



global environmental solutions

Northern Coal Logistics Project  
Decommissioning and Rehabilitation Strategy

Report Number 633.CCC13.01600

13<sup>th</sup> March 2014

Centennial Coal

Version: Final

# Northern Coal Logistics Project

## Decommissioning and Rehabilitation Strategy

PREPARED BY:

SLR Consulting Australia Pty Ltd  
ABN 29 001 584 612  
10 Kings Road New Lambton NSW 2305 Australia

(PO Box 447 New Lambton NSW 2305 Australia)  
T: 61 2 4037 3200 F: 61 2 4037 3201  
E: newcastleau@slrconsulting.com www.slrconsulting.com

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Centennial Coal.  
No warranties or guarantees are expressed or should be inferred by any third parties.  
This report may not be relied upon by other parties without written consent from SLR Consulting.

SLR Consulting disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

### DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
633.CCC13.01600	Draft 1	24 June 2013	Joni Woollard	Andrew Hutton	Andrew Hutton
	Draft 2	27 February 2014	Loren Yallop	Andrew Hutton	Andrew Hutton
	Draft 3	10 March 2014	Andrew Hutton	Eryn Bath	Andrew Hutton
	Final	13 March 2014	Andrew Hutton	Eryn Bath	Andrew Hutton

---

## EXECUTIVE SUMMARY

Northern Coal Services Pty Limited commissioned SLR Consulting Australia Pty Ltd (SLR) to prepare a Decommissioning and Rehabilitation Strategy for the proposed Northern Coal Logistics Project (the Project). This Rehabilitation and Decommissioning Strategy has been developed as a stand-alone report to form part of the Environmental Impact Statement for the Project.

The Project comprises both a continuation of existing operations and an upgrade to the surface coal handling and preparation infrastructure at the Newstan Colliery Surface Site and Cooranbong Entry Site, along with the existing private haul roads and rail loading infrastructure. These facilities are integral to the on-going handling, processing and transport of coal from the underground workings of Newstan Colliery and Mandalong Mine (including the proposed Newstan Colliery Extension of Mining Project and Mandalong Southern Extension Project) into domestic and export markets.

In order to effectively address the complexity of various land uses within the Project Application Area it has been divided into three management 'domains'. The domains identified within this Strategy are defined as:

- Domain 1: Mining Infrastructure Areas;
  - Newstan Colliery Surface Site; and
  - Cooranbong Entry Site;
- Domain 2: Tailings and Rejects Storage Facilities;
  - Northern Rejects Emplacement Area and Southern Rejects Emplacement Area at the Newstan Colliery Surface Site ; and
  - Hawkmount Quarry;
- Domain 3: Other Lands (including Haul Roads).

For each of the above domains a proposed post-mining land use has been nominated in order to establish the base assumptions used in the development of the decommissioning and rehabilitation strategy. Namely, the proposed post-mining land use for Domain 1 is industrial use. Domain 2 is proposed to be returned to a combination of native bushland and mixed native grasses. It is considered likely that post-mining use of the haul roads within Domain 3 will be used by nearby industry and/or converted to public roads. In the event that a post-mining use is not identified and agreed to with the relevant stakeholders, the haul roads will be rehabilitated to native bushland.

Decommissioning and rehabilitation activities for each domain are outlined in this Strategy, including the proposed removal of infrastructure such as services, equipment, buildings and roads. Conceptual rehabilitation success criteria have been developed to provide long-term performance goals for rehabilitation activities. As the Project is within the planning phase, the rehabilitation success criteria are considered conceptual. Final rehabilitation success criteria will be developed for the Project during the detailed closure planning.

An indicative closure timeline has also been developed for the Project. The key rehabilitation and decommissioning activities include closure planning, decommissioning and rehabilitation, maintenance and monitoring, relinquishment and post relinquishment activities.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>III</b>
<b>1.0 INTRODUCTION</b> .....	<b>1</b>
1.1 Overview .....	1
1.2 Background.....	1
1.3 Objectives of the Decommissioning and Rehabilitation Strategy .....	3
1.4 Relationship to the Mining Operations Plan.....	4
<b>2.0 THE PROJECT</b> .....	<b>5</b>
2.1 Project Application Area.....	5
2.2 Disturbance Areas .....	7
<b>3.0 LEGISLATION AND REGULATORY REQUIREMENTS</b> .....	<b>8</b>
3.1 Legislation .....	8
3.1.1 .... <i>Mining Act 1992</i> .....	8
3.1.2 .... <i>Environmental Planning and Assessment Act 1979</i> .....	8
3.1.3 .... <i>Protection of the Environment Operations Act 1997</i> .....	8
3.2 Environmental Planning Instruments .....	9
3.2.1 .... <i>State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007</i> .....	9
3.2.2 .... <i>Lake Macquarie Local Environmental Plan 2004</i> .....	9
3.2.3 .... <i>Draft Lake Macquarie Local Environmental Plan 2013</i> .....	10
3.3 Policies and Guidelines.....	11
3.3.1 .... <i>Strategic Framework for Mine Closure</i> .....	11
3.3.2 .... <i>A Guide to Leading Practise Sustainable Development in Mining</i> .....	11
3.3.3 .... <i>Guidance Paper - Financial Assurance for Mine Closure and Reclamation</i> .....	12
3.3.4 .... <i>NSW Department of Resources and Energy Guidelines</i> .....	12
3.3.5 .... <i>Centennial Coal Environment and Community Policy</i> .....	12
3.3.6 .... <i>Lower Hunter Regional Strategy</i> .....	13
3.3.7 .... <i>Lifestyle 2030 Strategy</i> .....	13
3.4 Director-General's Requirements .....	14
3.4.1 .... <i>Mining Lease Requirements for Rehabilitation</i> .....	14
<b>4.0 THE GENERAL ENVIRONMENT</b> .....	<b>19</b>
4.1 Existing Land Use .....	19
4.2 Soil Landscape Units .....	19
4.3 Ecology .....	20
4.4 Topography and Hydrology.....	20
4.5 Land and Soil Capability .....	21
4.6 Agricultural Suitability Assessment .....	22
4.7 Biophysical Strategic Agricultural Land .....	23
<b>5.0 ASSIGNING REHABILITATION AND CLOSURE DOMAINS</b> .....	<b>24</b>

