

31 July 2013

Director, Mining and Industry Projects
NSW Department of Planning & Infrastructure
23-33 Bridge Street
SYDNEY NSW 2000

Attention: Mr David Kitto

Dear David

**COALPAC CONSOLIDATION PROJECT ENVIRONMENTAL ASSESSMENT
BIODIVERSITY OFFSET STRATEGY**

As you are aware, a component of the Coalpac Consolidation Project (Project Application: 10_0178) Environmental Assessment included the development of a biodiversity offset strategy to compensate for the unavoidable ecological impacts associated with the Project. This strategy currently includes four properties that have been secured to provide for a total of 2,040 hectares (ha) of native vegetation, with a further commitment to achieve an overall ratio of at least 4:1 for forest and woodland vegetation to be impacted.

As part of the ongoing ecological assessment process, further investigations have been undertaken in the region to identify additional properties that could be potentially secured in order to meet Coalpac's commitment to an overall offset ratio for disturbance of native forest and woodland of at least 4:1.

Each property identified as having the potential to significantly enhance the existing offset strategy has also been assessed in terms of the area of 'like for like' vegetation present, in comparison to the communities that will be impacted by the Project. As a result of these investigations, four properties with the potential to provide significant additions to the current offset package have been identified, including:

- Hartley Vale (77 ha of native vegetation);
- Wolgan (483 ha of native vegetation);
- Hassan's Walls (697 ha of native vegetation); and
- Singlong Grange / The Pines (744 ha of native vegetation).

Some of the above properties are currently held in private ownership, with the owners indicating a willingness to sell, others such as Wolgan, Hartley Vale and Hassan's Walls are currently held by either Lithgow City Council or NSW Trade and Investment – Crown Lands with Lithgow City Council as Trustee.

None of these properties are currently managed in consideration of their ecological value. Coalpac are in discussions with the owners to potentially secure these properties as part of its offset strategy.

An analysis of the merit of each of the above properties being added to Coalpac's current portfolio of offset properties is provided in the attached letter report. This report demonstrates that Coalpac's commitment to obtaining an overall offset ratio of at least 4:1 for forest and woodland vegetation could be fully met if a combination of the above properties were secured as part of its biodiversity offset strategy.

We look forward to further consultation with both the Department and the NSW Office of Environment and Heritage to discuss the potential properties identified in the attached letter and to confirm whether a combination of some of these properties would form appropriate additions to the current offset package.

Should you require anything further, please do not hesitate to contact me on 02 6575 2000.

Yours faithfully
HANSEN BAILEY



James Bailey
Director

31 July 2013

Dorian Walsh
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**COALPAC CONSOLIDATION PROJECT - RE-EVALUATION OF
ECOLOGICAL IMPACTS OF PREFERRED PROJECT AND OFFSETTING
IMPLICATIONS**

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Dear Dorian,

As you are aware, the Coalpac Consolidation Project (the 'Project') has been amended to reduce the environmental footprint of the proposed open cut coal mine. Two successive changes have been made to significantly reduce the footprint below that which was exhibited in the original Environmental Assessment (EA) prepared by Hansen Bailey in 2012 (the 'Exhibited Project'). The first amendment was presented and discussed within a Preferred Project Report prepared by Hansen Bailey April 2013 (the 'Contracted Project'). The second and current amendment was made in July 2013 (the 'Preferred Project') and it is anticipated that these changes will be the subject of a second, amended Preferred Project Report.

An offset strategy has been prepared to compensate for predicted ecological impacts of the Project. It currently includes four properties that have been secured with a total 2,040 hectares (ha) of native vegetation. Coalpac has committed to obtaining an overall offset ratio of at least 4:1 for forest and woodland vegetation to be impacted and so is pursuing additional properties totalling more than 1,000 ha to augment its current offset strategy.

The purpose of this letter is twofold:

- To summarise the key ecological benefits of the Preferred Project (namely the reduced disturbance footprint) and to examine the implications of the reduced project disturbance footprint for the existing offset strategy; and
- To examine the extent to which additional 'Potential Properties' could be secured and incorporated in the current offset strategy to meet the

committed biodiversity offset ratio.

For the purposes of this report the following terms are used:

- **Exhibited Project:** the original Project that was exhibited as part of the EA in 2012;
- **Contracted Project:** the first modification to the Project that was exhibited within the Preferred Project Report dated April 2012; and
- **Preferred Project:** is the reduced disturbance footprint proposed in July 2013 that is the subject of this letter.

The findings of are set out below, and within **Appendices A** and **B** to this letter.

1. Background

The properties currently in the offset strategy (the 'Current Properties') are:

- Yarran View;
- Hyrock Hartley;
- Hillview/ Billabong; and
- Gulf Mountain.

The proponent committed to providing an offset package which will achieve an overall offset ratio of at least 4:1 for forest and woodland vegetation (4 hectares of offset for each hectare to be cleared) in the Contracted Project. The current offset package, comprising the Current Properties, needs to be enhanced to meet this commitment. It was acknowledged that further offset lands would be required to boost the total area of the offsets, and to ensure that the offset strategy meets current overall offsetting commitments of 4:1 for forest and woodland vegetation.

The vegetation communities that are not well represented on the properties listed above are lower valley floor communities and those that occur on soils derived from Permian geological deposits (see **Table 1**).

Cumberland Ecology has been assisting with the review of Potential Properties to enhance the current offset strategy to improve representation of impacted plant communities. Four Potential Properties were identified in the recent desktop assessment to provide suitable vegetation offsets. These properties were selected based on their overall size, proximity to the Project, quantum of 'like for like vegetation' communities (or similar communities) and habitat for threatened species that are predicted to be impacted by the Project.

