



18 July 2018

RE: Eliwana Banded Mulga Community Assessment

Matthew Dowling
Senior Environmental Advisor - Approvals
Fortescue Metals Group Ltd

Dear Matthew,

Spectrum Ecology carried out the Eliwana banded mulga community assessment on the 2nd and 4th June 2018. Please find attached the results from this survey.

Please contact me if you require any further information in relation to the attached.

Yours sincerely,
Melissa Hay
Senior Ecologist

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INTRODUCTION

Vegetation community *AanCHf* (*Acacia 'aneura'* low open woodland over *Chrysopogon fallax* mid sparse tussock grassland) has previously been mapped across 23 polygons representing a total area of 2,714 ha along the proposed Eliwana rail alignment. Prior to the field survey, two areas, representing 1,414 ha were recorded as including areas of “banded mulga”, which are potentially sheet-flow dependent and therefore could be vulnerable to changes in surface water flow. These polygons were categorised based on the pattern of vegetation distribution (such as banded versus not banded) and if the landscape position is favourable for sheet flow (such as open plains versus constrained drainage lines).

Fortescue Metals Group Ltd (Fortescue) commissioned Spectrum Ecology Pty Ltd (Spectrum Ecology) to visit two areas within these polygons that were designated as “uncertain” (one southern and one northern), to determine if they contained banded mulga and could be susceptible to changes in surface water flow. These areas are mapped on Figure 1.

METHODOLOGY

Spectrum Ecology’s Senior Botanist, Melissa Hay, carried out the banded mulga community assessment on the 2nd and 4th June 2018. Twenty-nine mapping notes were undertaken in areas previously mapped as “banded mulga”, in order to determine sheet flow dependence, and these are mapped on Figure 1.

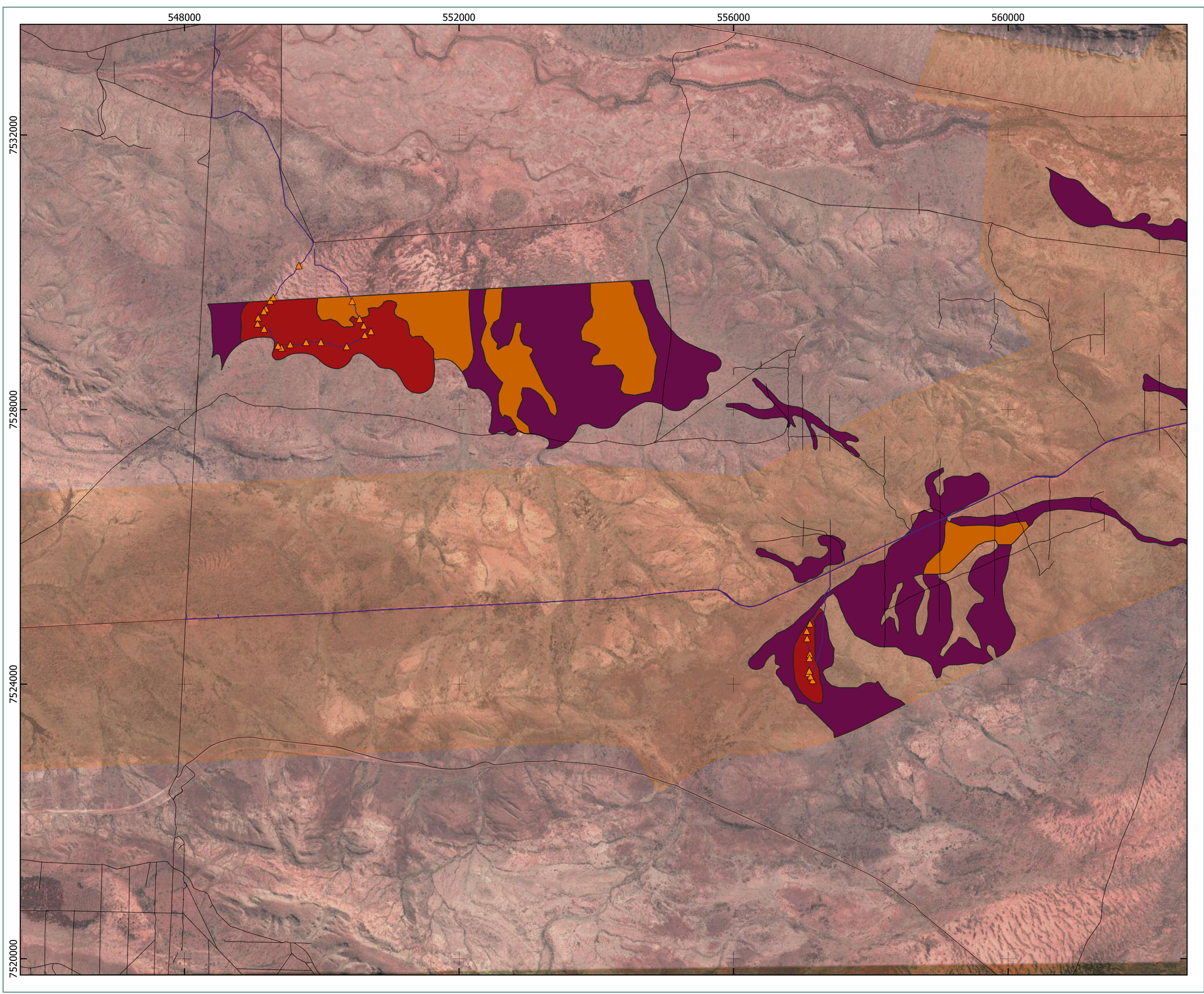
The following information was recorded at each mapping note:

- Botanist;
- Date;
- Mapping note code;
- GPS coordinate;
- Photograph (if required);
- Landform, geology and soil description;
- Notes on banding;
- Time since fire; and
- Vegetation condition (after Trudgen 1991).

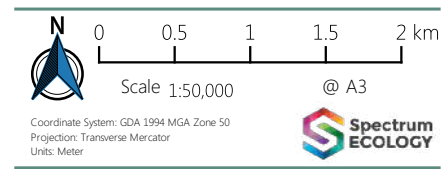
Data collection and field survey methods were consistent with Fortescue’s *Flora and Vegetation Assessment Guidelines (100-GU-EN-0005)*. All survey data is provided in accordance with Fortescue’s *Geographic Information Systems and Raw Data Guidelines 100-GU-EN-0009* and is included electronically with the report.

Limitations

The “uncertain” section within the southern area was recently burnt at the time of the survey making observation of banded patterning, or lack thereof, more difficult in this area. There were however, small unburnt patches in this area that displayed the non-banded patterning to allow confirmation of the non-banded patterning in this area. There were no other limitations identified for the survey.



- Legend**
- Rail Development Envelope
 - Existing tracks
 - Traverse
 - Mapping Note
- Banded Mulga Assessment Categories**
- Banded Mulga
 - No bands
 - Uncertain



Author: Melissa Hay Date: 16/07/2018

Mapping Notes, Traverses and Mulga Categories

Eliwana Banded Mulga Assessment

RESULTS AND DISCUSSION

Data collected at each mapping note, including banding information and coordinates are listed in Appendix 1. Site information and shapefiles of the updated mulga mapping are included electronically with the report. The southern and northern areas are discussed separately below.

Southern Area

The “uncertain” section of the southern area was recently burnt at the time of the survey and was characterised by large areas of open clay pans with little mulga regrowth. This area showed some evidence of surface water flow, with small flow lines seen from the hill to the east, however these were more obvious and likely exacerbated because of the recent burn. There were bare areas seen within the unburnt sections, however these were relatively small and not obviously banded (Figure 2).

The “uncertain” section within the southern area was therefore characterised as non-banded mulga. One polygon of banded mulga remains mapped within the southern area over approximately 52 ha. The mulga communities have been re-mapped on Figure 4.