5.1	Primary Domains.....	24
5.1.1	....Domain 1: Mining Infrastructure Areas .....	24
5.1.2	....Domain 2: Tailings and Reject Storage Facilities .....	28
5.1.3	....Domain 3: Other Land (including Haul Roads) .....	28
5.2	Secondary Domains.....	29
5.3	Domain Rehabilitation Objectives .....	29
<b>6.0</b>	<b>PRELIMINARY LAND USE OPTIONS ANALYSIS .....</b>	<b>31</b>
6.1	Proposed Post Disturbance Land Use.....	31
6.1.1	....Domain 1: Newstan Colliery Surface Site and Cooranbong Entry Site .....	31
6.2	Centennial Strategic Land Assessment.....	32
6.3	Stakeholder Engagement .....	32
<b>7.0</b>	<b>RISK MANAGEMENT.....</b>	<b>34</b>
7.1	Environmental Risk Assessment .....	34
7.2	Environmental Risk Management .....	34
<b>8.0</b>	<b>DECOMMISSIONING AND REHABILITATION IMPLEMENTATION .....</b>	<b>35</b>
8.1	Decommissioning Phase .....	35
8.1.1	....Domain 1: Mining Infrastructure .....	35
8.1.2	....Domain 2: Tailings and Rejects Storage Facilities .....	40
8.1.3	....Domain 3: Other lands (including Haul Roads).....	40
8.2	Landform Establishment .....	41
8.2.1	....Domain 1: Mining Infrastructure.....	41
8.2.2	....Domain 2: Tailings and Rejects Storage Facilities .....	41
8.2.3	....Domain 3: Other lands (including Haul Roads).....	43
8.3	Growth Medium Development (all Domains) .....	43
8.3.1	....Progressive Rehabilitation .....	43
8.3.2	....Topsoil Stripping .....	43
8.3.3	....Topdressing Management .....	44
8.3.4	....Soil Re-Spreading and Seedbed Preparation.....	44
8.3.5	....Erosion and Sediment Control .....	45
8.4	Ecosystem Establishment (all Domains) .....	45
8.4.1	....Revegetation Implementation Program .....	45
8.4.2	....Species to be used for Revegetation .....	45
8.4.3	....Feral Animal and Weed Management .....	45
8.5	Ecosystem Development .....	46
8.5.1	....Rehabilitation Monitoring and Maintenance.....	46
<b>9.0</b>	<b>CONCEPTUAL REHABILITATION SUCCESS CRITERIA .....</b>	<b>47</b>
<b>10.0</b>	<b>INDICATIVE CLOSURE TIMELINE .....</b>	<b>49</b>
<b>11.0</b>	<b>REFERENCES.....</b>	<b>55</b>

## TABLES

---

Figure 1 – Regional Locality .....	2
Figure 2 - Project Application Area.....	6
Table 1 – Land Use Zonings under Lake Macquarie LEP 2004 .....	9
Table 2 – Land Use Zonings under Draft Lake Macquarie LEP 2013 .....	10
Table 3 – Strategic Framework for Mine Closure Key Principles .....	11
Table 4 – Director General’s Requirements .....	14
Table 5 – Regulatory Requirements for Rehabilitation .....	14
Table 6 – Land and Soil Capability Classes.....	22
Table 7 – Agricultural Suitability Classes .....	23
Table 8 – Primary Domains .....	24
Table 9 – Secondary Domains .....	29
Table 10 – Primary and Secondary Domain Objectives .....	29
Table 1 – Rehabilitation Phases for Life of Mine.....	35
Table 2 – Preliminary Rehabilitation Success Criteria .....	47
Table 3 – Indicative Closure Timeline .....	50

## FIGURES

---

Figure 1 – Regional Locality .....	2
Figure 2 - Project Application Area.....	6
Figure 3 – Domain Plan.....	25

## ABBREVIATIONS

---

AHD	Australian Height Datum
ANZMEC	Australian and New Zealand Minerals and Energy Council
BBRA	Broad Brush Risk Assessment
BSAL	Biophysical Strategic Agricultural Land
CCL	Consolidated Coal Lease
CHP	Coal Handling Plant
CPP	Coal Preparation Plant
DCP	Development Control Plan
DECC	Former NSW Department of Environment and Climate Change
DECCW	Former NSW Department of Environment, Climate Change and Water

---

DGRs	Director General's Requirements
DII	Former NSW Department of Industry and Investment
DP&I	NSW Department of Planning and Infrastructure
Draft LEP 2013	Draft Lake Macquarie Local Environmental Plan 2013
DRE	NSW Division of Resources and Energy (part of DTIRIS),
DTIRIS	NSW Department of Trade and Investment, Regional Infrastructure and Services
EC	Electrical Conductivity
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESP	Exchangeable Sodium Percent
EPI	Environmental Planning Instrument
FCNSW	Forestry Corporation of NSW
ha	Hectares
ICMM	International Council of Mining and Minerals
km	Kilometres
KTP	Key Threatening Process
LDP	Licensed Discharge Point
LEP	Local Environmental Plan
LEP 2004	Lake Macquarie Local Environmental Plan 2004
LGA	Local Government Area
LHRS	Lower Hunter Regional Strategy
LMCC	Lake Macquarie City Council
LSC	Land and Soil Capability
m	Metres
Mining SEPP	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
ML	Mining Lease
mm	Millimetres
MOP	Mining Operations Plan
Mtpa	Million tonnes per annum
NPWS	NSW National Parks and Wildlife Service
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PHF	Product Handling Facility
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RCE	Rehabilitation Cost Estimate

