



23 March 2023

Michelle Carey
Land Access, Heritage and Approvals (Tenure)
CZR Resources
Suite 9, Level 3
47 Havelock Street
West Perth WA 6005
(via email)

Dear Michelle,

Robe Mesa Project: Haul Road Realignment and Associated Vegetation Extrapolation and Consolidation

Further to the 2022 detailed flora and vegetation survey completed by Biota (2023), we provide here the results of a desktop review of the Robe Mesa Project vegetation mapping. This encompassed extrapolating vegetation mapping of the lower haul road realignment, together with consolidation of Biota (2023) and RPS's (2021) vegetation mapping units and spatial data.

1.0 Scope and Objectives

The specific objectives of this desktop review comprised the following:

- Extrapolate vegetation mapping along unsurveyed areas of the lower haul road route where it deviates from the alignment surveyed in 2022, and add a 500m buffer from the central line of the new alignment;
- Consolidate Biota (2023) and RPS's (2021) vegetation mapping units; converting RPS's mapping units to Biota's codes and descriptions, where possible; and
- Provide consolidated vegetation mapping data as a single spatial layer.

For the purpose of this report, 'survey area' is defined as the combined areas that were surveyed by Biota (2023) and RPS (2021), together with the 500m buffer area surrounding the lower haul road realignment.

2.0 Methods and Limitations

Biota's approach took into consideration relevant legislation and guidance including the Environmental Protection Authority's (EPA) "Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment" (EPA 2016).

2.1 Vegetation Mapping Extrapolation and Consolidation

Vegetation mapping extrapolation was completed in areas where the realignment falls outside of the lower haul road boundary surveyed in 2022 (Biota 2023) and in the 500m buffer area. Extrapolation was completed via visual interpretation of aerial imagery from recent Lidar surveys (spatial data provided by CZR) and using other available imagery or relevant data (e.g. Google Earth, land systems mapping).

Once the extrapolation was completed, Biota's vegetation mapping spatial layer was consolidated with that of RPS (2021). This comprised converting RPS's vegetation mapping units into the equivalent Biota units, wherever possible; where RPS units did not have a Biota equivalent, they remained unchanged.

Vegetation maps were created and consolidated using Geographical Information System (GIS) software (QGIS and MapInfo Professional). All maps in this report were produced by Melissa Robinson (Principal GIS Cartographer at Biota).

2.2 Limitations

As per the EPA (2016) guidelines, potential constraints and limitations of this desktop review are as follows:

- Vegetation mapping extrapolation was completed solely using aerial imagery. This is only a minor limitation given the high quality of Lidar Imagery that was supplied by CZR.
- The extrapolated vegetation mapping includes some areas of vegetation units that are known to support the Priority 3 grass *Eragrostis crateriformis*, specifically A1, A4, C1, C2, C5 and E2. The presence of this Priority species cannot be confirmed without ground-truthing, which is beyond the scope of this desktop exercise.

3.0 Results

The extent of each mapping unit is presented and described in Table 1 in Attachment 1, and maps are provided in Attachment 2.

Mapping units shaded green in Table 1 (A1, A4, C1, C2, C5 and E2) are identified as conservation significant due to the presence of the Priority 3 species *Eragrostis crateriformis* in some areas.

Biota's 'A6' mapping unit (shaded yellow in Table 1) could be considered as significant as it has the potential to support the Priority 3 species *Triodia pisolitica*, however this could not be confirmed during the survey due to access restrictions (see Biota 2023). RPS's (2021) vegetation mapping units El.Ar.TwTp and El.AtuGr (also shaded yellow in Table 1) are significant as the presence of *T. pisolitica* was confirmed during that survey. The unit El.Aa.TwTp was reported as likely representing a new record of the P3 Priority Ecological Community '*Triodia pisolitica* assemblages of mesas of the west Pilbara' (RPS 2021).

The consolidation process renamed an RPS vegetation unit as Biota's vegetation mapping unit 'E1' and extended it into the northern part of the Mine associated infrastructure area (map 7, Attachment 2).

A secondary amendment to the previous (Biota 2023) vegetation mapping was made along the Lower Haul Road option. The extent of 'C5' vegetation encompassing sampling site CRM16 was reduced to encompass CRM16 and the narrow drainage line surrounding it, with vegetation unit 'E1' mapped around this (see map 1, Attachment 2).

4.0 Recommendations

Where the proposed haul road intersects vegetation units identified as significant due to the presence of Priority species, we recommend targeted searches are carried out prior to any clearing to confirm the presence and extent of populations.

I trust the detail provided here is sufficient for your requirements. Please contact me if you have any queries or comments.

Yours sincerely,

Biota Environmental Sciences Pty Ltd

Aster Braxton-Smith

Senior Botanist

Attachment 1: Vegetation Mapping Summary Table

Attachment 2: Vegetation Mapping

References

Biota (2023). Robe Mesa Project Detailed Flora and Vegetation Survey. Unpublished report for CZR Resources, Biota Environmental Sciences, Western Australia.

EPA (2016). *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*. Environmental Protection Authority, Western Australia.

RPS (2021). Detailed Flora and Vegetation Assessment - Robe Mesa and Robe East Extension Deposits. Unpublished report prepared for CZR Resources Ltd, October 2021, RPS Australia, West Perth, WA.

