



EPM 25169 "MACKUNDA DOWNS" Cannington Southern Domain Project Northwest Queensland

PARTIAL RELINQUISHMENT REPORT For the Period Ended 6 April 2017

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SUMMARY

This partial relinquishment report describes all exploration work carried out by BHP Billiton (BHPB) and South32 Cannington Pty Ltd for the reporting period from the 7th April 2014 to the partial relinquishment date of 6th April 2017, on that part of EPM 25169 “Mackunda Downs” (“the EPM”) selected for relinquishment. The tenement is in northwest Queensland and falls within the Mackunda 1:250,000 map sheet. It forms part of the Southern Domain Project.

The tenement is centred approximately 64 km southeast of Cannington Mine in northwest Queensland. The principal exploration target is Broken Hill type (BHt) Ag – Pb – Zn mineralisation (e.g., Cannington, Pegmont, Maronan).

No mineral exploration work, apart from desktop studies, was carried out by BHP Billiton (BHPB) or South32 Cannington Pty Ltd on the sub-blocks chosen for relinquishment during the period of this tenement.

LOCATION AND TENURE

Exploration Permit for Minerals 25169 in northwest Queensland was granted to BHP Billiton Minerals Pty Ltd on 7th April 2014 with a total of 100 sub-blocks for a period of 3 years. The tenement was transferred from BHP Billiton Minerals Pty Ltd to South32 Cannington Pty Ltd on the 5th of February 2015 and is the registered tenement holder under the entity South32 Ltd.

This partial relinquishment report summarises exploration work carried out by BHP Billiton (BHPB) and South32 Cannington Pty Ltd on that part of the EPM 25169 “Mackunda Downs” tenement (“the EPM”) selected for relinquishment, from the date of grant up to the 6th April 2017. The tenement location is shown in *Figure 1*. It is proposed to reduce the tenement by 40 sub-blocks leaving 60 sub-blocks remaining (*Tables 2 and 3; Figures 1 and 2*).

The tenement falls within the Mackunda 1:250,000 map sheet and covers an area of 100 sub-blocks, with the centre of the EPM located about 64 kilometres southeast of the Cannington Mine in northwest Queensland, and it has been subject to desktop reviews and geophysical modelling since the tenement was granted in April 2014. Access to the tenement is via a network of graded station tracks leading off the Kennedy Developmental Road and the Toolebuc - Middleton Road. Topographically the tenement area is flat to gently undulating channel country, with minor mesa formations. The streams draining the area in and surrounding the tenement flow to the east, south and southeast.

The principal exploration target within this project area is Proterozoic - age, Broken Hill type (BHt) Ag – Pb – Zn mineralisation (e.g. Cannington, Maronan, Pegmont).

Tenement details as at 6th April 2017 are shown in *Table 1* below and individual sub-block details are shown in *Table 2*.

Table 1. Tenement Details

EPM Number :	EPM 25169
Name :	Mackunda Downs
No. of sub-blocks :	100 Sub-blocks
Grant Date :	7 th April 2014
Expiry Date :	6 th April 2017
Holder :	South32 Cannington Proprietary Limited (100%)

Table 2. Sub-block Details

BIM	Block	Sub-blocks
CLON	1911	Y Z
CLON	1912	V W X Y Z
CLON	1983	D E J K O P T U Y Z
CLON	1984	A B C D E F G H J K L M N O P Q R S T U V W X Y Z
CLON	1985	L M Q R S V W X
CLON	2055	D E J K O P T U Y Z

CLON	2056	A B C D E F G H J K L M N O P Q R S T U V W X Y Z
CLON	2057	A B C F G H L M N Q R S V W X

The 40 sub-blocks selected for a 40% relinquishment of the tenement are shown in *Table 3*, and also in *Figure 1*.

