GEOLOGICAL MAPPING OF THE YARRAM JV PROJECT AREA, BATCHELOR, N.T.

by R. Russell for
Territory Resources Ltd
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1 SUMMARY AND CONCLUSIONS

1.1 Summary

Mapping of the Yarram JV area has been carried out over the period 23rd to 26th January 2012. The JV area covers about 2km^2 and lies 8km north-northwest of Batchelor, N.T. The intention of the mapping is to assist in the interpretation of the results that have been obtained in earlier drilling and to recommend further exploration targets.

The mineralisation occurs in a series of brecciated siltstone, shale and dolostone horizons in the Coomalie Dolostone Formation. The breccias are composed mainly of goethite/limonite and are frequently cored with lenses of hematite. The mineralised zones appear to be associated with faults trending about 060^O. This trend is parallel to the major fault at the Batchelor mine, about 1.5km to the southeast of the JV area.

The mapping was done by collecting geological data on walking traverses in the field followed by photo-interpretation of the available orthophoto. The final map is at a scale of 1:2,500 (Enclosure 1).

The present mapping is considered to be 'preliminary'. Time was limited to two days of fieldwork. The dense vegetation and wet season heat and humidity made traversing in the area challenging. Areas in close proximity to tracks or along the old rail alignment were accessed in the present field programme.

1.2 Conclusions

The iron mineralisation appears to lie along *en echelon* fault lines in the Coomalie Dolostone Formation. The iron is a hematite/goethite/limonite breccia that forms lenses along the strike of the faults. The lenses are up to 30 metres wide and between 50 and 200 metres long. High grade hematite forms smaller lenses within the goethite breccia zones. At least seven distinct zones of mineralisation have been identified in the present mapping. The iron breccia is heavily lateritised.

Iron grades in the goethite breccias lie between 50% and 60% Fe. Iron grades in the hematite are around 65% Fe. The hematite has a low phosphorus content. In the writer's opinion, the JV area contains the potential for modest volumes of very high grade iron and larger volumes of moderate grade.

The iron formations all form topographically elevated terrain. A high proportion of the mineralised zones could be targeted by simply drilling traverses across the high ground.

2 INTRODUCTION

2.1 Map Area

Mapping of the Yarram JV area has been carried out over the period 23rd to 26th January 2012. The mapped area is located about 8km northwest of the town of Batchelor in the Northern Territory (Figure 1). The mineralisation occurs in a series of fault breccias in the Coomalie Dolostone. The mineralisation comprises hematite lenses in a goethite/limonite breccia.

2.2 Brief

The intention of the work programme is to produce a map of the JV area and surroundings that outlines the most prospective iron outcrops. Geological information on the outcrops such as strike length, dip and the nature of the mineralisation, is required. The map is to form part of the data base for planning a drill programme in the area.

Thirty rock chip samples were collected from the main iron outcrops and exposures in the area. These are numbered TRK 510 to 539 and are listed on Table 1 together with a summary of the results.

2.3 The Map

The mapping described here is based on two days field work. The bush in the area is very dense, bordering on rain forest in places, and the wet season weather was hot and humid at the time of the field visit. As a result, the mapping can only be considered to be 'preliminary'.

The map produced is at a scale of 1:2,500. The mapping was done by collecting geological data on walking traverses in the field followed by photo-interpretation of the available orthophoto (Figure 2).

2.4 Report

This report is intended to provide some background geological information, outline the rationale of the work programme and annotate the map. The map is presented at the rear of the report and is designated Enclosure 1.

3 GENERAL GEOLOGY

3.1 Stratigraphy

3.1.1 Stratigraphy from previous mapping

The Yarram JV area lies almost entirely within the outcrop area of the Coomalie Dolostone Formation ('Ppc', Figure 1). Whites Formation sandstone (Ppis) and volcanics (Ppi) are thought to outcrop in the southwestern corner of the project area. Small areas of a unit called 'Geol Sec' (Pyg) have been mapped in the eastern parts of the area. This unit is thought to be a ferruginous quartz breccia. A series of sedimentary iron formations (Sif) appear to be part of this unit. Much of the area is covered by a superficial 'laterite' layer.

3.1.2 Observed stratigraphy

The writer did not see much of the above stratigraphy. Exposure is very poor due to the laterite cover, an extensive sheet of colluvium, deep weathering and thick vegetation. Natural exposures are confined to hematite lenses on high ground and low outcrops of the more massive laterites.

