BOWENS ROAD NORTH OPEN CUT
JUNE 2010 MODIFICATION

STATEMENT OF ENVIRONMENTAL EFFECTS

STRATFORD COAL

ResourceStrategies

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JUNE 2010 MODIFICATION
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JUNE 2010
Project No. GCL-09-11
Document No. 00346359

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1 INTRODUCTION

1.1 GENERAL

The Bowens Road North Open Cut (BRNOC) is an existing open cut coal mining operation owned and operated by Stratford Coal Pty Ltd (SCPL), a subsidiary of Gloucester Coal Ltd (GCL). The BRNOC is located to the immediate north of the Stratford Coal Mine (SCM), approximately 100 kilometres (km) north of Newcastle, New South Wales (NSW) (Figure 1).

The BRNOC operates under a separate Development Consent (Development Application [DA] 39-02-01) to the SCM and has been in operation since 2003.

This Statement of Environmental Effects (SEE) has been prepared by SCPL to support a request to modify DA 39-02-01 under Section 96(2) of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

1.1.1 Existing Operations

Development History and Status

The BRNOC was assessed in the *Bowens Road North Project Environmental Impact Statement* (BRN EIS) (SCPL, 2001a) and was approved by the NSW Minister for Urban Affairs and Planning in July 2001. The original BRNOC general arrangement is shown on Figure 2.

Since commencement of the operation, three modifications to the original BRNOC have been made:

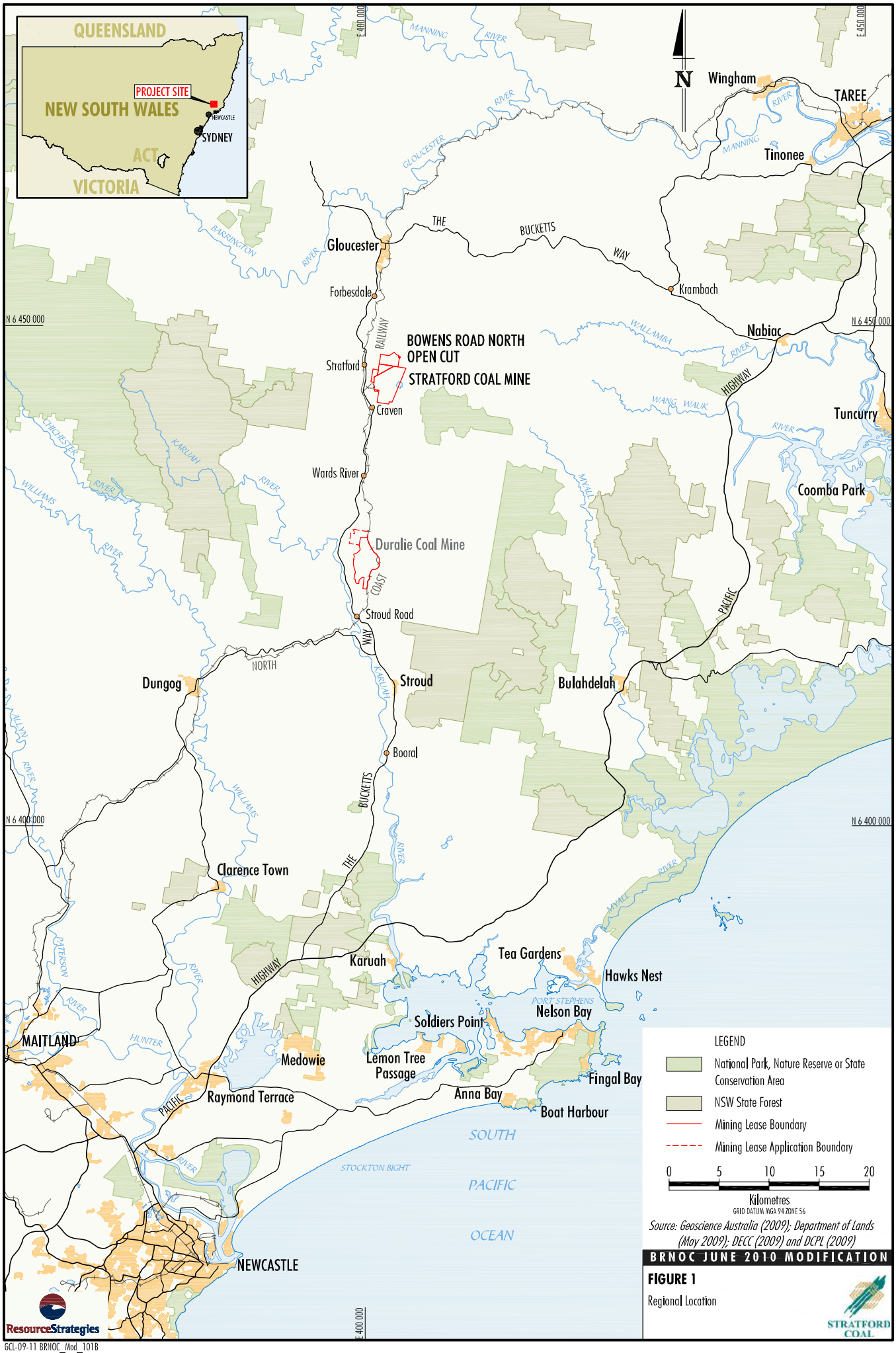
- In 2002, an application to modify the mining schedule and mine fleet was assessed via the *Bowens Road North Coal Mine – Project Modification Statement of Environmental Effects* (BRN 2002 SEE) (SCPL, 2002a). The modification was approved by the NSW Minister for Planning in October 2002.
- In 2004, an application to modify the mining rate (i.e. an increase from 0.65 to 0.9 million tonnes per annum [Mtpa]) was assessed. The modification was approved by the Minister assisting the Minister for Infrastructure and Planning in November 2004.
- In 2005, an application to modify the general arrangement and various Development Consent Conditions was assessed (BRN 2005 SEE) (SCPL, 2005). The modification was approved by the NSW Minister for Planning in June 2005.

A copy of the BRNOC consolidated Development Consent incorporating these modifications is provided as Attachment 1.

The extent of the approved BRNOC and SCM mine landforms and major infrastructure are shown on Figure 3.

Development of the Bowens Road North deposit began in March 2003. The open cut was initially developed as a box-cut, with waste rock extracted during the excavation of the box-cut emplaced in the BRNOC out-of-pit waste emplacements (Figure 3).

BRNOC is a daytime operation and mining and haulage is carried out between 7.00 am and 7.00 pm. BRNOC is consented to produce up to 0.9 million tonnes (Mt) of run-of-mine (ROM) coal per annum.



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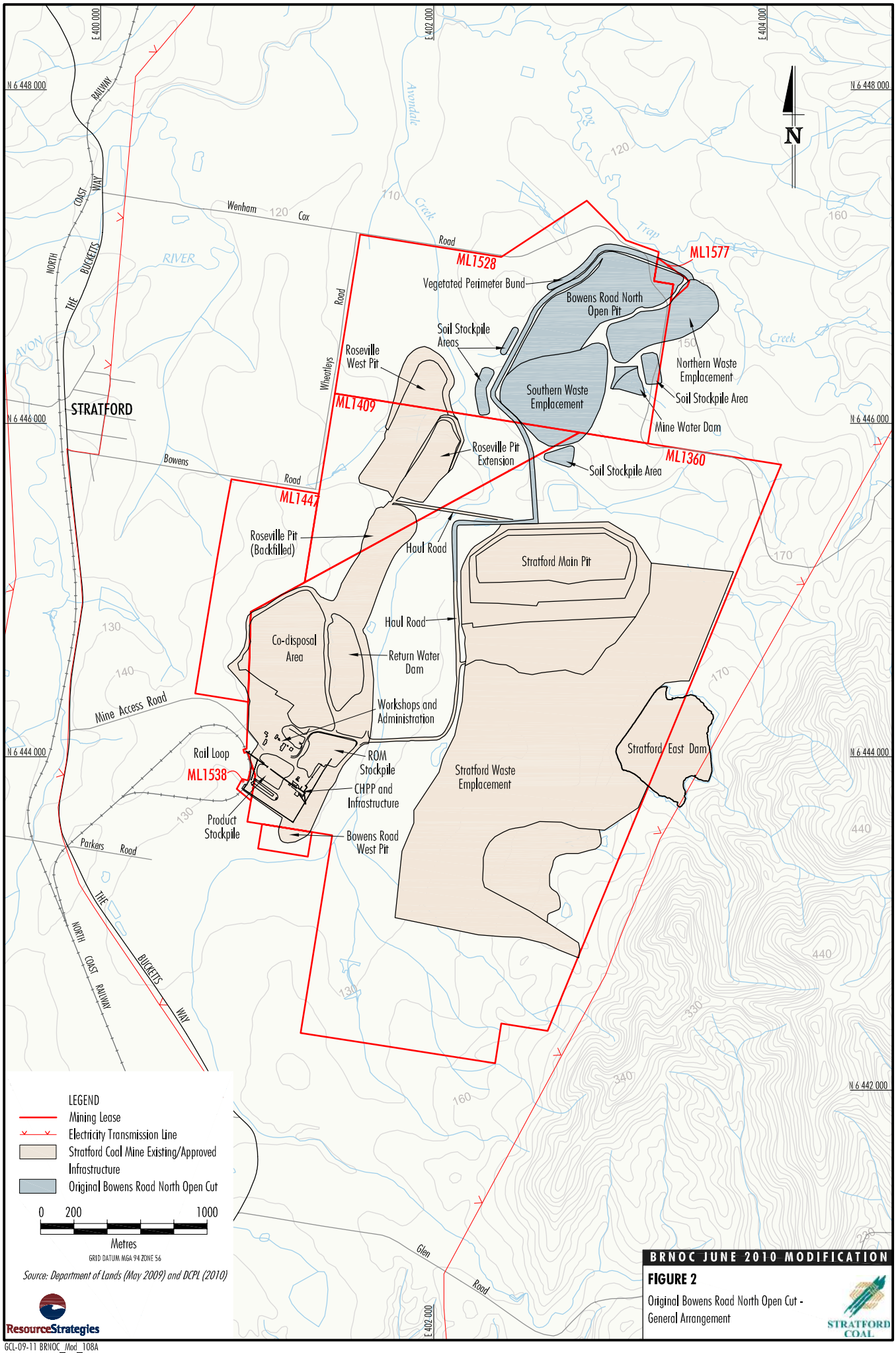
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RAILWAY
NORTH COAST WAY
THE BUCKETTS WAY
RIVER
AVON
Avondale
Dog Trap Creek
Wenham Cox Road
Bowens Road
Wheatleys Road
Parkers Road
Glen Road
STRATFORD
ML1528
ML1577
ML1409
ML1360
ML1447
ML1538
Vegetated Perimeter Bund
Bowens Road North Open Pit
Soil Stockpile Areas
Roseville West Pit
Southern Waste Emplacement
Northern Waste Emplacement
Soil Stockpile Area
Mine Water Dam
Roseville Pit Extension
Soil Stockpile Area
Roseville Pit (Backfilled)
Haul Road
Stratford Main Pit
Haul Road
Co-disposal Area
Return Water Dam
Workshops and Administration
Mine Access Road
Rail Loop
ROM Stockpile
CHPP and Infrastructure
Product Stockpile
Bowens Road West Pit
Stratford Waste Emplacement
Stratford East Dam
LEGEND
Mining Lease
Electricity Transmission Line
Stratford Coal Mine Existing/Approved Infrastructure
Original Bowens Road North Open Cut
0 200 1000
Metres
GRID DATUM MGA 94 ZONE 56
Source: Department of Lands (May 2009) and DCPL (2010)
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BRNOC JUNE 2010 MODIFICATION
FIGURE 2
Original Bowens Road North Open Cut - General Arrangement
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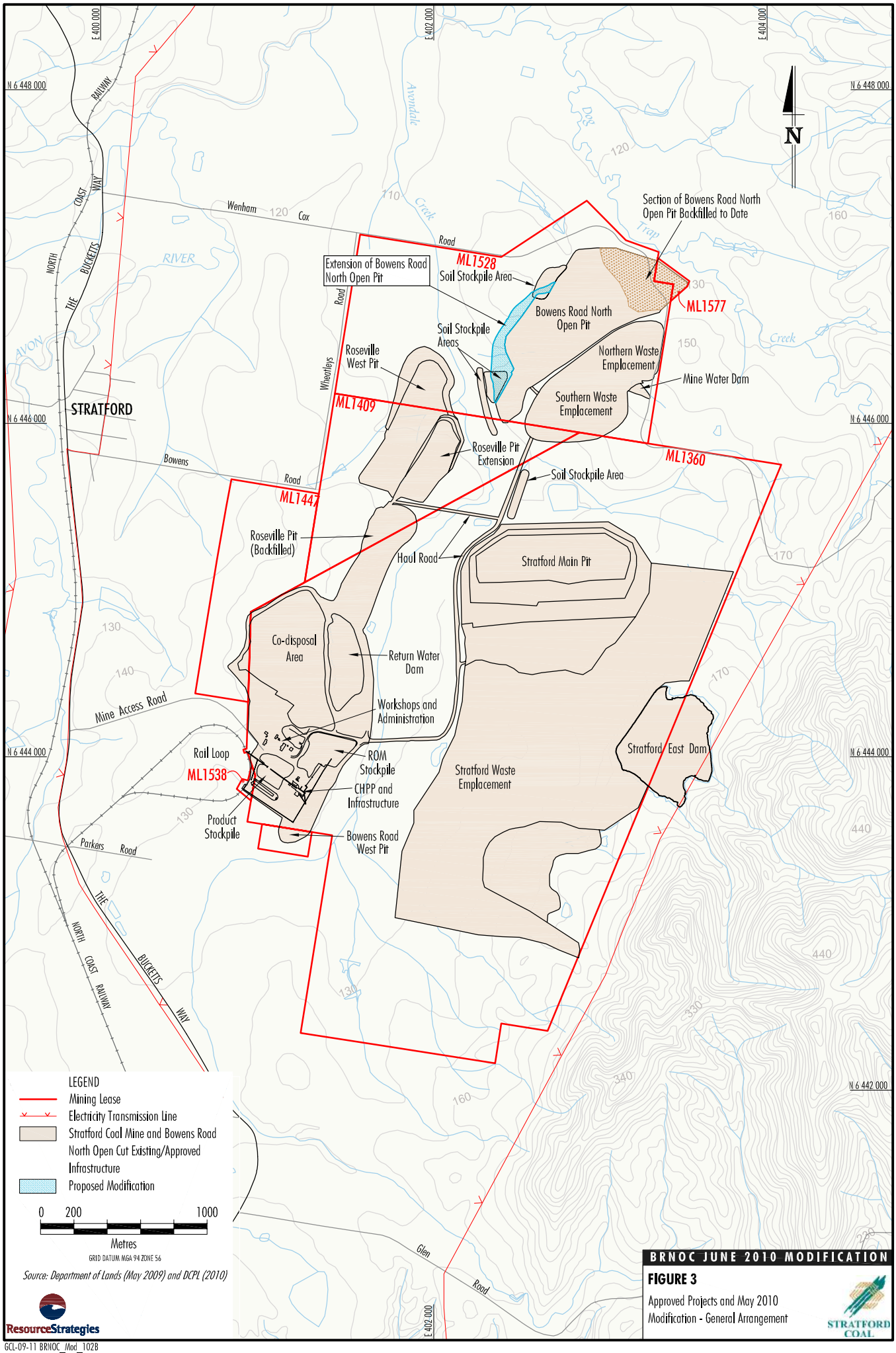
GCL-09-11 BRNOC_Mod_10BA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RAILWAY
NORTH COAST WAY
THE BUCKETTS WAY
RIVER
AVON
Avondale
Dog Trap Creek
Wenham
Cox
Road
Extension of Bowens Road North Open Pit
ML1528
Soil Stockpile Area
Section of Bowens Road North Open Pit Backfilled to Date
ML1577
Bowens Road North Open Pit
Soil Stockpile Areas
Roseville West Pit
Wheatleys
Road
Northern Waste Emplacement
Mine Water Dam
Southern Waste Emplacement
STRATFORD
ML1409
ML1360
Roseville Pit Extension
Soil Stockpile Area
Bowens
Road
ML1447
Roseville Pit (Backfilled)
Haul Road
Stratford Main Pit
Co-disposal Area
Return Water Dam
Workshops and Administration
Mine Access Road
Rail Loop
ML1538
ROM Stockpile
CHPP and Infrastructure
Product Stockpile
Bowens Road West Pit
Stratford Waste Emplacement
Stratford East Dam
Parkers Road
Glen
Road
LEGEND
Mining Lease
Electricity Transmission Line
Stratford Coal Mine and Bowens Road North Open Cut Existing/Approved Infrastructure
Proposed Modification
0 200 1000
Metres
GRID DATUM MGA 94 ZONE 56
Source: Department of Lands (May 2009) and DCPL (2010)
ResourceStrategies
BRNOC JUNE 2010 MODIFICATION
FIGURE 3
Approved Projects and May 2010 Modification - General Arrangement
STRATFORD COAL
GCL-09-11 BRNOC_Mod_102B

The BRNOC waste emplacements are currently undergoing rehabilitation, with re-contouring of the batters substantially completed and substantial revegetation of the batters and top surface completed. Rehabilitation to native woodland species has been undertaken on some 22 hectares (ha) of the emplacements. No further out-of-pit emplacement is proposed.

All remaining waste rock would be used as backfill and surcharge for the pit (rather than being emplaced out-of-pit). Post-mining, a final void would remain in the southern extent of the excavation.

Interaction with Stratford Coal Mine

All coal produced at BRNOC is transported via the existing haul road to the SCM ROM pad, where it is blended with SCM and Duralie Coal Mine (DCM) coal before being processed at the SCM CHPP. CHPP rejects associated with coal from all three of those sources are stored at the SCM and are managed by SCPL in accordance with SCPL's *Life of Mine Reject Disposal Plan* (SCPL, 2009a).

All product coal is transported from the SCM by rail.

1.1.2 June 2010 Modification Overview

The June 2010 Modification (the Modification) relates to a minor cutback of the BRNOC pit, along with a marginal increase in the maximum annual ROM coal production rate (from 0.9 to 1 Mtpa). Total additional ROM coal from the Modification would be approximately 1.4 million tonnes (Mt), additional waste rock would be approximately 3.5 Mbcm and mining operations at BRNOC would therefore be extended to mid-2013.

The location and extent of the proposed cutback to the approved BRNOC is shown on Figure 3.

The Modification is located within the BRNOC mining lease (ML) 1528 and on land owned by SCPL (Figures 4a and 4b).

Table 1 provides a summary comparison of the key components of the originally approved BRNOC, the currently approved BRNOC, and the BRNOC including the Modification. As shown in Table 1 and on Figures 2 and 3, the Modification is substantially the same development as the original BRNOC.

Section 3 describes the potential environmental impacts of the Modification and discusses how the existing environmental management and monitoring programmes at the BRNOC would be applied to manage potential environmental impacts.

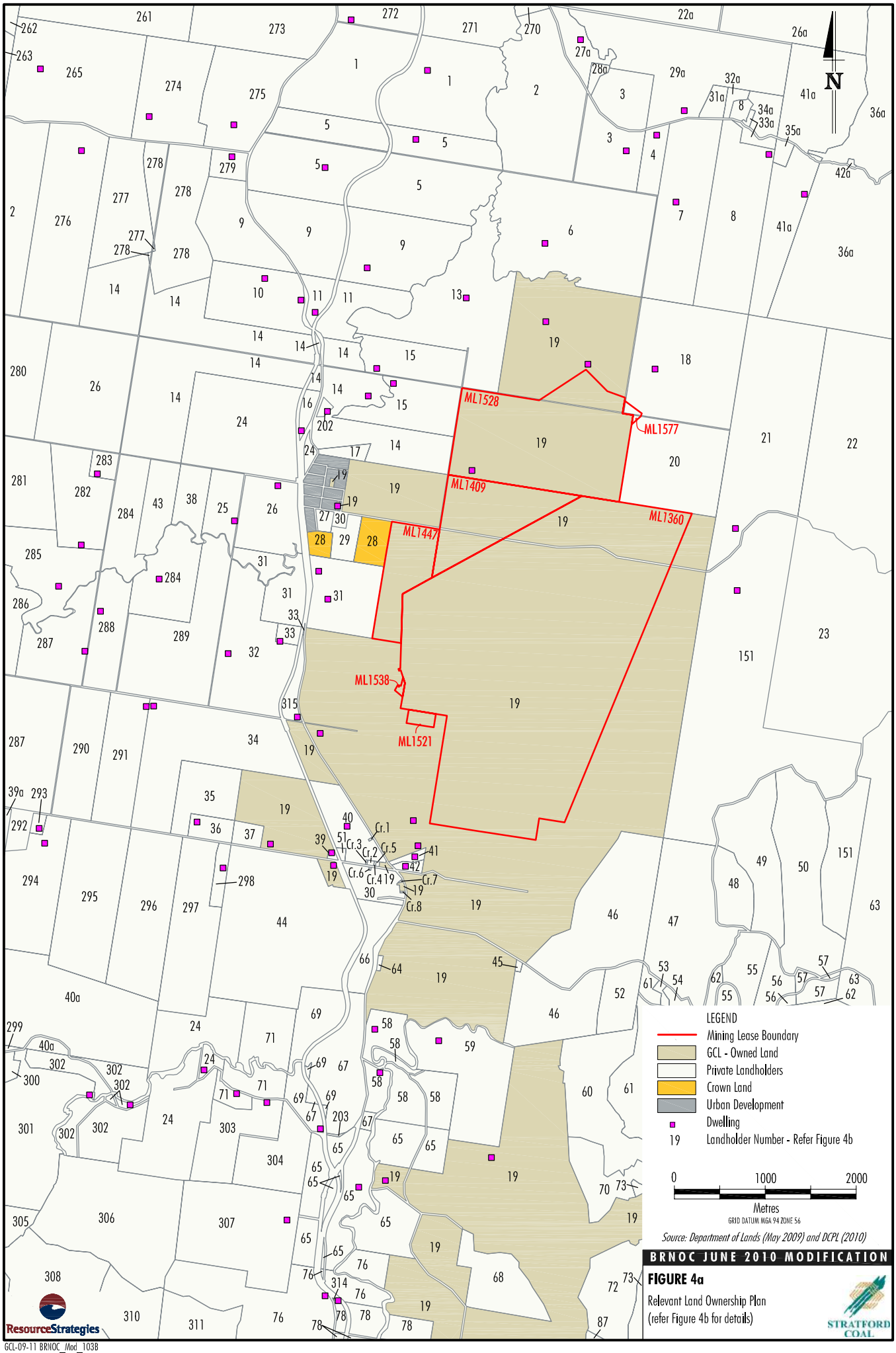
A detailed description of the proposed changes to the BRNOC is provided in Section 2.

1.2 LEGISLATIVE FRAMEWORK

The DA for the BRNOC was assessed under Part 4 of the EP&A Act. Modification of the BRNOC Development Consent (DA 39-02-01) is sought under Section 96(2) of the EP&A Act.

Section 96(2) of the EP&A Act states:

> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*
>
> *a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all) …*



GCL-09-11 BRNOC_Mod_103B

1 Wendy Jane Fraser
2 Farley (Gloucester) Pty. Limited
3 D.J. & D.L. Rosenbaum Pty. Limited
4 Colleen Dawn Crawley & Trevor Allan Crawley
5 Norman Edward Bignell
6 AGL Gloucester Le Pty Ltd& AGL Gloucester MG Pty Ltd
7 Mary Blanche Burrell
8 John Ernest Woodford & Marjorie Annette Woodford
9 Norman John Williams
10 Kenneth James Whatmore & Anne Grace Whatmore
11 Brian Keith Walker, Lesley Jane Walker, Tyson Brian Walker & Lacey Maree Walker
13 AGL Energy Limited
14 Allen James Wenham & Pamela Diane Wenham
15 GS & GL Falla Superannuation Pty Limited
16 Judith Helen Pickett
17 Darren James Fisher & Claire Louise Smith
18 Tanya Louise Denyer
19 Gloucester Coal Ltd
20 Trevor John Ellis
21 Richard Charles Clarke & Carolyn Ann Clarke
22 Michael Burns & Leonie Therese Burns
23 Ross Lewis Bagnall
24 Geoffrey Lawrence Harris
25 Marisa Thompson
26 Kevin John Lowrey & Robyn Lowrey
27 The Council of the Shire of Gloucester
28 Crown Land
29 Edwin Dennis Ward & Rhonda Fay Ward
30 The State of New South Wales
31 Allan Stanley Isaac
32 Eliza Ann Ruth McIntosh & Ronald Keith McIntosh
33 William Joseph Battaglini & Jacklin Maree Battaglini
34 Graham Wesley Hall & Kim Lorraine Hall
35 Leo John Dillon & Isobel Robyn Dillon
36 Graham Lindsay Wallace & Marion Frances Wallace
37 Timothy James Worth
38 Paul Michael Johnson & Judith Anne Johnson
39 Paula Anne Standen
40 Leslie Allenby Blanch
41 Cathryn Louise Devereux
42 Douglas John Blanch
43 Vicki Colleen Moseley
44 Peter Michael Cross & Kylie Jane
45 Megan Jane Ellis
46 Stanley Samuel Ellis
47 David Charles Digges, Carolyn Denise Digges, Timothy Charles Hart & Elizabeth Mary Hart
48 Marion Iris Rounsley
49 Yvonne Carter
50 Neil James Porter
51 Gloucester Printing Services Pty Ltd
52 Christiane Bertolino
53 William Charles Barnes & Cheryl Freda Barnes
54 Kenneth John Hughes & Carrysong Pty Limited
55 Allan James Hancock & Lynda Margret Hancock
58 Douglas William Blanch & Evelyn Fay Blanch
59 Guy William Cassar & Cecile Elizabeth Cassar
60 Philip Weston Greenwood
61 Brian John Allman
63 National Parks and Wildlife Service
64 Gloucester Shire Council
65 Noeline Elizabeth Weismantle
66 Lennard Charles Rogerson
67 Ian Robert Bowen
68 Julie Dawn Lyford
69 Ralph Hooper & Bronwyn Ann Bartholmew
70 Robert George Knight
71 Anthony Douglas Burnet & Robyn Annette Burnet
72 Brooke McRae
73 Rodney John Pearce & Anne Jeanette Pearce
76 Garry Bruce Grant & Terry Paul Grant
78 Barry Anthony Eves
87 Pacific Property Investments Ltd
151 Trevor William Wadland & Yvonne Louise Carter
202 Paul Phillip Wenham
203 Samuel Taylor
261 Frank Murray Hooke & Susan Elizabeth Hooke
262 Noel Albert Davis & Elizabeth Therese O'Sullivan
263 Patrick Michael Ryan
265 Hans Joran Stenstrom & Janete Stenhouse Stenstrom
270 Jason David Collins & Michelle Isobel Barrett
271 William Alexander Tomb
272 Allen Taylor & Company Limited
273 Baker Place Investments Pty Limited & Dr PW Brady Pty Limited
274 Warren Neil Wilson & Colleen Therese Wilson
275 Pace Farm Pty Limited
276 Alan Luscombe & Carol Luscombe
277 John William Farley
278 Mark Anthony Campbell & Roseleen Linette Campbell
279 John Donald Cullum & Rachel Anne Cullum
280 Clifford John Bramley & Terri Louise Bramley
281 Colin William Lewis & Lesley Ann Lewis
282 Peter Stephen Ross
283 Janet Nolan
284 Alec Gregory Perrin & Noreen Nita Jean Perrin
285 Marshall Leon Carter & Theresa Kathleen Carter
286 Gerard Roland Burley
287 Dorothy Kay Sinderberry & Carole Martha Rinkin
288 Alec Gregory Perrin
289 Eliza Ann Ruth Mcintosh
290 Anne Frances Ryan & Darcy Tordoff
291 Angela Lee Stackman & Mark Richard Partridge
292 James Reginald Fisher & Rhonda Patricia Fisher
293 Kerry Elizabeth Braunton
294 Gregory Vincent Morcom & Karen Morcom
295 William John Bush & Danielle Elizabeth Bush
296 Peter Geoffrey Watson & Heather Irene Watson
297 William Marten Bosma
298 Eric Allan Yates
299 Malcolm Ronald Lee
300 Bevan Douglas Hokin & Di Hokin
301 Folio Identifier Pty Limited
302 Edwin John Walton & Wendy Walton
303 JSTC Newcastle Pty Limited
304 Ernie Danzil Abeysekera & Sharee Ann Abeysekera
305 Lymaran Holdings Pty Limited
306 Gregory Hunt & Catherine Hunt
307 Graham John Wolfenden & Rosalind Mary Wolfenden
308 Pierre Marcel Simon Louys & Marie Therese Chantal Louys
310 Toni Unthank & Danny Francis Unthank
311 Paul Berthold & Carolyn Berthold
314 Dataphone Pty Ltd
315 Kenneth Bruce Bagnall
22a R. O. Sansom & Son Pty. Limited
26a Edward John Mckinley & Shirley June Mckinley
27a Douglas Robert Maclean & Janette Ann Maclean
28a Peter Stuart Jackson & Beverley Clair Jackson
29a Mckinleys Lane Pty Limited
31a Terence William Cox & Valerie Rita Cox
32a John Edward Malcom-Coe & Emilia Malcolm-Coe
33a Anthony George Langmead & Elizabeth Anne Langmead
34a Bernard Philip Tresidder
35a Gary Raymond Perkins & Elly Perkins
36a Anthony Stanford Berecry
39a Woods Road Pty Ltd
40a Howard Kerr Williams & Margaret Russell Williams
41a Gary Ronald Ferris & Kathleen Grace Ferris
42a William Rainsford Ribbons
Cr.1 William Deane Wood
Cr.2 Patricia May Black
Cr.3 Yvonne Frances Holden
Cr.4 Susan Frances Hoppe
Cr.5 John Bruce Punchard & Kerry Lewise Green
Cr.6 Rodger Malcolm Boorer
Cr.7 David Robert Pryce-Jones
Cr.8 Douglas John Blanch & Gwenyth Alison Mcnair

Source: Department of Lands (2010) and DCPL (2010) as at 9-3-10

BRNOC JUNE 2010 MODIFICATION

FIGURE 4b
Relevant Land Ownership List

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This SEE describes the Modification and provides justification for the conclusion that it is substantially the same development as the original BRNOC (i.e. the application of Section 96[2] of the EP&A Act is justified).

Table 1
Summary Comparison of the Original, Approved and Modified BRNOC

Development Component	Original BRNOC	Approved BRNOC	BRNOC Including June 2010 Modification
Mining Method	• Conventional open cut mine.	• Unchanged.	• Unchanged.
Life of Mine ROM Coal	• Mineable coal resource of 4 Mt.	• Unchanged.	• Additional 1.4 Mt of ROM coal (i.e. total of 5.4 Mt).
Annual ROM Coal Production Rate	• Mining of up to 0.65 Mtpa.	• Mining of up to 0.9 Mtpa.	• Mining of up to 1 Mtpa.
Total Area of Disturbance	• Disturbance of approximately 92 ha, consisting of the Project open-cut, waste emplacements, perimeter bunding, mine water dam, haul road and soil stockpiles.	• Total disturbance of approximately 94 ha.	• Total disturbance of approximately 98 ha.
Waste Rock Management	• Approximately 43 ha of out-of-pit waste emplacement. • Open pit backfill via in-pit waste emplacement with final void to the south.	• Out-of-pit waste emplacement reduced to approximately 35 ha. • Open pit backfill via in-pit waste emplacement with final void to the north.	• Out-of-pit unchanged from Approved BRNOC. • Open pit backfill via in-pit waste emplacement with final void to the north.
Total Waste Rock Mined	• Total overburden quantity of 8.1 million bank cubic metres (Mbcm).	• Unchanged.	• Additional 3.5 Mbcm of waste rock (i.e. total of approximately 11.6 Mbcm).
ROM Coal Transport	• Extension of SCM haul road, including a controlled crossing of Bowens Road. • Small ROM coal stockpile at the SCM.	• Unchanged.	• Unchanged.
Road Network	• Realignment of Wenhams Cox Road.	• Unchanged.	• Unchanged.
Visual and Noise Attenuation	• Perimeter bunds located to the north and west of the open-cut.	• Unchanged.	• Unchanged.
Operating Hours	• Mining up to 7 days per week, 7.00 am to 7.00 pm.	• Unchanged.	• Unchanged.
Water Management	• Comprehensive water management strategy based on the containment and reuse of mine water and on the control of sediment movement.	• Unchanged.	• Unchanged.
Workforce	• Up to nine employees.	• Unchanged.	• Approximately 15 employees.

1.2.1 Environmental Planning Instruments

Local Environmental Plan

The BRNOC is located in the Gloucester Local Government Area (LGA). The Gloucester Local Environmental Plan 2010 (LEP) was gazetted on 11 June 2010 under the EP&A Act. The following sub-sections identify the provisions in the LEP which have some relevance to the Modification.

Land Use Zoning

The BRNOC is zoned in land use area RU1 (Primary Production) in the LEP.

Zone RU1 covers the BRNOC mining leases and the objectives of this zone are as follows:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within the zone and land uses within adjoining zones.*
- *To encourage eco tourism enterprises that minimise any adverse effect on primary industry production and the scenic amenity of the area.*

The Modification is consistent with the objectives of RU1 (Primary Production) as:

- mining is a primary industry;
- mining operations and nearby agricultural enterprises have co-existed since the BRNOC's inception and this would continue for the Modification;
- the proposed BRNOC pit cutback is a minor extension of the approved BRNOC pit and would not result in the fragmentation or alienation of resource lands; and
- mine landforms would be progressively rehabilitated, including areas to be rehabilitated to pasture (Section 5) and therefore potentially being available for agricultural activities in the medium/long term.

"Mining" is permissible on lands zoned RU1 (Primary Production) with consent.

Flood Planning Provisions

Part 6, clause 6.1 of the Gloucester LEP contains flood planning provisions with the following objectives:

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,

(c) to avoid significant adverse impacts on flood behaviour and the environment.

The flood planning provisions apply to:

(a) land that is shown as "Flood planning area" on the Flood Planning Map, and

(b) other land at or below the flood planning level.

The Modification is not located within the "Flood planning area" referred to in the Gloucester LEP.

The proposed BRNOC pit cutback is a minor extension of the approved BRNOC pit (Figure 3). As shown on Figures 4a and 4b, SCPL owns all land within which the Modification is proposed. As such, it is considered that the Modification would not result in a flood risk to life and property associated with the use of the land.

Avondale Creek is located to the west of the existing BRNOC. Flows in Avondale Creek would continue to be unimpeded by the Modification. The proposed surface disturbance associated with the BRNOC pit cutback would not result in any significant impact on surface water resources or flood behaviour. No lands would be affected by flood waters in this area of the Avondale Creek floodplain, other than those owned by SCPL.

SCPL has demonstrated over the seven year life of the BRNOC that it can operate its mining operation effectively adjacent to the floodplain of Avondale Creek.

Development in areas subject to Airport Noise

Clause 6.2 of the LEP provides guidance for appropriate development of areas potentially subject to airport noise. The objectives of this clause are:

a) to prevent certain noise sensitive developments from being located near the Gloucester Airport and its flight paths,

b) to assist in minimising the impact of aircraft noise from that airport and its flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,

c) to ensure that land use and development in the vicinity of that airport do not hinder or have any other adverse impact on the ongoing, safe and efficient operation of that airport.

It is noted that the northernmost portion of the BRNOC mining lease is within the 'low level noise exposure' zone in the LEP's Noise Exposure Forecast Map. The BRNOC is not a 'noise sensitive development' and does not hinder or have any adverse impacts on the Gloucester Airport. This would be unchanged by the Modification.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

Clause 2 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries), 2007* (the Mining SEPP) outlines a number of aims, the following of which are relevant to the Modification:

b) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and

c) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources…

Clause 12 of the Mining SEPP requires that before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

a) consider:

(i) the existing uses and approved uses of land in the vicinity of the development, and

(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and

(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and

b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and

c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).

The Modification would involve a minor cutback (some 4 ha) of the BRNOC pit within ML 1528 and would not require any changes to the existing SCM infrastructure. Accordingly, the Modification is consistent with, and would not materially change, the current land use of the area.

Impact assessment for environmental aspects including land resources, noise, geochemistry, air quality, water resources, heritage, flora and fauna, hazard, risk and transport have been conducted for the Modification and indicate that the Modification would not result in significant additional impacts on adjoining land uses (Section 3).

The BRNOC would continue to have socio-economic benefit to the regional economy and the State of NSW (Section 3.14).

Clause 16, subclause (1), of the Mining SEPP requires that before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions such as:

a) require that some or all of the transport of materials in connection with the development is not to be by public road,

b) limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,

c) require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.

Clause 16, subclause (3), requires that the consent authority:

a) must not determine the application until it has taken into consideration any submissions that it receives in response from any roads authority or the Roads and Traffic Authority within 21 days after they were provided with a copy of the application, …

No material changes to operational road transport movements would occur as a result of the Modification, as no changes to the operational workforce or consumables used at the BRNOC are proposed. Product coal transport from the SCM would continue to be by rail.

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that would be affected by the development. Relevantly, the consent authority must consider whether conditions of the consent should:

a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or

b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or

c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or

d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.

Rehabilitation for the BRNOC is described in the BRN EIS and BRN 2002 SEE. Rehabilitation of the BRNOC including the Modification is described in Section 4 and would be consistent with the above documents.

CHPP rejects management associated with the Modification is described in Section 2.3 and an assessment of geochemical impacts (including proposed management and mitigation measures) is provided in Section 3.7.

Hazards and risk are assessed in Section 3.15. The Mining Lease relinquishment process is expected to provide for adequate consideration of public safety after rehabilitation works are complete.

Clause 8, subclause (2) of the Mining SEPP provides that:

> *(2) Without limiting subclause (1), if a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if the consent authority is satisfied as to certain matters specified in the plan, development for that purpose may be carried out on that land with development consent without the consent authority having to be satisfied as to those specified matters.*

Clause 14, subclause (1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

> *(a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
>
> *(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
>
> *(c) that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14, subclause (2) requires that, without limiting clause 14, subclause (1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programmes or guidelines concerning greenhouse gas emissions.

The potential impacts of the BRNOC pit cutback on surface and groundwater resources and measures to minimise potential impacts are discussed in Sections 3.5 and 3.6, respectively. The potential impacts of the modified BRNOC on threatened species and biodiversity and measures to minimise potential impacts are described in Section 3.1.

A greenhouse gas emissions assessment for the modified BRNOC, including mitigation and management measures, is provided in Section 3.4.

Clause 15 of the Mining SEPP requires that:

> *(1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*
>
> *(2) Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*

> *(3) The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

As described in Section 1.1.2, SCPL proposes to mine an additional 1.4 Mt of ROM coal from the BRNOC. The mining of this additional coal is considered by SCPL to be economically efficient.

State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)

Clause 13 of *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33) requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

> *(c) in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
>
> *(d) any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)…*

A Preliminary Hazard Analysis (PHA) was conducted for the BRNOC (i.e. the *Bowens Road North Project Preliminary Hazard Analysis* [SCPL, 2001d]). The Modification does not significantly alter the consequences or likelihood of a hazardous event occurring at the BRNOC, as the operational activities on-site would be generally unchanged. Notwithstanding, environmental management plans and procedures would be updated to include the Modification, where relevant (Section 3).

State Environmental Planning Policy No. 44 (Koala Habitat Protection)

State Environmental Planning Policy No. 44 (Koala Habitat Protection) (SEPP 44) requires the consent authority for any Development Application in certain LGAs (including the Gloucester LGA) to consider whether land subject to a Development Application is "potential Koala habitat" or "core Koala habitat".

EcoBiological (Appendix A) conducted detailed surveys for the Modification which included targeted surveys for the Koala and identification of Koala food trees. No Koalas or preferred Koala food trees were recorded during the surveys. It can therefore be concluded that the provisions of SEPP 44 do not apply to the Modification.

State Environmental Planning Policy No. 55 (Remediation of Land)

State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

Clause 7(1) states that a consent authority must not consent to the carrying out of any development on land unless:

> *(a) it has considered whether land is contaminated, and*
>
> *(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
>
> *(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further under clause 7(2), before determining an application for consent to carry out development that would involve a change of use on any of the land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

Clause 7(2) provides that before a consent authority determines an application for Development Consent, a "preliminary investigation" is required where:

- the application for consent is to carry out development that would involve a "change of use"; and
- that "change of use" is to certain land specified in clause 7(4).

The certain land specified in clause 7(4) on which the "change of use" must relate is either:

- land that is an "investigation area" – defined in SEPP 55 as land declared to be an investigation area by a declaration in force under Division 2 of Part 3 of the NSW *Contaminated Land Management Act, 1997*; or
- land on which development for a purpose referred to in Table 1 of the contaminated planning guidelines (being *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land* [NSW Department of Urban Affairs and Planning (DUAP) and NSW Environment Protection Agency (EPA), 1998] is being, or is known to have been, carried out.

The Modification would not involve a "change of use" because the Modification involves the continuation of mining activities within the existing Mining Lease (ML) 1528.

SEPP 55 is therefore not enlivened by the Modification. No preliminary land contamination investigation is required.

Environment Protection and Biodiversity Conservation Act, 1999

The primary objective of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) is to provide for the protection of those aspects of the environment that are of "national environmental significance". The EPBC Act establishes a scheme requiring environmental assessment and approval of proposals likely to impact significantly upon such matters, which in the EPBC Act are termed "protected matters".

The EPBC Act specifies seven matters of national environmental significance. These are:

- World Heritage properties;
- National heritage places;
- Ramsar wetlands of international importance;
- listed threatened species and communities;
- migratory species protected under international agreements;
- nuclear actions; and
- the Commonwealth marine environment.

A proposal that is likely to have a significant impact on a matter of environmental significance is described in the EPBC Act as a "controlled action". A person proposing to take an action that may be a controlled action is required by the EPBC Act to refer the proposal to the Federal Minister for Environment Protection, Heritage and the Arts. The Federal Minister for Environment Protection, Heritage and the Arts then decides whether or not the action is a controlled action.

The Modification is not located on a World Heritage property, National Heritage Place or Ramsar wetland area. It is not a nuclear action, nor would it impact on the Commonwealth marine environment.

Flora and fauna assessments have been conducted for the BRN EIS and further assessment has been conducted for the Modification, including consideration of species listed under the Schedules of the EPBC Act (Section 3.1).

The threatened species assessment conducted for the Modification concluded that the proposed BRNOC pit cutback would not have a significant impact on any threatened flora or fauna species or communities listed under the Schedules of the EPBC Act (Section 3.1).

The Modification has therefore not been referred to the Federal Minister for Environment Protection, Heritage and the Arts for consideration under the EPBC Act, as no "controlled action" is proposed.

1.2.2 Other Approvals

In addition to the modified Development Consent which is required to be obtained from the Minister for Planning, a modification or addendum to the *Mining Operations Plan for Bowens Road Open Cut* (SCPL, 2006) would also be prepared in consultation with the NSW Department of Industry and Investment (NSW I&I) (Minerals and Petroleum).

1.3 CONSULTATION

SCPL has developed and implemented a consultation programme for the BRNOC and SCM. The key objectives of the programme are to:

- inform government and public stakeholders about the progress and nature of SCPL's mining operations;
- recognise and respond to local concerns or interests; and
- continue dialogue between SCPL and stakeholders that commenced during the development of the SCM (including BRNOC).

This section describes the consultation undertaken prior to and during the preparation of this SEE.

1.3.1 State and Local Government Agencies

Consultation with State and local government agencies about SCPL development planning is ongoing.

SCPL has briefed senior NSW Department of Planning (DoP) representatives in regards to the Modification and the proposed approval path (i.e. Section 96(2) of the EP&A Act). Representatives of the NSW I&I have also been briefed in regards to the Modification.

SCPL provided an overview of the Modification to the GSC in March 2010. Items discussed included management of CHPP rejects.

1.3.2 Public Consultation

Consultation with the community has been conducted by SCPL since the mid-1990s.

Stratford Community Consultative Committee

A Community Consultative Committee (CCC) is in place at the SCM and meets quarterly to discuss environmental management at the SCM and BRNOC and discuss future developments when relevant. Minutes of the meetings and copies of the newsletters provided to the CCC are available publicly on the GCL website.

