Carmichael Coal Mine and Rail Project
Supplementary Environmental Impact Statement

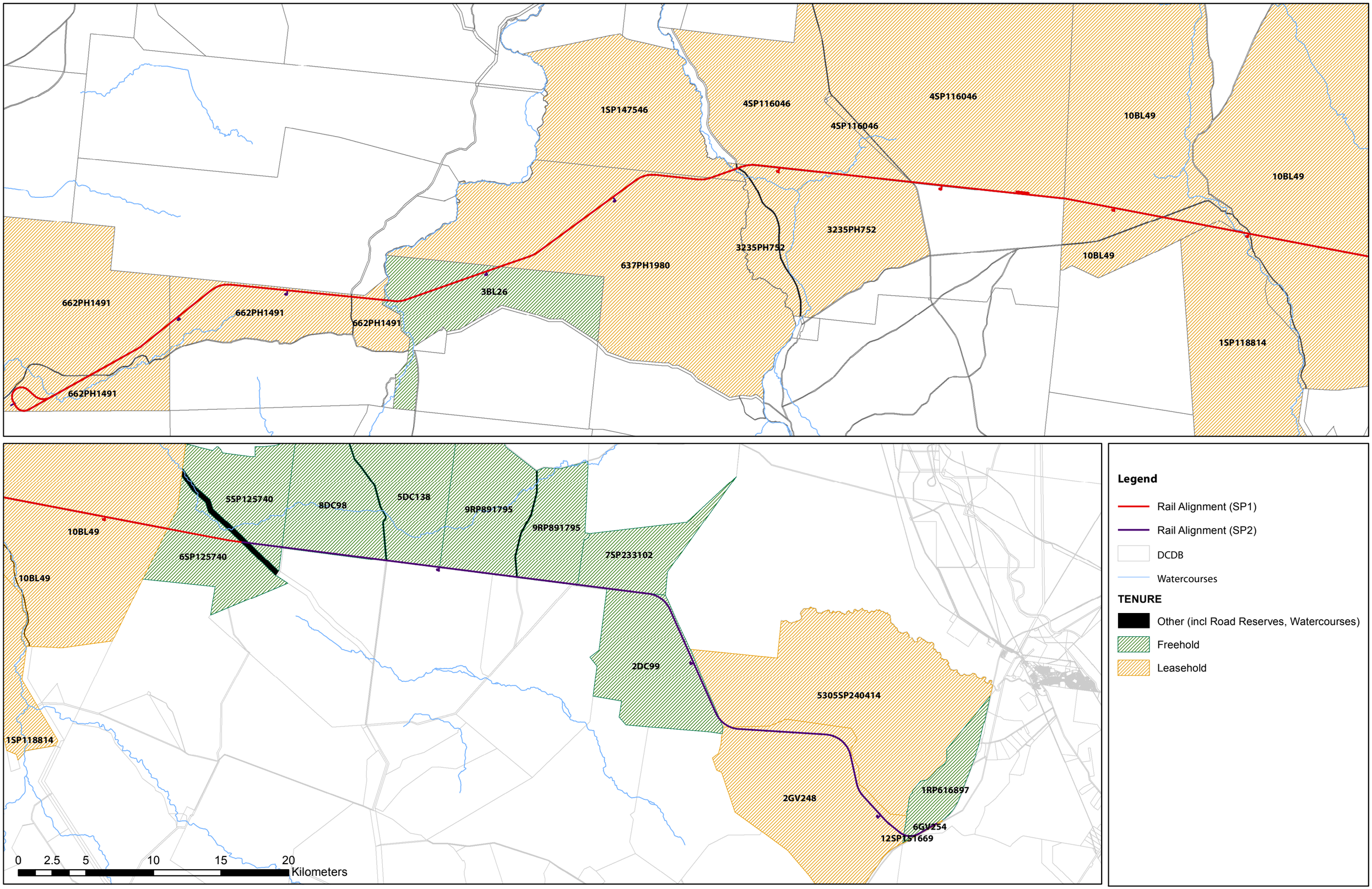
Volume 4, Appendix C3f – Vegetation Reports for SP2 and Laydown areas

Containing

- Part 3:
  - NCA Vegetation Clearing Permit Continued
  - SP2 PMAV

Attachment A

Tenure Plan



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surveying town planning urban design environmental management landscape architecture

Carmichael Coal Rail Alignment

Tenure Plan

N

SHG File | 6396
Date | 26/10/2012
Scale | 1:250,000@ A3
Data Information:
Universal Transverse Mercator
GDA 1994 MGA Zone 55

Client | Adani Mining Pty Ltd
Project | Carmichael Coal Rail Project
Source | DCBD (Derm 2012), Aerial (Vetka 2011)

Plan 1

Attachment B

Vegetation Community Plans

548000 000000 | 548500 000000 | 549000 000000 | 549500 000000 | 550000 000000 | 550500 000000 | 551000 000000

7577200 000000 | 7576800 000000 | 7576400 000000 | 7576000 000000 | 7575600 000000

11.3.3/11.3.21

11.4.8

11.4.8

11.4.8

11.4.8

11.4.11/11.4.9

11.4.8

5SP125740
FH

3DC98
FH

Location 1

Location 2

Location 3

6SP125740
FH

11.3.3/11.4.11

11.4.11/11.4.9

11.4.8

2DC193
LL

548000 000000 | 548500 000000 | 549000 000000 | 549500 000000 | 550000 000000 | 550500 000000 | 551000 000000

Metres
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N

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Regional Ecosystem v6.1 - DERM (2011)
DCDB - QLD Gov (2012)
Datum & Map Grid - GDA94 MGA Zone 55
Scale @ A3 1:10,000

Scale 1:10,000@ A3
Data Information:
Universal Transverse Mercator
GDA 1994 MGA Zone 55

Legend

- DCDB
- 95m Clearing Corridor
- Adani Mine EPC
- Watercourses

Regional Ecosystem v6.1

- Remnant vegetation containing Endangered REs
- Remnant vegetation containing Of Concern REs
- Remnant vegetation that is a Least Concern RE

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AMENDMENTS:

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A	25/10/2012	NCA Permit	RM

CLIENT: Adani Mining Pty Ltd
PROJECT: Charmichael Coal Rail Project
DATE: October 2012
CHECKED: -
CLIENT REF.: 6396
DRAWN: SA

PLAN OF: Carmichael Coal Rail Alignment - Vegetation Communities

PLAN No.: 6396 E 1 SP2 NCA Permit A

559000 559500 560000 560500 561000 561500 562000

7575600 7575200 7574800 7574400 7574000

8DC98 FH

5DC138 FH

Location 4

Lot 5DC138 non remnant area

11.4.8

2DC193 LL

1DC89 LL

Metres

0 50 100 200 300 400 500 600 700 800

N

SP1 Corridor - Vekta (2012)
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PLAN No.: 6396 E 2 SP2 NCA Permit A

562500.000000 563000.000000 563500.000000 564000.000000 564500.000000 565000.000000 565500.000000 566000.000000

7575600.000000 7575200.000000 7574800.000000 7574400.000000 7574000.000000 7573600.000000

11.4.11/11.4.9/11.4.5

5DC138
FH

11.4.8

9RP891795
FH

Lot 9 on RP891795
non remnant area

11.4.11/11.4.9/11.4.5

11.4.8

11.4.8

11.4.11/11.4.9/11.4.5

11.4.11/11.4.9/11.4.5

11.4.9

11.11.13

1DC89
LL

11.4.9

11.4.6

11.4.11/11.4.6/11.4.9

11.4.11/11.4.6/11.4.9

11.4.11/11.4.9/11.4.5

562500.000000 563000.000000 563500.000000 564000.000000 564500.000000 565000.000000 565500.000000 566000.000000

