

## ASX ANNOUNCEMENT

Date: 9 July 2020  
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### **The Gravity of the Situation at Little Broken Hill, NSW. A Technical Update.**

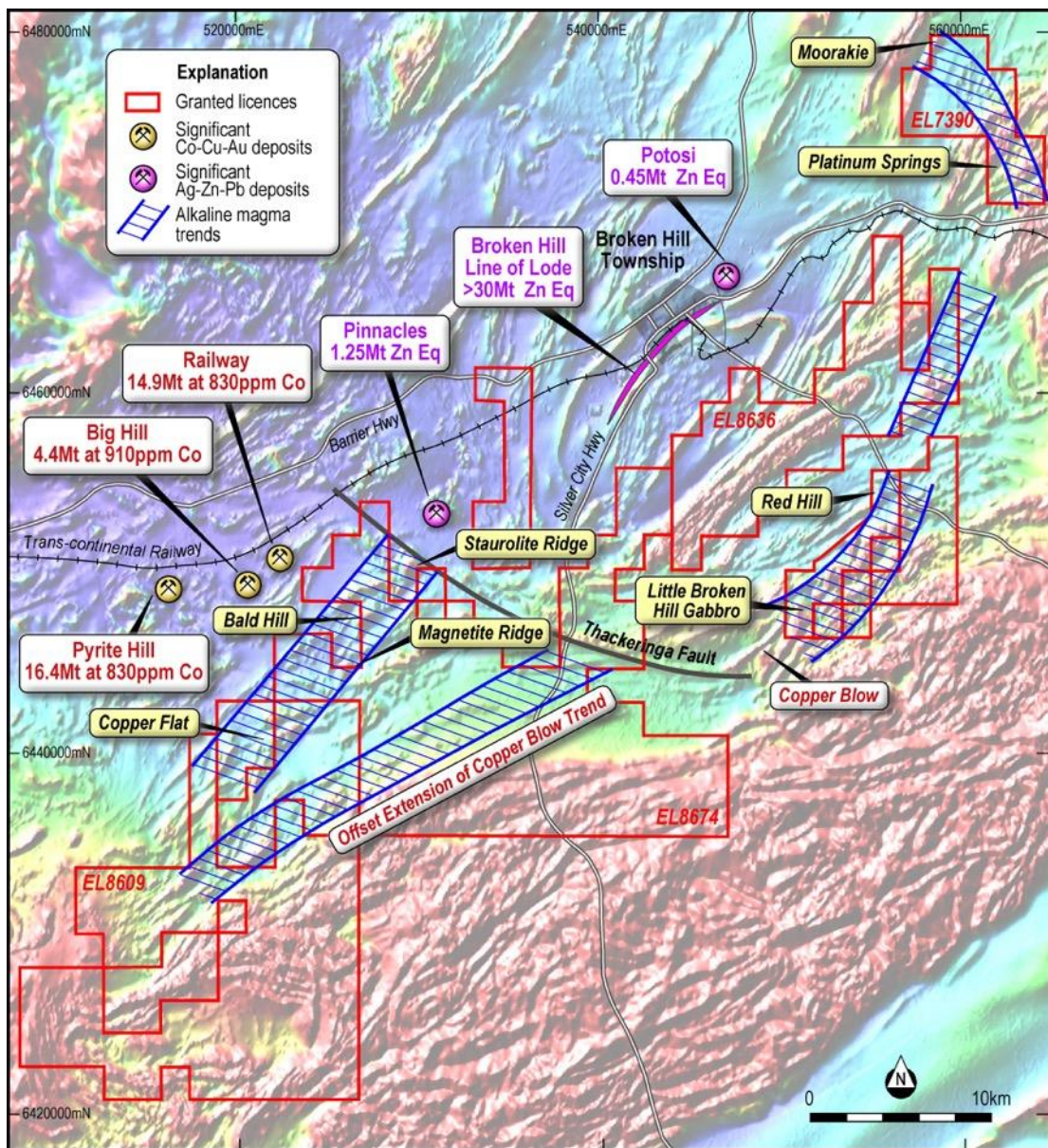
- **A new interpretation of the Little Broken Hill Gabbro reveals:**
  - **it was a mid-crustal magma chamber likely fed by mantle-sourced magmas carrying nickel-copper-PGEs through newly identified feeder zones that are priority targets for follow up;**
  - **at least five separate magma pulses fed the chamber during regional extension. This caused gravity sliding and slumping of the magma into the chamber which may also have helped trigger massive sulphide deposition; and**
  - **it is of the correct age, scale and geodynamic setting to host a major nickel-copper-PGE deposit;**
- **Interpretation of geochemistry data to refine drill targets is in progress.**
- **Drill programme to start by the end of July.**

A new interpretation of airborne magnetic data over the Red Hill to Little Broken Hill Gabbro (LBHG) area at Impact Minerals Limited's (ASX:IPT) 100% owned Broken Hill Ni-Cu-PGE project in New South Wales, has shown it is of the same scale as, and contains similar internal structures to, those that host many of the world's major nickel-copper-PGE deposits such as Jinchuan and Voiseys Bay.

