Baseline Radiation & Metals Report

TELLUS

Baseline Radiation and Metals Report E 16/440, M16/540 Sandy Ridge February 2016

Prepared by
David Jenkins
Terra Search
Perth

Executive Summary

This report details the baseline knowledge on the radiation and Metal content at Tellus Holdings Sandy Ridge Kaolinite and storage facility. All available public and proprietary geophysical and geochemical data has been examined by Principal Geologist David Jenkins to determine the background levels of metals and naturally occurring radioactive materials (NORM).

There is a large Kaolinite resource defined within the tenement. The well developed kaolinite zone is within the weathered portion of the granitic bedrock. Regional Magnetics indicate a large consistent basement and drilling to date has not identified any other significant lithologies, alteration or mineralisation in the area. There has been extensive analysis of drilling chips completed by Tellus Holdings over a suite of 24 elements. No elevated metals values have been returned and the likelihood of any localised enrichment with in the area is considered low.

Regional radiometrics shows a low background of radiation present in the area. The geology in the area is considered unlikely to produce significant accumulations of Uranium or Thorium with Potassium being the dominant radioactive species. The nearest uranium accumulations identified within the Western Australian Department of Mines mineral occurrence database are calcrete uranium occurrences that form in saline paleochannels and playa lake sediments. The nearest is low level mineralisation approximately 80km away at Lake Eva. There is no evidence of significant paleochannel development in the Sandy Ridge area. There are no significant Thorium accumulations in the region to the knowledge of the Author. Regional sampling of the granite shows the uranium content to be consistently at or below 11ppm. This is considered too low to contribute to any significant secondary surficial uranium enrichment. It is the authors opinion that the radiation levels in the project area are low.

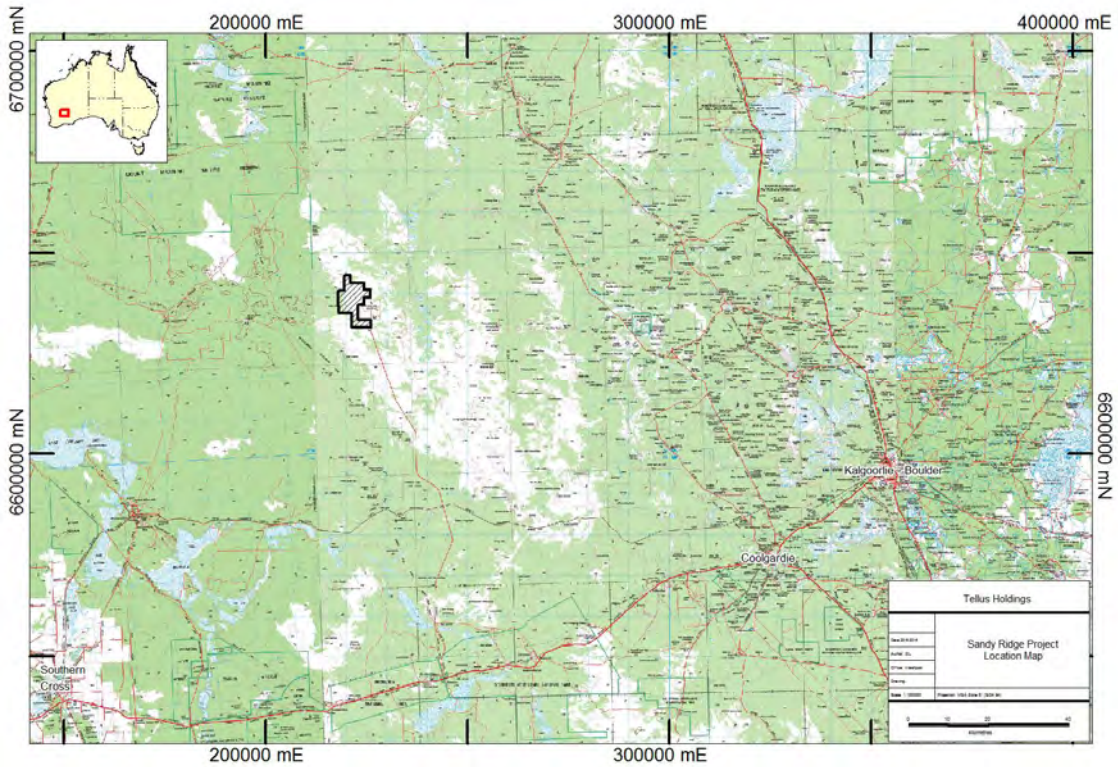
Contents

Table of Figures:

Table of Tables

1. Introduction

Terra Search has been commissioned by Tellus Holdings to review the baseline knowledge of the radiation and metals content within their Sandy Ridge project. Terra Search has completed two extensive drilling programs within the area and have a strong understanding of the geology and geochemistry in the area. The tenement E16/440 within the Sandy Ridge project area totals an area of approximately 59.3km2.