The CCC includes representatives from the following organisations:

- GSC;
- SCPL (two representatives); and
- local landholders (six representatives including representatives of a community organisation).

The CCC is briefed regarding SCPL's long-term development plans for SCM and DCM and regional exploration activities and SCPL has provided a review of the Modification to the CCC.

Website and Community Call Line

SCPL information is made available on the GCL website for members of the public to keep up to date with:

- contact details, including community complaints line;
- environmental management, plans and strategy information;
- CCC meeting minutes and newsletters;
- audit reports;
- monitoring and reporting data; and
- DAs.

The SCPL web address is provided below:

http://www.gloucestercoal.com.au/operations-stratford.php

SCPL has also established a dedicated Complaints Line (016 302 013) that is available 24 hours, seven days a week for community members who have enquiries or who wish to lodge complaints in relation to SCPL's activities. The number is advertised in the Sensis *White Pages Directory* and a local telephone directory (*Pink Pages*).

Sponsorships and Community Funding

GCL supports the local community through sponsorships of community organisations and direct payments to local councils. Recent beneficiaries of funding contributions to community groups include:

- Avon Valley Field Archers.
- Barrington Public School P&C Association.
- Booral Public School.
- The Bucketts Way Neighbourhood Group Inc.
- Dungog National Servicemen's Association.

- Dungog A&H Association Inc.
- Gloucester Show Society.
- Gloucester Little Athletics.
- Gloucester Business Chamber.
- Gloucester Country Club Limited.
- Gloucester Chamber of Commerce.
- Gloucester District Junior Cricket Association.
- Gloucester District Tennis Association Inc.
- Gloucester High School.
- Gloucester Junior Rodeo.
- Gloucester Men's Bowling Club.
- Gloucester Medical Centre Associateship.
- Gloucester Magpies Junior Rugby League Inc.
- Gloucester Public School.
- Gloucester Tourist Office.
- Gloucester Mountain Man Tri Challenge (Major Sponsor).
- GSC Hillcrest Appeal.
- St Joseph's P&F Association. Stratford Public Hall.
- Stratford Public School.
- Stroud Public School P&C Association.
- Stroud Road Community Hall & Progress Association Inc.
- Stroud Rodeo.
- Stroud Rugby League Football Inc.
- Stroud Show Association Inc.

SCPL would continue to provide funding contributions to community groups.

Local Contractors and Suppliers

Local contractors engaged at the existing BRNOC include:

- Ditchfield Contracting Pty Ltd; and
- Zamaway Pty Ltd.

Wherever practicable, SCPL prefers to utilise the services of local providers. Approval of the Modification would allow SCPL to continue to support local suppliers and contractors to the BRNOC, providing additional security and longevity of employment in the region.

1.4 STRUCTURE OF THIS SEE

This SEE is structured as follows:

Section 1	Provides an overview of the current BRNOC and the Modification, the statutory context and the consultation undertaken in relation to the Modification.
Section 2	Provides a description of the Modification.
Section 3	Provides a review of the existing environment, assesses the Modification and describes the existing SCPL environmental management systems and measures in place to manage and monitor any potential impacts.
Section 4	Provides a description of rehabilitation, monitoring and management which would be undertaken at the modified BRNOC.
Section 5	Provides a conclusion for the Modification.
Section 6	Lists the documents cited in this SEE.

Attachment 1 and Appendix A provide supporting information as follows:

Attachment 1	Bowens Road North Open Cut - Development Consent
Appendix A	Baseline Flora and Fauna Report
Appendix B	Threatened Species Assessment of Significance
Appendix C	Noise Review
Appendix D	Air Quality Review

2 DESCRIPTION OF THE PROPOSED MODIFICATION

2.1 MINING METHOD AND OPERATING HOURS

The Modification would not change the mining method of the approved BRNOC.

Further resource definition and mine planning conducted in relation to the BRNOC has identified additional recoverable coal on the western margin of the approved BRNOC pit (Figure 3). A cutback of the BRNOC pit is proposed and would involve continuation of mining of the same coal seams.

The proposed mobile mining fleet for the modified BRNOC would remain the same as the existing BRNOC fleet and is outlined in Table 2 below.

Table 2
BRNOC Mobile Fleet

Fleet Item	No. of Items
Excavators – Waste Rock	2
Excavators – Ripping	1
775 Haul Trucks	7
Dozers – Inpit	2
Dozers – Dump	1
Water Cart	1
Graders	1

Source: SCPL (2010).

The existing operational hours of the BRNOC (i.e. 7.00 am to 7.00 pm) would be unchanged.

2.2 COAL AND WASTE ROCK PRODUCTION

A provisional production schedule for the modified BRNOC is provided in Table 3.

Table 3
BRNOC Provisional Production Schedule

Project Year	Financial Year	Bowens Road North[1]	
		ROM (Mt)	Waste Rock (Mbcm)
1	2010 to 2011	1	1.9
2	2011 to 2012	1	1.8
3	2012 to 2013	0.7	0.6
	Total	**2.7**	**4.3**

Source: SCPL (2010).

[1] 1.3 Mt ROM coal and 0.8 Mbcm waste rock production associated with currently approved open cut.

The modified BRNOC would result in the mining of an additional 1.4 Mt of ROM coal (i.e. a total of 5.4 Mt over the life of mine). An additional 3.5 Mbcm of waste rock would be mined at the modified BRNOC (i.e. a total of approximately 11.6 Mbcm of waste rock over the life of mine). The modified BRNOC would operate until mid-2013.

The Modification would result in a minor (0.1 Mtpa) increase in the annual ROM coal production rate from the BRNOC. ROM coal would continue to be transported to the SCM CHPP for processing. Waste rock would continue to be backfilled within the BRNOC pit (i.e. the existing BRNOC out-of-pit waste emplacements would be unchanged).

2.3 CHPP REJECT MANAGEMENT

BRNOC CHPP rejects would continue to be managed at SCM in accordance with SCPL's *Life of Mine Reject Disposal Plan* (SCPL, 2009a). An assessment of the disposal of BRNOC CHPP rejects at the SCM would be included in a separate SCM modification application.

2.4 WORKFORCE

No changes to the BRNOC operational workforce (of approximately 15 employees) would be required for the Modification.

3 ENVIRONMENTAL REVIEW

The existing environment within and surrounding the BRNOC has been comprehensively surveyed and assessed and is described in detail in the BRN EIS. A review of the environmental values relevant to the Modification is provided in the following sub-sections.

Given the integrated operation of the BRNOC and the SCM, mitigation and management measures used at the SCM are often relevant to the BRNOC. The SCM mitigation and management measures relevant to the BRNOC are referred to where relevant in this section.

3.1 FLORA AND FAUNA

Background

The flora and fauna in the approved BRNOC area and surrounds was previously characterised by a number of surveys, namely, Hoye and Finney (1994), ERM Mitchell McCotter Pty Ltd (1996), Hoye (1998), Dowling (2000), Mount King Ecological Surveys (2001) and Greg Richards and Associates (2001).

Dowling (2000) identified four vegetation units in the existing approved BRNOC area, namely, cleared grazing land, dry sclerophyll forest, riparian vegetation, and health land. The BRNOC area and surrounds were characterised by extensive areas of land that have been previously modified for agricultural purposes. Scattered trees and remnant dry sclerophyll woodland in various stages of disturbance were also present. During the surveys, no threatened flora species listed under the TSC Act, FM Act or EPBC Act were recorded (Dowling, 2000).

During the fauna surveys in the existing approved BRNOC mine area, only one threatened fauna species was identified, namely the Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) (Greg Richards and Associates, 2001).

In accordance with the provisions of Section 5A of the EP&A Act, Assessments of Significance were prepared for 26 threatened fauna species (Mount King Ecological Surveys, 2001; Greg Richards and Associates, 2001). The Assessments of Significance indicated that no threatened fauna species would be significantly affected by the BRNOC mine to the extent that local population viability would be undermined.

Environmental Review

Baseline surveys of the Modification disturbance area were undertaken by EcoBiological in April and July 2007 and March 2010 (Appendix A). These surveys included targeted searches for threatened species and ecological communities in accordance with the *Threatened Biodiversity Survey and Assessment Guidelines* (DEC, 2004) and in consideration of the DECCW *Field Survey Methods* (DECCW, 2010b) and *Threatened Species Profile Database* (DECCW, 2010c). These baseline surveys were conducted as part of flora and fauna surveys covering the BRNOC and SCM (EcoBiological, 2010b).

Vegetation Communities and Threatened Ecological Communities

The Modification would result in approximately 4 ha of land disturbance, associated with the pit cutback (Figure 3).

Dowling (2001) previously mapped the vegetation in the Modification area as dry sclerophyll forest. EcoBiological (Appendix A) re-mapped the vegetation in the Modification area, splitting the dry sclerophyll forest into two separate communities (Figure 5):

- approximately 2.2 ha of White Stringybark – Grey Ironbark Grass/Shrub Forest (Stringybark Forest); and
- approximately 1.8 ha of Cabbage Gum Floodplain Grassy Woodland (Cabbage Gum Woodland).

The Stringybark Forest occurs as a remnant patch (in the order of 16 ha) on elevated land to the west of the BRNOC and has poor connectivity to other habitat areas in the landscape (Figure 5).

The Cabbage Gum Woodland occurs on the floodplain and is dominated by mature regrowth Cabbage Gum (*Eucalyptus amplifolia* subsp. *amplifolia*) (Appendix A). EcoBiological (Appendix A) identified the Cabbage Gum Woodland as the *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community* (River-Flat Eucalypt Forest EEC) listed under the TSC Act. The River-Flat Eucalypt Forest EEC was not listed under the TSC Act when the BRNOC was approved in 2001.

The area of River-Flat Eucalypt Forest EEC proposed to be removed (approximately 1.8 ha), albeit relatively small, has inherent conservation value. An Assessment of significance was prepared for the River-Flat Eucalypt Forest EEC (Appendix B). The assessment concludes that the proposed Modification is unlikely to have a significant effect on River-Flat Eucalypt Forest EEC.

No threatened ecological communities listed under the EPBC Act or FM Act has been recorded, or is considered likely to occur in the Modification disturbance area (Appendix A; DEWHA, 2010b).

The proposed land clearance would result in removal of any dead wood and dead trees, bushrocks and hollow-bearing trees in the Modification disturbance area, which are listed as key threatening processes under the TSC Act. The hollow-bearing trees in the Modification disturbance area are limited to less than five trees (Appendix A).

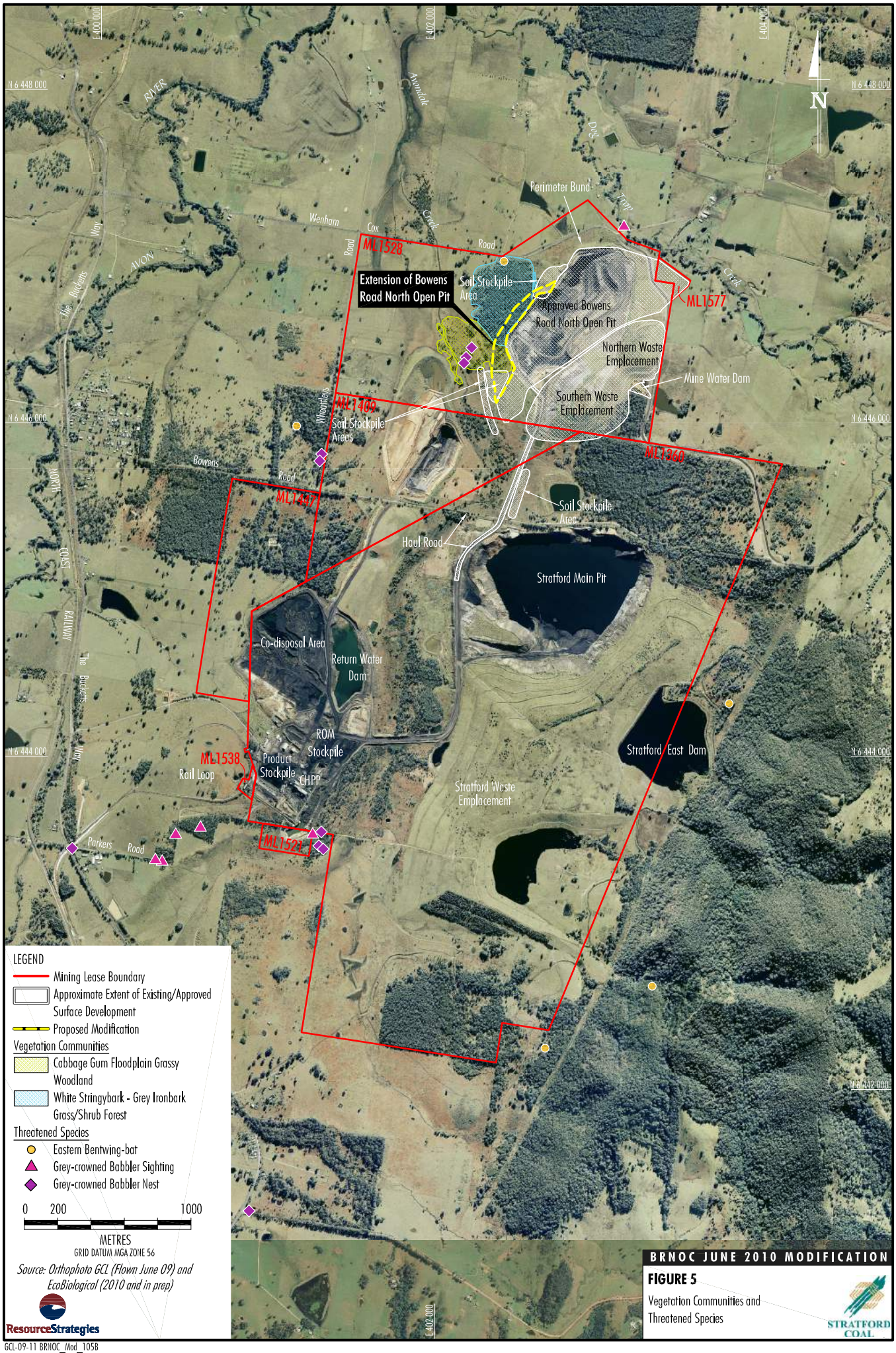
The Modification is not likely to further decrease the connectivity of the remaining habitat patches to other habitat areas in the landscape, as the Modification disturbance area is an extension of the approved BRNOC.

Rehabilitation and revegetation of the proposed disturbance areas is described later in this section.

The potential indirect impacts from the Modification (e.g. noise, dust and lighting) would be largely unchanged from the approved BRNOC. These indirect impacts are managed at the BRNOC in accordance with the existing management protocols, plans and programmes.

Threatened Flora Species

No threatened flora species listed under the TSC Act, FM Act or EPBC Act have been recorded in the proposed BRNOC pit cutback area (after Appendix A; EcoBiological, 2010; SRBG, 2010; NSW Government, 2010; DECCW, 2010a; Dowling, 2000), despite suitable targeted surveys conducted in accordance with the survey requirements in the *Threatened Biodiversity Survey and Assessment Guidelines* (DEC, 2004) and the *Threatened Species Profile Database* (DECCW, 2010c).


E 400 000
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E 404 000
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N 6 446 000
N 6 444 000
N 6 442 000
N
Perimeter Bund
Trig
Wenham
Cox
Creek
Road
ML1528
Extension of Bowens Road North Open Pit
Soil Stockpile Area
Approved Bowens Road North Open Pit
ML1577
Northern Waste Emplacement
Mine Water Dam
Southern Waste Emplacement
ML1469
Soil Stockpile Areas
ML1360
Bowens Road
ML1447
Soil Stockpile Area
Haul Road
Stratford Main Pit
Co-disposal Area
Return Water Dam
ROM Stockpile
Product Stockpile
CHPP
ML1538
Rail Loop
Stratford East Dam
Stratford Waste Emplacement
ML1522
Parkers Road
RIVER
Avondale
Dog
AVON
The Buckets Way
NORTH COAST RAILWAY
The Buckets Way
LEGEND
Mining Lease Boundary
Approximate Extent of Existing/Approved Surface Development
Proposed Modification
Vegetation Communities
Cabbage Gum Floodplain Grassy Woodland
White Stringybark - Grey Ironbark Grass/Shrub Forest
Threatened Species
Eastern Bentwing-bat
Grey-crowned Babbler Sighting
Grey-crowned Babbler Nest
0 200 1000
METRES
GRID DATUM MGA ZONE 56
Source: Orthophoto GCL (Flown June 09) and EcoBiological (2010 and in prep)
ResourceStrategies
BRNOC JUNE 2010 MODIFICATION
FIGURE 5
Vegetation Communities and Threatened Species
STRATFORD COAL
GCL-09-11 BRNOC_Mod_105B

Threatened Fauna Species

No threatened fauna species listed under the TSC Act, FM Act or EPBC Act have been recorded in the proposed BRNOC pit cutback area (after Appendix A; EcoBiological, 2010; NSW Government, 2010; Australian Museum, 2010; DECCW, 2010a; Mount King Ecological Surveys, 2001; Greg Richards and Associates, 2001). Two threatened fauna species listed as Vulnerable under the TSC Act have been recorded in the surrounds, namely, the Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis*) and Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) (Figure 5), and both species may utilise habitat resources in the Modification area.

No threatened populations listed under TSC Act, FM Act or EPBC Act has been recorded, or is likely to occur within the Modification disturbance area (Appendix A).

Assessments of significance have been prepared in accordance with Section 5A of the EP&A Act and are provided in Appendix B. The assessments conclude that the proposed Modification is unlikely to have a significant effect on any threatened species, populations, ecological communities or their habitats.

Critical Habitat

No critical habitat occurs within the vicinity of the Modification disturbance area as designated by the Register of Critical Habitat held by the Federal Minister for Environment Protection, Water, Heritage and the Arts (DEWHA, 2010c), Register of Critical Habitat held by the Director-General of the DECCW (DECCW, 2010f), the Register of Critical Habitat held by the Director-General of the NSW I&I (Fishing and Aquaculture) (2010) or the Gloucester LEP. Therefore, the Modification would not affect any critical habitat.

Other Matters of National Environmental Significance

A number of migratory birds listed under the EPBC Act may utilise habitat resources in the surrounds due to their wide ranging nature (DEWHA, 2010b), although the Modification disturbance area provides minor habitat for these species. No matters of national environmental significance would be significantly impacted by the Modification.

Environmental and Noxious Weeds

A total of 12 introduced flora species were recorded during the surveys (Appendix A). No weed species listed as noxious under the NSW *Noxious Weeds Act, 1993* in the Gloucester LGA were recorded by EcoBiological (Appendix A). Giant Parramatta Grass (*Sporobolus fertilis*) is a noxious weed which is known to occur on site.

Introduced Fauna

Two introduced terrestrial fauna species have been recorded in the Modification disturbance area and surrounds, namely the European Rabbit and Hare (Appendix A).

Potential Koala Habitat

No Koalas or preferred Koala food trees have been recorded in the Modification disturbance area or surrounds (Appendix A).

Cumulative Impacts

Cumulative impacts are considered to be the total impact on the environment that would result from the incremental direct and indirect impacts of the Modification added to other existing impacts.

The existing surface disturbance areas at the BRNOC total some 94 ha. Cumulative impacts are expected to primarily occur as a result of the additional vegetation clearance (approximately 4 ha) required for the Modification.

Mitigation Measures and Management

The potential impacts of the BRNOC on flora and fauna are currently managed via implementation of existing management protocols, plans and programmes, including the following:

- Land Management Plan (LMP);
- Landscape and Revegetation Management Plan (LRMP);
- BRNOC Flora and Fauna Management Plan (FFMP) (SCPL, 2002g, 2003);
- Erosion and Sediment Control Plan (ESCP);
- Lighting Management Plan;
- Site Water Management Plan (SWMP);
- *Gloucester District Bush Fire Management Plan Operations* (NSW Bush Fire Service, 2003); and
- *Noise Consent and Management Plan* (NMP) (Engineers & Scientists Limited [ViPAC], 2006).

Potential impacts of the Modification on flora and fauna and their habitats would be managed by the continued implementation of the above management protocols, plans and programmes. Where required, these plans would be revised to incorporate the Modification.

Vegetation Clearance and Pre-clearance Fauna Surveys

The FFMP establishes a vegetation clearance protocol to minimise the impact of the BRNOC clearance activities on flora and fauna. Procedures have been put in place for delineating areas requiring clearing; conducting pre clearance surveys; and developing specific fauna management strategies associated with vegetation clearing. The removal of native vegetation is undertaken, where practicable, in consideration of seasonal factors to minimise disturbance to potential breeding and hibernation activities.

Threatened Species Management

A threatened species management protocol has been developed and implemented to facilitate the identification and management of threatened flora and fauna species and is provided in the FFMP. The key components of the Threatened Species Management Protocol (a component of the FFMP) are observations/surveys for threatened species (prior to disturbance and throughout operations), completion of a Threatened Species Assessment and Management Strategy, regulatory reviews and monitoring.

Bushfire Management

The *Gloucester District Bush Fire Management Plan Operations* (NSW Bush Fire Service, 2003), outlines the bushfire management measures in place at the SCM and BRNOC (SCPL, 2009b).

Rehabilitation and Revegetation

Rehabilitation and revegetation of post-mine landforms is described in the FFMP and LRMP. Rehabilitation would be undertaken in the Modification disturbance area as described in Section 4. These plans would be revised to incorporate the Modification.

Offset Measures

An offset area is proposed in consideration of the flora and fauna characteristics of the Modification disturbance area, DECCW's principles for the use of biodiversity offsets in NSW (DECCW, 2009g) and ecological principles commonly used in the design of reserves for wildlife conservation.

The proposed offset area is located on freehold GCL-owned land located in the Gloucester Valley, approximately 20 km to the south of the BRNOC (Figure 6). The land is currently managed for pastoral purposes. The proposed offset area adjoins an existing proposed (444 ha) offset area, offered as part of the Duralie Extension Project EA (Figure 6). Therefore, the two offset proposals together would have a number of significant biodiversity advantages.

Vegetation communities which would be cleared and conserved for the Modification are outlined in Table 4 and shown on Figures 5 and 6.

Table 4
Vegetation Communities which would be Cleared and Conserved by the Modification

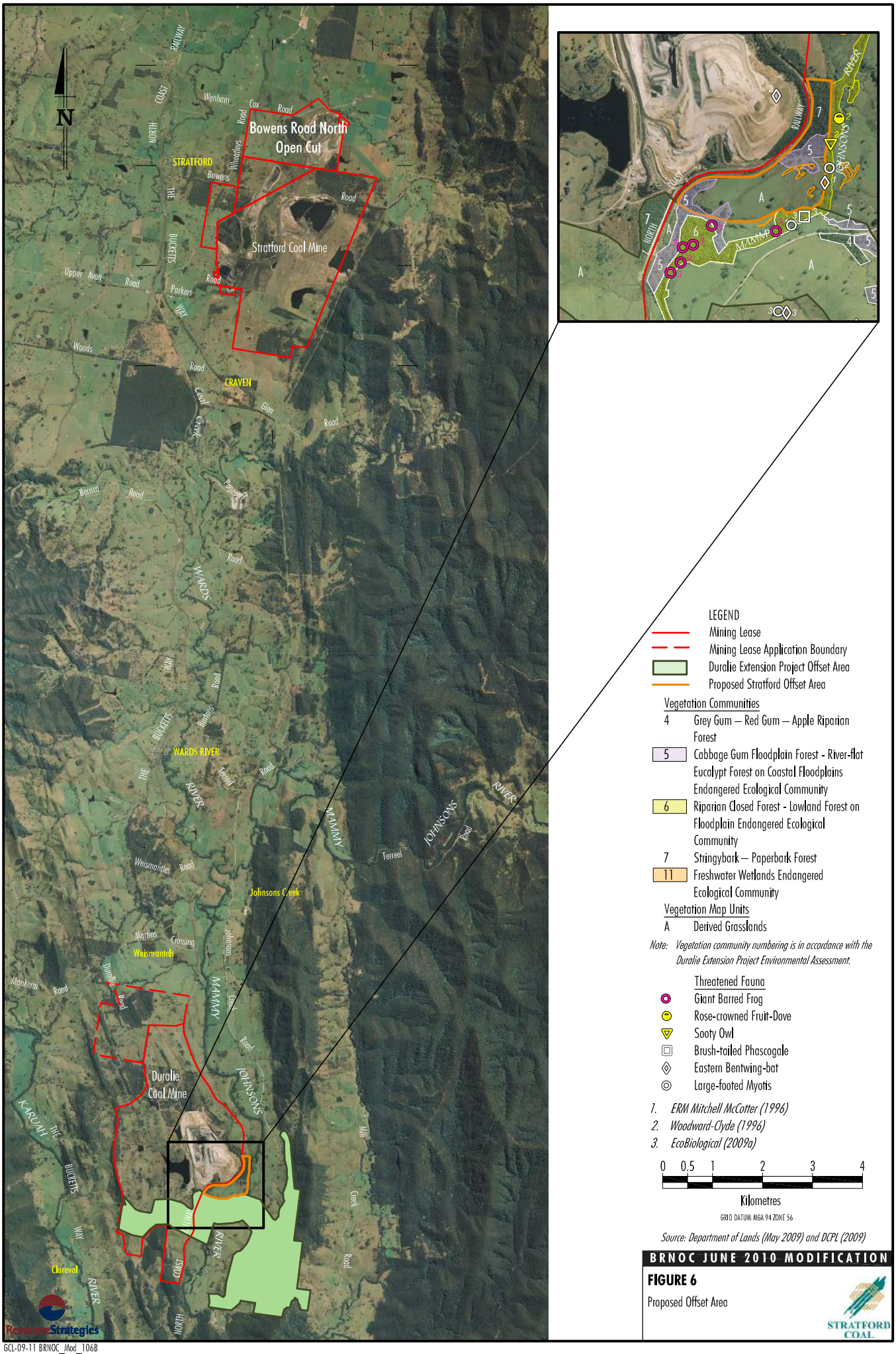
Approximate Area to be Cleared (refer Figure 5)	**Approximate Area of Existing Vegetation to be Offset** (refer Figure 6)
2.2 ha of Stringybark Forest	4.5 ha of Stringybark – Paperbark Forest
1.8 ha of Cabbage Gum Woodland (equivalent to the River-Flat Eucalypt Forest EEC)	6 ha of Cabbage Gum Floodplain Forest (equivalent to the River-Flat Eucalypt Forest EEC)
	0.5 ha of Freshwater Wetlands Endangered Ecological Community
Total 4 ha	**Total 11 ha**

Source: Approximate areas are based on vegetation mapping provided on Figure 5.

In addition to the enhancement of existing areas of native vegetation communities (Table 4), some 18 ha of derived grasslands would be revegetated to enhance the connectivity of existing habitat and create linkages to the Mammy Johnsons River.

The size and location of the proposed offset has been chosen on the basis of the ecological gains from the proposal including:

- The proposed offset area would result in the conservation of two threatened ecological communities listed under the TSC Act, approximately 6 ha of the River-Flat Eucalypt Forest EEC and approximately 0.5 ha of the Freshwater Wetlands on Coastal Floodplains EEC (EcoBiological, 2009).
- The proposed offset area contains potential habitat for the threatened Grey-crowned Babbler (eastern subspecies).
- Similar vegetation communities/fauna habitats, compared to the Modification disturbance area, would be conserved/enhanced in the proposed offset area.
- The proposed offset area is suitably located adjacent to an existing proposed offset area, offered as part of the Duralie Extension Project EA).



LEGEND

- Mining Lease
- Mining Lease Application Boundary
- Duralie Extension Project Offset Area
- Proposed Stratford Offset Area

Vegetation Communities

- 4 Grey Gum – Red Gum – Apple Riparian Forest
- 5 Cabbage Gum Floodplain Forest - River-flat Eucalypt Forest on Coastal Floodplains Endangered Ecological Community
- 6 Riparian Closed Forest - Lowland Forest on Floodplain Endangered Ecological Community
- 7 Stringybark – Paperbark Forest
- 11 Freshwater Wetlands Endangered Ecological Community

Vegetation Map Units

- A Derived Grasslands

Note: Vegetation community numbering is in accordance with the Duralie Extension Project Environmental Assessment.

Threatened Fauna

- Giant Barred Frog
- Rose-crowned Fruit-Dove
- Sooty Owl
- Brush-tailed Phascogale
- Eastern Bentwing-bat
- Large-footed Myotis

1. *ERM Mitchell McCotter (1996)*
2. *Woodward-Clyde (1996)*
3. *EcoBiological (2009a)*

0 0.5 1 2 3 4

Kilometres

GRID DATUM: MGA 94 ZONE 56

Source: Department of Lands (May 2009) and DCPL (2009)

BRNOC JUNE 2010 MODIFICATION

FIGURE 6

Proposed Offset Area

STRATFORD COAL

GCL-09-11 BRNOC_Mod_106B

- The proposed offset area would enhance the connectivity of existing habitat and create linkages to the Mammy Johnsons River.
- The following threatened fauna were recorded within the adjoining habitat: Giant Barred Frog, Rose-crowned Fruit-dove, Sooty Owl, Brush-tailed Phascogale, Eastern Bentwing-bat and Large Footed Myotis (ERM Mitchell McCotter Pty Ltd, 1996; Woodward-Clyde, 1996; EcoBiological, 2009).

It is concluded that the proposed offset measures constitute a suitable offset against residual flora and fauna impacts associated with the Modification, given the anticipated improvement in the flora and fauna habitat value that are planned to eventuate in the proposed offset area in the medium to long-term.

Security of the Offset Area

The conservation of the proposed offset area would be secured in perpetuity through a voluntary conservation agreement with the NSW Minister for the Environment. A voluntary conservation agreement provides permanent protection as it is registered on the title of the land.

Management of the Offset Area

If the Duralie Extension Project is approved, one management plan would be prepared to facilitate the management and monitoring of the two offset areas (i.e. the Duralie Extension Project offset area and the Modification offset area). The Offset Management Plan would be prepared to the satisfaction of the Director-General of Planning. The Offset Management Plan would detail measures including:

- encouraging native regeneration by providing appropriate fencing to exclude grazing from existing treed areas;
- selective revegetation in derived grasslands by appropriate plantings or seeding using local seed sources;
- soil erosion management;
- managing weeds and pests;
- signage of the proposed offset area;
- restricting vehicular and people access; and
- monitoring, auditing and reporting the performance of the offset.

Performance of the Offset Area

The Offset Management Plan would contain a monitoring programme developed by a suitably qualified person(s) to assess the performance of the management measures in enhancing habitats for flora and fauna.

The monitoring programme would provide for monitoring of revegetation areas (e.g. using Landscape Function Analysis/Ecosystem Function Analysis [or equivalent] and photo points) and the monitoring of existing woodland/ forest areas (e.g. using permanent quadrats and photo points).

The offset area would be independently audited at intervals agreed with relevant authorities. This would include auditing of the proposed offset area for the Modification. The audits would be conducted by a suitably qualified person(s) to:

- assess compliance with the Offset Management Plan;
- assess the performance of the offset area;
- review the adequacy of the management measures and monitoring programme; and
- recommend actions or measures to improve the performance of the offset, Offset Management Plan, or monitoring programme, if required.

3.2 NOISE

3.2.1 Existing Environment

Background

As a component of the BRN EIS, Richard Heggie Associates (2001) completed an assessment of the cumulative intrusive SCM and BRNOC daytime noise emissions, in accordance with the NSW *Industrial Noise Policy* (INP) (EPA, 2000). Subsequent to the BRN EIS, a number of modifications have been assessed that involved re-assessment of predicted cumulative noise levels from the SCM and BRNOC in accordance with the requirements of the INP (EPA, 2000):

- As a component of the Roseville Pit Extension SEE, Heggies Australia (2005) conducted the *Stratford Coal Mine Operating Noise Impact Assessment*.
- As a component of the Roseville West Pit SEE, Heggies Australia (2006) completed the *Stratford Coal Mine Roseville West Pit Modification Operating Noise and Blasting Impact Assessment*.
- In 2008, Heggies Pty Ltd completed the *Stratford Coal Mine Coal Handling Modification Noise Impact Assessment*.

Operational noise criteria are provided in Consent Condition 6.4.1 of the BRNOC Development Consent (Attachment 1).

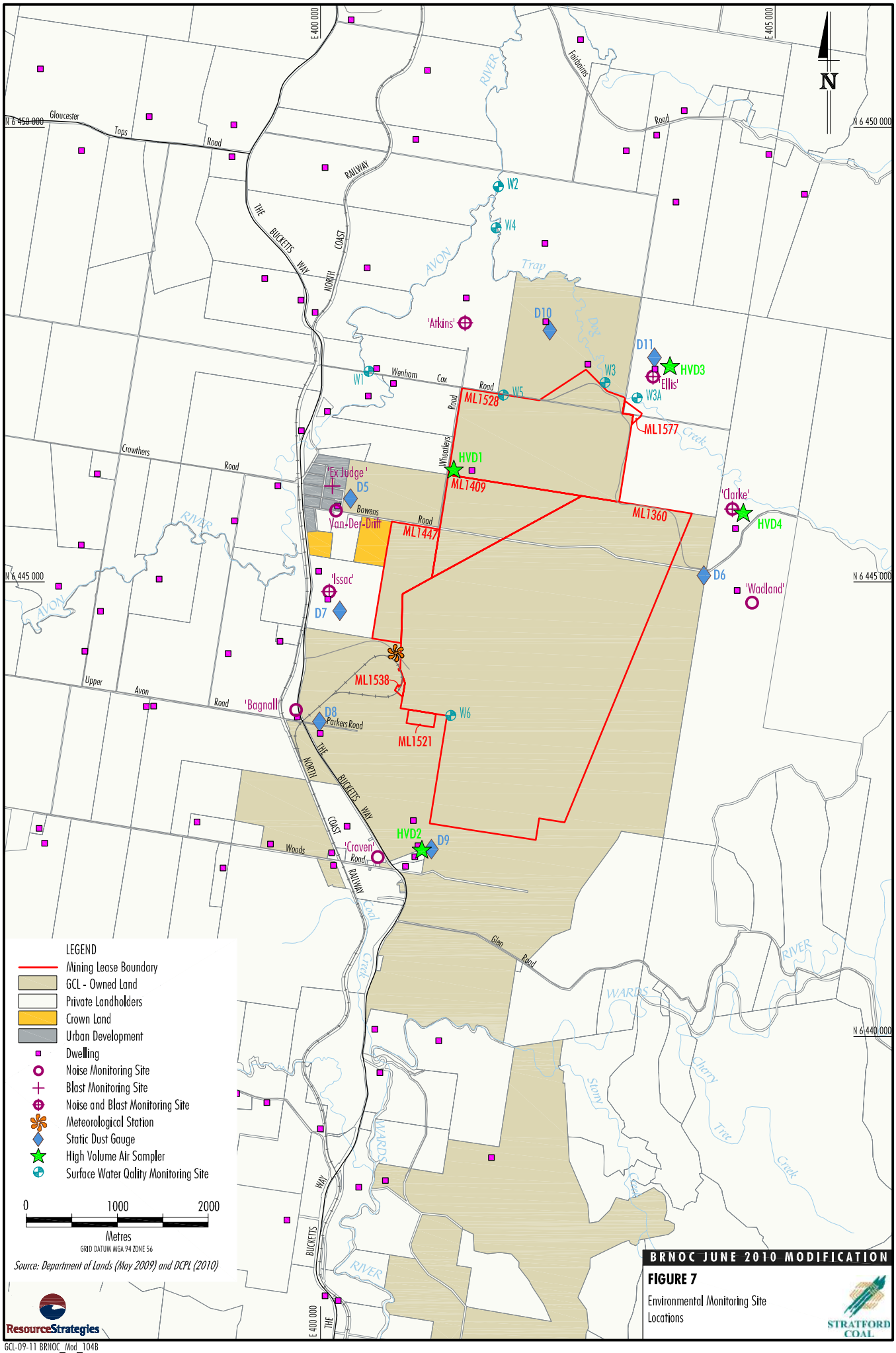
Operational Noise Performance

Given the integrated operation of the BRNOC and SCM, noise measurement is undertaken quarterly in an integrated fashion by SCPL. Noise monitoring is undertaken at eight locations surrounding the BRNOC (Figure 7). Review of noise monitoring results in the last three AEMRs (SCPL, 2007a, 2008, 2009b) indicates that noise levels at monitoring locations proximal to the BRNOC complied with the relevant criteria at all times.

More recently, routine noise monitoring was conducted in September 2009, December 2009 and March 2010 in accordance with the NMP. Compliance was achieved during the daytime and evening[1] periods at all eight monitoring locations in September 2009, except at Clarke (Figure 7) where a marginal (2 A-weighted decibels [dBA]) exceedance was recorded during the daytime survey when light to moderate westerly winds prevailed. These winds fluctuated around 3 m/s (and often above) (which is the maximum wind speed relevant to the BRNOC noise limits) on the day of monitoring.

Noise compliance was achieved during the daytime and evening[1] periods at all eight monitoring locations (Figure 7) in December 2009.

[1] BRNOC operates in the daytime and one hour of the evening period (i.e. 7.00 am to 7.00 pm).



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Compliance was achieved during the daytime and evening at all eight monitoring locations in March 2010 with the exception of one exceedance at Isaac (Figure 7) during the evening[1] survey, however this was outside of BRNOC operating times (i.e. after 7.00 pm).

3.2.2 Potential Impacts

Heggies Pty Ltd (Heggies) (Appendix C) has undertaken a review of the likely noise implications of the Modification. The Modification would result in a minor change to the footprint of the BRNOC and mining operations would not be substantially closer to the nearest privately-owned receivers. In addition, noise monitoring records indicate that compliance is generally achieved at the nearest receivers. Given that the existing fleet would remain unchanged (Section 2.1), it is considered by Heggies that minimal change to the existing noise emissions associated with the BRNOC would occur as a result of the Modification.

3.2.3 Mitigation Measures and Management

SCPL manages its mining operations in accordance with the requirements of the NMP. The NMP describes measures to manage noise emissions from the BRNOC and SCM operations, including:

- proactive/predictive and reactive mitigation measures to limit noise emissions, including (ViPAC, 2006):
  - *An awareness and understanding of noise issues will be included in site inductions for all staff, contractors and visitors to the SCM;*
  - *The use of significant noise generating equipment simultaneously will be avoided wherever possible;*
  - *The noisiest activities will be scheduled where practicable to the least sensitive times of the day;*
  - *Weather conditions will be monitored and where adverse conditions are experienced or predicted operational changes will be made to avoid or reduce noise impacts;*
  - *All machinery and plant used on site will be maintained regularly to minimise noise generation;*
  - *All valid noise complaints will be responded to and acted on as per provisions in this NMP;*
  - *Strategies and targets will be developed as part of the annual review of noise monitoring results and the review of valid noise complaints. These strategies will be reported in the annual report and their effectives will be reported on in subsequent reports; and*
  - *If valid complaints regarding specific pieces of machinery or equipment are received, a maintenance inspection will be undertaken and if required works will be undertaken.*
- long-term strategies to address exceedances of applicable noise levels at private residences;
- complaints handling and on-site responsibilities; and
- quarterly noise monitoring and equipment plant noise surveys.

In addition to the above, SCPL has already implemented a range of physical and operational noise mitigation measures to reduce noise emissions from the BRNOC and SCM operations.

These noise management and mitigation measures would continue to be applied for the Modification. The integrated SCM and BRNOC noise monitoring programme would be continued and results reported in the AEMR.

The automated meteorological monitoring station (Figure 7) would continue to be operated to record temperature, net solar radiation, rainfall, wind speed, wind direction and sigma theta (the rate of change of wind direction). Direct measurement of temperature lapse rates is conducted during regular noise monitoring and would also continue for the Modification.

3.3 AIR QUALITY

3.3.1 Existing Environment

Air Quality Management Regime

Air quality management and monitoring at the BRNOC is described in the Air Quality Monitoring Program (AQMP) (SCPL, 2007b).

Air Quality Criteria

Dust Deposition

The NSW Department of Environment, Climate Change and Water (DECCW) amenity criteria for dust deposition seeks to limit the maximum increase in the mean annual rate of dust deposition from a new development to 2 grams per square metre per month (g/m^2/month) and total dust deposition (i.e. including background air quality) to 4 g/m^2/month.

Concentrations of Suspended Particulate Matter

Suspended particulate matter (referred to as total suspended particles [TSP]) is typically less than 50 micrometres (μm) in size and can be as small as 0.1 μm. Fine particles less than 10 μm are referred to as PM_{10}. Details of the air quality criteria for concentrations of suspended particulate matter are provided in Table 5.

Table 5
Air Quality Assessment Criteria for Suspended Particulate Matter Concentrations

Pollutant	Criterion/Goal	Agency
TSP Matter	90 $\mu g/m^3$ (annual mean)	National Health and Medical Research Council
PM_{10}	50 $\mu g/m^3$ (24 hour average – maximum)[1]	DECCW assessment criterion
	30 $\mu g/m^3$ (annual mean)	DECCW assessment criterion

[1] BRNOC emissions only.

$\mu g/m^3$ micrograms per cubic metre.

Previous Assessments

Holmes Air Sciences (HAS) (2001) prepared an air quality impact assessment which assessed cumulative emissions from the SCM and the BRNOC. This assessment concluded that no residences were predicted to experience annual average dust deposition or TSP levels above the applicable assessment criteria (HAS, 2001). It was predicted that compliance with the short-term PM_{10} criterion of 50 $\mu g/m^3$ would be achieved with the implementation of air quality management measures (HAS, 2001).

Air Quality Monitoring Results

Air quality monitoring at the SCM and BRNOC is conducted in accordance with the AQMP. Monitoring is conducted at seven dust gauges and four high volume air samplers (Figure 7).

All monitoring results from 2001 to 2009 indicate that annual average dust deposition in the vicinity of the SCM and BRNOC has been within the DECCW criterion (i.e. 4 g/m^2/month). Monitoring records indicate that all annual average PM_{10} concentration results from May 2001 to December 2009 have been within the DECCW annual average PM_{10} criterion (i.e. 30 $\mu g/m^3$).

The majority of recorded 24 hour PM_{10} concentrations are less than 20 µg/m^3. There has been nine days since monitoring commenced in May 2001 when the 24 hour PM_{10} concentrations were above the DECCW criterion (i.e. 50 µg/m^3). AEMR records indicate that these exceedances were attributed to agricultural activities, fires or regional dust storm events, not SCPL mining operations.

The results correlate well with modelling predictions made in HAS (2001) and indicate that the existing SCM and BRNOC together are complying with DECCW criteria (PAE Holmes, 2010).

3.3.2 Potential Impacts

PAE Holmes (2010) has conducted a review of the likely air quality implications of the Modification (Appendix D).

The Modification to the BRNOC would result in a minor change to the footprint of the BRNOC and a minor increase in the annual ROM coal production (from 0.9 to 1.0 Mtpa). The proposed maximum ROM coal and waste rock annual production rates (and therefore cumulative dust emissions) from the BRNOC and the nearby SCM are significantly less than the rates which formed the basis for the HAS (2001) air quality assessment (Appendix D). This is because the significantly higher rates associated with operation of the SCM Main Pit were included within the HAS (2001) assessment (Appendix D). As noted in Section 3.3.1, the HAS (2001) assessment concluded that no residences would exceed annual average dust deposition, PM_{10} or TSP assessment criteria and that compliance with the short-term PM_{10} criterion of 50 µg/m^3 would be achieved with the implementation of air quality management measures (HAS, 2001).

Based on the above and monitoring data collected to date, cumulative dust emissions and associated potential impacts would be significantly less than what was originally predicted by HAS (2001) (Appendix D). It is therefore considered that the BRNOC would continue to comply with ambient air quality goals and the proposed modification is of minimal air quality impact (Appendix D).

3.3.3 Mitigation Measures and Management

Air quality management procedures used at the BRNOC are described in the AQMP and include (SCPL, 2007b):

- regular watering of in-service haul roads in dry weather;
- generally restricting open areas that have the potential for dust generation;
- regular maintenance of haul roads; and
- prompt rehabilitation of disturbed ground.