Impact Minerals Managing Director Dr Mike Jones said "Our new interpretation of the structure of the Little Broken Hill area is extremely exciting as it demonstrates the Little Broken Hill intrusion formed in a mid-crustal magma chamber likely being fed directly by mantle-related magmas enriched in nickel-copper-PGE. This chamber was expanding laterally as a result of regional extensional stresses related to the break-up of the supercontinent Rodinia at the same time as, and close to, the giant Jinchuan deposit in China".

"The lateral expansion allowed multiple phases of magma to be injected into the Little Broken Hill chamber through newly identified major feeder zones that are now priority targets for follow up. In this dynamic environment these new magma pulses caused gravitational instabilities in the chamber leading to slumping and sliding of the magmas under the simple force of gravity. Such gravity slides, in particular their edges and parent feeder zones, are increasingly being recognised as important controls on the accumulation of sulphides in major mineralised intrusions such as the Bushveld Complex" he said.

"We are working through the limited geochemistry available on the gabbro to determine if the chemical characteristics of the different units identified can provide vectors to ore. Previous exploration in the area has been hampered by shallow alluvial cover and 70% of the LBHG is not exposed. Our upcoming drill programme will test a large part of this area which covers the key feeder zone targets" Dr Jones said.



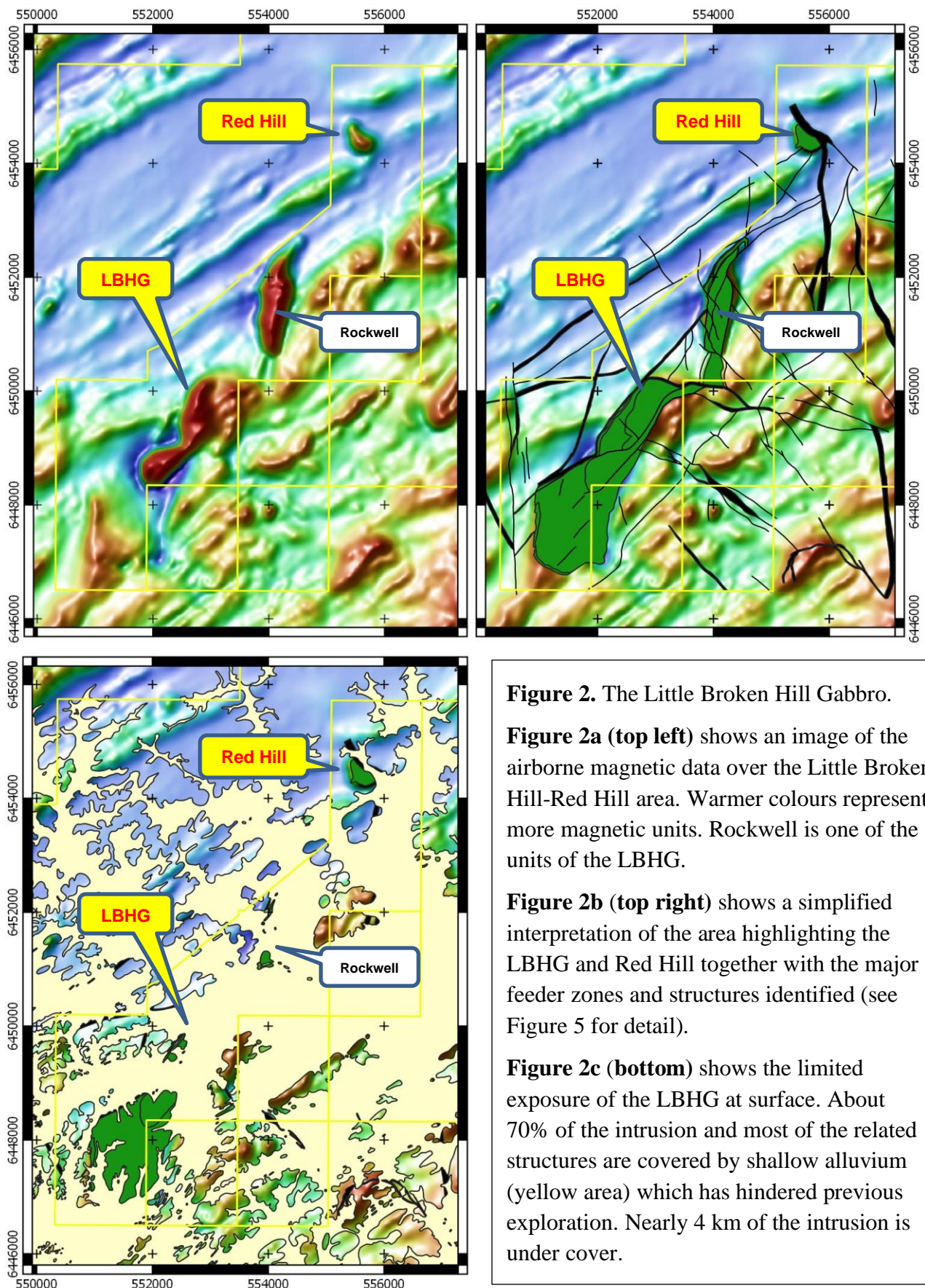
**Figure 1.** Impact's ground holdings in the Broken Hill area showing key prospects including Red Hill, Platinum Springs and Little Broken Hill Gabbro.