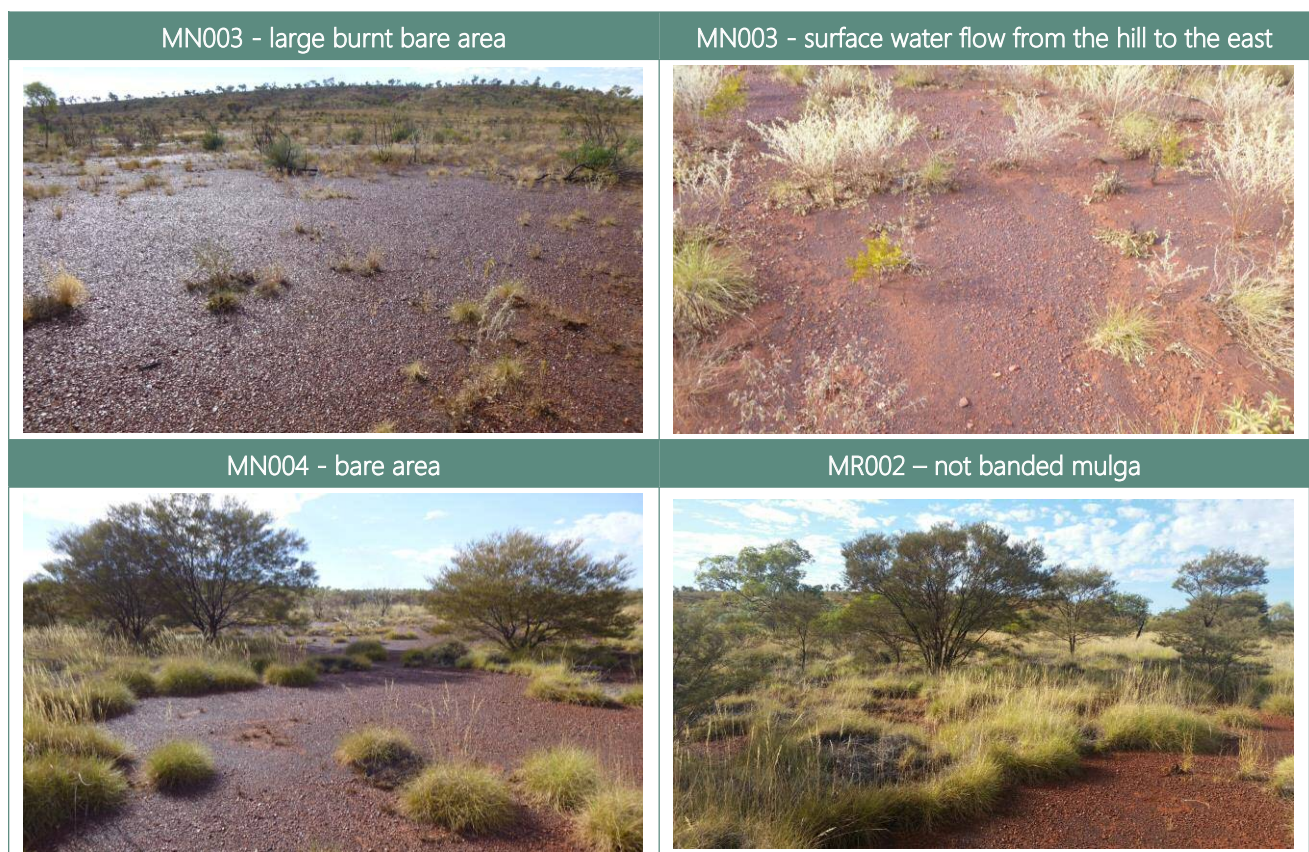


Figure 2: Banded Mulga Assessment – Southern Area Photographs

Northern Area

The northern area was a transition zone between the banded and non-banded mulga. Some areas displayed obvious banding and others were clearly non-banded. The areas between these were transition zones and were mostly non-banded but with some linear bare areas present, indicative of banding (Figure 3).

The “uncertain” section within the northern area has therefore been modified and is mapped in Figure 4. Three polygons of banded mulga remain in the northern section accounting for approximately 368 ha (Figure 4).

