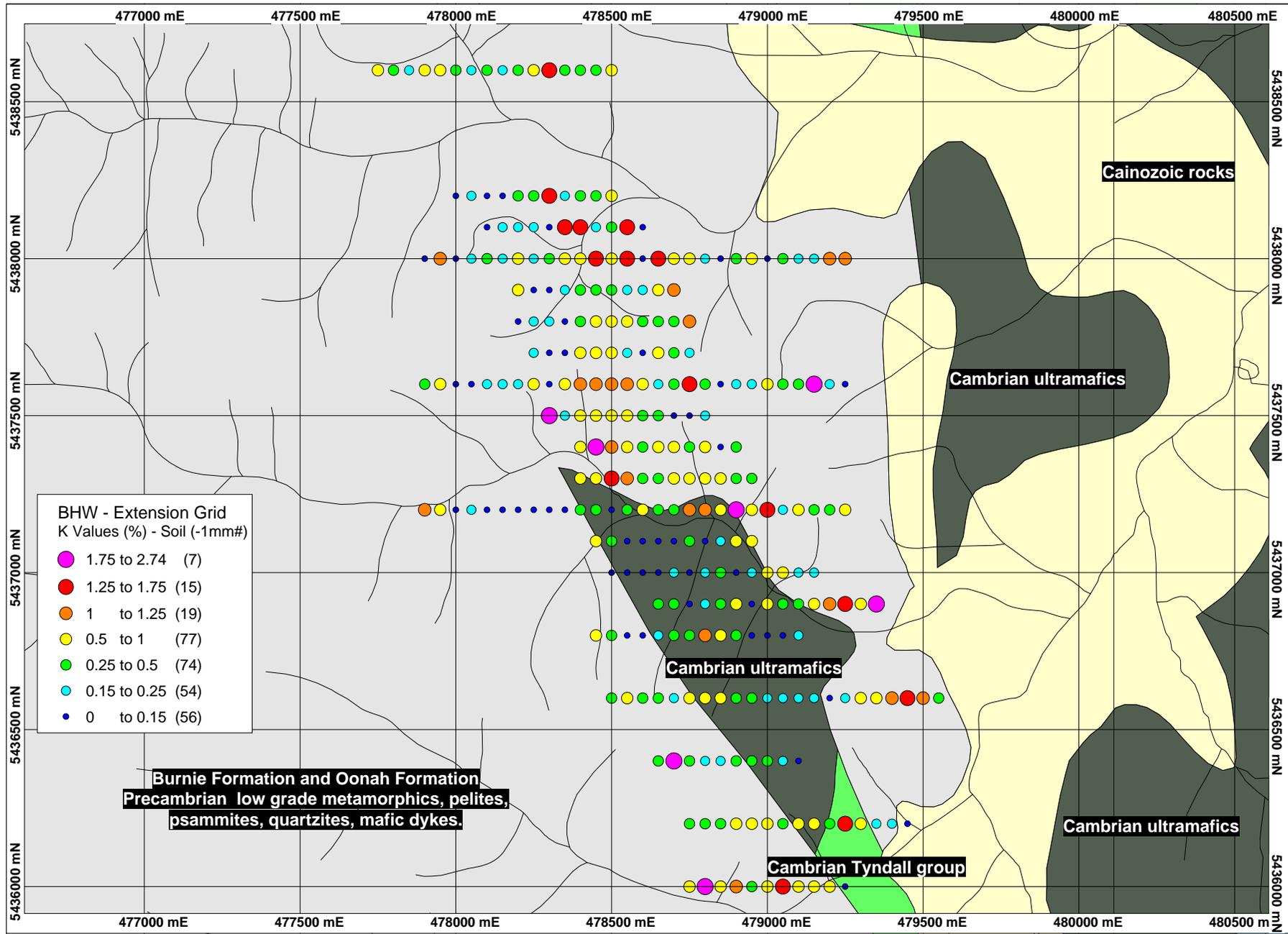
Barnes Hill West - Soil Sampling Program
Zinc Values (ppm).