## About the Little Broken Hill Gabbro

The Little Broken Hill Gabbro (LBHG) lies about 25 km south of the town of Broken Hill and is the largest of a string of mafic to ultramafic intrusions that occur in a 40 km long belt from Little Broken Hill in the south west to Red Hill, Darling Creek, Platinum Springs and Moorkai in the north east (Figure 1).

The LBHG is evident in airborne magnetic data (Figure 2a) and is about five kilometres long and up to one kilometre thick. There are no detailed published studies on the gabbro and it is poorly understood. It is comprised of a number of individual units or lobes that have differing magnetic and chemical properties (compare Figures 2a and 2b and Figure 3).





**Figure 2.** The Little Broken Hill Gabbro.

**Figure 2a (top left)** shows an image of the airborne magnetic data over the Little Broken Hill-Red Hill area. Warmer colours represent more magnetic units. Rockwell is one of the units of the LBHG.

**Figure 2b (top right)** shows a simplified interpretation of the area highlighting the LBHG and Red Hill together with the major feeder zones and structures identified (see Figure 5 for detail).

**Figure 2c (bottom)** shows the limited exposure of the LBHG at surface. About 70% of the intrusion and most of the related structures are covered by shallow alluvium (yellow area) which has hindered previous exploration. Nearly 4 km of the intrusion is under cover.

Importantly, about 70% of the gabbro and four kilometres of strike is covered by up to about 25 metres of alluvium (Figure 2c). This cover has been a hindrance to previous exploration and only very limited sampling and drilling has been completed by previous explorers away from the areas of outcrop. This work returned only modest results and discouraged further exploration given the very high grade nickel-copper-PGE results returned from the other prospects in the region.

However, Impact's work has now shown that the gabbro has many of the characteristics required to potentially host a major nickel-copper-PGE deposit and that compelling targets exist under the alluvial cover or at depth. Three important lines of evidence for this are:

1. The structural controls on the intrusion and formation of the LBHG.
2. The age and geodynamic setting of the LBHG and related mafic and ultramafic rocks.
3. The internal chemistry of the individual units within the LBHG which is a work in progress.

### **1. The Structural Controls on the Intrusion of the Little Broken Hill Gabbro**

A new interpretation of the internal geometry and structure of the Little Broken Hill Gabbro has been completed in-house by Impact staff and based on available 50 metre line spaced airborne magnetic data, maps by the Geological Survey of New South Wales and field checking.

The interpretation is shown in Figure 3 and for the technically minded, details are provided at the end of this report and to be read in conjunction with Figure 3.

Impact's work has shown that the Little Broken Hill Gabbro is a mid-crustal magma chamber that was fed at least in part by ultramafic to mafic magmas sourced from the mantle such as those at Red Hill and the 9 km long Platinum Springs-Moorkaie trend (Figure 1). Those magmas were demonstrably carrying extensive nickel-copper-PGEs both as magmatic sulphides such as at Platinum Springs and in related hydrothermal fluids such as at Red Hill. These deep seated magmas fed the mid-crustal chamber through a sequence of extensional faults and shears that constitute feeder zones for the main intrusive body. Three possible feeder zones have been identified (Figure 3).