2. Location and Access

The tenement can be accessed by travelling 90km north along the Mt. Walton Road from the Great Eastern Highway. After travelling 90km north there is a left turn onto the Mt. Dimer Road heading west. 4.5km down the Mt. Dimer road is a turnoff to the north, which is the access road to tenement E16/440 project area.

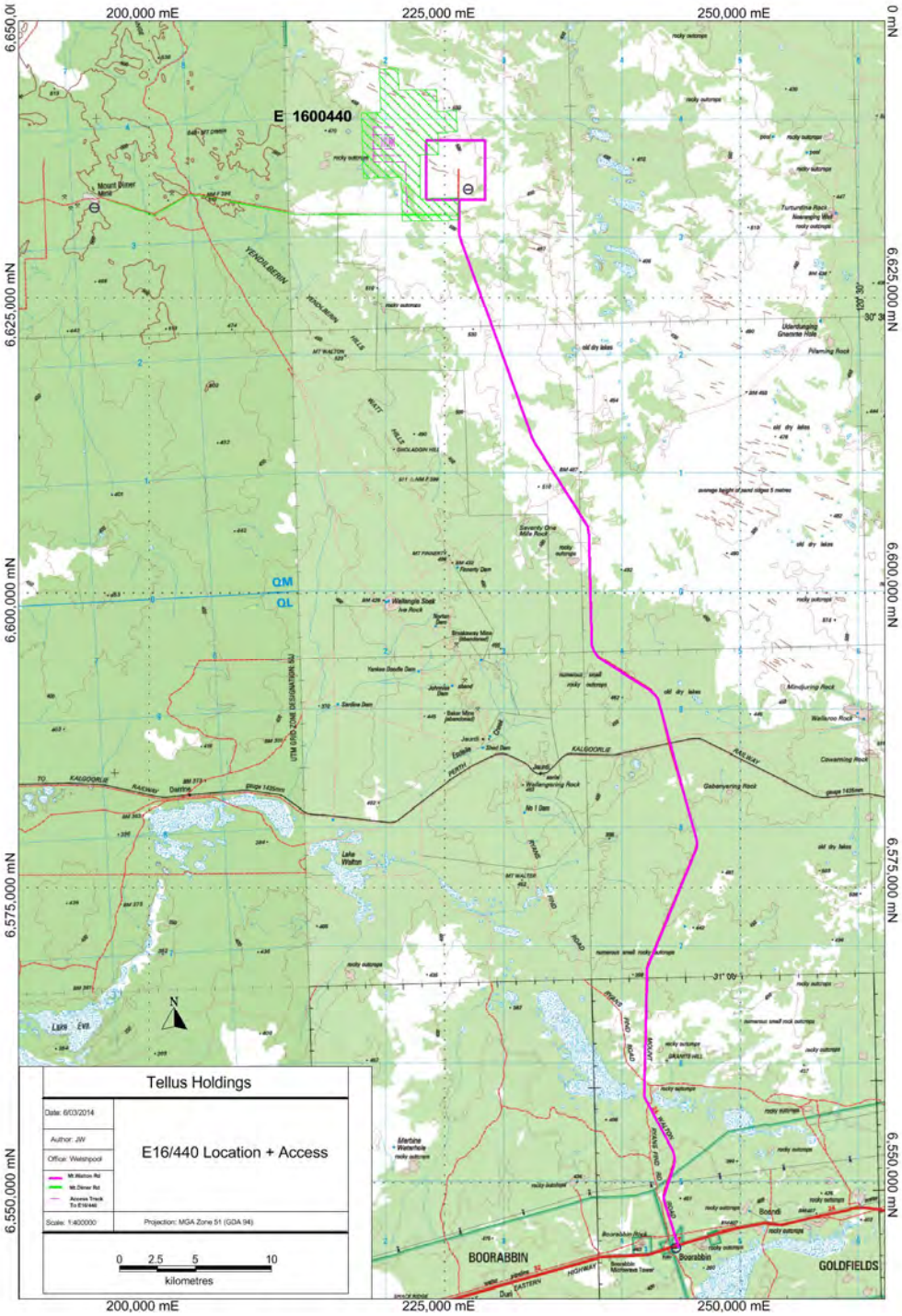


Figure 1 Sandy Ridge Location and Access

3. Tenure

E16/440 was granted to Tellus Holdings on the 23rd of January 2013. The E16/440 tenement consists of 20 subblocks with a combined area of 59.3km². The tenement is graticular (Fig 3). A mining lease M16/540 has been applied for covering 8.32km².