0 50 100 200 300 400 500 600 700 800 Metres

N

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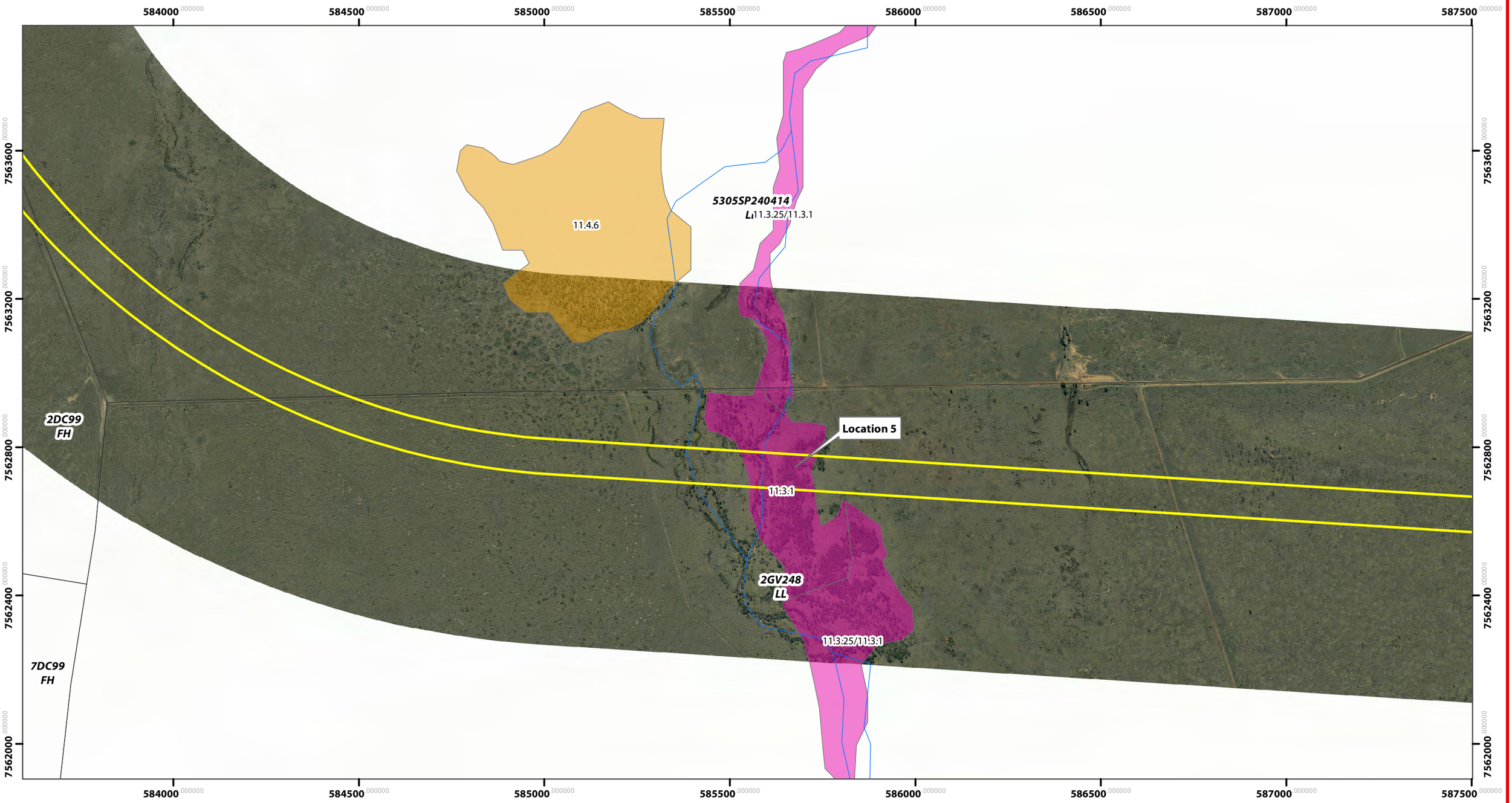
DRAWN: SA

PLAN OF: Carmichael Coal Rail Alignment - Vegetation Communities

PLAN No.: 6396 E 3 SP2 NCA Permit A



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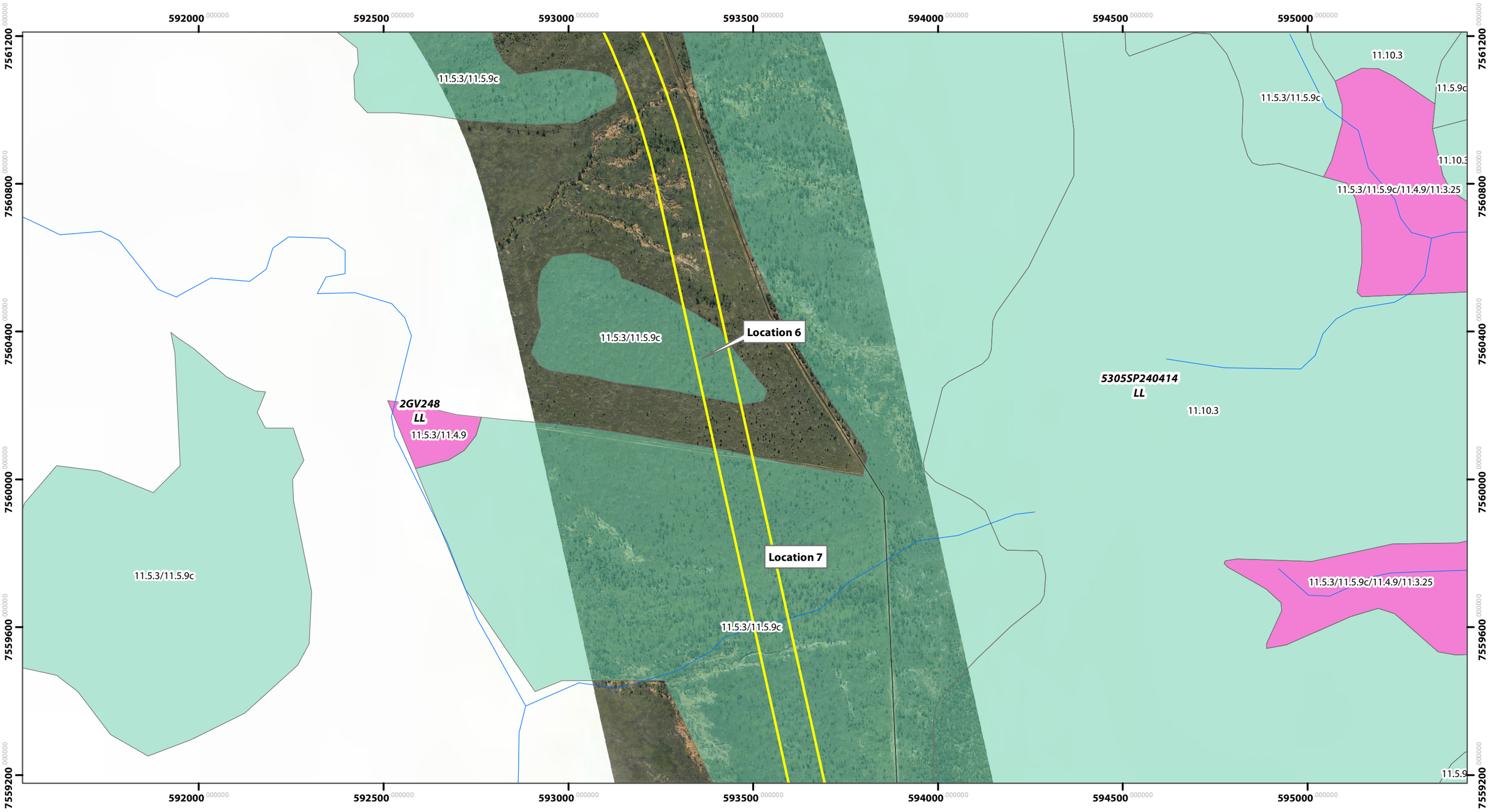
DATE:	October 2012
CHECKED:	-
CLIENT REF.:	6396
DRAWN:	SA