NREA	Northern rejects emplacement area
SREA	Southern rejects emplacement area
ROM	Run-of-mine
SLR	SLR Consulting Australia Pty Ltd
TSC Act	<i>Threatened Species Conservation Act 2005</i>

## 1.0 INTRODUCTION

### 1.1 Overview

SLR Consulting Australia Pty Ltd (SLR) was commissioned by Northern Coal Services Pty Limited (Northern Coal Services), a wholly owned subsidiary of Centennial Coal Company Limited (Centennial), to prepare a Decommissioning and Rehabilitation Strategy for the proposed Northern Coal Logistics Project (the Project) in the Newcastle coalfields of New South Wales (NSW).

The Project location is shown in **Figure 1**. This Rehabilitation and Decommissioning Strategy has been developed as a stand-alone report to form part of the Environmental Impact Statement (EIS) for the Project.

### 1.2 Background

The Northern Coal Logistic Project, in conjunction with Centennial's Newstan Extension of Mining Project and Mandalong Southern Extension Project, is part of the long-term strategy Centennial has developed for its future operation in the Newcastle Coalfields to provide the infrastructure and flexibility required to meet future opportunities in both the domestic and export coal markets.

Centennial has an ongoing commitment to environmental management through their Environment and Community Policy, which states:

*"Our Vision – To conduct our business in an efficient and environmentally responsible manner, that is compatible with the expectations of our shareholders, government, employees and the community".*

*"Our Beliefs – Everyone has the responsibility for minimising impact to the environment, environmental performance can always be improved, respecting our stakeholders is essential to business success".*

Due to the nature of operations proposed as part of the Northern Coal Logistics Project, including the minor areas of surface disturbance, the ability to undertake progressive rehabilitation, particularly revegetation, will be relatively limited compared to extractive mining operations. However, Northern Coal Services will adopt a progressive approach to rehabilitation (as needed) in accordance with a series of approved management plans, including on-going maintenance of all previously rehabilitated areas within the Project Application Area.

The majority of the rehabilitation activities undertaken to date have been following construction (for example, the Cooranbong Private Haul Road) and part of the progressive rehabilitation of the Northern Rejects Emplacement Area (NREA) and Southern Rejects Emplacement Area (SREA) at Newstan Colliery Surface Site. Surface water management controls have also been established and maintained, where required, to minimise erosion and sedimentation.



G:\Drafting\CCC13-012\Figures\Decom & Rehab\Figures\Current\CAD\Fig1\_633.CCC13-01200\_Regional\_Locality\_V1.dwg

To be printed A4

### 1.3 Objectives of the Decommissioning and Rehabilitation Strategy

This Decommissioning and Rehabilitation Strategy has been prepared to meet the Director General's Requirements (DGRs) (**Section 3.4**), along with the requirements of other relevant government agencies and industry standards.

The **purpose** of this Decommissioning and Rehabilitation Strategy is to establish objectives for the decommissioning and rehabilitation of the existing disturbed land and disturbed land that will result from the Project.

Specifically, this Decommissioning and Rehabilitation Strategy:

- Establishes an overall vision for closure (with objectives) for the Project;
- Identifies final land use options;
- Defines the preferred final land use options; and
- Defines rehabilitation objectives and preliminary rehabilitation success criteria to demonstrate that the desired final land use has been achieved.

The principal **objectives** of the Decommissioning and Rehabilitation Strategy for the Project are to:

- Provide an overall framework for mine closure planning and rehabilitation; and
- Propose decommissioning and rehabilitation strategies for areas disturbed by the Project that will:
  - Mitigate environmental impacts of the Project;
  - Ensure closure is completed in accordance with leading industry practice;
  - Ensure that the Project Application Area can be used for suitable beneficial uses post closure;
  - Consider the biodiversity value of the surrounding area and integrate these values with the final land use options for the Project Application Area;
  - Establish clear and agreed criteria that can be used to provide the standards against which the final mine rehabilitation and post disturbance land use can be assessed; and
  - Ensure the closed facility does not pose an unacceptable risk to public health and safety.

Further, the principal *rehabilitation* objectives for the Project include:

- Achieve an acceptable post-disturbance land use:
  - *Rehabilitation will aim to create a landform with land use capability and/or suitability compatible with the surrounding land-use, unless other beneficial land uses are pre-determined and agreed.*
- Create a stable post-disturbance landform:
  - *Disturbed land will be rehabilitated to a condition that is self-sustaining or a condition where maintenance requirements are consistent with an agreed post-mining land use. Surface water features, such as dams, retained on the lease will be safe, self-sustaining and acceptable for the post-mining land uses.*
- Preserve downstream water quality:
  - *The quality of surface and ground waters that leave the mining leases will be adequate to maintain environmental values and beneficial uses downstream of the Project Application Area.*
- Preserve the integrity of public utilities:

- *Decommissioning and rehabilitation activities will be undertaken in a manner which minimises impacts of public utilities.*

This Strategy has generally been prepared in accordance with the requirements of the following relevant strategic land use planning and resource management plans and policies (where they relate to mine rehabilitation and decommissioning). They include:

- The Strategic Framework for Mine Closure (ANZMEC & MCA, 2000);
- Leading Practice Sustainable Development Program for the Mining Industry - Mine Rehabilitation (Department of Industry, Tourism and Resources, 2006a);
- Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion (Department of Industry, Tourism and Resources, 2006b);
- Lake Macquarie Environmental Plan (Lake Macquarie City Council, 2004);
- Draft Lake Macquarie Local Environment Plan 2013 (Lake Macquarie City Council, 2013); and
- Lifestyle 2030 Strategy (Lake Macquarie City Council, 2013).