The dust control measures and management practices described above and outlined in the AQMP would also be applied to the Modification.

3.4 GREENHOUSE GAS EMISSIONS

3.4.1 Existing Environment

The major sources of Scope 1 (direct) greenhouse gas emissions at the BRNOC include:

- combustion of diesel during mining operations;
- use of explosives; and
- fugitive emissions of methane.

3.4.2 Potential Impacts

The existing major sources of greenhouse gas emissions from the BRNOC (Section 3.4.1) would remain unchanged for the Modification.

Incremental greenhouse gas emissions associated with the Modification would be related to:

- extension of the duration of mining operations in the BRNOC (i.e. additional fugitive emissions and diesel and explosive consumption);
- increased off-site transport (i.e. diesel consumption); and
- combustion of approximately 0.9 Mt of additional product coal (this is the total product coal expected after washing the total 1.4Mt of additional BRNOC ROM coal).

An assessment of the incremental greenhouse gas emissions (Scope 1 and Scope 3 [indirect] emissions) for the Modification was conducted using empirical emission factors provided by the *National Greenhouse Accounts Factors* (Commonwealth Department of Climate Change, 2008, 2009).

Incremental greenhouse gas emissions associated with the Modification (over the modified life of BRNOC) would be related to the increased:

- combustion of diesel during mining operations (approximately 12 kilo tonnes carbon dioxide equivalent [kt CO_2-e] of Scope 1 and 1 kt CO_2-e of Scope 3 emissions);
- fugitive emissions of methane (approximately 63 kt CO_2-e of Scope 1 emissions);
- use of explosives (0.0001 kt CO_2-e of Scope 1 emissions);
- combustion of diesel during transport of product coal to Newcastle (approximately 3 kt CO_2-e of Scope 3 emissions); and
- combustion of product coal (approximately 2,173 kt CO_2-e of Scope 3 emissions).

3.4.3 Mitigation Measures and Management

SCPL implements a number of measures to minimise greenhouse gas emissions from the BRNOC. Maximising energy efficiency is a key consideration in the development of the mine plan. For example, significant savings of greenhouse gas emissions (through increased efficiency of energy usage) are achieved by mine planning decisions which minimise haul distances for ROM coal and waste rock transport and therefore fuel use.

3.5 SURFACE WATER RESOURCES

3.5.1 Existing Environment

Regional Hydrology

The BRNOC is located approximately 3 km south-east of the Avon River. The Avon River has a catchment area of some 290 square kilometres (km^2) and is one of approximately 30 tributary rivers contributing to the greater Manning River system. The Manning River system drains some 8,000 km^2 and extends from the Great Dividing Range to the coast near Taree (Figure 1).

Local Hydrology

Local hydrology comprises a number of drainage lines and creeks flowing west and north-west towards the Avon River. Avondale Creek is a tributary of Dog Trap Creek and drains the BRNOC area, joining Dog Trap Creek approximately 1 km north of the BRNOC.

As the drainage lines within the BRNOC area have small catchments, they typically exhibit low to zero flow for extended periods during dry weather, while heavy rainfall events result in short duration, high flow events. Groundwater seepage provides minor contributions to flows in Dog Trap Creek and Avondale Creek during periods of elevated groundwater levels that follow extended rainfall events.

Surface Water Management

The BRN EIS concluded that appropriate controls should be implemented to manage erosion and sedimentation potential. Surface water management at the BRNOC and SCM is conducted in accordance with the SWMP (including site water balance and surface water monitoring programme) and the ESCP.

Surface water quality and flow monitoring in the vicinity of the BRNOC and SCM is described in the 2009 AEMR (SCPL, 2009b), and relevant sites are shown on Figure 7.

3.5.2 Potential Impacts

The Modification would not change the approved BRNOC water management system. Notwithstanding, the slightly increased catchment area associated with the proposed cutback would result in capture of additional incident rainfall within the BRNOC pit. This additional water would not be material to the integrated BRNOC/SCM water balance. The BRNOC pit cutback would be set back from Avondale Creek.

The Modification would result in an increase in the volume of co-disposed CHPP rejects to be deposited in the SCM Main Pit void. Changes to CHPP rejects and water storage at the SCM from the Modification would be dealt with in a separate SCM modification application. Notwithstanding, Gilbert & Associates (2010) report that the additional CHPP rejects generated as a result of the Modification would be able to be stored within the SCM Main Pit and sufficient water storage within the SCM Main Pit would be maintained such that the implied spill risk from the SCM Main Pit is less than 1%.

Potential impacts in relation to erosion and sedimentation are discussed in Section 3.9.2.

3.5.3 Mitigation Measures and Management

Surface water management (including erosion and sediment control) at the BRNOC would continue to be undertaken in accordance with the SWMP and ESCP. The SWMP and ESCP would be updated to include the Modification.

3.6 GROUNDWATER RESOURCES

3.6.1 Existing Environment

Background

Australasian Groundwater and Environmental Consultants (AGE) (2001) assessed the potential cumulative impacts of the SCM and BRNOC on local groundwater systems using numerical modelling techniques.

The main aquifers in the Gloucester Basin are associated with the coal seams which are intersected by faults that compartmentalise groundwater flow. Groundwater at the BRNOC occurs predominantly within coal seams and is recharged from overlying colluvium. The direction of groundwater flow is from the south-east to the north-west and the main groundwater discharge zones are Avondale and Dog Trap Creeks, Avondale Swamp and the Avon River. A groundwater divide is located between the Stratford Main Pit and the BRNOC.

SCPL has conducted a monitoring programme of groundwater levels and quality within its MLs and regional registered and unregistered bores since 1993/1994. The monitoring programme has indicated that the pit dewatering has not had any appreciable impact upon regional groundwater levels or quality. In addition, groundwater levels in the vicinity of the BRNOC to date are consistent with the drawdown predictions made by AGE (2001) (Gilbert & Associates, 2009) (i.e. drawdown on groundwater levels have generally been limited in scale and extent).

Groundwater quality and level monitoring in the vicinity of the BRNOC is described in the 2009 AEMR (SCPL, 2009b).

3.6.2 Potential Impacts

Potential groundwater impacts related to the BRNOC pit cutback would include continued groundwater extraction associated with dewatering and groundwater inflows to the BRNOC pit.

Experience with mining at BRNOC to date indicates that the groundwater aquifers contained in the coal seams are generally confined and that drawdown effects are localised in nature. Monitoring undertaken since the commencement of mining in 2003 indicates that development of the BRNOC has not led to any significant impacts on groundwater levels or quality (Gilbert & Associates, 2009). This is not anticipated to change for the Modification. The BRNOC pit cutback would not intersect the Avondale Creek alluvium.

The volumetric allocations of the BRNOC groundwater extraction licences have been issued for groundwater inflows from the coal seam in accordance with inflow predictions by AGE (2001). The pit cutback would not trigger a requirement for any change to the licensed volumetric allocation for the duration of the mining operations (i.e. until mid-2013).

3.6.3 Mitigation Measures and Management

Local and regional groundwater levels and quality would continue to be monitored and reported in accordance with the SWMP. Groundwater inflow rates into the BRNOC pit would also continue to be monitored.

The proposed BRNOC pit cutback and associated works would not encroach upon the banks of Avondale Creek. Notwithstanding, in order to manage pit stability, SCPL would commission a suitably qualified geotechnical engineer to conduct a review of the stability of the pit cutback design.

3.7 GEOCHEMISTRY

The BRN EIS included a geochemical assessment (i.e. acid forming potential and element solubility) of waste rock. Testwork results classified mine waste rock as non-acid forming (NAF) and unlikely to generate environmentally harmful leachate when exposed to surface oxidation processes (SCPL, 2001a). The EIS concluded that no specific waste rock management procedures were required in terms of waste rock geochemistry (SCPL, 2001).

To date, the majority of waste rock from the BRNOC has been placed directly in out-of-pit waste rock emplacements with some backfill in the north-eastern section of the open pit. The out-of-pit waste emplacements and open pit backfill area are now partially rehabilitated.

An additional 3.5 Mbcm of waste rock would be mined for the Modification. The waste rock types would be the same as those mined to date and described in the BRN EIS. The additional waste rock would have the same geochemical characteristics as the waste rock mined to date and therefore no specific waste rock management procedures are required. Waste rock from the pit cutback would continue the backfill of the BRNOC pit.

The BRNOC pit cutback would involve mining the same coal seams as the existing BRNOC pit. CHPP rejects from the washing of the additional BRNOC ROM coal would also therefore be geochemically similar. The disposal of additional CHPP rejects associated with the processing of BRNOC coal in the SCM Main Pit would be assessed in a separate SCM modification application.

3.8 LAND RESOURCES

3.8.1 Existing Environment

Land Use

SCPL owns the majority of land within the BRNOC ML areas and portions of buffer lands surrounding the mining operations (Figures 4a and 4b). The SCM and BRNOC, together with the DCM (which is located approximately 20 km to the south of the SCM) are the main mining developments in the local area. The majority of the land within the BRNOC ML areas has been cleared as a result of past rural land use practices such as grazing. SCPL's local landholdings outside of the ML areas are used for agricultural production (primarily grazing). In addition, coal seam gas exploration activities are undertaken in the district and coal seam gas production is proposed.

Landforms

The BRNOC is situated within the Gloucester Valley. The landforms of the Gloucester Valley are characterised by north-south oriented linear ridges with intervening undulating lowlands and floodplains. The ridges rise up to 600 metres (m) Australian Height Datum (AHD), are moderately to steeply sloping and remain timbered, while the undulating lowlands generally range from 50 to 150 m AHD in elevation and are characterised by gentle slopes and generally cleared land.

The Modification disturbance area is located within ML 1528 (Figure 3). A number of components of the BRNOC and the SCM contribute to local topography including:

- the BRNOC waste emplacements;
- the SCM Main Pit void;
- the SCM waste emplacement;
- the BRNOC;
- Roseville Pit Extension and Roseville West Pit;
- the backfilled Roseville pit;
- the SCM co-disposal area and return water dam; and
- various water management structures and storages.

These landforms and associated major infrastructure are shown at approved full development on Figure 3.

Soils

Soil assessments conducted for the BRN EIS identified two major soil types within the BRNOC ML, *viz.* Alluvial Soils and Yellow Soloths soils.

For the Modification, an area of approximately 4 ha of Yellow Soloth soils would be disturbed by the pit cutback.

In accordance with existing management practices, where soil resources are suitable for stripping and use in rehabilitation, soils would be stripped and directly placed on areas where progressive rehabilitation is being undertaken, or stockpiled for later use.

The existing erosion and sediment control measures would be extended to the Modification. The BRNOC operates under relevant management plans (e.g. BRNOC Soil Stripping Management Plan [SSMP] [SCPL, 2002b]). Soil management would continue to be conducted in accordance with the BRNOC SWMP (SCPL, 2002c) and SSMP.

3.8.2 Potential Impacts

Topography and Landscape Impacts

The key change to the existing topography that would result from the Modification is the extension of the BRNOC pit and ultimately, the final void. The proposed BRNOC pit cutback would extend the currently approved extent of BRNOC pit approximately 180 m to the west resulting in approximately 4 ha of land clearance.

In the context of the currently approved BRNOC pit and final void, the landform alteration outlined above represents a minor modification to the existing and approved topographical alterations associated with the BRNOC pit (i.e. the proposed cutback area is minor relative to existing BRNOC disturbance areas) (Figure 3).

Potential visual impacts associated with changes in topography are described in Section 3.10.2.

Soils and Erosion Potential

The potential soil and erosion-related impacts identified in the BRN EIS that would be relevant to the Modification include:

- increased erosion and sediment movement due to increased exposure of soils during clearance for the BRNOC pit cut-back; and
- alteration of physical and chemical soil properties during stripping and stockpiling operations for the pit extension.

Land Use/Capability

The Modification would not materially change land use in the BRNOC area. The rehabilitation of the modified BRNOC landforms would target an agreed final land use following discussions with regulatory authorities and landholders.

Land Contamination

No new potential sources of land contamination would be associated with the Modification.

Bushfire Management

SCPL would continue to operate in accordance with the *Gloucester District Bush Fire Management Plan Operations* (NSW Bush Fire Service, 2003), which outlines the bushfire management measures in place at the BRNOC (SCPL, 2009b).

3.8.3 Mitigation Measures and Management

Potential impacts to land resources at the BRNOC are currently managed via the implementation of measures included in the following:

- BRNOC LMP (SCPL, 2001b);
- ESCP (SCPL, 2002d);
- SSMP;
- SWMP;
- BRNOC LRMP (SCPL, 2001c);
- *Gloucester District Bush Fire Management Plan Operations* (NSW Bush Fire Service, 2003); and
- BRNOC Environmental Management Strategy (SCPL, 2002e).

These measures would continue to be implemented for the Modification, where relevant.

3.9 VISUAL ASPECTS

3.9.1 Existing Environment

The Vale of Gloucester is listed as a landscape conservation area by the National Trust and an indicative historical place under the Register of the National Estate, because of scenic and historical values. The scenic values of the area primarily relate to the lowlands being cleared while the surrounding volcanic ridges remain timbered and provide a picturesque backdrop to land uses within the valley. The Register of National Estate listing for the Vale of Gloucester indicates:

> *Development should not detract from the essentially rural nature of the area, and be harmoniously sited in respect to the more outstanding features of the landscape.*

The visual character in the area immediately surrounding the BRNOC is a combination of cleared grazing lands and the mine landforms associated with the SCM and BRNOC. The BRNOC waste emplacements are visible from The Bucketts Way and a number of other public vantage points to the north and west. Disjunct patches of remnant vegetation occur along creek lines, road verges and as isolated remnants within the gently undulating topography. Vegetation cover is heavier and almost continuous along the ridgeline that delineates the valley to the east of the BRNOC.

Additionally, the night-time character of the BRNOC area is influenced by the light emissions of the existing SCM CHPP and evening mining operations (i.e. Roseville West Pit)

3.9.2 Potential Impacts

The potential visual impacts of the Modification would be minimal given there would be no change to the BRNOC out-of-pit waste emplacements. The Modification would however involve the clearance of a small proportion of an existing patch of vegetation immediately west of the open pit (i.e. approximately 4 ha of vegetation for the proposed pit cutback).

The BRN EIS indicated that some views of the BRNOC landforms would be available from the Wadland residence, which is located approximately 2 km to the southeast of the BRNOC (Figures 4a and b). At this distance the proposed BRNOC pit cutback would be a minor extension to the existing BRNOC and would only result in clearance of a small proportion of the patch of existing remnant vegetation (i.e. the majority of the existing vegetation would be retained) and therefore, there would be no material change to the visual character of the area.

The scale and nature of the evening lighting for the modified BRNOC would be similar in intensity to the existing lighting. Given BRNOC mining operations cease at 7.00 pm daily, night lighting is not a relevant issue.

3.9.3 Mitigation Measures and Management

Potential visual impacts at the BRNOC are currently managed via the implementation of measures included in the LRMP and Lighting Management Plan (SCPL, 2002f). These measures would continue to be implemented for the Modification where relevant.

The LRMP provides landscaping strategies that would be implemented where relevant to reduce the visual impacts of the BRNOC. Strategies relevant to the Modification include on-site and off-site vegetation screening, including planting adjacent to local roads. Extensive vegetation screening (i.e. planting of up to 1,800 trees) of the BRNOC from The Bucketts Way has been undertaken (SCPL, 2009b).

As discussed above, no additional lighting impacts are anticipated as a result of the Modification.

3.10 ABORIGINAL HERITAGE

A heritage survey of the BRNOC area was conducted by Heritage Search (2000). This survey only located one isolated artefact in the central BRNOC area. The artefact was a broken flake and was categorised as having no particular scientific or educational significance and was considered of no social significance by the local Aboriginal people.

Heritage Search (2000) also classified the majority of the BRNOC area as having low potential for the presence of subsurface archaeological material and test excavation was not recommended. The Forster Local Aboriginal Land Council (LALC) concurred with the Heritage Search assessment and advised that monitoring of topsoil stripping in ML 1528 was not necessary (Heritage Search, 2000).

A search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted for an area of approximately 25 km x 25 km surrounding the Modification disturbance area in February 2010 (DECCW, 2010h). Six Aboriginal heritage sites had previously been recorded in the search area. The sites of relevance included one open camp site which had been recorded during the previous surveys for the SCM (38-1-0008) (Brayshaw, 1984) and one isolated artefact which was recorded within the BRNOC area (38-1-0031). The open camp site is situated well outside of the Modification disturbance area. The remaining four sites identified in the AHIMS search were located well away from the SCPL mining operations.

SCPL obtained a “Consent to Destroy” Permit from the DECCW for the isolated find (38-1-0031) prior to the development of the BRNOC (SCPL, 2009b). The artefact was removed from the site in January 2008 (SCPL, 2009b). A report detailing the retrieval of the artefact is presented within the Plans and Appendices volume of the 2009 AEMR (SCPL, 2009b).

There are no known Aboriginal heritage sites within the proposed BRNOC pit cutback area. Should any Aboriginal objects be uncovered during topsoil stripping activities for the modified BRNOC, works in the immediate area of the find would cease and the DECCW would be advised.

3.11 NON-ABORIGINAL HERITAGE

A non-Aboriginal heritage survey of the BRNOC area was undertaken in 2000 for the BRN EIS. No sites or artefacts of European heritage significance were identified. In addition, a search of the Register of National Estate and State Heritage Inventory found that no sites were recorded within the BRNOC area (Heritage Search, 2000).

As described in Section 3.10.1, the Vale of Gloucester Landscape Conservation Area was registered by the National Trust of Australia (NSW) in 1976. The Vale of Gloucester Landscape Conservation Area has not been listed in either the Gloucester or Great Lakes LEP or any other regional plan.

A search of the Australian Heritage Database (DEWHA, 2010d) did not identify any other relevant items of non-Aboriginal heritage.

The disturbance area for the Modification is an extension of the existing BRNOC pit and within the area previously surveyed for the BRN EIS. There are no known non-Aboriginal heritage sites within the proposed BRNOC pit cutback area. The Modification is therefore anticipated to have no impact on non-Aboriginal heritage values.

The Modification would not have an adverse affect on the stated historical features of the Vale of Gloucester Landscape Conservation Area as described in the National Trust listing. Potential visual impacts of the Modification are considered in Section 3.10.2.

3.12 ROAD TRANSPORT

The Bucketts Way is the principal road servicing the BRNOC area and runs approximately 40 km west from Nabiac on the Pacific Highway to Gloucester and then south to rejoin the Pacific Highway approximately 8 km south of Karuah (Figure 1).

The local minor road network in the BRNOC area comprises a grid of local roads, running approximately east-west and north-south. The local minor road network primarily provides property access for local landholders and generally does not carry through traffic. A section of Bowens Road, which was previously located across SCM mining leases is now closed (SCPL, 2009b).

The BRN EIS included an assessment of potential road transport impacts associated with the BRNOC, based on the estimated level of employment (up to nine employees). The assessment concluded that there would be no changes to the levels of service on the road network and would be no significant impacts on road safety (SCPL, 2001).

Currently, there are approximately 15 employees at the BRNOC. Minimal changes to the transport requirements (e.g. workforce, consumables, visitors, general deliveries and maintenance vehicles) of the existing BRNOC are proposed and, therefore, minimal changes to the potential impacts described in the BRN EIS are anticipated.

3.13 SOCIAL AND ECONOMIC ASPECTS

The BRN EIS predicted positive socio-economic effects, including a small increase in economic activity, direct and indirect employment and net production benefits of $30 Million (M).

The Modification would not involve any change to the current operational workforce, however it would extend the life of mine to mid-2013 and hence extend the positive socio-economic benefits.

The BRNOC currently employs some 15 operational personnel. This level of employment would continue for the Modification. A large proportion of these employees (approximately 51%) would continue to be sourced from the local area.

SCPL would continue to provide community infrastructure contributions of approximately $16,250 per annum as a community infrastructure contribution to the GSC in accordance with the BRNOC Development Consent (indexed according to the CPI Sydney [all groups] Index).

The operation of the BRNOC would continue to result in the collection of royalties and taxes by the State of NSW and the Commonwealth Government.

3.14 HAZARD AND RISK

All hazardous materials at the BRNOC are stored and used in accordance with the relevant material safety data sheets (MSDS). The MSDS register is updated when new materials or chemicals are brought to site. The mine contractor is responsible for the Dangerous Goods Licence for the Fuel Farm.

A PHA was conducted for the BRNOC (i.e. the *Bowens Road North Project Preliminary Hazard Analysis* [SCPL, 2001d]). Relevant hazard prevention and mitigation measures from these assessments have been implemented for the BRNOC.

The Modification would not introduce any new hazardous materials to the BRNOC. The fuel and chemical storage facilities on-site would remain unchanged. The road transport requirements (e.g. deliveries) for consumables to the BRNOC would also remain largely unchanged. The Modification would not increase the number of potential impact mechanisms to the environment, public and private property, and their associated consequences and likelihoods, to the extent that risk levels would increase from those previously assessed in the BRNOC PHA. Subsequently, there would be no increase to the overall PHA risk assessment findings as a result of the Modification.

The existing BRNOC management and mitigation measures would continue to be implemented to minimise the risks associated with the Modification.

4 REHABILITATION, MONITORING AND MANAGEMENT

4.1 REHABILITATION

The primary objectives of the rehabilitation programme for the BRNOC are the minimisation of erosion and reinstatement of pre-mining land capability. Other objectives of rehabilitation are:

- the generation of a final rehabilitated landform which is consistent with general landforms in the area and which would blend in with the hills to the east;
- to provide a landform which is suitable for the primary final land uses of grazing and fauna habitat enhancement;
- to plan mining and overburden handling operations to minimise rehandling, reshaping and contouring; and
- to minimise the amount of disturbed land awaiting rehabilitation.

General rehabilitation principles applicable to the modified BRNOC would be consistent with those presented in the BRN EIS and include:

- Preservation of areas of existing vegetation and landforms wherever possible.
- Progressive rehabilitation of landforms in accordance with approved plans.
- Stabilisation of newly prepared (i.e. topsoiled) landforms prior to establishment of long-term vegetation using moisture retaining passive drainage systems, water holding structures and where appropriate, authorised hybrid cover crops to provide initial erosion protection.
- Exclusion of livestock from rehabilitation areas through the use of fencing and/or bunding.
- Development of flexible rehabilitation concepts that facilitate trial-based improvements to the programme.
- Preparation of the annual rehabilitation programme and budget by site management.

The relevant Mining Operations Plan (MOP) and AEMR describe the rehabilitation programme. A summary of the key elements of the rehabilitation programme is provided below.

Waste Emplacements

Rehabilitation of the BRNOC out-of-pit waste emplacements has been undertaken progressively since the commencement of mining operations in 2003. The out-of-pit waste emplacements have been recontoured to batter slopes of 1(vertical):4(horizontal). Rehabilitation works undertaken to date have included shaping and sown pasture treatment on topsoiled areas on the northern waste emplacement (SCPL, 2009b) and establishment of endemic woodland shrubs and trees. Plate 1 provides some views of the progressive waste emplacement rehabilitation to date. Rehabilitation works on the BRNOC waste emplacements would continue to be undertaken.

No additional out-of-pit waste emplacement is proposed for the Modification.

BRNOC Waste Rock Emplacement Rehabilitation

North-east Batter

Western Batter

Northern Batter

Eastern Batter

South-east Batter

South-west Batter

ResourceStrategies

BRNOC JUNE 2010 MODIFICATION

PLATE 1

Successful BRNOC Rehabilitation

STRATFORD COAL

Final Void

The rehabilitation principles for the modified BRNOC final void would be consistent with those described in BRN EIS regardless of a previous modification (SCPL, 2002a) which relocated the final void to the southern portion of the open cut. Relevant final void rehabilitation principles described in the BRN EIS include:

- As the final void would extend below the local groundwater table, it would begin to accumulate groundwater inflows once mine dewatering ceases.
- It is proposed to re-establish drainage from the rehabilitated mine waste emplacements and backfilled areas within the open pit into the void, resulting in the accumulation of surface waters.
- The void would be filled by a combination of groundwater and surface water inflows, and local groundwater levels would be re-established to pre-mining levels.
- Once filled, overflow from the void would flow to Avondale Creek via a constructed drainage pathway.
- The final void waterbody and drainage pathway would be bordered by wetland and woodland (Figure 8).
- Perimeter bunding of the open cut to largely restrict access to the steeper slopes of the final void.
- Any further final void access restrictions (e.g. fencing) for safety and exclusion of stock would be designed and implemented in consultation with the relevant authorities.

The rehabilitation strategy for BRNOC void would be included in an integrated SCM and BRNOC Final Void Management Plan.

Infrastructure Areas

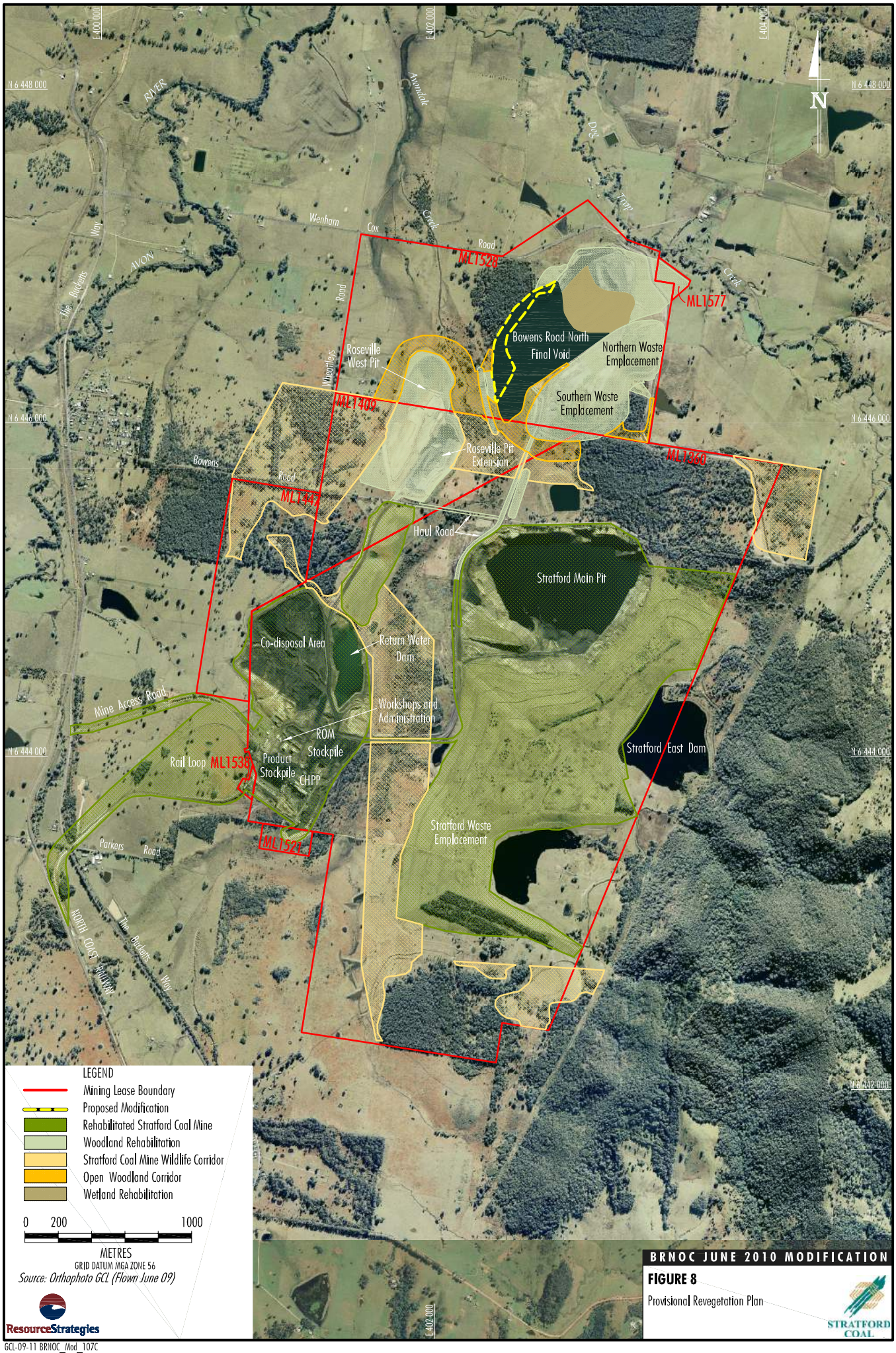
Rehabilitation of infrastructure areas at the modified BRNOC would involve removal of concrete hardstands, site access roads and water management structures (where agreed in consultation with relevant landholders) and these areas would be deep-ripped and seeded as required.

Figure 8 provides the provisional post-mining revegetation plan for the BRNOC incorporating the Modification.

4.2 ENVIRONMENTAL MONITORING AND MANAGEMENT

GCL's *Environmental Policy* principles are (GCL, 2008a):

- *To enhance the development and maintenance of high standards of environmental management.*
- *A commitment to the Environmental Management program by all personnel.*
- *Environmental performance shall be regularly assessed and information distributed to the local community through the consultative committees.*
- *Minimisation of areas disturbed by operations.*
- *Minimisation of impact on the surrounding environment.*
- *Application of best practical technologies for rehabilitation, water and environmental protection.*
- *The preservation of fauna and flora.*
- *The preservation of downstream water quality.*
- *The achievement of final land forms that are stable and sustainable.*



GCL-09-11 BRNOC_Mod_107C

GCL's *Energy Management Policy* principles are (GCL, 2008b):

- *To enhance the development and maintenance of high standards of energy management.*
- *A commitment to the Energy Management program by all personnel.*
- *Energy usage performance shall be regularly assessed and a commitment of continuous improvement.*
- *Application of best practical technologies for the mining and production of the Company's products in the most economic and energy efficient manner.*
- *A goal of reducing the amount of energy per tonne of coal processed, resulting in lower production costs and reduced energy and demands on Electricity Providers, thereby reducing the impact on the environment and green house gas generation.*

SCPL's Environmental Management Strategy has the following objectives (SCPL, 2002e):

- *To ensure compliance with statutory requirements and with reasonable community expectations.*
- *To develop and maintain the most cost effective environmental management for the Stratford Mine.*
- *To provide all employees with the knowledge, skills and equipment necessary to meet their environmental obligations.*
- *To promote an awareness and concern for good environmental management amongst all employees.*
- *To provide a "feed-back loop" so that the results of environmental monitoring are used to assess, and where necessary improve, environmental performance.*

Environmental management at the BRNOC has included the development and implementation of a range of environmental management plans, procedures and environmental monitoring programmes.

Examples of relevant BRNOC environmental management plans, procedures and monitoring programmes include:

- LMP;
- FFMP;
- ESCMP;
- NMP;
- Lighting Management Plan;
- SSMP;
- SWMP;
- LRMP;
- BRN Project Blasting/Vibration Management Plan (SCPL, 2002h);
- BRNOC Dust Management Plan (SCPL, 2002i);
- BRN Project Road Closure Management Plan (SCPL, 2002j);
- BRN Project Environmental Management Strategy;
- *Gloucester District Bush Fire Management Plan Operations* (NSW Bush Fire Service, 2003); and
- monitoring results provided annually in AEMRs, where relevant.

The SCPL environmental monitoring programme includes monitoring sites and monitoring frequencies for all major environmental parameters and covers all issues and requirements relevant to the Modification.

The existing MOP would be updated where relevant to address the Modification. Environmental monitoring and management of BRNOC operations would continue to be reported in the AEMR.

5 CONCLUSION

Environmental reviews have been conducted to determine whether the Modification would materially alter the findings of the previous environmental assessments. The environmental reviews have concluded:

- The BRN EIS involved a total surface disturbance area of some 92 ha. Subsequent modifications have resulted in an existing operation which has a total surface disturbance area of some 94 ha. The Modification would result in the clearance of an additional 4 ha (i.e. a total of approximately 98 ha).
- Assessments of significance prepared in accordance with Section 5A of the EP&A Act conclude that the proposed Modification is unlikely to have a significant effect on any threatened species, populations, ecological communities or their habitats.
- To offset the additional vegetation proposed to be cleared which includes 1.8 ha of River-Flat Eucalypt Forest EEC, an offset area of some 11 ha is proposed which would result in the conservation of two threatened ecological communities listed under the TSC Act, *viz*. approximately 6 ha of the River-Flat Eucalypt Forest EEC and approximately 0.5 ha of the Freshwater Wetlands on Coastal Floodplains EEC.
- The BRNOC has a strong record of compliance with relevant noise criteria and operates only between 7.00 am and 7.00 pm.
- From a noise perspective, the Modification is minor in nature, would not change operational hours and would not materially change BRNOC noise emissions.
- Consistent with the findings of the BRN EIS, the modified BRNOC is expected to continue to comply with applicable dust deposition and suspended particulate matter criteria at nearby private dwellings.
- Additional waste rock would be geochemically similar to the waste rock mined to date and described in the BRN EIS (i.e. NAF) and hence the originally proposed management measures would continue.
- There would be no material change to the potential water resource impacts assessed in the BRN EIS, including potential flooding, erosion and sedimentation, groundwater inflows and groundwater drawdown.
- The Modification is not anticipated to have any impact on heritage values (Aboriginal or European) and, therefore, no additional impacts to those described in the EIS would result.
- Minimal changes to the transport requirements (e.g. workforce, consumables, visitors, general deliveries and maintenance vehicles) of the existing BRNOC are proposed.
- The Modification would continue the economic and employment benefits provided by the BRNOC described in the BRN EIS until mid-2013. The Modification would increase the production of coal from the BRNOC that would, in turn, maintain the generation of export revenue for SCPL and continue the collection of royalties and taxes by the State of NSW and the Federal Government.
- The Modification's general rehabilitation principles and objectives would be consistent with those presented in the BRN EIS.
- With the continued implementation of environmental management measures and monitoring programmes, no significant additional effects on residents or existing environmental values are expected to result from the Modification.

Based on the above and a comparative analysis of the key elements (i.e. Table 1 and Figures 2 and 3) it is considered that the Modification is substantially the same as the originally approved BRNOC.

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ATTACHMENT 1

BOWENS ROAD NORTH OPEN CUT – DEVELOPMENT CONSENT

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

INTEGRATED STATE SIGNIFICANT DEVELOPMENT

DETERMINATION OF DEVELOPMENT APPLICATION PURSUANT TO SECTIONS 76(A)9 & 80

I, the Minister for Urban Affairs and Planning, pursuant to Sections 76(A)9 & 80 of the Environmental Planning and Assessment Act, 1979 ("the Act") determine the development application ("the application") referred to in Schedule 1 by granting consent to the application subject to the conditions set out in Schedule 2.

The reasons for the imposition of the conditions are to:

(i) minimise the adverse impact the development may cause through water and air pollution, noise, and visual disturbance;

(ii) provide for environmental monitoring and reporting; and

(iii) set requirements for mine infrastructure provision.

Andrew Refshauge MP
Minister for Urban Affairs and Planning,

Sydney, 2001 File No. S99/01462

Schedule 1

Application made by:	Stratford Coal Pty Limited (ACN 064 016 164) ("the Applicant").
To:	The Minister for Urban Affairs and Planning (DA 39-02-01)
In respect of:	Land described in Appendix "1".
For the following:	Development of an open cut coal mine, and construction and operation of associated surface facilities ("the Development").
BCA Classification:	10(a) Coal crusher

NOTE:

1) To ascertain the date upon which the consent becomes effective, refer to section 83 of the Act.
2) To ascertain the date upon which the consent is liable to lapse, refer to section 95 of the Act.
3) Section 97 of the Act confers on an Applicant who is dissatisfied with the determination of a consent authority a right of appeal to the Land and Environment Court exercisable within 12 months after receipt of notice.

SCHEDULE 2

Development Consent Conditions for the Bowens Road North Open Cut Coal Mine

INDEX

DEFINITIONS:

AEMR - *Annual Environmental Management Report*
CCC – *Community Consultative Committee*
Construction – *Construction of road works and surface facilities, and clearing of vegetation relating to the construction of road works and surface facilities*
DA - *Development Application*
DA area - *Development Application area which includes all works described in the DA.*
Director-General - *Director-General of the Department of Urban Affairs and Planning or delegate.*
EIS - *Environmental Impact Statement*
Independent Dispute Resolution - *defined in a flow chart which indicates DUAP will appoint an independent dispute facilitator to deal with the matters of concern (refer Schedule A)*
Mining Operations – *Includes overburden removal, coal extraction and vegetation removal and soil stripping relating to overburden removal and coal extraction*
Surface facilities – *mine waste emplacements, soil stockpiles, perimeter bunds, dedicated coal crusher, ROM coal and product stockpiles, diversion drains, runoff collection ponds, mine water dam, excess water pipeline*

Government Authorities

GSC - *Gloucester Shire Council*
DLWC - *Department of Land and Water Conservation*
DMR - *Department of Mineral Resources*
DUAP – *Department of Urban Affairs and Planning*
EPA - *Environment Protection Authority*
MSB - *Mine Subsidence Board*
NPWS - *National Parks and Wildlife Service*
NSW Agriculture - *New South Wales Agriculture*
NSW Fisheries - *New South Wales Fisheries*
RTA - *Roads and Traffic Authority*

Red type represents 1 October 2002 modification
Blue type represents 17 November 2005 modification
Green Type represents 20 June 2005 modification

1. General

There is an obligation on the Applicant to prevent and minimise harm to the environment throughout the life of the project. This requires that all practicable measures are to be taken to prevent and minimise harm that may result from the construction, operation and, where relevant, decommissioning of the development.

1.1 Adherence to terms of DA, EIS, SIS, etc.

(a) The development is to be carried out generally in accordance with development application No. 39-02-01, and the EIS dated February 2001, prepared by Resource Strategies and certified in accordance with Section 78A(8) of the Act, and the following documentation:

(i) additional information provided to the Department in response to the issues raised during the exhibition period in a document entitled "Proposed Bowens Road North Open Cut Coal Mine Responses to DUAP Highlighted Submissions" undated and sent by electronic mail to DUAP on 4 May 2001;

(ii) additional information regarding the bat fauna assessment provided to the Department in a facsimile from Resource Strategies dated 5 June 2001;

(iii) additional information regarding issues raised in a submission by NSW Agriculture, provided to the Department in electronic mail from Resource Strategies dated 5 June 2001;

(iv) additional information regarding the buffer distance from Dog Trap Creek provided to DLWC and the Department in a facsimile from Resource Strategies dated 3 July 2001;

(v) the modification application (MOD-21-4-2002) and accompanying Statement of Environmental Effects titled "Bowens Road North Open Cut Coal Mine – Project modification" dated April 2002 and prepared by Resource Strategies Pty Ltd on behalf of Stratford Coal Mine, including:

- correspondence dated 30 August 2002 from Stratford Coal Pty Ltd to PlanningNSW regarding the withdrawal of the Ellis property from the Development Consent; and

(vi) the modification application described in the letter from stratford Coal to the Department, dated 4 March 2005;

as may be modified by the conditions set out herein.

(a)(a) If there is any inconsistency between the material in the above documents, the material in the most recent document shall prevail to the extent of the inconsistency.

(b) If, at any time, the Director-General is aware of environmental impacts from the proposal that pose serious environmental concerns due to the failure of environmental management measures in place to ameliorate the impacts, the Director-General may order the Applicant

to cease the activities causing those impacts until those concerns have been addressed to the satisfaction of the Director-General.

(c) If any licence conditions are breached the applicant shall comply with any modification to the work as specified by the relevant agency.

1.2 Period of Approval/Project Commencement

(a) This consent is limited to a period of 14 years from the date of the mine lease approval for the Stratford Coal Mine.

(b) At least two weeks prior to the commencement of construction and Mining Operations respectively or within such period as agreed by the Director-General, the Applicant shall submit for the approval of the Director-General a compliance report detailing compliance with all the relevant conditions that apply prior to the commencement of construction and Mining Operations.

(c) Date of commencement of construction and Mining Operations is to be notified in writing to the Director-General, and GSC, at least two weeks prior to commencement of construction and Mining Operations respectively.

1.3 Dispute Resolution

In the event that the Applicant, GSC or a Government agency, other than the Department of Urban Affairs and Planning, cannot agree on the specification or requirements applicable under this consent, the matter shall be referred by either party to the Director-General or if not resolved, to the Minister for Urban Affairs and Planning, whose determination of the disagreement shall be final and binding on the parties.

1.4 Security Deposits and Bonds

Security deposits and bonds will be paid as required by DMR under mining lease approval conditions.

2. Mine Management

2.1 Mine Management Plan, Operations and Methods

(a) No mining undertaken in accordance with this consent shall occur until the Applicant has submitted and had accepted by the DMR, a Mining Operations Plan (MOP) in accordance with current guidelines issued by DMR. The Plan covers mining operations for a period of up to seven years.

(b) The MOP shall:

(i) be prepared in accordance with DMR Guidelines for the Preparation of Mining Operations Plans (Document 08060002.GUI or its most recent equivalent);

(ii) demonstrate consistency with the conditions of this consent and any other statutory approvals;

(iii) demonstrate consistency with the Environmental Management Plans for the project site;

(iv) provide the basis for implementing mining operations, environmental management, and ongoing monitoring;

(v) include a mine rehabilitation and land use management plan;

(vi) identify a schedule of proposed mine development for the period covered by the plan and include:

- the area proposed to be impacted by mining activity and resource recovery mining methods and remediation measures
- areas of environmental, heritage or archaeological sensitivity and mechanisms for appropriately minimising impact
- water management, and
- proposals to appropriately minimise surface impacts; and

(vii) further consider the acid-generating potential of the coal seam in consultation with, and to the satisfaction of, DMR.

(c) In preparing the Mine Operations Plan, the Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of those services.

(d) A copy of the MOP, excluding commercial in confidence information, shall be forwarded to GSC and the Director-General within 14 days of acceptance by DMR.

(e) At least two years prior to the cessation of mining operations the Applicant shall investigate, determine and report, taking account of the potential community benefits, on a final strategy for the future use of the mine site and any general infrastructure components, in consultation with DUAP, DLWC and GSC and for approval of DMR and the Director-General.

2.2 Limits on Production

(a) Run of Mine coal production from the Bowens Road North project shall not exceed 0.90 million tonnes per annum (Mtpa).

2.3 Hours of Operation

(a) [1]Coal mining, coal handling, processing and stockpile operations on the Bowens Road North Open Cut Mine may only be carried on between 7.00am to 7.00pm.

[1] EPA General Terms of Approval

(b) [2]Subclause (a) above does not apply if a delivery of material outside the hours of operation is required by police or other authorities for safety reasons and/or the operation or personnel or equipment are endangered. In such circumstances, prior notification shall be provided to the EPA and affected residents as soon as possible, or within a reasonable period in the case of emergency.

(c) [3]The hours of operation specified in subclause (a) above, may be varied with written consent if the EPA is satisfied that the amenity of the residents in the locality will not be adversely affected.

[2] EPA General Terms of Approval
[3] EPA General Terms of Approval

3. Land and Site Environmental Management

3.1 Appointment of Environmental Officer

(a) The Applicant shall ensure that a suitably qualified and experienced Environmental Officer is available throughout the life of the mine, whose appointment is to be approved by the Director-General, in the first instance before the Officer commences duties. The Officer shall:

(i) be responsible for the preparation of the environmental management plans (refer to Condition No. 3.2);

(ii) be responsible for considering and advising on matters specified in the conditions of this consent and compliance with such matters;

(iii) be responsible for receiving and responding to complaints in accordance with Condition 10.2(a);

(iv) facilitate an environmental induction and training program for all persons involved with construction activities, mining and remedial activities; and

(v) make recommendations to the Mine Manager to take reasonable steps to avoid or minimise adverse environmental impacts. The Mine Manager shall issue instructions to stop work if an adverse impact on the environment is likely to occur.

(b) The Applicant shall notify the Director-General, DMR, EPA, NPWS, DLWC, GSC, and CCC (refer condition 10.1) of the name and contact details of the Environmental Officer upon appointment and any changes to that appointment.

3.2 Environmental Management Strategies and Plans

(a) The Applicant shall prepare an Environmental Management Strategy providing a strategic context for the environmental management plans [refer condition 3.2(d)]. The Environmental Management Strategy shall be prepared following consultation with the NPWS, DLWC, EPA, DMR, GSC, and the CCC (refer condition 10.1) and to the satisfaction of the Director-General. The strategy shall be provided to the Director-General no later than the time the first Environmental Management Plan under sub-clause (d) below is submitted.