PLAN OF: Carmichael Coal Rail Alignment - Vegetation Communities

PLAN No.: 6396 E 4 SP2 NCA Permit A



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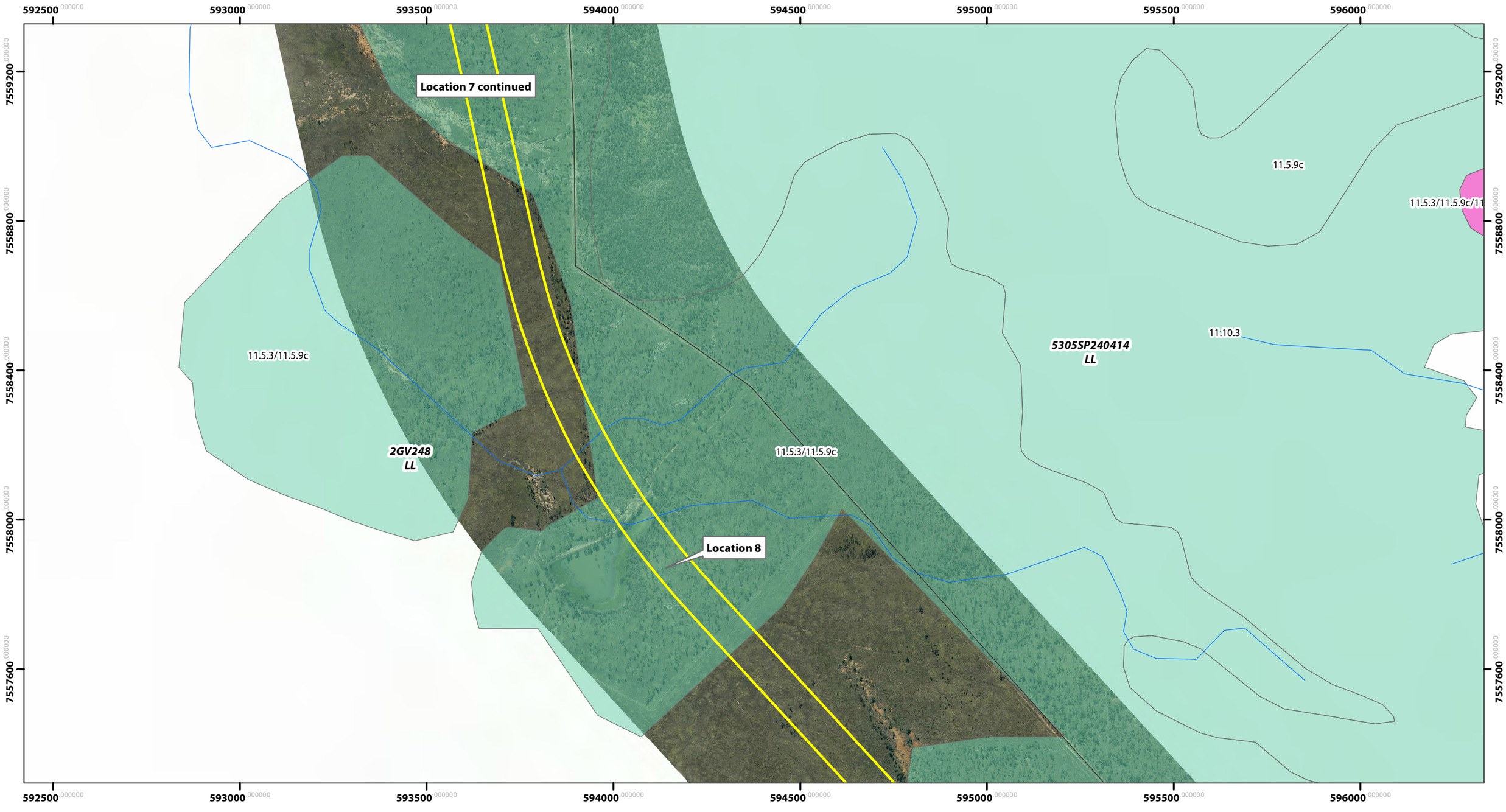
DATE:	October 2012
CHECKED:	-
CLIENT REF.:	6396
DRAWN:	SA

PLAN OF: Carmichael Coal Rail Alignment - Vegetation Communities

PLAN No.: 6396 E 5 SP2 NCA Permit A



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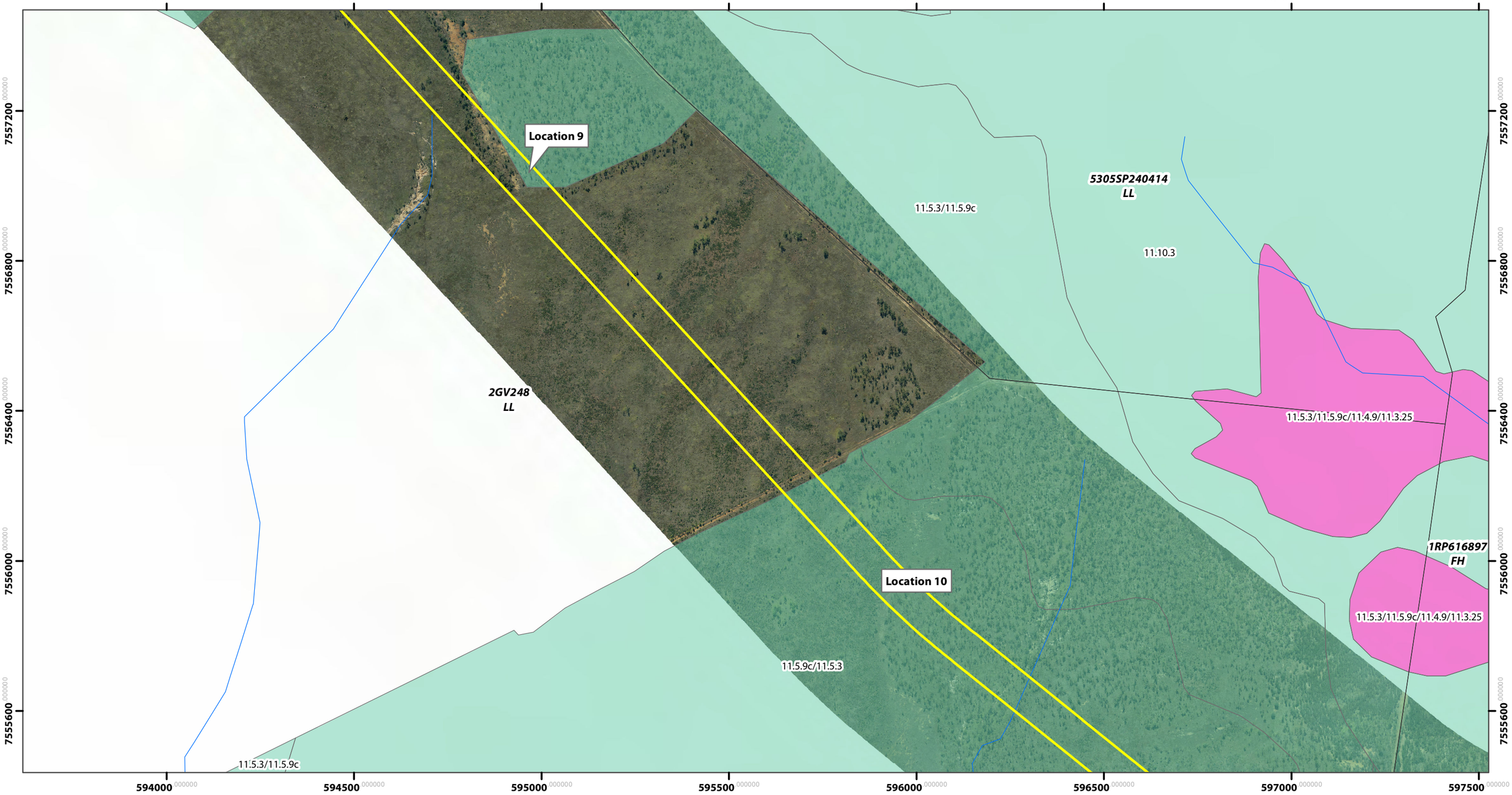

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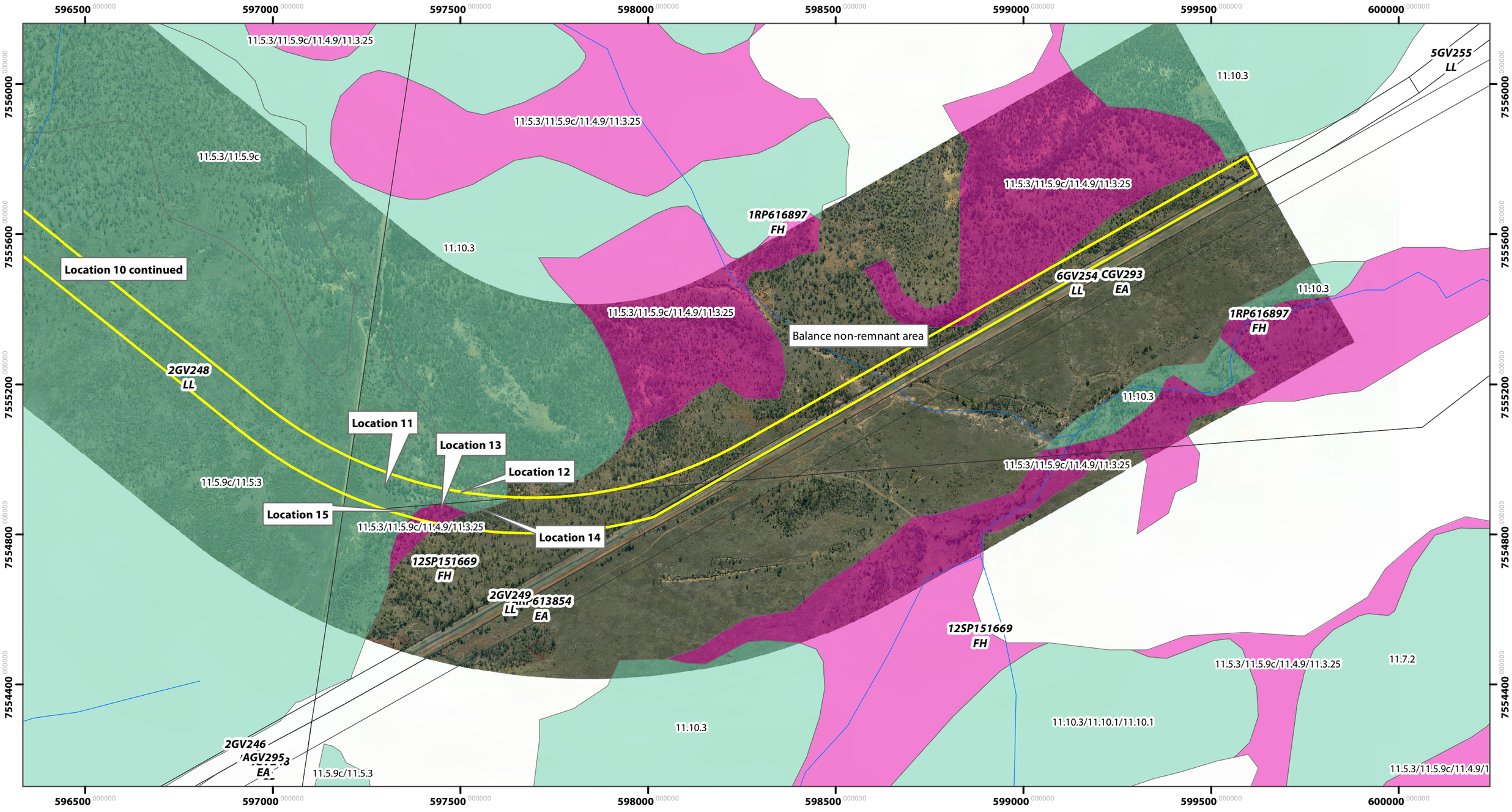