BID Map	Graticular Block	Sub Block
SH5109	6946	q,v,w,x
SH5109	7017	e,k,p
SH5109	7018	a,b,c,d,f,g,h,l,m,r,w,x,y

Table 1 Graticular Blocks E16/440

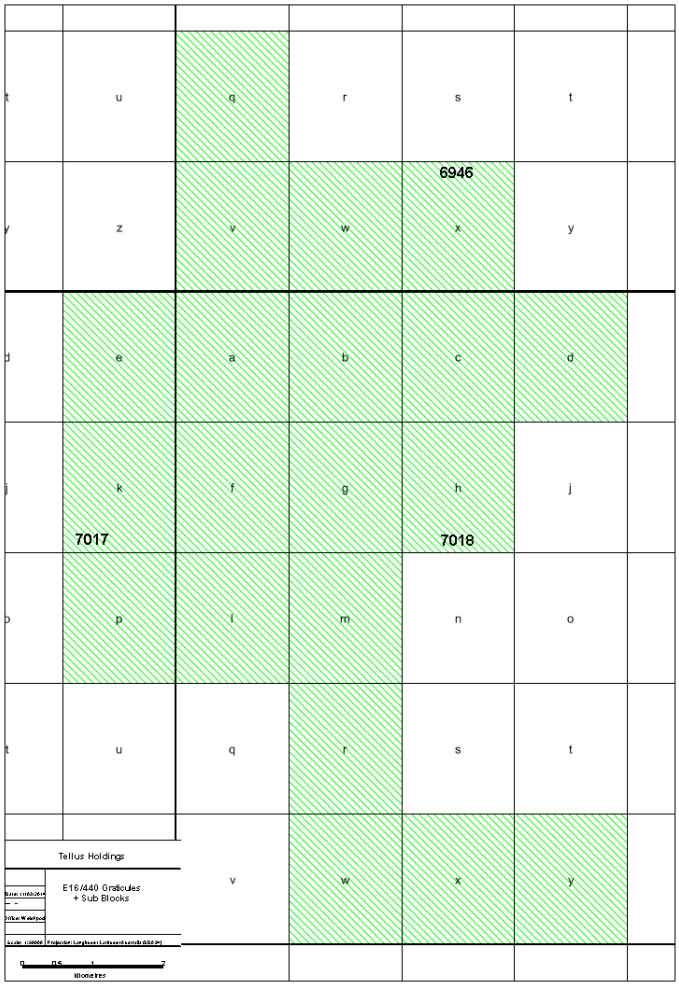


Figure 2 Graticules and Sub Blocks

4. Geology

Regional Geology

The project area lies in the central eastern portion of the Yilgarn Craton, a tectonically stable, ancient craton comprising linear to arcuate north-west trending belts of greenstone and local gneissic rocks intruded by granitoid rocks of Archaean age. Overlying all these rock units are alluvial, colluvial, aeolian or lacustrine deposits of Cainozoic age. Some of the surficial sediments and the basement rocks (except where outcropping), are deeply weathered and lateritised. The Archaean rocks are generally poorly exposed.

The granitoids occur in plutons and linear belts and are mainly equigranular to foliated adamellites, with subordinate granites, paragneiss and orthogneiss. Locally they are intruded by quartz veins, pegmatites and aplites (Fig 4).

The Cainozoic sediments are generally thin and variable, except in the palaeodrainages, where sediments of Eocene age infill incised palaeochannels. The remaining surficial sediments comprise locally-developed alluvial, colluvial, aeolian, occasional lacustrine and hydrochemical deposits of Late Cainozoic age.

In the vicinity of the Sandy Ridge area, Archaean monzogranites of the Yilgarn Granites Supersuite is the bedrock. Deep weathering of the feldspathic and ferromagnesian minerals within the granite has resulted in the formation of kaolinite. Flanking these rocks are similarly aged metamorphosed mafic dominant granite-greenstones of the Youanmi Terrane – Southern Cross Domain. Also present within the area are sedimentary siliciclastic rock, including metamorphosed sandstone, siltstone, shale and chert. Weathering of the monzogranite generally extends to a maximum depth of 30 m, although it is closer to 40 m within the study area. The weathering profile on the granitoids generally comprises a ferruginous laterite at the surface, underlain by kaolinitic clay in which most rock structures and textures have been obliterated. This then grades downward into a zone of weathered rock with identifiable rock textures and structures in which joints are clay filled.

Project Geology.

The geology of the project area is consistent across the tenement with an Archaean monzogranite bedrock present throughout, below sands, residual soils and laterite (Fig 5). Minor mafic dykes of likely Proterozoic age are also present but are thin and of little significance, with only one dyke intersected in all drilling to date. The granite has been weathered to a depth of between 30-40m across the drilled area with a strong kaolinitised clay zone above the granite saprock. A silcrete layer is common with a lateritic residuum present in most cases. Typical drillchip trays of 2 drillholes are shown in figure 3.