Table 3. Relinquished Sub-block Details

BIM	Block	Sub-blocks
CLON	1912	X Y Z
CLON	1984	E K P U Z
CLON	1985	L M Q R S V W X
CLON	2056	D E J K O P T U Z
CLON	2057	A B C F G H L M N Q R S V W X

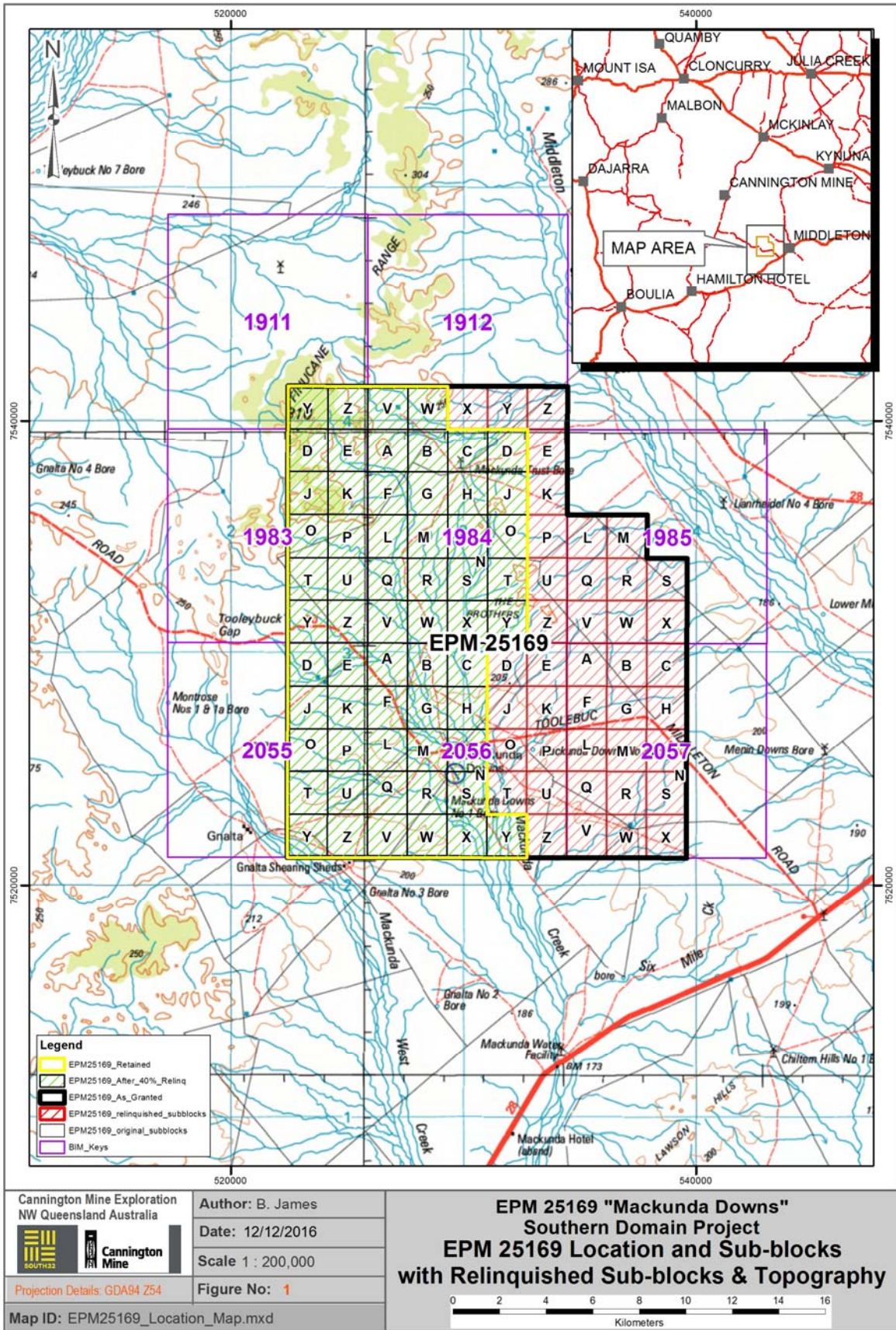


Figure 1. EPM 25169 Tenement Sub-block Details and Location Map with Relinquished Sub-blocks.