#### **1.4 Relationship to the Mining Operations Plan**

Decommissioning and rehabilitation activities for the Project will be undertaken in accordance with an approved Mining Operations Plan (MOP) to be developed and approved by the NSW Department Trade and Investment, Regional Infrastructure and Services' (DTIRIS) Division of Resources and Energy (DRE). The MOP will function as the primary rehabilitation and decommissioning management plan for the Project and will document both long term rehabilitation principles for the life of the operation, including specific construction, operation and rehabilitation activities for the term of the MOP (a period of up to seven years).

This Decommissioning and Rehabilitation Strategy is intended to provide conceptual information that provides the framework for more detailed rehabilitation planning to be developed and documented in the Project MOP.

## 2.0 THE PROJECT

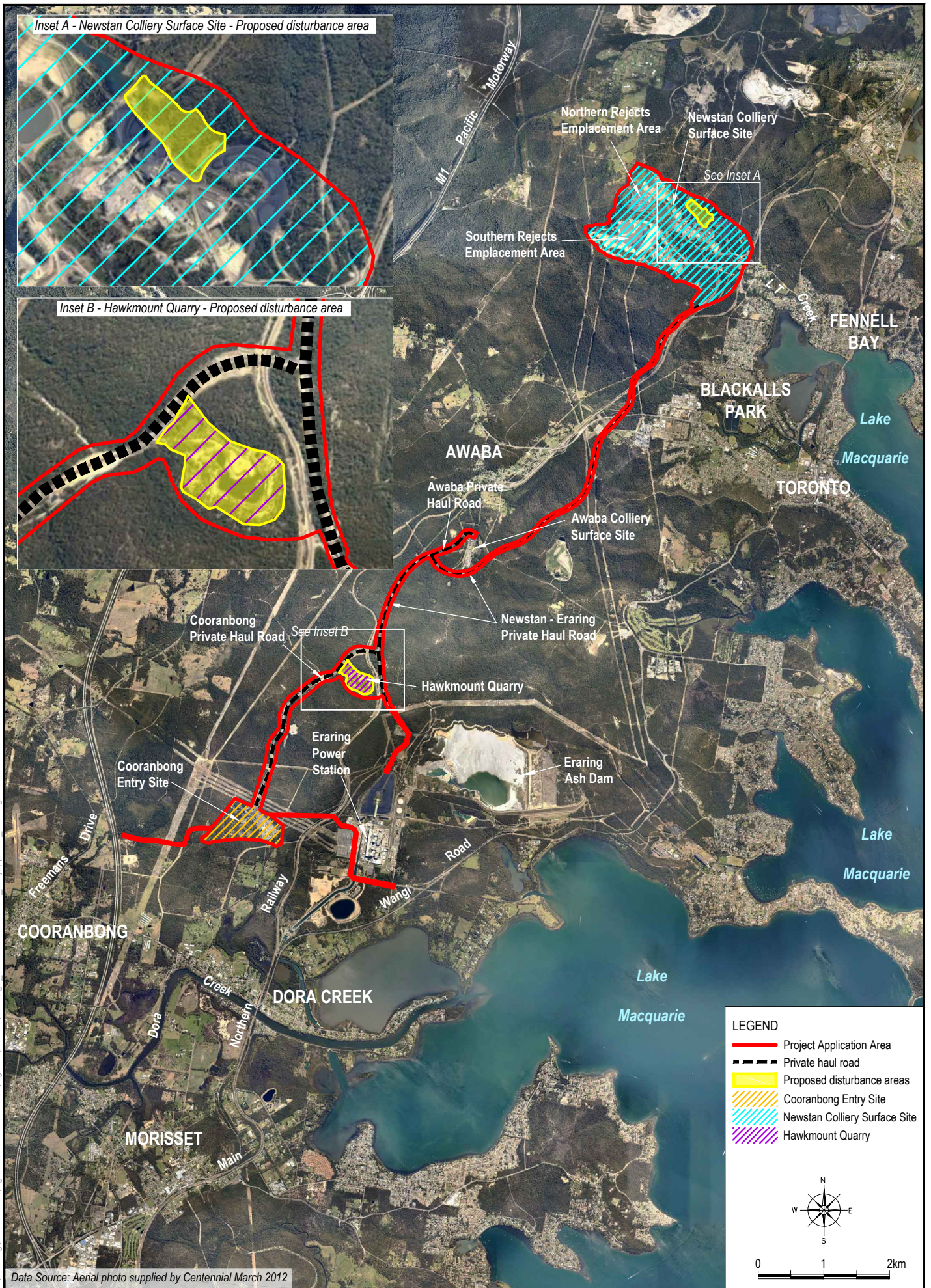
Northern Coal Services seeks single new development consent for the Northern Coal Logistics Project to regulate the approved existing coal handling, processing and transport operations at the Newstan Colliery Surface Site, Cooranbong Entry Site and along the private haul roads, as well as to utilise existing and proposed new surface infrastructure. The primary components of the Project are to:

- Re-develop and upgrade the existing coal preparation and handling infrastructure at the Newstan Colliery Surface Site to enable continued utilisation for the receipt, handling and processing of up to 8 million tonnes per annum (Mtpa) ROM coal from the Newstan Colliery (up to 4.5 Mtpa), the Awaba Colliery (up to 0.88 Mtpa) and Mandalong Mine (up to 6 Mtpa);
- Continue to utilise the existing coal handling infrastructure at the Cooranbong Entry Site to enable the receipt, handling and processing of up to 6 Mtpa of ROM coal from Mandalong Mine;
- Increase the volume of coal transported from the Cooranbong Entry Site to Newstan Colliery Surface Site, via truck using existing private haul roads, from 4 Mtpa to up to 6 Mtpa;
- Increase the volume of coal transported from the Cooranbong Entry Site to Eraring Power Station, using the existing dedicated overland conveyor, from 4 Mtpa to up to 6 Mtpa;
- Increase the volume of coal transported from the Newstan Colliery Surface Site to Eraring Power Station, via truck using existing private haul roads, from 2 Mtpa to up to 4.5 Mtpa;
- Increase the volume of coal transported from the Newstan Colliery Surface Site rail loading facilities by train to the Port of Newcastle and/or Port Kembla (for export) and/or Vales Point Power Station from 3 Mtpa to up to 8 Mtpa;
- Continue to transport up to 0.5 Mtpa of middlings by truck via private haul roads from Newstan Colliery Surface Site to Cooranbong Entry Site for subsequent supply to the Eraring Power Station via a dedicated overland conveyor.
- Continue to transport up to 0.88 Mtpa of material (including coal and stone from construction activities undertaken as part of the Newstan Colliery Extension of Mining Project) by truck via private haul roads from the Awaba Colliery Surface Site to the reject emplacement areas at the Newstan Colliery Surface Site;
- Transport reject material from the Newstan Colliery Surface Site to the Newstan Colliery Northern Reject Emplacement Area (NREA), the Newstan Colliery Southern Reject Emplacement Area (SREA) and/or Hawkmount Quarry via existing private haul roads;
- Increase the volume of water discharged via licenced discharge points at the Newstan Colliery Surface Site and Cooranbong Entry Site;
- Provide employment for up to 120 full-time personnel;
- Provide a life of operation of 30 years from the granting of development consent; and
- Operate 24 hours per day, seven days per week.

### 2.1 Project Application Area

The Project Application Area encloses approximately 503 hectares and, as identified on **Figure 2**, comprises:

- The existing Newstan Colliery Surface Site, encompassing the coal preparation and handling infrastructure, reject emplacement areas, water management infrastructure and rail loading infrastructure, near Fassifern. The exceptions to this are the mine ventilation shafts and ventilation fans, which form part of the Newstan Extension of Mining Project;
- The proposed extension to the Newstan Colliery Surface Site to accommodate new coal handling and processing infrastructure;



G:\Drafting\CCC13-012\Figures\Decor & Rehab\Figures\Current\CAD\Fg2\_633.CCC13-01200\_ProjAppArea\_V4.dwg

- The existing surface infrastructure at the Cooranbong Entry Site near Dora Creek, comprising the coal handling plant (CHP), coal stockpiles, workshop building and water management infrastructure. The exceptions to this are the mine ventilation shaft, ventilation fan and the Borehole Dam, which form part of the Mandalong Southern Extension Project;
- The existing Hawkmount Quarry comprising a disused quarry located immediately to the east of the Cooranbong Private Haul Road between Newstan Colliery Surface Site and Cooranbong Entry Site; and
- The existing Cooranbong Private Haul Road, Awaba Private Haul Road and Newstan-Eraring Private Haul Road, which link the Newstan Colliery Surface Site, Awaba Colliery Surface Site, Cooranbong Entry Site and Eraring Power Station.

While the mine ventilation shafts and fans at the Newstan Colliery Surface Site are located within the Project Application Area, they do not form part of the Project because they will become part of Centennial's Newstan Extension of Mining Project (separate development application) in order to facilitate the continuation and/or augmentation of the ventilation of the Newstan Colliery underground workings.

Similarly, while the mine ventilation shaft, ventilation fan and Borehole Dam at the Cooranbong Entry Site are located within the Project Application Area, they do not form part of the Project because they will become part of Centennial's Mandalong Southern Extension Project in order to facilitate the continuation and/or augmentation of the following:

- The ventilation of the main headings that accommodate the underground conveyors that run from the Mandalong Mine workings through to both the Cooranbong Entry Site and the Delta Entry Site, incorporating the mine ventilation shaft; and
- The management of water in the underground workings of the Mandalong Mine, including the storage of water in goaf areas and then the pumping of water via a dewatering bore to the Borehole Dam at the surface of the Cooranbong Entry Site.

## 2.2 Disturbance Areas

While the majority of land within the Project Application Area is already highly disturbed and developed, the Project does comprise two areas of proposed surface disturbance:

- (a) Newstan Colliery Surface Site** – an area of approximately 7.5 hectares within the Newstan Colliery Surface Site is proposed to be disturbed for the re-development and upgrade of the coal handling and processing infrastructure.
- (b) Hawkmount Quarry** – an area of approximately 13.9 hectares within the Hawkmount Quarry site is proposed to be disturbed for the purposes of reject emplacement.

## 3.0 LEGISLATION AND REGULATORY REQUIREMENTS

### 3.1 Legislation

#### 3.1.1 Mining Act 1992

The *Mining Act 1992* regulates environmental protection, rehabilitation and closure conditions included in all mining leases. A number of surface mining leases issued under the *Mining Act 1992* relate to the Project Application Area. These leases and the associated lease conditions relevant to decommissioning and rehabilitation are listed in **Section 3.4.1**.

The relevant provisions of the *Mining Act 1992* have been considered during the preparation of this Strategy, including the current surface mining leases and lease conditions.

#### 3.1.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal piece of legislation overseeing the assessment and determination of development proposals in NSW. Objectives of the EP&A Act include:

“(a) to encourage:

*(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*

*(ii) the promotion and co-ordination of the orderly and economic use and development of land,*

*(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*

*(vii) ecological sustainable development ...”*

Pursuant to Section 89C of the EP&A Act, and in accordance with the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP), the Project comprises State significant development (SSD). Development consent for the Project is being sought under Part 4 Division 4.1 of the EP&A Act.