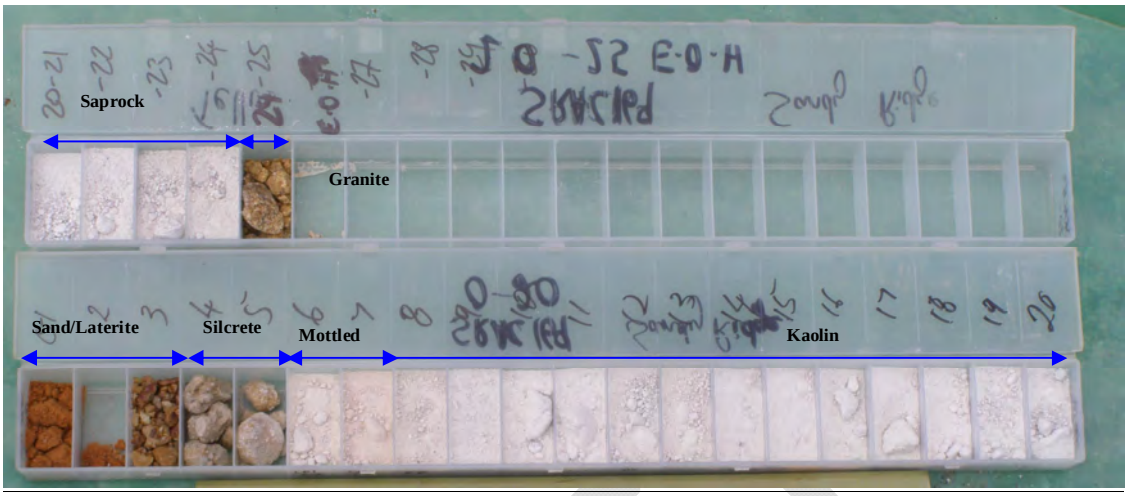


Figure 3 Chip tray for SRAC169

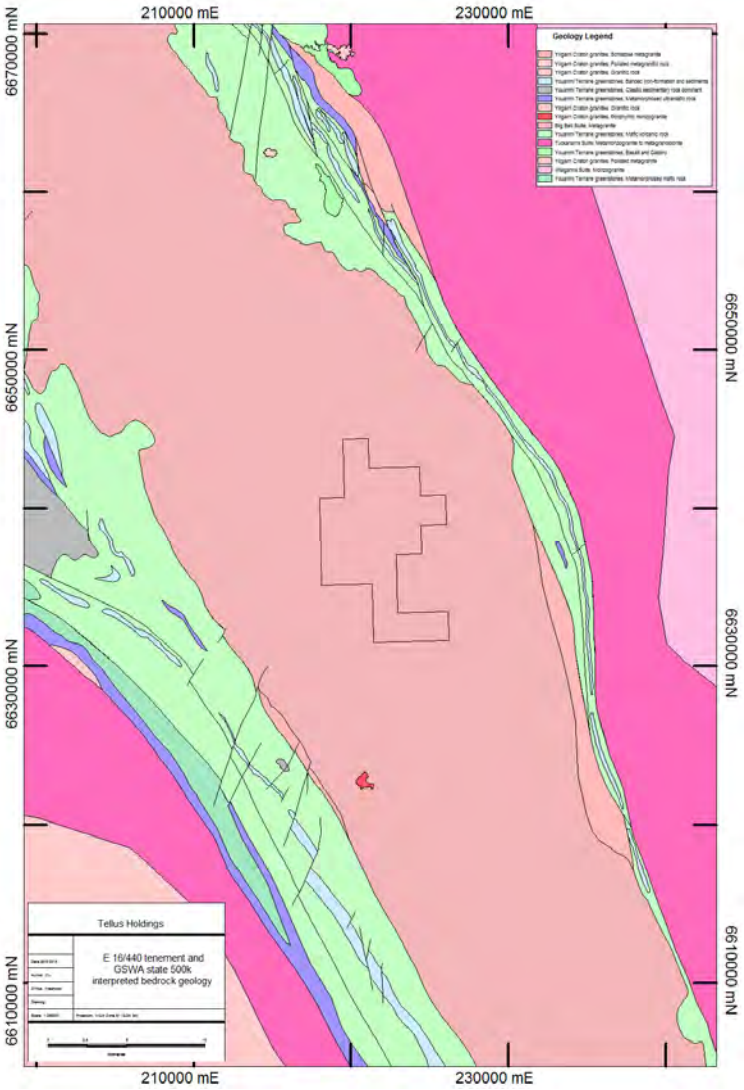


Figure 4 Regional Geology E 16/440

No veining or alteration has been encountered and the kaolinitisation is considered to be a weathering product and not a hydrothermal process. There is little cover across the area and no significant paleochannel development. No strong aquifers were encountered in the drilling.