The assessment concluded that the following Potential Properties warranted further investigation:

- Wolgan (483 ha of native vegetation);

- Hartley Vale (77 ha of native vegetation);
- Hassan's Walls (698 ha of native vegetation); and
- Singlong Grange/ The Pines (799 ha of native vegetation).

A further desktop analysis of the Potential Properties was conducted to clarify the amounts of 'like for like vegetation' each property contains, and to determine whether any vegetation communities not listed within the BioBanking assessment conducted for the site would constitute similar vegetation to that impacted. Note that the clarification was based on limited field work and more detailed vegetation mapping may be required in future if one or more properties are selected for the enhanced compensatory offset strategy.

2. Methods

2.1 Reduced Disturbance Footprint of the Preferred Project

The reduced ecological footprint of the Preferred Project was examined and compared to the disturbance footprint of both the Exhibited Project and the Contracted Project. This has been done by overlaying the Preferred Project disturbance footprint on the existing vegetation map for the Project Boundary and Disturbance Boundary.

The reduced areas of vegetation that are predicted to be cleared were calculated using GIS techniques and summarised in comparison to earlier proposed disturbance footprints.

2.2 Offset Ratio for the Preferred Project

The areas of vegetation that are predicted to be cleared by the Preferred Project were re-evaluated to revise the offset ratios based upon the reduced disturbance footprint of the project for the Current Properties and Potential Properties. The potential to address gaps and boost the offset ratios of communities that are not well represented on the Current Properties was then considered.

The Coalpac Project area occurs near the junction of several different vegetation map areas including the Western Blue Mountains, the Central Western CMA and others. Therefore, nearby vegetation communities that are the same or very similar to those occurring on parts of the mine site have been named differently in these areas. Notwithstanding the different names, it is valid to consider communities with 'like for like' or similar composition, and this is permitted under the rules of BioBanking.

For this reason two names are provided for each plant community. The first is a general or broad plant community name, the second is the name applied within the EA and the Preferred Project Report for the Contracted Project (generally derived from the names used by the Western Blue Mountains Vegetation Map).

In addition to the communities that are predicted to be impacted, the Potential Properties examined include other forest and woodland types that are not within the Project Boundary and will not be impacted. The ecological values of some such communities have also been

considered as they provide similar vegetation to one or more communities being impacted and/or they provide threatened fauna habitat.

An analysis was undertaken that compared the dominant canopy tree species of the impacted vegetation communities with the dominant species of communities in the offsets. Additionally, soil type, community structure, vegetation formation and vegetation class were assessed for similarity with those impacted.

Within the BioBanking assessment, communities considered as like for like offsets predominantly occurred within the Central West CMA. Several of the existing and potential offset properties do not occur within the same CMA, thus communities were matched with the most similar community in adjacent CMAs.

The area of Broad-leaved Peppermint – Brittle Gum – Red Stringybark dry open forest on the South Eastern Highlands has been altered since the initial gap analysis was conducted. During this assessment it was determined that 41.31 ha of the community occurs on the Hillview/ Billabong property, which was not included in the original gap analysis.

3. Results

3.1 Reduced Disturbance Footprint of the Preferred Project

Figures showing the Preferred Project, and the area now excluded from the mining proposal are shown in **Appendix A**.

The impacts of the Project have been reduced as follows:

- Exhibited Project disturbance footprint - 958 ha;
- Contracted Project disturbance footprint - 762 ha; and
- Preferred Project disturbance footprint- 666 ha.

The disturbance footprint of the Preferred Project is approximately 292 ha and 97 ha smaller than the disturbance footprint of the Exhibited Project and the Contracted Project, respectively.

The Preferred Project will result in the retention of the majority of all existing forest and woodland vegetation between the currently approved open cut pit at the Invincible Colliery and the Significant Pagoda Landscapes (SPL) mapped and discussed in the Preferred Project Report for the Contracted Project. All of the Pagoda Shrubland and a high proportion of the talus slopes woodlands will be protected from disturbance under the reduced mine plan. All of the major cliffs and pagodas within the SPL will be protected from mining and will be buffered from it by the protection of a broad band of intervening forest and woodland.

Table 1 below summarises the major plant communities that are within the latest area to be excluded from the open cut mining area, ranked in order from the community type that will benefit most from the proposed change to the mine plan, to those that will benefit least. The major reduction in impact is for MU 30 (Exposed Blue Mountains Sydney Peppermint - Silvertop

Ash Shrubby Woodland), a community that was not previously well represented in the offset strategy. The next two communities MU13 and MU34 are vegetation types that occur on soils derived from Permian sediments. They are also not well represented in the current offset strategy.

Table A.1 in **Appendix A** provides a summary of the differences in vegetation clearance between the Exhibited Project, the Contracted Project and the Preferred Project.

Table 1 **Reduction in Area of Impact from the Contracted Project to the Preferred Project**

Map Unit	Plant Community Name	Area (ha) Reduction between Contracted Project and Preferred Project
MU30	Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland	61.9
MU13	Tableland Gully Ribbon Gum Blackwood Apple Box Forest	18.2
MU34	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest	9.2
MU32	Tableland Scribbly Gum – Narrow-leaved Stringybark Shrubby Open Forest	3.5
MU35	Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest	2.0
MU20	Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland (EPBC)	0.9
Total		95.5

3.2 Offset Ratios for Preferred Project

The overall offset ratio for the Contracted Project and the Preferred Project (if all of the Potential Properties were utilised) are summarised in **Table 2** below.

Table 2 **Native Vegetation Offsets**

	Contracted Project	Preferred Project
Native Vegetation Cleared (ha)	761	666
Offset Area (ha) (Native Forest, Woodland and Grassland)	2,040	4,096
Overall Offset Ratio for Native Forest, Woodland and Grassland	2.7	6.2
Offset Area (ha) (Native Forest and Woodland only)	1,831	3,819
Overall Offset Ratio for Native Forest and Woodland only	2.4	5.7

If all of the Potential Properties were to be secured then the commitment to achieve an overall offset ratio of at least 4:1 for forest and woodland vegetation made in the Preferred Project Report would be significantly exceeded.

