Iron Bridge

Pityrodia sp. Marble Bar Infrastructure Plan

North Star Magnetite Project

February 2020
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	Pityrodia sp. Marble Bar Infrastructure Plan		**662NS-5530-PL-EN-0001**
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1. CONTEXT, SCOPE AND RATIONALE

This *Pityrodia* sp. Marble Bar (*Pityrodia* sp. MB) Infrastructure Plan (the Plan) has been prepared by IB Operations Pty Ltd (IBO) to demonstrate that the mine and associated infrastructure within the Mine Development Envelope (MDE) has been located to avoid or minimise the direct loss of *Pityrodia* sp. MB for the Iron Bridge Magnetite Project (the Project).

This Plan has been prepared to ensure compliance with Conditions 6-1 and 6-2 of Ministerial Statement (MS) 993.

1.1 The Proposal

IBO is a joint venture company between FMG Iron Bridge (Aust) Pty Ltd and Formosa Steel IB Pty Ltd. IBO proposes to develop and manage the Project which is located approximately 110 km south of Port Hedland in the Pilbara Region of Western Australia (WA) (Figure 1).

The Project will mine approximately 30 Mtpa of magnetite ore, which will be processed on site and transported to Port Hedland for export. The ore will be crushed and further processed onsite to produce a magnetite product, dry process rejects and wet tailings. All tailings will be sent to a dedicated tailing storage facility (TSF) and mine waste will be sent to a waste rock dump (WRD). Magnetite concentrate will be delivered to Port Hedland via a slurry pipeline and exported through the Port Hedland Inner Harbour. The Project has received Ministerial approval (MS 993) under Part IV of the EP Act and has been approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act; EPBC 2012/6689).

The Project is being implemented in two stages, with Stage 1 now fully constructed. Evidence of substantial commencement of Stage 2 was provided to DWER on 5 August 2019. This has included construction of:

- An aerodrome and associated access road
- Expansion of the North Star accommodation village
- Construction of the water pipeline
- Development/ widening of the existing site access road.

1.1.1 Stage 1

Stage 1 (Hematite) was referred to the EPA as a discrete proposal under the EP Act on 2 July 2012. On 6 August 2012, the EPA determined that the Stage 1 proposal did not require formal environmental impact assessment (EPA ref: A520691).

1.1.2 Stage 2

Stage 2 of the Project (Magnetite) was assessed by the EPA under a Public Environmental Review (PER). The assessment considered the potential for the Project to impact on the then Priority 1 species *Pityrodia* sp. Marble Bar (G.Woodman & D.Coultas GWDC Opp 4) (*Pityrodia* sp. MB), which subsequent to the EPA's assessment, was re-classified to Threatened Flora[1]. EPA stated in its Report and Recommendations that Stage 2 of the Project could be managed to meet the EPA's objective for flora and vegetation subject to a number of conditions. Stage 2 of the Project received Ministerial approval on 5 January 2015 under MS 993.

Stage 2 of the Project was also granted approval under the EPBC Act on 6 February 2015 and conditions were placed on the Project as outlined in EPBC 2012/6689. None of the conditions specifically relate to *Pityrodia* sp. MB, which at the time of assessment was not listed as a threatened species. It was subsequently listed as Endangered under the EPBC Act on 11 March 2018[2].

1.1.3 Associated Infrastructure

Condition 6-2 (1) refers to "associated infrastructure". Associated infrastructure is to be developed to support mining operations, which may include the following:

- Gas fired power station;
- Concentrate handling facilities;
- Roads and pipelines;
- Water processing, ponds and reticulation;
- Bulk fuel storage;
- Workshops and maintenance facilities;
- Laydown and storage facilities;
- Explosives and chemical storage;
- Camp and administration buildings; and
- Aerodrome and associated roads.

[1] Under the Wildlife Conservation (Rare Flora) Notice 2017.

[2] Under *Pityrodia* sp. Marble Bar (G.Woodman & D.Coultas GWDC Opp 4) Conservation Advice

1.2 Condition requirements

Table 1 details the requirements of Condition 6 of MS 993 and references the section of this Plan where those requirements are addressed.