#### 3.1.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the State’s environmental regulatory framework and includes licensing requirements for certain activities. The objectives of the POEO Act that relate to decommissioning and rehabilitation include protecting, restoring and enhancing the environment to reduce risks to human health and prevent degradation of the environment. The POEO Act has been considered in the preparation of this Strategy.

## 3.2 Environmental Planning Instruments

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

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) provides for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of NSW. The Mining SEPP defines development for the purpose of mining that may be carried out with development consent. It also defines mining developments that are prohibited, exempt from the need for consent, or can be undertaken provided they comply with pre-determined criteria/standards (complying development).

Development listed under the Mining SEPP as being exempt from the need for obtaining planning approval, specifically in relation to the decommissioning process, includes the demolition of a building or structure. Such demolition needs to be carried out in accordance with *Australian Standard AS2601-2001, Demolition of Structures*. Furthermore, such development is only defined as exempt if the building or structure is not a heritage item, is not within a heritage conservation area and the demolition takes place on an approved mine site and is of minimal environmental impact.

### 3.2.2 Lake Macquarie Local Environmental Plan 2004

The objective of the *Lake Macquarie Local Environmental Plan 2004* (LEP 2004) is to achieve development of land in accordance with the principles of ecologically sustainable development by:

- Promoting balanced development of that land; and
- Implementing the *Lifestyle 2020 Strategy* adopted by the Lake Macquarie City Council (LMCC) in March 2000 (now replaced by *Lifestyle 2030 Strategy*, which was adopted by LMCC in March 2013).

The land use zonings of the various components of the Project Application Area pursuant to LEP 2004 are listed in **Table 1**.

**Table 1 – Land Use Zonings under Lake Macquarie LEP 2004**

Project Application Area	Land Use Zoning
Newstan Colliery Surface Site	<ul style="list-style-type: none"> <li>• 1(1) Rural (Production);</li> <li>• 4(1) Industrial (Core);</li> <li>• 5 Infrastructure;</li> <li>• 6(1) Open Space;</li> <li>• 7(2) Conservation (Secondary);</li> <li>• 7(3) Environmental (General); and</li> <li>• 9 Natural Resources.</li> </ul>
Cooranbong Entry Site	<ul style="list-style-type: none"> <li>• 4(1) Industrial (Core);</li> <li>• 7(2) Conservation (Secondary); and</li> <li>• 9 Natural Resources.</li> </ul>
Hawkmount Quarry	<ul style="list-style-type: none"> <li>• 5 Infrastructure; and</li> <li>• 9 Natural Resources.</li> </ul>
Private Haul Road	<ul style="list-style-type: none"> <li>• 4(1) Industrial (Core);</li> <li>• 4(2) Industrial (General);</li> <li>• 5 Infrastructure;</li> <li>• 6(1) Open Space;</li> <li>• 7(2) Conservation (Secondary); and</li> <li>• 9 Natural Resources.</li> </ul>

Development for the purpose of mining (and related activities) is permissible with development consent under the provisions of LEP 2004 within zones 1(1) Rural (Production), 4(1) Industrial (Core) and 9 Natural Resources. While mining is a prohibited land use within the other land use zones within the Project Application Area, sub-clause 7(1) of the Mining SEPP states that development for the purpose of underground mining and facilities for processing or transportation of minerals (if the minerals were mined from that land or adjoining land) (includes all associated construction, operation and decommissioning activities) may be carried out on any land with development consent. In relation to any inconsistency between the Mining SEPP and an LEP, sub-clause 5(3) provides that the Mining SEPP prevails to the extent of the inconsistency. On this basis, any provision within LEP 2004 that would otherwise operate to prohibit the Project has no effect.

### 3.2.3 Draft Lake Macquarie Local Environmental Plan 2013

The *Draft Lake Macquarie Local Environmental Plan 2013* (Draft LEP 2013) was prepared for the purposes of implementing the *Standard Instrument LEP* across the Lake Macquarie Local Government Area (LGA), and repealing LEP 2004. The Draft LEP 2013 was adopted by LMCC on 13 May 2013 and it is anticipated to be gazetted in 2014. Once gazetted, the Draft LEP 2013 will replace LEP 2004.

The land use zonings of the various components of the Project Application Area pursuant to Draft LEP 2013 are depicted in **Table 2** below:

**Table 2 – Land Use Zonings under Draft Lake Macquarie LEP 2013**

Project Application Area	Land Use Zoning
Newstan Colliery Surface Site	<ul style="list-style-type: none"> <li>• E2 Environmental Conservation;</li> <li>• RE1 Public Recreation;</li> <li>• RU2 Rural Landscape;</li> <li>• SP1 Special Activities (Mine); and</li> <li>• SP2 Infrastructure (Railway Corridor).</li> </ul>
Cooranbong Entry Site	<ul style="list-style-type: none"> <li>• E2 Environmental Conservation; and</li> <li>• SP1 Special Activities (Mine).</li> </ul>
Hawkmount Quarry	<ul style="list-style-type: none"> <li>• E2 Environmental Conservation;</li> <li>• SP2 Infrastructure (Railway Corridor); and</li> <li>• SP2 Infrastructure (Electricity Generating Works).</li> </ul>
Private Haul Road	<ul style="list-style-type: none"> <li>• E2 Environmental Conservation;</li> <li>• RE1 Public Recreation;</li> <li>• RU2 Rural Landscape;</li> <li>• SP1 Special Activities (Mine);</li> <li>• SP2 Infrastructure (Railway Corridor); and</li> <li>• SP2 Infrastructure (Classified Road).</li> </ul>

Development for the purpose of mining (and related activities) is permissible with development consent under the provisions of Draft LEP 2013 within zone SP1 Special Activities (Mine). While mining is a prohibited land use within all other proposed land use zones within the Project Application Area, sub-clause 7(1) of the Mining SEPP states that development for the purpose of underground mining and facilities for processing or transportation of minerals (if the minerals were mined from that land or adjoining land) (includes all associated construction, operation and decommissioning activities) may be carried out on any land with development consent. In relation to any inconsistency between the Mining SEPP and an LEP, sub-clause 5(3) provides that the Mining SEPP prevails to the extent of the inconsistency. On this basis, any provision within Draft LEP 2013 that would otherwise operate to prohibit the Project has no effect.