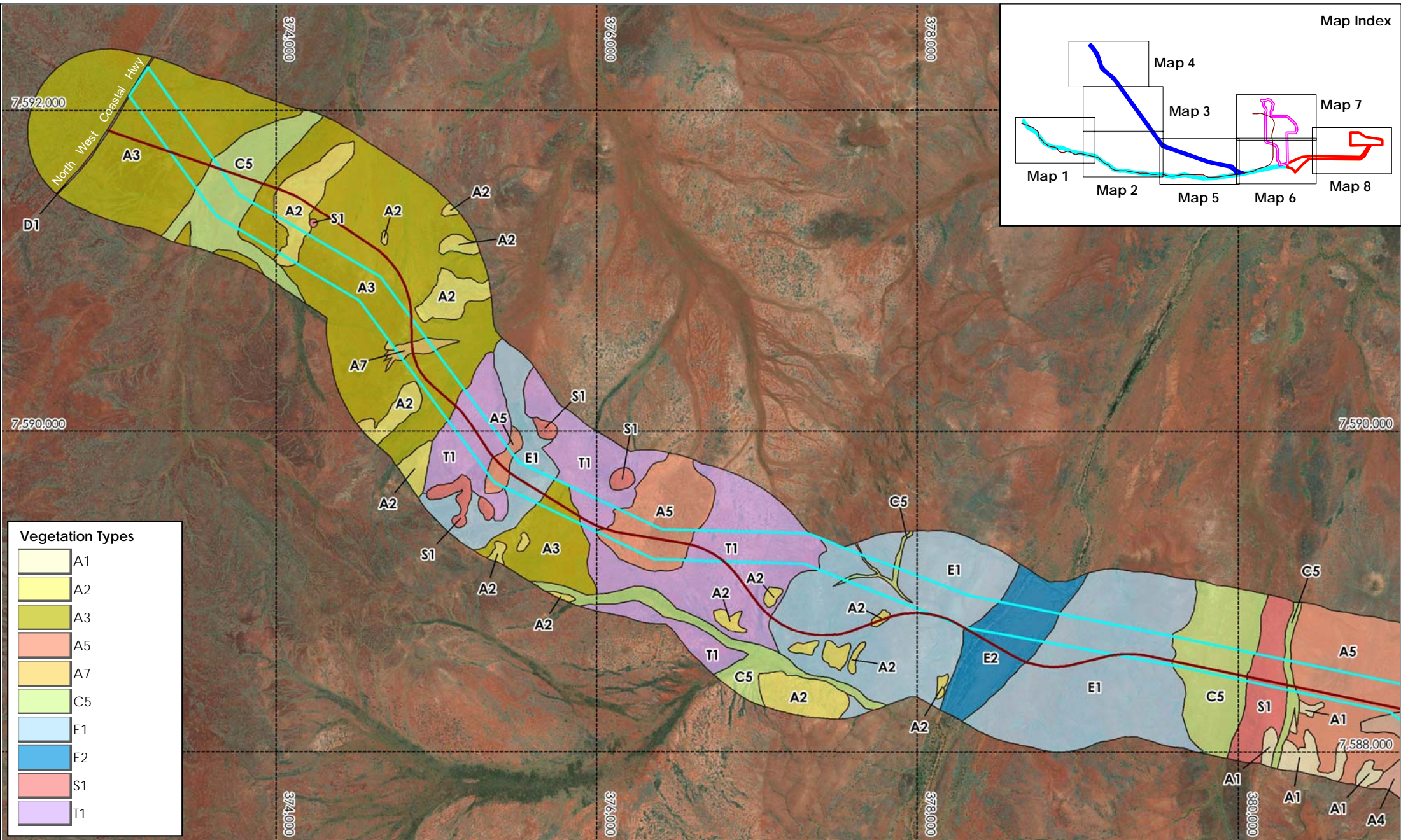
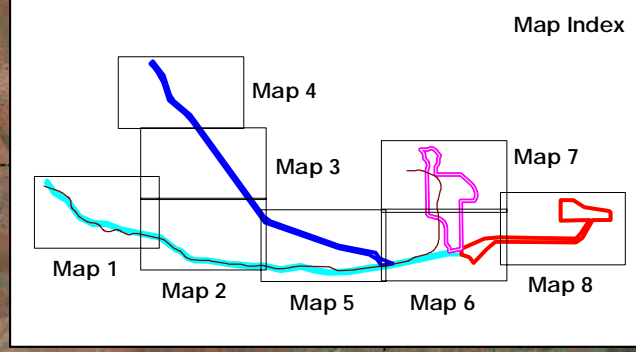
Attachment 1: Vegetation Mapping Summary Table

Table 1: Biota vegetation mapping units from the 2022 survey (Biota 2023) and equivalent RPS vegetation mapping units (RPS 2021).

Biota Mapping Code	Biota Vegetation Unit	RPS Mapping Code	RPS Vegetation Unit	Area in Hectares (%)
Vegetation of Drainages				
E2	<i>Eucalyptus victrix</i> (<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>) and <i>Melaleuca</i> spp. over mixed <i>Acacia</i> spp. over * <i>Cenchrus</i> spp.	EcEv.Mg	<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and <i>E. victrix</i> Mid Closed Forest over <i>Melaleuca glomerata</i> , <i>Gossypium robinsonii</i> and <i>Acacia trachycarpa</i> Tall Sparse Shrubland over <i>Eulalia aurea</i> , and other mixed species Grassland / Forbland.	179.27 (2.7%)
C5	<i>Corymbia hamersleyana</i> over mixed <i>Acacia</i> spp. over <i>Triodia epactia</i> .	NA	NA	597.14 (8.9%)
T2	<i>Triodia epactia</i> hummock grassland.	NA	NA	43.96 (0.7%)
NA	NA	MaEc.Mg.Cv	<i>Melaleuca argentea</i> and <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> Mid Open Forest over <i>Melaleuca glomerata</i> Tall Open Shrubland over <i>Cyperus vaginatus</i> Open Sedgeland.	0.27 (<0.01%)
Vegetation of Hills and Slopes				
A6	<i>Acacia arida</i> over <i>Triodia wiseana</i> .	Aar.Tw	<i>Acacia arida</i> Mid Sparse Shrubland over <i>Triodia wiseana</i> Hummock Grassland.	139.00 (2.1%)
A7	<i>Acacia bivenosa</i> over <i>Triodia wiseana</i> .	Ab.Tw	<i>Acacia bivenosa</i> and <i>Acacia</i> spp. Mid Open Shrubland over <i>Ptilotus</i> spp. and <i>Senna</i> spp. Low Sparse Shrubland over <i>Triodia wiseana</i> Hummock Grassland.	209.39 (3.1%)
E1	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over mixed <i>Acacia</i> spp. over <i>Triodia wiseana</i> .	El.Ab.Tw	<i>Eucalyptus leucophloia</i> Low Isolated Trees over <i>Acacia bivenosa</i> Mid Open Shrubland to Isolated Shrubs over <i>Triodia wiseana</i> Hummock Grassland.	332.12 (5.0%)
S1	<i>Senna</i> spp. and <i>Acacia bivenosa</i> over <i>Triodia wiseana</i> .	NA	NA	85.55 (1.3%)
T1	<i>Triodia longiceps</i> open hummock grassland.	NA	NA	159.25 (2.4%)
NA	NA	El.Aa.TwTp	<i>Eucalyptus leucophloia</i> Low Isolated Clumps of Trees over <i>Acacia arida</i> Isolated Clumps of Shrubs over <i>Triodia wiseana</i> and <i>T. pisoliticola</i> Sparse Hummock Grassland.	16.78 (0.3%)
NA	NA	El.AtuGr	<i>Eucalyptus leucophloia</i> Low Open Woodland over <i>Gossypium robinsonii</i> and <i>Acacia tumida</i> var. <i>pilbarensis</i> Tall Open Shrubland over <i>Acacia arida</i> Mid Open Shrubland Over <i>Triodia wiseana</i> , (<i>Triodia pisoliticola</i>) Open Hummock Grassland.	1.83 (<0.1%)
Vegetation of Plains				
A1	<i>Acacia xiphophylla</i> tall shrubland over <i>Triodia epactia</i> open hummock grassland.	Ax.Te	<i>Acacia xiphophylla</i> Tall Open Shrubland over <i>A. synchronicia</i> Mid Sparse Shrubland over a mixed Low Open Shrubland / Forbland over <i>Triodia epactia</i> Sparse Hummock Grassland.	741.86 (11.1%)

