10 June 2014

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DIXON SAND MODIFICATION 4 - OFFSET INVESTIGATION

Dear Neil,

The purpose of this letter is to provide additional information regarding the offsets for the Dixon Sands sand quarry (DA 250-09-01 Modification 4). The New South Wales Office of Environment and Heritage (OEH) have expressed reservations as to the adequacy of offsets currently proposed for the Dixon Sands stage 4 Modification (the 'Project'). As such, a survey has been undertaken to assess the suitability of an area of vegetation to the south of the Project as an area of offset. **Appendix A** of this letter details the findings of the survey, while **Appendix B** provides raw data collected during the survey. **Appendix C** provides correspondence from OEH.

We have concluded that a portion of the Haerses Rd property could add significant value to the biodiversity offset package for the Project. Should you wish to discuss the implications of the use of this vegetation as an offset area, please feel free to contact myself or Aleksei Atkin on (02) 9868 1933.

Yours sincerely

David Robertson

David Robertson
Director
david.robertson@cumberlandecology.com.au

Appendix A

Offset Assessment - Haerses Road

A.1 Background

A Flora and Fauna Impact Assessment was prepared by Cumberland Ecology in 2013 assessing the impacts of a proposed modification of the Dixon Sands sand quarry (DA 250-09-01 Modification 4) (the 'Project') on vegetation, threatened flora and threatened fauna. The assessment concluded that there would be no significant impact to threatened flora, fauna or vegetation communities. As part of the assessment, an offset was proposed to compensate for the direct impacts to native vegetation through rehabilitation. The details of impacts and the existing offsets are shown in **Table 1** below.

Table 1 Existing Biodiversity Offset Package

Vegetation Community	Impact Area (ha)	Rehabilitation Area (ha)	Offset Ratio
Banksia ericifolia – Leptospermum trinervium Heath	1.86	4.66	2.50
Angophora costata – Corymbia gummifera Woodland	1.15	1.19	1.03
Cynodon dactylon – Axonopus fissifolius Exotic Grassland	0.62		0.00
Eucalyptus punctata – Acacia parramattensis Woodland	0.67	0.98	1.47
TOTAL	**4.30**	**6.83**	**1.59**

Following submission of the Flora and Fauna Impact Assessment, discussions were held with New South Wales (NSW) Office of Environment and Heritage (OEH) to progress the approval. One of the key concerns raised by OEH was the ratio of pre-existing offsets. Consequently, the proponent has commissioned subsequent searches for offsets and has proposed additions to the biodiversity offset package through the protection of part of an area of vegetation located at Haerses Road, Maroota (the 'Subject Site'), to the south of the Project. This report provides a summary of biodiversity values within the Subject Site.

A.2 Methods

Prior to the inspection of the Subject Site, a database analysis of threatened species recorded in the area (10km radius) was undertaken. The species recorded in the area were among a suite of species considered during habitat assessment of the property. Further, a literature review was conducted which included analysis of previous ecological survey within the Subject Site. During the two day site inspection on the 31 March 2014 and 1 April, 2014, existing vegetation mapping was ground-truthed by recording the changes in vegetation composition and structure during random meanders and utilised aerial photography, topographic maps, a hand-held GPS unit. Additionally, where mapped vegetation communities were altered, 20 x 20 metre floristic quadrats were undertaken.

Notes and photographs were recorded during habitat assessment. The Subject Site was assessed for ground, shrub/understorey and canopy cover, presence of hollow-bearing trees, habitat features such as bush rock and fallen trees, and signs of fauna usage such as scats and scratches. Incidental fauna sightings were also recorded during the site inspection.

A.3 Key Findings – Haerses Road

The key features of this property for consideration as a biodiversity offset are as follows:

Lot & DP: Lot 176 and 177 DP 752039, Lot 170 DP 664767, Lot 7308 DP 1163424 and Lot B DP 407341.

Size: 52.8 ha (23.74 of which is comprises native vegetation).