(b) The Environmental Management Strategy shall include, but not be limited to:

(i) statutory and other obligations which the Applicant is required to fulfil during construction and mining, including all approvals and consultations and agreements required from authorities and other stakeholders, and key legislation and policies;

(ii) definition of the role, responsibility, authority, accountability and reporting of personnel relevant to environmental management, including the Environmental Officer;

(iii) overall environmental management objectives and performance outcomes, during construction, mining and decommissioning of the mine, for each of the key environmental elements for which management plans are required under this consent;

(iv) overall ecological and community objectives for the project, and a strategy for the restoration and management of the areas affected by mining operations, including elements such as wetlands and other habitat areas, creek lines and drainage channels, within the context of those objectives;

(v) identification of cumulative environmental impacts and procedures for dealing with these at each stage of the development;

(vi) steps to be taken to ensure that all approvals, plans, and procedures are being complied with;

(vii) processes for conflict resolution in relation to the environmental management of the project; and

(viii) documentation of the results of consultations undertaken in the development of the Environmental Management Strategy.

(c) The Applicant shall make copies of the Environmental Management Strategy available to GSC, EPA, DLWC, NPWS, DMR, MSB and the CCC within fourteen days of approval by the Director-General.

(d) The Applicant shall prepare the following environmental management plans:

(i) Flora and Fauna Management Plan (refer condition 3.4(a));

(ii) Landscape and Revegetation Management Plan (refer condition 3.6(a));

(iii) Land Management Plan (refer condition 3.8(a));

(iv) Site Water Management Plan (refer condition 4.1(a));

(v) Erosion and Sediment Control Plan (refer condition 4.5(a));

(vi) Soil Stripping Management Plan (refer condition 4.5(d));

(vii) Dust Management Plan (refer condition 6.1(b));

(viii) Blasting/Vibration Management Plan (refer condition 6.3(f));

(ix) Noise Management Plan (refer condition 6.4.3(a));

(x) Lighting Management Plan (refer condition 6.5(b)).

These environmental management plans may also form part of the overall Site Management Plan and/or Mining Operations Plan.

(e) The Applicant shall make copies of the environmental management plans in sub-clause (d) above available to the relevant government agencies, GSC and CCC, and ensure that the plans are made publicly available within 14 days of approval.

(f) The management plans are to be reviewed, and updated as directed by the Director-General, in consultation with the relevant government agencies. They will reflect changing environmental requirements or changes in technology/operational practices. Changes shall be made and approved in the same manner as the initial environmental management plan. The plans shall also be made publicly available at GSC within two weeks of approval by the DUAP.

3.3 Heritage Assessment, Management and Monitoring

<u>European Heritage</u>

(a) Should any historical relics be unexpectedly discovered on the site during excavation, all excavation or disturbance to the area is to stop immediately and the Heritage Council of NSW shall be informed in accordance with section 146 of the NSW Heritage Act 1977.

(b) Work may not recommence in the area described in subclause (a) until any necessary Excavation Permit under section 139 of the NSW Heritage Act 1977 has been approved by the Heritage Council of NSW.

Aboriginal Heritage

(c) Lodgement and approval of a NPWS Consent to Destroy (with Salvage) shall be obtained by the Applicant from the NPWS Director-General prior to any works associated with the destruction and/or interference of the Aboriginal site identified with the bank on the eastern dam during the Aboriginal Cultural Heritage Assessment Report.

(d) Written endorsement from the Forster Local Aboriginal Land Council shall be obtained by the Applicant to be submitted with the NPWS Consent to Destroy (with Salvage) for the Aboriginal site identified during the Aboriginal Cultural Heritage Assessment.

(e) The Applicant shall ensure that destruction and salvage of all Aboriginal relics approved within the NPWS Consent to Destroy (with Salvage), not being human remains from the identified Aboriginal site, be undertaken by experienced Aboriginal representatives of the Forster Local Aboriginal Land Council.

(f) The Applicant and/or consent holder shall provide to the NPWS Northern Aboriginal Heritage Unit a listing of any Aboriginal relics salvaged (excluding human remains) from the identified Aboriginal site by representatives of the Forster Local Aboriginal Land Council.

(g) Should human skeletal remains and/or any other Aboriginal sites be uncovered during excavation works, all works shall cease immediately and the NPWS Northern Aboriginal Heritage Unit and the Forster Local Aboriginal Land Council shall be contacted immediately and/or as soon as possible.

3.4 Flora and Fauna Assessment, Management and Monitoring

Assessment and Management

(a) The Applicant shall prior to commencement of Mining Operations prepare and implement a Flora and Fauna Management Plan for the management of flora and fauna issues for the DA area. The Plan is specifically required to outline procedures for clearing or disturbing vegetation and other habitat types, along with measures for habitat reinstatement and management.

The Plan shall be prepared in consultation with NPWS and GSC, and to the satisfaction of the Director-General. The Plan shall be prepared by an appropriately qualified and experienced ecologist. The ecologist shall be responsible for providing advice to minimise potential impacts upon threatened and protected fauna species that may utilise the site and to provide expert advice on the regeneration and reconstruction of flora and fauna habitat on mined areas. The Plan shall include but not be limited to:

i) Measures required prior to commencing work at Bowens Road North

- details of strategic vegetation management, outlining timeframes for clearing and re-vegetation activities and a map illustrating the Plan. The Plan should aim to maximise scope for new vegetation to establish and restore ecological integrity;
- details of the schedule for clearing activities incorporating seasonal habitat requirements for species such as bats and other mammals, with the objective of avoiding incidents during sensitive hibernation and breeding periods.

ii) Clearing of vegetation

- details of pre-clearance inspections to be conducted by a qualified ecologist. Pre-clearance inspections shall include searching for, trapping and releasing fauna that may be impacted by construction activities, relocating tree hollow roosts for bats in cleared areas where practical (or providing artificial bat roosts in adjacent vegetation where relocation is not practical). Pre-clearance inspections shall be conducted prior to the commencement of Mining Operations;
- details of how micro habitats including stags, tree hollows and nests will be either retained *in situ*, salvaged and relocated to adjacent habitat and rehabilitation works, or compensated for by the provision of alternative habitat (eg. roosting boxes). Where practical, the salvage and relocation of micro habitats shall occur in preference to the provision of artificial habitat;
- details of how native vegetation remnants adjoining proposed disturbance areas would be protected from accidental damage. This shall include details of the use of sediment fences;

iii) Reconstruction of native bushland – Post Mining fauna habitat

- strategies for the establishment of long-term post-mining land use objectives over the site;
- details for replacing community types that currently exist on site with communities of the same or similar dominant species composition, notably Dry Sclerophyll Woodland, Riparian Vegetation, and Heathland;
- measures to re-instate vegetation communities and to use local endemic species for revegetation as soon as possible;
- measures to connect existing areas and future areas of habitat rehabilitation to form a network of wildlife corridors throughout the site and to adjoining lands to facilitate species recruitment through natural immigration;
- strategies for the preparation of the site for habitat rehabilitation, as part of the revegetation;
- strategies for the development of an area of compensatory woodland habitat around the south-western perimeter of the mine, including the riparian margin of Avondale Creek as shown on Figure 5.1 of the EIS, and connecting existing vegetation remnants. The area shall be clearly illustrated and measures identified to conserve the area, at least while the land is under the ownership of Stratford Coal Pty Ltd. Planting of the area shall be initiated no later than the commencement of Mining Operations;
- methods of revegetation;
- measures to monitor the success of revegetated areas and plant additional species where necessary;
- measures to manage existing areas of remnant vegetation and promote regeneration, including fencing to exclude grazing animals, where appropriate, and control of feral animals where practical, and maintain weed and fire controls;
- strategies to manage the impact of surface water management, erosion and sediment control measures, and flooding mitigation measures on flora and fauna, including the impact of heavy machinery;

- development of a protocol for identifying and managing significant impacts on any threatened flora and fauna species not identified in the EIS, during construction or operation of the coal mine (refer also to subclause (e) below); and
- details of the habitat monitoring program (refer to subclause (i) below).

(iv) details of the inter-relationship of this plan with:
- the Wildlife Corridor Management Plan for Stratford Coal Mine; and
- other fauna and flora management requirements under the development consent for Stratford Coal Mine.

(b) Where practical, trees that would be partially submerged by the mine water dam shall be retained in situ to allow their continued use as fauna roosts.

(c) Revegetated areas shall be protected from grazing by domestic stock. The revegetation program shall also aim to extend and re-establish existing native vegetation on and, where possible, adjacent to the site.

(d) Cleared vegetation shall not be burnt unless otherwise approved by the EPA. Where possible, cleared vegetation shall be mulched and stored for use in rehabilitation. All reasonable measures to use surplus vegetation shall be undertaken.

(e) If threatened species (listed under the Threatened Species Conservation Act, 1995) other than those recognised in the EIS are identified on the site during construction or operation of the coal mine, the Applicant shall immediately notify NPWS. The Applicant shall cease any work which could adversely impact on the identified species, should an appropriately qualified and experienced ecologist (approved by the Director-General) in consultation with NPWS deem it necessary. In the event that work ceases, work shall not recommence until advice has been received from NPWS.

(f) During the life of the mine and until the revegetated areas are established to the satisfaction of the DMR, the Applicant shall maintain the revegetated areas. Maintenance shall include, where necessary, but not be limited to:
(i) replanting failed or unsatisfactory areas;
(ii) repairing erosion problems;
(iii) fire management – fire suppression or fire encouragement;
(iv) pest and weed control;
(v) control of feral animal populations;
(vi) maintain and repair fencing;
(vii) fertiliser application;
(viii) application of lime or gypsum to control pH and improve soil structure.

(g) The efforts and progress of the Flora and Fauna Management Plan shall be documented in the AEMR in accordance with the Department of Mineral Resource's Guidelines to the Mining, Rehabilitation and Environmental Management Process (March 1998) or its latest version.

Monitoring

(h) The regeneration works shall be monitored by an appropriately qualified and experienced ecologist approved by the Director-General. The results of the monitoring and the

effectiveness of the reafforestation shall be reported annually as part of the Annual Environmental Management Report.

(i) The Applicant shall prepare a monitoring program of habitat areas on the site and any immediately adjacent land owned by Stratford Coal Pty Ltd, including any wetlands and aquatic habitats, during the development and for a period after the completion of the development to be determined by the Director-General in consultation with NPWS. The monitoring program shall be included in the Flora and Fauna Management Plan (Condition 3.4(a)) and a summary of the results shall be provided in the AEMR. The program shall:
   (i) monitor impacts attributable to the development and include monitoring of the success of any restoration or reconstruction works. The Applicant shall carry out any further works required by the Director-General and DMR as a result of the monitoring;
   (ii) establish an ongoing monitoring program of the existing and proposed revegetated areas to assess their floristics and structure and to propose contingency measures for improvements to revegetation if required; and
   (iii) establish an ongoing monitoring program of fauna species diversity and abundance and the effectiveness of reconstructed ecosystems in providing fauna habitat and contingency measures should impacts be identified as occurring. Monitoring of bat fauna shall be included in the fauna monitoring program.

   Note: The information obtained from the monitoring shall be used to guide future revegetation efforts on the mine site.

3.5 Site Rehabilitation Management

The Applicant shall carry out rehabilitation of all mine areas in accordance with the requirements of any Mining Lease granted by the Minister for Mineral Resources and ensure the progressive rehabilitation of the area is also in consultation with DLWC.

3.6 Visual Amenity and Landscaping

(a) A Landscape and Revegetation Management Plan shall be prepared by the Applicant and approved by the Director-General prior to commencement of construction. The Plan shall be prepared in consultation with the GSC. The Plan shall include, but not limited to, the following:

   (i) an on-site landscaping strategy detailing design and proposed planting of trees and shrubs and the construction of mounding or bunding:
      - along public roads including Bowens Road, Wheatleys Road and Wenhams Cox Road;
      - around the open cut and mine water dam;
      - around the waste emplacements; and
      - at any other areas identified as necessary by GSC for the maintenance of satisfactory visual amenity, and as agreed by the Director-General.
   (ii) appropriate erosion control and sediment control practices for earthworks associated with the landscaping.

(iii) details of visual appearance of any buildings, structures, facilities or works (including paint colours and specifications). Buildings and structures shall be designed and constructed/renovated so as to present a neat and orderly appearance and to blend as far as practicable with the surrounding landscape.

(iv) details, specifications and staged work programs to be undertaken, maintenance of all landscape works and maintenance of building materials and cladding.

(v) the process of incorporating vegetation screening and fauna protection corridors into the proposed visual and landscaping works;

(vi) use of indigenous species;

(vii) details of an off-site landscape strategy detailing proposed planting of trees and/or shrubs. The strategy shall also include details of the process to be undertaken should the owners of the Ellis residence request off-site landscaping works in accordance with sub-clause (b) below;

(viii) details of the inter-relationship of the plan with the Landscaping Plan developed for Stratford Coal Mine.

(b) If the owner of the Ellis property requests, the Applicant shall engage a mutually agreeable landscape architect to prepare a property landscape enhancement plan for that owner. The Applicant shall meet the costs for the preparation of such plan.

(c) If the owner referred to in sub-clause (b) above requests, the Applicant shall meet the reasonable costs for implementing the property landscape enhancement plan.

(d) Should the Applicant and/or landowner dispute the details of the property landscape enhancement plan prepared in accordance with subclauses (b) and (c) above, then either party may refer the matter to the Director-General. If the matter cannot be resolved within 21 days, the matter shall be referred to an Independent Dispute Resolution Process. The decision of the Independent Dispute Resolution Process shall be final, as agreed by the Director-General.

(e) In the event that a landowner considers that the visual impacts from the proposal once operational are adversely greater than that predicted in the EIS at their dwelling, the Applicant shall, upon the receipt of a written request, consult the landowner, discuss their concerns and the level of impact compared to EIS predictions, and, in the case of impact adversely greater than the EIS predictions, possible mitigation measures.

(f) Should the Applicant and / or landowner dispute the level of adverse impact or any proposed mitigation measures from subclause (e) above, then either party may refer the matter to the Director-General in consultation with GSC. If the matter cannot be resolved within 21 days, the matter shall be referred to an Independent Dispute Resolution Process. The decision of the Independent Dispute Resolution Process shall be final, as agreed by the Director-General.

3.7 Bushfire and other Fire Controls

The Applicant shall:

(a) provide adequate fire protection works on site, including the availability of trained personnel, water tankers and fire fighting equipment and annual hazard reduction measures with particular attention to boundaries of adjoining landholdings;

(b) prior to commencement of mining operations prepare a Bushfire Management Plan for all its holdings contained in the DA, to the satisfaction of GSC and the Rural Fire Service.

3.8 Land Management

(a) The Applicant shall, prior to commencement of Mining Operations prepare a Land Management Plan for the areas of the proposed surface facilities, and its holdings in the DA area, to provide for proper land management in consultation with DLWC, GSC, and to the satisfaction of the Director-General. The plan shall include, but not be limited to:

(i) pastures and remnant vegetation management;

(ii) prevention and rehabilitation of land degradation;

(iii) control of weed infestation on topsoil stockpile material;

(iv) assessment of the potential for commercial harvesting of standing timber removed from the site;

(v) eradication of vermin and noxious weeds as required by the Rural Lands Protection Board, and the Prickly Pear Authority and other relevant authorities, with particular focus on Giant Parramatta Grass;

(vi) feral animal control; and

(vii) details of the inter-relationship of this plan with the Land Management Plan for Stratford Coal Mine.

(b) The Applicant shall minimise the removal of trees and other vegetation from the proposed surface facilities area, and restrict any clearance to the areas occupied by mine activity, buildings and paved surfaces, and those areas necessary for fire control in accordance with GSC requirements.

4. Water Management and Monitoring

4.1 Surface & Ground Water Management Plans

The Applicant shall:

(a) prior to the commencement of Construction and Mining Operations, prepare a Site Water Management Plan for the DA area, or revise and update the existing Plan to address the issues associated with the modification application MOD-21-4-2002. The Plan shall be prepared in consultation with DLWC and GSC and to the satisfaction of the Director-General and DLWC, and shall address, but not be limited to, the following matters:

(i) management of the quality and quantity of surface and ground water within the areas covered by the water management plans;

(ii) management of stormwater and general surface runoff diversion to ensure separate effective management of clean and dirty water. This shall include a consideration of the separation of heavily contaminated waters including those containing oil, grease or other pollutants. Refer also to subclause (vii);

(iii) measures to prevent the degradation of downstream surface water quality below the pre-mining ANZECC beneficial water use classification due to mining operations, particularly in the Avon River, Avondale Creek, Dog Trap Creek, and the unnamed creeks and ephemeral watercourses in the area;

(iv) contingency plans for managing adverse impacts of the development on surface and groundwater quality;

(v) demonstration of the robustness of the mine water circuit to handle additional inflows of water to the pit;

(vi) details of any discharge arrangements and any requirements to modify the volume of storages on site;

(vii) [4]measures to develop and implement a Stormwater Management Scheme to mitigate the impacts of stormwater run-off from and within the premises following the completion of construction activities. The Scheme should be consistent with the Stormwater Management Plan for the catchment. Where a Stormwater Management Plan has not yet been prepared the Scheme should be consistent with the guidance contained in *Managing Urban Stormwater: Council Handbook* or its latest version (available from the EPA);

(viii) measures to ensure that poorer quality class waters are effectively reused on the site including consideration of segregation of waters based on salinity classes and other levels of contamination;

(ix) details of a strategy for the decommissioning of water management structures, including mine water dams;

[4] EPA General Terms of Approval

(x) details of design and maintenance of all storages, diversions, transmission channels and sedimentation basins for the site, to minimise sedimentation of watercourses;

(xi) details of any licensing requirements for any extractions, storages, or other constructions on the site;

(xii) projection of potential groundwater changes during mining (short term) and post-mining (long term) with particular attention given to the effect of changes to groundwater quality and mobilisation of salts. This shall include a re-evaluation of the groundwater modelling to verify the ingress rates and salt mass balance of the Bowens Road void following the modification to the mine plan as described in the modification application MOD-21-4-2002;

(xiii) [5]the response system and remediation requirements, should local groundwaters degrade beyond their current beneficial use classification level;

(xiv) [6]contingency procedures in the event of a spill or other incident which has the potential to degrade local groundwaters;

(xv) a program for reporting on the effectiveness of the water management systems and performance against objectives contained in the approved site water management plans, and EIS;

(xvi) a consideration of potential impacts on the Atkins property of accidental releases of water from the mine site. Mitigation measures to be implemented to prevent adverse impacts on the Atkins property shall be detailed in the Plan;

(xvii) measures to demonstrate that long term increases in downstream salinity will be minimal as a result of providing a free draining void to the Bowens Road open cut mine; and

(xviii) outline of the proposed changes to the operation of the mine and methods to address the issues associated with the modification application MOD-21-4-2002."

Pollution of waters

(b) [7]Except as may be expressly provided by a licence under the Protection of the Environment Operations Act 1997 in relation of the development, section 120 of the Protection of the Environment Operations Act 1997 must be complied with in and in connection with the carrying out of the development.

(c) The Applicant shall ensure that no discharge waters adversely affect any neighbouring property.

Mine Water

(d) The mine water balance shall be recalculated on a six-monthly basis and reported in the AEMR. Any discharge must be synchronised to occur within triggers on river flows.

[5] DLWC General Terms of Approval
[6] DLWC General Terms of Approval
[7] EPA General Terms of Approval

Dog Trap Creek

(e) The Applicant shall liaise with DLWC prior to commencement of construction or operation, to substantiate the adequacy of the proposed buffer between the mine and Dog Trap Creek so that the integrity of the creek is maintained.

Final Void

(f) Upon cessation of mining activity, the Applicant shall monitor the quality of waters that accumulate within the final void for a time period to be determined in consultation with DLWC, DMR and EPA. The results of the monitoring of quality shall be compared with the predictions of the EIS and reported to DLWC at a frequency to be determined in consultation with DLWC. Should the results of this monitoring show that the EIS predictions are not accurate in regard to long term water quality, the Applicant shall be responsible for the maintenance and rehabilitation of the final void to the satisfaction of DLWC, EPA and DMR, until relinquishment of the mining lease by DMR.

Rehabilitation

(g) The Applicant shall re-establish a post-mining drainage system incorporating each drainage line discharging from the area of the mining development. The drainage system shall be comparable to the drainage density of the pre-mining land. The design and implementation of the post-mining drainage system is to be to DLWC standard.

Wastewater management

(h) [8]Any wastewater utilisation areas must effectively utilise the wastewater applied to those areas. This includes the use for pasture or crop production, as well as ensuring the soil is able to absorb the nutrients, salts, hydraulic load and organic materials in the solids or liquids. Monitoring of land and receiving waters to determine the impact of wastewater application may be required by the EPA.

Remediation

(i) The Applicant shall be responsible for the remediation of any downstream riparian impact which may occur as a result of any unlicensed/ non-consensual loss of pit/ void waters from the site, to the satisfaction of DLWC and DMR.

4.2 Surface and Groundwater Monitoring

(a) The Applicant shall:

(i) construct and locate surface and groundwater monitoring positions, in consultation with DLWC, and to the satisfaction of the Director-General and DLWC, at least three months prior to the commencement of mining operations;

(ii) prepare a detailed monitoring program in respect of ground and surface water quality and quantity, including water in and around the DA area during mining works and

[8] EPA General Terms of Approval

post mine operations. The program shall be developed in consultation with DLWC, and to the satisfaction of the Director-General and DLWC.

(iii) incorporate into the Site Water Management Plan details of the monitoring program. The monitoring program shall include: the duration (pre, during and post mining); sites to be sampled; frequency of sampling; the parameters to be measured (including but not limited to the location and depths of aquifers and any groundwater-dependent ecosystems); the depth of bore construction; the need for any contingency plans; the analysis of data and the reporting procedure; and determination of appropriate cut-off criteria for monitoring purposes determined in consultation with DLWC. The results of the monitoring program shall be reported in the AEMR. The monitoring program for post-mining shall be prepared no later than one year prior to the cessation of mine operations.

(iv) The monitoring program shall have the capacity to collect sufficient data to adequately assess:

- the impact of any licensed groundwater extraction on groundwater levels on neighbouring properties and in the locality, and to identify any water quality impacts;
- any licensing requirements associated with the monitoring works;
- [9]if any capture of alluvial groundwater is occurring into the mine workings, and the extent of the cone of depressurisation surrounding the mine;
- potential adverse impacts or degradation of the groundwater systems through the development of a contingency program with identified stages of implementation; and
- any concerns or complaints from surrounding landholders on groundwater matters, and any ensuring actions, which shall be maintained and be available to DLWC.

(v) [10]monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with:

- the Approved Methods Publication; or
- if there is no methodology required by the Approved Methods Publication or by the general terms of approval or in the licence under the *Protection of the Environment Operations Act 1997* in relation to the development or the relevant load calculation protocol, a method approved by the EPA in writing before any tests are conducted,
- unless otherwise expressly provided in the licence.

<u>Requirement to monitor water discharges</u>

(b) [11]Overflow events from all erosion and sediment control dams or mine water storages are to be monitored (by sampling and obtaining results by analysis) for the concentration of each pollutant specified in Column 1 of Table 1. The Applicant must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns of Table 1.

Table 1: Water and Land

[9] DLWC General Terms of Approval
[10] EPA General Terms of Approval
[11] EPA General Terms of Approval

Pollutant	Units of measure	Frequency	Sampling Method
TSS	Mg/L	During each overflow event	Representative sample
Conductivity	µS/cm	During each overflow event	Representative sample
pH	pH	During each overflow event	Representative sample

(c) [12]Additional monitoring of surface water, groundwater, erosion and sediment control structure/dams, and receiving waters, may be required by the EPA to determine the impact on surrounding water quality.

4.3 Licence under the Water Act, 1912

[13]The Applicant shall obtain a licence from DLWC in respect of boreholes and monitoring piezometers under Part 5 of the *Water Act, 1912*.

4.4 Permit under the Rivers and Foreshores Improvement Act, 1948

(a) [14]The Applicant shall obtain a permit under Part 3A of the *Rivers and Foreshores Improvement Act, 1948* for works within forty metres of a river as defined under the Act.

(b) [15]Subclause (a) applies to proposed mine infrastructure including but not limited to:
- (i) water management structures;
- (ii) haul roads;
- (iii) Wenhams Cox Road realignment;
- (iv) erosion and sediment control features; and
- (v) perimeter bunds.

Dams

(c) [16]All construction drawings shall be certified by a practising structural engineer or in the case of unstable land a geotechnical engineer.

(d) [17]Any discharge from the dam shall not result in erosion or bank/bed instability of existing flow lines.

(e) [18]No materials shall be used that may pollute the watercourse.

(f) [19]All proposed dams shall be designed for, amongst other things, toe stability; forces from flooding, hydraulic pressures, seepage, attack from burrowing fauna and revegetation.

(g) [20]The surface of the excavated area shall be progressively regraded to a smooth and even slope from the water to the bank of the watercourse and drain towards the low flow channel.

[12] EPA General Terms of Approval
[13] DLWC General Terms of Approval
[14] DLWC General Terms of Approval
[15] DLWC General Terms of Approval
[16] DLWC General Terms of Approval
[17] DLWC General Terms of Approval
[18] DLWC General Terms of Approval
[19] DLWC General Terms of Approval

Perimeter Bunds

(h) [21]Any bunds shall be designed for, amongst other things, toe stability; forces from flooding, hydraulic pressures, seepage, attack from burrowing fauna and revegetation.

Road Drainage Crossings

(i) [22]Erosion of the bed and banks upstream and downstream of the crossings shall be prevented with suitable scour protection.

Wenhams Cox Road Re-Alignment

(j) [23]The location and construction of the road must minimise the disturbance to the riparian vegetation located adjacent to Dog-Trap Creek.

4.5 Soil Management

(a) The Applicant shall prepare an Erosion and Sediment Control Plan for the surface facilities and mining operations in consultation with the DLWC or revise and update the existing Plan to address the issues associated with the modification application MOD-21-4-2002, taking account of the DLWC "*Draft Guideline for Establishment of Stable Drainage Areas on Rehabilitated Minesites*" or its latest version, and to the satisfaction of DLWC and the Director-Director-General.

(b) The Erosion and Sediment Control Plan required under subclause (a) shall include but not be limited to:

(i) details of temporary and permanent sediment and erosion control systems to be used during both mine construction and operation, including for earthworks associated with landscaping;

(ii) details of soil salinity management where relevant;

(iii) [24]measures that will be employed to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction activities. The Plan should be prepared in accordance with the requirements for such plans outlined in *Managing Urban Stormwater: Soils and Construction* (available from the Department of Housing) or its latest version;

(iv) details of the proposed measures to maximise the retrieval of topsoil for subsequent use in the rehabilitation program;

(v) consideration and management of erosion and sedimentation of surface watercourses/waterbodies, including all creeklines within the DA areas;

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[20] DLWC General Terms of Approval
[21] DLWC General Terms of Approval
[22] DLWC General Terms of Approval
[23] DLWC General Terms of Approval
[24] EPA General Terms of Approval

(vi) a program for reporting on the effectiveness of the sediment and erosion control systems and performance against objectives contained in the approved Erosion and Sediment Control Management Plan, and EIS;

(vii) details of the inter-relationship between the Plan and any measures for soil or erosion control under the development consent for Stratford Coal Mine.

(c) The Applicant shall implement works necessary to stabilise the diversions associated with the Bowens Road North Open Cut. These works shall be implemented following finalisation of the review of the water management system for the mine and shall be to the satisfaction of DLWC.

(d) The Applicant shall also prepare a Soil Stripping Management Plan to the requirements of DMR and DLWC or revise and update the existing Plan to address issues associated with the modification application MOD-21-4-2002 and the matters listed below.

that shall include, but not be limited to:

(i) details of the management of soil stockpiles, soil stripping techniques and scheduling;

(ii) details of the management of weed infested topsoil. If the topsoil is proposed to be used in rehabilitation works, measures to ensure it is adequately sterilised or treated.

(iii) a program for reporting on the effectiveness of the soil stripping methods and performance against objectives contained in the soil stripping management plan, and EIS;

(iv) details of the inter-relationship between the Plan and any measures for soil stripping under the development consent for Stratford Coal Mine; and

(v) outline of the proposed changes to the operation of the mine and methods to address the issues associated with the modification application MOD-21-4-2002.

4.6 Limit to Open Cut Pit & Associated Infrastructure

The Applicant shall ensure that the open cut pit and associated infrastructure are located a least 40 metres from the bank of Avondale Creek.

5. Hazardous Materials and Overburden Management

5.1 Overburden Emplacement and Management

(a) The Applicant shall construct and manage the overburden emplacement in general accordance with the layout depicted in Figure 1 in Appendix 2, and to the satisfaction of the DMR.

(b) The Applicant shall undertake measures, as far as practical, to prevent spontaneous combustion from occurring on the site.

5.2 Waste

(a) [25]The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by a licence under the *Protection of the Environment Operations Act 1997*.

This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection licence under the *Protection of the Environment Operations Act 1997*.

(b) The Applicant shall reuse, recycle or dispose of all waste (including but not limited to solid waste, liquid waste and putrescible matter) from the site to the satisfaction of GSC or EPA, as relevant.

5.3 Hazards

(a) The Applicant shall adopt the risk prevention and remedial measures as nominated in Section I3.2.3 of Appendix I of the EIS.

(b) The relevant plans for the Stratford Coal Mine, as detailed in Section I3.2.3 of Appendix I of the EIS shall be expanded to incorporate the Bowens Road North Coal mine.

[25] EPA General Terms of Approval

6. Air Quality, Blast, Noise and Light Management and Monitoring

6.1 Air Quality Management and Monitoring

Air Quality Standards/Goals

(a) The Applicant shall comply with the air quality standards/goals as outlined in Tables 2 and 3 below. These goals/standards apply for the cumulative impacts of Bowens Road North Coal Mine and Stratford Coal Mine (Stage 1) and for the impacts of Bowens Road North Coal Mine alone (Stage 2).

Table 2 Health Based Air Quality Criteria for Particulate Matter Concentrations

Pollutant	Standard/Goal	Agency
Total Suspended Particulate Matter (TSP)	90μg/m^3 (annual mean)	National Health and Medical Research Council (NH&MRC)

Table 3 NSW EPA Amenity Based Criteria for Dust Fallout

Existing Dust Fallout Level (g/m^2/month)	Maximum Acceptable Increase Over Existing Fallout Levels (g/m^2/month)	
	Residential	Other
2	2	2
3	1	2
4	0	1

Dust Management Plan

(b) The Applicant shall, prior to the commencement of construction or operation, prepare a Dust Management Plan or revise and update the existing Plan to address, detailing air quality safeguards and procedures for dealing with dust emissions from the construction and operation of the Bowens Road North mine, as modified by the modification application MOD 21-4-2002, to the satisfaction of the Director-General. The Plan shall be prepared in consultation with the GSC and EPA and shall be updated as required by the Director-General. The Plan shall include, but not be limited to, details of:

(i) the identification of dust affected properties in accordance with the criteria detailed in condition 6.1(a);

(ii) specifications of the procedures for the dust monitoring program for the purpose of undertaking independent dust investigations;

(iii) outline the procedure to notify property owners and occupiers as identified in the EIS or by monitoring as likely to be affected by dust from the mine in excess of criteria detailed in condition 6.1(a);

(iv) mitigation measures to be employed to minimise dust emissions;

(v) the establishment of a protocol for handling dust complaints that include recording, reporting and acting on complaints;

(vi) outline of response and/or management measures to be undertaken in the event of complaints from a landowner where dust levels are demonstrated to be below the dust criteria in condition 6.1(a);

(vii) appropriate mechanisms for community consultation;

(viii) outlining proactive/predictive and reactive mitigation measures to be employed to minimise dust emissions including visible dust emanating from the site;

(ix) equipment to be available and used to control dust generation;

(x) methods to determine when and how the mine operation is to be modified to minimise the potential for dust emissions, particularly from surface activities;

(xi) identification of longer term strategies directed towards mitigating dust levels;

(xii) details of locations and frequency of dust monitoring and deposition gauges at the residential areas as agreed by the Director-General;

(xiii) details of the inter-relationship of this plan with the dust management plan of the Stratford Coal Mine;

(xiv) a program to continue baseline monitoring undertaken prior to development consent;

(xv) measures to alter mining operations at any time when driver visibility or traffic safety on any nearby public roads is adversely affected by dust from mining operations; and

(xvi) a program to undertake ambient monitoring of PM_{10} concentrations and dust deposition rates at nearest sensitive receptors;

(xvii) measures to manage and mitigate short term episodic events including investigations into the relationships between short-term variations in dust levels (particularly TSP and dust deposition) and levels of complaints and annoyance, with a view to reviewing the monitoring approaches; and

(xviii) outline of the proposed changes to the operation of the mine and methods to address the issues associated with the modification application MOD-21-4-2002.

Air Quality and Dust Monitoring

(b) The Applicant shall:

(i) undertake monitoring at locations described in the Dust Management Plan (refer to Condition 6.1(a));

(ii) monitor and report against the NSW EPA goals of 50µg/m^3 (24-hour average) and 30µg/m^3 (annual mean). The results of this monitoring and reporting are to be incorporated into the AEMR;

(iii) [26] establish in consultation with the EPA, dust deposition and total suspended particulate (TSP) matter monitoring sites. The sampling method, units of measure, interval and frequency of monitoring will be as set out in the *Approved Methods for sampling and analysis of Air Pollutants in NSW*;

(iv) include sites for monitoring impacts of dust at the nearest non-mine owned residences and locations as may be determined to be necessary by the Director-General and in accordance with the Dust Management Plan referred to in Condition 6.1(a);

(v) consider the use of existing relevant monitoring locations at Stratford mine;

(vi) provide reporting once every six months on the performance of the control measures and of the monitoring system detailed in the EIS and conditions of this consent, unless otherwise agreed by the Director-General. The reports shall be provided to the Director-General, CCC and GSC within seven days of completion of the report; and

[26] EPA General Terms of Approval

(vii) provide all results and analysis of air quality monitoring in the AEMR including a determination of the dust deposition rate in g/m^2/month, which shall be plotted in the AEMR.

(c) In the event that a landowner or occupier considers that dust from the project at his/her dwelling or over more than 25% of his/her vacant land is in excess of the criteria detailed in Tables 2 and 3 above, and the Director-General is satisfied that an investigation is required, the Applicant shall upon the receipt of a written request:

(i) consult with the landowner or occupant affected to determine his/her concerns;

(ii) make arrangements for, and bear the costs of, appropriate independent dust investigations in accordance with the Dust Management Plan, and to the satisfaction of the Director-General, to quantify the impact and determine the source of the effect and contribution of the Bowens Road North mine;

(iii) modify the mining activity or take other steps in accordance with the Dust Management Plan if exceedences are demonstrated to result from Bowens Road North mine related activity. This shall include:

1) introduction of additional controls, either of dust generation from individual sources on the site or on site operations, or modify operations to ensure that the dust criteria are achieved; and/or;

2) enter into an agreement with the landowner or provide such forms of benefit or amelioration of the impact of dust as may be agreed between the parties as providing acceptable compensation for the dust levels experienced.

(iv) conduct follow up investigation(s) to the satisfaction of the Director-General, where necessary.

Note: Vacant land in this condition means the whole of the lot in a current plan registered at the Land Titles Office as at the date of this consent that does not have a dwelling situated on the lot and is permitted to have a dwelling on that lot.

(d) If the independent dust investigations in sub-clause (c) above confirm that cumulative dust levels from Stratford Coal Mine and Bowens Road North Coal mine during Stage 1, or Bowens Road Coal Mine alone during Stage 2, are in excess of the relevant criteria detailed in Tables 2 and 3 above, and if the measures in sub-clause (c)(iii) (1) above do not reduce the dust levels below the criteria in Tables 2 and 3, or if agreement in accordance with sub-clause (c)(iii) (2) above cannot be reached, the Applicant shall at the written request of the owner acquire the relevant property. Acquisition shall be in accordance with the procedures set out in Condition 11.1.

(e) Further independent investigation(s) shall cease if the Director-General is satisfied that the relevant criteria in Tables 2 and 3 are not being exceeded and are unlikely to be exceeded in the future.

(f) [27]Monitoring for the concentration of a pollutant emitted to the air required to be conducted by the EPA's general terms of approval, or a licence under the Protection of the Environment Operations Act 1997, in relation to the development or in order to comply with a relevant local calculation protocol must be done in accordance with:

[27] EPA General Terms of Approval

- any methodology which is required by or under the *Protection of the Environment Operations Act 1997* to be used for the testing of the concentration of the pollutant;
- if no such requirement is imposed by or under the *Protection of the Environment Operations Act 1997*, any methodology which the general terms of approval or a condition of the licence or the protocol (as the case may be) requires to be used for that testing; or
- if no such requirement is imposed by or under the *Protection of the Environment Operations Act 1997* or by the general terms of approval or a condition of the licence or the protocol (as the case may be), any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

6.2 Dust Suppression and Control

(a) The Applicant shall ensure the prompt and effective rehabilitation of all disturbed areas of the DA area following the completion of mining and associated activities in that area to minimise the generation of wind blown dust.

(b) [28]Activities occurring at the premises must be carried out in a manner that will minimise emissions of dust from the premises.

6.3 Blast Management and Monitoring

Overpressure

(a) [29]The overpressure level from blasting operations on the premises must not:

(i) Exceed 115dB (Linear Peak) for more than 5% of the total number of blasts over a period of 12 months; and

(ii) Exceed 120dB (Linear Peak) at any time,

The airblast overpressure values stated above apply when the measurements are performed with equipment having a lower cut-off frequency of 2Hz or less. If the instrumentation has a higher cut off frequency then a correction of 5dB should be added to the measured value. Equipment with a lower cut-off frequency exceeding 10Hz should not be used for the purpose of measuring airblast overpressure.

Ground vibration (ppv)

(b) [30]Ground vibration peak particle velocity from the blasting operations at noise sensitive receivers must not:

(i) Exceed 5mm/s for more than 5% of the total number of blasts over a period of 12 months; and

(ii) Exceed 10mm/s at any time, when measured at any point within one (1) metre of any affected residence or other noise sensitive location such as a school or hospital.

[28] EPA General Terms of Approval
[29] EPA General Terms of Approval
[30] EPA General Terms of Approval

Time of blasting

(c) [31]Blasting operations on the premises may only take place between 9.00am and 5.00pm Mondays to Saturdays inclusive.

(d) [32]The hours of operation for blasting operations specified in this condition may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.

Frequency of blasting

(e) [33]Blasting at the premises is limited to one (1) blast each day on which blasting is permitted unless under extenuating circumstances as determined by the Mine Manager. In such cases when an additional blast is deemed necessary the EPA shall be notified in writing within twenty four hours of the additional blast occurring.

Blasting/Vibration Management Plan

(f) The Applicant shall prepare and implement a Blasting/Vibration Management Plan to the satisfaction of the Director-General, prior to the commencement of any blasting. The Plan must include, but not be limited to, the following matters:

(i) compliance standards;
(ii) mitigation measures;
(iii) remedial action;
(iv) monitoring methods and program;
(v) monitoring program for flyrock distribution;
(vi) measures to be undertaken to demonstrate that the Bowens Road North mine is achieving best practice in minimising air blast overpressure, ground vibration levels, fumes and odours from blasting activities. This shall include specific reference to best practice measures employed to meet the blasting criteria under subclauses 6.3(a) and 6.3(b) at the Ellis, Atkins and Clarke residences;
(vii) measures to protect underground utilities (eg: rising mains, subsurface telecommunication and electric cables) and livestock on non-mine owned land;
(viii) measures to consider the blasting activities from the Stratford mine. This shall include details of the proposed measures to ensure that cumulative blast related impacts are managed;
(ix) procedures for the notification of occupiers of buildings and residents prior to detonation of each blast;
(x) measures to ensure no damage by flyrock to people, property, livestock and powerlines; and
(xi) details of the inter-relationship of this plan with the blasting requirements of the development consent for Stratford Coal Mine.

(g) The applicant shall, as a minimum, advise occupiers of buildings and residents within two (2) kilometres of blasting locations of future blasting events on at least a monthly basis, and of any changes to the proposed blast schedules.

[31] EPA General Terms of Approval
[32] EPA General Terms of Approval
[33] EPA General Terms of Approval

(h) Upon written request of the owner of any dwellings located within two (2) kilometres of the blasting locations, the Applicant shall arrange at its own costs, for the inspection by a technically qualified person agreed to by both parties, to record the material condition of any structure on such property within 14 days of receipt of the request. The Applicant shall supply a copy of any inspection report, certified by the person who undertook the inspection, to the relevant property owner within fourteen (14) days of receipt of the report.

(i) The Applicant shall, in consultation with GSC and RTA, prepare a Road Closure Management Plan to the satisfaction of the Director-General prior to the commencement of any blasting within 500 metres of any public road (including but not limited to Wenhams Cox Road and Bowens Road). The Plan shall include, but not be limited to, the following matters:

(i) details of the proposed safety management measures during the period of the road closure and blast;

(ii) details of the procedures for closing the relevant road and the period which the road will be closed during blasting activities;

(iii) methods for ensuring the safety of road users and the general public during the blast period;

(iv) strategies for informing road users and the local community of the proposed road closure;

(v) details of the procedures for permitting the passage of emergency vehicles during the road closure. This shall also include details of the proposed methods for sufficiently notifying emergency service providers of the proposed times and period of the road closures;

(vi) methods for clearing the road of any debris resulting from a blast; and

(vii) details of the disruptions that are likely to occur during the closure period.

(j) The Applicant shall incur the costs for any damage to any public road resulting from any blast related activities. The repairs shall be undertaken to a standard acceptable to GSC and/or the RTA as relevant.

Blast Monitoring

(k) The applicant must monitor ground vibration and overpressure of all blasts.

(l) [34]Ground vibration or the overpressure must be measured at all noise sensitive sites (eg. residences, hospitals, schools etc), selected in consultation with the EPA.

[34] EPA General Terms of Approval

6.4 Noise Control

6.4.1 Noise Criteria

Noise Management Zone

(a) At dwellings where the noise criteria in Table 4 below are demonstrated to be exceeded, or are exceeded during mining operations, the Applicant shall undertake management measures as outlined in condition 6.4.1 (e) and the Noise Management Plan.

Table 4: Intrusive $L_{Aeq(15minute)}$ Noise Criteria for Stages 1 and 2 of the Bowens Road North Project

Location	**Intrusive Criteria $L_{Aeq(15\ minute)}$ dB(A)[4]**	
	Day[1]	**Evening[1]**
Stratford / Craven residential[2]	36	36
Stratford / Craven rural[3]	35	35

Note:
1. Day period is 7am to 7pm, Evening period is 7pm to 10pm
2. Stratford/Craven residential area includes but is not limited to:
   - Stratford and Craven villages; and
   - Properties of Isaac (South), Isaac (North), Grono/D Blanch, Blanch, Standen/Mulliett, Van Der Drift, Battaglini, Lowrey as described in the EIS.
3. Stratford/Craven rural area includes but is not limited to properties owned by McIntosh, Tiedeman, Williams, Campbell, Thompson, Bowen, Bignell, Morgan, and Clarke as described in the EIS.
4. The noise limits apply for winds up to three (3) metres per second and/or Pasquill Stability Classes of A,B,C,D,E, and F.

Noise Acquisition Zone

(b) The acquisition zone for intrusive noise in Stages 1 and 2 of the Bowens Road North Project is defined by predicted or demonstrated exceedence of the noise levels at any non-mine owned dwellings of the dB(A) $L_{Aeq(15\ minute)}$ noise levels shown in Table 5 below.

Table 5: Intrusive $L_{Aeq(15minute)}$ Noise Acquisition Criteria for Stages 1 and 2 of the Bowens Road North Project

Location	**Intrusive Noise Acquisition Criteria $L_{Aeq(15\ minute)}$ dB(A)[4]**	
	Day[1]	**Evening[1]**
Stratford / Craven residential[2]	> 41	> 41
Stratford / Craven rural[3]	> 40	> 40

Note:
1. Day period is 7am to 7pm, Evening period is 7pm to 10pm
2. Stratford/Craven residential area includes but is not limited to:
   - Stratford and Craven villages; and

- Properties of Isaac (South), Isaac (North), Grono/D Blanch, Blanch, Standen/Mulliett, Van Der Drift, Battaglini, Lowrey

as described in the EIS.