Table 3 summarises area impacted, offset provided and like for like offset provided for each vegetation community if all of the Potential Properties were utilised.

Table 3 Like For Like Vegetation Offsets Summary

MU Code / BioMetric Code	Community	Preferred Project Disturbance (ha)	Preferred Project Offsets (Like for Like) (ha)	Offset Ratio (Offset Area/Impact Area)
MU20 / CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)	16.4	362.5	22.1
MU13, MU35 / CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	117.3	299.2	2.6
MU30 / CW228	Sydney Peppermint - Silvertop Ash shrubby low open forest of the upper Blue Mountains	233.3	795.1	3.4
MU34, MU37 / CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	228.0	573.5	2.5
MU32 / CW176	Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion (Benson 290)	71.3	747.6	10.5
TOTAL		666.3	2,777.8	4.2

* Assumes all of the Potential Properties are utilised

Table 3 shows that all 'like for like' vegetation communities are offset by a ratio of at least 2.5:1 and that in some cases this ratio exceeds 20:1. The total 'like for like' offset ratio across all vegetation communities is 4.2:1.

Tables provided in **Appendix B** of this letter detail the findings of the offset assessment. The colour coding in the table represents the following:

- Orange: Communities that are 'like for like' as per the BioBanking assessment;
- Green: Communities considered by Cumberland Ecology to constitute 'like for like' vegetation, though not according to the BioBanking assessment (i.e. communities that

contain the same dominant tree species and structure, but may not occur within the same CMA as the Project);

- Light Blue: Vegetation communities similar to those impacted (i.e. communities that occur in the same or similar geological landscape to those within the Project, and share some but not all dominant tree species as the communities within the Project.).

Vegetation communities without colour coding are not considered 'like for like' for any impacted community. The total area of forest and woodland for each property is displayed with the property name. Vegetation communities are the names of the units mapped on the properties. Their BioBanking equivalents are also provided.

The detailed analysis provided in **Appendix B** shows that when the 'like for like' vegetation communities are considered within the combined Potential Properties, there is potential to improve the representation of vegetation communities within the offset package. This is helped by the reduced disturbance footprint and the reduced need for offsets for lower valley floor and Permian plant community types.

Amongst the Potential Properties, there is a suite of plant communities that are not 'like for like' but very similar in structure and floristics (species composition) to a number of impacted plant communities. When these plant communities are factored into an offset package incorporating the Potential Properties, they would add significantly to the package.

Finally, if all of the Potential Properties were to be utilised, approximately 552 ha of additional native vegetation that does not match any of the impacted vegetation would be included, further enhancing the ecological value of the overall offset package. Much of this additional vegetation is in good condition and would afford habitat for a range of threatened fauna species, including most of those predicted to be impacted by the Preferred Project, and several other species that are not predicted to be impacted. The final table in **Appendix B** provides a preliminary analysis of the threatened species habitat values that may be ascribed to the additional (non like for like or similar) vegetation communities. As can be seen from this table, which is based upon threatened species predicted by the BioBanking calculator to occur, a high proportion of threatened species relevant to the Project Boundary would occur within these areas.

4. Conclusion

The primary component in reducing the ecological impact of any project in the first instance is avoidance. Coalpac has modified the Project to avoid 30% of the native vegetation clearing proposed from that of the Exhibited Project.

The Preferred Project will significantly reduce the disturbance footprint of the Project and will retain the majority of the forest and woodland vegetation to the west of the SPL identified in the Preferred Project Report for the Contracted Project.

The reduction in the size of the disturbance footprint will also protect additional areas of several of the plant communities that were not well represented in the original offset strategy, particularly Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland

(additional 61.86 ha excluded from open cut mining), Tableland Gully Ribbon Gum Blackwood Apple Box Forest (additional 18.19 ha excluded from open cut mining) and Tableland Slopes Brittle Gum - Broad-leaved Peppermint (additional 9.16 ha excluded from mining).

Coalpac's commitment to obtaining an overall offset ratio of at least 4:1 made in the Preferred Project Report in April 2013 would be more than satisfied by drawing on the Potential Properties reviewed.

Further, when analysed on a like for like vegetation basis, if added to the offset strategy the Potential Properties achieve a good level of 'like for like' vegetation.

If you would like to discuss this letter further please contact me on either (02) 9868 1933 or 0425 333 466.