Table 1: Condition 6 of MS 993

MS 993 Condition No.	Details	Relevant Section(s) of this Plan
6-1	Prior to the disturbance of any individuals of *Pityrodia* sp. MB within the Mine Development Envelope (MDE), the proponent shall prepare and submit a *Pityrodia* sp. MB Mine Infrastructure Plan to the CEO.	The development and submission of this Plan addresses this requirement
6-2	The *Pityrodia* sp. MB Mine Infrastructure Plan required by condition 6-1 shall: (i) demonstrate that mine and associated infrastructure within the MDE will be located to avoid or minimise the direct loss of *Pityrodia* sp. MB, as far as practicable; and (ii) include spatially accurate, rectified and geographically referenced data and maps showing the location of the mine and associated infrastructure within the MDE.	Section 2.1.3, Figure 2 Appendix 1

2. RATIONALE AND APPROACH

2.1 Survey and study findings

Baseline surveys have informed the management approach presented to address Condition 6 of MS 993. The following surveys have been conducted and were deemed to be relevant to this Plan:

- A two-phase flora and vegetation survey was undertaken for the Project Mine Development Envelope (MDE) between April and September 2011 (ecologia Environment, 2012a; Appendix 1);
- A targeted *Pityrodia* sp. MB flora survey was carried out in April 2012 (ecologia Environment, 2012b; Appendix 2);
- A *Pityrodia* sp. MB regional survey was conducted in September 2015 (ecologia Environment, 2016; Appendix 3) in accordance with the *Pityrodia* sp. MB Regional Survey Plan (ecologia Environment, 2014), which was submitted as per Conditions 7-2 to 7-4 of MS 993 and approved by DWER in March 2015; and
- A detailed (two phase) flora and vegetation survey was conducted by Ecoscape in 2018 (Ecoscape, 2018; Appendix 4) over the Glacier Valley area, to build on previous data. The Glacier Valley area lies to the south-east of the MDE. As part of this survey, all *Pityrodia* sp. MB populations already known from the previous studies above were reconfirmed and additional targeted searches were conducted in areas of potential habitat.

The ecologia Environment (2012a) study found that *Pityrodia* sp. MB was relatively abundant, with 541 plants recorded from 14 loci (representing 14 populations separated by more than 500 m) within the study area. The targeted survey (ecologia Environment, 2012b) found a total of 688 *Pityrodia* sp. MB plants from 10 loci.

The *Pityrodia* sp. MB regional survey (ecologia Environment, 2016) recorded 2,114 new locations of *Pityrodia* sp. MB, representing 7,473 previously unrecorded mature individuals, with an additional 269 juveniles and 45 seedlings recorded. Based on all known records of *Pityrodia* sp. MB, there was an estimated 9,848 individuals recorded (including 9,534 mature individuals, 269 juveniles and 45 seedlings) (ecologia Environment, 2016) representing 67 populations separated by at least 500 m.

The Glacier Valley Extension Flora and Vegetation Survey (Ecoscape, 2018) located one additional *Pityrodia* sp. MB plant within 200 m of the single plant associated with Population 12. Six new populations (designated Populations 69 to 74) were recorded from the survey area, totalling 259 plants, plus two additional populations recorded outside of the survey area (designated Populations 75 and 76) totalling seven plants. The total number of new plants recorded from this survey was 267 (including plants outside the Glacier Valley survey area), increasing the total number of known *Pityrodia* sp. MB plants to 10,115.

2.1.1 Key Population Assumptions

Following integration of the locations recorded during survey and studies mentioned above and reconciliation of existing datasets, the total number of known *Pityrodia sp. MB* plants is currently 10,115, from 76 populations (Ecoscape, 2018). *Pityrodia* sp. MB also appeared to be strongly associated with the Capricorn Land System (ecologia Environment, 2012b), however the majority of records from the Glacier Valley Extension Survey were located on the Talga Land System where it has not previously been recorded.

Additional *Pityrodia* sp. MB individuals are likely to be recorded adjacent to known records. Given this, the overall population of *Pityrodia sp. MB* is likely to be larger than currently estimated (Ecoscape, 2018).