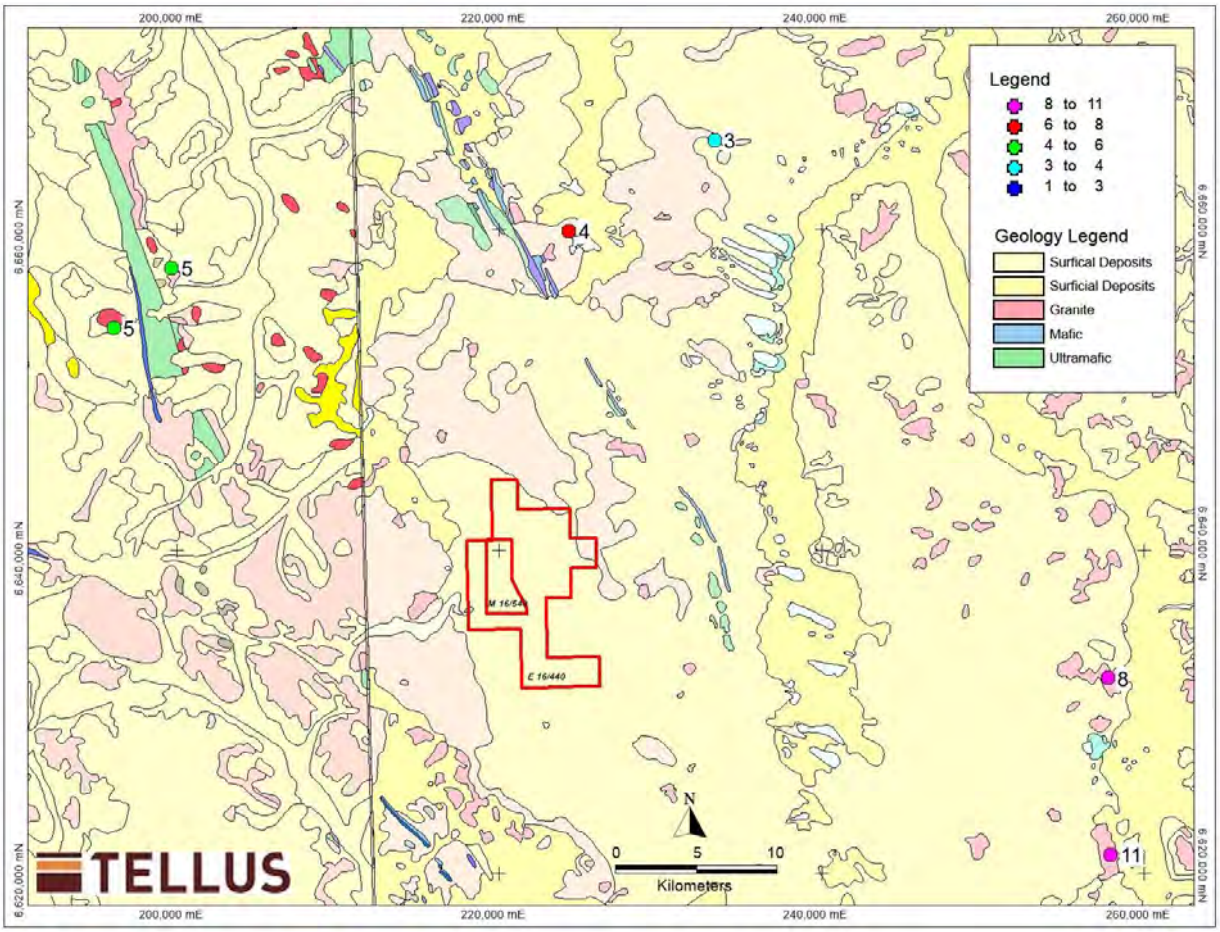


Figure 5 Regional surface geology with OZCHEM Geochemical data Uranium values in ppm

5. Baseline Radiation levels

The area has no known Naturally occurring radioactive material (NORM). The nearest known uranium prospects within the Department of Mines and Petroleum databases are some 80km to the south east at Lake Eva and 100k to the west at Lake Marmion (http://www.dmp.wa.gov.au/Minerals/Mines-and-Mineral-Deposits-2283.aspx). An airborne magnetics and radiometrics survey was flown in 1997 by World Geoscience Corporation for Stockdale Prospecting. The survey specifications are detailed below:

SURVEY SPECIFICATIONS

AIRCRAFT - VH-MEH ROCKWELL SHRIKE COMMANDER AC500S

MAGNETOMETERS - Geometrics G-822A Cesium
RESOLUTION - 0.001 nanotesla
CYCLE RATE - 0.1 second
SAMPLE INTERVAL - 7.8 metres

SPECTROMETER - 256 channel PGAM-1000
VOLUME - 33.56 litres
CYCLE RATE - 1.0 second
SAMPLE INTERVAL - 78 metres

DATA ACQUISITION - Picodas PDAS-1000
- 11 CHANNEL RMS GR33A

FLIGHT LINE SPACING - 250 metres
FLIGHT LINE DIRECTION - 090 - 270 degrees
TIE LINE SPACING - none flown
TIE LINE DIRECTION - none flown degrees

This survey is the most detailed survey available for the area. The magnetics show a stable response across the area consistent with the geological interpretation of a stable granite basement (Fig 6).

The Radiometrics is similarly low across the tenement with no significant anomalies in the Uranium and Thorium wavelengths and values on the low end of radiometric response (Fig 7). The uranium/Thorium Ratio is used to highlight any uranium enrichment zones within an area. As can be seen in Figure 7b, there is no significant variation in this ratio across the area indicating that uranium levels are likely to be at the background levels of the monzogranite body.

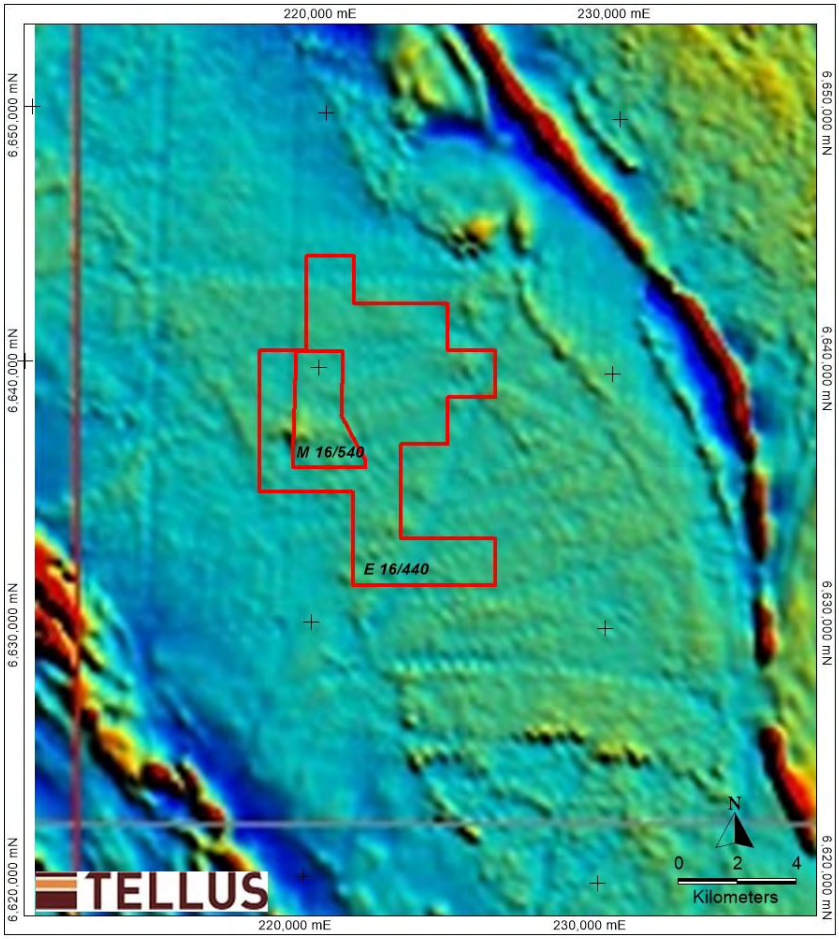


Figure 6 Regional Magnetics

Rock chip sampling of the granite outcrop in the region, available from Geoscience Australia's OZCHEM database, has returned a maximum of 11ppm Uranium and Thorium (Fig 5). None of the samples are within the tenement area itself. This level of background is considered within the lower range of typical values for a granite terrain. The main mechanism for concentration of NORM within the region is surficial concentrations in paleochannels and playa lakes in a saline environment. The lack of any paleochannels or lacustrian environments in the project area would preclude such a concentration.