3. Stratford/Craven rural area includes but is not limited to properties owned by McIntosh, Tiedeman, Williams, Campbell, Thompson, Bowen, Bignell, Morgan, and Clarke as described in the EIS.
4. The noise limits apply for winds up to three (3) metres per second and/or Pasquill Stability Classes of A,B,C,D,E, and F.

(c) The properties in Table 6 below are predicted to experience noise levels greater than the intrusive acquisition criteria identified in Table 5 above, and shall be acquired by the Applicant if requested by the landowner in accordance with Condition 11.1.

Table 6: Dwellings Predicted to be Within the Intrusive Noise Acquisition Zone

Property Number (as stated in the EIS)	Property Owner
46	Wadland (Stratford/Craven rural)
24	Ellis (Stratford/Craven rural)
90b	Bagnall (Stratford/Craven residential)
58	Bramley (Stratford/Craven rural)

(d) Subclause (c) shall only apply whilst the Stratford Coal Mine is in operation. The provisions of subclauses (a), (b), and (e) – (n) shall continue to apply to the properties listed in Table 6 after cessation of operations at the Stratford Coal Mine.

(e) In the event that a landowner or occupier of a non-mine owned property considers that noise from the project once operational is in excess of:

- the noise levels depicted in Tables 4 or 5 above; or
- the noise levels depicted in Table 5 over more than 25% of his/her vacant land,

and the Director-General is satisfied that an investigation is required, the Applicant shall upon the receipt of a written request:

i) consult with the landowner or occupant affected to determine his/her concerns;

ii) make arrangements for, and bear the costs of, appropriate independent noise investigations in accordance with the noise management plan, and to the satisfaction of the Director-General, to quantify the impact and determine the source of the effect and:

- during Stage 1, the cumulative contribution of Stratford Coal Mine and Bowens Road North Coal Mine to the effect; or
- during Stage 2, the contribution of Bowens Road North Coal Mine to the effect.

iii) take steps in accordance with a noise reduction plan prepared as part of the noise management plan, if exceedences are demonstrated to result from:

- the cumulative contribution of Stratford Coal Mine and Bowens Road North Coal Mine during Stage 1; or
- the contribution of Bowens Road North Coal Mine during Stage 2.

This shall include:

1) introduction of additional controls, either on noise emission from individual sources on the site or on site operations or modify operations, to ensure that the criteria in Table 4 above are achieved, as far as possible; or

2) with the agreement of the landowner, and in the case of cumulative impacts the other relevant mining operations, undertaking of noise control at the dwelling to achieve acceptable internal noise levels due to Bowens Road North Coal Mine alone or due to all mining activities, as relevant; or

3) entering into an agreement with the landowner, and in the case of cumulative impacts the other relevant mining operations in the area and the landowner, to provide such other forms of benefit or amelioration of the impacts of noise as may be agreed between the parties, as providing acceptable compensation for the noise levels experienced;

iv) conducting follow up investigation(s) to the satisfaction of the Director-General, where necessary.

Note: Vacant land in this condition means the whole of the lot in a current plan registered at the Land Titles Office as at the date of this consent that does not have a dwelling situated on the lot and is permitted to have a dwelling on that lot.

(f) If the independent noise investigation(s) in sub-clause (e) above confirms that noise criteria in Table 5 are being exceeded by:

- the cumulative contribution of Stratford Coal Mine and Bowens Road North Coal Mine during Stage 1; or
- the contribution of Bowens Road North Coal Mine during Stage 2,

and the measures in condition 6.4.1(e)(iii) do not reduce the noise levels below the criteria in Table 5, the Applicant shall, at the written request of the landowner, acquire the relevant property. Acquisition shall be in accordance with the procedures set out in Condition 11.1.

(g) If continued complaints and noise investigations confirm that noise criteria in Table 4 are being exceeded, but are less than the noise levels in Table 5, the Applicant shall continue to negotiate with the landowner, and other mines in the vicinity where relevant, until a resolution to the satisfaction of the Director-General is reached.

(h) If a landowner disputes any noise mitigation or other measures proposed by the Applicant in accordance with sub-clause (e) above, the matter shall be referred by either the Applicant or landowner to the Director-General in consultation with GSC. If the matter cannot be resolved within 21 days, the matter shall be referred to the Independent Dispute Resolution Process.

(i) Further independent investigations shall cease if the Director-General is satisfied that the relevant criteria in Tables 4 and 5 are not being exceeded and are unlikely to be exceeded in the future.

(j) The Applicant shall, after commencement of mine construction and operations, and thereafter quarterly unless otherwise directed by the Director-General, undertake monitoring of affected residences to verify noise predictions, including management and acquisition zones. Any alterations to predictions, management and acquisition zones, shall be provided to the affected resident(s) and to the CCC together with necessary action in accordance with this Condition.

(k) [35] EPA Applicable Noise Limits for EPA licence purposes (refer to Schedule C)

(l) [36]For the purpose of noise measurement for subclause (k) above, noise from the premises must be measured 30 metres from the residence (rural situations), where the boundary is more than 30 metres from the residence, to determine compliance with this condition over a period of 15 minutes using "FAST" response on the sound level meter.

(m) [37]The $L_{Aeq(15\ minute)}$ noise emission limits identified in subclause (k) above, apply for winds up to three (3) metres per second and/or Pasquill Stability Classes of A,B,C,D,E, and F.

(n) The Applicant shall implement appropriate mitigation measures to ensure noise impacts of operations (e.g. maintenance works) within the Bowens Road North Project area, carried on between 10.00pm and 7.00am, do not exceed 35dBA at receivers, under meteorological conditions of winds up to three (3) metres per second and/or Pasquill Stability Classes of A,B,C,D,E, and F.

6.4.2 Noise Mitigation Measures

(a) [38]Prior to carrying out any mining operations on the Ellis Property (with the exception of the winning of material for the construction of earth barriers), the Applicant shall establish the earth barriers depicted in Figure 1 in Appendix 3.

(b) [39]Additional earth barriers may be required by the EPA should unacceptable noise impacts occur on sensitive receptors.

6.4.3 Noise Management Plan

(a) The Applicant shall, prior to commencement of mining construction or operations, prepare and implement a Noise Management Plan (incorporating construction and operational noise), or revise and update the existing plan to address the issues associated with the modification application MOD 21-4-2002, to the satisfaction of the Director-General. The EPA and GSC should also be consulted prior to the finalisation of the Management Plan. The Plan shall:

i) include details of the methods to be used for the continuous monitoring of noise to evaluate, assess and report the L Aeq (15 minute) and LAeq (period) noise emission levels due to the normal operations of the Bowens Road North Coal Mine;

ii) provide details regarding operating configuration; determining survey intervals; weather conditions and seasonal variations; selecting variations, locations, periods and times of measurements;

iii) detail management measures where the target criteria in Table 4 of this consent are predicted to be exceeded, or are exceeded during mining operations. These measures should include but not be limited to:

- noise monitoring on site and within the community, notwithstanding the requirements for noise compliance reports for Stages 1 and 2 of the Bowens Road

[35] EPA General Terms of Approval
[36] EPA General Terms of Approval
[37] EPA General Terms of Approval
[38] EPA General Terms of Approval
[39] EPA General Terms of Approval

North project. The selection of representative monitoring locations within the community must be carried out in consultation with the Director-General;

- prompt response to any community issues of concern;
- refinement of on site noise mitigation measures and mine operating procedures where practical;
- discussions with relevant property holders to assess concerns;
- consideration of acoustical mitigation at receivers; and
- consideration of negotiated agreements with property owners.

iv) specify the procedures for a noise monitoring program for the purpose of undertaking independent noise investigations;

v) outline the procedure to notify property owners and occupiers likely to be affected by noise from the operations;

vi) establish a protocol for handling noise complaints that include recording, reporting and acting on complaints, particularly where complaints are received and it is demonstrated noise levels are in excess of the criteria contained in this consent;

vii) record appropriate mechanisms for community consultation;

viii) outline proactive/predictive and reactive mitigation measures to be employed on the site to limit noise emissions;

ix) identify longer term strategies directed towards mitigating noise levels that exceed the noise target levels in Table 4;

x) outline measures to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms);

xi) survey and investigate noise reduction measures from plant and equipment annually, subject to noise monitoring results and/or complaints received, and report in the AEMR at the conclusion of the first 12 months of operations and set targets for noise reduction taking into consideration valid noise complaints in the previous year;

xii) include details of the inter-relationship of this plan with the Noise Management Plan for Stratford Coal Mine; and

xiii) outline of the proposed changes to the operation of the mine and methods to address the issues associated with the modification application MOD-21-4-2002.

(b) The Applicant shall also:

i) make copies of the Noise Management Plan available to the EPA, GSC and CCC within fourteen days of approval, or as otherwise agreed to be the Director-General; and

ii) include a summary of noise monitoring results in the AEMR.

6.4.4 Noise Monitoring

(a) [40]The level of noise emitted from the premises must be monitored for 72 hours every three (3) months at locations agreed to in consultation with the EPA. The monitoring must determine $L_{Aeq,15\ min}$ $L_{A10,15\ min}$ $L_{A90,15\ min}$ and $L_{A1,1\ min}$ levels and include an assessment of the impact of operational noise on adjoining residents.

[40] EPA General Terms of Approval

6.4.5 Mobile Equipment

Deleted

6.4.7 Noise Compliance

(a) [41]A noise compliance assessment must be submitted to the EPA within three (3) months of the commencement of the Bowens Road North Open Cut Coal mine and a further noise compliance assessment report shall be submitted to the EPA after the commencement of Stage 2 of Bowens Road Open Cut Coal mine.

6.5 Lighting Emissions

(a) The Applicant shall screen or direct all on-site lighting away from residences and roadways to the satisfaction of GSC.

(b) The Applicant shall, prior to commencement of construction, prepare a Lighting Management Plan to the satisfaction of the Director-General, outlining details of the proposed process and measures to address complaints that may be received from residents or road users impacted by lighting from the mine site and details of measures to minimise light emissions.

(c) The Applicant shall report on the effectiveness of the lighting emission controls in the AEMR.

[41] EPA General Terms of Approval

7. Transport and Utilities

7.1 Road Transport

(a) No coal shall be hauled from the mine site along public roads, except under emergency circumstances and with the prior approval of the Director-General and GSC.

7.2 Road Construction

(a) [42]Design plans and environmental management plans for the realignment of Wenhams Cox Road are to be submitted to GSC for approval by the Director of Technical Services. Plans are to be prepared in accordance with GSC's "Standard Conditions for Engineering Works".

(b) Construction and management of the intersection of Bowens Road and the Bowens Road North Mine / Stratford Coal Mine haul road are to be to the satisfaction of Gloucester Shire Council.

(c) [43]All costs relating to road opening, dedications and closures are to be met by the Applicant.

7.3 Road Work Schedule

The Applicant shall notify GSC and residents using the road of the schedule of roadworks and disruptions to road usage, at least 24 hours prior to the scheduled roadworks or disruption to road usage.

[42] Gloucester Council General Terms of Approval
[43] Gloucester Council General Terms of Approval

7.4 Provision of Utility Services

In preparing the Mining Operations Plan (refer to Condition 2.1), the Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of services (such as transmission lines, pipelines, optic cables etc).

7.5 Rail

[44]The applicant shall ensure that no loading and rail movements associated with coal destined for domestic markets shall occur between the hours of 10.00pm and 7.00am, unless determined unavoidable by Rail Access Corporation, National Rail and/or Freight Corp. In the event of any complaints received due to any rail movements for domestic coal from the mine during these hours, the applicant shall furnish the Director-General with a report which provides details of the consultation measures the applicant has taken with Rail Access Corporation, National Rail and/or Freight Corp to avoid loading and rail movements during these hours of 10.00pm to 7.00am.

7.6 Air Strip

Management measures to ensure adequate air safety and reasonable access for the rural air strip to the east of the Bowens Road North Coal Mine are to be detailed in the MOP.

7.7 Access

All existing access arrangements from Wenhams Cox Road shall be retained.

[44] EPA General Terms of Approval

8. Monitoring/Auditing

(a) In addition to the requirements contained elsewhere in this consent, the Director-General may, at any time in consultation with the relevant government authorities and Applicant, require the monitoring programs in Conditions 3, 4 and 6 to be revised/updated to reflect changing environmental requirements or changes in technology/operational practices. Changes shall be made and approved in the same manner as the initial monitoring programs. All monitoring programs shall also be made publicly available at GSC within two weeks of approval of the relevant government authority.

(b) All sampling strategies and protocols undertaken as part of any monitoring program shall include a quality assurance/quality control plan and shall be included in the relevant environmental management plan. Only accredited laboratories shall be used for laboratory analysis.

8.1 Third Party Monitoring / Auditing

Independent Environmental Auditing

(a) Every three years from the date of this consent until completion of mining in the DA area, or as otherwise directed by the Director-General, the Applicant shall conduct an environmental audit of the mining and infrastructure areas of the development in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing, and ISO 14011 - Procedures for Environmental Auditing (or the current versions), and in accordance with any specifications required by the Director-General. Copies of the report shall be submitted by the Applicant to the Director-General, GSC, EPA, DLWC, DMR, NPWS and CCC within two weeks of the report's completion for comment.

(b) The audit shall:

(i) assess compliance with the requirements of this consent, licences and approvals;

(ii) assess the development against the predictions made in the EIS;

(iii) review the effectiveness of the environmental management of the mine, including any mitigation works;

(iv) be carried out at the Applicant's expense; and

(v) be conducted by a duly qualified independent person or team approved by the Director-General in consultation with GSC.

(c) The Director-General may, after considering any submission made by the relevant government agencies, GSC and CCC on the report, notify the Applicant of any requirements with regard to any recommendations in the report. The Applicant shall comply with those reasonable requirements within such time as the Director-General may require.

8.2 Meteorological

(a) Meteorological monitoring shall be undertaken by the Applicant utilising the existing meteorological station installed for the Stratford Coal Mine. The monitoring results from this station shall be incorporated in the AEMR.

(b) Meteorological monitoring shall be undertaken in accordance with subclause (a) above, for the life of the Bowens Road North Coal Mine.

9. Reporting

9.1 Reports on Operations

(a) The Applicant shall report on mine operations in accordance with the mine operations plan (refer to Condition 2.1).

9.2 Annual Environmental Management Report (AEMR)

(a) The Applicant shall, throughout the life of the mine and for a period of at least three years after the completion of mining in the DA area, prepare and submit an Annual Environmental Management Report (AEMR), which may be incorporated into the existing Stratford Coal Mine AEMR, to the satisfaction of the Director-General and DMR. The AEMR shall review the performance of the mine against the Environmental Management Strategy and the relevant Mining Operations Plans, the conditions of this consent, and other licences and approvals relating to the mine. To enable ready comparison with the predictions made in the EIS, diagrams and tables, the report shall include, but not be limited to, the following matters:

(i) an annual compliance audit of the performance of the project against conditions of this consent and statutory approvals;

(ii) a review of the effectiveness of the environmental management of the mine in terms of EPA, DLWC, DMR, and GSC requirements;

(iii) results of all environmental monitoring required under this consent or other approvals, including interpretations and discussion by a suitably qualified person;

(iv) identification of trends in monitoring results over the life of the mine;

(v) an assessment of any changes to agricultural land suitability resulting from the mining operations, including cumulative changes;

(vi) a listing of any variations obtained to approvals applicable to the DA area during the previous year;

(vii) the outcome of the water budget for the year, the quantity of water used from water storages and details of discharge of any water from the site;

(viii) rehabilitation report; and

(ix) environmental management targets and strategies for the next year, taking into account identified trends in monitoring results.

(b) In preparing the AEMR, the Applicant shall:

(i) consult with the Director-General during preparation of each report for any additional requirements;

(ii) comply with any reasonable requirements of the Director-General or other relevant government agency; and

(iii) ensure that the first report is completed and submitted within twelve months of this consent, or at a date determined by the Director-General in consultation with the DMR and the EPA.

(c) The Applicant shall ensure that copies of each AEMR are submitted at the same time to the Director-General, DMR, EPA, DLWC, NPWS, GSC and CCC, and made available for public information at GSC within fourteen days of submission to these authorities.

9.3 Recording and Reporting Requirements

Monitoring Records

(a) [45]The results of any monitoring required to be conducted by the EPA's general terms of approval, or a licence under the *Protection of the Environment Operations Act 1997,* in relation to the development or in order to comply with any load calculation protocol must be recorded and retained as set out in subclauses (b) and (c).

(b) [46]All records required to be kept by the licence must be:
- (i) in a legible form, or in a form that can readily be reduced to a legible form;
- (ii) kept for at least 4 years after the monitoring or event to which they relate took place; and
- (iii) produced in a legible form to any authorised officer of the EPA who asks to see them.

(c) [47]The following records must be kept in respect of any samples required to be collected:
- (i) the date(s) on which the sample was taken;
- (ii) the time(s) at which the sample was collected;
- (iii) the point at which the sample was taken; and
- (iv) the name of the person who collected the sample.

(d) [48]The Applicant must provide an annual return to the EPA in relation to the development as required by any licence under the *Protection of the Environment Operations Act 1997* in relation to the development. In the return the Applicant must report on the annual monitoring undertaken (where the activity results in pollutant discharges), provide a summary of complaints relating to the development, report on compliance with licence conditions and provide a calculation of licence fees (administrative fees and, where relevant, load based fees) that are payable. If load based fees apply to the activity the applicant will be required to submit load-based fee calculation worksheets with the return. This may form part of the AEMR.

[45] EPA General Terms of Approval
[46] EPA General Terms of Approval
[47] EPA General Terms of Approval
[48] EPA General Terms of Approval

10. Community Consultation/Obligations

10.1 Community Consultative Committee

(a) The Applicant shall

(i) Expand the responsibilities of the existing CCC for the Stratford Coal Mine to incorporate the Bowens Road North Coal Mine and ensure that a meeting of the CCC is held prior to submission of the Environmental Management Strategy (Condition 3.2).

(ii) Representatives from relevant government agencies or other individuals may be invited to attend meetings as required by the Chairperson. The Committee may make comments and recommendations about the preparation and implementation of environmental management plans, monitor compliance with conditions of this consent and other matters relevant to the operation of the mine during the term of the consent. The Applicant shall ensure that the Committee has reasonable access to the necessary plans for such purposes. The Applicant shall consider the recommendations and comments of the Committee and provide a response to the Committee and Director-General.

(b) The Applicant shall, at its own expense:

(i) nominate two (2) representatives (including the Environmental Officer) to attend all meetings of the Committee;

(ii) provide to the Committee regular information on the progress of work and monitoring results;

(iii) promptly provide to the Committee such other information as the Chair of the Committee may reasonably request concerning the environmental performance of the development;

(iv) provide access for site inspections by the Committee; and

(v) provide meeting facilities for the Committee, and ensure minutes of Committee meetings are taken. These minutes shall be available for public inspection at GSC within 14 days of the meeting, or as agreed by the Committee.

(c) If required by the Committee, the Applicant shall establish a trust fund or other funding arrangement that may be agreed between the Applicant and Committee, to be managed by the Chair of the Committee to facilitate the functioning of the Committee, and pay $2000 per annum to the fund for the duration of mining in the DA area, or as otherwise reasonably directed by the Director-General. The monies are to be used only if required for the engagement of consultants to interpret technical information and the like. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be made by the date of the first Committee meeting. A record of the finances of the trust fund during each year shall be provided to the Director-General and Applicant by the Chair on each anniversary of the first payment. Any unspent monies shall be returned to the Applicant each year.

10.2 Complaint Handling Procedures

(a) The Environmental Officer employed by the mine (refer condition 3.1) shall be responsible for:

(i) establishing and maintaining a system for recording complaints with respect to construction works and mine operations on a dedicated and publicly advertised telephone line, 24 hours per day 7 days per week, entering complaints or comments in an up to date log book, or other suitable data base, and ensuring that an initial response is provided to the complainant within 24 hours;

(ii) for providing a report of complaints received with respect to the construction and operation of the mine, every six months throughout the life of the project to the Director-General, GSC, EPA, DMR, and CCC, or as otherwise agreed by the Director-General. A summary of this report shall be included in the AEMR (condition 9.2(a)).

(b) The Applicant must nominate at least two persons (and their telephone numbers) who will be available to the EPA on a 24 hours basis, and who have authority to provide information and to implement such measures as may be necessary from time to time to address a pollution incident or to prevent pollution from continuing as directed by an authorised officer of the EPA.

11. Proponents Obligations

11.1 Area of Affectation – Land Acquisition

Note*:* In Condition 11.1 (a)-(g) "land" means the whole of a lot in a current plan registered at the Land Titles Office as at the date of this consent.

(a) The Applicant shall negotiate and purchase a property, as identified by Conditions 6.1 (d), or 6.4.1 (c and e), within six (6) months of a written request from the affected land owner. The owner of any dwelling, or vacant land (as described in Condition 6.1 (d) and 6.4.1(e)), located in areas that exceed noise and/or air quality criteria established in accordance with conditions 6.1 (a) and 6.4.1 (b) of this consent, and at any time after the granting of development consent, may request the Applicant in writing to purchase the whole of that property.

(b) In respect of a request to purchase land arising under this condition, the Applicant shall pay the owner the acquisition price which shall take into account and provide payment for:

(i) a sum not less than the current market value of the owner's interest in the land at the date of this consent, as if the land was unaffected by the Bowens Road North Project the subject of this DA, having regard to:

1) the existing use and permissible use of the land in accordance with the applicable planning instruments at the date of the written request; and

2) the presence of improvements on the land and/or any Council approved building or structure which although substantially commenced at the date of request is completed subsequent to that date.

The sum outlined above does not include the value associated with the businesses operating on that land (eg. annual turnover/profit or goodwill) but is limited to physical structures and improvements only.

(ii) the owner's reasonable compensation for disturbance allowance and relocation costs within the Gloucester or Great Lakes Local Government Area, or within such other location as may be determined by the Director-General in exceptional circumstances; and

(iii) the owner's reasonable costs for obtaining legal advice and expert witnesses for the purposes of determining the acquisition price of the land and the terms upon which it is to be acquired.

Notwithstanding any other condition of this consent, the Applicant may, upon request of the landowner, acquire any property affected by the project during the course of this consent on terms agreed to between the Applicant and the landowner.

(c) In the event that the Applicant and any owner referred to in this condition cannot agree within the time limit upon the acquisition price of the land and/or the terms upon which it is to be acquired, then:

(i) either party may refer the matter to the Director-General, who shall request the President of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, who shall determine, after consideration of any submissions from the owners, a fair and reasonable acquisition price for the land as described in sub-clause (b) and/or terms upon which it is to be acquired;

(ii) in the event of a dispute regarding outstanding matters that cannot be resolved, the independent valuer shall refer the matter to the Director-General, recommending the appointment of a qualified panel. The Director-General, if satisfied that there is need for a qualified panel, shall arrange for the constitution of the panel. The panel shall consist of:

1) the appointed independent valuer,
2) the Director-General or nominee, and
3) the President of the Law Society of NSW or nominee.

The qualified panel shall determine a fair and reasonable acquisition price as described in sub-clause (b) above and/or the terms upon which the property is to be acquired.

(d) The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Director-General and the costs of determination referred to in sub clauses (b) and (c).

(e) Upon receipt of a determination pursuant to sub-clauses (b) and (c), the Applicant shall, within 14 days, offer in writing to acquire the relevant land at a price not less than the determination. Should the Applicant's offer to acquire not be accepted by the owner within six (6) months of the date of such offer, the Applicant's obligations to purchase the property shall cease, unless otherwise agreed by the Director-General.

(f) In the event that the Applicant and the land owner agree that only part of the land is to be transferred to the Applicant, the Applicant shall pay all reasonable costs associated with obtaining Council approval to any plan of subdivision and registration of the plan at the Office of the Registrar-General.

(g) The provisions of this condition do not apply to a land owner who is the holder of an authority under the Mining Act, 1992.

11.2 Contributions to Council

The applicant shall pay contributions to Council in the amount of:

(a) $18,000 as a developer contribution, payable prior to the commencement of construction; and

(b) $16,250 per annum as a community infrastructure contribution, payable quarterly and indexed to CPI Sydney (all groups) Index.

11.3 Mining Act

Deleted

12. Further Approvals and Agreements

12.1 Statutory Requirements

(a) The Applicant shall ensure that all statutory requirements including but not restricted to those set down by the Local Government Act 1993, Protection of the Environment Administration Act 1991, Protection of the Environment Operations Act 1997, Rivers and Foreshores Improvement Act 1948, Water Act 1912, National Parks and Wildlife Act 1974, and all other relevant legislation, Regulations, Australian Standards, Codes, Guidelines and Notices, Conditions, Directions, Notices and Requirements issued pursuant to statutory powers by the GSC, EPA, DMR, NPWS, DLWC, RTA, NSW Agriculture, and NSW Fisheries, are fully met.

(b) Structural Adequacy

Detailed plans and specifications relating to the design and construction of each structural element associated with the proposed development are to be submitted to the Principal Certifying Authority prior to the construction of each particular building or structure. Such plans and specifications must be accompanied by certification provided by a practicing professional structural engineer or an accredited certifier certifying the structural adequacy of the proposed building design and compliance with the Building Code of Australia.

(c) Verification of Construction

Upon completion of building works and prior to the issue of an occupation certificate, a certificate/s prepared by a suitably qualified person or a compliance certificate/s issued by an accredited certifier, is to be submitted to the Principal Certifying Authority certifying that the following building components, where relevant, have been completed in accordance with approved plans and specifications:

(i) footings;
(ii) concrete structures, including ground floor and any subsequent floors, retaining walls and columns;
(iii) framing and roof structure;
(iv) fire protection coverings to building elements required to comply with the Building Code of Australia; and
(v) mechanical ventilation.

The certificate/s shall demonstrate at what stage of construction inspections were undertaken.

SCHEDULE A continued
Notes for Independent Dispute Resolution Process

1. The process will be subject to a procedural protocol to ensure that the process is transparent and consistent

2. The process will be subject to terms of reference on both a qualitative and quantitative basis against which judgements will be made.

3. In relation to disputes regarding noise impacts, the process will only result in agreed outcomes regarding mitigation measures proposed by the Applicant in the noise management zone. Acquisition is not an option in the noise management zone, unless otherwise privately agreed between the Applicant and landowner, and therefore acquisition will not be an option for the dispute resolution process to consider in these cases.

SCHEDULE C

The following noise limits apply to this development:

Applicable noise limits

Land Holder	Daytime $L_{Aeq, 15min}$ (7.00am to 7.00pm)		Evening $L_{Aeq, 15min}$ (7.00pm to 10.00pm)	
	Stage 1: Cumulative Bowens Road North/Stratford dB(A)	Stage 2: Bowens Road North dB(A)	Stage 1: Cumulative Bowens Road North/Stratford dB(A)	Stage 2: Bowens Road North dB(A)
McIntosh	39	37	39	37
Atkins	38	38	35	35
Tiedeman	38	35	35	35
Campbell	37	35	37	35
Thompson	36	35	36	35
Williams	35	35	35	35
Bowen	35	35	35	35
Clarke	35	35	35	35
Bignell	35	35	35	35
Morgan	35	35	35	35
Isaac (South)	41	37	41	36
Isaac (North)	40	36	40	36
Craven Village	40	37	40	36
Grono/D Blanch	40	38	40	37
Blanch	40	38	40	38
Standen/Mulliett	39	36	39	36
Stratford Village	38	36	36	36
Van Der Drift	38	36	38	36
Battaglini	38	36	38	36
Lowrey	36	36	36	36
All other Craven Village residential properties	40	37	40	36
All other Stratford Village residential properties	38	36	36	36
All other Stratford/Craven rural properties	35	35	35	35

Important note: The noise limits provided by the EPA in the above Table are for the purposes of the EPA statutory compliance requirements. These limits <u>do not</u> change the noise requirements under other conditions of this consent.

Appendix 1
Land proposed to be developed

Name	Land
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Part of Lot 1 DP 198031
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Part of Lot 1 DP 718347
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Part of Lot 80 DP 979859
Removed from Appendix 1 – 1 October 2002. Reinstated to Appendix 1 – 20 June 2005 SG Ellis & Sons Pty Ltd Stratford 2422	Part of Lot 78 DP 979859
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Lot 52 DP 979859
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Lot 1 DP 194827
CIM Resources Limited in 7/10 Share CIM Stratford Pty Ltd in 2/10 Share ICA Coal Pty Ltd in 1/10 Share	Lot B DP 116316
Mr D K L'Estrange Mtgee. Commonwealth Bank of Australia	Lot 771 DP 826955
Removed from Appendix 1 – 1 October 2002. Reinstated to Appendix 1 – 20 June 2005 S G Ellis & Sons Pty Ltd Stratford 2422 EASEMENT DP 826955 Powerlines	Part of Lot 772 DP 826955

APPENDIX 2

Figure showing “Proposed North east Extension”

APPENDIX 3

Figure showing location of noise bunds – "Bowens Road North Pit extension shown as proposed area of disturbance".

APPENDIX A

FLORA AND FAUNA BASELINE REPORT

ecobiological

survey & assessment

Flora and Fauna Survey Report:

Bowens Road North Coal Mine, Gloucester, New South Wales.

Flora and Fauna Survey Report:

Bowens Road North Coal Mine, Gloucester, New South Wales.

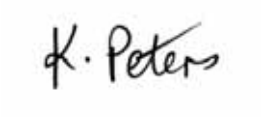
May 2010

Report prepared for Gloucester Coal Pty Ltd.

Prepared By:
ecobiological

David Paull
Senior Ecologist
NPWS Scientific Licence S12398

Reviewed By:



Kristy Peters
Ecologist
NPWS Scientific Licence S12398

PO Box 585
Warners Bay NSW 2282

2/9 Oakdale Road
Gateshead NSW 2290

Tel 1300 881 869
Fax 1300 881 035

www.ecobiological.com.au

ABN 74 114 440 041

ecobiological
survey & assessment

Executive Summary

ecobiological was commissioned by Gloucester Coal Pty Ltd to conduct flora and fauna surveys at Bowens Road North Coal Mine. The study area consists of a current mining operation and surrounding land currently owned and operated by Gloucester Coal Pty Ltd off The Bucketts Way, Gloucester, NSW. Field surveys were conducted between April 2007 and March 2010.

Vegetation Community Mapping

A total of two defined native vegetation communities and one modified community (cleared agricultural grasslands) were recorded in the study area. Vegetation condition ranged from moderate to good within the remnant wooded patch, with the rest of the study area regarded as in poor condition.

One Threatened Ecological Community (TEC) has been determined to occur within the study area. The Cabbage Gum Floodplain Grassy Woodland constitutes part of the endangered *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* ecological community.

Flora

Data collected during the field surveys revealed that the study area supported 77 plant species, 12 of which are introduced, exotic or weed species. These weed species were more commonly found in the cleared and disturbed areas. No threatened flora species were or have been recorded within the study area.

Fauna

Forty-five species of vertebrate fauna were recorded across the study area, including two threatened species listed under the NSW Threatened Species Conservation Act 1995 (Grey-crowned Babbler and Eastern Bentwing-bat,) and two exotic species (Rabbit and Hare). One other threatened species has also recorded from the study area, the Yellow-bellied Sheathtail Bat (Richardson 2001). The habitats in the study area have the potential to provide some breeding, roosting or foraging resources for 11 other threatened fauna species known to occur within 10 km of the study area.

Abbreviations

DECC (W) Department of Environment and Climate Change (and Water)

EP&A Act *Environmental Planning and Assessment Act* 1979

EPBC Act *Environment Protection and Biodiversity Conservation Act* 1999

GPS Global Positioning System

ha hectares

km kilometres

LEP Local Environmental Plan

LGA Local Government Authority

NPWS National Parks and Wildlife Service

ROTAP Rare or Threatened Australian Plants

SEPP State Environmental Planning Policy

sp Species (singular)

spp Species (plural)

subsp subspecies

TEC Threatened Ecological Community

TSC Act *Threatened Species Conservation Act* 1995

var. variety

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1. Introduction

1.1. Scope

ecobiological was commissioned by Gloucester Coal Pty Ltd to conduct flora and fauna surveys at Bowens Road North Coal Mine. The location of the study area (area of investigation) is shown in Figure 1.

Site surveys were conducted in 2007, with follow-up surveys conducted in 2010. This report outlines the result of field and desktop investigations into this area.

1.2. Regional and Local Context

The study area consists of a current mining operation and surrounding land currently owned and operated by Gloucester Coal Pty Ltd off The Bucketts Way, Gloucester, NSW.

The study area is approximately 158 ha in size and is surrounded in all directions by a combination of cleared paddocks and stands of remnant forest and regrowth. The extent of vegetation and infrastructure that adjoins the study area is shown in Figure 2.

1.3. Geology, Topography and Soils

The study area is comprised of two soil landscapes; the Gloucester Erosional and the Craven transferral landscapes (Henderson 2000).

Gloucester Erosional landscape on the study area consists of undulating low hills, with relief to 50 m, elevation to 220 m and slopes are <10%. Geology of this landscape is Permian sediments in the Stroud- Gloucester Basin characterised by Yellow soloths. There is a sheet and gully erosion risk with seasonal waterlogging. These are acid soils with potential aluminium toxicity.

Other features are a low permeability, low fertility and a high sodicity / dispersion.

Craven Transferral landscape in the study area consist of low wide drainage depressions, with a local relief of <2 m and elevation 120-160 m and slopes of 2-5%. Geology of this landscape is a Quaternary alluvium within the Stroud- Gloucester Basin characterised by alluvial and Yellow

soloth and Brown Sodsolic soils.

There is a gully and sheet erosion risk along with risks of dryland salinity, seasonal waterlogging, poor drainage, flood hazard. These soils are strongly acidic with a high sodicity / dispersion.

The soil types of the study area include alluvial, yellow soloth and brown podzolic soils.

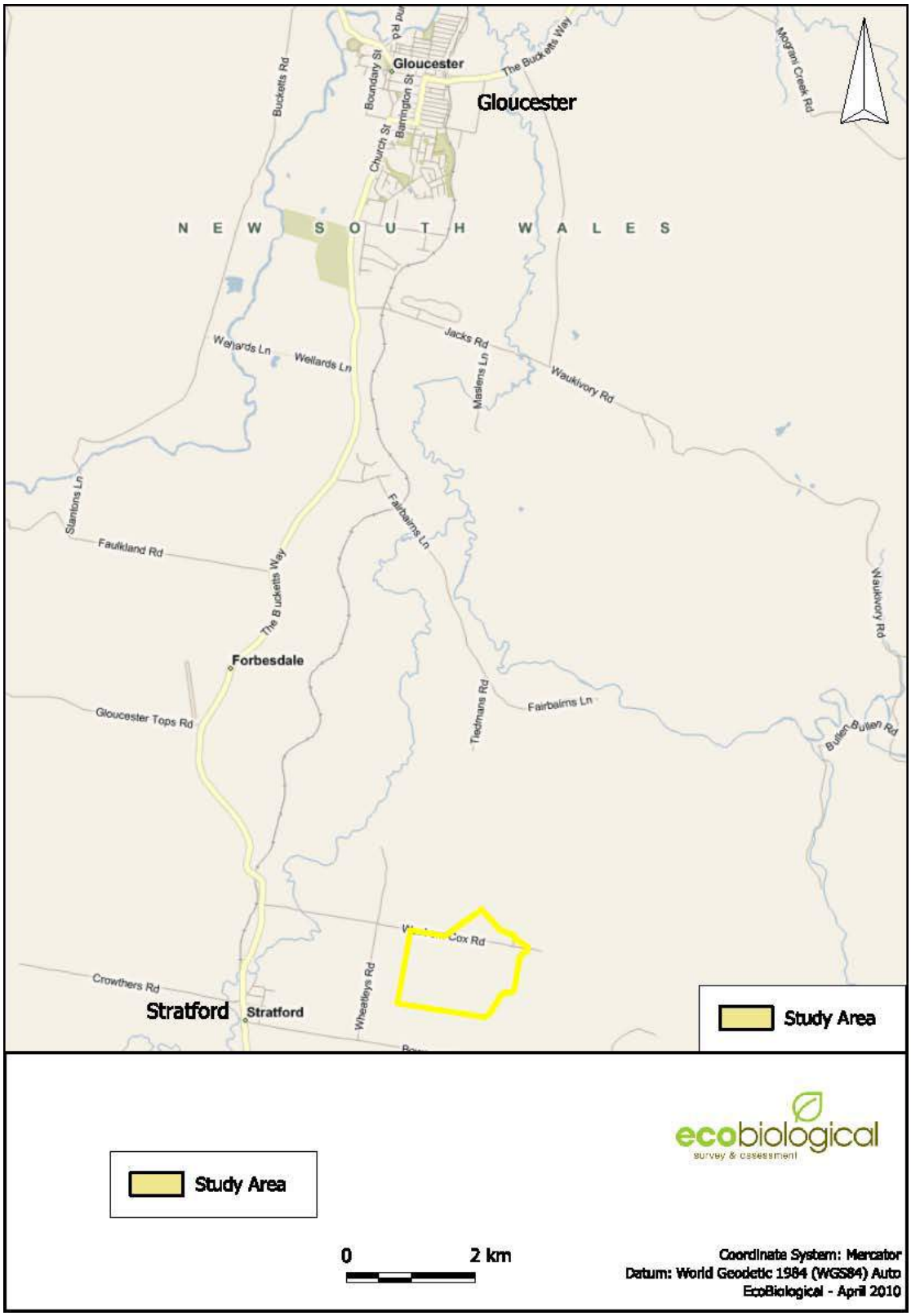

Figure 1: The location of the study area within the surrounding region.

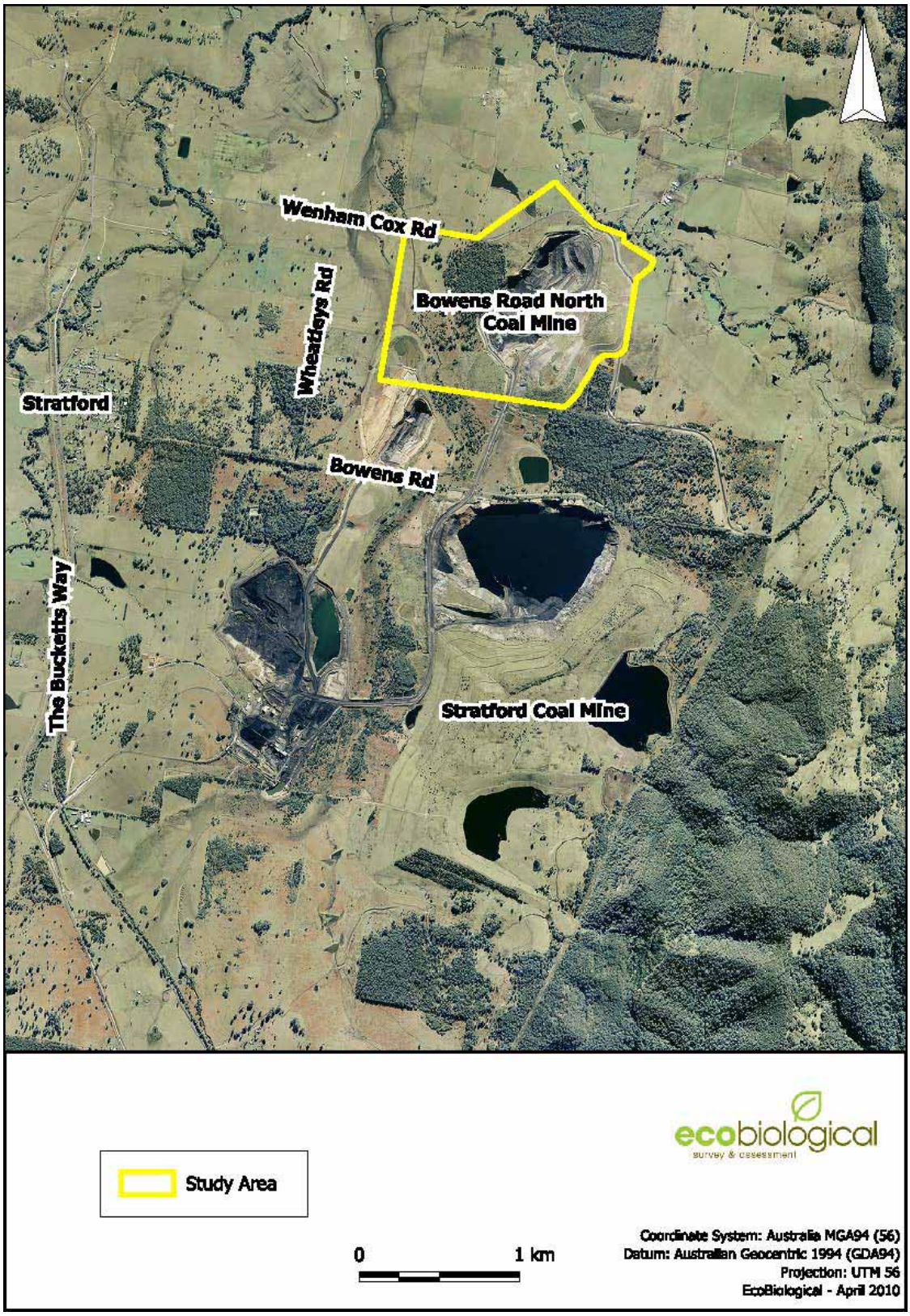

Figure 2: Aerial photograph showing the study area and surrounding landscape.

2. Survey Methods

2.1. Data Review, Weather and Logistics

2.1.1. Review of Databases and Literature

A list of threatened flora, fauna, populations, ecological communities and migratory species reported from within a five-kilometre radius of the subject site was obtained from the BioNet database (BioNet 2010) which includes records from DECCW's Atlas of NSW Wildlife, the Australian Museum, Forests NSW and the Royal Botanical Gardens, Sydney. In addition, a database search was conducted using DEWHA's Protected Matters search tool of the same area (DEWHA 2010).

In addition a review of past ecological reports carried out in the general area (Dowling 2000; Hoye 1998; Hoye and Finney 1994; MKES 2001; Richardson 2001).

A series of field surveys were then conducted using the compiled list of threatened species as a guide to species potentially likely to occur in the study area. The survey was not, however, limited to the species compiled from database extracts and past consultant records. Searches were carried out in order to compile a comprehensive species list for the study area.

2.1.2. Weather Conditions and Survey Activities

The study area was surveyed throughout April and July 2007; and then in March 2010. A full list of survey activities and weather conditions during the survey period is provided in Table 1. Temperatures, total rainfall and moon information for the survey period are provided in Table 2 (climate data was obtained from Lostock Dam weather station).

Co-ordinates of all survey plots are shown in Appendix 1.

Table 1: Schedule of activities and weather conditions during the survey period.

Activity	Date	Weather Conditions
Flora investigation		
20x20m quadrat surveys and meandering transects	30/04/2007 18/03/2010	
Fauna and fauna habitat investigation		
Fauna trapping	16/04 – 21/04/2007	Calm to light breezes, clear to partly cloudy skies, slight rainfall, mild temperatures
Spotlighting	23/04/2007	Calm to light breeze, mild temperatures, clear to partly cloudy, no rain
Anabat Call Recording	23/04/2007	Calm to light breeze, mild temperatures, clear to partly cloudy, no rain
Nocturnal Call Playback	23/04/2007	Calm to light breeze, mild temperatures, clear to partly cloudy, no rain
Bird Survey	26/04/2007	Calm to light breeze, mild to warm temperatures, clear to partly cloudy, no rain
Amphibian Survey	17/07/2007	Calm to light breeze, mild to warm temperatures, clear to partly cloudy, no rain
Reptile Survey	16/04 – 21/04/2007	Calm to light breeze, mild to warm temperatures, clear to partly cloudy, no rain
Fauna habitat /tree hollows	18/03/2010	

Table 2: Temperatures, total rainfall and moon information for the survey period.