Massive medium-grained sandstone is exposed in a cutting in the old railway alignment. However, it is so massive that dip and strike are difficult to measure. Other sedimentary units in the area do not outcrop although the vegetation is so dense that natural outcrops may be obscured.

3.1.3 Trenches

Old trenches from earlier exploration provided some exposures of the geology (Photograph 3). Five trenches were visited in the northwest of the JV area while a further two trenches were used in the mapping on the main track nearer the centre of the project. Although heavily overgrown, the exposures in the trenches are still useful. Three general observations were made from the work in the trenches:

- It appears that the only near-surface solid geology is associated with the iron units. The hematite forms only a part of the iron formations and represents lenses within goethite/limonite breccia (Figure 3).
- The iron breccias are flanked by sheets of laterite (ferricrete) that grade into nodular immature laterite and then pisolitic laterite with distance from the outcrops.
- Deep matrix-supported colluvium is common and underlies most of the lower-lying topography in the JV area.

3.1.4 Gravel pit

A large gravel pit is excavated in the southeast of the area (Photograph 4). The pit represents the best exposure of superficial units in the JV area and was mapped in some detail. However, little useful information with regard to iron was obtained here. Bedrock units were possibly exposed in the northwest of the pit (Photograph 5). These sites were sampled and returned good to moderate iron grades (57% and 54%) with

high phosphorus (around 0.38%; Sample sites TRK 521 and 522, Table 1). The rest of the gravel pit contained massive, nodular and pisolitic laterite with no indications of bedrock exposure.

3.1.5 Old rail alignment

Cuttings along the old rail alignment also provide some useful exposures (Photographs 6 and 7). The general pattern of the iron formations is confirmed in the northern part of the alignment where a goethite breccia is exposed adjacent to a hematite outcrop. Massive medium-grained sandstone (see paragraph *3.1.2* above) is exposed in this part of the rail alignment.

Low grade goethite/laterite breccias are exposed further south (TRK 516, Table 1). Hematite float in the surrounding colluium suggests that this goethite zone contains some hematite lenses but the outcrop could not be found in the dense vegetation.

4 THE MAP

4.1 Construction of Map

The map of the area was constructed from two days of field traversing supported by photo-interpretation. Field conditions were very warm and humid. Vegetation was high so the visibility of rock outcrops was restricted. Hostile insects were also a problem which provided a further challenge to the field work.

The present interpretation is made only from the field traversing and photo-interpretation. Old drill results are available but these were only used as a general guide to the mapping. The map is presented here as Enclosure 1. The original is a neat pencil-drawn working draft.

The map is essentially an incomplete fact-map of outcrop. Traverses were completed in the field where access was available: along roads and tracks, in old trenches, the old rail alignment and the gravel pit. Geological and geomorphological features were noted in these features and a GPS reading of northings and eastings recorded. This information was then transferred onto transparent overlays. The maps were completed by photo-interpretation between these 'field-truth' lines. The photograph used was a geometrically correct ortho-photo (Figure 2) that had been enlarged to a scale of 1:2,500 for the purposes of this work.

4.2 Map Description

The map represents an interpretation of the geology in areas that the writer was able to visit during the field work. Some of the mapping is outside of the JV area.

4.2.1 Iron formations

The iron formations appear to form distinct zones trending primarily about 060^{O} NE. A secondary trend towards the NW at about 320^{O} may occur in the west of the area. There appears to be tight folding within the zones. Dip of the zones is difficult to measure in the field as they generally comprise breccia. However, the overall dip appears to be toward the northwest.

The iron formations appear to be goethite/limonite breccias containing lenses of high grade hematite (Figure 3). The units are lateritised. Massive sheets have developed in close proximity to the goethite. The laterite then grades into nodular and then pioslitic laterite with distance from the iron formations. The iron zones are irregular and may be *en echelon*. They appear to form lenses about 30 metres wide and up to 200 metres long. At least 7 mineralised zones are identified.

In the writer's opinion, the mineralisation is likely to have originated as fault breccias on faults splaying off the main NE trending fault zone at the Batchelor Mine some 1.5km to the southeast of the JV area. The fault zones have subsequently been invaded by iron-rich solutions. Successive episodes of enrichment have resulted in the formation of the hematite. The enrichment of the whole of the breccia zones is incomplete at present.

4.2.2 Earlier drilling

The iron formations where the earlier drilling has been carried out in the central-eastern part of the JV area was visited only briefly by the writer. Vegetation was very thick, field conditions were difficult and little could be seen of the bedrock geology. The interpretation on the present map in the area of earlier drilling is taken from the high and medium-grade drill hits. It is stylised, representing the approximate pattern of hematite and goethite with depth, and does not represent the outcrop geology.