Yours sincerely



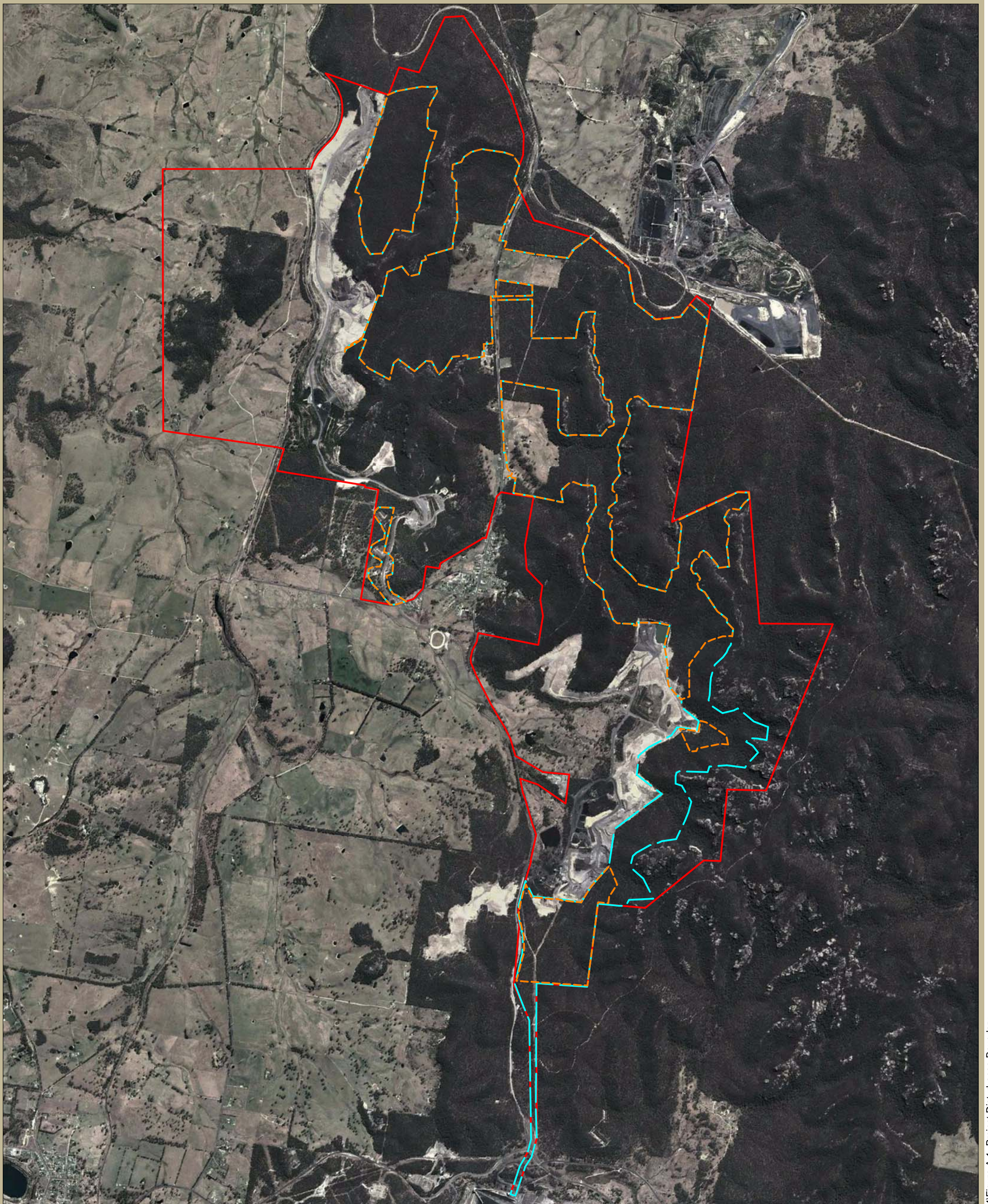
Dr David Robertson

Director

David.Robertson@cumberlandecology.com.au

Appendix A

Ecological Footprint of the Preferred Project

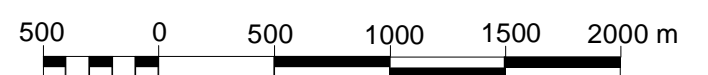


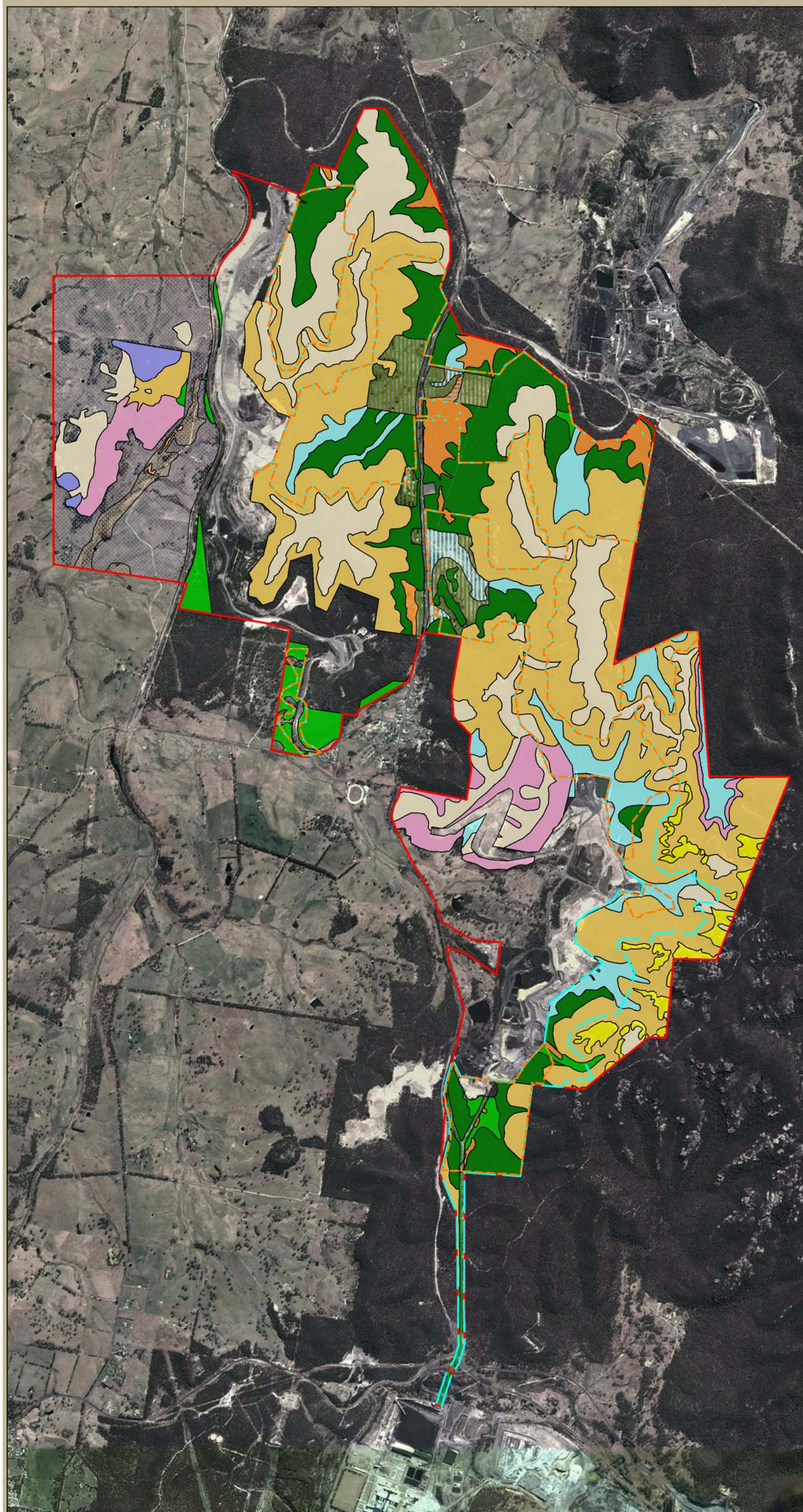
- Legend**
- Project Boundary
 - Updated Project Disturbance Boundary
 - Contracted Project Disturbance Boundary