Biota Mapping Code	Biota Vegetation Unit	RPS Mapping Code	RPS Vegetation Unit	Area in Hectares (%)
A2	<i>Acacia xiphophylla</i> tall shrubland over <i>Triodia wiseana</i> very open hummock grassland.	NA	NA	83.78 (1.3%)
A3	Mixed <i>Acacia</i> spp. over <i>Triodia wiseana</i> .	Aspp.Tw	<i>Acacia</i> spp. Mid Isolated Shrubs over a mixed Low Open to Sparse Shrubland over <i>Triodia wiseana</i> Open Hummock Grassland.	688.33 (10.3%)
A4	Mixed <i>Acacia</i> spp. over <i>Triodia epactia</i> .	Aat.Te	<i>Acacia atkinsiana</i> , <i>A. ancistrocarpa</i> and <i>A. sclerosperma</i> subsp. <i>sclerosperma</i> Tall Shrubland to Sparse Shrubland over mixed species Low Sparse Shrubland over <i>Triodia epactia</i> Hummock Grassland.	1,332.01 (19.9%)
A5	Mixed <i>Acacia</i> spp. over <i>Triodia longiceps</i> .	NA	NA	564.50 (8.4%)
C1	<i>Corymbia hamersleyana</i> over mixed <i>Acacia</i> spp. over <i>Triodia epactia</i> .	Ch.Ai.Te	<i>Corymbia hamersleyana</i> Low Isolated Trees over <i>Acacia inaequilatera</i> Mid to Tall Sparse Shrubland over <i>Triodia epactia</i> Hummock Grassland.	546.53 (8.2%)
C2	<i>Corymbia candida</i> subsp. <i>candida</i> over mixed <i>Acacia</i> spp. over <i>Triodia epactia</i> .	Cc.Te	<i>Corymbia candida</i> subsp. <i>candida</i> Low Woodland to Open Forest over <i>Acacia synchronicia</i> , <i>A. ancistrocarpa</i> and <i>A. trachycarpa</i> Tall Open Shrubland over a mixed Low Open Shrubland / Forbland over <i>Triodia epactia</i> Open Hummock Grassland.	531.61 (7.9%)
C3	<i>Corymbia deserticola</i> subsp. <i>deserticola</i> over mixed <i>Acacia</i> spp. over <i>Triodia epactia</i> .	NA	NA	11.33 (0.2%)
C4	<i>Corymbia zygophylla</i> over mixed <i>Acacia</i> spp. over <i>Triodia</i> spp.	NA	NA	162.44 (2.4%)
NA	NA	Asy.EcrTe	<i>Acacia synchronicia</i> Mid Open Shrubland over <i>Triodia epactia</i> Open Hummock Grassland (with intermittent clay pans with ephemeral Open Forbland and Open Tussock Grassland).	140.89 (2.1%)
NA	NA	AsyAsc.Te	<i>Eucalyptus victrix</i> and <i>Corymbia hamersleyana</i> Low Isolated Trees over <i>Acacia synchronicia</i> and <i>A. sclerosperma</i> subsp. <i>sclerosperma</i> Tall Sparse Shrubland over a mixed Low Open Shrubland / Forbland over <i>Triodia epactia</i> Sparse Hummock Grassland.	94.17 (1.4%)
Other Mapping Units				
D1	Cleared areas.	NA	NA	30.01 (0.4%)
Total				6,692.02

Attachment 2: Vegetation Mapping



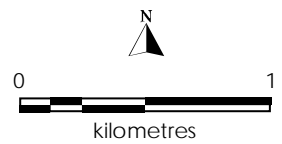
Vegetation Types

	A1
	A2
	A3
	A5
	A7
	C5
	E1
	E2
	S1
	T1



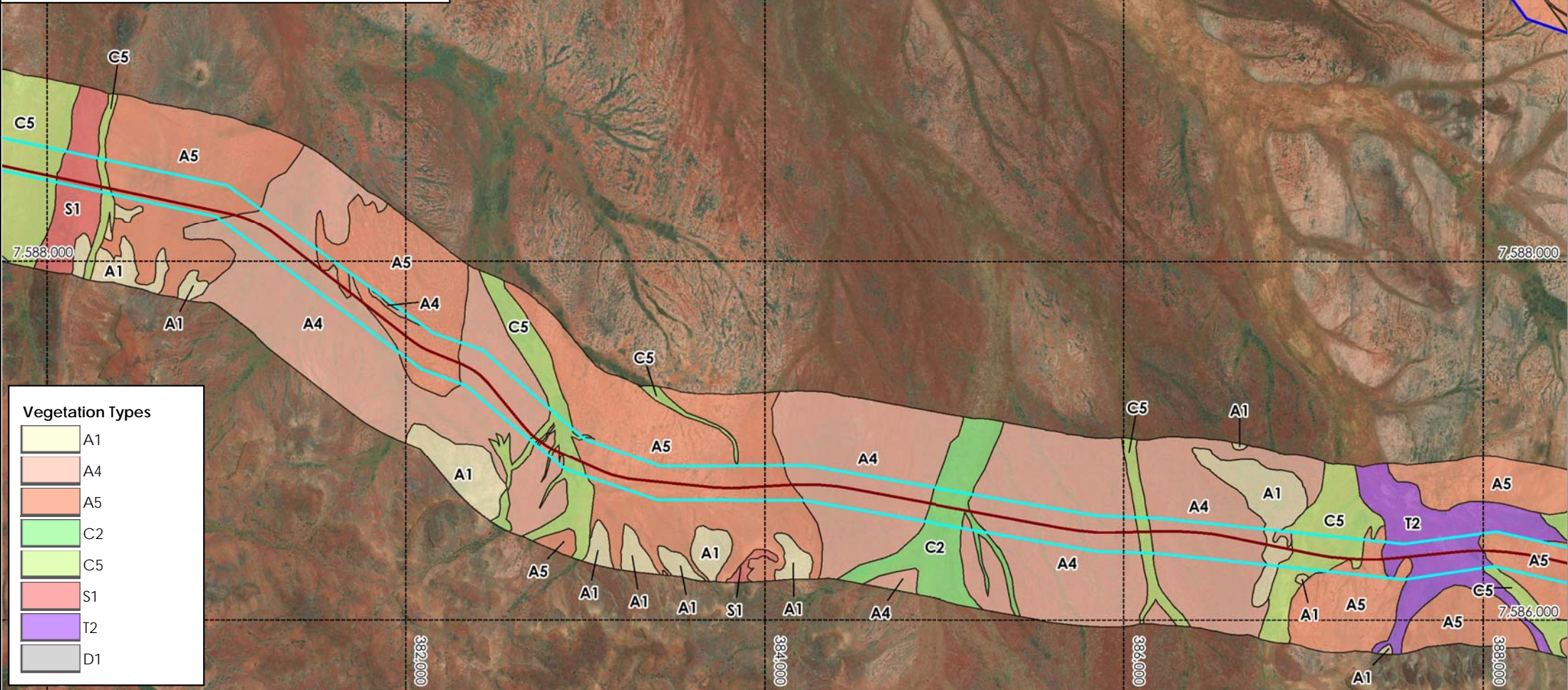
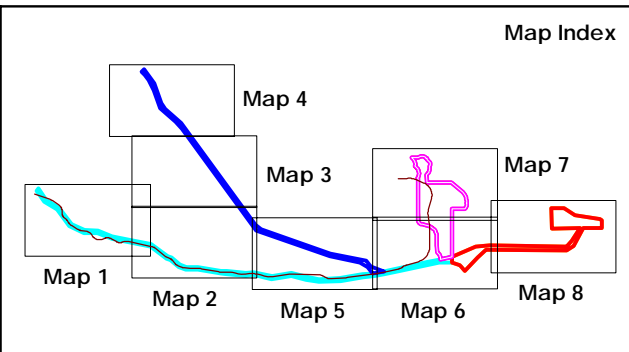
- Upper haul road option (CZR)
- Lower haul road option (CZR/RHI)
- East additional area (EAA)