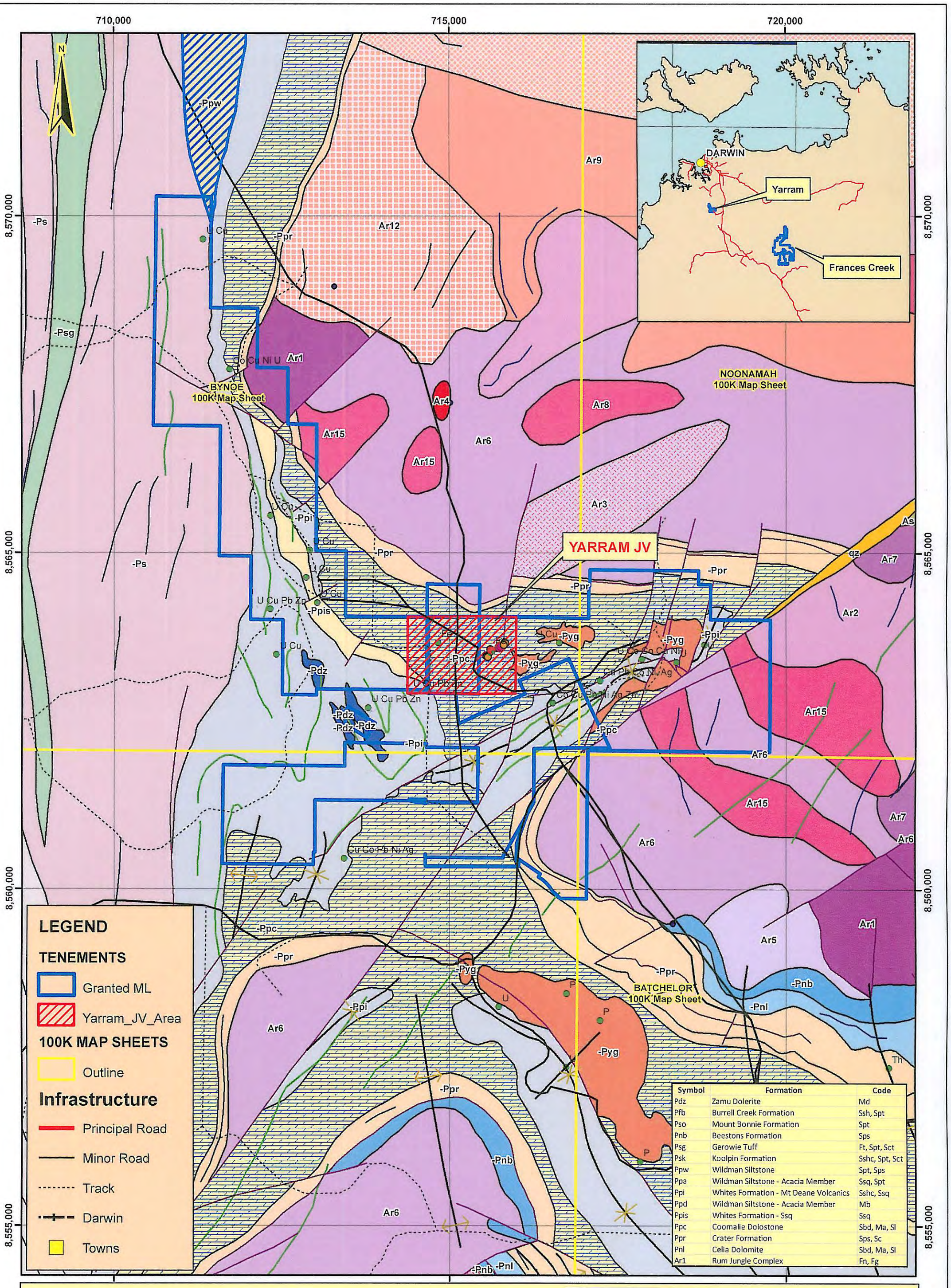
4.2.3 Target zones

Virtually all of the mineralised zones seen by the writer occupy topographically high ridges. Vegetation is relatively dense on these ridges due to the trapping effect of the iron formations on groundwater. In the writer's opinion, it is likely that most of the iron will outcrop or subcrop on high ground. Drilling the topographic highs will cover most of the better targets in the JV area.