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Figure A.1. Updated Project Disturbance Boundary





Legend

- Project Boundary
- Updated Project Disturbance Boundary
- Contracted Project Disturbance Boundary

Vegetation Community

- Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland (EPBC)
- Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland Derived Native Grassland (EPBC)
- Capertee Rough-barked Apple - Red Gum - Yellow Box Woodland Derived Native Grassland (TSC EEC)
- Capertee Rough-barked Apple - Red Gum - Yellow Box Woodland: non grassy
- Tableland Gully Ribbon Gum Blackwood Applebox Forest
- Tableland Gully Ribbon Gum Blackwood Applebox Forest Derived Native Grassland
- Tableland Scribbly Gum - Narrow-leaved Stringybark Shrubby Open Forest
- Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Woodland
- Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Woodland Low Diversity Derived Native Grassland
- Tableland Slopes Brittle Gum - Broad-leaved Peppermint Grassy Forest
- Tableland Slopes Brittle Gum - Broad-leaved Peppermint Grassy Forest Derived Native Grassland
- Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest
- Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest Derived Native Grassland
- Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest Low Diversity Derived Native Grassland
- Tableland Gully Snow Gum - Ribbon Gum Grassy Forest
- Tableland Gully Snow Gum - Ribbon Gum Grassy Forest Low Diversity Derived Native Grassland
- Pagoda Rock Sparse Shrubland
- Cox's Permian Red Stringybark - Brittle Gum Woodland
- Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland

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Figure A.2. Impact on Vegetaiton Communities