Date	Temperature (°C)			
	Maximum	Minimum	Rainfall (mm)	Moon Phase
16/04/2007	29.6	15	1.6	Waning crescent
17/04/2007	24.6	15.5	0	New moon
18/04/2007	24.4	13.4	0	Waxing crescent
19/04/2007	25.3	12.2	0	Waxing crescent
20/04/2007	26.4	13.6	0	Waxing crescent
21/04/2007	25.3	12.8	0	Waxing crescent
23/04/2007	26.7	13.3	0	Waxing crescent
26/04/2007	27.3	13.9	0	Waxing gibbous
18/03/2010	26.4	13.8	0	Full Moon

Source: Bureau of Meteorology 2010.

2.2. Vegetation Communities and Floristic Diversity

Vegetation mapping and floral species diversity surveys involved initial aerial photographic interpretation, followed by ground-truthing field surveys.

2.2.1. Vegetation Community Mapping

An initial site visit, including a brief survey of the vegetated areas within the study area, was conducted to broadly determine vegetation status, community diversity and the potential locations for placing survey quadrats based on stratifying the community types.

The 2007 survey defined communities by the dominant species in the overstorey, shrub and ground layers. Both natural and modified or non native vegetation community types were investigated. The approach utilised for the vegetation classification involved the following:

- Determining floral species diversity;
- Determining dominant species and vegetation structure; and
- Mapping boundaries of and describing vegetation communities, walking the boundaries of each community with a hand held GPS unit. Tracks from the GPS were then imposed over an ortho-rectified aerial photograph.

2.2.2. Flora Survey Techniques

Systematic flora surveys were conducted across the study area and consisted of the following steps as described below. The location of all flora survey quadrats and random meander tracks is shown in Figure 3.

Quadrats

20 m x 20 m quadrats were sampled and meandering transects were undertaken. Methods used were based on DEC (2004).

Five quadrats were sampled in 2007 and two additional plots were sampled in 2010. The quadrat Q1 currently lies within the pit area as this sample was taken prior to subsequent expansion works. The plot R4 lies just outside the study area though is considered to be representative of the vegetation in the study area and is used here. Flora species within each

quadrat was identified and the Braun-Blanquet scale (Poore 1955) was applied to describe the cover abundance. Where any species was not able to be identified in the field, samples were taken and identified at a later date.

Random Meanders

Random meanders were also to undertake targeted surveys for threatened flora species identified as occurring in the region. Two species were judged to have potentially suitable habitat in the study area and were targeted during surveys; the Scat Pomaderris *Pomaderris queenslandica* known from dry sclerophyll shrubby forest and the White-flowered Wax Plant *Cynanchum elegans* known from a range of habitats including dry sclerophyll forest and woodland.

Floristic Identification and Nomenclature

Floristic identification and nomenclature was based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on PlantNet (http://plantnet.rbgsyd.nsw.gov.au).

Vegetation Condition Assessment

Vegetation in the study area received an assessment of its condition according to a number of floristic, structural and disturbance criteria. These criteria are outlined in Table 3.

Table 3: Vegetation Condition Assessment table.

Vegetation Condition Indicators Vegtation Communities			
	CGGW	SPF	DG
Timber Harvesting			
Firewood Collection			
Exotic Weed Cover			
Grazing Impacts and Trampling by Introduced or Overabundant Native Herbivores			
Soil Disturbance			
Canopy Dieback			
Evidence of Recent Flood or High Velocity Flows			
Frequency of Burning			
Natural Recruitment of Native Species			

0 = Nil; 1 = Minimal; 2 = Moderate; 3 = High.

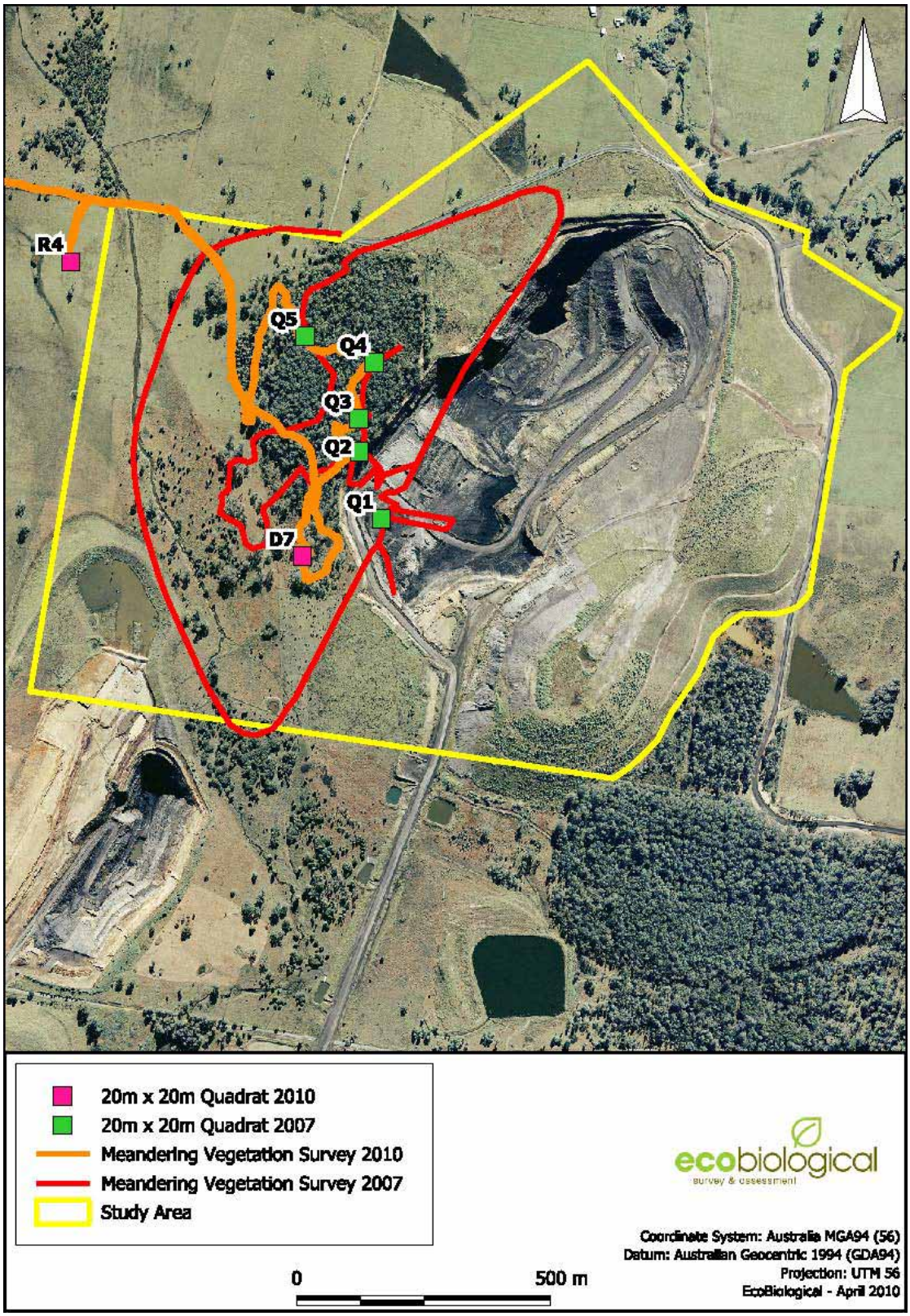

Figure 3: Aerial photograph of the study area showing the location of flora survey quadrats and random meandering tracks.

2.3. Fauna

2.3.1. Fauna Habitat Assessment

A fauna habitat assessment was conducted across the study area to investigate the habitat value of the remnant vegetation for native fauna.

A qualitative assessment of the habitat value of the study area included consideration of factors such as landscape connectivity, habitat structure, abundance of hollows and fallen wood, observations of fauna presence such as nests and scratches on trees and regeneration, erosion and grazing levels.

Habitat Hollow Survey

Hollows are an important resource utilised by a variety of forest fauna. Vertebrate and invertebrate species use hollows as diurnal or nocturnal shelter sites, for rearing young, feeding, thermo-regulation and to facilitate ranging behaviour and dispersal. Approximately 400 Australian species potentially use hollows either on a permanent or opportunistic basis. Many threatened species are obligate users, requiring the presence of hollows to survive in the landscape (Gibbons & Lindenmayer 2002).

A walking survey of the study area was undertaken to visually locate trees containing habitat hollows. A GPS waypoint of each tree containing hollows was recorded as well as the number of hollows present and the internal diameter of each hollow in three size classes (small <8 cm; medium 8-20 cm; large >20 cm).

2.3.2. SEPP 44 Koala habitat protection

SEPP 44 requires that any development proposals affecting one hectare or more of a property must be evaluated for potential and core Koala habitat. Potential Koala habitat is defined as 'areas of native vegetation where the trees listed in Schedule 2 of SEPP 44 (Table 4) constitute at least 15% of the total number of trees in the upper and lower strata of the tree component'.

Should potential Koala habitat be found, further investigation for the existence of core Koala habitat should be undertaken. Core Koala habitat is defined as ‘an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population’.

If such habitat is found to be present, then a detailed Plan of Management should be prepared for the Koala colony in the area.

Table 4: List of SEPP 44 – Schedule 2 preferred Koala Feed Trees

Preferred Koala Feed Trees	
Scientific Name	Common Name
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus microcorys	Tallow wood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or Manna Gum
Eucalyptus camaldulensis	River Red Gum
Eucalyptus haemastoma	Broad-leaved Scribbly Gum
Eucalyptus signata	Scribbly Gum
Eucalyptus albens	White Box
Eucalyptus populnea	Bimble Box or Poplar Box
Eucalyptus robusta	Swamp Mahogany

2.3.3. Fauna Survey Techniques

The assessment of fauna was undertaken across the study area and the following fauna groups (amphibian, reptile, bird and mammal) were surveyed in accordance with the DECCW survey requirements (DECCW 2009) and the Lower Hunter Central Coast Regional Environmental Management Strategy: Flora and Fauna Guidelines (Murray *et al.* 2002a, 2002b). These methods are outlined below.

The location of all fauna surveys is shown on Figure 4. The total trap night count for the study area is shown in Table 5. Table 6 lists the effort of all other fauna survey techniques.

Table 5: Trapping statistics for the study area.

Trap type	April 2007 Transect 1.		Trap nights
	Traps	Nights	
Hair Tubes (tree)	15	4	60
Elliott B Tree	15	4	60
Elliott A	20	4	80
Cage	3	4	12
Hair Tubes - Ground	21	4	84
Harp Trap	1	4	4
Type IV Funnel Traps	6	4	24

Table 6: Time invested in each survey method applied during the investigation period.

Activity	Sampling Effort
Spotlighting	1 person hrs
Anabat Call Recording	12 recording hrs
Call Playback	2 person hrs
Bird Survey	2 person hrs
Amphibian Survey	2 person hrs
Reptile Survey	1 person hrs

Relative Abundance

Each fauna species detected in the study area was assigned a broad abundance class based upon the frequency in which it was observed. One of four abundance classes were assigned, either one sighting only, uncommon (more than one sighting but encountered only infrequently), common (encountered frequently but not in high numbers relative to the species normal abundance), or abundant (encountered frequently and in large numbers relative to the species normal abundance).

Arboreal Mammals

To survey arboreal mammals, Elliott B traps and hair tubes were placed in trees at heights of 3 m or above and at intervals of approximately 20 m. Traps were placed in trees using platforms suspended on tree pegs and hair tubes were nailed to the tree trunks. A handful of nesting material was also placed in each trap to enable a trapped animal to maintain an appropriate body temperature.

Traps and hair tubes were baited with a mixture of rolled oats, honey, peanut butter and treacle. The trunks of trees with the traps and hair tubes were sprayed with a honey and water mixture forming a scent line from the upper trunk to a particular trap or hair tube. These traps were checked daily for arboreal species and wafers from the hair tubes were collected after a four-night period.

Hair identification methods followed those of Brunner *et al.* (2002). If any hair sample was suspected to be from a vulnerable or endangered species, the sample was sent to Barbara Triggs, an expert in the field of hair identification, for verification.

Spotlighting was undertaken for a one hour period on foot from dusk. Trees were inspected (during daylight hours) for the presence of habitat hollows and if present then a subset of hollows were watched at dusk to see if any nocturnal birds or mammals emerged.

Two hours of call playback was also undertaken at four locations on or after dusk for threatened arboreal mammals (Koala, Squirrel Glider and Yellow-bellied Glider) by broadcasting calls over a megaphone in an attempt to encourage a response (for call playback dates see Table 1). All sites were located within the study area or within 1 km of the study area. This process involved playing a pre-recorded call for a period of a few minutes, followed by listening and watching for a response from fauna for a few minutes, and repeating.

Terrestrial Mammals

In order to identify any small terrestrial mammals, 20 Elliott A, 21 ground hair-tubes and three cage traps were placed along the transect. The transect was approximately 400 m in length and traps were placed out at approximately 20 m intervals. A handful of nesting material was also placed in each trap to enable a trapped animal to maintain an appropriate body temperature.

Elliott A and hair tubes were baited with a mix of rolled oats, honey, peanut butter and treacle. During the April 2007 trapping period, cage traps were baited with raw chicken to target Spotted-tail Quolls. The traps were set in position for four consecutive nights and checked each morning.

As previously stated, spotlighting was also undertaken on foot for an hour period to identify the presence of any large terrestrial mammals. Opportunistic daytime searches were also conducted for the presence of fauna activity such as diggings, droppings or scratch marks, and, where possible, identification was made.

Bats

An Anabat II bat-call recorder (Titley Electronics, Ballina) was used to record the calls of any Microchiropteran bats feeding in the area. The unit was set up at dusk and recording occurred for a total of 12 recording hours over one night. The recording location is shown in Figure 4 and the date of

Anabat survey is shown in Table 1. Call recordings were analysed by Kristy Peters of **ecobiological**.

At each transect, one harp trap was positioned in a bat 'flyway' and set in position for four consecutive nights and checked each morning. Harp traps are useful for capture of slower flying bat species that commonly fly below the canopy. Some of these species have weak echolocation calls or have calls which are readily confused with other bat species, limiting the accuracy of echolocation call analysis.

Spotlighting searches of blossoming trees were undertaken to identify any Megachiropteran bat species.

Birds

The method employed to survey diurnal birds was an area search of various habitat zones in the study area. Plot-based surveys were conducted in April, 2007 (Figure 4). Two 1-ha plots were surveyed for between 20 – 30 minutes.

Birds were identified either visually, with the aid of binoculars, or by call interpretation. Surveys were conducted in the morning or late afternoon, when bird activity is maximised (Bibby *et al.* 2000). Opportunistic surveys were also conducted while driving throughout the mine site, when working near the mine dams and farmland waterbodies and during other fauna survey activities.

Targeted nocturnal bird surveys were conducted on one night at a total of only four locations during the April 2007 (Figure 4). One survey site was located within the study area, while three more were undertaken in close range of the study area (all within 1 km and within auditory range for owl to hear) and so have been included here. After dark, the calls of threatened nocturnal bird species (Bush Stone-curlew, Powerful Owl, Barking Owl, Masked Owl,

Sooty Owl and Grass Owl) were broadcast over a megaphone in an attempt to encourage a response. The study area was also searched to locate any regurgitated owl pellets. If any pellets were found, their size, shape and content would be used in an attempt to determine the species of owl from which the pellet originated as well as the prey species the owl had been feeding on. Analysis methods followed those of Brunner *et al.* (2002) and Triggs (1996).

Amphibians

Standardised survey techniques for amphibian species were employed throughout the survey period and included diurnal and nocturnal habitat searches, nocturnal spotlight surveys and call playback techniques (Figure 4).

During diurnal surveys lasting at least 20 minutes, visual searches and dip-netting were carried out to locate any tadpoles present in any water bodies. During nocturnal surveys lasting at least 30 minutes, spotlight searches were carried out by walking lengths of suitable habitat and using head torches to search for frogs by eye shine or by physical sightings. Adult frogs encountered were identified by visual confirmation or by their distinct advertisement calls.

Two species, the Green and Golden Bell Frog *Litoria aurea* and the Green-thighed Frog *Litoria brevipalmata* were targeted by the use call-playbacks in order to invoke a response. Potentially suitable habitats for these species were detected at some locations in the study area (MKES 2001).

Reptiles

Type IV funnel traps (similar to a fish or lobster trap) were paired along two 26 m runs of drift fence near the transect. This was left in place for four consecutive days and nights and traps were checked daily.

During survey periods across the study area suitable reptile habitat was inspected to detect the presence of any reptile species by way of occupancy, scats or other detectable traces. Suitable habitat in the study area included roadsides, course woody debris, and crevices, fallen hollow logs and limbs.

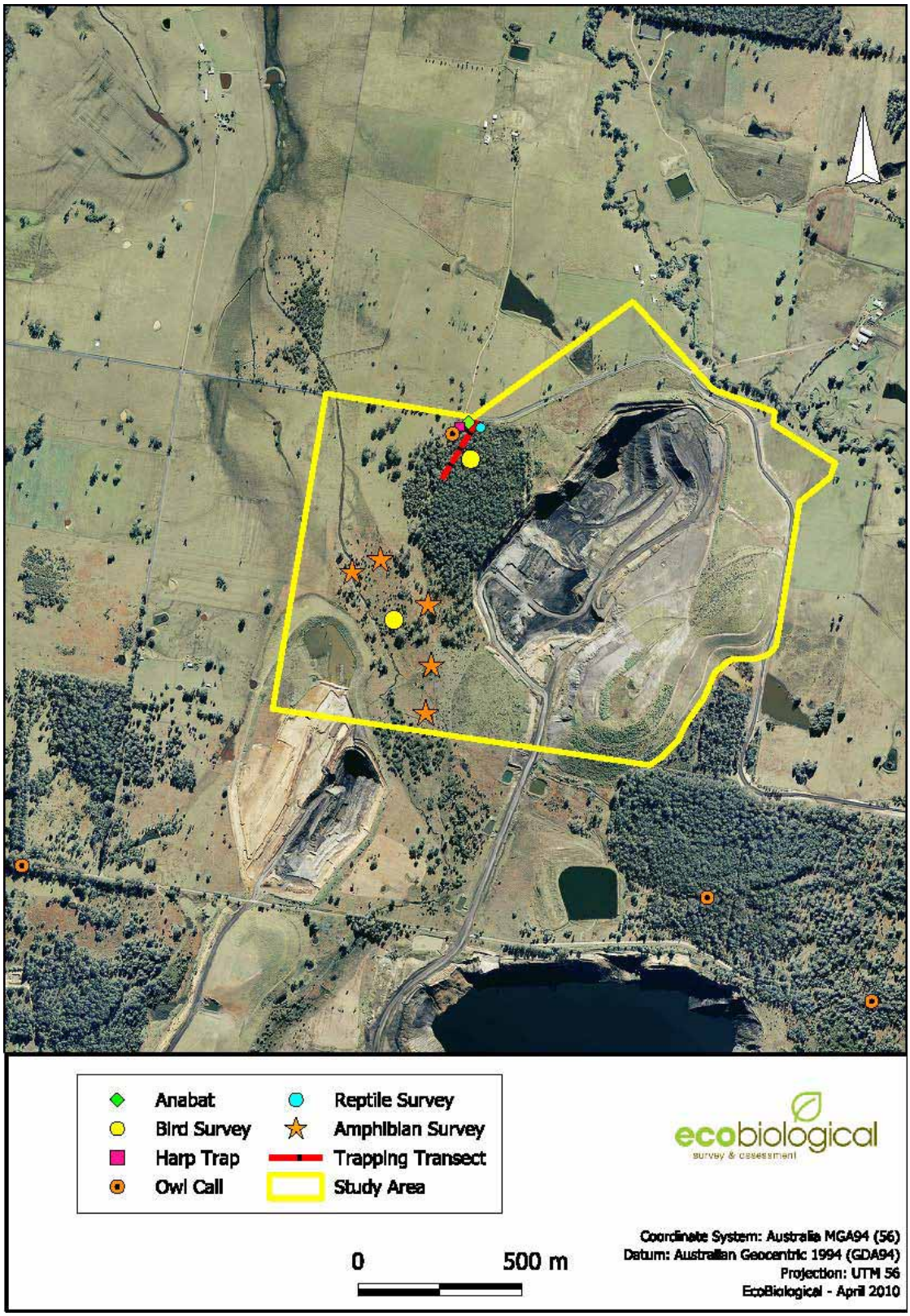

Figure 4: Aerial photograph of the study area showing the location of fauna survey methods

2.4. Database and literature search for threatened species

2.4.1. Database Search

Records of threatened species previously recorded within a five-kilometre radius of the study area are detailed in the following sections.

Flora

Four threatened flora species were previously recorded or modelled to occur within a 10-kilometre radius of the study area (Table 7). No threatened flora species have previously been recorded within the Bowens Road North study area.

Table 7: Threatened flora species recorded within a 10-kilometre radius of the study area.

Scientific Name	Common Name	Conservation Status		Last Date Recorded *
		(TSC Act)	(EPBC Act)	
Asperula asthenes	Trailing Woodruff	V		10/02/2010
Pomaderris queenslandica	Scant Pomaderris	E		10/02/2010
Grevillea obtusiflora		E		31/10/1979
Cynanchum elegans	White-flowered Wax Plant	E		14/04/2002

E = Endangered; V = Vulnerable

*Recorded in NSW Wildlife Atlas

An EPBC Act Protected Matters Search indicated that two species, the Dwarf Heath Casuarina *Allocasuarina defungens* and the Leafless tongue-orchid *Cryptostylis hunteriana* are modelled to occur in the area, but neither has been previously recorded within 10 km of the study area. Further, habitat for these species does not occur in the study area.

Of the four species identified in Table 7, only the Scant Pomaderris and the White-flowered Wax Plant have potentially suitable habitat in the study area, these species were targeted during field surveys.

Fauna

A total of 24 threatened fauna species have been previously recorded within a 10-kilometre radius of the study area (Table 8). These include two frogs, one reptile, five birds and 16 mammals.

Table 8: Threatened fauna species recorded within a 10-kilometre radius of the study area.

Class/Scientific Name	Common Name	Conservation Status		Last Date Recorded	Source
		TSC Act	EPBC Act		
Amphibians					
Mixophyes iteratus	Giant Barred Frog	E	E	20/12/2001	SF record
Mixophyes balbus	Stuttering Barred Frog	E		16/02/2002	SF record
Reptiles					
Hoplocephalus stephensii	Stephens' Banded Snake	V		22/10/1995	NPW Atlas
Birds					
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		30/04/2005	SF record & NPW Atlas
Ninox strenua	Powerful Owl	V		11/09/2002	NPW Atlas
Pomatostomus temporalis temporalis	Grey-crowned Babbler	V		26/06/2005	NPW Atlas
Ptilinopus regina	Rose-crowned Fruit-dove	V		17/08/2003	NPW Atlas
Chthonicola sagittata	Speckled Warbler	V		21/02/1999	NPW Atlas
Mammals					
Dasyurus maculatus	Spotted-tailed Quoll	V	E	30/06/2006	NPW Atlas
Macropus parma	Parma Wallaby	V		11/09/2002 *	NPW Atlas
Petaurus australis	Yellow-bellied Glider	V		31/10/1996	NPW Atlas
Petaurus norfolcensis	Squirrel Glider	V		17/08/2003	NPW Atlas
Phascogale tapoatafa	Brush-tailed Phascogale	V		27/07/2003	NPW Atlas
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	22/10/1995	NPW Atlas
Phascolarctos cinereus	Koala	V		20/12/2003	SF record & NPW Atlas
Planigale maculata	Common Planigale	V		16/8/2003	NPW Atlas
Potorous tridatylus tridactylus	Long-nosed Potoroo	V	V	03/04/2001 *	SF record
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V		08/12/2001	SF record Hoye 1994; Hoye and Finney 1998
Mormopterus norfolkensis	Eastern Freetail-bat	V		20/12/2001	SF record
Myotis macropus	Large-footed Myotis	V	V	27/08/2004	NPW Atlas Hoye and Finney 1998
Kerivoula papuensis	Golden-tipped Bat	V		18/12/2001	SF record
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V		2001	Richardson (2001)
Scoteanax rueppellii	Greater Broad-nosed Bat	V		19/12/2001	SF record Hoye and Finney 1998
Pteropus poliocephalus	Grey-headed Flying Fox	V	V	01/03/2001	NPW Atlas

E = Endangered; V = Vulnerable; *These records have only a ten-km accuracy

In addition, an EPBC Act Protected Matters Search indicated that five

species, the Booroolong Frog *Litoria booroolongensis*, Australian Painted Snipe *Rostratula australis*, Regent Honeyeater *Anthochaera phrygia*, Swift Parrot *Lathamus discolor*, Hastings River Mouse *Pseudomys oralis* and the Large-eared Pied Bat *Chalinobolus dwyeri* are modelled to occur in the study area. None has been previously recorded within 10 km of the study area, further, habitat for these species the study area should be regarded as being sub-optimal.

Based on available published information on their known habitat preferences, 14 of the species listed in Table 7 are thought to have potentially suitable foraging, breeding or roosting habitat resources within the study area. These are the Green and Golden Bell Frog, Green-thighed Tree Frog, Stephens' Banded Snake, Powerful Owl, Grey-crowned Babbler, Speckled Warbler, Spotted-tailed Quoll, Squirrel Glider, Brush-tailed Phascogale, Eastern Bentwing-bat, Eastern Freetail Bat, Large-footed Myotis, Yellow-bellied Sheathtail Bat and the Greater Broad-nosed Bat. These species were targeted during field surveys.

All species listed in Table 8 were targeted during site fauna surveys.

A total of 12 migratory bird species were identified in the EPBC protected Matters Search to potentially occur within the study area (Table 9). These were comprised seven terrestrial, four wetland and one marine species.

Table 9: Migratory Species (EPBC Act Protected Matters Search)

Class/Scientific Name	Common Name	Migrant type
Haliaeetus leucogaster	White-bellied Sea-Eagle	Terrestrial
Hirundapus caudacutus	White-throated Needletail	Terrestrial
Merops ornatus	Rainbow Bee-eater	Terrestrial
Monarcha melanopsis	Black-faced Monarch	Terrestrial
Monarcha trivirgatus	Spectacled Monarch	Terrestrial
Myiagra cyanoleuca	Satin Flycatcher	Terrestrial
Anthochaera phrygia	Regent Honeyeater	Terrestrial
Ardea alba	Great Egret	Wetland
Ardea ibis	Cattle Egret	Wetland
Gallinago hardwickii	Latham's Snipe	Wetland
Rostratula benghalensis s. lat. (sic) australis	Australian Painted Snipe	Wetland
Apus pacificus	Fork-tailed Swift	Marine

2.4.2. Literature Search

A plant survey of the study area was conducted by Dowling (2000). A total of 103 species from 40 families were recorded during the survey (Table E-2). Of these, 18 species were introduced exotics and two of these were gazetted noxious plants within Gloucester Shire. No flora species listed as threatened under the TSC Act or EPBC Act were found within the study area. Further to this, no plants considered to be rare or threatened by Briggs and Leigh (1996) was recorded within the study area.

A fauna survey (excluding bats) of the study area was conducted by Mt King Ecological Services (2001). A total of 55 bird (53 native and 2 introduced), 11 mammal (6 native and 5 introduced), 3 reptile (all native) and 11 amphibian (all native) species were located within or near the project area.

A bat survey of the study area was conducted by Richardson (2001). He detected five bat species including the threatened Yellow-bellied Sheathtail Bat. Previous studies of bats have also been undertaken in the greater Stratford Mine area (Hoye 1998; Hoye and Finney 1994). These studies also identified the Greater Broad-nosed Bat, Large-footed Myotis and the Eastern Bentwing-bat as occurring within the greater Stratford area.

3. Field Survey Results

3.1. Flora

The floristic survey conducted within seven plots across the study area identified a total of 77 species. The majority of native species were identified within the remnant forested areas. The species list includes all species recorded in quadrats (Appendix 2).

The surveys identified 12 introduced, exotic or weed species, although it is likely this number would be greater if the study area was sampled in the spring. These weed species were more commonly found in the cleared and disturbed areas. No noxious species were identified.

No threatened flora species were observed during the flora surveys at the Bowens Road North study area, despite suitable targeted surveys in accordance with DECCW survey requirements.

3.1.1. Vegetation Community Types

While the majority of the land in the study area was cleard agricultural land (40.2 ha), two native vegetation communities were identified at the Bowens Road North Coal Mine site (Figure 5).

- Cabbage Gum Floodplain Grassy Woodland (10.3 ha)
- White Stringybark – Grey Ironbark Grass / Shrub Forest (14.2 ha); and

One Threatened Ecological Community (TEC) has been determined as occurring within the study area. The Cabbage Gum Floodplain Grassy Woodland constitutes part of the endangered *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* ecological community.

Profiles of native vegetation assemblages occurring within the study area are detailed below. The profiles detail the general descriptions, floristic and structural variations and relationships to other communities.

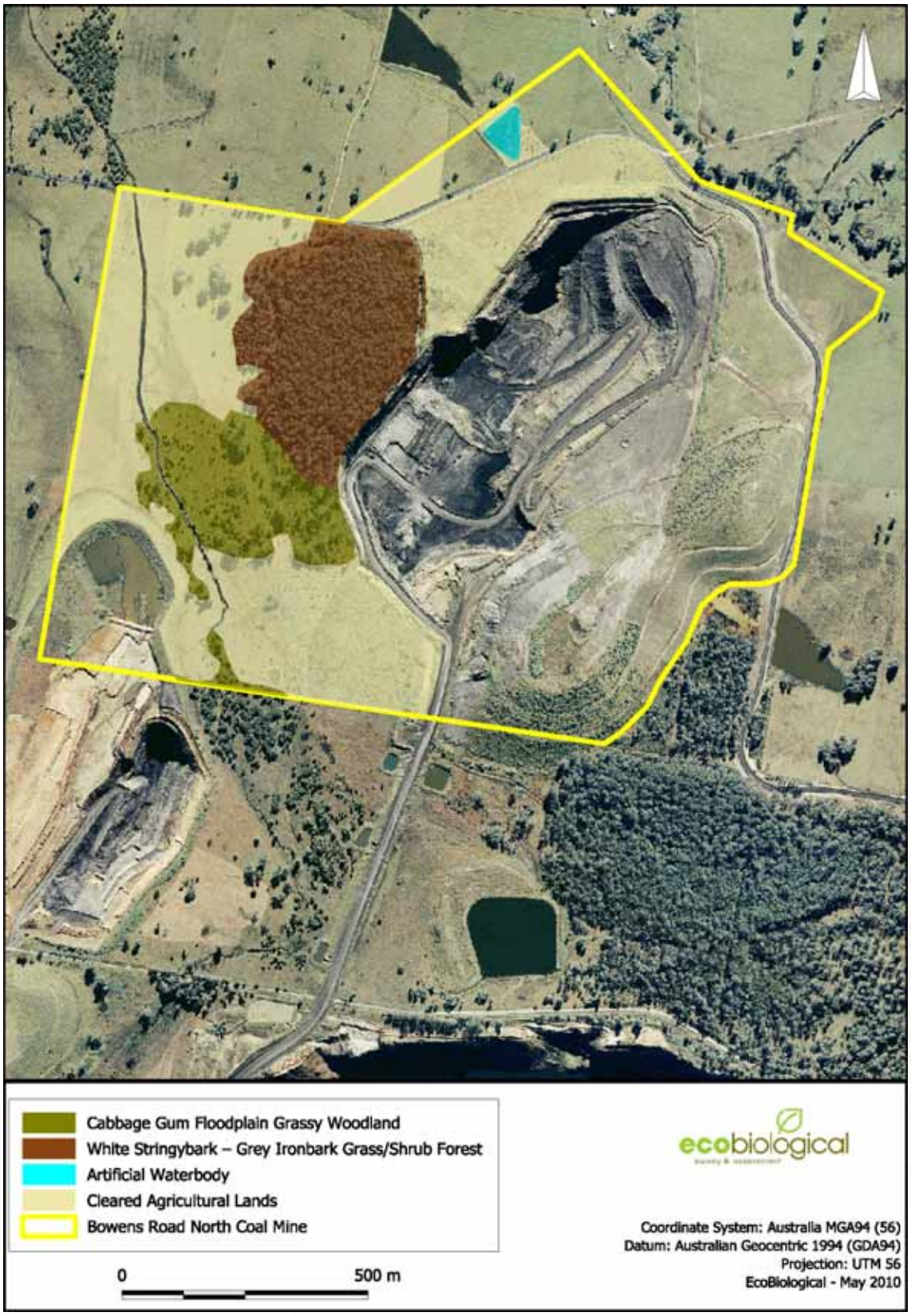

Figure 5: Aerial photograph of the study area showing mapped vegetation communities.

(a) *Cabbage Gum Floodplain Grassy Woodland*

Vegetation Formation – Grassy Woodlands

Vegetation Class – Coastal Valley Grassy Woodlands

Equivalent Vegetation Type - *Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands* (DECC Biometric Type Database 2009).

Conservation Status:

The community had key indicator species in the canopy, groundcover, rushes / grasses and vines, and a good representation of the characteristic species in all stratum (sourced from Identification Guidelines for Endangered Ecological Communities *River-flat Eucalypt Forest on Coastal Floodplains*, DECC, December 2007). The locality does not meet the identification guide (south of Port Stephens); however, the land form is indicative of an alluvial floodplain, being approximately 40m ASL and generally quite flat.

The Cabbage Gum Floodplain Grassy Woodland in the study area is determined to form a part of the *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* TEC.

Structure:

Can be an open woodland to tall open forest up to 30 m high, but in the study area it is characterised as being regrowth dominated, generally not more than 10 m (Plate 1). Where mid stratum was present, it was between 5-10 m high with moderate to dense cover but this layer was mostly lacking. The shrub and ground cover was moderate to sparse under the mid stratum, generally less than 50%, and up to 100% cover in the open woodland areas.

General description:

The Cabbage Gum Floodplain Grassy Woodland within the study area has been previously impacted by clearing and cattle grazing.

This community is strongly dominated by *Eucalyptus amplifolia* subsp. *amplifolia* (Cabbage Gum). Occasional species were *E. globoidea* (White Stringybark).

The mid stratum is largely absent put small patches of dense *Melaleuca nodosa* thickets with some *M. decora*, and *M. thymifolia* occurring on the flats.

The shrub stratum was generally elevated to about 2 m, with *M. nodosa, Exocarpus cupressiformis* (Cherry Ballart), as common species. The bottlebrush *Callistemon rigidis* was common.

The ground stratum was dominate by grasses were *Imperata cylindrica* (Bladey Grass), *Microlaena stipoides* var *stipoides* (Weeping Grass), *Entolasia stricta* (Wiry Panic) and *Themeda australis* (Kangaroo Grass). Common ground herbs were *Glycine clandestina* and *Schoenus apogon*.

The main weed species were typical of disturbed and pasture improved areas. Common species in the forested areas were *Hypochaeris radicata* (Catsear) and *Senecio madagascariensis* (Fireweed) and grasses such as *Paspalum dilatatum* (Paspalum) and *Senecio madagascariensis* (Fire Weed).

Plate 1. Cabbage Gum Floodplain Grassy Woodland regrowth on floodplains.

Distribution:

This community is restricted to the alluvial soils on the valley floor, generally on the riparian zones and water courses. On the study area, this community was found on the floodplain areas mainly to the west and south.

Habitat:

The Cabbage Gum Floodplain Grassy Woodland was restricted to the floodplain areas, where alluvial soils were deeper and rich. The ground cover shows signs of frequent sheet flows, with many minor drainage lines.

(b) *White Stringybark – Grey Ironbark Grass/Shrub Forest*

Vegetation Formation – Dry Sclerophyll Forests (Shrubby subformation)

Vegetation Class – North Coast Dry Sclerophyll Forests

Equivalent Vegetation Type - *Spotted Gum - Grey Ironbark forest dry open forest of the lower foothills of the Barrington Tops, North Coast* (DECC Biometric Type Database 2009).

Structure:

Open woodland to tall open forest to 20-30 m high, though in the study area, generally lower than 20m (Plate 2). In less disturbed areas the mid stratum was to 5 m high with moderate to dense cover. The shrub and ground cover was low to moderate under the dense mid stratum.

General description:

This vegetation community was found on the low ridge and at the lower slopes adjacent to the floodplain area.

The dominant species were *Eucalyptus globoidea* and *E. molucanna* (Grey Box) growing as co-dominant in some areas. Canopy less than 20 m high.

The mid layer had a moderately dense to open mid and shrub layer of *Melaleuca nodosa.* Other common shrub species were *Callistemon linearis, Acacia ulicifolia, Ozothamnus diosmifolius* and *Bursaria spinosa* to 2-3 m.

The forested areas had a moderate to sparse shrub and ground layer, mainly due to a dense mid layer. *Hibbertia diffusa* (Wedge Guinea Flower) and *Pultenaea villosa* were common shrub species.

The typical ground cover had native grasses and herbs including, *Entolasia stricta, Pratia purpurascens, Opercularia diphylla* and *Chlienthes sieberi ssp sieberi,* and was relative to the shrub layer density.

The common grasses included *Entolasia stricta* (Wiry Panic), *Themeda australis* (Kangaroo Grass) and *Microlaena stipoides (Weeping Grass).* The common herbs were *Dichondra repens* (Kidney Weed), *Pratia purpurascens* (Whiteroot), *Lagenifera stipitata* and *Lindsaea linearis* (Screw Fern). One orchid species was recorded, a *Pterostylis* species, the correct identify of which could not be determined due to the poor quality of the sample.

Distribution:

This community type is known from other similar higher elevation locations across the broader valley area.

Plate 2. White Stringybark–Grey Ironbark Grass/shrub forest at the study area.

(c) *Cleared Agricultural Lands*

Vegetation Formation – Grasslands

Vegetation Class – N / A

Equivalent Vegetation Type – N / A

Structure:

Cleared Agricultural Lands are considered independent of the naturally forming grasslands, grassy woodlands or sclerophyll forests, which these areas were likely to have been prior to clearing. The Cleared Agricultural Lands are considered as open grasslands with an overall composition of native species not exceeding 50%.

General description:

The cleared grasslands are generally dominated by exotic grass species such as Paspalum (*Paspalum dilatatum*), Narrow –leaved Carpet Grass (*Axonopus fissifolius*), Kikuyu (*Pennisetum clandestinum*) and Parramatta Grass (*Sporobolus africanus*). Other common exotic species included Fireweed (*Senecio madagascariensis*), Catsear (*Hypochaeris radicata*) and Fleabane (*Conyza* spp.).

Cleared Agricultural Lands had scattered native grasses such as *Themeda australis* (Kangaroo Grass), *Imperata cylindrica* (Bladey Grass), *Aristida vagans* (Three-awned Spear Grass) and *Cymbopogon refractus* (Barbed-wire Grass) generally associated with adjacent natural vegetation communities. Native herbs were also relatively common, including Glycine and Desmodium species, *Pratia purpurescens* (Whiteroot), *Cheilanthes seiberi* (Rock Fern) and *Dichondra repens*. Occasional scattered or clumps of shrubs were present in areas, particularly *Bursaria spinosa* (Box Thorn) and *Acacia ulicifolia* and *Ozothamnus diosmifolius* (Dogwood).

Occasional remnant trees are also found within the area mapped as cleared agricultural grassland, including White Stringybark and paperbarks. These are not considered part of a natural ecological community as all stratums beneath remnant paddock trees are either absent or dominated by exotic species.

Distribution:

This community type at the study area is confined to where native vegetation has been cleared and passive agriculture (grazing) is likely to have been the dominant land use.

3.1.2. Vegetation condition assessment

The vegetation condition assessments are from site interpretation and indicate that significant disturbance and modification has occurred across the study area. Remnant vegetation at the study area was found to have high levels of timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, and moderate levels of exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, minimal canopy dieback or high frequency burning.

There is evidence of recent flood and good levels of recruitment of native species. Table 10 shows an estimated condition for all three native vegetation types mapped on the study area.

Table 10. Vegetation Condition Assessment table.

Vegetation Condition Indicators.	Vegetation Groups		
	CGGW	SPF	AG
Timber Harvesting	3	3	3
Firewood Collection	0	1	0
Exotic Weed Cover	2	2	1
Grazing Impacts and Trampling by Introduced or Overabundant Native Herbivores	3	2	3
Soil Disturbance	1	1	1
Canopy Dieback	0	0	0
Evidence of Recent Flood or High Velocity Flows	3	1	1
Frequency of Burning	0	1	0
Natural Recruitment of Native Species	3	3	1

0 = Nil; 1 = Minimal; 2 = Moderate; 3 = High.

CGGW: Cabbage Gum Grassy Woodland; SPF: Stringybark-Paperbark Forest; AG: Agricultural Grassland.

3.2. Fauna

3.2.1. Fauna Habitat

Fauna habitat assessment proformas were completed for the three representative habitat types in the study area. It was found that the wooded remnant areas offered a moderate to good condition fauna habitat.

Dry Sclerophyll Forest

A moderate-sized remnant patch of dry sclerophyll forest exists in the study area, which is surrounded by areas of cleared land. Most of the forest is regrowth, with only small numbers of old growth trees present. A substantial level of grazing has occurred, although this has not stopped good local regeneration.

The number of habitat layers varies within the patch, with some areas containing a grass, shrub, mid-storey and canopy layer, while other areas lack a shrub layer or contain only a grass and tall canopy layer with little undergrowth. The dominant tree height ranges from 10-20 m.

Good internal connectivity exists in this remnant patch. External connectivity however is generally poor, with only thin strips of remnant vegetation (often sparse) connecting the patch to other areas of vegetation.

The level of hollow abundance is relatively low, attributed to the small number of old growth trees remaining. The forest floor is covered mostly by grass, with some areas covered by leaf litter or sedges, and some small areas remaining bare. There is a reasonable level of ground log abundance in the patched. Overall the habitat value of this area is considered to be good.

Grassy Woodlands

Consists mostly of remnant forest dominated by regrowth, or grasslands with only scattered remnant trees present. Regeneration is occurring in most areas, despite recent moderate to high levels of grazing. Internal connectivity is good, while external connectivity is poor. This area may be typified a having only a canopy and grass layer, while some areas also contain a sparse shrub and mid-storey. The canopy generally consists of eucalypts with a dominant tree height of 15-20m.

The level of hollow abundance is low with only a small number of old growth trees present. The ground is dominated by grass with small amounts of leaf litter and bare ground also present. Minimal to moderate levels of ground log abundance occur throughout.

Overall the habitat value of this area is considered to be moderate. Table 11 identifies the main plants which provide particular fauna habitat resources.

Table 11. Plants found on site which provide particular fauna habitat attributes.

Common Name	Scientific Name	Habitat Values
Rough-barked Apple	*Angophora subvelutina*	Yellow-bellied Glider sap tree
Bottlebrush	*Callistemon linearis, C. rigidus*	Nectar producing plant
Cabbage Gum	*Eucalyptus amplifolia*	Yellow-bellied Glider sap tree; Koala food tree
Grey Box	*Eucalyptus moluccana*	Yellow-bellied Glider sap tree
Cherry Ballart	*Exocarpus cupressiformis*	Fruit bearing plant
Paperbark	*Melaleuca decora, M. nodosa, M. seiberi*	Nectar producing plants

Agricultural Grassland

The Cleared Agricultural Lands have few opportunities for use by native fauna species other than, open country adapted grass and seed feeding species.

Habitat Tree Hollow Surveys

Only twelve (12) hollow-bearing living trees and 10 dead trees were recorded in the study area (Figure 7). The types of hollows encountered are depicted in Figure 6. 46 hollows were recorded, thirty-three (33) were small (<8 cm diameter), four were medium-sized (8-20 cm diameter) and nine large (>20 cm diameter).