2.1.2 Design Approach

The mine and associated infrastructure within the Project MDE was planned and located by following the hierarchy of mitigation. As per Condition 6-2, this Plan is to include avoid or minimise the direct loss of *Pityrodia* sp. MB populations within the MDE. The change from the Rev 0 submission is brought about by progression of engineering design which clarifies the number of impacted plants.

Mine Pits, Run of Mine (ROM) and Waste Rock Dumps (WRDs)

The mine will include multiple pits and ROM that will not disturb any known locations of *Pityrodia* sp. MB plants. The mine pits were designed based on geotechnical information to limit the size of the pits to as low as practicable.

The WRD east of the pits was located as close to the pits as possible to minimise the length of haul roads, and therefore reduce the total disturbance footprint. The WRD placement will not disturb known *Pityrodia* sp. MB plants.

Tailings Storage Facility (TSF), Return Water Pond and Dry Rejects Stockpile

The TSF and return water pond have been located and designed to take into account the topography of land within the MDE. However, due to the constraints of available low-lying area within the mine tenement boundary, the return water pond TSF will disturb approximately 52 individuals from Population 43 and the TSF will disturb 161 individuals from Populations 5, 7, 43 and 46 representing 0.51% and 1.59% of the total known number of *Pityrodia* sp. MB respectively (see Table 2 and Figure 2).