GEOLOGY

COVER SEQUENCE

Geology in the project area consists of interpreted Proterozoic Soldiers Cap Group (Mt Norna Quartzite, Toole Creek Volcanics and Llewellyn Creek Formation), beneath Mesozoic sediments of the Eromanga Basin and Quaternary alluvial sediments.

The Eromanga Basin cover units comprise monotonous, mostly carbonaceous mudstones, siltstones and rarer sandstones and gravels of the Mesozoic Rolling Downs Group - dominantly the Wallumbilla Formation - and locally the overlying calcareous mudstones and dirty limestones of the Toolebuc Formation. Within and surrounding the tenement the Mesozoic geology comprises the Mackunda Formation, which consists of siltstone and sandstone. These Mesozoic deposits are overlain in the tenement by a thin veneer of Quaternary and Tertiary fluvial sands, gravels and clays of the Wondoola Beds, forming a flat-lying, featureless terrain broken only by a number of river channels and associated terraces.

BASEMENT GEOLOGY

The tenement area is underlain by sub-units of the Proterozoic Soldiers Cap Group (1695 - 1665 Ma, Giles & Nutman, 2003). The dominant lithologies in the Soldiers Cap Group are meta-siliciclastics which include planar bedded pelitic schists with graded bedding; thin units of cross-bedded immature quartzo-feldspathic meta-arenites and orthoquartzites; and intervals of more abundant inter-bedded basic volcanics and basic sills with minor carbonaceous schists, calc-silicates and quartzites. Overall there is a distinctive absence of significant carbonate sequences or acid volcanics, and a dominance of immature clastics. Thin horizons of banded iron formation associated with small base-metal showings occur at restricted stratigraphic levels, generally within the Mt Norna Quartzite.

Metamorphic grade in Proterozoic rocks of the region varies from largely greenschist facies with abundant relict sedimentary textures in the north around Cloncurry, with metamorphic grade increasing to the south and south-east towards, and south of, Cannington, where metamorphic grade reaches upper amphibolite facies, resulting in widespread sillimanite – K-feldspar-bearing schists, migmatitic gneisses and pegmatites, plus the obliteration of original rock textures.

The differences in metamorphic grade and poor outcrop, complicates clear correlation of these higher grade metamorphic sequences with the previously defined Soldiers Cap Group around Cloncurry. Interpretation of regional magnetic surveys indicates that the higher metamorphic grade sequences within the Soldiers Cap Group extend for up to 50 kilometres under cover to the east and southeast. Many of the lithostratigraphic units interpreted from the magnetic data are not well represented in areas of outcrop. The Cannington Deposit occurs within these undercover extensions, and is interpreted to lie within broad litho-magnetic equivalents of the Mt Norna Quartzite of the Soldiers Cap Group. However, given lack of outcrop, complex deformation and high-grade metamorphism, detailed correlations are uncertain.

Beardsmore *et al.* (1988) proposed an informal stratigraphic scheme for the Eastern Succession. Higher-grade metamorphics south of Cloncurry were assigned to the Fullarton River Group, overlain by components of the previously defined Soldiers Cap Group, with the two groups included in a newly defined Maronan Supergroup. However, type sections, critical age relationships and contacts have not been formally defined. Host lithologies evident in drilling from the Cannington area, are

comparable with units of the proposed Fullarton River Group in this informal terminology. Based on broad litho-stratigraphic and geophysical similarities between the Soldiers Cap Group and the Fullarton River Group, they appear to be directly correlatable sequences.

Isotopic dating of a garnetiferous felsic gneiss from the proposed Fullarton River Group (some 30 km north of Cannington), has given an age of 1677 ± 9 Ma (Page, 1993), which would imply an age equivalence with Cover Sequence 3.

A range of small Ag – Pb – Zn prospects with Broken Hill-type deposit affinities occur within the outcropping higher-grade metamorphics north and west of Cannington within the Soldiers Cap Group (Dingo, Maramungee, Fairmile, Black Rock, Pegmont), as well as in covered equivalents (Altia, Maronan, Cannington). All of these prospects are hosted within psammite-rich packages that are correlated with the Mt Norna Quartzite. *Table 4* compares the lithology and geophysical expressions of the Soldiers Cap Group and Fullarton River Group.