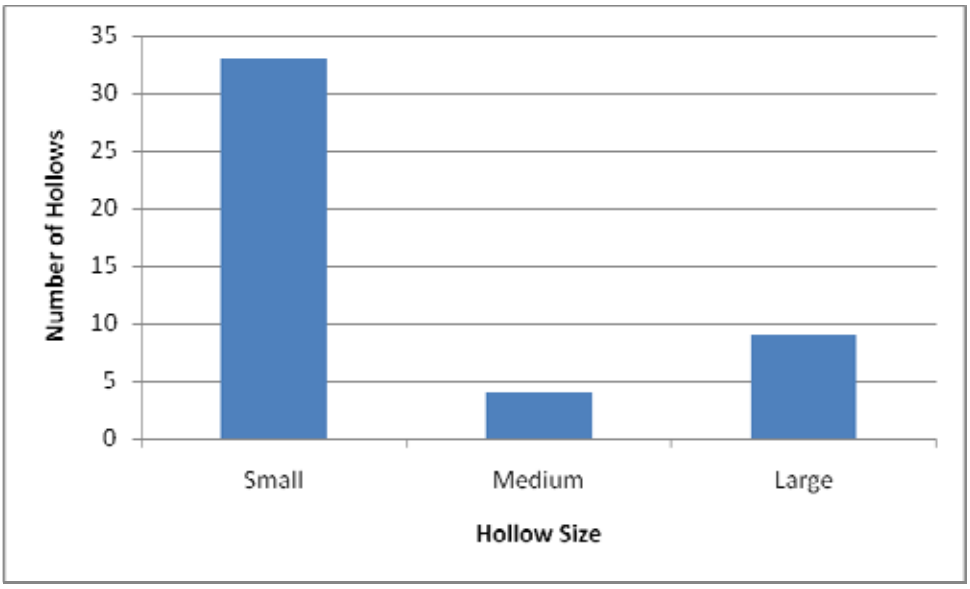

Figure 6: Number of trees within each hollow diameter size class.
Note: Small < 8 cm, medium = 8 – 20 cm and large > 20 cm diameter.

3.2.2. SEPP 44 – Koala Habitat

The project area is within a local government area that is known to contain Koalas (State Environmental Planning Policy No. 44 – Koala Habitat Protection). However, no preferred Koala forage tree species have been recorded from the study area.

Therefore the bushland within the project area cannot be considered as potential habitat for Koalas. Despite target searches, no Koalas were recorded during any surveys of the study area. Considering the isolated and disturbed nature of the remnant bushland and the lack of feed trees within the study area, it is considered unlikely that any Koalas would use the study area.

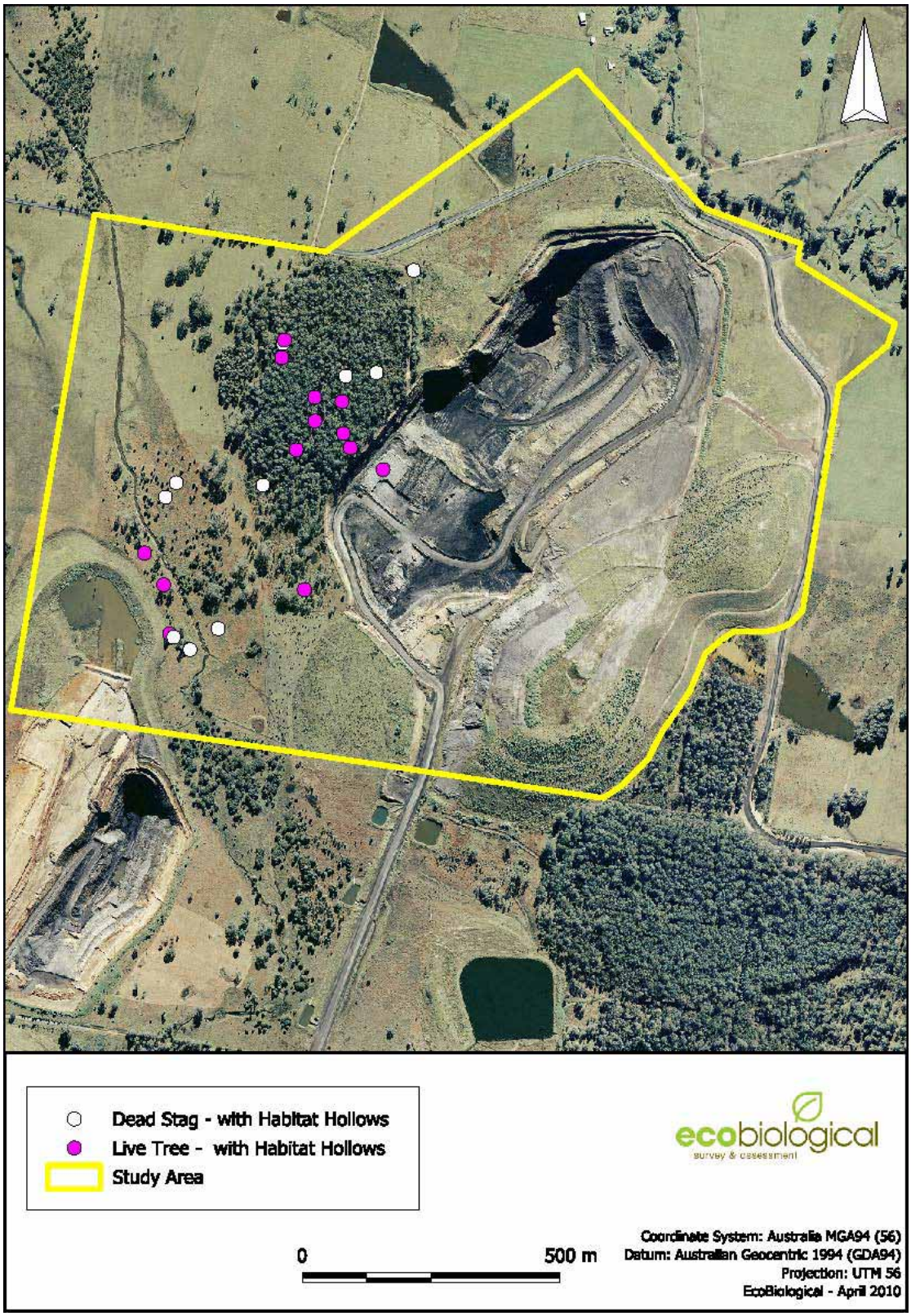

Figure 7: Aerial photograph of the study area showing the location of trees containing habitat hollows.

3.2.3. Fauna Species Composition

A total of 45 fauna species were recorded within the study area (consisting of eight frogs, four reptiles, 26 birds and seven mammals. A list of these species and their relative abundance is shown in Appendix 3. Two of these mammals were exotic species (the Rabbit and the Hare).

Most species were recorded infrequently, though large numbers of some species of frogs were noted in the man-made water bodies. Despite suitable habitat for two threatened frog species, none were detected despite targeted searches. High numbers of two other species were noted in the study area during site surveys, the Yellow-faced Honeyeater and the Little Forest Bat.

3.2.4. Threatened Fauna Species

Two threatened fauna species were recorded during the surveys (Figure 8, Table 12). One sound recording was made of a cave-dwelling bat, the Eastern Bentwing-bat, *Miniopterus oceanensis*, flying over the forested part of the study area.

The other threatened species, the Grey-crowned Babbler *Pomatostomus temporalis* was detected via opportunistic sightings of an individual and several old nest sites. The nests were found clustered among paperbark trees in the Cabbage Tree Woodland section of the study area while the individual was observed north of the study area (Figure 8).

All of the threatened species recorded at the study site are listed as Vulnerable under the TSC Act and are not listed under the EPBC Act.

Table 12. Threatened fauna species detected during surveys.

Scientific Name	Common Name	Survey Method	Habitat recorded in	No. of individuals observed
Pomatostomus temporalis temporalis	Grey-crowned Babbler	Opportunistic sightings	Grassy Woodland	Group of several nests and one bird
Miniopterus oceanensis	Eastern bent-wing Bat	Anabat Recording	Dry Sclerophyll Forest	Echolocation call recording over forested area

One EPBC-listed migratory species was detected during surveys in the study area, the Cattle Egret, *Ardea ibis*.

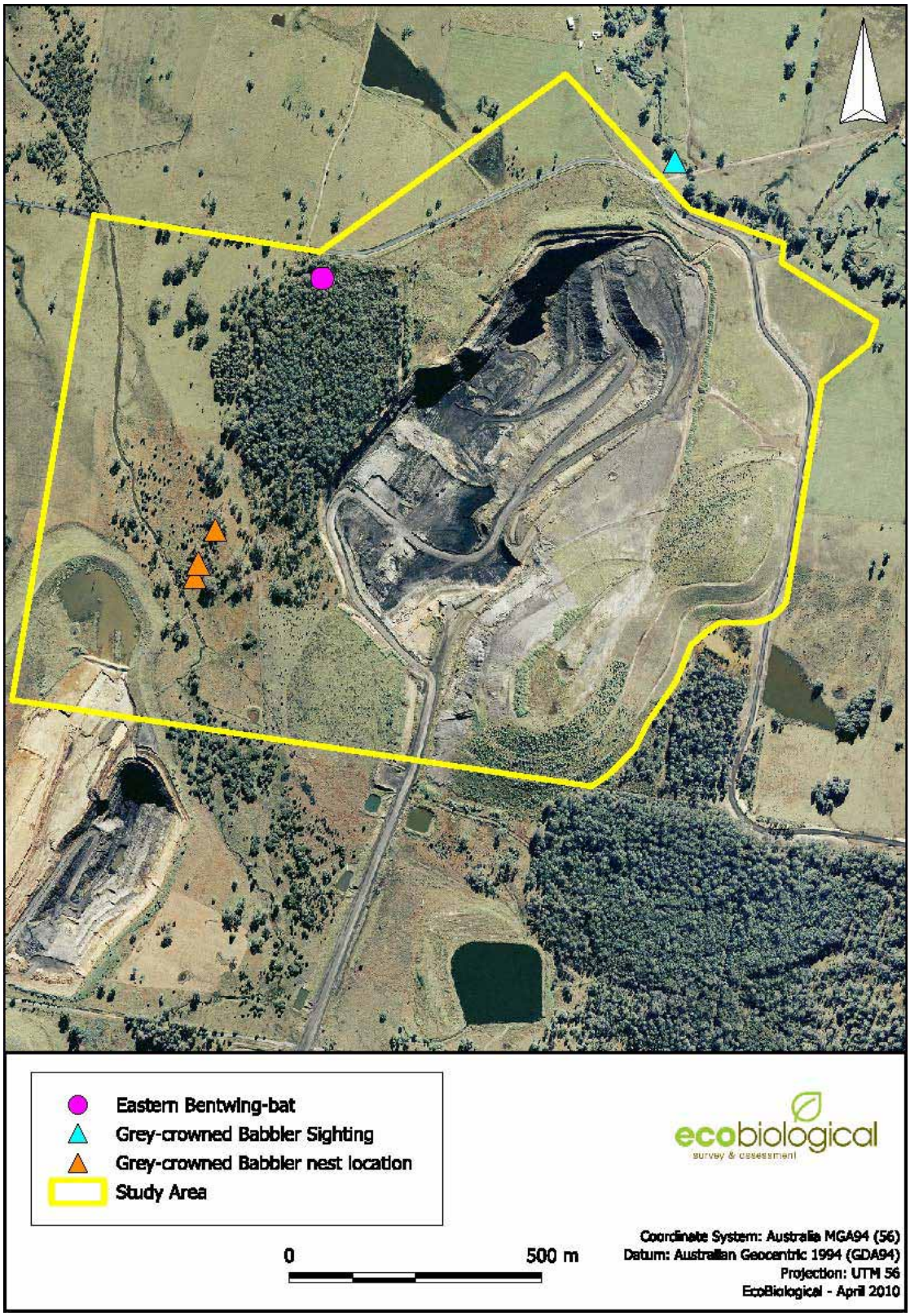

Figure 8: Aerial photograph of the study area showing the locations of threatened fauna detected during field surveys.

4. Conclusions

Field surveys of the study area were conducted between April 2007 and March 2010. The key findings are summarised below.

Vegetation Community Mapping

A total of two defined native vegetation communities and one modified community (cleared agricultural grasslands) were recorded in the study area. Vegetation condition ranged from moderate to good within the remnant wooded patch, with the rest of the study area regarded as in poor condition.

One Threatened Ecological Community (TEC) has been determined to occur within the study area. The Cabbage Gum Floodplain Grassy Woodland constitutes part of the endangered *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions* ecological community.

Flora

Data collected during the field surveys revealed that the study area supported 77 plant species, 12 of which are introduced, exotic or weed species. These weed species were more commonly found in the cleared and disturbed areas. No threatened flora species were recorded within the study area.

Fauna

Forty-five species of vertebrate fauna were recorded across the study area, including two threatened species listed under the NSW Threatened Species Conservation Act 1995 (Grey-crowned Babbler and Eastern Bentwing-bat,) and two exotic species (Rabbit and Hare). One other threatened species has also recorded from the study area, the Yellow-bellied Sheathtail Bat (Richardson 2001). The habitats in the study area have the potential to provide some breeding, roosting or foraging resources for 11 other threatened fauna species known to occur within 10 km of the study area.

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Appendix 1: Co-ordinates of all sites, quadrats and transects.

Site/Quadrat/Transect	Sampling location co-ordinates			
	From or Single Point		To	
Flora Quadrats	Longitude	Latitude	Longitude	Latitude
Quadrat no. (Quadrat no. / Year)				
1 (20/07)	151.9423	-32.3046		
2 (21/07)	151.9430	-32.3043		
3 (22/07)	151.9432	-32.3039		
4 (23/07)	151.9366	-32.2867		
5 (24/07)	151.9375	-32.2901		
Trapping Transects				
TT1	151.9292	-32.2683	151.9312	-32.2715
Harp Traps				
H1	151.9285	-32.2707		
Anabats				
AT13	151.9659	-32.1096		
Bird Surveys				
T1	151.9301	-32.2674		
T2	151.9281	-32.2688		
Owl Surveys				
OC1	151.9337	-32.2677		
OC2	151.9296	-32.2713		
OC3	151.9447	-32.2736		
OC4	151.9253	-32.2760		
Amphibian Surveys				
Ap1	151.9258	-32.2681		
Ap2	151.9309	-32.2665		
Ap3	151.9313	-32.2669		
Ap4	151.9322	-32.2691		
Ap5	151.9317	-32.2801		
Reptile Surveys				
R1	151.9258	-32.2681		

Appendix 2: Flora species from all quadrats

			1	2	3	4	5	D7	R4
Family	Scientific Name	Common Name	2007	2007	2007	2007	2007	2010	2010
Adiantaceae	*Cheilanthes sieberi* subsp. *sieberi*	Mulga Fern	0	2	4	0	2	0	0
Anthericaceae	*Caesia parviflora* var. *parviflora*	Pale Grass Lily	0	0	4	0	0	0	0
Apiaceae	*Centella asiatica*	Swamp Pennywort	0	0	0	0	0	2	0
Apiaceae	*Hydrocotyle laxiflora*		0	0	0	0	0	2	0
Asteraceae	**Conyza bonariensis*	Flaxleaf Fleabane	0	0	0	0	0	2	0
Asteraceae	**Conzya* sp.	Fleabane	0	0	0	0	0	0	2
Asteraceae	**Hypochaeris radicata*	Catsear	2	0	0	0	0	2	2
Asteraceae	**Senecio madagascariensis*	Fireweed	0	0	0	0	0	0	2
Asteraceae	*Lagenophora stipitata*	Blue Bottle-daisy	0	1	2	2	0	0	0
Asteraceae	*Ozothamnus diosmifolius*	White Dogwood	0	2	0	0	0	0	0
Asteraceae	*Vittadinia cuneata*	Fuzzweed	0	2	2	2	2	0	0
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell	0	0	0	0	0	0	1
Celastraceae	*Maytenus silvestris*	Orange Bark	0	0	2	0	1	0	0
Convolvulaceae	*Dichondra repens*	Kidney Weed	2	0	2	2	2	0	0
Convolvulaceae	*Polymeria calycina*		0	0	0	0	0	2	0
Cyperaceae	**Cyperus brevifolius*		0	0	0	0	0	0	2
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	0	0	0	0	0	2	2
Cyperaceae	*Schoenus apogon*	Common Bog-rush	0	0	0	0	0	2	0
Dilleniaceae	*Hibbertia diffusa*		0	2	6	0	2	0	0
Fabaceae - Faboideae	*Daviesia ulicifolia*	Gorse Bitter Pea	1	2	0	2	1	0	0
Fabaceae - Faboideae	*Desmodium rhytidophyllum*		0	0	0	2	0	0	0
Fabaceae - Faboideae	*Desmodium varians*	Slender Tick-trefoil	2	2	2	0	0	0	0
Fabaceae - Faboideae	*Glycine clandestina*	Twining Glycine	2	0	2	0	0	0	0
Fabaceae - Faboideae	*Hardenbergia violacea*	Purple Coral Pea	0	2	0	2	2	0	0
Fabaceae - Faboideae	*Kennedia rubicunda*	Dusky Coral Pea	0	0	3	0	2	0	0

Fabaceae - Faboideae	*Platylobium formosum* subsp. *parviflorum*	Handsome Flat Pea	0	2	0	0	0	0	0
Fabaceae - Faboideae	*Pultenaea euchila*	Orange Pultenaea	0	2	0	0	0	0	0
Fabaceae - Faboideae	*Pultenaea villosa*	Hairy Bush-pea	0	4	0	2	1	0	0
Fabaceae - Mimosoideae	*Acacia falcata*	Sickle Wattle	0	0	0	0	2	0	0
Fabaceae - Mimosoideae	*Acacia ulicifolia*	Prickly Moses	1	2	0	0	0	0	0
Goodeniaceae	*Goodenia paniculata*	Branched Goodenia	0	0	0	0	0	2	0
Juncaceae	**Juncus cognatus*		0	0	0	0	0	0	2
Juncaceae	*Juncus continuus*		0	0	0	0	0	2	0
Juncaceae	*Juncus usitatus*	Common Rush	0	0	0	0	0	0	2
Lobeliaceae	*Pratia purpurascens*	Whiteroot	2	0	2	2	2	2	0
Lomandraceae	*Lomandra confertifolia* subsp. *rubiginosa*	Mat-rush	0	2	0	0	0	0	0
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*	Wattle Mat-rush	0	0	0	0	1	0	0
Lomandraceae	*Lomandra multiflora* subsp. *multiflora*	Many-flowered Mat-rush	0	0	1	0	0	0	0
Meliaceae	*Melia azedarach*	White cedar	0	0	0	0	0	0	0
Myrtaceae	*Angophora subvelutina*	Broad-leaved Apple	0	0	0	0	0	2	0
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush	0	0	0	1	0	0	0
Myrtaceae	*Callistemon rigidus*	Stiff Bottlebrush	0	0	0	0	0	2	0
Myrtaceae	*Eucalyptus amplifolia* subsp. *amplifolia*	Cabbage Gum	4	0	0	0	0	4	0
Myrtaceae	*Eucalyptus globoidea*	White Stringybark	0	5	2	5	5	0	0
Myrtaceae	*Eucalyptus moluccana*	Grey Box	0	2	2	0	0	0	0
Myrtaceae	*Melaleuca decora*		3	2	0	0	0	0	0
Myrtaceae	*Melaleuca nodosa*	Prickly-leaved Paperbark	0	0	2	6	5	2	0
Myrtaceae	*Melaleuca sieberi*		0	0	2	2	3	0	0
Myrtaceae	*Melaleuca thymifolia*	Thyme Honey-myrtle	0	0	0	0	0	1	0
Orchidaceae	*Pterostylis* sp.		0	0	2	0	0	0	0
Philydraceae	*Philydrum lanuginosum*	Woolly Frogmouth	0	0	0	0	0	2	0
Phormiaceae	*Dianella caerulea*	Blue Flax-lily	0	0	2	2	0	0	0
Phormiaceae	*Dianella longifolia* var. *longifolia*		0	2	0	0	0	0	0
Phyllanthaceae	*Phyllanthus hirtellus*	Thyme Spurge	0	0	0	2	2	0	0

Pittosporaceae	*Billardiera scandens* var. *scandens*	Hairy Apple Berry	0	2	2	2	0	0	0
Pittosporaceae	*Bursaria spinosa* subsp. *spinosa*	Blackthorn	0	2	0	0	2	0	0
Pittosporaceae	*Pittosporum revolutum*	Hairy Pittosporum	0	0	2	0	2	0	0
Plantaginaceae	**Plantago lanceolata*	Lambs Tongue	1	0	0	0	0	0	0
Poaceae	**Andropogon virginicus*	Whisky Grass	2	0	0	0	0	2	0
Poaceae	**Axonopus fissifolius*	Narrow-leafed Carpet Grass	0	0	0	0	0	5	5
Poaceae	**Paspalum dilatatum*	Paspalum	2	0	0	0	0	5	2
Poaceae	**Sporobolus africanus*	Parramatta Grass	0	0	0	0	0	0	2
Poaceae	*Aristida vagans*	Threeawn Speargrass	0	3	0	0	3	0	0
Poaceae	*Cynodon dactylon*	Couch	0	0	0	0	0	3	0
Poaceae	*Entolasia stricta*	Wiry Panic	0	3	2	4	4	0	0
Poaceae	*Eragrostis brownii*	Browns Lovegrass	2	0	0	0	0	2	0
Poaceae	*Imperata cylindrica* var. *major*	Bladey Grass	6	0	0	0	0	3	0
Poaceae	*Joycea pallida*	Silvertop Wallaby Grass	0	2	0	0	0	0	0
Poaceae	*Microlaena stipoides* var. *stipoides*	Weeping Grass	0	2	0	0	0	0	0
Poaceae	*Panicum simile*	Two-Colour Panic	0	0	0	0	2	0	0
Poaceae	*Themeda australis*	Kangaroo Grass	3	5	0	0	0	3	0
Rubiaceae	*Opercularia diphylla*		0	2	2	0	2	0	0
Rutaceae	*Boronia polygalifolia*	Dwarf Boronia	0	2	0	0	0	0	0
Santalaceae	*Exocarpos cupressiformis*	Native Cherry	0	0	0	0	1	0	0
Scrophulariaceae	*Veronica plebeia*	Trailing Speedwell	0	0	2	0	0	0	0
Solanaceae	*Solanum prinophyllum*	Forest Nightshade	0	0	0	0	1	0	0
Verbenaceae	**Verbena bonariensis*	Purple Top	2	0	0	0	0	2	2

Cover Abundance Scale calculated as:
1 = few individuals / less than 1% cover; 2 = cover between 1-5%; 3 = cover between 6-25%; 4 = cover between 26-50%; 5 = cover between 51-75%; 6 = cover between 76-100%
* - denotes an introduced species

Appendix 3: Fauna species recorded within the study area

Relative abundance: O = one sighting only; U = uncommon; C = common; A = abundant.

Scientific Name	Common Name	Method of Detection	Relative Abundance
Amphibians			
Limnodynastes peronii	Striped Marsh Frog	Heard, sighted	A
Limnodynastes tasmaniensis	Spotted Marsh Frog	Heard, sighted	C
Litoria dentata	Bleating Tree Frog	Heard	U
Litoria fallax	Eastern Dwarf Tree Frog	Heard, sighted	A
Litoria latopalmata	Broad-palmed Frog	Heard, sighted	A
Litoria peronii	Peron's Tree Frog	Heard, sighted	C
Litoria tyleri	Tyler's Tree Frog	Heard	U
Uperoleia fusca	Dusky Toadlet	Heard, sighted	U
Reptiles			
Ctenotus robustus	Robust Ctenotus	Funnel trap, reptile search	U
Chelodina longicollis	Eastern Long-necked Turtle	Spotlighting	C
Eulamprus quoyii	Eastern Water Skink	Reptile search	U
Lampropholis delicata	Garden Skink	Reptile search	C
Birds			
Falco longipennis	Australian Hobby	Opportunistic	U
Gymnorhina tibicen	Australian Magpie	Diurnal Bird Survey	C
Corvus coronoides	Australian Raven	Diurnal Bird Survey	C
Tyto javanica	Eastern Barn Owl	Nocturnal survey	U
Acanthiza pusilla	Brown Thornbill	Diurnal Bird Survey	C
Ardea ibis M	Cattle Egret	Diurnal Bird Survey	C
Ocyphaps lophotes	Crested Pigeon	Diurnal Bird Survey	C
Platycercus elegans	Crimson Rosella	Diurnal Bird Survey	C
Platycercus eximius	Eastern Rosella	Diurnal Bird Survey	C
Pomatostomus temporalis	Grey-crowned Babbler	Diurnal Bird Survey	O
Rhipidura fuliginosa	Grey Fantail	Diurnal Bird Survey	C
Microeca fascinans	Jacky Winter	Opportunistic	U
Dacelo novaeguineae	Laughing Kookaburra	Diurnal Bird Surve	C
Grallina cyanoleuca	Magpie-lark	Diurnal Bird Survey	C
Vanellus miles	Masked Lapwing	Diurnal Bird Survey	U
Manorina melanocephala	Noisy Miner	Diurnal Bird Survey	C

Scientific Name	Common Name	Method of Detection	Relative Abundance
Oriolus sagittatus	Olive-backed Oriole	Diurnal Bird Survey	U
Cracticus nigrogularis	Pied Butcherbird	Diurnal Bird Survey	C
Pachycephala rufiventris	Rufous Whistler	Diurnal Bird Survey	C
Threskiornis spinicollis	Straw-necked Ibis	Diurnal Bird Survey	U
Pardalotus striatus	Striated Pardalote	Diurnal Bird Survey	U
Acanthiza lineata	Striated Thornbill	Diurnal Bird Survey	C
Cormobates leucophaeus	White-throated Treecreeper	Diurnal Bird Survey	C
Rhipidura leucophrys	Willie Wagtail	Diurnal Bird Survey	C
Acanthiza nana	Yellow Thornbill	Diurnal Bird Survey	U
Lichenostomus chrysops	Yellow-faced Honeyeater	Diurnal Bird Survey	A
Terrestrial and Arboreal Mammals			
Macropus giganteus	Eastern Grey Kangaroo	Opportunistic	C
Macropus rufogriseus	Red-necked Wallaby	Opportunistic	C
*Lepus europeus**	European Hare	Opportunistic	U
*Oryctolagus cuniculus **	European Rabbit	Opportunistic	C
Bats			
Miniopterus oceanensis #	Eastern Bentwing-bat	Anabat	C
Tardarida australis	White-striped Freetail-bat	Spotlighting	U
Vespadelus vulturnus	Little Forest Bat	Anabat	A

* Introduced species,
# Listed as a threatened species under the NSW TSC Act
M Listed as a Migratory species EPBC Act

Appendix 4: Contributions and qualifications of ecobiological staff

Name	Qualification	Title/Experience	Contribution
David Paull	M.Res. Sc.	Senior Ecologist 20 years experience in field ecology and assessment.	Report writing.
Simon Clulow	B. Sc./B. Teach	Ecologist (Herpetologist) 6 years - Research in evolutionary biology, ecology, reproductive physiology and conservation biology (with a focus in the field of herpetology).	Amphibian and reptile surveys, trapping design, mammal and reptile trap checking, owl call playback spotlighting.
Kristy Peters	B. Park Mgt (Hons)	Ecologist (Ornithologist) 3 years – Bird identification and Anabat analysis.	Bird surveys, spotlighting, owl call playback, Anabat analysis, report review.
Adam Blundell	B. Env Sc. (Hons)	Managing Director 10 years – Research on large forest owls, trained by Barbara Triggs in hair and scat analysis.	Trapping design, hair sample analysis, spotlighting, owl call playback.
Dan Pedersen	B. Sc.	Botanist 6 years - Botany, vegetation classification and mapping, bushfire consultant.	Flora survey and species ID, vegetation community mapping.
Ryan Parsons	B. Env.Sc.	Botanist	Habitat hollow survey.
Dianna Brettschneider	B. App. Sc (Env)	GIS Manager 2 years - georeferencing, processing, analysis and display of spatial data in GIS.	Preparation of map layouts for report.

Appendix 5: Licensing matters relating to the survey

ecobiological and employees involved in the current study are licensed or approved under the *National Parks and Wildlife Act* 1974 (License Number: S12398, Expiry: 30 November 2010) and the *Animal Research Act* 1985 to harm / trap / release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.

APPENDIX B

THREATENED SPECIES ASSESSMENT OF SIGNIFICANCE

APPENDIX B

BOWENS ROAD NORTH OPEN CUT JUNE 2010 MODIFICATION

ASSESSMENT OF SIGNIFICANCE

STRATFORD COAL

JUNE 2010
Project No. GCL-09-11
Document No. 00345994.doc

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EXECUTIVE SUMMARY

The Bowens Road North Open Cut (BRNOC) is an existing open cut coal mining operation owned and operated by Stratford Coal Pty Ltd, a subsidiary of Gloucester Coal Ltd.

SCPL proposes to modify the BRNOC Development Consent (the proposed Modification). The Modification relates to a minor cutback of the BRNOC pit, along with an increase in annual ROM coal production. The modified BRNOC would be an incremental extension to the approved BRNOC of precisely the same character, in the same location, with a large proportion of the aspects of the operation remaining unchanged.

The purpose of this document is to assess whether the proposed Modification is likely to significantly affect threatened species, populations or ecological communities or their habitats listed under the NSW *Threatened Species Conservation Act, 1995* and *Fisheries Management Act, 1994* in accordance with Section 5A of the *Environmental Planning and Assessment Act, 1979*.

This document assesses the potential impacts of the proposed Modification on five threatened fauna species and one threatened ecological community. No threatened flora species or endangered populations are known or considered to possibly occur within the study area.

The assessments conclude that the proposed Modification is unlikely to have a significant effect on any threatened species, populations, ecological communities or their habitats, considering aspects such as the wider extent of potential habitat for the species, the small scale of the proposed Modification (adjacent to the existing approved pit) and the already fragmented nature of the habitat in the landscape.

B1 INTRODUCTION

The Bowens Road North Open Cut (BRNOC) is an existing open cut coal mining operation owned and operated by Stratford Coal Pty Ltd (SCPL), a subsidiary of Gloucester Coal Ltd. The BRNOC is located to the immediate north of the Stratford Coal Mine (SCM), approximately 100 kilometres (km) north of Newcastle, New South Wales (NSW) (Figure B-1).

The Modification relates to a minor cutback of the BRNOC pit, along with an increase in annual run of mine (ROM) coal production from 0.9 to 1 million tonnes per annum (Mtpa). Total additional ROM coal from the Modification would be approximately 1.4 million tonnes, additional waste rock would be approximately 3.5 million bank cubic metres (Mbcm) and mining operations would continue to mid-2013. The proposed changes to the currently approved BRNOC are shown on Figure B-2. A more detailed description of the proposed Modification is provided in Section 2 of the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010).

Baseline surveys of the proposed Modification disturbance area were undertaken by EcoBiological in April and July 2007 and March 2010 (EcoBiological, 2010). These surveys included targeted searches for threatened species and ecological communities in accordance with the *Threatened Biodiversity Survey and Assessment Guidelines* (Department of Environment and Conservation [DEC], 2004) and in consideration of the Department of Environment, Climate Change and Water (DECCW) *Field Survey Methods* and *Threatened Species Profile Database* (DECCW, 2010a).

Two native vegetation communities occur within the proposed BRNOC pit cutback area (EcoBiological, 2010) (Figure B-2):

- White Stringybark – Grey Ironbark Grass/Shrub Forest (Stringybark Forest); and
- Cabbage Gum Floodplain Grassy Woodland (Cabbage Gum Woodland).

The Stringybark Forest occurs as a remnant patch on elevated land to the west of the BRNOC and has poor connectivity to other habitat areas in the landscape (Figure B-2). The Cabbage Gum Woodland occurs on the floodplain, to the east of a tributary of the Avon River, and is dominated by mature regrowth Cabbage Gum (*Eucalyptus amplifolia* subsp. *amplifolia*) (EcoBiological, 2010).

B1.1 PURPOSE OF THE DOCUMENT

The purpose of this document is to assess whether the proposed Modification is likely to significantly affect threatened species, populations or ecological communities or their habitats listed under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and *Fisheries Management Act, 1994* (FM Act) in accordance with Section 5A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The following factors are considered to determine the likelihood of a significant impact:

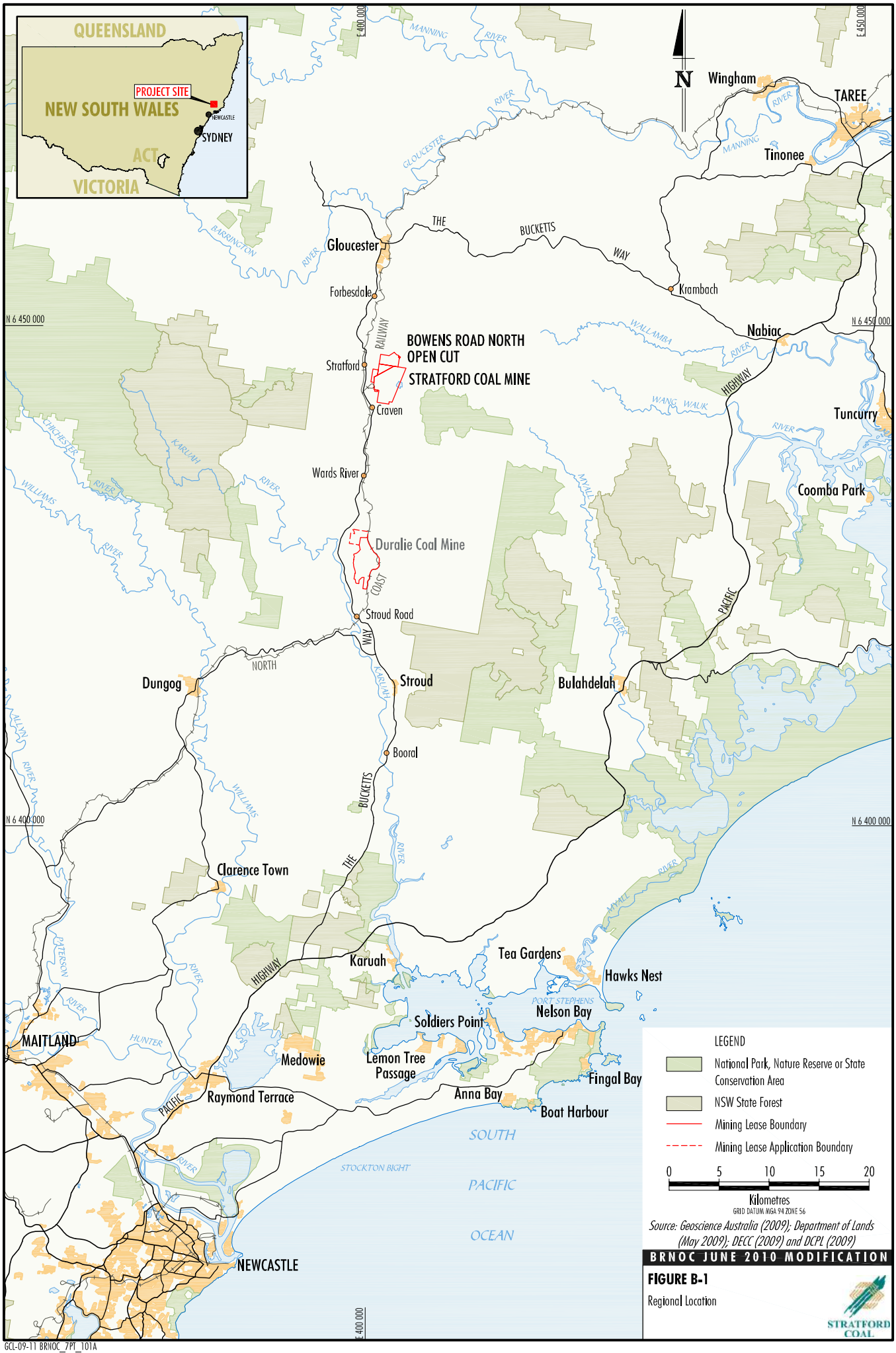
(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.



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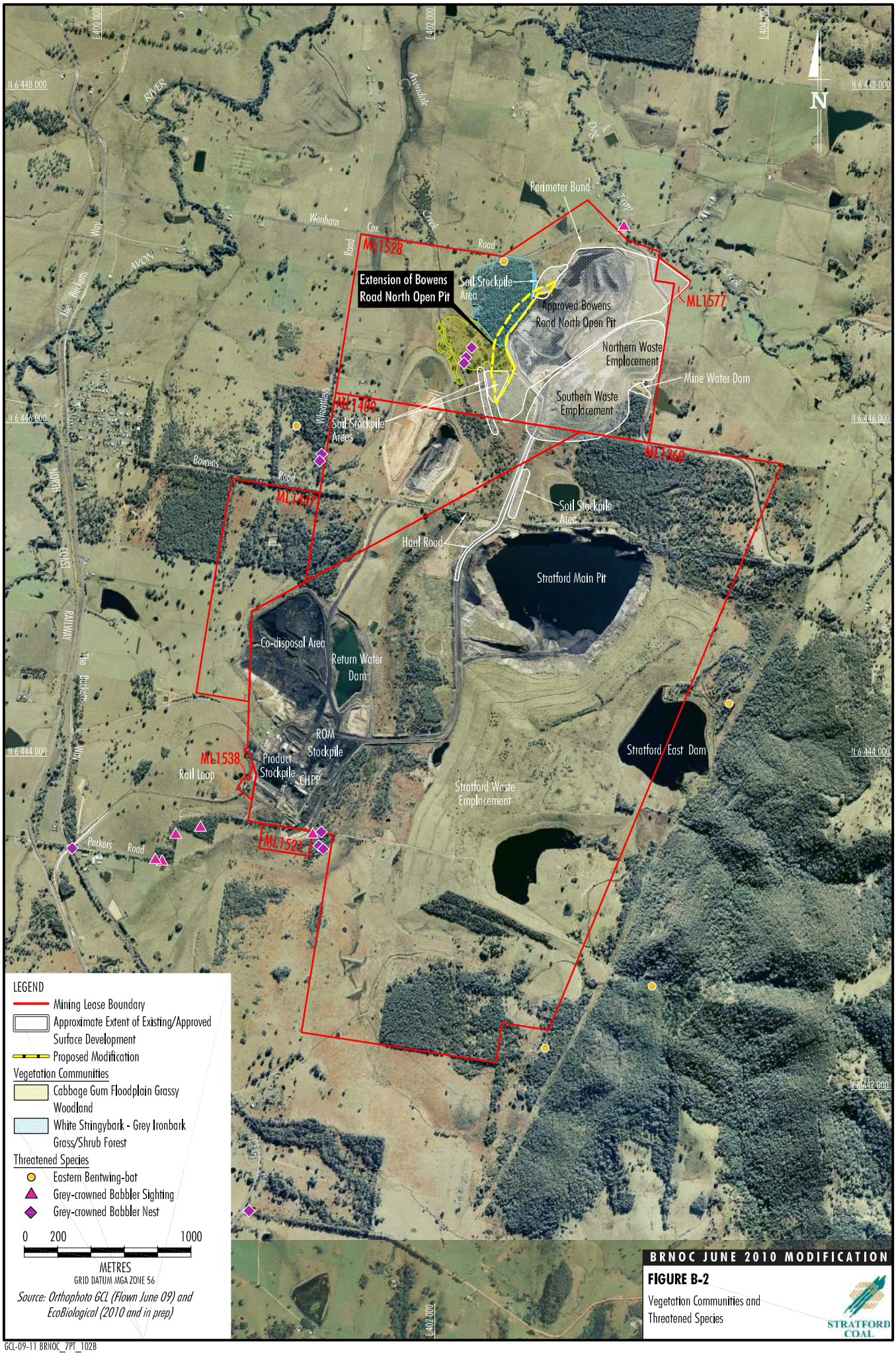


GCL-09-11 BRNOC_7PT_102B

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

B1.2 DOCUMENT TERMS

Study Area	The proposed Modification area and any additional areas which are likely to be affected by the proposal, either directly or indirectly.
Direct Impacts	Are those that directly affect habitat and individuals and include but are not limited to death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat.
Indirect Impacts	Occur when proposed Modification-related activities affect species, populations or ecological communities in a manner other than a direct loss.
Lifecycle	The series or stages of reproduction, growth, development, aging and death of an organism.
Viable	The capacity to successfully complete each stage of the lifecycle under normal conditions.
Local Population	The population that occurs in the study area. In cases where multiple populations occur in the study area, each population should be assessed separately.
Risk of Extinction	Is the likelihood that the local population will become extinct either in the short-term or in the long-term as a result of direct or indirect impacts on the viability of that population.
Local Occurrence	Occurrence within the study area.
Composition	Refers to both the assemblage of fauna species, and the physical structure of the ecological community.
Habitat	Is the area occupied, or periodically or occasionally occupied, by any threatened species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during the different stages of their lifecycles.

For clarity the following terms have also been defined:

Known Habitat	Is considered to be habitat in the study area in which the species has been recorded.
Potential Habitat	Is considered to be habitat in the study area in which the species has not been recorded but may potentially utilise.

B1.3 DOCUMENT SCOPE

Threatened species and ecological communities which are assessed against factors of significance in this document are presented in Table B-1.

Table B-1
Threatened Species Assessed by Assessments of Significance in this Document

Species Name	Common Name	Conservation Status[1]
Birds		
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V
Daphoenositta chrysoptera	Varied Sittella	V
Mammals		
Miniopterus australis	Little Bentwing-bat	V
Miniopterus schreibersii oceansis	Eastern Bentwing-bat	V
Mormopterus norfolkensis	Eastern Freetail-bat	V
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	V
Ecological communities		
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions		E

[1] TSC Act V (Vulnerable), E (Endangered)

No threatened flora species or endangered populations are known or considered likely to occur in the study area (after Dowling, 2000 and EcoBiological, 2010).

The list of threatened species and ecological communities in Table B-1 was compiled in consideration of a number of references and factors including:

- The results of detailed surveys undertaken at the site over multiple years by EcoBiological (2010 and in prep.), Hoye and Finney (1994), Hoye (1998), Dowling (2000), Mount King Ecological Surveys (2001), Greg Richards and Associates (2001) and Woodward-Clyde (1996).
- Operational experience, existing threatened species management (SCPL, 2002 and 2003), and yearly environmental reporting at the existing SCM and BRNOC.
- The nature and extent of the disturbance associated with the proposed Modification.
- The schedules of the TSC Act and FM Act.
- Australian Museum Fauna Database records within a search area of approximately 20 km x 20 km surrounding the study area (Australian Museum, 2010).
- Atlas of Australia Birds database records produced by Birds Australia (2010) within a search area of approximately 20 km x 20 km surrounding the study area.
- Sydney Royal Botanic Gardens (2010) database records within a search area of approximately 20 km x 20 km surrounding the study area.
- DECCW Atlas of NSW Wildlife database records for within a search area of approximately 20 km x 20 km surrounding the study area (DECCW, 2010b).
- Distribution and habitat descriptions on the DECCW Threatened Species Internet Site (DECCW, 2010a), and in seminal texts such as Strahan (2004).
- Preliminary and Final Determinations of the NSW Scientific Committee (DECCW, 2010c).

- The essential lifecycle components of candidate species (including breeding, foraging, roosting/nesting and movement/migration).

It is noted that the following threatened fauna species are generally known to utilise River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community (River-Flat Eucalypt Forest EEC); Osprey (*Pandion haliaetus*), Brush-tailed Phascogale (*Phascogale tapoatafa*), Yellow-bellied Glider (*Petaurus australis*), Squirrel Glider (*Petaurus norfolcensis*) and Grey-headed Flying Fox (*Pteropus poliocephalus*) DECCW, 2010a). Although none of these species have been recorded in the Modification area (EcoBiological, 2010), the potential for the Modification to adversely impact these species is considered below.

The habitat in the Modification area is not ideal for the Osprey, as the species prefers coastal areas, near large rivers, lagoons or lakes for feeding on fish (after DECCW, 2010a). The Osprey is not known to occur within approximately 20 km of the Modification area (after DECCW, 2010b; EcoBiological, 2010 and in prep.).

The habitat in the Modification area is suboptimal for arboreal mammals, namely the Brush-tailed Phascogale, Yellow-bellied Glider and Squirrel Glider, as the habitat is dominated by mature regrowth, fragmented, relatively discontinuous with other habitat areas in the wider surrounds (Figure B-2) and tree hollow impoverished. Despite targeted surveys for these species undertaken by EcoBiological (2010) and Mount King Ecological Surveys (2001), these species were not recorded in the Modification area.