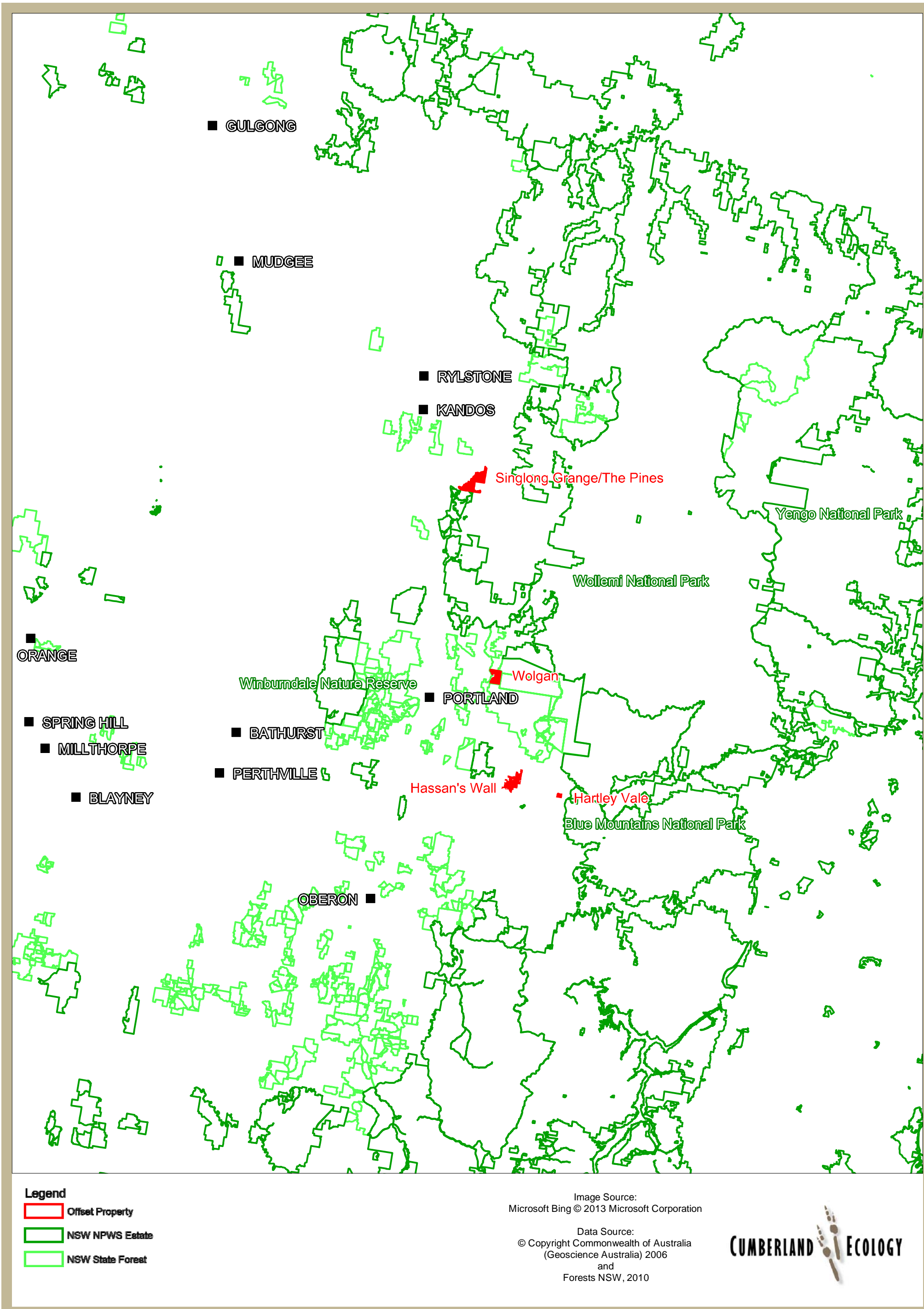


Figure A.3. Additional Offset Properties Overview

Table A.1 Comparison of areas that would be cleared by Exhibited Project and Current Preferred Project

Code	Vegetation Community within the Project Boundary	Area Impacted (ha)			Area avoided (ha)	Area reduction (%)
		(1) Exhibited Project Disturbance Boundary (EA)	(2) Contracted Project Disturbance Boundary (PPR)	(3) Preferred Project Disturbance Boundary (July)	(1) - (3)	(1) - (3)/(1) X 100
MU20	Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland (EPBC)	16.21	14.96	14.09	2.12	13
MU20 DNG*	Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland Derived Native Grassland (EPBC)	0.27	0.27	0.27	0	0
MU20b	Capertee Rough-barked Apple Red Gum Yellow Box Woodland Derived Native Grassland (TSC EEC)	1.96	1.96	1.96	0	0
MU20a	Capertee Rough-barked Apple - Red Gum - Yellow Box Woodland: non grassy	0.11	0.11	0.11	0	0
MU13	Tableland Gully Ribbon Gum Blackwood Apple Box Forest	93.94	91.15	72.96	20.98	22
MU13a	Tableland Gully Ribbon Gum Blackwood Apple Box Forest Derived Native Grassland	15.02	15.03	15.03	-0.01	0
MU35	Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest	18.87	17.98	15.99	2.88	15
MGBIP DNG*	Tableland Gully Mountain Gum Broad-leaved Peppermint Grassy Forest Derived Native Grassland	12.43	12.43	12.43	0	0
MGBIP DNG*	Tableland Gully Mountain Gum Broad-leaved Peppermint Grassy	0.85	0.85	0.85	0	0

Table A.1 Comparison of areas that would be cleared by Exhibited Project and Current Preferred Project

Code	Vegetation Community within the Project Boundary	Area Impacted (ha)			Area avoided (ha)	Area reduction (%)
		(1) Exhibited Project Disturbance Boundary (EA)	(2) Contracted Project Disturbance Boundary (PPR)	(3) Preferred Project Disturbance Boundary (July)	(1) - (3)	(1) - (3)/(1) X 100
	Forest Low Diversity Derived Native Grassland					
MU30	Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland	370.43	295.18	233.32	137.11	37
MU34	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest	185.77	182.86	173.7	12.07	6
MU34 DNG*	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest Derived Native Grassland	50.1	49.23	49.23	0.87	2
MU37	Cox's Permian Red Stringybark - Brittle Gum Woodland	23.71	5.05	5.05	18.66	79
MU32	Tableland Scribbly Gum – Narrow-leaved Stringybark Shrubby Open Forest	112.51	74.8	71.33	41.18	37
MU33	Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Woodland	13.02			13.02	100
MU33 DNG*	Tableland Broad-leaved Peppermint - Brittle Gum - Red Stringybark Grassy Woodland Low Diversity Derived Native Grassland	42.72			42.72	100
MU43	Pagoda Rock Sparse Shrubland	0.05			0.05	100
TOTAL		957.97	761.86	666.32	291.65	30

Appendix B

Offset Analysis

Community 1 - Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions

Slopes and South Eastern Highlands Bioregions				Existing Offsets							Potential Offsets					Offsets
Map Unit Code	Vegetation Community	BB Code	Associated BB Veg Type	Preferred Project Impact (ha)	Hyrock Hartley (236)	Gulf Mountain (1278)	Yarran View (443)	Hillview/ Billabong (83)	Subtotal	Area Required to reach 4:1	Wolgan (483)	Hassan's Walls (698)	Hartley Vale (77)	Singlong Grange (799)	Subtotal	Remainder Required to reach 4:1
MU20	Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland (EPBC)	CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)	14.09	5.53											
MU20 DNG	Capertee Rough-barked Apple - Red Gum - Yellow Box Grassy Woodland Derived Native Grassland (EPBC)	CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)	0.27	29.34											
MU20	Blakely's Red Gum -Yellow Box -Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin	HN506	Blakely's Red Gum -Yellow Box -Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin								357.00					
MU20 DNG	Blakely's Red Gum -Yellow Box -Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin (derived grassland)	HN506	Blakely's Red Gum -Yellow Box -Rough-barked Apple grassy woodland of the Capertee Valley, Sydney Basin (derived grassland)								102.00					
MU20b	Capertee Rough-barked Apple Red Gum Yellow Box Woodland Derived Native Grassland (TSC)	CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)	1.96												
48	Red Stringybark - Blakely's Red Gum - Yellow Box woodland	CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)													
MU20a	Capertee Rough-barked Apple - Red Gum - Yellow Box Woodland: non grassy	CW103	Apple Box moist gully grass-forb open forest of the NSW South Western Slopes and South Eastern Highlands Bioregions (Benson 283)	0.11												
	White Box Woodland (EPBC)	HU654	White Box - Yellow Box grassy woodland on basalt slopes in the upper Hunter Valley, Brigalow Belt South		43.01											
	White Box Woodland Derived Native Grassland (EPBC)	HU655	White Box - Yellow Box grassy woodland on basalt slopes in the upper Hunter Valley, Brigalow Belt South		143.77											
	White Box Woodland Low Diversity Native Grassland/Exotic	HU656	White Box - Yellow Box grassy woodland on basalt slopes in the upper Hunter Valley, Brigalow Belt South		36.52											