Metres
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CLIENT REF.:	6396
DRAWN:	SA

PLAN OF: Carmichael Coal Rail Alignment - Vegetation Communities

PLAN No.: 6396 E 8 SP2 NCA Permit A

environmental management

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Property Map of Assessable Vegetation

Carmichael Coal Rail Project
Separable Proportion 2 (SP2)

6396 E
August 2012
Adani Mining Pty Ltd

Document Control

Title	Property Map of Assessable Vegetation
Job Number	**6396**
Client	Adani Mining Pty Ltd

Document Issue

Issue	Date	Prepared By	Checked By
Draft	14/08/2012	Dave Havill/ Andrew Craig	Ross Marshall
Client Version 1	24/08/2012	Andrew Craig / Tom Connor	Ross Marshall
Final Version 2	05/09/2012	David Havill	Ross Marshall

Disclaimer

This report has been prepared for Adani Mining Pty Ltd. Saunders Havill Group cannot accept responsibility for any use of or reliance upon the contents of this report by any third party.

Reports and/or Plans by Others

Reports and/or plans by others may be included within this Environmental Management report to support the document.

Table of Contents

Tables

I. Introduction

The Saunders Havill Group (SHG) was engaged by Adani Mining Pty Ltd (Adani) to prepare Complex Property Maps of Assessable Vegetation (PMAV) to support requested Regional Ecosystem (RE) mapping amendments for the Carmichael Coal Rail Project investigation corridor. The Carmichael Coal Rail Project has been granted a Rail Feasibility Investigators Authority (RFI Authority) by the Chief Executive of the Department of Transport and Main Roads who administers the *Transport Infrastructure Act 1994*.

The RFIA Authority covers a 500m wide corridor extending from the proposed mine (EPC 1690) to the existing or national rail infrastructure at Moranbah. The investigation area was refined to an area of 95 metres for the mapping amendment investigation with access obtained via mutual agreement.

This report has been prepared for Separable Proportion 2 (SP – 2) of the Adani rail corridor and describes field survey effort and site based observations supporting proposed changes to RE mapping. It is noted that no mapped remnant or regrowth vegetation communities occur within either the Fordyce or Mount Dillingen Holding properties. These areas are not included as part of this report.

Reporting is per the requirements outlined within the Application Kit for a Property Map of Assessable Vegetation (2004) and the *Vegetation Management Act 1999* and has been separated on a property basis. The following properties make up SP – 2:

1. H & S Dahl (Lot 6 on SP125740);
2. H & T Jones (Lot 5 on SP125740);
3. T Jones (Lot 8 on DC98);
4. L & O Scott (Lot 5 on DC138);
5. H & S Philip (Lot 9 on RP891795);
6. A Fordyce (Lot 7 on SP233102) – *No PMAV required*;
7. K, S & R Hughes (Lot 2 on DC99);
8. M & R Flohr (Mount Dillingen Holding) (Lot 5305 on SP240414) – *No PMAV required*;
9. E & R Acton (Rugby Run) (Lot 2 on GV248); &
10. BHP Coal (Lot 12 on SP151669 and Lot 1 on RP616897).

Refer Plan1: SP-2 Overview.

N

NEWLANDS

GLENDEN

MOUNT COOLON

GUNJULLA

GOONYELLA

MORANBAH

4SP116046

1SP147546

10BL49

3235PH752

637PH1980

3BL26

662PH1491

1SP118814

5SP125740

5DC138

8DC98

9RP891795

7SP233102

6SP125740

2DC99

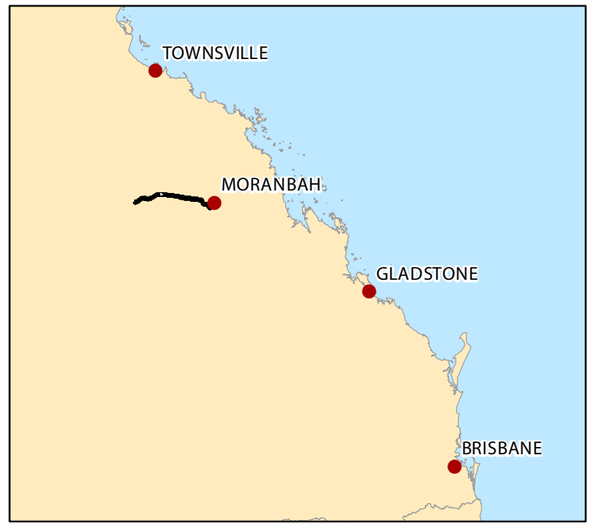
5305SP240414

1RP616897

2GV248

12SP151669

0 5 10 20 30 40 50 Kilometres



Legend

- Rail Alignment (SP2)
- Rail Alignment (SP1)
- PMAV Properties (SP1 & SP2)
- DCDB

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Adani Rail Project

Property Overview (SP1 & SP2)

SHG File | 5950
Date | 5/09/2012
Scale | 1:700,000@A3
Data Information:
Universal Transverse Mercator
GDA 1994 MGA Zone 55

Client | Adani Mining Pty Ltd
Project | EIS
Address/RPD | Isaac Regional Council
Source | DCBD (Derm 2012), Aerial (Vetka 2011)

Plan 1

2. Overview

The SP – 2 component of the proposed Adani Rail Corridor is largely situated within a disturbed agricultural setting which retains few vegetation values. Remaining mapped remnants are generally associated with watercourses that have been retained as part of historical clearing practices associated with agricultural activities.

Vegetation remaining outside of watercourses is generally present in small clumps and forming linear patches retained along property boundaries. In these locations RE mapping requires minor alterations to accurately reflect the extent or presence of remnant vegetation at the property scale. This rectification process has been undertaken using a combination or aerial photo analysis or field confirmation.

The eastern end of the rail corridor extends through a broader patch of Least Concern and Endangered vegetation associated with Mount Dillingen which forms part of a north south vegetated corridor.

Few RE mapping amendments are proposed along the SP – 2 corridor. This is expected due to the dominance of Least Concern and Of Concern vegetation communities that are relatively common within the local landscape and generally accurately mapped by current Regional Ecosystem mapping.

3. Methodology

A detailed site assessment was conducted to accurately map and define vegetation into categories as defined by the Queensland Herbarium. The methodology is designed to ensure an accurate delineation of the separate polygons and ensure all supporting information responds to the requirements of a properly made Property Map of Assessable Vegetation submission. The following stages were undertaken:

1. Desktop Research;
2. Review of Aerial Imagery;
3. Detailed Vegetation Survey; and
4. GIS Mapping of Vegetation Communities.

3.1. Desktop Research

Prior to the site survey, the following vegetation based information sources were assessed to assist in the final determination of the on-site survey methodology:

- Existing vegetation mapping released under the provisions of the *Vegetation Management Act 1999* and Regional Ecosystem descriptions;
- Queensland Herbarium mapping methodology and procedures outlined in Neldner, V.J, Wilson, B.A., Thompson, E.J. and Dillewaard, H.A. (Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland);
- Environmental Database Searches for the *Environmental Protection and Biodiversity Conservation Act 1999*.
- Applicable Schedules of the *Nature Conservation (Wildlife) Regulation 1994*;
- Geology (250K), soils and Topographical Maps (as required); and
- Specific Queensland Herbarium searches for records of unknown or specific vegetation species listed to occur in the region.

3.2. Aerial Imagery Analysis

Adani Mining Pty Ltd provided contemporary aerial imagery for the Carmichael Rail Corridor flown in March 2011. Where the alignment varied from the flown corridor, Google Earth imagery was utilised to supplement information.