Bioregion: Sydney Basin Bioregion.

Location/Context: The proposed offset area applies only to parts of lots to the east of Haerses Road. The Subject Site adjoins private vegetated land, mixed rural and agricultural and approved sand extraction. The vegetation within the Subject Site is not directly connected with OEH land, but forms part of a large patch of privately owned vegetation, which creates a significant vegetative link between Marramarra National Park to the east and Maroota Ridge State Conservation Area to the west.

Geology: Geology in the locality is dominated by Hawkesbury Sandstone and has some areas of shale capping. Tertiary sand, silt, clay and gravel on the upper slopes of the Subject Site, grading to Hawkesbury Sandstone containing sandstone, quartz and some shale on the lower slopes. These are the same geological forms that occur within the Project Boundary.

Topography: The topography of the Subject Site is undulating hills, generally sloping towards Little Cattai Creek to the east.

Vegetation & Habitat Condition: Variable condition with areas of remnant native vegetation, rehabilitation of sand extraction sites and intensive agriculture.

A.3.1 Vegetation

Six vegetation communities occur within the Subject Site. These are shown in **Figure 1**, and areas of each community are listed in **Table 2** below.

Table 2 Vegetation within the Subject Site

Vegetation Community	Area (ha)
Sydney Sandstone Ridgetop Woodland	15.73
Sydney Hinterland Transition Woodland	2.58
Sydney Sandstone Gully Forest	3.53

Table 2 Vegetation within the Subject Site

Vegetation Community	Area (ha)
Sydney Sandstone Heath	1.90
Intensive Agriculture	28.07
Other Rural	0.98
TOTAL	52.8

Sydney Sandstone Ridgetop Woodland mapped within the Subject Site is considered equivalent to the *Angophora costata – Corymbia gumnifera* Woodland identified within the Project Boundary. The community occurs in approximately 15.73 ha of the Subject Site, in a large central patch in the south of the Subject Site and a smaller patch in the north of the Subject Site.The community within the Subject Site contains a canopy of *Angophora costata* (Smooth-barked Apple), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus piperita* (Sydney Peppermint). This vegetation community is listed within the *Tetratheca glandulosa* Threatened Species Profile (OEH, 2013) as suitable habitat for the species, which has the potential to be impacted by the Project.