In addition, Impact has recognised five different units within the LBHG each of which has different magnetic, chemical and field characteristics (Figure 3). The geometry of the units, four of which are folded, are best explained as the product of repeated pulses of magma being injected from the feeder zones into a laterally expanding magma chamber. Each new pulse of magma causes gravitational instabilities in the chamber leading to slumping and sliding of the magmas towards the centre and edges of the chamber.

Such gravity slides have been shown to be important controls on the deposition and sorting of magmatic massive sulphide in a number of major deposits including the Bushveld Complex in South Africa (Maier et al 2012).



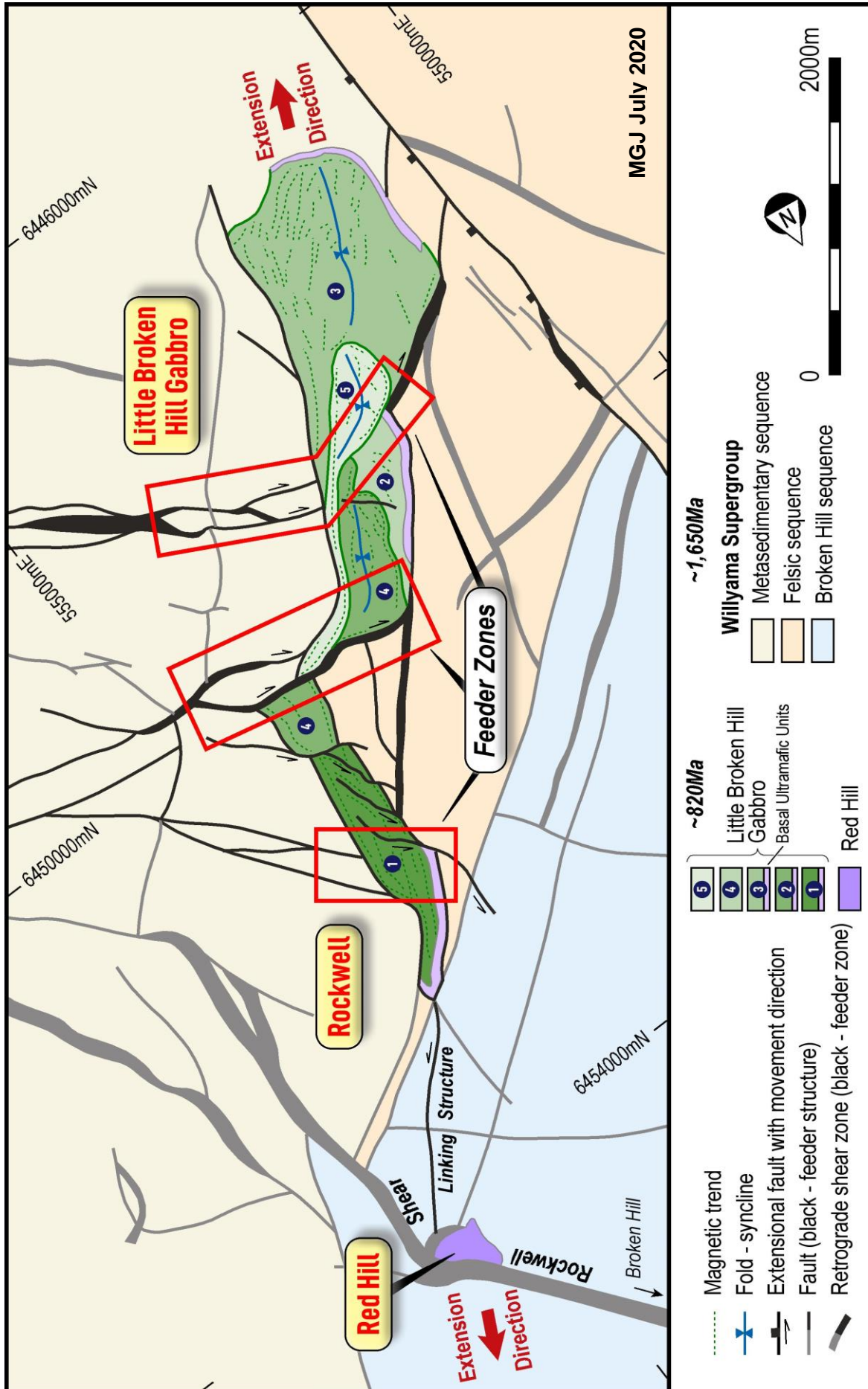
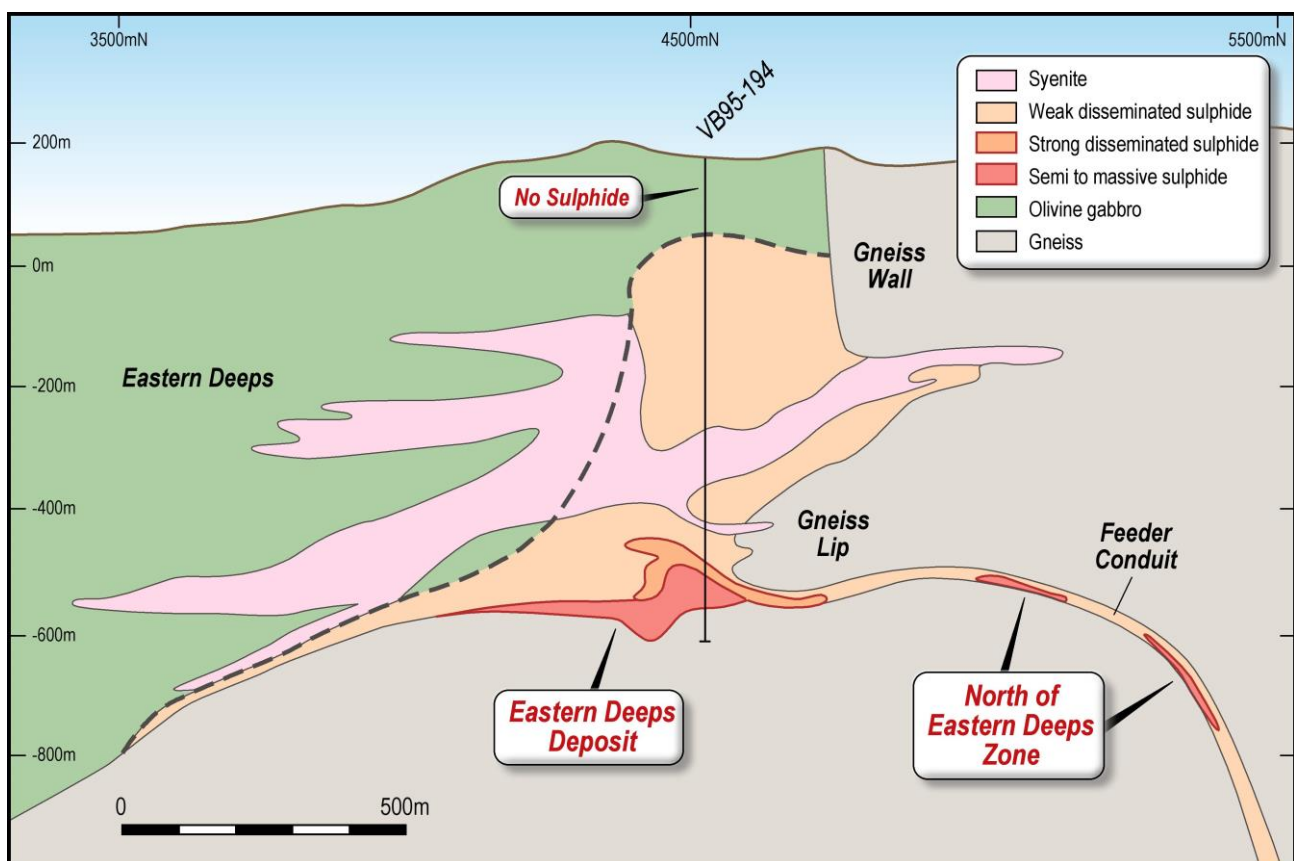