White Box Shrubby Woodland	HU653	White Box - Narrow-leaved Ironbark shrubby open forest on hills of the central Hunter Valley, Sydney Basin		219.75											
Total Like for Like				0	0	0	5.53	5.53	60.19	0	0	0	357.00	357.00	-296.81
Total Similar Vegetation				0	0	262.76	0	262.76	-197.04	0	0	0	0	0	-197.04
GRAND TOTAL			16.43	0	0	262.76	5.53	268.29	-202.57	0	0	0	357.00	357.00	-559.57

Community 2 - Mountain Gum - Manna Gum open forest of the South Eastern Highlands															Existing and Potential Offsets	
				Existing Offsets						Potential Offsets						
Map Unit Code	Vegetation Community	BB Code	Associated BB Veg Type	Preferred Project Impact (ha)	Hyrock Hartley (236)	Gulf Mountain (1278)	Yarran View (443)	Hillview/ Billabong (83)	Subtotal	Area Required to reach 4:1	Wolgan (483)	Hassan's Walls (698)	Hartley Vale (77)	Singlong Grange (799)	Subtotal	Remainder Required to reach 4:1
MU13	Tableland Gully Ribbon Gum Blackwood Applebox Forest	CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	72.96	44.96						24.03					
MU13a	Tableland Gully Ribbon Gum Blackwood Applebox Forest Derived Native	CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	15.03												
MU35	Tableland Gully Mountain Gum - Broad-leaved Peppermint Grassy Forest	CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	15.99												
MGBIP DNG	Tableland Gully Mountain Gum Broad-leaved Peppermint Grassy Forest Derived Native Grassland	CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	12.43												
MGBIP DNG	Tableland Gully Mountain Gum Broad-leaved Peppermint Grassy Forest Low Diversity Derived	CW154	Mountain Gum - Manna Gum open forest of the South Eastern Highlands	0.85												
73	Cool Montane Wet Forest	HN558	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands								191.30					
	Montane Gully Forest	HN558	Narrow-leaved Peppermint - Mountain Gum - Brown Barrel moist open forest on high altitude ranges, northern South Eastern Highlands								38.89					
11	Tableland Gully Snow Gum - Ribbon Gum Montane Grassy Forest	HN572	Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands								3.89					
2J	Montane Gully Forest	HN599	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin		16.16											
8	Newnes Sheltered Peppermint - Brown Barrel	HN599	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin								16.41	78.71				

Total Like for Like		0	44.96	0	0	44.96	424.08	24.03	191.30	38.89	0	254.219	169.86
Total Similar Vegetation		16.16	0	0	0	16.16	452.88	16.41	82.60	0	0	99.01	353.87
GRAND TOTAL	117.26	16.16	44.96	0	0	61.12	407.92	40.44	273.90	38.89	0	353.23	54.69

Community 3 - Sydney Peppermint - Silvertop Ash shrubby low open forest of the upper Blue Mountains															Existing and Potential Offsets		
				Existing Offsets						Potential Offsets							
Map Unit Code	Vegetation Community	BB Code	Associated BB Veg Type	Preferred Project Impact (ha)	Hyrock Hartley (236)	Gulf Mountain (1278)	Yarran View (443)	Hillview/ Billabong (83)	Subtotal	Area Required to reach 4:1	Wolgan (483)	Hassan's Walls (698)	Hartley Vale (77)	Singlong Grange (799)	Subtotal	Remainder Required to reach 4:1	
MU30	Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland	CW228	Sydney Peppermint - Silvertop Ash shrubby low open forest of the upper Blue Mountains	233.32													
70	Sydney Sandstone woodland/open-forest	CW228	Sydney Peppermint - Silvertop Ash shrubby low open forest of the upper Blue Mountains														
	Eucalyptus sieberi - Eucalyptus piperita Open forest/Woodland	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin		157.92							5.66					
28	Sandstone Plateau And Ridge Scribbly Gum - Silvertop Ash Shrubby Woodland	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin								35.45						
29	Sandstone Slopes Sydney Peppermint Shrubby Forest	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin								11.25	16.26					
30	Exposed Blue Mountains Sydney Peppermint - Silvertop Ash Shrubby Woodland	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin								197.40	76.26					
26	Newnes Plateau Narrow-leaved Peppermint - Silvertop Ash Layered Open Forest	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin									23.87					
136	Blue Mountains Ridgetop Forest	HN600	Sydney Peppermint - Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin									270.98					
2G	Eucalyptus oreades Open-forest/Tall Open-forest	HN599	Sydney Peppermint - Narrow-leaved Peppermint shrubby open forest on sheltered slopes of the Newnes Plateau, Sydney Basin		5.39												
Total Like for Like					157.92	0	0	0	157.92	775.36	244.10	387.37	5.66	0	637.13	138.23	
Total Similar Vegetation					5.39	0	0	0	5.39	927.89	0	0	0	0	0	927.89	
GRAND TOTAL				233.32	163.31	0	0	0	163.31	769.97	244.10	387.37	5.66	0	637.13	132.84	