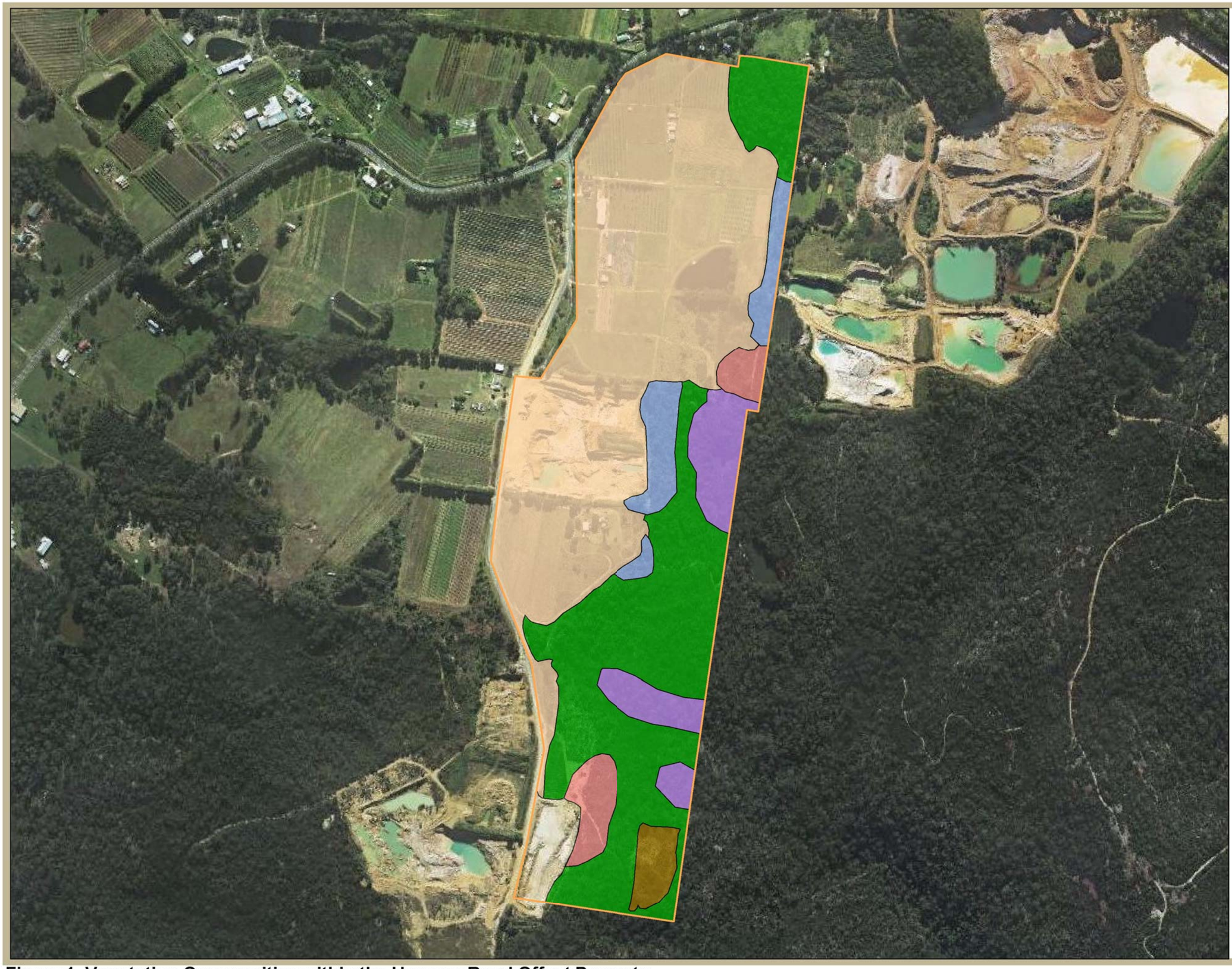
The Sydney Hinterland Transition Woodland mapped within the Subject Site is considered equivalent to the *Eucalyptus punctata – Acacia parramattensis* Woodland, as the community within the Subject Site contains high densities of both *Eucalyptus punctata* (Grey Gum) and *Acacia parramattensis* (Parramatta Wattle). The community occurs in approximately 2.58 ha of the Subject Site, and exists predominantly along the upper slopes on the northern and western portions of the Subject Site. Other occasionally occurring canopy species include *Corymbia gummifera* (Red Bloodwood), *Corymbia eximina* (Yellow Bloodwood) and *Allocasuarina littoralis* (Black She-oak).

Sydney Sandstone Gully Forest occurs in approximately 3.53 hectares of the Subject Site, predominantly on the lower slopes adjacent to Little Cattai Creek. The vegetation community does not occur within the Project Boundary, however provides suitable foraging habitat for threatened fauna species with potential to be impacted by the Project, such as the Glossy Black-Cockatoo (*Calyptorhyncus lathami*) which feeds on *Allocasuarina littoralis* (Black She-oak) which is found in this vegetation community. This vegetation community is dominated by *Eucalyptus piperita* (Sydney Peppermint), *Angophora costata* (Smooth-barked Apple) and *Allocasuarina littoralis* (Black She-oak).

Sydney Sandstone Heath occurs in two separate areas on the Subject Site, totalling 1.9 ha. The vegetation within the Subject Site is considered the same community as the *Banksia ericifolia – Leptospermum trinervium* Heath identified within the Project Boundary. The community within the Subject Site is predominantly shrubby, with the shrub layer being dominated by *Leptospermum trinervium* (Flaky-barked Tea-tree) and *Petrophile pulchella* (Conesticks), with occasional emergent *Angophora hispida* (Dwarf Apple). This vegetation community constitutes suitable habitat for *Melaleuca deanei*, which was located within the Project Boundary.