Figure 3. Interpretation of the Little Broken Hill Gabbro. Note the opposite fault slip direction either side of the central of the three possible feeder zones identified. The gabbro has expanded further to the right of this zone (SW) than the left (NE – Rockwell Lobe)

Feeder zones (and associated gravity slides) are well known loci for nickel-copper-PGE mineralisation. A very good example of a feeder zone is the Eastern Deeps mineralisation at the world class Voiseys Bay in Canada (>150 Mt at 1.6% nickel, 0.9% copper and 0.1% cobalt) as shown in Figure 4. Here, a significant massive sulphide body and a related large cloud or halo of disseminated sulphide has been deposited at the exit point of a feeder zone which in itself was carrying extensive sulphide mineralisation.

This is a useful conceptual model for Little Broken Hill and the search is now on in the first instance to find an outer halo of disseminated sulphide in this intrusion which may then provide vectors to the ultimate target of massive sulphide.

An interpretation of the geochemistry of rock chip and drill assays from the gabbro is now underway and will no doubt add to the exciting model that Impact has built for its nickel-copper-PGE exploration in the Broken Hill region.



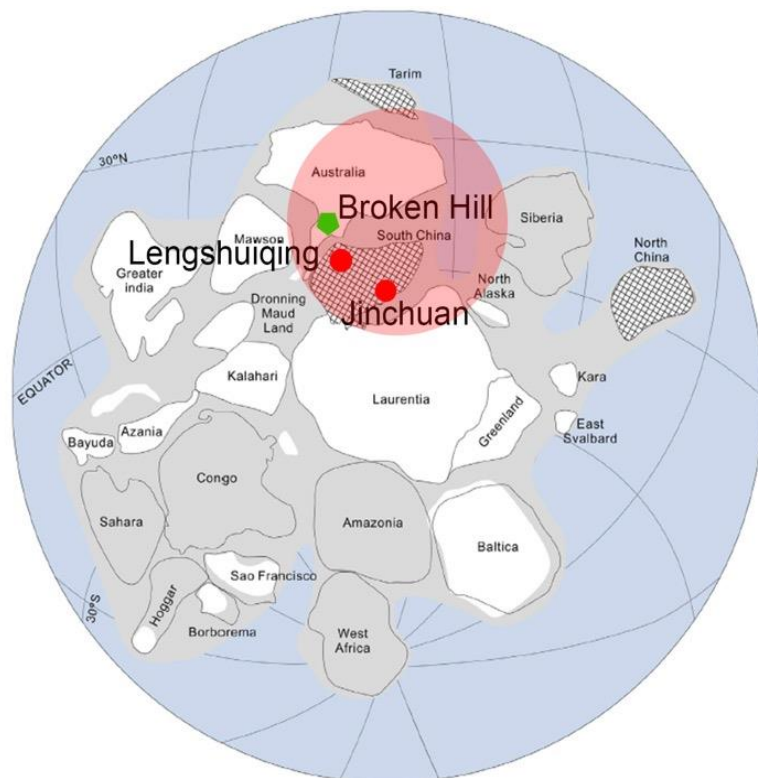
**Figure 4.** Cross-section through the Eastern Deeps deposit at Voiseys Bay. Note the feeder zone to the main intrusion and the large halo of disseminated sulphide mineralisation adjacent to the feeder. The massive sulphide body is some 600 metres deep and there is no surface expression of mineralisation.

## 2. The Age, Size and Geodynamic Setting of the Little Broken Hill Gabbro

The LBHG is about 827 million years old and related to the break-up of a supercontinent called Rodinia by a rising “plume” of mafic to ultramafic magma derived from the mantle (Figure 5, Wingate et al 1998). Unpublished age dating by Impact indicates all of the mafic-ultramafic rocks in the Broken Hill area are likely to be of a similar age.

At that time, Broken Hill was located close to Jinchuan, one of the world’s largest nickel-copper-PGE deposits (>500Mt at 1.2% Ni 0.7% Cu 0.4 g/t PGM) which is also of a similar age (Figure 3). This geodynamic framework of a rising mantle plume is widely recognised as a crucial component to the formation of major magmatic nickel-copper-PGE sulphide deposits (ASX Release March 6<sup>th</sup> 2019).

The Voiseys Bay deposit also formed in a similar geodynamic environment but at an earlier time in the Earth’s history, 1.3 billion years ago.



**Figure 5.** Position of the proposed mantle plume head (red circle) responsible for the breakup of Rodinia showing the location of Broken Hill in relation to the Jinchuan and Lengshuiqing Ni-Cu- Co-PGE deposits at about 800 million years ago (after Huang et al., 2015).