Table 4. Lithostratigraphic and Geophysical Comparison Between the Soldiers Cap Group and Fullarton River Group

Soldiers Cap Group			Fullarton River Group	
Stratigraphic Unit	Lithology	Geophysical Expression	Lithology	Geophysical Expression
Toole Creek Volcanics	Mafic volcanics, mafic sills interbedded with carbonaceous slates/phyllites. Minor BIFs at base.	Non- to weakly-magnetic. Dense packages due to mafics. Regionally extensive formational conductors.	Amphibolite intercalated with graphitic schist and gneiss.	Non- to weakly-magnetic, although amphibolite commonly contains post-tectonic albite-magnetite-amphibole alteration. Dense packages due to mafics. Regionally extensive formational conductors.
Mt Norna Quartzite	Well bedded. Graded bedding of feldspathic quartzite and wackes with subordinate pelitic mudstone/siltstone. Contains minor to moderate mafic sills and thin BIFs.	Non-magnetic package with short-strike length magnetic units (mafic sills and BIFs). Low to moderate density. Non-conductive.	Intercalated pelites and psammites. Moderate amphibolite with minor BIFs.	Non-magnetic package with short-strike length magnetic units (mafic sills and BIFs). Low to moderate density. Non-conductive.
Llewellyn Creek Formation	Bedded quartz-mica psammite and pelite with turbiditic graded bedding cycles.	Non-magnetic. Density is low to moderate. Non-conductive.	Pelitic and psammitic gneiss grading into migmatitic quartzo-feldspathic gneiss. Minor amphibolite.	Non-magnetic. Density is low to moderate. Non-conductive.



EXPLORATION WORK COMPLETED DURING THE PERIOD

Exploration work completed during the reporting period on the sub-blocks selected for partial relinquishment consisted of desktop studies, including a review of the local and regional geophysical information for target generation purposes. No previous mineral exploration drilling has been conducted in the tenement, limiting the geological information available on the tenure.

To the south and east of Cannington Mine, exploration under Mesozoic cover rocks relies on historical drilling and geophysical survey results, and depth to basement is estimated at around 600m in the project area.

The sub-blocks selected for relinquishment do not appear to cover any highly ranked exploration targets and no further exploration work on them is warranted. The broad magnetic high in the eastern portion of the tenement is not principal to the targeted exploration models and thus has been selected for relinquishment (*Figure 2*).

Future exploration proposed on the tenement includes deep geochemical drill testing of the basement across the highly ranked targets. Follow up geophysics, geochemistry and drilling will be dependent on the results intersected in the initial basement geochemical drill holes.