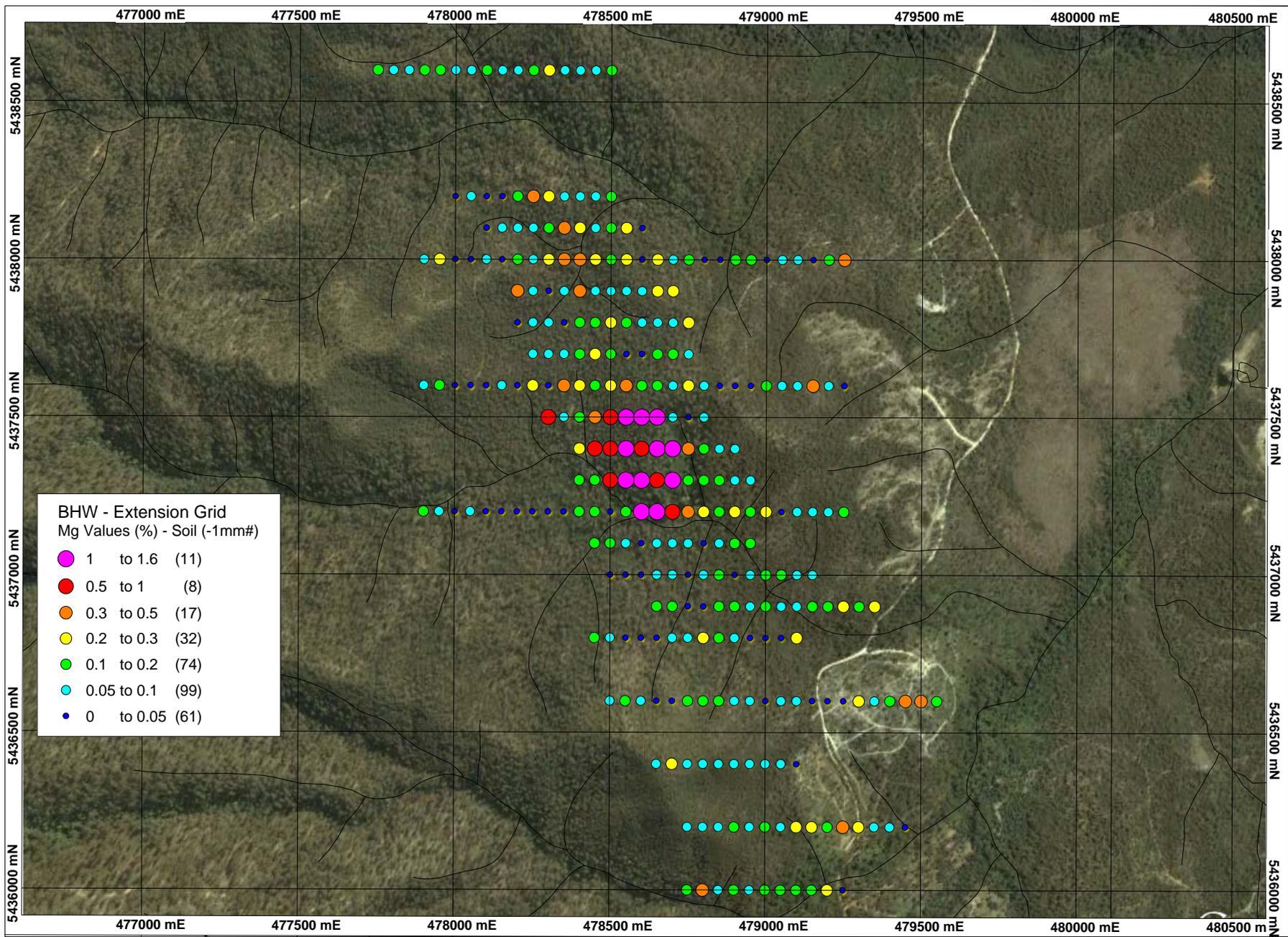
Barnes Hill West - Soil Sampling Program
Barium Values (ppm).



Barnes Hill West - Soil Sampling Program
Sulphur Values (%).



Barnes Hill West - Soil Sampling Program
Potassium Values (%).



Barnes Hill West - Soil Sampling Program
Magnesium Values (%) over Google Image.

Mg highlights main zone of mafic element associated co-anomalism in data