Other target areas have been identified where high vegetation coincides with NE or NW trending lineations on the imagery. These are termed 'possible target zones' (Enclosure 1) where further mapping is required.

4.2.4 Recommended drill traverses

Drill traverses are recommended over the iron zones in the central and northwestern parts of the JV. Two 'possible' traverses should also be considered in the northeastern corner of the area to extend the earlier drilling in this direction.



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DECEMBER 2011

Figure 1 Location of the Yarram JV Area

Symbol	Formation	Code
Pdz	Zamu Dolerite	Md
Pfb	Burrell Creek Formation	Ssh, Spt
Pso	Mount Bonnie Formation	Spt
Pnb	Beestons Formation	Sps
Psg	Gerowie Tuff	Ft, Spt, Sct
Psk	Koolpin Formation	Sshc, Spt, Sct
Ppw	Wildman Siltstone	Spt, Sps
Ppa	Wildman Siltstone - Acacia Member	Ssq, Spt
Ppi	Whites Formation - Mt Deane Volcanics	Sshc, Ssq
Ppd	Wildman Siltstone - Acacia Member	Mb
Ppis	Whites Formation - Ssq	Ssq
Ppc	Coomalie Dolostone	Sbd, Ma, Sl
Ppr	Crater Formation	Sps, Sc
Pnl	Celia Dolomite	Sbd, Ma, Sl
Ar1	Rum Jungle Complex	Fn, Fg

LEGEND

TENEMENTS

Granted ML

Yarram_JV_Area

CADASTRAL

Cadastral

TERRITORY RESOURCES LTD
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JANUARY 2012