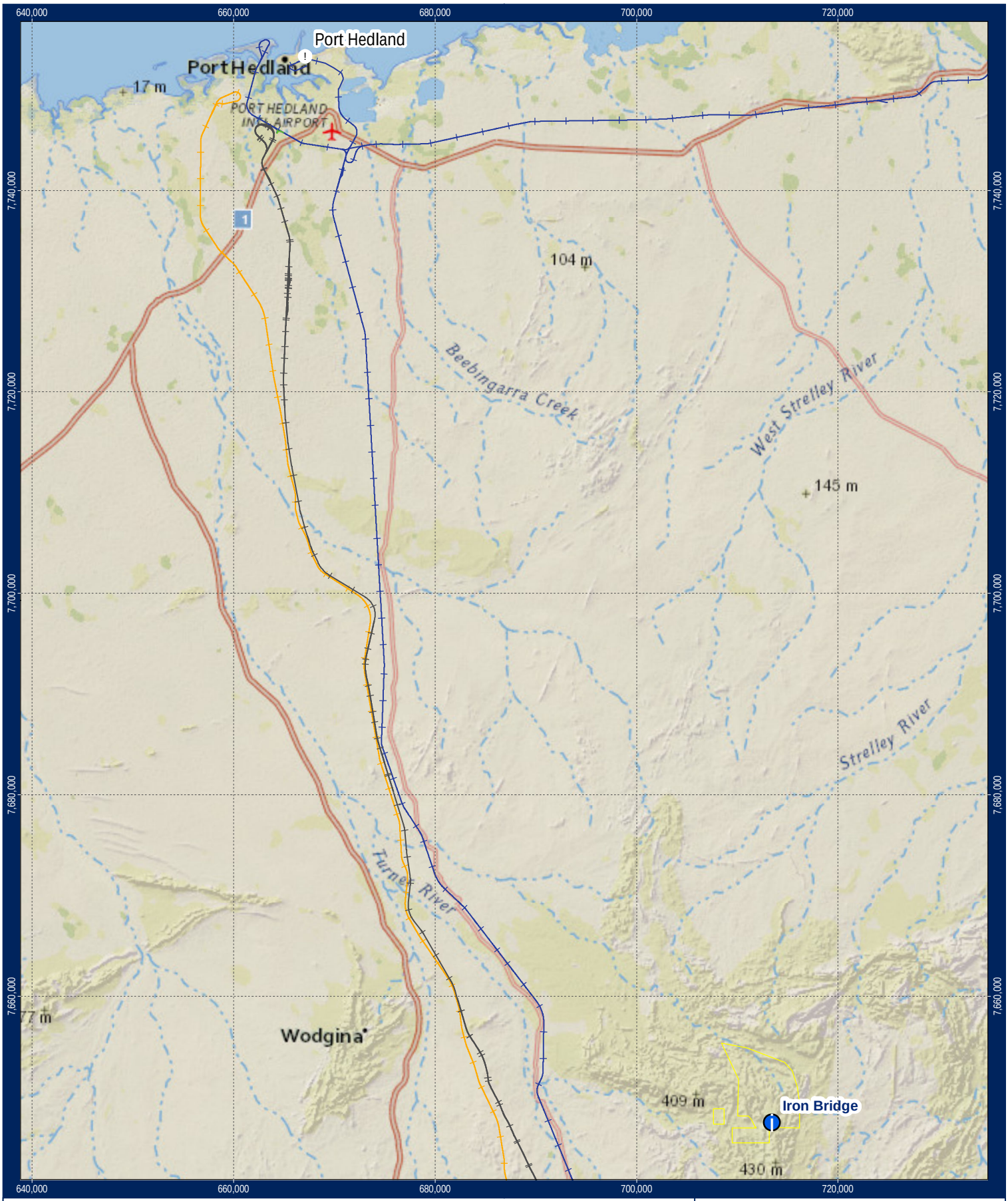
Processing Plant, Roads and Pipelines

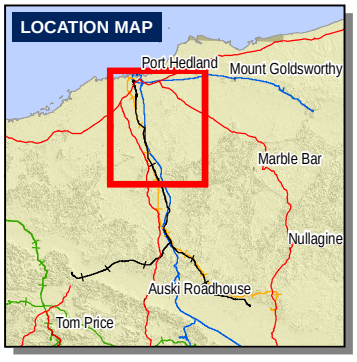
The linear infrastructure for the Project, such as roads and pipelines, have a higher degree of flexibility to avoid *Pityrodia* sp. MB plants. IBO has utilised existing disturbed tracks and other areas as far as practicable for new roads and pipelines. Due to topographical constraints approximately 127 *Pityrodia* sp. MB individuals will be disturbed from populations 5,43 and 76 in association with the Haul Roads, which represents 1.18% of the total known number of individuals (see Table 2).

Table 2: Approximate number of individuals to be disturbed within MDE (including 5 m buffer)

Design Element	Pop. 5	Pop. 7	Pop. 43	Pop. 46	Pop. 76	Total	Percent of known individuals
TSF	70	66	22	3	-	161	1.59%
Return water pond	-	-	52	-	-	52	0.51%
Haul road	10	-	116	-	1	127	1.26%
					Total	**340**	**3.36%**

Figure 1: Regional Location Map





LEGEND

- Towns
- Iron Bridge Project Area
- FMG Rail Alignments
- BHPB Rail
- Rio Tinto Rail
- Roy Hill Rail
- Mining Area Development Envelope

Data Source(s):
Topography; Esri, 2019
All other data, FMG, 2016

0 5 10 15 20
Kilometres

Project Location
Iron Bridge
Map 1 of 3

Requested By: M. Morris
Drawn By: N. Rappa
Revised By: nrappa
Approved By: P. Mastalir
Scale: 1:500,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: 662NS_0000_MP_EN_0014.001_r0

Date: 17-Apr-19
Size: A4P
Revision: 0
Confidentiality: 0

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Figure 2: *Pityrodia sp. Marble Bar* records from within the Mine Development Envelope

696,000 700,000 704,000 708,000 712,000 716,000

7,656,000 7,652,000 7,648,000 7,644,000

Inset 1

Population: 43

Inset 2

Population: 43

Inset 3

Population: 43

Inset 4

Population: 46

Inset 1 Inset 2 Inset 3 Inset 4

43 46 5 44 7 50 10 76 47 72

LOCATION MAP

Port Hedland, Dampier, Karratha, Mount Goldsworthy, Marble Bar, Nullagine, Auski Roadhouse

LEGEND

- Road
- Minor Track

Pityrodia sp. Marble Bar

- Directly Impacted
- Indirectly Impacted

- Infrastructure Development Envelope
- Mining Area Development Envelope
- Pityrodia sp. Marble Bar Populations

Data Source(s):
Aerial Imagery: Landgate
All other data: FMG, 2018

0 500 1,000 1,500 2,000
Meters

Requested By: F. Joubert
Drawn By: N. Rappa
Revised By: nrappa
Approved By: P. Mastalir
Scale: 1:60,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: 662NS_0000_MP_EN_0082_r1

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Avoidance of Pityrodia sp. Marble Bar in Mining Development Envelope

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Appendix 1: Spatial Data

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