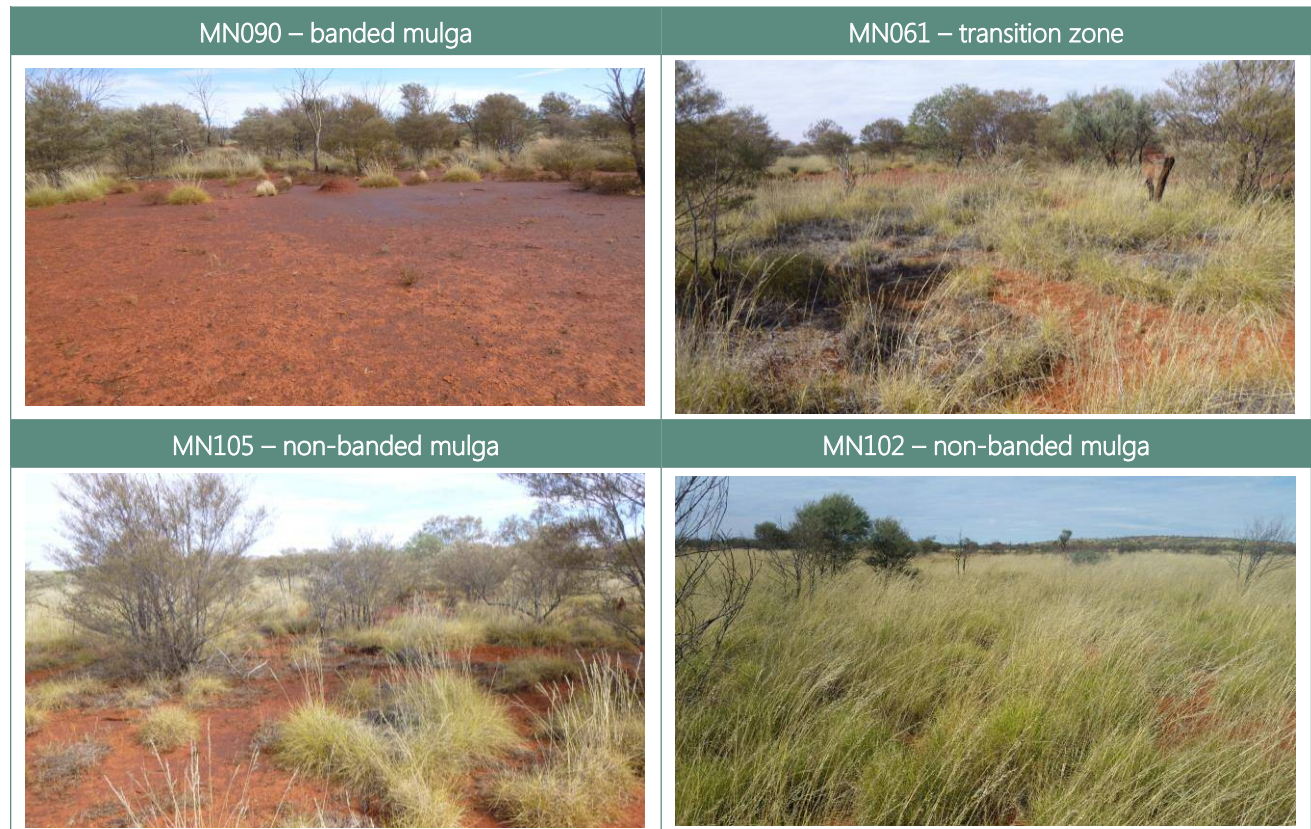
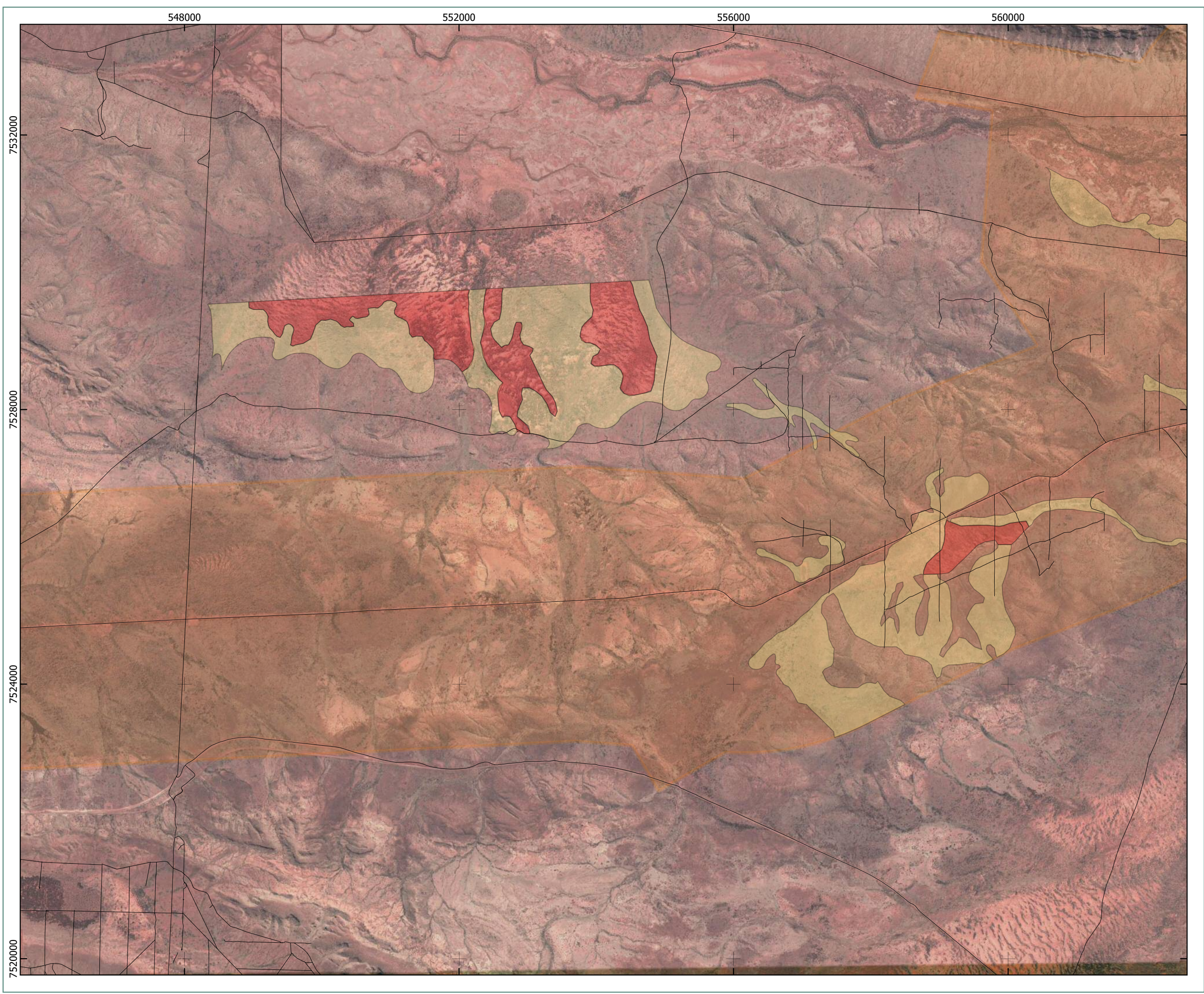