0 500 1,000 m

Figure 2 Air Photograph Imagery of the Yarram Project Area

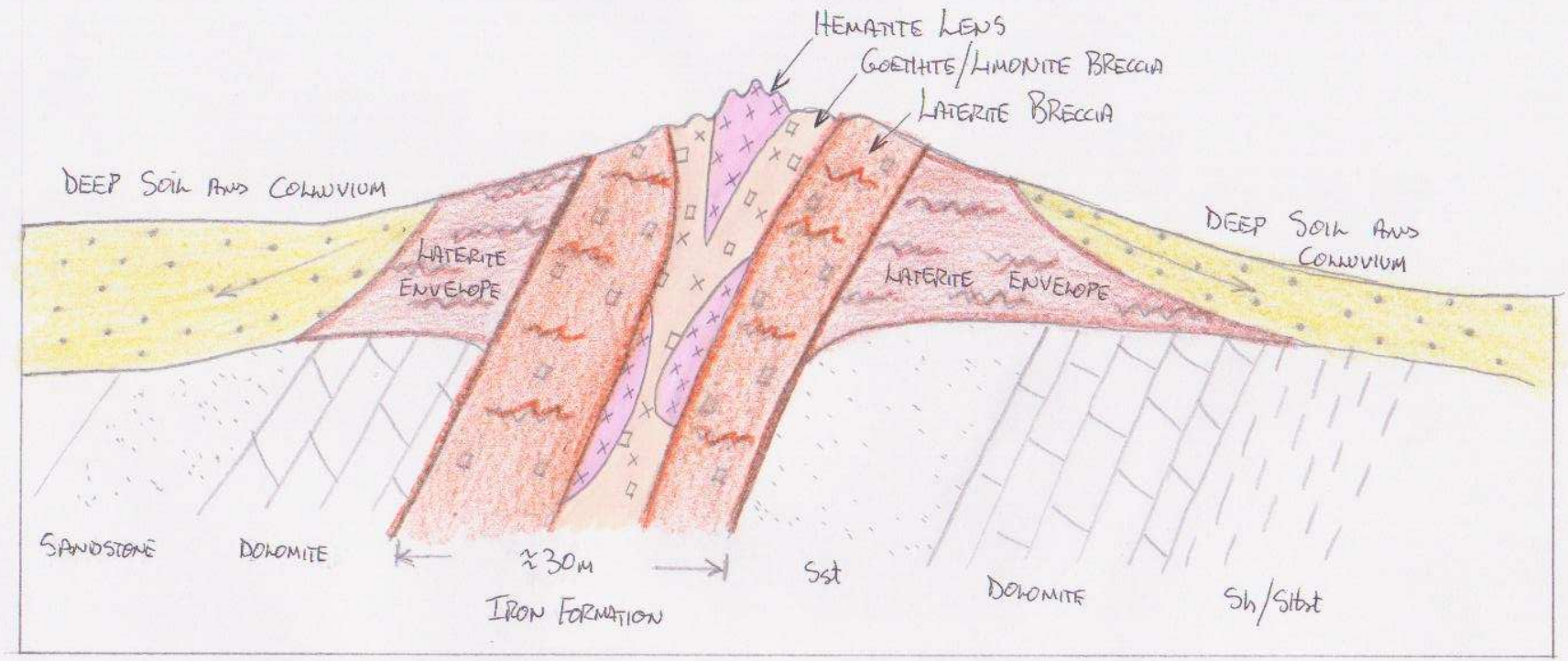


Figure 3 Schematic Geological Cross Section, Iron Mineralised Zones

Table 1 Sample Sites, Yarram JV collected by R. Russell January 2012.

Field No.	TRK No.	Easting	Northing	Lithology	Fe%	SiO_2%	Al_2O_3 %	P%	LOI%	Comments
R1	**510**	714662	8561710	Cherty goethite breccia	25.6	57.7	1.14	0.26	4.28	Southern road cutting on bitumen road. Outside JV area
R2	**511**	714661	8562814	Hematite in goethite breccia	65.6	2.22	0.74	0.07	2.29	Big road cutting on S boundary of lease. Complex breccias.
R3	**512**	714683	8563774	Hematite in goethite breccia	56.7	2.56	0.99	0.3	9.9	Road cutting on bitument road near corner of Keane and Kerle properties. Complex breccia zone with laterite sheath.
R4	**513**	714683	8563756	Goethite breccia	58.9	2.77	1.82	0.16	10.1	
R5	**514**	714422	8563750	Goethite breccia	52.2	9.86	3.65	0.48	9.77	On fenceline between Keane and Kerle properties in west
R6	**515**	715128	8563696	Hematite	61.5	2.79	1.3	0.24	6.82	Knobbly outcrop to W of railway access track
R7	**516**	715126	8563366	Goethite/hematite breccia	53.7	6.2	5.04	0.24	11.3	In railway cutting, near fallen tree
R8	**517**	715200	8563764	Goethite breccia	61.5	2.06	1.23	0.16	7.01	In costean to NE of rail/road crossing. Low grade
R9	**518**	715250	8563710	Hematite	59.7	2.43	1.22	0.2	9.44	Hematite pod to south of costean
R10	**519**	715321	8563358	Hematite	68.1	0.84	0.65	0.02	0.86	Costean on W side of track near old gravel pit. V high grade.
R11	**520**	715436	8563436	Hematite	67.6	1.09	1.09	0.02	0.87	Rubble in jungle to E of access track.
R12	**521**	715448	8563194	Goethite/limonite breccia	57.3	2.71	2.33	0.39	10.6	Laterites in old gravel pit. Hard floor of pit probably bedrock?
R13	**522**	715480	8563186		54.1	6.66	3.2	0.37	10.9	
R14	**523**	715984	8563000	Goethite/limonite breccia	50.2	6.29	7.84	0.39	10.8	Fence corner traverse. Laterites form strong ridge on Fe bedrock?
R15	**524**	716254	8563220	Hematite boulder	66.4	1.71	1.36	0.03	1.03	Rise on fenceline traverse in E. Hematite float in thick bush
R16	**525**	716275	8563248	Hematite float	58.3	1.71	2.06	0.76	9.24	
R17	**526**	716284	8563216	Hematite in laterite	67.9	0.86	0.49	0.02	0.56	Thick bush, rise on fenceline traverse
R18	**527**	714972	8563804	Hematite	58.1	3.17	2.63	0.2	10.7	N end of trench 2
R19	**528**	714958	8563742	Hematite	65.3	2.31	1.18	0.07	2.7	Outcrop forms lens on W side of trench 2. Strike 060°.
R20	**529**	714961	8563730	Hematite	60.8	1.71	1.27	0.16	9.17	Outcrop exposed in trench 3
R21	**530**	714902	8563700	Iron laterites	57.6	4.52	2.17	0.12	9.85	Exposed in trench 3
R22	**531**	714924	8563770	Hematite	62.5	2.17	1.31	0.1	5.65	Outcrop to the E of trench 3. Lens.
R23	**532**	714840	8563822	Hematite	57.9	4.59	1.72	0.24	9.39	Lenticular outcrop to the W of trench 4. Strike 070°.
R24	**533**	714858	8563764	Hematite	62.1	1.96	1.01	0.14	7.37	Hematite outcrop E of trench 4, lens is 3 x 10m
R25	**534**	714864	8563678	Hematite	66.6	1.09	0.55	0.08	3.13	Hi grade hematite in laterite outcrops to E of trench 4.
R26	**535**	714781	8563774	Hematite	59.8	2.56	1.65	0.3	8.5	Composite. Hematite lens to W of trench 5
R27	**536**	714772	8563824	Hematite	57.4	1.53	1.07	0.42	9.61	High grade. Big lens outcrops to W of trench 5
R28	**537**	715001	8563678	Hematite	60.4	2.31	0.7	0.22	9.46	Lenses outcropping to the W of trench 1
R29	**538**	715007	8563734	Hematite	59.5	3.24	2.43	0.14	7.91	
R30	**539**	715024	8563812	Hematite float	59.7	4.29	2.54	0.17	7.34	Hematite subcrop somewhere here. N end of trench 1