The remaining land within the Subject Site is utilised as agricultural and rural land. Approximately 29.05 ha of these communities occur across the Subject Site, along the western boundary of the remnant vegetation.

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Haerses Road Offset Property

Vegetation Community

- Sydney Sandstone Ridgetop Woodland
- Sydney Hinterland Transition Woodland
- Sydney Sandstone Gully Forest
- Sydney Sandstone Heath
- Intensive Agriculture
- Other Rural

Grid North

Image Source:
SIXmaps 23-04-2013

CUMBERLAND ECOLOGY

I:\...\11011\Figures\Letter 10\20140512\Figure 1. Vegetation_Haerses Road Offset

Figure 1. Vegetation Communities within the Haerses Road Offset Property

100 0 100 200 300 400m

A.3.2 Flora Values

Two threatened flora species are known to occur within the Subject Site. *Tetratheca glandulosa* has been identified at three separate locations within the Subject Site and is listed as Vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act). *Darwinia biflora* has been detected at eight separate locations within the Subject Site, including once during the current survey within the Sydney Sandstone Heath vegetation community. The species is listed as Vulnerable under both the TSC Act and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). *Darwinia biflora* is not known to occur within the Project Boundary, however is of conservation significance due to its threatened species listing. Additionally, suitable habitat for *Melaleuca deanei* occurs within the Sydney Sandstone Heath community (OEH, 2014a) occurring within the Subject Site.

A.3.3 Fauna Values

Fauna habitat within the Subject Site occurs as open forest and heath, with ephemeral water sources. Vegetation occurring on higher fertility geology, such as the Sydney Hinterland Transition Woodland have a tall open forest structure dominated by Eucalypt species, whereas areas on lower fertility sandstone geology occur in a heathy formation dominated by shrubs. Forested areas contain a diversity of roost, forage and shelter habitats for both terrestrial and arboreal fauna, with flowering Eucalypt and Acacia species occurring in high densites throughout the vegetation. Numerous large, hollow-bearing trees occur, which contain suitable habitat for hollow-roosting microchiropteran bat species, in addition to arboreal mammals. Additionally, forested areas contain significant areas of *Allocasuarina littoralis* (Black She-oak), which are a preferred feed tree species of the Glossy Black-Cockatoo (*Calyptorhyncus lathami*). The Glossy Black-Cockatoo (*Calyptorhyncus lathami*) has been detected during previous surveys of the site (Greenloaning Biostudies, 2002), in addition to a Koala (*Phascolarctos cinereus*), which is listed as Vulnerable under both the TSC Act and EPBC Act. Suitable forage habitat for microchiropteran bats exists across the site, with forested areas containing a dense shrub layer being suitable for smaller bat species, and open woodland and forest edges being suitable for larger species of microchiropteran bats. Previous surveys (Greenloaning Biostudies, 2002) have identified several bat species within the southern portion of the Subject Site, including the:

- Eastern Horseshoe Bat (*Rhinolophus megaphyllus*);
- Little Freetail-bat (*Mormopterus Sp. 2*);
- Large-eared Pied Bat (*Chalinolobus dwyeri*);
- Gould's Wattled Bat (*Chalinolobus gouldii*);
- Chocolate Wattled Bat (*Chalinolobus morio*);
- Eastern Broad-nosed Bat (*Scotorepens orion*); and
- Little Forest Bat (*Vespadelus vulturnus*).

One of these species, the Large-eared Pied Bat (*Chalinolobus dwyeri*) is listed as Vulnerable under both the TSC Act and the EPBC Act.