- Mine associated infrastructure
- Design realignment route



**Robe Mesa Project
Vegetation Map 1**



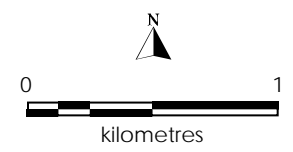


Vegetation Types	
	A1
	A4
	A5
	C2
	C5
	S1
	T2
	D1



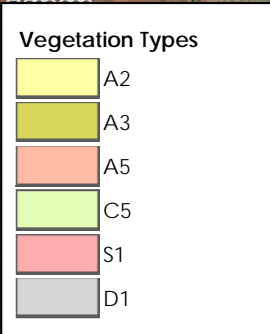
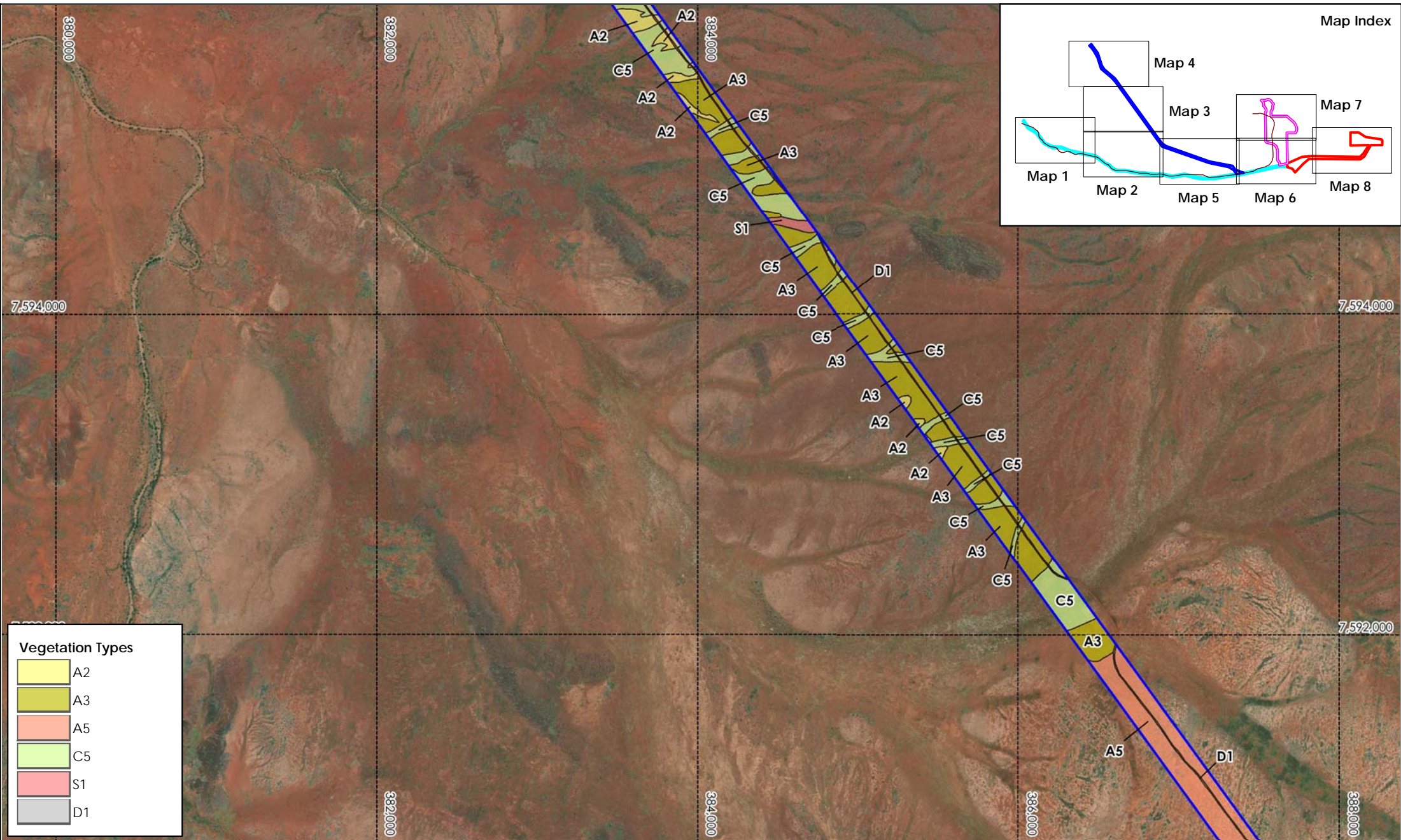
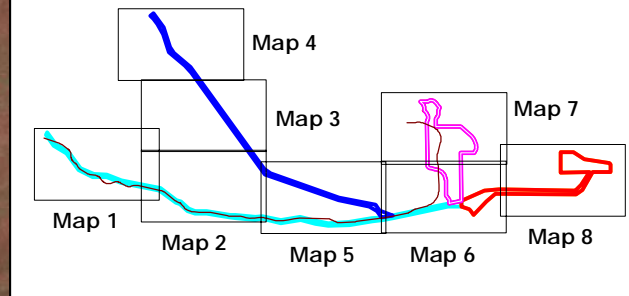
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- Lower haul road option (CZR/RHI)
- East additional area (EAA)