Community 4 - Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands															Existing and Potential Offsets		
				Existing Offsets						Potential Offsets							
Map Unit Code	Vegetation Community	BB Code	Associated BB Veg Type	Preferred Project Impact (ha)	Hyrock Hartley (236)	Gulf Mountain (1278)	Yarran View (443)	Hillview/ Billabong (83)	Subtotal	Area Required to reach 4:1	Wolgan (483)	Hassan's Walls (698)	Hartley Vale (77)	Singlong Grange (799)	Subtotal	Remainder Required to reach 4:1	
MU34	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	173.70													
MU34 DNG	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest Derived Native Grassland	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	49.23													
MU37	Cox's Permian Red Stringybark - Brittle Gum Woodland	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	5.05							40.03						
		HN570	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands								13.89						
	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands		41.31												
	Broadleaved Peppermint - Brittle Gum Woodland	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands		478.24												
	Tableland Slopes Brittle Gum – Broad-leaved Peppermint Grassy Forest Derived	CW117	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands		7.17												
Total Like for Like					0	478.24	0	41.31	519.55	392.37	40.03	13.89	0	0	53.92	338.45	
Total Similar Vegetation					0	0	0	0	0	911.92	0	0	0	0	0	911.92	
GRAND TOTAL				227.98	0	478.24	0	41.31	519.55	392.37	40.03	13.89	0	0	53.92	338.45	

Community 5 - Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion															Existing and Potential Offsets		
				Existing Offsets						Potential Offsets							
Map Unit Code	Vegetation Community	BB Code	Associated BB Veg Type	Preferred Project Impact (ha)	Hyrock Hartley (236)	Gulf Mountain (1278)	Yarran View (443)	Hillview/ Billabong (83)	Subtotal	Area Required to reach 4:1	Wolgan (483)	Hassan's Walls (698)	Hartley Vale (77)	Singlong Grange (799)	Subtotal	Remainder Required to reach 4:1	
MU32	Tableland Scribbly Gum – Narrow-leaved Stringybark	CW176	Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest	71.33													

MU38	Grey Gum -Narrow-leaved Stringybark -Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin	HN534	Grey Gum - Narrow-leaved Stringybark - Inland Scribbly Gum shrubby open forest of the western Capertee Valley, Sydney Basin										281
MU39	Blue-leaved Ironbark -pine shrubby open forest on hills in the Capertee Valley, Sydney Basin	HN510	Blue-leaved Ironbark -pine shrubby open forest on hills in the Capertee Valley, Sydney Basin										55
	Blue Mountains Escarpment Complex	HN580	Sandstone cliff soak moist shrubland of the Sydney Basin			20.21							
	Blue Mountains Riparian Complex	HN607	Water Gum - Coachwood riparian scrub along sandstone streams, Sydney Basin			1.14							
	Blue Mountains Swamps	HN602	Tableland swamp meadow on impeded drainage sites of the western Sydney Basin and South Eastern Highlands			3.38						0.88	
	Riparian River Oak Forest	CW180	River Oak riparian woodland of the Brigalow Belt South and Nandewar Bioregions (Benson 84)			6.98							
	Modified Bushland	-				4.87							
59	Non-native Vegetation - Pine plantation / woodlot / shelter	-										0.39	
60	Non-native Vegetation - Other exotics (willow etc)	-										0.13	
62	Cleared and Severely Disturbed Lands	-								3.62	12.85		
Native Woodland and Forest						56.62	6.98	0	0	158.10	22.35	32.02	340

Table B.1 Preliminary Analysis of the Threatened Species Habitat Values

Species		BioMetric Vegetation Type											
Scientific Name	Common Name	HN569	HN508	HN563	HN559	HN574	HN534	HN510	HN580	HN607	HN602	CW143	CW180
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo												
<i>Climacteris picumnus</i>	Brown Treecreeper	y										y	y
<i>Petroica boodang</i>	Scarlet Robin	y			y	y	y	y			y	y	y
<i>Chthonicola sagittata</i>	Speckled Warbler												
<i>Daphoenositta chrysoptera</i>	Varied Sitella												
<i>Lophoictinia isura</i>	Square-tailed Kite												
<i>Ninox strenua</i>	Powerful Owl					y						y	y
<i>Glossopsitta pusilla</i>	Little Lorikeet					y	y	y	y				y
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	y					y	y					y
<i>Grantiella picta</i>	Painted Honeyeater					y	y	y				y	y
<i>Anthochaer aphrygia</i>	Regent Honeyeater					y	y	y	y				y
<i>Lathamus discolor</i>	Swift Parrot	y										y	
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler					y						y	y
<i>Neophema pulchella</i>	Turquoise Parrot	y				y	y	y					y
<i>Melanodryas cucullata</i>	Hooded Robin												
<i>Stagonopleura guttata</i>	Diamond Firetail					y						y	y
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	y	y									y	

Table B.1 Preliminary Analysis of the Threatened Species Habitat Values

Species		BioMetric Vegetation Type											
Scientific Name	Common Name	HN569	HN508	HN563	HN559	HN574	HN534	HN510	HN580	HN607	HN602	CW143	CW180
<i>Tyto novaehollandiae</i>	Masked Owl					y				y		y	y
<i>Ninox connivens</i>	Barking Owl	y				y	y	y				y	y
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll												y
<i>Petrogale penicillata</i>	Brush-tailed Rock Wallaby												
<i>Phascolarctos cinereus</i>	Koala	y								y		y	y
<i>Petaurus norfolcensis</i>	Squirrel Glider												y
<i>Cercartetus nanus</i>	Eastern Pygmy-possum												
<i>Petaurus australis</i>	Yellow-bellied Glider												
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat												
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	y	y		y	y	y			y			
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat												
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat												
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat											y	y
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat												
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake												
<i>Varanus rosenbergi</i>	Rosenberg's Goanna												