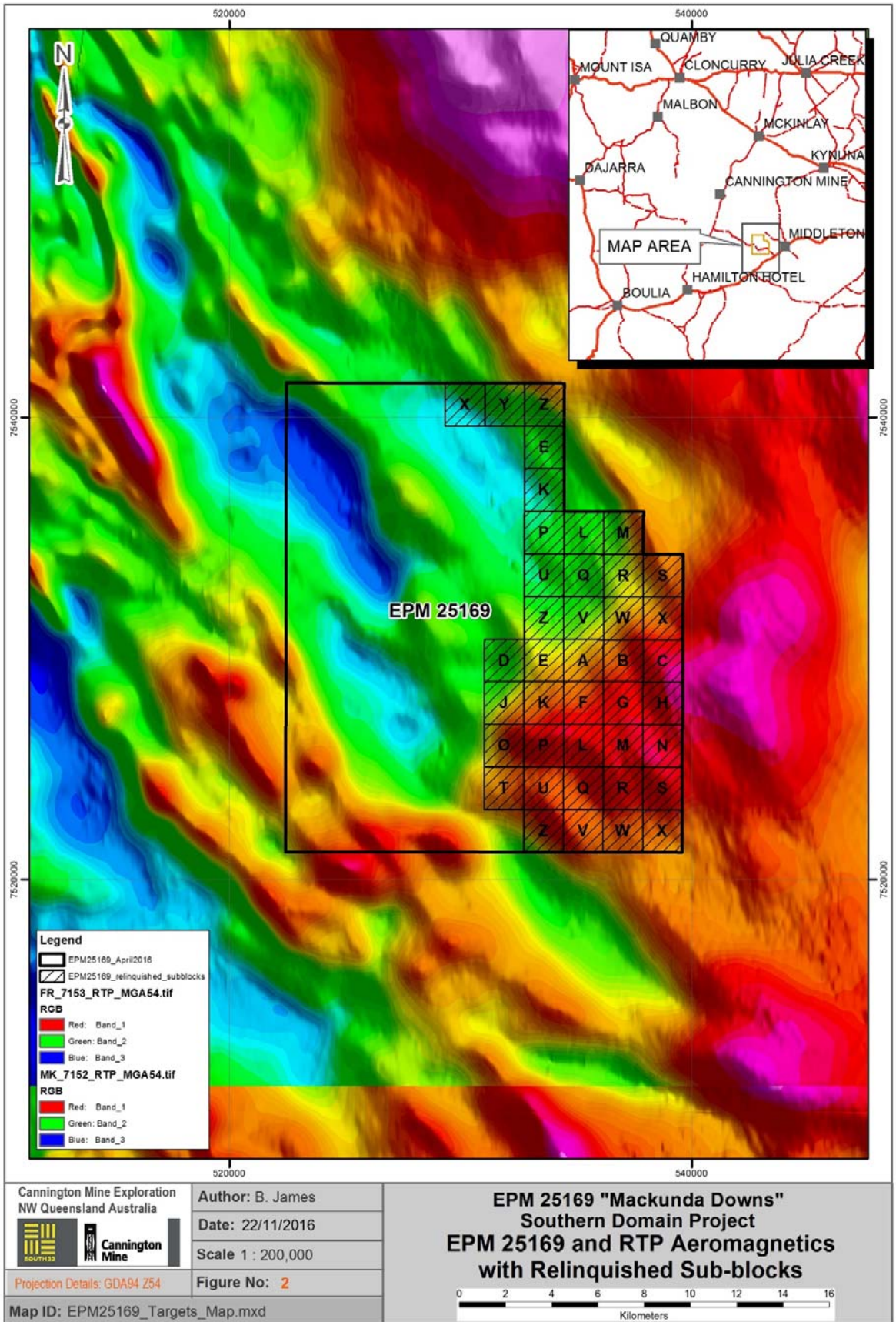


Figure 2. EPM 25169 RTP Aeromagnetic Map with Relinquished Sub-blocks.



CONCLUSIONS

EPM 25169 is 100% wholly owned and operated by South32 and covers prospective Proterozoic rocks south-east of the Cannington mine-site in northwest Queensland. Currently consisting of 100 sub-blocks, the tenement has been reviewed with respect to BHT style Ag – Pb – Zn mineralisation.

The tenure area has been interpreted to contain Soldiers Cap Group stratigraphy, predominantly Mt Norna Quartzite and Toole Creek Volcanics.

Apart from a desktop review of available information for target generation purposes, no detailed exploration work has been conducted on the 40 sub-blocks chosen for relinquishment. The sub-blocks selected do not appear to cover any highly ranked exploration targets and no further work on them is warranted.



REFERENCES

Beardsmore, T. J., Newberry, S. P. and Laing, W. P., 1988, The Maronan Supergroup: an inferred early volcano-sedimentary rift sequence in the Mount Isa Inlier, and its implications for ensialic rifting in the Middle Proterozoic of northwest Queensland: *Precambrian Research*, v. 40-41, p. 487-508.

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Page, R. W., 1993, Geochronological results from the Eastern Fold Belt, Mount Isa Inlier: *Australian Geological Survey Organisation Research Newsletter* 19, p. 4-5.