The Subject Site has excellent vegetation connectivity, being adjacent to vegetation within Little Cattai Creek, which forms part of a large patch connecting to Marramarra National Park to the east. The most viable area as a potential offset is considered to be the southern portion of the Subject Site, as this is least likely to suffer edge effects and weed encroachment from adjacent agricultural practices.

A.4 Offsetting Approach

OEH have indicated in their letter dated 24 February 2014 that they believe that the current offset proposal is inadequate, does not provide security as to the longevity of the proposed offset and that the area of suitable habitat for *Melaleuca deanei* is too low. To address these concerns, the proponent is proposing to provide 8.65 ha of land to be included within the offsets package for the Project (see **Table 3**). The exact configuration of the offset area will be determined at a later date through consultation with OEH.

The total area of suitable habitat for *Melaleuca deanei* within the Subject Site has been included within the offset ratio, generating a total offset ratio for *Melaleuca deanei* habitat of approximately **3.5:1**. Additionally, areas of other vegetation communities have been included to create a **total offset ratio of over 2:1**.

The proposed biodiversity offset package detailed within this letter does not include rehabilitated land within the offset ratio, however it should be noted that a significant area of habitat for *Melaleuca deanei* will be created through rehabilitation work. **Table 3** below provides a summary of the revised biodiversity offset package for the Project if a portion of the Subject Site is included.

The offsets within the Subject Site are proposed to be conserved through the implementation of a legal instrument, such as a Section 88B Positive Covenant, ensuring that the land is protected in the long term. The long-term management of both this land and the rehabilitaiton areas within the Project extraction footprint will be addressed within the Rehabilitation Management Plan.

Table 3 Proposed Biodiversity Offset Package

Project Vegetation Community	Offset Vegetation Community	Impact Area (ha)	Subject Site (ha)	Proposed Offset Area (ha)	Finalised Offset Ratio	Additional Rehabilitation Area (ha)	Offset Ratio Incl. Rehabilitation
Banksia ericifolia – Leptospermum trinervium Heath	Sydney Sandstone Heath	1.86	1.9	1.9	1.02	4.66	3.52
Angophora costata – Corymbia gummifera Woodland	Sydney Sandstone Ridgetop Woodland	1.15	15.73	4	3.47	1.19	4.50
Cynodon dactylon – Axonopus fissifolius Exotic Grassland		0.62		0	0.00		0.00
Eucalyptus punctata – Acacia parramattensis Woodland	Sydney Hinterland Transition Woodland	0.67	2.58	1.50	2.24	0.98	3.71
	Sydney Sandstone Gully Forest		3.53	1.25			
TOTAL		**4.30**	**23.74**	**8.65**	**2.01:1**	**6.83**	**3.60:1**

A.5 Conclusions and Recommendations

The Subject Site will generate a high value offset for the Project, as it contains suitable habitat for all threatened flora and fauna species with potential to be impacted by the Project. The Subject Site provides suitable areas of like-for-like vegetation communities to act as an adequate offset. Additionally, the Subject Site provides known habitat for a number of additional state and federally listed threatened species, which will benefit from the conservation of the Subject Site.

The area of native vegetation within the Subject Site is greater than that required to adequately offset the Project, thus the remainder of the land has potential to act as an offset for future projects, and can be managed as a single entity solely for the purpose of conservation. It is recommended that consultation with OEH occur as to the exact configuration and location of the offset area for the Project, but that conditional approval be granted to the Project based on their commitment to conserve additional offsets. The acquisition of a portion of the Subject Site will generate an offset ratio of **2:1** for vegetation communities impacted, which is increased to **3.6:1** if the rehabilitation areas within the Project are included.

A.6 References

Cumberland Ecology (2013) Dixon Sands Maroota – Flora and Fauna Impact Assessment. Prepared for Nexus Environmental Planning Pty. Ltd.

Greenloaning Biostudies (2002) Proposed Sand Extraction at Haerses Rd, Maroota – Constraints Associated with Flora and Fauna of the Site. Prepared for Dixon Sands Pty. Ltd.