- Mine associated infrastructure
- Design realignment route



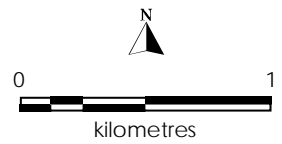
Robe Mesa Project Vegetation Map 2





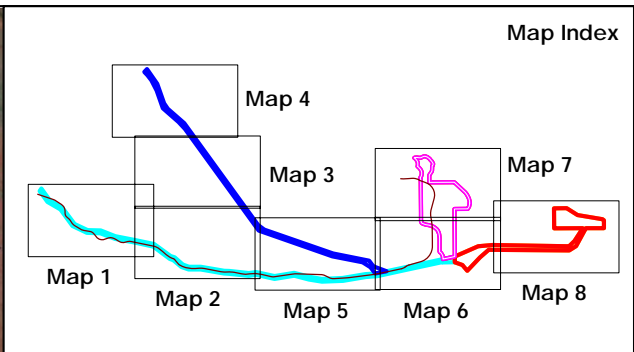
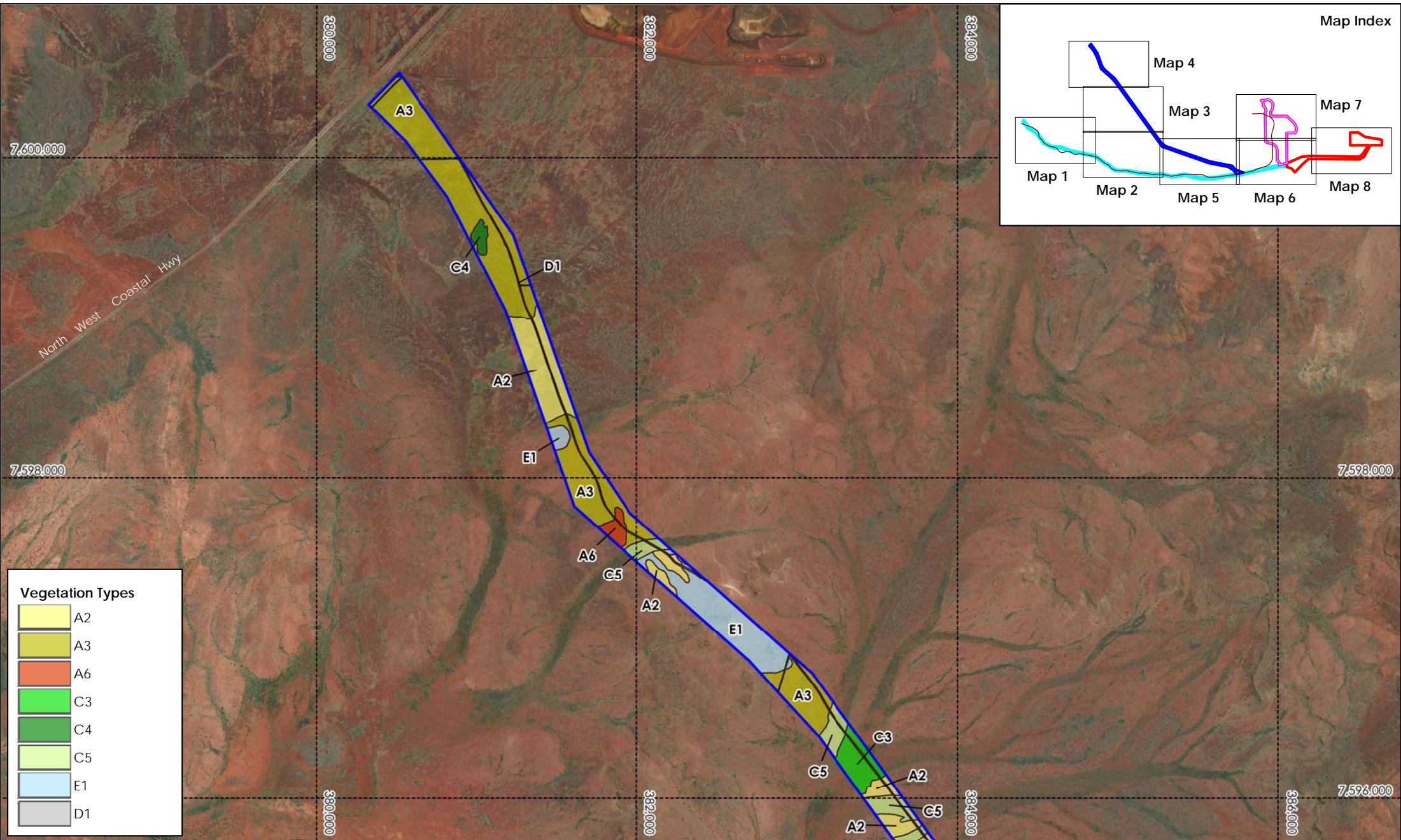
- Upper haul road option (CZR)
- Lower haul road option (CZR/RHI)
- East additional area (EAA)