Aerial imagery was reviewed prior to field survey analysis to identify potential variations in vegetation community type and structure. Imagery was used to create draft vegetation polygons requiring analysis in the field. Survey effort was targeted to these locations to confirm Regional Ecosystems present.

3.3. Detailed Vegetation Survey

Following the broad delineation of vegetation communities using aerial photography and information obtained in the desktop review, a detailed vegetation survey was conducted to locate, describe and map the regional ecosystem polygons. Methodologies followed the Queensland Herbarium mapping methodology and procedures outlined in Neldner, V.J, Wilson, B.A., Thompson, E.J. and Dillewaard, H.A. (Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland – version 3.1).

Mapped Remnant Vegetation

A transect methodology was adopted to gain an accurate representation of the canopy species within each vegetation polygon where the regional ecosystem (RE) code is disputed.

The assessment of remnant mapped areas involved a random transect 100m long and 50m wide within the mapped remnant polygon. Detailed data sheets and GPS markings were recorded within each site using standard Queensland Herbarium Map Assessment Request forms.

Information on the height and composition of vegetation was recorded at each GPS location with information later analysed to assess the extent of disturbance and accuracy of species canopy mix. All data was collected using a Trimble GEO-XT with sub 1m accuracy.

Mapped Grassland Communities

Locations containing mapped grassland communities were assessed using a Secondary Transect methodology as detailed within Queensland Herbarium mapping methodology and procedures outlined in Neldner, V.J, Wilson, B.A., Thompson, E.J. and Dillewaard, H.A. (Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland – version 3.1).

3.4. GIS Mapping of Vegetation Communities

Filed survey data was reviewed in combination with aerial imagery to refine mapped vegetation polygons and assign RE codes. Where possible, reference data was obtained either in the field or through discussions with the Qld Herbarium. Where reference data was not available SHG ecologists drew on internal data sources collected during historical surveys within the region. Information was used to compare transect results and final remnant polygons assigned.

4. H&S DAHL Lot 6 on SP125740

The *Vegetation Management Act Regional Ecosystem and Remnant Map Version 6.1* identifies two RE communities and three High Value Regrowth communities across two Landzones within the H & S Dahl property. Preclear data was used to determine the REs of the high value regrowth.

This property is one of the more vegetated properties within SP – 2 with two areas of remnant vegetation mapped. The first community is an Of Concern polygon situated on a Cainazoic Plains with the other an Of Concern community associated with Diamond Creek. RE mapping within these areas is generally consistent with current RE mapping.

Based on the detailed field assessment, the application area was divided into four (4) assessment areas based on the location of the mapped remnant & high value regrowth polygons and status of the regional ecosystem community.

Table 1: Dahl Summary

Site	Current RE Mapping Version 6.1	Current RE Mapping Version 6.1 (Area)	RE Observed	RE Observed (Area)
H & S Dahl Area A – Polygon 1	Of Concern RE 11.4.11/11.4.6	4.9 ha	Of Concern RE 11.4.11	4.9 ha
H & S Dahl Area B – Polygon 1	Of Concern High Value Regrowth	2.7 ha	Of Concern High Value Regrowth	2.7 ha
H & S Dahl Area B – Polygon 2	Endangered High Value Regrowth	< 0.5ha	Of Concern High Value Regrowth	*Included in above RE area*
H & S Dahl Area C – Polygon 1	Endangered High Value Regrowth	0.5 ha	Of Concern High Value Regrowth	2.0 ha
H & S Dahl Area C – Polygon 2	Of Concern High Value Regrowth	1.5 ha	Of Concern High Value Regrowth	*Included in above RE area*
H & S Dahl Area C – Polygon 3	Of Concern RE 11.3.3 / 11.4.1	14.3 ha	Of Concern RE 11.3.3 / 11.4.1	14.3 ha

4.1. H & S Dahl Area A – Polygon 1

Table 2: Dahl Area A - Polygon 1 Summary

Site Description		
Location:	H & S Dahl; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community comprised of Of Concern RE 11.4.11/11.4.6. Refer to Figure 1. Field surveys within this location describe the presence of a canopy dominated by *Acacia cambagei* and *Acacia harpphylla* representing RE 11.4.6, with a ground layer consistent with native grassland RE 11.4.11. Both of these RE communities have an Of Concern Status and therefore no changes to RE mapping are proposed within this location. Refer to Transect 1 within Appendix A and Figure 2.	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	543,617 m E	7,577,401 m S

Regional Ecosystem Profile	
Current RE Mapping (Version 6.1)	Of Concern RE 11.4.11/11.4.6
Regional Ecosystem Observed:	Of Concern RE 11.4.11 / 11.4.6
Width of RE	-

Photo: Area A - Polygon 1

Transect 1 situated within Of Concern RE 11.4.11/11.4.6.

Figure 1: Regional Ecosystem Mapping and Survey Effort (Lot 6 on SP125740 Area A)

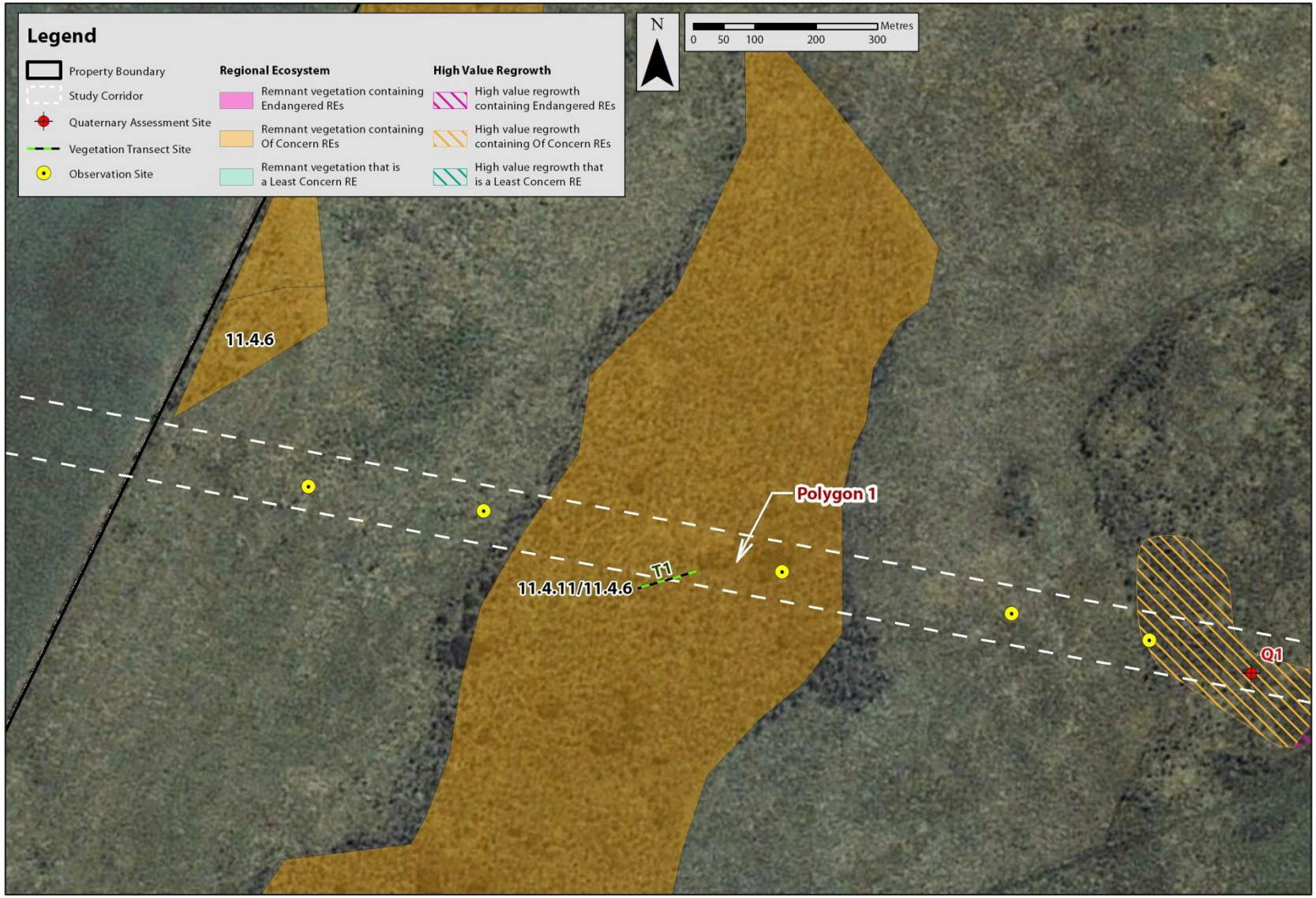
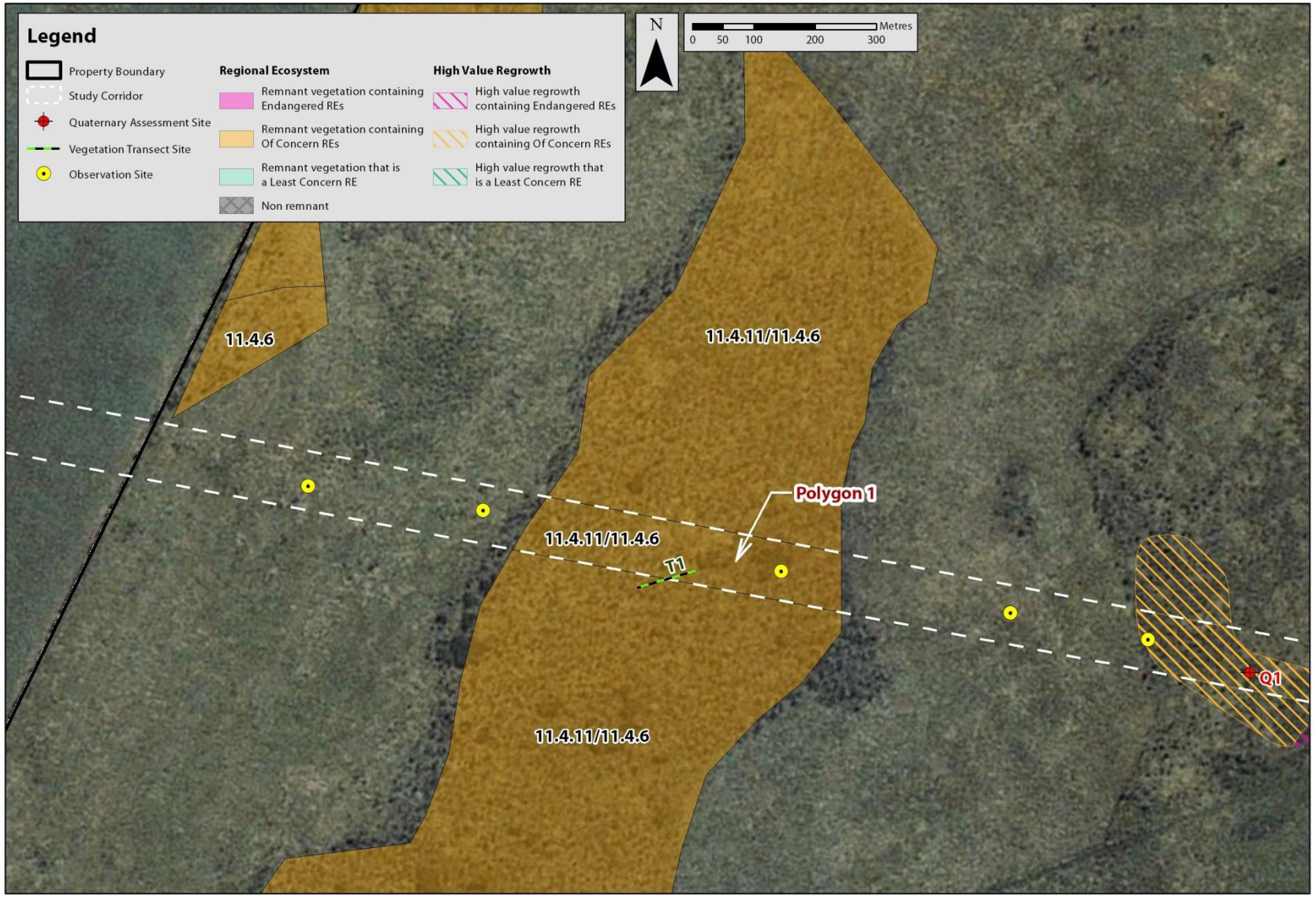