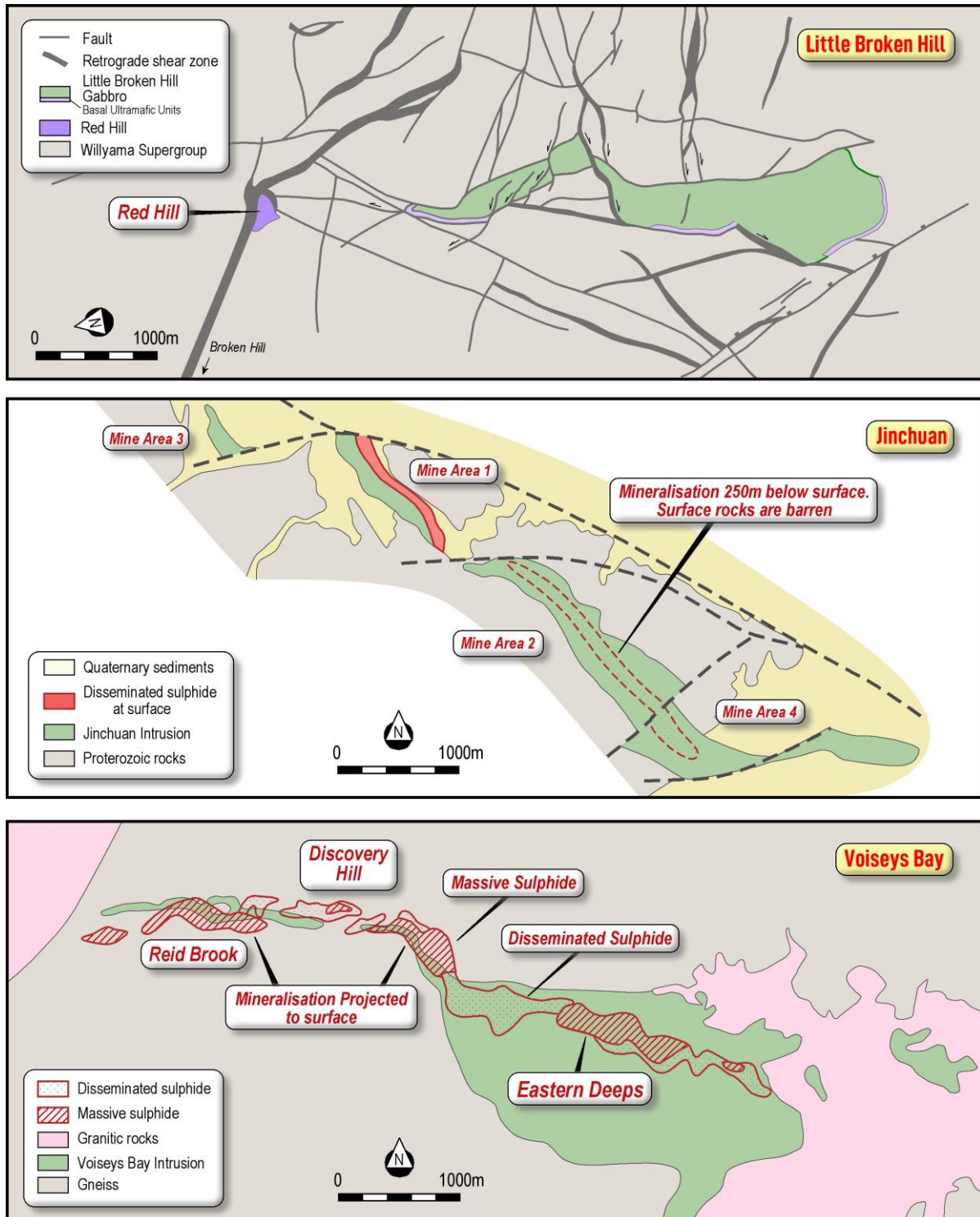
A comparison of the size of the Little Broken Hill Gabbro and the host intrusions at Jinchuan and Voiseys Bay is shown in Figure 6. The geometric similarities are obvious.

Importantly, more than 95% of the mineralisation at both Jinchuan and Voiseys Bay occurs at depths of up to many hundreds of metres below surface and the deposits are for the most part “blind”, that is, there are no surface indications of the underlying world class orebodies (Figures 4 and 6).

This is an important consideration in exploration at the LBHG as there is only one drill hole deeper than 25 metres.



Such comparisons clearly demonstrate that the LBHG has the correct scale, geodynamic setting and lack of previous exploration to host a major nickel-copper-PGE deposit.



**Figure 6.** Comparison of the Little Broken Hill Gabbro-Red Hill area with Jinchuan and Voiseys Bay. Note the similar scale and also how most of the mineralisation at Jinchuan and Voiseys Bay is at depth.



## Next Steps

A drill programme to test the Little Broken Hill Gabbro, Red Hill and Platinum Springs is due to start by the end of July (Figure 1 and ASX Release 1<sup>st</sup> July 2020).

At the **Little Broken Hill Gabbro** an extensive programme of aircore drilling will test the previously un-drilled four kilometre long part of the intrusive complex which is under shallow cover. The new interpretation described in this report has identified compelling targets related to shear zones and faults that may have been feeder zones to the intrusion and which are priority areas for follow up.