- Mine associated infrastructure
- Design realignment route



**Robe Mesa Project
Vegetation Map 3**





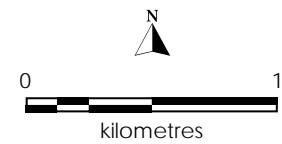
Vegetation Types

	A2
	A3
	A6
	C3
	C4
	C5
	E1
	D1



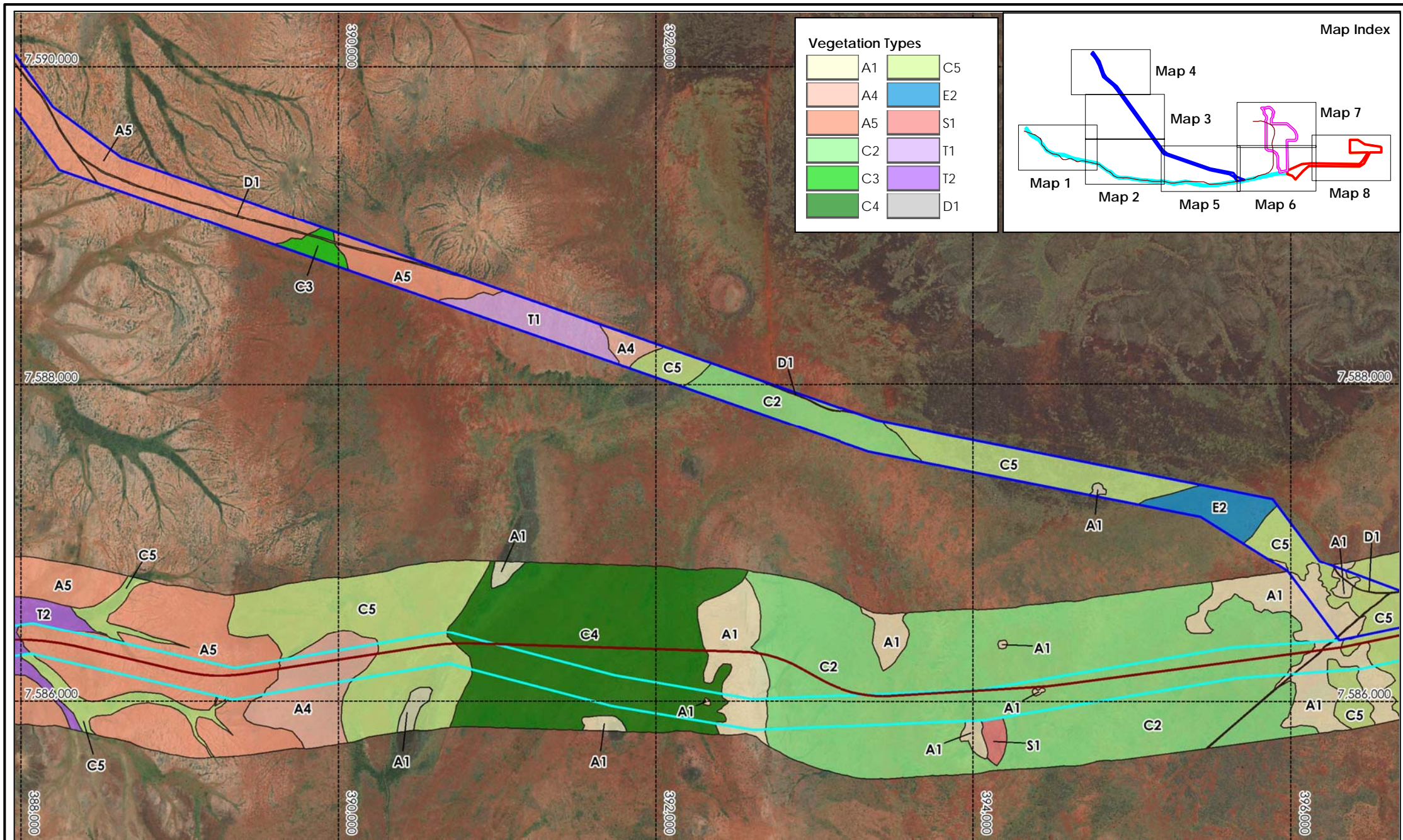
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- Lower haul road option (CZR/RHI)
- East additional area (EAA)

- Mine associated infrastructure
- Design realignment route



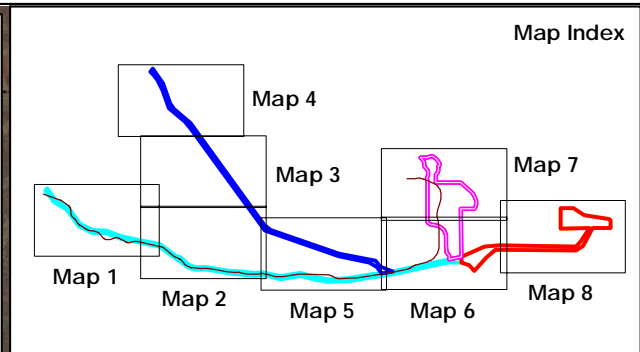
Robe Mesa Project Vegetation Map 4










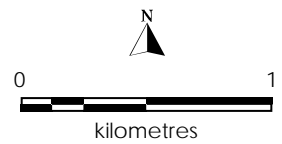
Vegetation Types

A1	C5
A4	E2
A5	S1
C2	T1
C3	T2
C4	D1



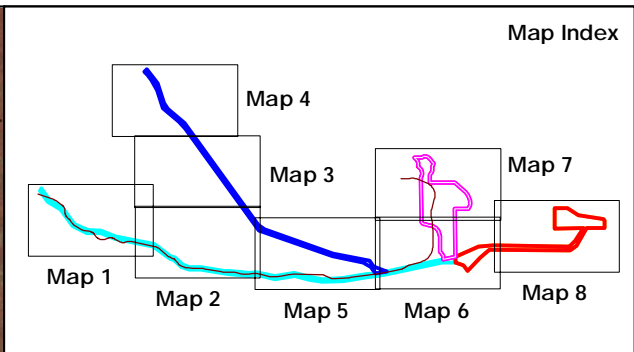
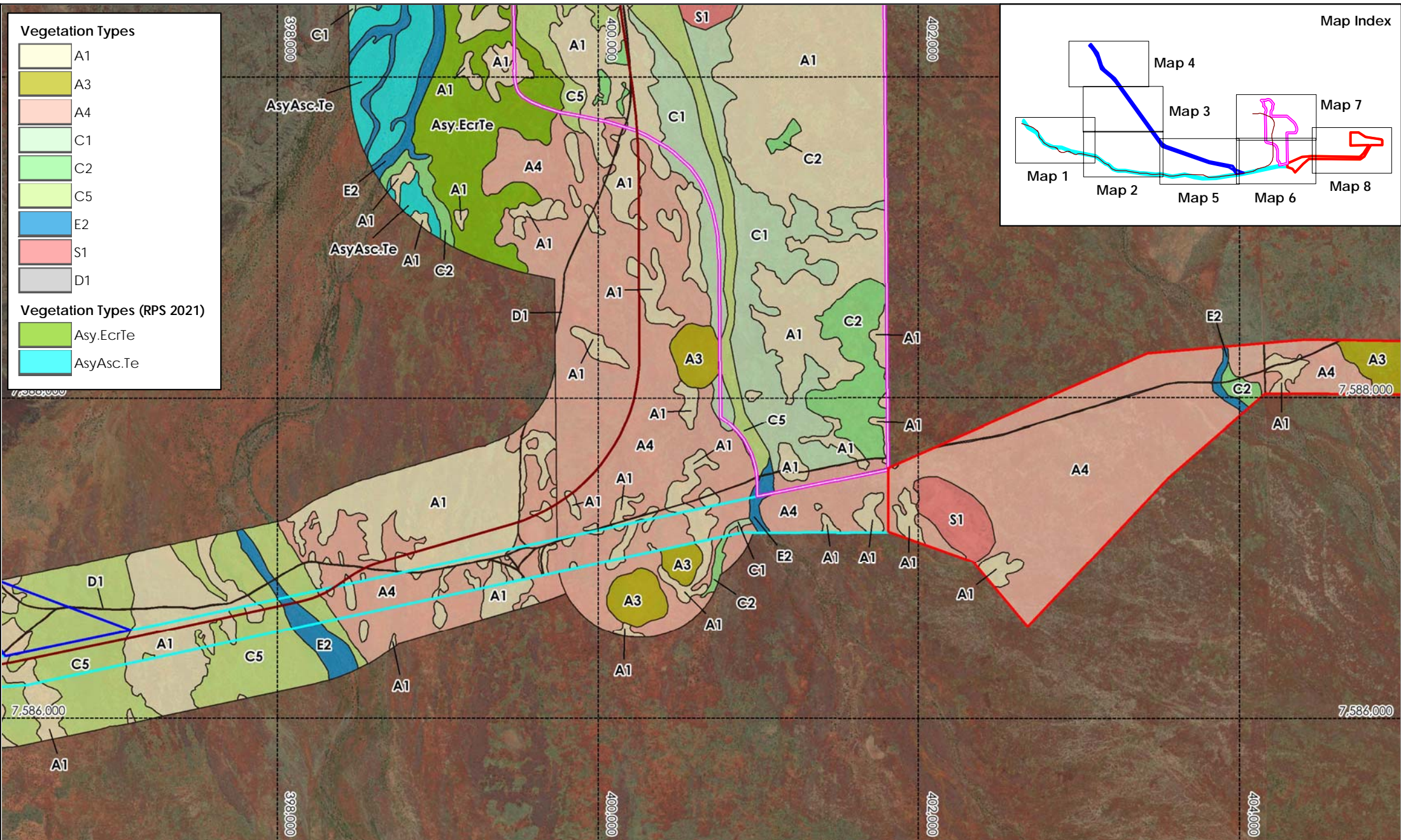
-  Upper haul road option (CZR)
-  Lower haul road option (CZR/RHI)
-  East additional area (EAA)