### 3.3 Policies and Guidelines

#### 3.3.1 Strategic Framework for Mine Closure

The *Strategic Framework for Mine Closure* (2000) has evolved as a cooperative development between the Australian and New Zealand Minerals and Energy Council (ANZMEC) and the Australian Minerals Industry (represented by the Minerals Council of Australia). It is designed to provide a broadly consistent framework for mine closure across various Australian jurisdictions.

The objective of the *Strategic Framework for Mine Closure* is to encourage the development of comprehensive closure plans that return all mining and mining-related sites to viable, and whenever practicable, self-sustaining ecosystems, and to ensure these plans are adequately financed, implemented and monitored within all jurisdictions.

The *Strategic Framework for Mine Closure* is structured around six key principles. The DGRs for the Project (see **Section 3.4**) require this Strategy to be prepared with regard to these six principles. The key principles and the sections of this Strategy that address these principles are provided in **Table 3**.

**Table 3 – Strategic Framework for Mine Closure Key Principles**

Key Principle	Relevant Section(s) of this Strategy Addressing this Principle
Stakeholder Engagement: to enable all stakeholders to have their interests considered during the mine closure process	<b>Section 6.3</b>
Planning: to ensure the process of closure occurs in an orderly, cost effective and timely manner	<b>Sections 8 and 10</b>
Financial Provisioning: to ensure the cost of closure is adequately represented in company accounts and that the community is not left with a liability	<b>Section 3.2</b>
Implementation: to ensure there is clear accountability, and adequate resources, for the implementation of the closure plan	<b>Section 10</b>
Standards: to establish a set of indicators which will demonstrate the successful completion of the closure process	<b>Sections 1.3, 5.3, 9 and 10</b>
Relinquishment: to reach a point where the company has met agreed completion criteria to the satisfaction of the responsible authority	<b>Section 9</b>

#### 3.3.2 A Guide to Leading Practise Sustainable Development in Mining

The Guide to Leading Practise Sustainable Development in Mining (Department of Resources, Energy and Tourism 2011) consolidates a series of handbooks relevant to all stages of a mine's life, being exploration, feasibility, design, construction, operation, closure and rehabilitation. The aim of the guideline is to identify key issues affecting sustainable development in the mining industry and provide information and case studies to enable a more sustainable basis for its operation. This Decommissioning and Rehabilitation Strategy has been developed in accordance with a number of guides generated through the Guide to Leading Practise Sustainable Development in Mining. These include:

- Mine Closure and Completion;
- Mine Rehabilitation;
- Biodiversity Management;
- Tailings Management;
- Water Management;
- Community Engagement and Development; and
- Hazardous Materials Management.

### 3.3.3 Guidance Paper - Financial Assurance for Mine Closure and Reclamation

The Financial Assurance for Mine Closure and Reclamation (International Council of Mining and Metals 2006) considers environmental financial assurance measures. It looks at issues and current policies in the use of financial assurances through the industry; analysing trends that were revealed through a survey of the industry, governments and financial institutions.

Environmental financial assurance for mine closure ensures that funds are available for decommissioning and reclamation of a site if an operator does not fulfil its obligations. It provides confidence to both governments and communities that satisfactory closure will be achieved. The document provides guidance on environmental financial assurance for both operators and regulators and covers the following areas:

- The case for financial assurance;
- Key issues associated with the application of financial assurance policies; and
- Recommendations for improving standards of practice relating to financial assurance.

Following Project Approval, Northern Coal Services will prepare a Rehabilitation Cost Estimate (RCE) to determine an adequate security bond to provide for unplanned closure of the Project. The RCE will be prepared as part of the Project's MOP, and will be updated and re-submitted to the DRE each time a MOP amendment or new MOP is prepared to ensure the security bond makes financial provision to cover the cost of rehabilitation associated with the anticipated maximum disturbance footprint in the MOP term.

### 3.3.4 NSW Department of Resources and Energy Guidelines

The DRE has in place a series of policy guidelines and environmental management guidelines that are either directly or indirectly relevant to mine closure issues. The following DRE guideline documents were considered during the preparation of this Strategy:

- *EDG01: – Borehole Sealing Requirements on Lands: Coal Exploration (2012a);*
- *EDG02: – Borehole Sealing Requirements on the Beds of Water Bodies: Coal Exploration (1997);*
- *ESB26: – Rehabilitation Cost Calculation Tool V1.12 Excel Spreadsheet Tool used to calculate mine security deposits (2013a);*
- *EDP11 Rehabilitation Security Deposits (2012b);*
- *ESG1 Rehabilitation Cost Estimate Guidelines (2010); and*
- *ESG3: – Mining Operations Plans Guidelines (2013c).*

### 3.3.5 Centennial Coal Environment and Community Policy

The Centennial Coal Environment and Community Policy is a statement of Centennial's commitment to manage environmental issues. When considering mine closure issues, the Policy contains specific reference to:

- Making appropriate decisions which comply with or exceed approvals, licences and agreements;
- Working constructively with local authorities, stakeholders and communities;
- Contributing to the conservation of biodiversity;
- Planning, designing and closing operations in a manner that enhances sustainable development; and
- Engaging and communicating openly with communities, with due regard and respect for local interests, cultures and customs.