Figure 2: Regional Ecosystem Changes (Lot 6 on SP125740 Area A)



4.2. H & S Dahl Area B – Polygon I

Table 3: H & S Dahl Area B - Polygon 1 Summary

Site Description		
Location:	H & S Dahl; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community comprised of Of Concern High Value Regrowth. Refer to Figure 3. No changes are proposed to this regrowth polygon. Species observed during the field survey include *Terminalia oblongata* and *Eremophila mitchellii* as detailed in Quaternary Site 1 No Mapping amendments are proposed within Area B –Polygon 1. Refer to Quaternary Site 1 within Appendix A and Figure 4 .	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	544,466 m E	7,577,291 m S

Regional Ecosystem Profile	
Current RE Mapping (Version 6.1)	Of Concern High Value Regrowth
Regional Ecosystem Observed:	Of Concern High Value Regrowth
Width of RE:	-

4.3. H & S Dahl Area B – Polygon 2

Table 4: H & S Dahl Area B - Polygon 2 Summary

Site Description		
Location:	H & S Dahl; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community described as High Value Regrowth containing Endangered Regional Ecosystems. Refer to Figure 3. Species observed during the field survey include *Terminalia oblongata* and *Eremophila mitchellii* as detailed in Area B – Polygon 1. In addition a number of *Geijera parviflora* specimens were observed within this area further indicating High Value Regrowth containing Of Concern RE 11.4.6 Refer to Figure 4	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	544,466 m E	7,577,291 m S
Regional Ecosystem Profile		
Current RE Mapping (Version 6.1)	Endangered High Value Regrowth	
Regional Ecosystem Observed:	Of Concern High Value Regrowth	
Width of RE:	-	

Photo: Area B - Polygon 2
Example of High Value Regrowth containing RE 11.4.6

Figure 3: Regional Ecosystem Mapping and Survey Effort (Lot 6 on SP125740 Area B)