Trenches between railway and bitumen road

Photograph 1 The goethite breccias exposed in the road cutting on the SW boundary of the JV area. The hammer rests on a hematite boulder and the dip is towards the left (south).

Photograph 2 The hammer rests in a zone of hematite boulders forming a breccia in the same road cutting as Photograph 1. Hematite boulders can be seen forming a layer of float at the surface.

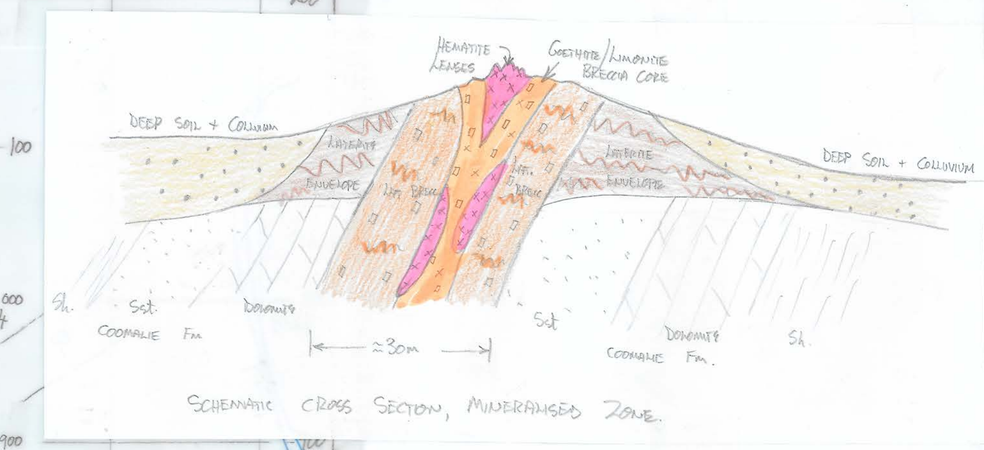
Photograph 3 One of the old trenches in the NW part of the JV area. The trenches are overgrown but generally still standing.

Photograph 4 A bedrock bar in the NW end of the gravel pit. The well-developed laterite makes identification of bedrock uncertain.

Photograph 5 Iron nodules in the laterite of the gravel pit. This material returned moderate iron grades of 57% and 54% Fe (Samples TRK 521 and 522, Table 1).

Photograph 6 A cutting in the old rail alignment. Although heavily overgrown, much of the superficial geology is still exposed in these cuttings.

Photograph 7 Nodular laterite in a cutting on the old rail line. Cobbles and boulders of hematite float (background) also occur which suggests that there is an outcrop of this material in the immediate vicinity.



KEY

STRUCTURE and MORPHOLOGY

- Scarp
- Strike of beds
- Steep to shallow
- Break of Slope
- Shallow to steep
- Lineation, possible bedding plane or joint
- Major Ridge Crest
- Possible Fault Block on downthrow side
- Dip and Strike
- Antiform
- Synform

OUTCROP/SUBCROP

- Hematite
- Goethite/limonite Breccia
- Laterite Breccia Low in iron
- Laterite Sheet; Mainly ferricrete
- Deep Residual Soil Contains colluvial debris
- Sandstone

OTHER

- Anomalous High Trees
- High Grass
- Possible Target Zone Further mapping required
- Drill Traverse
  - Possible
  - Recommended
- Creek
- Cultural: mine workings, pits, tracks, roads

N

50 40 30 20 10 0 50 100 150 200 METRES

SCALE 1:2,500

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GEOLOGICAL MAP OF THE

YARRAM PROJECT AREA, BATCHELOR, N.T.

By R. Russell January 2012

Scale 1:2,500

ENCLOSURE 1