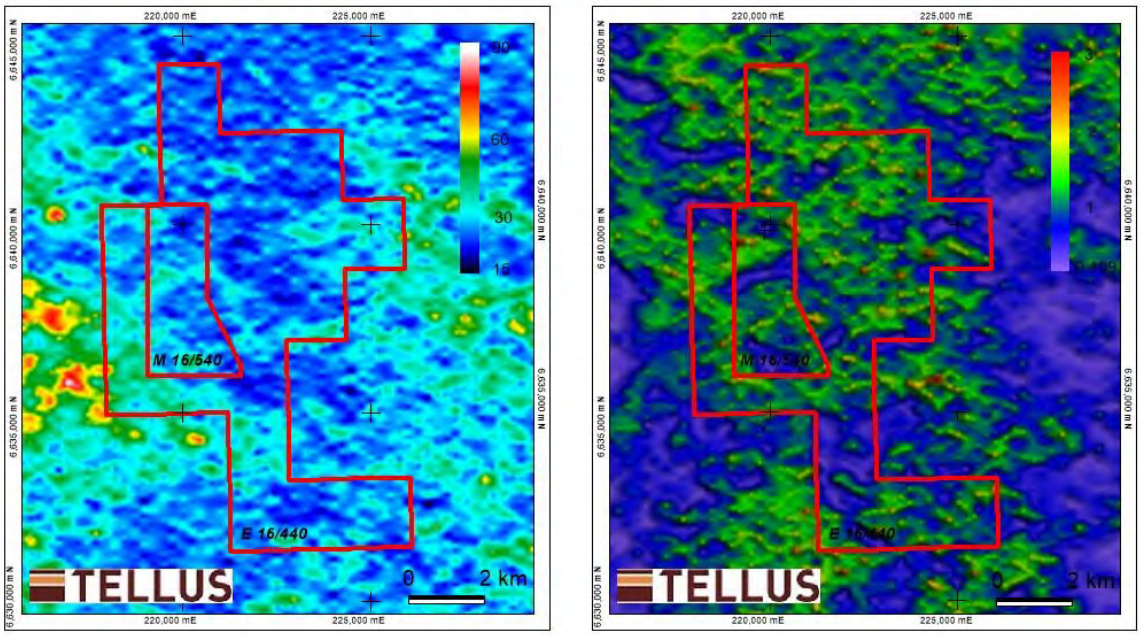


Figure 7 Radiometric response a) Uranium channel (LHS) b) Uranium/Thorium Ratio (RHS)

It is the authors opinion that the radiation levels in the project area are low.

6. Baseline Metals levels

The geology of the project area is dominated by granites which tend to be low in metal content compared to more mafic rocks. There has been extensive analysis of the exploration drilling at Sandy Ridge with a total of 312 assays available from the 2015 drilling program (Fig 10). These assays were processed at Nagrom using XRF for Fe2O3, SiO2, Al2O3, TiO2, MnO, CaO, P, S, MgO, Zn, LOI, K2O, Sn, V, Cr, Co, Ni, Cu, As, Pb and Ba. Thirty-two of the assays were QAQC samples which provide a high level of confidence in the data. These assays were completed on composite samples from the Kaolinite zone. The statistics of the compositing exercise are displayed in Table 11 below. The data from previous drilling was not considered as a more limited suite of elements were analysed for.

Table 2 Statistics of the Composite Samples

Property	Value
Number of composites for assay	280+32 duplicates
Average meters per composite	4.2 m
Maximum meters per composite	6 m
Minimum meters per composite	2 m
Maximum number of composites per hole	5

Table 3 shows the statistical data for the full suite of analysed elements. The maximum

values are low for all of the contaminant elements and the distribution statistics show a remarkable consistency across the site. These low levels are as expected for the geological environment in the project area. The overlying laterite zones will have some secondary enrichment of some elements. Given the low levels these are unlikely to be of concern although direct assay of same of this material could be undertaken.

Table 3 Statistical analysis of the 24 elements analysed

Attribute	Fe2O3	SiO_2	Al_2O_3	TiO_2	MnO	CaO	P	Na_2O
Count	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000
Min	0.0758	45.9580	30.0240	0.0680	0.0005	0.0100	0.0005	0.0060
Max	2.8300	55.5170	39.3360	0.9910	0.0170	0.0700	0.0450	0.3990
Mean	0.6474	48.1276	37.0629	0.4032	0.0016	0.0272	0.0077	0.0990
Std Dev	0.3629	1.5494	1.5175	0.1593	0.0019	0.0095	0.0084	0.0564
Variance	0.1317	2.4006	2.3027	0.0254	0.0000	0.0001	0.0001	0.0032
Attribute	S	MgO	Zn	LOI_{1000}	K_2O	Sn	V	Cl
Count	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000
Min	0.0005	0.0100	0.0005	8.9000	0.0550	0.0005	0.0005	0.0005
Max	0.0310	0.2880	0.0130	13.9000	4.7660	0.0050	0.0060	0.3150
Mean	0.0078	0.0588	0.0021	12.9436	0.5555	0.0008	0.0017	0.0740
Std Dev	0.0063	0.0389	0.0019	0.7735	0.7370	0.0007	0.0013	0.0566
Variance	0.0000	0.0015	0.0000	0.5982	0.5431	0.0000	0.0000	0.0032
Attribute	Cr	Co	Ni	Cu	As	Pb	Ba	Sr
Count	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000	312.0000
Min	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Max	0.0120	0.0030	0.0220	0.0020	0.0020	0.0330	0.0970	0.0110
Mean	0.0010	0.0005	0.0010	0.0005	0.0005	0.0038	0.0099	0.0016
Std Dev	0.0013	0.0001	0.0022	0.0001	0.0001	0.0047	0.0151	0.0017
Variance	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000