Figure 3: Banded Mulga Assessment – Northern Area Photographs



- Legend**
-  Rail Development Envelope
 -  Existing tracks
 - Mulga Mapping**
 -  Banded Mulga
 -  No bands






00.511.52

km

Scale 1:50,000 @ A3

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter



Author: Melissa Hay Date: 16/07/2018

Banded Mulga Mapping

Eliwana Banded Mulga Assessment

Appendix 1: Mulga Mapping Notes Information

Site	Date	Botanist	Landform	Soil	Rocks	Fire	Condition	Coordinate (GDA94)	Notes
MN001	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	< 2 yrs	Very Good	50K 557065, 7524776	Mulga - not banded
MN002	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	< 2 yrs	Very Good	50K 557110, 7524440	Mulga - not banded
MN003	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 557106, 7524380	Mulga - not banded
MN004	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 557089, 7524160	Mulga - not banded
MN028	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550443, 7529580	Mulga - banded
MN061	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549160, 7529177	Mulga - not banded
MN090	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549666, 7530098	Mulga - banded
MN091	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549294, 7529636	Mulga - banded
MN092	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549186, 7529473	Mulga - banded
MN093	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549157, 7529433	Mulga - banded
MN094	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549157, 7529433	Mulga - edge of banding
MN095	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549065, 7529252	Mulga - edge of banding
MN098	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549362, 7528931	Mulga - not banded
MN099	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	< 2 yrs	Very Good	50K 549540, 7528949	Mulga - edge of banding
MN100	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	< 2 yrs	Very Good	50K 549772, 7528983	Mulga - banded
MN101	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549987, 7528982	Mulga - not banded
MN102	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550363, 7528921	Mulga - not banded
MN103	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550627, 7529088	Mulga - not banded
MN104	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550717, 7529142	Mulga - not banded
MN105	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550611, 7529224	Mulga - not banded
MN106	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 550551, 7529321	Mulga - not banded
MR001	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	< 2 yrs	Very Good	50K 557113, 7524882	Mulga - not banded
MR002	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	> 5 yrs	Very Good	50K 557071, 7524668	Mulga - not banded
MR003	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 557102, 7524196	Mulga - not banded
MR004	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 557151, 7524057	Mulga - not banded
MR005	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	> 5 yrs	Very Good	50K 549252, 7529587	Mulga - banded
MR006	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	> 5 yrs	Very Good	50K 549073, 7529339	Mulga - edge of banding
MR007	4/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 549415, 7528901	Mulga - not banded
MR008	2/06/2018	Melissa Hay	Plain	Red-brown sandy clay	Ironstone gravel	2-5 yrs	Very Good	50K 557121, 7524114	Mulga - not banded