OEH (2013) Threatened Species Profile – *Tetratheca glandulosa* *http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10798*

OEH (2014a) Threatened Species Profile – *Melaleuca deanei* http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10515

OEH (2014b) Draft NSW Biodiversity Offsets Policy for Major Projects

Appendix B

Survey Results

Table 4 Flora Species List

Family	Scientific Name	Common Name	*	Status (TSC, EPBC)	Q1	Q2	Q3
Trees							
Myrtaceae	*Angophora costata*	Smooth-barked Apple			5		
Myrtaceae	*Corymbia eximia*	Yellow Bloodwood					1
Myrtaceae	*Corymbia gummifera*	Red Bloodwood					1
Myrtaceae	*Eucalyptus piperita*	Sydney Peppermint			5		1
Myrtaceae	*Eucalyptus punctata*	Grey Gum					5
Small Trees							
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak			5	1	1
Cunoniaceae	*Ceratopetalum gummiferum*	Christmas Bush			1		
Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle					6
Myrtaceae	*Angophora hispida*	Dwarf Apple				2	
Myrtaceae	*Angophora costata*	Smooth-barked Apple					1
Myrtaceae	*Corymbia eximia*	Yellow Bloodwood			1		1
Myrtaceae	*Eucalyptus squamosa*	Scaly Bark				2	
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree				1	
Myrtaceae	*Eucalyptus haemastoma*	Scribbly Gum				1	
Shrubs							
Apiaceae	*Platysace linearifolia*	-			2	2	
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax			1		
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax					1
Asteraceae	*Ozothamnus diosmifolius*	Rice Flower					2
Casuarinaceae	*Allocasuarina littoralis*	Black She-oak				1	
Cunoniaceae	*Ceratopetalum gummiferum*	Christmas Bush			1		
Cunoniaceae	*Callicoma serratifolia*	Black Wattle			adj		
Dilleniaceae	*Hibbertia bracteata*				2	1	
Dilleniaceae	*Hibbertia empetrifolia*					3	
Ericaceae - Styphelioideae	*Epacris pulchella*	Wallum Heath			1	4	
Ericaceae -	*Epacris microphylla*	Coast Coral Heath				1	

Table 4 Flora Species List

Family	Scientific Name	Common Name	*	Status (TSC, EPBC)	Q1	Q2	Q3
Styphelioideae							
Ericaceae - Styphelioideae	*Leucopogon microphyllus*					4	
Euphorbiaceae	*Amperea xiphoclada*	Broom Spurge			1		
Euphorbiaceae	*Micrantheum ericoides*					1	
Fabaceae - Faboideae	*Bossiaea rhombifolia*				2		
Fabaceae - Faboideae	*Bossiaea scolopendria*					2	
Fabaceae - Faboideae	*Phyllota phylicoides*	Heath Phyllota				2	
Fabaceae - Mimosoideae	*Acacia suaveolens*	Sweet Wattle			1	1	
Fabaceae - Mimosoideae	*Acacia terminalis*	Sunshine Wattle			1		
Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle					2
Lamiaceae	*Hemigenia purpurea*					2	
Myrsinaceae	*Myrsine variabilis*						1
Myrtaceae	*Leptospermum polyanthum*				3		
Myrtaceae	*Kunzea ambigua*	Tick Bush			3		
Myrtaceae	*Angophora costata*	Smooth-barked Apple			1		
Myrtaceae	*Corymbia gummifera*	Red Bloodwood			1		
Myrtaceae	*Angophora hispida*	Dwarf Apple				3	
Myrtaceae	*Leptospermum trinervium*	Flaky-barked Tea-tree				5	
Myrtaceae	*Darwinia biflora*			V,V		2	
Phyllanthaceae	*Phyllanthus hirtellus*	Thyme Spurge			2	1	1
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum			1		2
Proteaceae	*Hakea laevipes*	-			1	2	
Proteaceae	*Grevillea sericea*	Pink Spider Flower			1	3	
Proteaceae	*Grevillea buxifolia*	Grey Spider Flower				1	
Proteaceae	*Persoonia pinifolia*				3	1	
Proteaceae	*Persoonia linearis*	Narrow-leaved					1