-  Mine associated infrastructure
-  Design realignment route



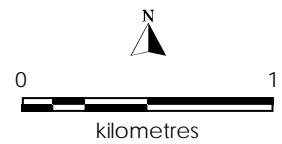
**Robe Mesa Project
Vegetation Map 5**





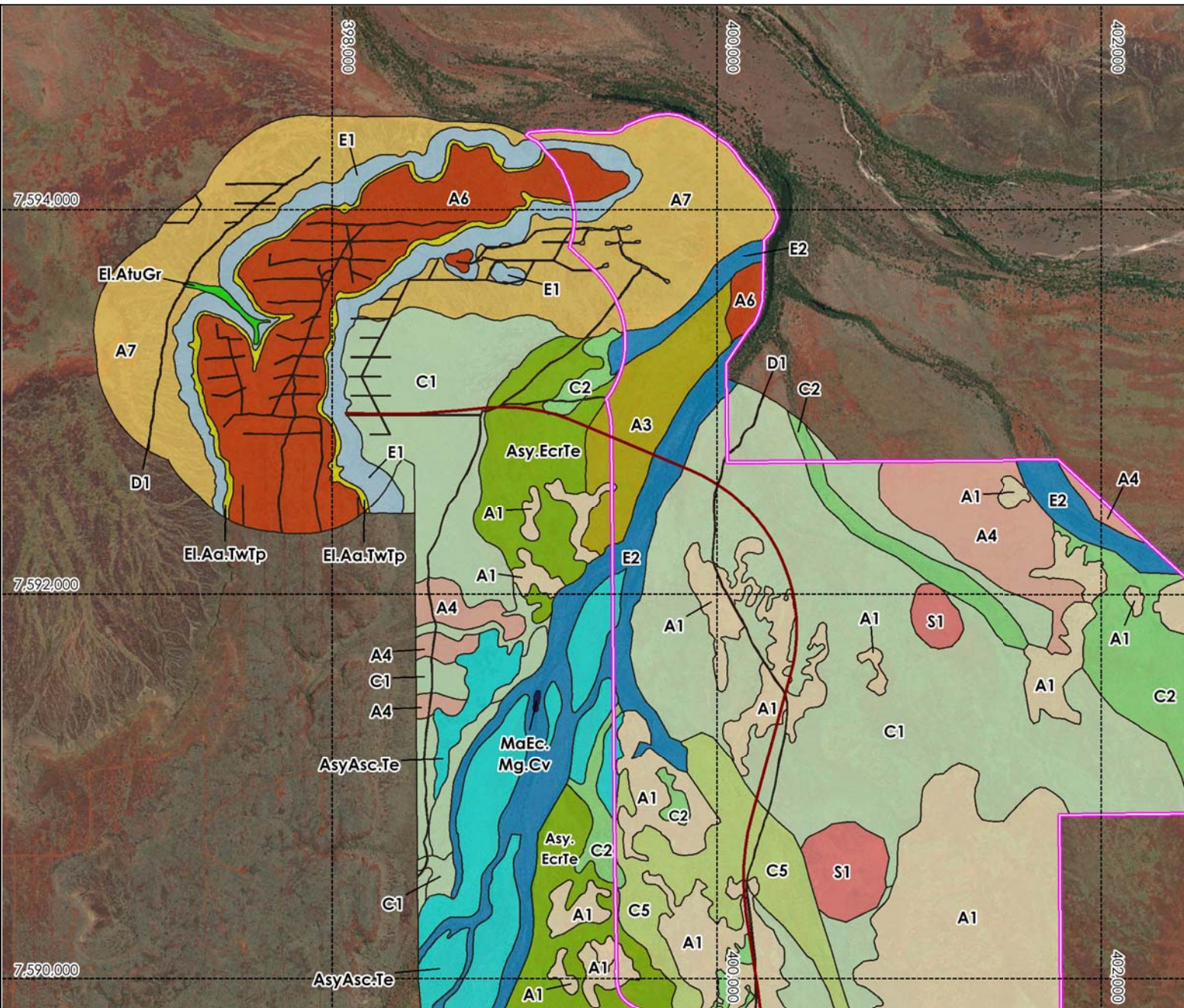
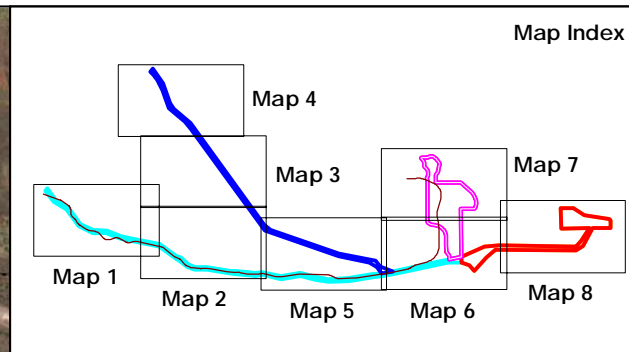
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- East additional area (EAA)