Impact has received a grant of \$75,000 from the New Frontiers Cooperative Drilling grants programme awarded by the Department of Planning, Industry and Environment of the New South Wales Government for drilling at Little Broken Hill.

At **Red Hill** a programme of RC and diamond drilling will test the along trend and down plunge extension of the exceptional nickel-copper-PGE mineralisation discovered by Impact which includes the rare PGE's rhodium, osmium, ruthenium and iridium (ASX Releases 7<sup>th</sup> May 2020 and 23<sup>rd</sup> October 2015). For example, Hole RHD012 returned:

**3.5 metres at 162.4 g/t (5.3 ounces) 7PGE comprising:**

**5.7 g/t rhodium, 2.6 g/t iridium, 2.0 g/t osmium, 1.1 g/t ruthenium, 144 g/t (4.6 ounces) palladium, 5 g/t platinum, 6 g/t gold, 2.9% nickel, 2.3% copper and 14.5 g/t silver from 67.3m down hole.**

At **Platinum Springs** a programme of aircore and RC drilling will follow up a previous drill intercept of **0.6 metres at 11.5 g/t platinum, 25.6 g/t palladium, 1.4 g/t gold, 1.3 g/t rhodium, 1.7 g/t iridium, 2.0 g/t osmium and 0.8 g/t ruthenium 7.6% copper and 7.4% nickel** returned in Impact's drill hole PSD02 (ASX Release 3<sup>rd</sup> February 2016).

Further details on the proposed drill programmes at all three targets will be reported in due course.

Statutory approvals for the drill programme are now in place for Red Hill and Platinum Springs with approvals expected shortly for Little Broken Hill Gabbro.

## COMPLIANCE STATEMENT

This report contains a new interpretation of airborne magnetic data at Broken Hill.

### Dr Mike Jones

Managing Director

*The review of exploration activities and results contained in this report is based on information compiled by Dr Mike Jones, a Member of the Australian Institute of Geoscientists. He is a director of the company and works for Impact Minerals Limited. He has sufficient experience which is relevant to the style of mineralisation and types of deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code). Mike Jones has consented to the inclusion in the report of the matters based on his information in the form and context in which it appears.*

### **AN INTERPRETATION OF THE LITTLE BROKEN HILL GABBRO (Figure 3)**

1. There are five distinct units or lobes to the LBHG recognised on the basis of their mapped geological characteristics (where exposed), differing magnetic responses, geometry and in particular cross-cutting relationships present in the magnetic data (numbered 1 to 5 in Figure 3).
2. A basal ultramafic unit is present in three of the lobes which indicates the LBHG now dips steeply to the south east.
3. The ultramafic units would originally have been at the base of the intrusion allowing the original “way up” of the body to be deduced. Rotation of the intrusion to view it in its original upright position reveals the structural geometry of the intrusion (compare Figures 2 and 3).
4. The LBHG has intruded along a major NNE trending lithological/structural contact in the older Willyama Supergroup which has been reactivated.
5. The LBHG intrusion is significantly affected by a sequence of (now) WNW trending faults that are at a high angle to the trend of the intrusion and have a normal or extensional fault geometry.
6. The extensional fault geometry is asymmetric either side of a major WNW trending fault central to the entire intrusion: one major unit to the NE (called Rockwell) and 4 units to the SW. The central part of the intrusion is thinner above a basement high (or horst).
7. The WNW trending zones are therefore likely to be feeder zones and active during the emplacement of the intrusion.
8. The units/lobes all have internal synclinal folds in them that face away from the faults. This geometry is characteristic of gravity sliding, slumping and collapse. New magma injections from the feeder zones are gravitationally unstable at the sides of magma chambers and slump down towards the middle.
9. The geometry is consistent with the entire LBHG intrusion being “pulled apart” in an NNE-SSW extension direction during the intrusion event itself. Such extension would allow the intrusion to expand laterally as more magma is injected.
10. The inferred extension direction also compatible with the intrusion of the Red Hill ultramafic (with its very high grade vein-hosted nickel-copper-PGE’s) along the Rockwell Shear. One particular fault structure (“Linking Structure”) may link or offset the Red Hill and Rockwell intrusions. These faults may be conduits for hydrothermal PGE and Ni-Cu as found at Red Hill.
11. The LBHG is more evolved than Red Hill and may have been fed by it or similar ultramafic units at depth through the identified network of feeder zones and shears.
12. The inferred extension direction from the structural interpretation is also the same as that inferred by many other workers in the scientific literature from the Gairdner dyke swarm to the west which is also related to the break-up of Rodinia at 827Ma.