Table 4 Flora Species List

Family	Scientific Name	Common Name	*	Status (TSC, EPBC)	Q1	Q2	Q3
		Geebung					
Proteaceae	*Banksia spinulosa*	Hairpin Banksia			2		
Proteaceae	*Banksia oblongifolia*	Fern-leaved Banksia				3	
Proteaceae	*Lambertia formosa*	Mountain Devil			1	3	
Proteaceae	*Lomatia silaifolia*	Crinkle Bush			1		
Proteaceae	*Banksia serrata*	Old-man Banksia			1		
Proteaceae	*Petrophile pulchella*	Conesticks				5	
Proteaceae	*Banksia ericifolia*	Heath-leaved Banksia				2	
Rutaceae	*Boronia floribunda*				2	1	
Rutaceae	*Boronia ledifolia*	Sydney Boronia				1	
Santalaceae	*Exocarpos strictus*	Dwarf Cherry					2
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush			5		1
Verbenaceae	*Lantana camara*	Lantana	*				1
Herbs - Dicots							
Apiaceae	*Xanthosia tridentata*	Rock Xanthosia			1	1	
Asteraceae	*Actinotus minor*	Lesser Flannel Flower				3	
Asteraceae	*Bidens pilosa*	Cobblers Pegs	*				6
Asteraceae	*Tagetes minuta*	Stinking Roger	*				3
Chenopodiaceae	*Einadia hastata*	Berry Saltbush					3
Goodeniaceae	*Dampiera stricta*					1	
Haloragaceae	*Gonocarpus teucrioides*	Raspwort			1		
Lobeliaceae	*Pratia purpurascens*	Whiteroot					1
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	*				2
Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum			2		
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	*				2
Herbs – Monocots (Grasses)							
Poaceae	*Entolasia stricta*	Wiry Panic			4	1	1
Poaceae	*Andropogon virginicus*	Whisky Grass	*		1		
Poaceae	*Anisopogon avenaceus*	Oat Speargrass				3	

Table 4 Flora Species List

Family	Scientific Name	Common Name	*	Status (TSC, EPBC)	Q1	Q2	Q3
Poaceae	*Austrostipa pubescens*	a Spear Grass			2		
Poaceae	*Chloris gayana*	Rhodes Grass	*				1
Poaceae	*Digitaria ninolentus*						2
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass			1		1
Poaceae	*Eragrostis brownii*	Brown's Lovegrass			3		2
Poaceae	*Microlaena stipoides*	Weeping Grass			2		6
Poaceae	*Oplismenus aemulus*						3
Poaceae	*Panicum simile*	Two-colour Panic			1		
Poaceae	*Pennisetum clandestinum*	Kikuyu Grass	*				1
Poaceae	*Setaria parviflora*		*				2
Poaceae	*Themeda australis*	Kangaroo Grass			1		2
Herbs – Monocots (Other)							
Commelinaceae	*Commelina cyanea*	Native Wandering Jew	*				1
Cyperaceae	*Cyathochaeta diandra*				3	4	1
Cyperaceae	*Gahnia sieberiana*	Red-fruit Saw-sedge			1		
Cyperaceae	*Lepidosperma laterale*				1		
Cyperaceae	*Schoenus apogon*	Common Bog-rush				2	
Lomandraceae	*Lomandra filiformis var. filiformis*	Wattle Mat-rush			1		
Lomandraceae	*Lomandra glauca*	Pale Mat-rush				1	
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush			3		1
Lomandraceae	*Lomandra multiflora*	Lomandra multiflora					1
Lomandraceae	*Lomandra obliqua*	Fish Bones Mat-rush			1	1	
Orchidaceae	*Cryptostylis sp.*				2		
Phormiaceae	*Dianella caerulea var. assera*				2		1
Restionaceae	*Lepyrodia scariosa*					5	
Xanthorrhoeaceae	*Xanthorrhoea media*	Grass Tree				2	1
Herbs – Ferns and Allies							