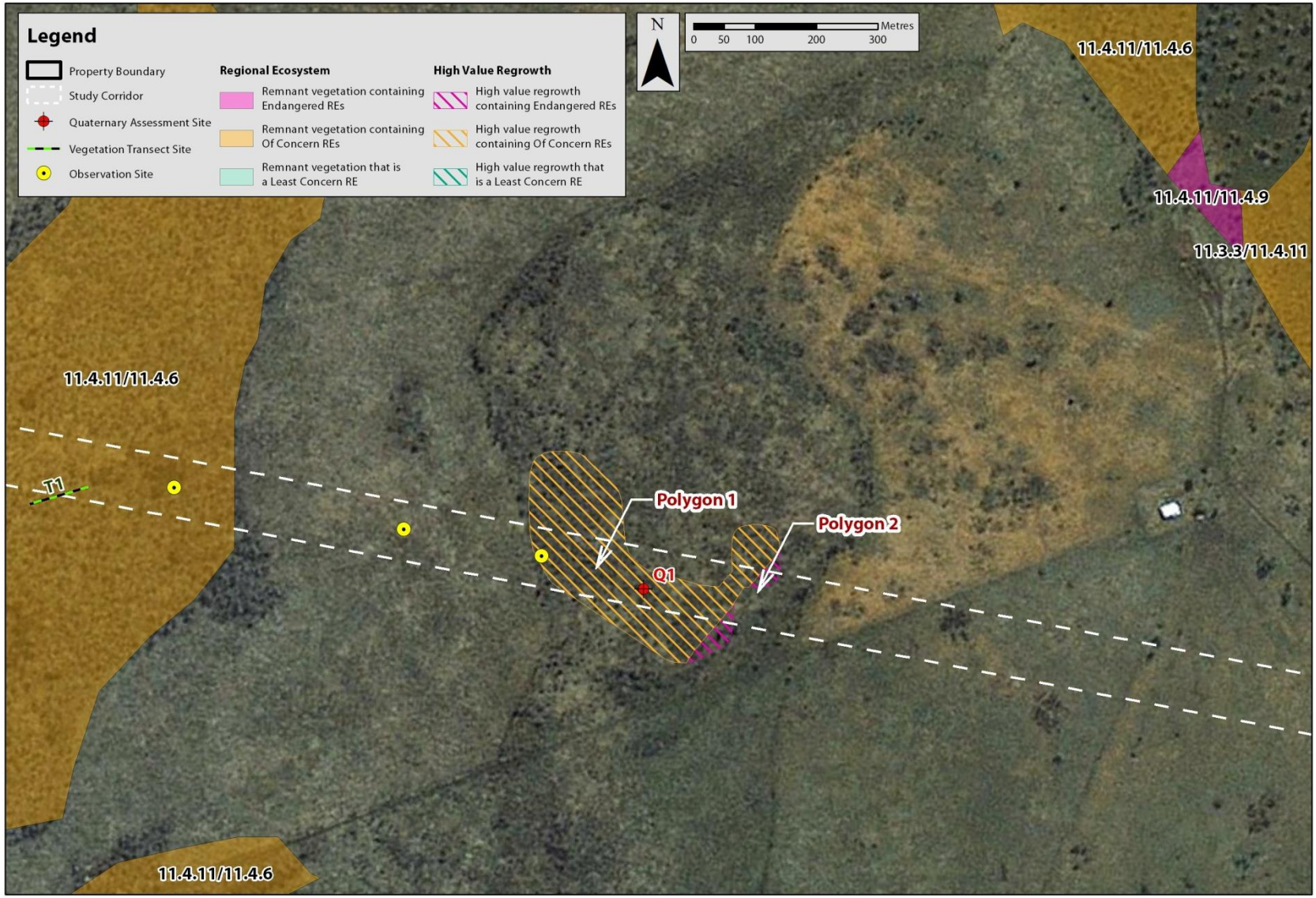
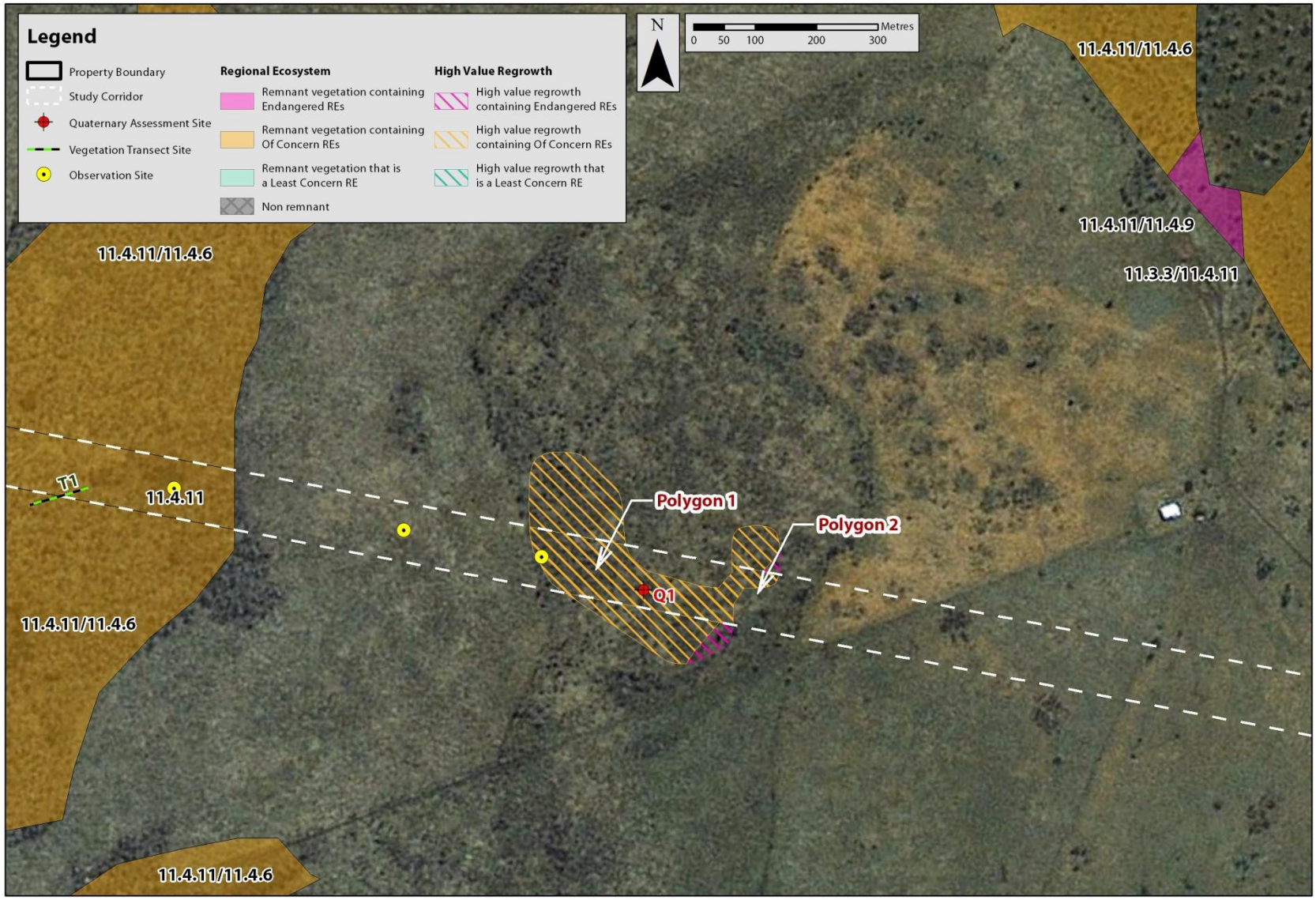


Figure 4: Regional Ecosystem Changes (Lot 6 on SP125740 Area B)



4.4. H & S Dahl Area C – Polygon I

Table 5: H & S Dahl Area C - Polygon 1 Summary

Site Description		
Location:	H & S Dahl ; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community comprised of Endangered High Value Regrowth. Refer to Figure 5. Vegetation within this location is consistent with the mapped adjacent Remanat Vegetation and includes species consistent with Of Concern RE 11.3.3. Species are dominated by Ecalyptus coolabah and the presence of *Acacia Harpophylla* and *Terminalia oblongata*. The mapped High Value Reegowth is proposed as Of Concern Regrowth. Refer to Quaternary Site 2 within Appendix A and Figure 6.	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	544,466 m E	7,577,291 m S
Regional Ecosystem Profile		
Current RE Mapping (Version 6.1)	Endangered High Value Regrowth	
Regional Ecosystem Observed:	Of Concern High Value Regrowth	
Width of RE:	-	

Photo: Area C - Polygon 1

Photo demonstrating presence of Regrowth Of Concern RE 11.3.3.

4.5. H & S Dahl Area C – Polygon 2

Table 6: H & S Dahl Area C - Polygon 2 Summary

Site Description		
Location:	H & S Dahl; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community comprised of High Value Regrowth described as Of Concern. Refer to Figure 5. Vegetation within this location is consistent with the mapped adjacent Remnant Vegetation and includes species consistent with Of Concern RE 11.3.3. Species are dominated by *Eucalyptus coolabah* with *Acacia Harpophylla* and *Terminalia oblongata* also observed No map amendments are proposed. Refer to Quaternary Site 2 within Appendix A and Figure 6.	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	544,466 m E	7,577,291 m S
Regional Ecosystem Profile		
Current RE Mapping (Version 6.1)	Of Concern High Value Regrowth	
Regional Ecosystem Observed:	Of Concern High Value Regrowth	
Width of RE:	-	

4.6. H & S Dahl Area C – Polygon 3

Table 7: H & S Dahl Area C - Polygon 3 Summary

Site Description		
Location:	H & S Dahl; Lot 6 on SP125740	
Site Description:	The site is located within a mapped vegetation community comprised of Of Concern RE 11.3.3/11.4.11. Refer to Figure 5. Canopy species in this location are dominated by a monoculture of *Eucalyptus coolabah* with an understorey of native grasses as detailed in Transect 2. Landzone investigations would be required to separate these communities. However it is noted that bot RE 11.3.3 and 11.4.11 are Of Concern communities. No Mapping amendments are proposed within Area C –Polygon 3. Refer to Transect 2 within Appendix A and Figure 6.	
Datum:	GDA94 (MGA55)	
Eastings/Northings	Eastings	Northings
	544,466 m E	7,577,291 m S

Regional Ecosystem Profile	
Current RE Mapping (Version 6.1)	Of Concern RE 11.3.3/11.4.11
Regional Ecosystem Observed:	Of Concern RE 11.3.3/11.4.11
Width of RE	-

Photo: Area C - Polygon 3

Eucalyptus coolabah dominated canopy within RE 11.3.3/11.4.11

Figure 5: Regional Ecosystem Mapping v6.1 (Lot 6 on SP125740 Area C)