The Grey-headed Flying Fox is not known to occur within approximately 20 km of the Modification area (after DECCW, 2010b; EcoBiological, 2010 and in prep.). Despite targeted surveys for these species undertaken by EcoBiological (2010), Hoye and Finney (1994), Hoye (1998) and Greg Richards and Associates (2001) the species has not been recorded in the Modification area.

B1.4 APPLYING FACTORS OF THE ASSESSMENT

The following sections (a) to (g) provide an overview of the factors considered for the threatened species addressed in Section B2.

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

As defined in Section B1.2, a lifecycle is the series or stages of reproduction, growth, development, ageing, and death of an organism (DECC, 2007). The removal or modification of habitat resources or the disruption of important periodic events (e.g. plant germination) may disrupt a species lifecycle and be detrimental to the survival of a species (DECC, 2007). Important lifecycle components for plants include seed banks, recruitment (germination and establishment of plants) and reproduction (including pollination and fecundity). For animals, important lifecycle components include breeding, mortality, dormancy, roosting, feeding, migration and dispersal. The risk of such an activity to cause a local population to become extinct will increase if any factor operates to reduce the local population size or reproduction success (DECC, 2007).

In accordance with the *Threatened Species Assessment Guidelines: The Assessment of Significance* (DECC, 2007), any known or potential local population described in this document is assumed to be viable, i.e. the population has the capacity to successfully complete each stage of the lifecycle under normal conditions.

Factor (a) is applicable to the threatened species addressed in Section B2 of this document.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

This factor is essentially identical to Factor (a) except that it refers only to endangered populations, whereas Factor (a) refers to species. Table B-2 provides a list of endangered populations currently (June 2010) listed in the TSC Act (DECCW, 2010d).

Table B-2
Endangered Populations under the *Threatened Species Conservation Act, 1995*

Species	Endangered Populations
Flora	
Weeping Myall (*Acacia pendula*)	Weeping Myall population in the Hunter catchment.
Gosford Wattle (*Acacia prominens*)	Gosford Wattle population in the Hurstville and Kogarah Local Government Areas (LGAs).
Black Cypress Pine (*Callitris endlicheri*)	Black Cypress Pine, Woronora Plateau population.
Chorizema parviflorum Benth. (a shrub)	*Chorizema parviflorum* Benth. population in the Wollongong and Shellharbour LGAs.
Cymbidium canaliculatum	*Cymbidium canaliculatum* population in the Hunter Catchment.
Darwinia fascicularis subsp. *oligantha*	*Darwinia fascicularis* subsp. *oligantha* populations in the Baulkham Hills and Hornsby LGAs.
Dillwynia tenuifolia	*Dillwynia tenuifolia* population at Kemps Creek.
	Dillwynia tenuifolia in the Baulkham Hills LGA.
Pine Donkey Orchid (*Diuris tricolor*)	Pine Donkey Orchid population in the Muswellbrook LGA.
River Red Gum (*Eucalyptus camaldulensis*)	*Eucalyptus camaldulensis* population in the Hunter catchment.
Narrow-leaved Stringybark (*Eucalyptus oblonga*)	*Eucalyptus oblonga* population at Bateau Bay and Wyong LGA.
Eucalyptus parramattensis subsp. *parramattensis*	*Eucalyptus parramattensis* subsp. *parramattensis* population in the Wyong and Lake Macquarie LGAs.
Narrow-leaved Red Gum (*Eucalyptus seeana*)	*Eucalyptus seeana* population in the Greater Taree LGA.
Nambucca Glycine (*Glycine clandestine*)	*Glycine clandestina* population in the Nambucca LGA.
Keraudrenia corrolata var. *denticulata*	*Keraudrenia corrolata* var. *denticulata* population in the Hawkesbury LGA.
Leionema lamprophyllum subsp. *obovatum*	*Leionema lamprophyllum* subsp. *obovatum* population in the Hunter Catchment.
Lespedeza juncea subsp. *sericea*	*Lespedeza juncea* subsp. *sericea* population in the Wollongong LGA.
Marsdenia viridiflora subsp. *viridiflora*	*Marsdenia viridiflora* subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith LGAs.
Pomaderris prunifolia (a shrub)	*Pomaderris prunifolia* population in the Parramatta, Auburn, Strathfield and Bankstown LGAs.
Pultenaea villifera	*Pultenaea villifera* population in the Blue Mountains LGA.
Rhizanthella slateri	*Rhizanthella slateri* in the Great Lakes LGA.
Tadgell's Bluebell (*Wahlenbergia multicaulis*)	Tadgell's Bluebell population in the Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield LGAs.
Zieria smithii	Low growing form of *Zieria smithii* population at Diggers Head.
Fauna	
Tusked Frog (*Adelotus brevis*)	Tusked Frog population in the Nandewar and New England Tablelands Bioregions.
White's Skink (*Egernia whitii*)	White's Skink in the Broken Hill Complex Bioregion.
Australian Brush-turkey (*Alectua lathami*)	Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions.
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai LGAs.

Table B-2 (Continued)
Endangered Populations under the *Threatened Species Conservation Act, 1995*

Species	Endangered Populations
Fauna (*Continued*)	
Glossy Black-cockatoo (*Calyptorhynchus lathami*)	Glossy Black-cockatoo, Riverina population.
White-browed Treecreeper (*Climacteris affinis*)	White-browed Treecreeper population in the Carrathool LGA south of the Lachlan River and Griffith LGA.
White-fronted Chat (*Epthianura albifrons*)	White-fronted Chat population in the Sydney Metropolitan Catchment Management Authority area.
Emu (*Dromaius novaehollandiae*)	Emu population in the NSW North Coast Bioregion and Port Stephens LGA.
Little Penguin (*Eudyptula minor*)	Little Penguin population in the Manly Point Area.
Broad-toothed Rat (*Mastacomys fuscus*)	Broad-toothed Rat population at Barrington Tops in the Gloucester, Scone and Dungog LGAs.
Long-nosed Bandicoot (*Perameles nasuta*)	Long-nosed Bandicoot population at North Head.
	Long-nosed Bandicoot in inner west Sydney.
Long-nosed Potoroo (*Potorous tridactylus*)	Long-nosed Potoroo population at Cobki Lakes and Tweed Heads West.
Squirrel Glider (*Petaurus norfolcensis*)	Squirrel Glider population on the Barrenjoey Peninsula, north of Bushrangers Hill.
	Squirrel Glider population in the Wagga Wagga LGA.
Greater Glider (*Petauroides volans)*	Greater Glider population in the Eurobodalla LGA.
Yellow-bellied Glider (*Petaurus australis*)	Yellow-bellied Glider population on the Bago Plateau.
Koala (*Phascolarctos cinereus*)	Koala population in the Hawks Nest and Tea Gardens area.
	Koala population in the Pittwater LGA.
Menippus fugitives (a beetle)	*Menippus fugitivus* population in the Sutherland Shire.

None of the endangered populations in Table B-2 occur within the study area.

Endangered populations listed under the FM Act, namely, Western population of Olive Perchlet (*Ambassis agassizii*), Snowy River population of River Blackfish (*Gadopsis marmoratus*) and Murray-Darling Basin population of Eel Tailed Catfish (*Tandanus tandanus*) are not relevant to the study area.

Given the above, Factor (b) is not applicable to the proposed Modification and is indicated as such in the following Assessments of Significance.

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

This factor provides for consideration of the local occurrence of an ecological community and any modification to the composition of the community (DECC, 2007).

In accordance with the *Threatened Species Assessment Guidelines: The Assessment of Significance* (DECC, 2007), this factor also provides for an assessment of the impact to species components of an ecological community and consideration of their function.

Factor (c) is applicable to the ecological community addressed in Section B2 of this document.

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

This factor has three parts. Part (i) of this factor requires an assessment of the extent of habitat removal or modification as a result of the proposed Modification, Part (ii) of this factor requires an assessment of the likelihood of an area to become fragmented or isolated and Part (iii) of this factor requires an assessment of the importance of the habitat to the long-term survival of the species, population or ecological community. When applying these factors, consideration is given to impacts (e.g. short-term, long-term, direct and indirect) on known and potential habitat.

In accordance with the *Threatened Species Assessment Guidelines: The Assessment of Significance* (DECC, 2007), applying this factor has involved the following steps:

- *An assessment of the area and quality of habitat of the threatened species, population or ecological community that occurs within the locality…*
- *An estimate of the area and quality that the habitat of the study area represents in relation to the area and quality of that habitat within the locality.*
- *An assessment of the role of the habitat to be affected in sustaining habitat connectivity in the locality.*
- *An assessment of the ecological integrity of the habitat to be affected in the study area, in relation to the ecological integrity, tenure and security of the habitat which will remain both in the study area and in the locality.*

Factors such as habitat clearance, fire, damming, road/freeway construction, fences, mining/quarrying, etc. can create a barrier to the dispersal of some species. The type of barrier and the species involved will determine the level of impact on dispersal capability or the degree of isolation.

Factor (d) is applicable to the threatened species and ecological communities presented in Section B2.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Factor (e) considers whether the proposed Modification is likely to affect land that is, or is part of, critical habitat. Table B-3 provides a list of critical habitat currently (June 2010) listed in the Register of Critical Habitat kept by the Director-General of the DECCW and the Register of Critical Habitat kept by the Director-General of the Industry and Investment NSW (I&I NSW) (DECCW, 2010e; I&I NSW, 2010a).

No declared critical habitat is identified within the Gloucester Local Environmental Plan applicable to the proposed Modification. Further no critical habitat listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999* occurs within the vicinity of the study area.

Considering the above, there is no critical habitat within the vicinity of the study area as designated by the Register of Critical Habitat held by the Director-General of the DECCW or the Director-General of the I&I NSW. Therefore Factor (e) is not applicable to the proposed Modification and is indicated as such in the following Assessments of Significance.

Table B-3
Critical Habitat in the Registers of Critical Habitat

Critical Habitat	Declaration Status
DECCW	
Bomaderry zieria within the Bomaderry bushland.	Pending finalisation
Eastern Suburbs Banksia Scrub Endangered Ecological Community.	Preparation of final version of declaration
Gould's Petral (*Pterodroma leucoptera leucoptera*)	Final declaration made November 2006
Wollemia nobilis (the Wollemi Pine).	Final declaration made December 2006
Little penguin population in Sydney's North Harbour.	Final declaration made September 2002
Mitchell's Rainforest Snail in Stotts Island Nature Reserve.	Final declaration made October 2001
I&I NSW	
Grey Nurse Shark Critical Habitat	Final declaration made 2002.

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

The DECCW and Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) internet sites (DECCW, 2010a; DEWHA, 2010) were searched for approved or draft recovery plans and threat abatement plans relevant to the species listed in Table B-2.

In 2004, amendments were made to the TSC Act and FM Act which removes the mandatory requirement for NSW government departments to prepare recovery plans and threat abatement plans, and instead requires the government department to prepare a *Threatened Species Priorities Action Statement* (PAS). From 2007, the DECCW has made the PAS available online. The PAS (DECCW, 2010f) sets out the measures required to promote the recovery of each threatened species, population and ecological community to a position of viability in nature and for managing each key threatening process. Despite the new approach to recovery and threat abatement planning, existing recovery plans and threat abatement plans remain in place.

In applying this Factor (f), consideration was given to measures outlined in the PAS (DECCW, 2010f) as well as existing applicable recovery plans and threat abatement plans. Factor (f) is applicable to the threatened fauna species presented in Section B2.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

There are currently (June 2010) 33 key threatening processes listed under the TSC Act (DECCW, 2010g) and seven listed under the FM Act (I&I NSW, 2010b) (Table B-4).

The applicable threatening processes listed in Table B-4 have been considered in the following assessment for threatened species and ecological communities (Section B2).

Table B-4
Key Threatening Processes under the *Threatened Species Conservation Act, 1995* and *Fisheries Management Act, 1994*

Key Threatening Process	Type of Threat
TSC Act	
Invasion, establishment and spread of Lantana (*Lantana camara*)	Weed
Invasion and establishment of exotic vines and scramblers	Weed
Invasion of native plant communities by *Chrysanthemoides monilifera*	Weed
Invasion of native plant communities by exotic perennial grasses	Weed
Invasion and establishment of Scotch Broom (*Cytisus scoparius*)	Weed
Invasion and establishment of the Cane Toad (*Bufo marinus*)	Pest animal
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)	Pest animal
Competition and habitat degradation by Feral Goats (*Capra hircus*)	Pest animal
Competition from feral honeybees (*Apis mellifera*)	Pest animal
Herbivory and environmental degradation caused by feral deer	Pest animal
Importation of Red Imported Fire Ants (*Solenopsis invicta*)	Pest animal
Introduction of the Large Earth Bumblebee (*Bombus terrestris*)	Pest animal
Invasion of the Yellow Crazy Ant (*Anoplolepis gracilipes*)	Pest animal
Predation by the Feral Cat (*Felis catus*)	Pest animal
Predation by the European Red Fox (*Vulpes vulpes*)	Pest animal
Predation by the Plague Minnow (*Gambusia holbrooki*)	Pest animal
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island	Pest animal
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	Pest animal
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Habitat loss/change
Bushrock removal	Habitat loss/change
Loss of hollow-bearing trees	Habitat loss/change
Clearing of native vegetation	Habitat loss/change
Alteration of habitat following subsidence due to longwall mining	Habitat loss/change
High frequency fire resulting in the disruption of lifecycle processes in plants and animals and loss of vegetation structure and composition	Habitat loss/change
Anthropogenic climate change	Habitat loss/change
Loss and/or degradation of sites used for hill-topping by butterflies	Habitat loss/change
Removal of dead wood and dead trees	Habitat loss/change
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Habitat loss/change
Infection by Psittacine Circoviral (beak and feather) disease affecting endangered psittacine species and populations	Disease
Infection of frogs by amphibian chytrid causing the disease Chytridiomycosis	Disease
Infection of native plants by *Phytophthora cinnamomi*	Disease
Death or injury to marine species following capture in shark control programs on ocean beaches	Other
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	Other
FM Act	
Degradation of native riparian vegetation along NSW water courses	Habitat loss/change
Hook and line fishing in areas important for the survival of threatened fish species	Other
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Habitat loss/change
Introduction of fish to waters within a river catchment outside their natural range	Pest animal
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Pest animal
Removal of large woody debris from NSW rivers and streams	Habitat loss/change
The current shark meshing programme in NSW waters	Other

B2 ASSESSMENTS OF SIGNIFICANCE

B2.1 GREY-CROWNED BABBLER (EASTERN SUBSPECIES) (*POMATOSTOMUS TEMPORALIS TEMPORALIS*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

In NSW, the Grey-crowned Babbler (eastern subspecies) occurs on the western slopes of the Great Dividing Range, the western plains and woodlands in the Hunter Valley and in several locations on the north coast of NSW (DECCW, 2010a).

The Grey-crowned Babbler (eastern subspecies) inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains (DECCW, 2010a). This species lives and breeds in a co-ordinated communal group which may include up to 12 individuals (DECCW, 2010a). These extended family parties are essential for both the co-operative feeding of young and predator avoidance (King, 1980 in Garnett and Crowley, 2000).

The Grey-crowned Babbler (eastern subspecies) typically breeds between July and February (DECCW, 2010a). Conspicuous, dome-shaped nests are constructed from sticks and are maintained year round and used for roosting at night (DECCW, 2010a). Nests used for breeding have been found to be used afterwards as roosts, while some nests have been found to be used for roosting only (Dow and King, 1984).

The Grey-crowned Babbler (eastern subspecies) feeds on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, where they dig and probe amongst leaf litter and tussock grasses (NSW Scientific Committee, 2001; DECCW, 2010a). Populations of the Grey-crowned Babbler (eastern subspecies) are nomadic ground foragers (Flegg, 2002).

Threats relevant to this species includes (DECCW, 2010a):

- *Clearing of woodland remnants.*
- *Heavy grazing and removal of coarse, woody debris within woodland remnants.*
- *Nest predation by species such as ravens and butcherbirds may be an issue in some regions where populations are small and fragmented.*

The Cabbage Gum Woodland in the proposed BRNOC pit cutback area provides potential habitat for the Grey-crowned Babbler (Figure B-2). Disused nests of the Grey-crowned Babbler were recorded amongst paperbark trees to the west of the proposed BRNOC pit cutback area (EcoBiological, 2010) (Figure B-2). Various sightings of the Grey-crowned Babbler have been made during recent fauna surveys (Figure B-2) (EcoBiological, 2010; EcoBiological, in prep), indicating that a viable colony of Grey-crowned Babbler occurs in the surrounds. The Grey-crowned Babbler generally lives in co-ordinated communal groups which may include up to 12 individuals (DECCW, 2010a).

There is reported to be a single Grey-crowned Babbler population in the Gloucester Shire comprising of approximately 20 family groups (Gloucester Shire Council [GSC], 2005). In the shire, the Grey-crowned Babblers inhabit an area from the Gloucester township to the shire boundary 20 km south (GSC, 2005). The distribution of this species in the Gloucester Shire appears to be restricted to the valley (GSC, 2005).

Sightings of the species are often recorded in open woodland areas, with fallen dead wood, bark and leaf litter on the ground, native tussock grasses and shrubs, and canopy trees, particularly Broad-leaved White Mahogany (*Eucalyptus carnea*), Grey Box (*E. molluccana*), White Stringybark (*E. globoidea*) and Narrow-leaved Stringybark (*E. eugenoides*) (GSC, 2005).

The Modification would involve the removal of approximately 1.8 hectares (ha) of Cabbage Gum Woodland habitat which represents potential habitat for the Grey-crowned Babbler (eastern subspecies). This species may use the potential habitat for breeding, roosting and foraging.

The Modification disturbance area does not represent a limit of the known distribution of the Grey-crowned Babbler. As stated previously, the Grey-crowned Babbler population in the Gloucester Shire is thought to span an area between the Gloucester township to the shire boundary 20 km south (GSC, 2005). The Grey-crowned Babbler has been recorded in multiple locations near the SCM and BRNOC (Figure B-2) and these records may represent one or more Grey-crowned Babbler family group(s) persisting in the area.

The maintenance of family group(s) plays an important role in maintaining the local population. The proposed Modification is highly unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, given the:

- relatively small area of potential habitat proposed to be removed (approximately 1.8 ha) and the Modification area is a linear strip within 200 m of the existing open pit and not likely to isolate remaining habitat areas (Figure B-2);
- Grey-crowned Babbler has not been recorded utilising habitat in the Modification disturbance area; and
- Grey-crowned Babbler has been recorded in multiple locations in the wider surrounds (Figure B-2).

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as pre-clearance surveys, the Threatened Species Management Protocol [TSMP] and revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

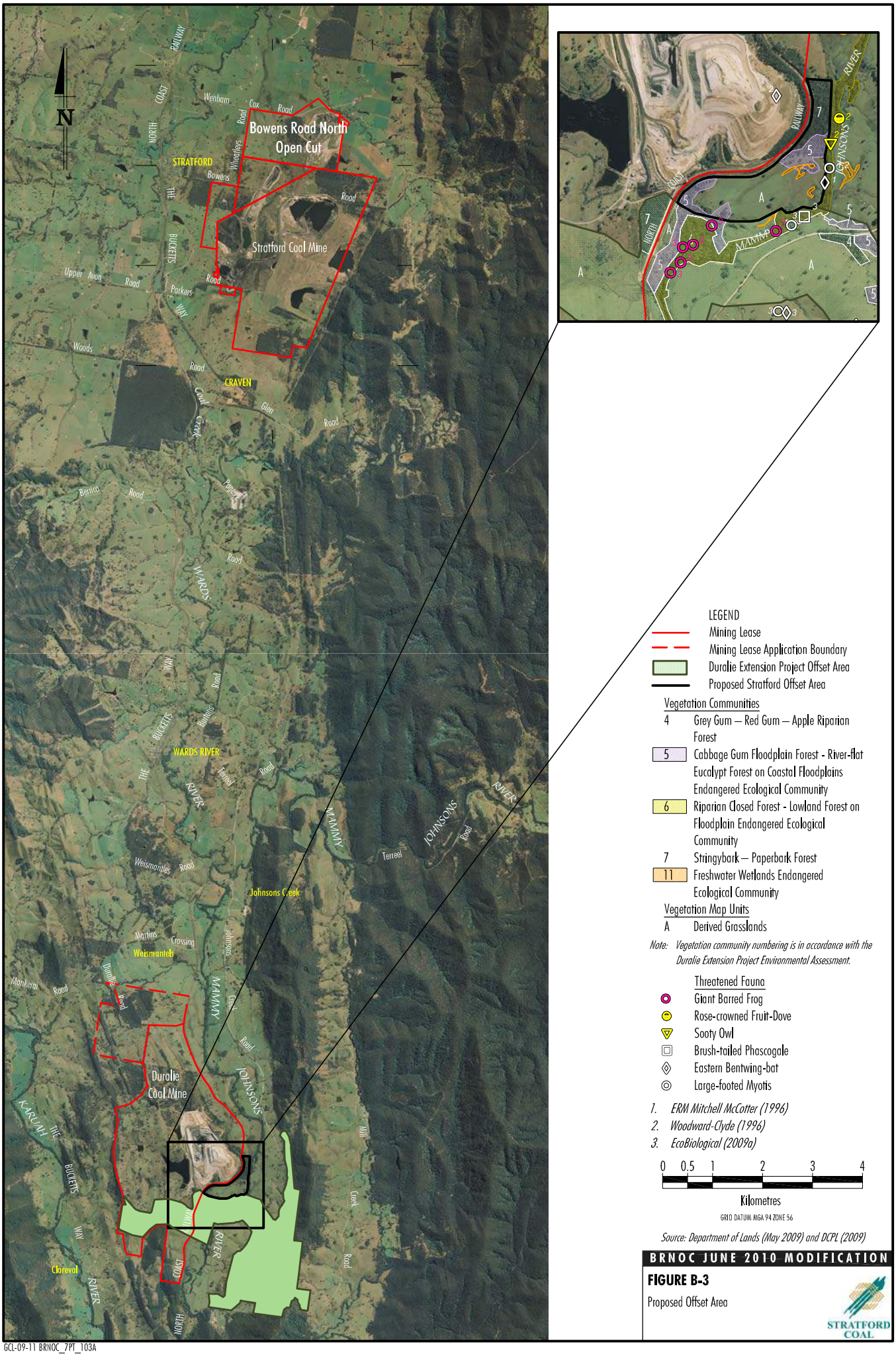
Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).



BRNOC JUNE 2010 MODIFICATION

FIGURE B-3

Proposed Offset Area

STRATFORD COAL

GCL-09-11 BRNOC_7PT_103A

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The habitat requirements for the Grey-crowned Babbler (eastern subspecies) are described above. As previously established, potential habitat for the Grey-crowned Babbler occurs within the proposed Modification area and surrounds.

A relatively small area of habitat is proposed to be removed (approximately 1.8 ha). The Modification area is a linear strip within 200 m of the existing open pit, as such the Modification would not result in habitat fragmentation or adverse effects to existing connectivity with other habitat areas in the landscape. The Grey-crowned Babbler (eastern subspecies) are nomadic ground foragers (Flegg, 2002). However, these birds are reluctant to traverse tracts of cleared land (NSW Scientific Committee, 2001a).

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

The Modification would not result in the fragmentation or isolation of habitat for the Grey-crowned Babbler (eastern subspecies). The proposed habitat removal is highly unlikely to cause the loss of the Grey-crowned Babbler in the local area given the species has been recorded in multiple locations in the wider surrounds (Figure B-2).

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Grey-crowned Babbler (eastern subspecies) and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the clearing of native vegetation which is a key threatening process in Schedule 3 of the TSC Act relevant to the Grey-crowned Babbler (eastern subspecies).

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Grey-crowned Babbler (eastern subspecies) is not likely.

B2.2 VARIED SITTELLA (*DAPHOENOSITTA CHRYSOPTERA*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The Varied Sittella (*Daphoenositta chrysoptera*) has recently been listed as Vulnerable under the TSC Act.

The Varied Sittella has a wide distribution across every mainland state and territory in Australia (Simpson and Day, 1999). This species inhabits most habitats, such as eucalypt forests and woodlands, mallee and Acacia woodland, with the exception of treeless deserts and open grasslands (Debus and Soderquist, 2008).

This species feeds on arthropods which are found in tree crevices and builds nests made of plant fibres and cobwebs in tree canopies (DECCW, 2010c). Noske (1998) observed nests mostly built on dead branches.

The Varied Sittella is mostly sedentary, and cleared agricultural land represents a potential barrier to this species movement (DECCW, 2010c).

The Varied Sittella has been recorded approximately 1 to 2 km from the Modification disturbance area (EcoBiological, in prep).

The proposed Modification is highly unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, given the species has not been recorded in the habitat patch associated with the Modification area, despite surveys (EcoBiological, 2010) and the cleared agricultural land between the Modification area and the habitat in which it was recorded, may represent a potential barrier to this species (after DECCW, 2010c).

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as pre-clearance surveys, the TSMP and revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The habitat requirements for the Varied Sittella are described above. No known habitat utilised by the Varied Sittella would be removed for the Modification.

Although this species has been recorded approximately 1 to 2 km from the Modification disturbance area (EcoBiological, in prep), the potential habitat within the Modification has poor connectivity to other habitat areas in the landscape (Figure B-2). As previously stated, the Varied Sittella is mostly sedentary, and cleared agricultural land represents a potential barrier to this species movement (DECCW, 2010c).

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

The Modification would not result in the fragmentation or isolation of habitat for the Varied Sittella.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Varied Siittella and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the following key threatening processes relevant to the Varied Sitella; the clearing of native vegetation, removal of dead wood and dead trees as well as the loss of hollow bearing trees (DECCW, 2010c).

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Varied Sittella is not likely.

B2.3 EASTERN BENTWING-BAT (*MINIOPTERUS SCHREIBERSII OCENENSIS*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The Eastern Bentwing-bat is found along the east coast of NSW (DECCW, 2010a). Caves are the primary roosting habitat for the Eastern Bentwing-bat, although the species may also use derelict mines, stormwater tunnels, buildings and other man-man structures (DECCW, 2010a).

The Eastern Bentwing-bat forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young (DECCW, 2010a). Maternity caves have specific temperature and humidity regimes. At other times throughout the year, Eastern Bentwing-bat populations disperse within approximately 300 km of maternity caves (DECCW, 2010a). Breeding/roosting colonies range in size from approximately 100 to 150,000 individuals (DECCW, 2010a). The species hunts in forested areas, catching moths and other flying insects above the tree tops.

Threats relevant to this species include (DECCW, 2010a):

- *Damage to or disturbance of roosting caves, particularly during winter or breeding.*
- *Loss of foraging habitat.*
- *Application of pesticides in or adjacent to foraging areas.*
- *Predation by feral cats and foxes.*

Echolocation calls of the Eastern Bentwing-bat were recorded at the northern end of the Stringybark Forest remnant, to the north of the proposed BRNOC pit cutback area (Figure B-2) (EcoBiological, 2010). The portion of the remnant proposed to be disturbed for the Modification may provide some foraging habitat for this species as it is known to hunt in forested areas, catching moths and other flying insects (after DECCW, 2010a).

No suitable roosting habitat for this species occurs in the Modification area as this species roosts in caves (or possibly derelict mines, stormwater tunnels, buildings and other man-man structures (after DECCW, 2010a). This species has been more widely recorded in the surrounds (Figure B-2; EcoBiological, in prep).

The Modification would involve the removal of approximately 4 ha of potential foraging habitat for the Eastern Bentwing-bat. The proposed habitat removal is highly unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction given:

- Roosting habitat (i.e. caves) would not be impacted (EcoBiological, 2010).
- The relatively small area of potential habitat proposed to be removed (approximately 4 ha) and the Modification area is a linear strip within 200 m of the existing open pit and not likely to isolate remaining habitat areas (Figure B-2);
- The Eastern Bentwing-bat has not been recorded utilising habitat in the Modification disturbance area.
- The Eastern Bentwing-bat has been recorded in multiple locations in the wider surrounds (Figure B-2).
- Forests in the wider surrounds provide potential foraging habitat for the Eastern Bentwing-bat.

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The Modification would result in the removal of approximately 4 ha of potential foraging habitat for the Eastern Bentwing-bat. No roosting habitat for the species would be impacted (after EcoBiological, 2010).

The Modification would not fragment or isolate habitat for the Eastern Bentwing-bat due to the species mobility and wider occurrence of potential habitat in the surrounds.

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

Given the above, the Eastern Bentwing-bat in the locality would not be dependant on the potential foraging habitat which would be removed for the Modification. The Eastern Bentwing-bat has been recorded in multiple locations in the wider surrounds (EcoBiological, in prep).

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Eastern Bentwing-bat and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the clearing of native vegetation which is a key threatening process in Schedule 3 of the TSC Act relevant to the Eastern Bentwing-bat.

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Eastern Bentwing-bat is not likely.

B2.4 EASTERN FREETAIL-BAT (*MORMOPTERUS NORFOLKENSIS*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The Eastern Freetail-bat (*Mormopterus norfolkensis*) is generally found in dry sclerophyll forest and woodland east of the Great Dividing Range (DECCW, 2010a). This species roosts mainly in tree hollows, but will also roost under bark or in man-made structures (DECCW, 2010a). The Eastern Freetail-bat is solitary and insectivorous (DECCW, 2010a).

Threats relevant to this species includes (DECCW, 2010a):

- *Loss of hollow-bearing trees.*
- *Loss of foraging habitat.*
- *Application of pesticides in or adjacent to foraging areas.*

The habitat in the Modification disturbance area provides potential foraging and roosting resources for the Eastern Freetail-bat, although the species has not been recorded utilising habitat in the Modification disturbance area.

It is highly unlikely that the proposed Modification to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, given there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat.

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as pre-clearance surveys, the TSMP and revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The Modification would result in the removal of approximately 4 ha of potential habitat for the Eastern Freetail-bat. As stated above, there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

The Modification would not fragment or isolate habitat for the Eastern Freetail-bat due to the species mobility and wider occurrence of potential habitat in the surrounds.

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

Given the above, the Eastern Freetail-bat in the locality would not be dependant on the potential habitat which would be removed for the Modification.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Eastern Freetail-bat and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the following key threatening processes relevant to the Eastern Freetail-bat; the clearing of native vegetation, removal of dead wood and dead trees as well as the loss of hollow bearing trees.

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Eastern Freetail-bat is not likely.

As stated above, there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

B2.5 LITTLE BENTWING-BAT (*MINIOPTERUS AUSTRALIS*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The Little Bentwing-bat (*Miniopterus australis*) is distributed in north-eastern NSW and eastern QLD (NPWS, 2000).

The species inhabits moist eucalypt forest, rainforest or dense coastal banksia scrub. The Little Bentwing-bat roosts in caves, tunnels and sometimes tree hollows during the day, and at night forages for small insects beneath the canopy of densely vegetated habitats (NPWS, 2000).

This species frequently shares roosting sites with the Eastern Bentwing-bat and, in winter, the two species may form mixed clusters (NPWS, 2000).

Threats relevant to this species includes (DECCW, 2010a):

- *Disturbance of colonies, especially in nursery or hibernating caves may be catastrophic.*
- *Destruction of caves that provide seasonal or potential roosting sites.*
- *Changes to habitat, especially surrounding maternity caves.*
- *Use of pesticides.*

The Modification would involve the removal of approximately 4 ha of potential foraging habitat for the Little Bentwing-bat.

The proposed habitat removal is highly unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, given:

- Primary roosting habitat (i.e. caves) would not be impacted (EcoBiological, 2010).

- The relatively small area of potential habitat proposed to be removed (approximately 4 ha) and the Modification area is a linear strip within 200 m of the existing open pit and not likely to isolate remaining habitat areas (Figure B-2);
- The Little Bentwing-bat has not been recorded utilising habitat in the Modification disturbance area.
- The Little Bentwing-bat has been recorded in multiple locations in the wider surrounds, suggesting forests in the wider surrounds provide habitat for the Little Bentwing-bat (Figure B-2).

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The Modification would result in the removal of approximately 4 ha of potential foraging habitat for the Little Bentwing-bat. No primary roosting habitat for the species would be impacted (i.e. caves) (after EcoBiological, 2010). There are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

The Modification would not fragment or isolate habitat for the Little Bentwing-bat due to the species mobility and wider occurrence of potential habitat in the surrounds.

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

Given the above, the Little Bentwing-bat in the locality would not be dependant on the potential habitat which would be removed for the Modification. Further, the Little Bentwing-bat has been recorded in multiple locations in the wider surrounds (EcoBiological, in prep).

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Little Bentwing-bat and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the following key threatening processes relevant to the Little Bentwing-bat; the clearing of native vegetation, removal of dead wood and dead trees as well as the loss of hollow bearing trees.

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Little Bentwing-bat is not likely.

As stated above, there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

B2.6 YELLOW-BELLIED SHEATHTAIL BAT (*SACCOLAIMUS FLAVIVENTRIS*)

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

The Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) can be found in a wide range of habitats, including wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grasslands and desert (Churchill, 1998).

The Yellow-bellied Sheathtail-bat roosts in tree hollows. The species has been found to utilise multiple roost sites and may roost singly or in groups of up to six (DECCW, 2010a). It breeds from December to mid-March, with a single offspring born (DECCW, 2010a).

The Yellow-bellied Sheathtail-bat is insectivorous and forages above the tree canopy. A variety of prey items are eaten including long-horned grasshoppers, shield bugs and flying ants, while beetles comprise up to 90% of this species' diet (Churchill, 1998).

The seasonal movements of the Yellow-bellied Sheathtail-bat are unknown, although there is speculation about their migration to southern Australia in late summer and autumn.

The threats relevant to the Yellow-bellied Sheathtail-bat include (DEC, 2006a):

- *"Disturbance to roosting and summer breeding sites.*
- *Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.*
- *Loss of hollow-bearing trees; clearing and fragmentation of forest and woodland habitat.*
- *Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores."*

The Yellow-bellied Sheathtail-bat has a widespread distribution across eastern and northern Australia (Churchill, 1998; Strahan, 2004).

The habitat in the Modification disturbance area provides potential foraging and roosting resources for the Yellow-bellied Sheathtail-bat, although the species has not been recorded utilising habitat in the Modification disturbance area.

It is highly unlikely that the proposed Modification to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction, given there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat.

Impact mitigation measures which are currently implemented at the BRNOC and are relevant to this species (such as pre-clearance surveys, the TSMP and revegetation of post mine landforms) would be continued as part of the Modification.

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(c).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The Modification would result in the removal of approximately 4 ha of potential habitat for the Yellow-bellied Sheathtail-bat. As stated above, there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

The Modification would not fragment or isolate habitat for the Yellow-bellied Sheathtail-bat due to the species mobility and wider occurrence of potential habitat in the surrounds.

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

Rehabilitation and revegetation of post-mine landforms would be undertaken in the Modification disturbance area as described in the *Bowens Road North Open Cut June 2010 Modification Statement of Environmental Effects* (SCPL, 2010)

Given the above, the Yellow-bellied Sheathtail-bat in the locality would not be dependant on the potential habitat which would be removed for the Modification.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the Yellow-bellied Sheathtail-bat and no NSW threat abatement plan is applicable to the recognised threats of this species.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed Modification would involve the following key threatening processes relevant to the Yellow-bellied Sheathtail-bat; the clearing of native vegetation, removal of dead wood and dead trees as well as the loss of hollow bearing trees.

Although the proposed Modification would involve disturbance to native vegetation, the small scale of native vegetation disturbance associated with the proposed Modification is such that a significant impact on the Yellow-bellied Sheathtail-bat is not likely.

As stated above, there are only a small number of hollow-bearing trees (i.e. less than five) in the Modification disturbance area (EcoBiological, 2010) that provide potential roosting habitat for this species.

B2.7 RIVER-FLAT EUCALYPT FOREST

(a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(a).

(b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

Not applicable. Refer to Section B1.4(b).

(c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(i) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community (River-Flat Eucalypt Forest EEC) is found on the river flats of the coastal floodplains of NSW (DECCW, 2010a). The community occurs on silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains (NSW Scientific Committee, 2008b). While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include: Forest Red Gum (*Eucalyptus tereticornis*), Cabbage Gum (*E. amplifolia*), Rough-barked Apple (*Angophora floribunda*) and Broad-leaved Apple (*A. subvelutina*).

The River-Flat Eucalypt Forest EEC generally occurs below 50 m elevation, but may occur on localised river flats up to 250 m above sea level in the NSW North Coast, Sydney Basin and South East Corner bioregions. The structure of the community may vary from tall open forests to woodlands and generally has a tall open tree layer of eucalypts, which may exceed 40 m in height, although partial clearing may have reduced the canopy to scattered trees (NSW Scientific Committee, 2008b; DECCW, 2009a). These forests and woodlands typically form mosaics with other floodplain forest communities and treeless wetlands, and often they fringe treeless floodplain lagoons or wetlands with semi-permanent standing water (e.g. Goodrick, 1970).

In NSW, major occurrences of the River-Flat Eucalypt Forest EEC include: approximately 2,000 ha in the lower Hunter region; less than 10,000 ha on the NSW south coast from Sydney to Moruya, and less than 1,000 ha in the Eden region (DECCW, 2010a). The area of River-Flat Eucalypt Forest EEC proposed to be removed (approximately 1.8 ha), albeit relatively small, has inherent conservation value.

The Modification is not likely to place the local occurrence of the community at risk of extinction, given the relatively small area to be removed and the wider occurrence of the community in the surrounds. EcoBiological (in prep) report that they have mapped approximately 115 ha of River-Flat Eucalypt Forest EEC on SCPL-owned lands, within 6 km of the Modification area.

SCPL propose an offset area for the Modification which is located adjoining Duralie Coal Pty Ltd's existing proposed offset area, offered as part of the Duralie Extension Project EA (Figure B-3). Two offset proposals together would have a number of significant biodiversity advantages which would enhance the community. The Modification would also result in the conservation and management of approximately 6 ha of River-Flat Eucalypt Forest EEC in the proposed offset area (Figure B-3).

(d) In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

(i) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Approximately 1.8 ha of River-Flat Eucalypt Forest EEC would be removed for the Modification. The Modification area is a linear strip within 200 m of the existing open pit, as such the Modification would not result in habitat fragmentation or adverse effects to existing connectivity with other habitat areas in the landscape (Figure B-2).

The Modification disturbance area is an extension of the approved BRNOC pit. The potential indirect impacts from the Modification would be the same as those from the existing BRNOC, such as noise, dust and lighting.

The proposed removal of approximately 1.8 ha of River-Flat Eucalypt Forest EEC is not likely to threaten the viability of the community in the locality. As previously stated, EcoBiological (in prep) has reported approximately 115 ha of River-Flat Eucalypt Forest EEC on SCPL-owned lands within 6 km of the Modification area.

(e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Not applicable. Refer to Section B1.4(e).

(f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

No NSW recovery plan is available for the River-Flat Eucalypt Forest EEC.

(g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Land clearance for the proposed Modification would involve threatening processes in Schedule 3 of the TSC Act, such as clearing of native vegetation, removal of dead wood and dead trees as well as the removal of hollow bearing trees. The hollow-bearing trees in the Modification disturbance area are limited to less than five trees.

As previously stated, the Modification would also result in the conservation and management of approximately 6 ha of River-Flat Eucalypt Forest EEC in the proposed offset area (Figure B-3).

B3 CONCLUSION

The proposed Modification is unlikely to have a significant effect on any threatened species, populations, ecological communities or their habitats, considering aspects such as the extent of potential habitat for the species, the small scale of the proposed Modification and the already fragmented nature of the habitat which would be removed.

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APPENDIX C

NOISE REVIEW

HEGGIES

16 June 2010

10-3140 June 2010 Modification 20100616

Stratford Coal Pty Ltd
PO Box 168
GLOUCESTER NSW 2422

Attention: Mr Tony Dwyer

Dear Tony

Bowens Road North - June 2010 Modification

We understand that Stratford Coal Pty Ltd (SCPL) intends to modify the Bowens Road North (BRN) Development Consent (DA 39-02-01) (the Modification) to include the following:

- a minor cutback of the BRN pit, along with an increase in annual ROM coal production from 0.9 to 1 Mtpa;
- additional run-of-mine (ROM) coal of approximately 1.4 million tonnes (Mt);
- additional waste rock of approximately 3.5 Million bank cubic metres (Mbcm); and
- extension of the life of mine to approximately 2013.

Heggies has reviewed the potential impacts of the Modification on the existing noise emissions associated with the BRN.

The Modification to the BRN open cut would result in a minor change to the footprint of the BRN (i.e. a minor cutback adjoining the existing open pit). This change to the footprint would not result in significant changes in the distance of BRN noise sources to privately-owned receivers. In addition, the existing mine fleet would remain generally unchanged, therefore the sound power levels associated with the Modification would be similar to the existing BRN noise levels.

Given the above, it is considered that there would be minimal change to the existing noise environment as a result of the Modification.

Please do not hesitate to contact the undersigned should you have any queries.

Yours faithfully

Glenn Thomas

GLENN THOMAS
Technical Director

HEGGIES PTY LTD
Part of the International SLR Group

2 Lincoln Street Lane Cove NSW 2066 Australia
PO Box 176 Lane Cove NSW 1595 Australia
Telephone 61 2 9427 8100 Facsimile 61 2 9427 8200
Email sydney@heggies.com Website www.heggies.com ABN 29 001 584 612

APPENDIX D

AIR QUALITY REVIEW

25 June 2010

Tony Dwyer
Manager – Approvals and Environment
Stratford Coal Pty Ltd
PO Box 168
GLOUCESTER NSW 2422

Dear Tony,

BOWENS ROAD NORTH – MAY 2010 MODIFICATION

We understand that Stratford Coal Pty Ltd (SCPL) intends to modify the Bowens Road North Open Cut (BRNOC) Development Consent (DA 39-02-01) to include the following:

- a minor cutback of the BRNOC pit, along with an increase in annual ROM coal production from 0.9 to 1 million tonnes per annum (Mtpa);
- additional run-of-mine (ROM) coal of approximately 1.4 million tonnes;
- additional waste rock of approximately 3.5 million bank cubic metres; and
- continuation of mining operations until mid-2013.

PAEHolmes has reviewed the BRNOC air quality monitoring data and compared these data against the cumulative predictive modelling in *Air Quality Impact Assessment: Bowens Road North Open Cut – Stratford Coal Mine, Stratford NSW* (**Holmes Air Sciences**, **2001**). The review found that the current BRNOC and the nearby Stratford Coal Mine (SCM) operations are complying with ambient air quality goals for dust and particulate matter and when compared to the modelling predictions, the data generally correlates well.

The proposed modification to the BRNOC would result in a minor change to the footprint of the BRNOC and a minor increase in the annual ROM coal production (from 0.9 to 1.0 Mtpa). The proposed maximum ROM coal and waste rock annual production rates (and therefore cumulative dust emissions) from the BRNOC and the nearby SCM are significantly less than the rates which formed the basis for the **HAS** (**2001**) air quality assessment. This is because the significantly higher rates associates with operation of the SCM Main Pit were included within the **HAS** (**2001**) assessment. The **HAS** (**2001**) assessment concluded that no residences were predicted to experience annual average dust deposition or TSP levels above the applicable assessment criteria and that compliance with the short-term PM_{10} criterion of 50 µg/m^3 would be achieved with the implementation of air quality management measures (**HAS**, **2001**).

PAEHolmes

SYDNEY

Suite 2B, 14 Glen St
Eastwood NSW 2122

Ph: + 61 2 9874 8644
Fax: + 61 2 9874 8904

info@paeholmes.com
www.paeholmes.com

BRISBANE

GOLD COAST

TOOWOOMBA

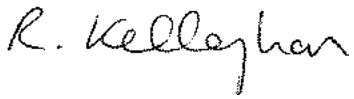
A PEL COMPANY

Queensland Environment Pty Ltd
Trading as PAEHolmes
ABN: 86 127 101 642

Based on the above and monitoring data collected to date, cumulative dust emissions and associated potential impacts would be significantly less than what was originally predicted by **HAS** (**2001**). It is therefore considered that the BRNOC would continue to comply with ambient air quality goals and the proposed modification is of minimal air quality impact.

Please do not hesitate to contact the undersigned should you have any queries.

Regards,



RONAN KELLAGHAN
SENIOR ENVIRONMENTAL CONSULTANT