Table 4 Flora Species List

Family	Scientific Name	Common Name	*	Status (TSC, EPBC)	Q1	Q2	Q3
Adiantaceae	*Cheilanthes sieberi*	Rock Fern					2
Dennstaedtiaceae	*Histiopteris incisa*	Bat's Wing Fern			1		
Dennstaedtiaceae	*Pteridium esculentum*	Bracken Fern			3		
Dicksoniaceae	*Calochlaena dubia*	Rainbow Fern			2		
Lindsaeaceae	*Lindsaea linearis*	Screw Fern			3	1	
Herbs - Climbers							
Apocynaceae	*Araujia sericifera*	Moth Vine	*				1
Lauraceae	*Cassytha glabella*					1	
Lauraceae	*Cassytha pubescens*	-			1		1
Pittosporaceae	*Billardiera scandens*	Hairy Apple Berry			3		1
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla			2		

Notes: CE= Critically Endangered, E= Endangered, V=Vulnerable

** denotes exotic species*

1 = <5% cover, rare

2 = <5% cover, occasional

3 = <5% cover, common

4 = <5% cover, very common

5 = 5 - 25% cover

6 = 26 - 50% cover

7 = 51 - 75% cover

8 = 76 - 100% cover

Appendix C

OEH Correspondence

NSW GOVERNMENT | Office of Environment & Heritage

PCU51621

Your reference: DA 250-09-01 Mod 4
Our reference: DOC14/16815
Contact: Rachel Lonie 9995 6837

Ms Elle Donnelly
Mining and Industry Projects
Department of Planning and Infrastructure
GPO Box 39
Sydney NSW 2001

Dear Ms Donnelly

I refer to your email correspondence dated 13 February 2014 inviting the Office of Environment and Heritage (OEH) to comment on the Response to Submissions Report on the Old Northern Quarry, Maroota (Dixon Sands) proposed modification.

Comments are provided in Attachment 1.

Should you have any queries in regard to this correspondence please contact Rachel Lonie, Senior Operations Officer, on 9995 6837 or by email at rachel.lonie@environment.nsw.gov.au.

Department of Planning
Received
27 FEB 2014
Scanning Room

Yours sincerely

S. Harrison 24/02/14

SUSAN HARRISON
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ATTACHMENT 1

Office of Environment and Heritage (OEH) to comment on the Response to Submissions Report on the Old Northern Quarry, Maroota (Dixon Sands) proposed modification

The Office of Environment and Heritage (OEH) notes that Cumberland Ecology (CE) has undertaken some additional flora surveys and has addressed the inadequacies OEH raised in relation to flora and fauna surveys and groundwater impacts. OEH now considers that these issues have been adequately addressed.

OEH still has concerns with the proposed offsets, particularly in relation to the *Melaleuca deanei* and threatened fauna habitats on site. The proposal is to recreate a vegetation community of 6.83 ha to offset the loss of 4.3 ha of remnant woodland, including threatened species habitats. As stated in the previous response, this provides an offset ratio of only 1.58, which is very low for a recreated community. In addition, there is a commitment to prepare a Rehabilitation Management Plan (RMP), however there is no commitment to the duration of the plan or the long term security of the revegetated lands.

OEH considers the offset area should be protected and managed in perpetuity. CE compares its proposed offsets against the Offset Principles in Appendix C. For Principle 5 ("Offsets must be enduring, enforceable and auditable") it is noted that the consultant's response is that the offsets will be enforceable and auditable, but is silent on whether the offsets will be enduring. OEH considers more detail is required to demonstrate that the offset will meet this requirement.