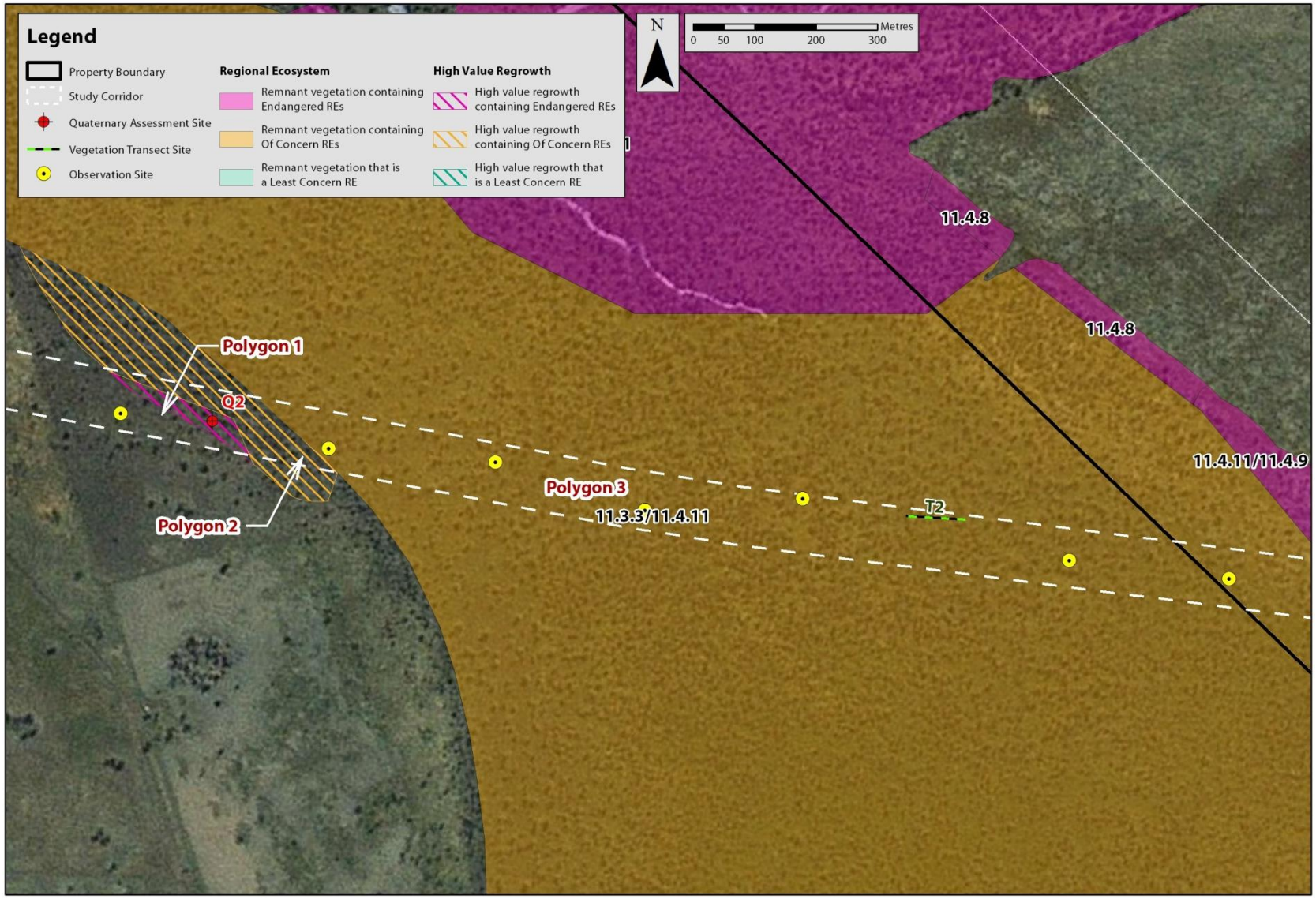
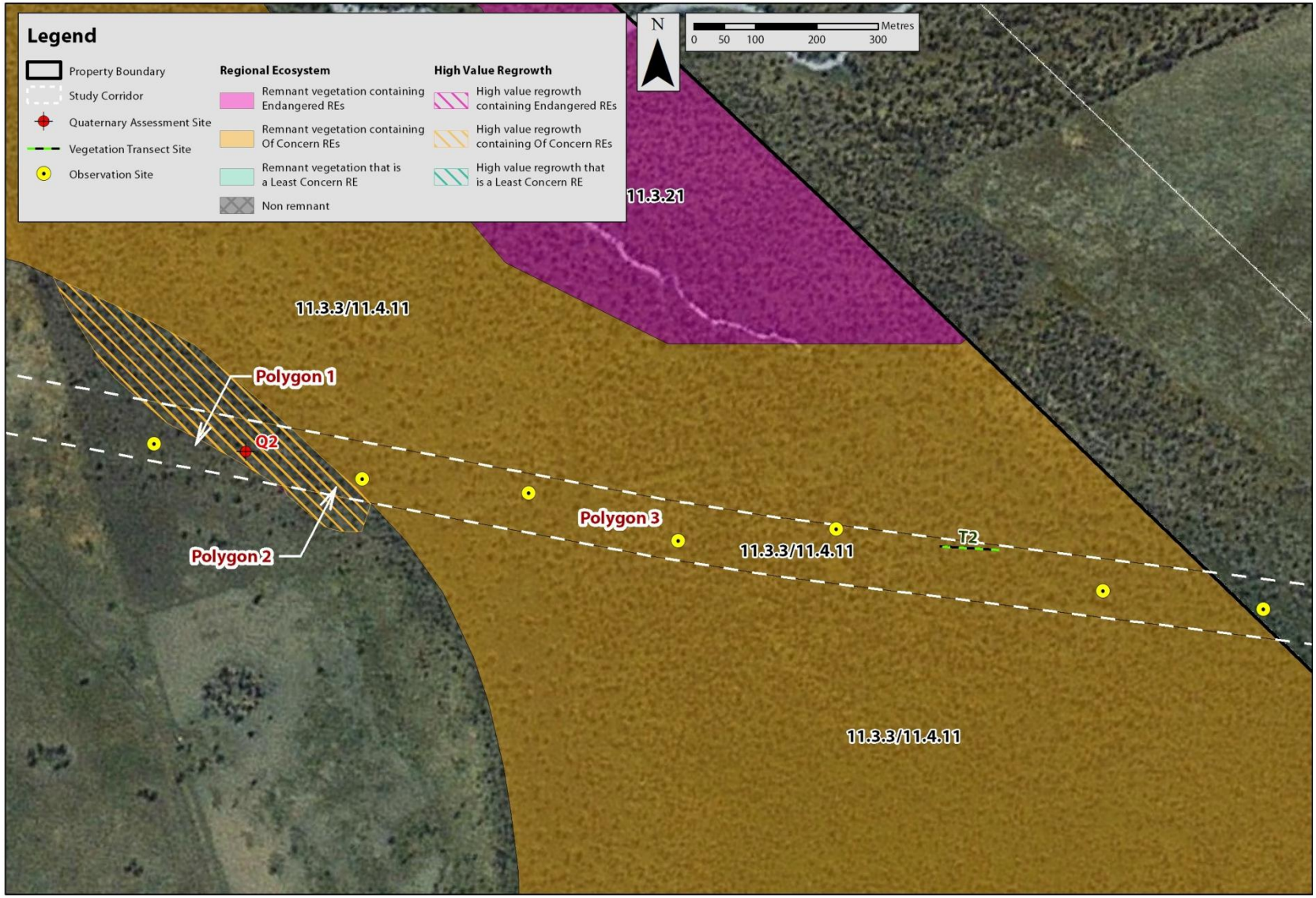


Figure 6: Regional Ecosystem Changes (Lot 6 on SP125740 Area C)



5. H & T Jones

The *Vegetation Management Act Regional Ecosystem and Remnant Map Version 6.1* shows three RE communities within the single Landzone within the H & T Jones property.

The main area of vegetation within this location is associated with a broader polygon which extends into the adjoining H & S Dahl property. The only other mapped area includes a thin patch of remnant Endangered RE which has been retained along the property boundary.

Based on the detailed field assessment, the application area within the H & T Jones Property was divided into two assessment areas based on the location of the mapped remnant polygons and status of the regional ecosystem community.

Table 8: H&T Jones

Site	Current RE Mapping Version 6.1	Current RE Mapping Version 6.1 (Area)	RE Observed	RE Observed (Area)
H & T Jones Area A – Polygon 1	Endangered RE 11.4.11/11.4.9	0.6 ha	Of Concern 11.4.11	0.6 ha
H & T Jones Area B – Polygon 1	Endangered RE 11.4.9	< 0.5 ha	Non-remnant	-

5.1. H&T Jones Area A – Polygon 1

Table 9: H & T Jones Area A Polygon 1 Summary

Site Description		
Location:	H & T Jones; Lot 5 on SP125740	
Site Description:	The site is located within mapped composite vegetation community described as Endangered RE 11.4.11 / 11.4.9 described as containing approximately 50% Endangered RE 11.4.9 and 50% Of Concern RE 11.4.11 (Figure 7) Field investigations confirmed the absence of RE 11.4.9 within this location with no *Acacia harpophylla* (Brigalow) specimens observed and the majority of the area devoid of canopy vegetation. Native grass species including *Dichanthium sericeum, Leptoschloa digitata, Bothrichloa* spp., *Heteropogon contortus* and *Themeda triandra* are consistent with those identified in RE11.4.11. *Eucalyptus coolabah* was identified within the survey area at low densities also supporting the presence of Of Concern RE 11.4.1. Area shows signs of historical clearing and grazing however disturbance levels appear low. Refer to Quaternary Site 1 and Figures 8 for the proposed mapping changes.	
Datum:	GDA94 MGA55	
Eastings/Northings	Eastings	Northings
	548682.69	7576608.52
Regional Ecosystem Profile		
Current RE Mapping (Version 6.1)	Endangered RE 11.4.11/11.4.9	
Regional Ecosystem Observed:	Of Concern RE 11.4.11	
Width of RE:	70m	

Photo: Area A Polygon 1 –
The area mapped as remnant RE 11.4.11/11.4.9. RE 11.4.9 was not identified during survey with Acacia harpophylla absent from survey area.