- Mine associated infrastructure
- Design realignment route



Robe Mesa Project Vegetation Map 6



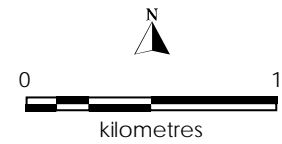


Vegetation Types	
[Light Yellow]	A1
[Light Green]	A3
[Light Orange]	A4
[Dark Orange]	A6
[Yellow]	A7
[Light Green]	C1
[Light Green]	C2
[Light Green]	C5
[Light Blue]	E1
[Blue]	E2
[Red]	S1
[Grey]	D1

Vegetation Types (RPS 2021)	
[Light Green]	Asy.EcrTe
[Cyan]	AsyAsc.Te
[Yellow]	El.Aa.TwTp
[Light Green]	El.AtuGr
[Blue]	MaEc.Mg.Cv










- Upper haul road option (CZR)
- Lower haul road option (CZR/RHI)
- East additional area (EAA)
- Mine associated infrastructure
- Design realignment route

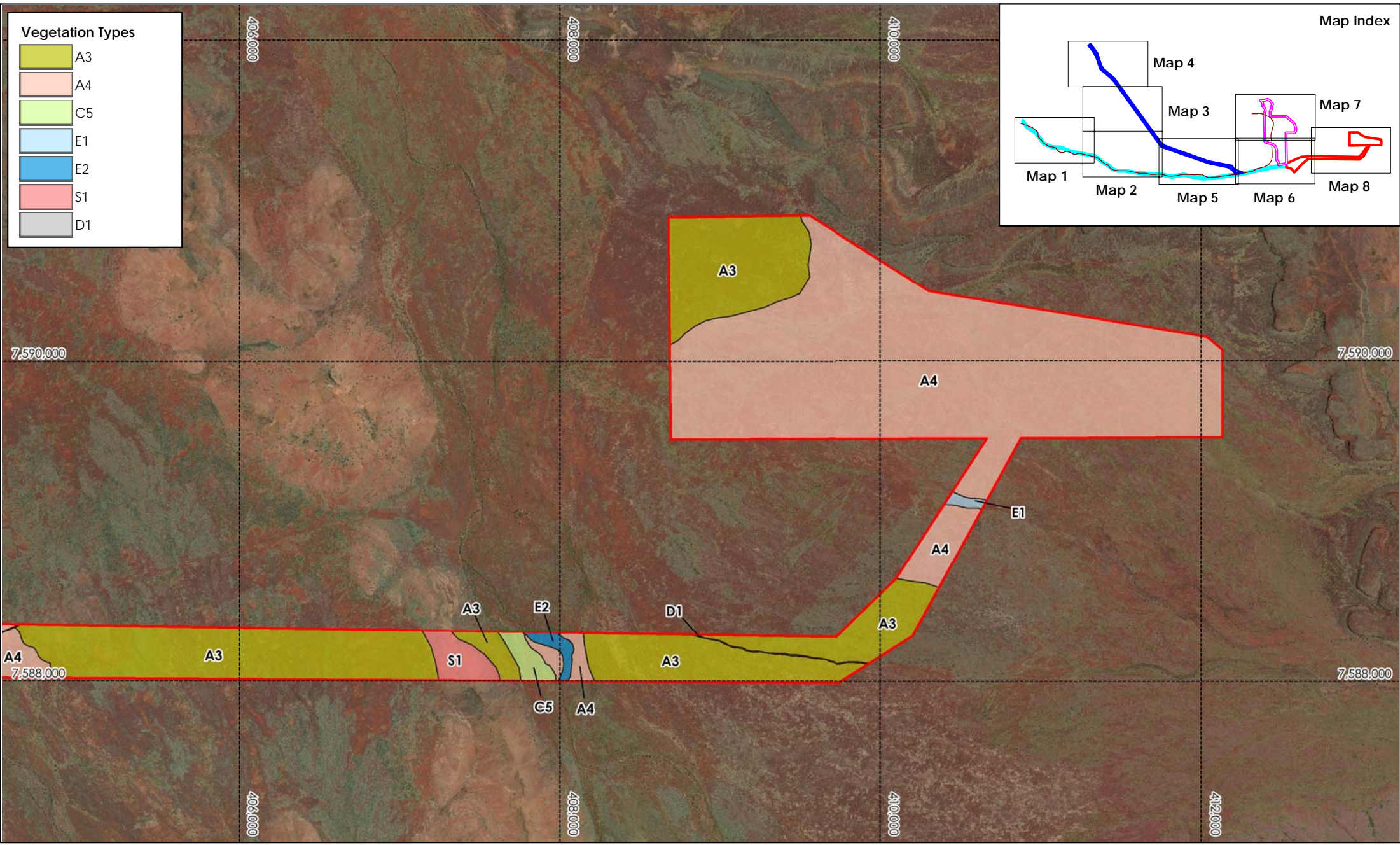
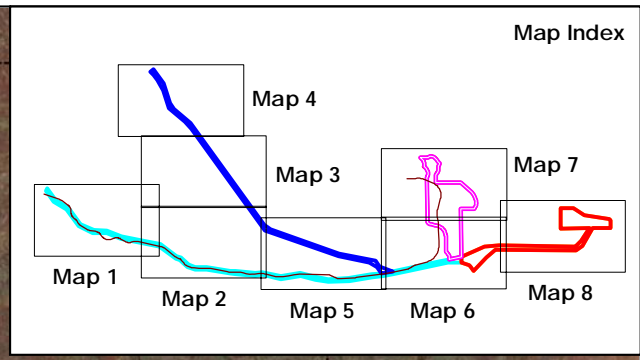





Robe Mesa Project Vegetation Map 7





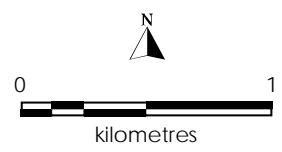
Vegetation Types

	A3
	A4
	C5
	E1
	E2
	S1
	D1



-  Upper haul road option (CZR)
-  Lower haul road option (CZR/RHI)
-  East additional area (EAA)

-  Mine associated infrastructure
-  Design realignment route



**Robe Mesa Project
Vegetation Map 8**

Biota
Environmental
Sciences