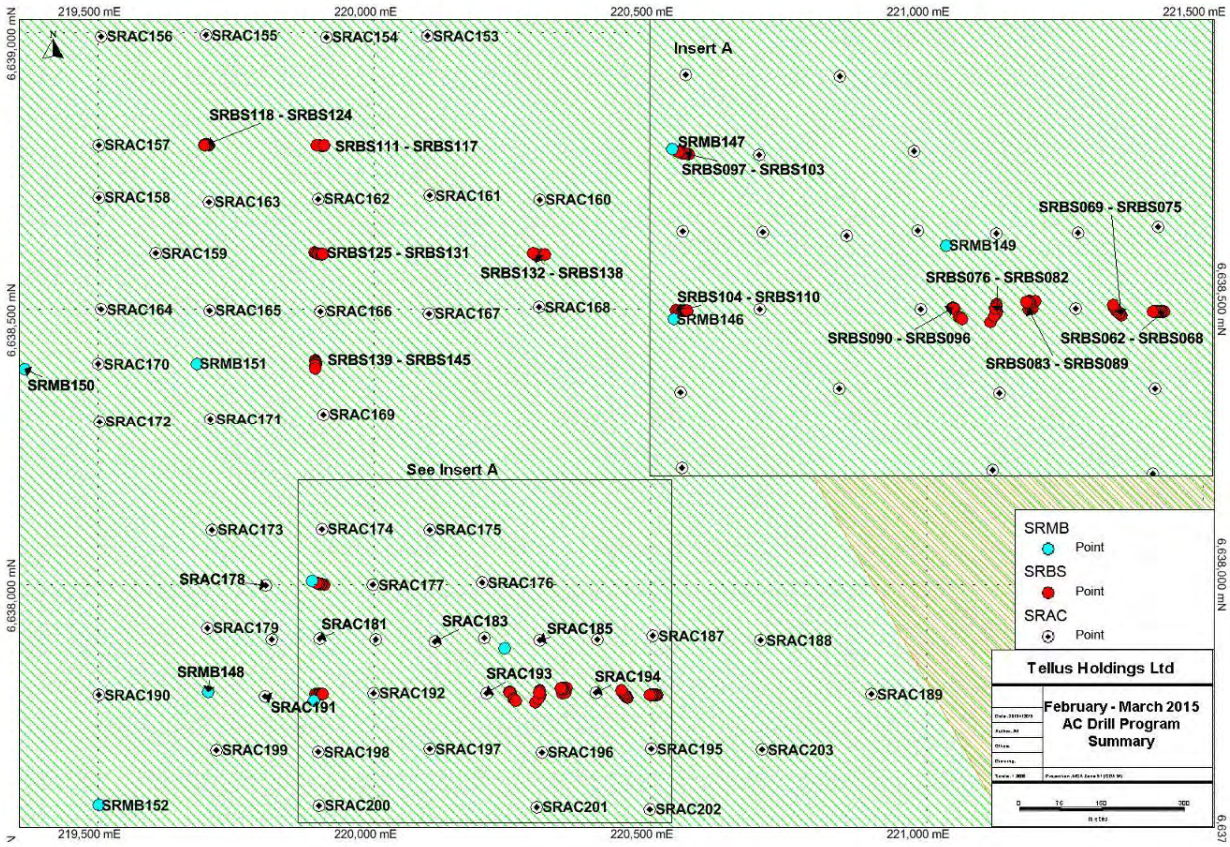


Figure 8 Distribution of drilling data used for the calculation of baseline metal contents

7. Conclusions

The Sandy Ridge project has remarkable geological consistency across the investigated area. Radiation and Metal levels have been examined using publicly available regional geological, geophysical and geochemical data. Baseline metals level have also been quantified in the kaolinitic zone using the drilling data collected by Tellus.

The results of this investigation are that radiation levels are low across the region and metal levels are also low. It should be noted that the laterite zone present above the kaolinite zone in a majority of the area may have elevated metal levels compared with the kaolinite zone and may require specific testing during future investigations, although the levels are not expected to be of concern.