### 3.3.6 Lower Hunter Regional Strategy

The Lower Hunter Regional Strategy (LHRS) (Department of Planning 2006) applies to the Lake Macquarie LGA and identifies how the expected growth in the Lower Hunter Region will be managed to provide for both economic development and the protection of environmental assets, cultural values and natural resources. The purpose of the LHRS is to ensure that the Lower Hunter has adequate and appropriately located land available to sustainably accommodate the projected housing and employment requirements for the region's population until 2031.

The LHRS is a strategic planning document that outlines the NSW Government's vision for future land use planning in the region. It has been prepared to complement and inform the other relevant local and State planning instruments.

The LHRS Maps, whilst generally small scale, and presented to show regional strategy, show the Newstan Colliery Surface Site and Cooranbong Entry Site as existing "*Employment Land*", with the surrounding areas in proximity to the Project Application Area as being a mix of "*Employment Land*", "*Rural and Resource Land*" and "*Existing Urban Area*". Further, the Natural Resources Map shows the areas in proximity to the Project Application Area as comprising a "Coal Resources" area which is overlain by a combination of "*Non Coal Extractive Resources*" and "*Rural Land & Environmental Assets*".

The LHRS acknowledges that innovative development proposals can still be considered outside the regional strategy, however that they would need to address the Sustainability Criteria (Appendix 1 of the LHRS) These Sustainability Criteria would need to be addressed at the rezoning application stage, should a rezoning be required to facilitate any post disturbance land use options.

A summary of the Sustainability Criteria include the following:

- Infrastructure Provision – ensuring any land use option is able to be satisfactorily serviced in terms of utilities, transport, communications, open space, etc.;
- Access – ensuring accessible transport options for efficient and safe travel are available;
- Employment Lands – ensuring employment related land is provided in appropriately zoned areas;
- Avoidance of Risk – ensuring potential risks associated with flooding, slope, bushfire, etc. can be appropriately managed;
- Natural Resources – ensuring development limits adverse impacts on natural resources such as water supply, agricultural land and productive resource lands; and
- Environmental Protection – ensuring biodiversity, air quality, heritage and waterway health is protected and enhanced.

### 3.3.7 Lifestyle 2030 Strategy

The *Lifestyle 2030 Strategy* (Lifestyle 2030) is a revised version of the *Lifestyle 2020 Strategy* and was adopted by LMCC in March 2013. Lifestyle 2030 provides the long-term direction for the overall development of Lake Macquarie and describes LMCC's high level policies for managing private and public development in the area. It does not release new land for development or propose new environmental protection areas, rather focuses on consolidating land already identified in the LHRS and previous *Lifestyle 2020 Strategy*.

Lifestyle 2030 states that the coal mining industry is important to the LGA and it is important that land use policy responds as changes take place in these industries, including to land use within mine holdings, consistent with the desired outcomes of Lifestyle 2030. Lifestyle 2030 contains Strategic Plan Maps and Intent Statements that identify the preferred pattern of development. Those matters relevant to the Project Application Area can be summarised as follows:

- The Urban Structure and Movement System maps identify the Hawkmount Quarry as a "Waste Management" area, with the haul road identified as "Private Haul Road". The Newstan Colliery Surface Site and Cooranbong Entry Sites are shown as forming part of a "Rural Landscape" surrounded by a mix of "Proposed Conservation Areas", "Urban Areas" and "Major Remnant Vegetation".

- The Green System Map identifies the Newstan Colliery Surface Site as a disturbed area surrounded by a mix of “Regionally Significant Vegetation and Habitat” and “State Significant Vegetation and Habitat”. The Cooranbong Entry Site is shown as a disturbed area surrounded by “State Significant Vegetation and Habitat”.

### 3.4 Director-General’s Requirements

The DGRs for the Project were originally issued by the Department of Planning and Infrastructure (DP&I) on 20 March 2012, with revised DGRs issued on 7 August 2013. The DGRs relevant to the preparation of this Strategy, along with a reference to where the requirement is addressed in this report, are listed in **Table 4**.

**Table 4 – Director General’s Requirements**

Director-General’s Requirements	Section of Decommissioning and Rehabilitation Strategy Addressing the Requirement
Rehabilitation - including the proposed rehabilitation strategy for the site, having regard to the key principles in the Strategic Framework for Mine Closure, including:	
Rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria;	This requirement is satisfied through the development of this Strategy, in particular <b>Sections 1.3, 5.3, 8.0 and 9.0</b>
Nominated final land use, having regard to any relevant strategic land use planning or resource management plans or policies; and	<b>Sections 3.0, 6.1 and 6.2.</b>
The potential for integrating this strategy with any other rehabilitation and/or offset strategies in the region.	<b>Section 6.1</b>

#### 3.4.1 Mining Lease Requirements for Rehabilitation

The surface mining leases relevant to the Northern Coal Logistics Project that have conditions/requirements relating to rehabilitation are listed in **Table 5**. The relevant sections where each of these requirements has been addressed in this report are also listed in **Table 5**.

**Table 5 – Regulatory Requirements for Rehabilitation**

Condition	Area	Requirement	Addressed in Report
CCL727, CCL746, CCL763 and CCL764 Condition 2	CCL Area	The leaseholder shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>
CCL762 Condition 2	CCL Area	<p>Environmental Harm</p> <p>(a) The leaseholder shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.</p> <p>(b) For the purpose of this condition:</p> <p>(i) environment means components of the earth including:</p> <p>A. land, air and water, and</p> <p>B. any layer of the atmosphere, and</p> <p>C. any organic or inorganic matter and any living organism, and</p> <p>D. human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs A-C.</p> <p>(ii) harm to the environment includes any direct or indirect alterations of the environment that has the effect of degrading the environment and, without limiting the generality of the above, includes any act or omission that</p>	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>

Condition	Area	Requirement	Addressed in Report
		results in pollution, contributes to the extinction or degradation of any threatened species, populations or ecological communities and their habitats and causes impacts to places, objects and features of significance to Aboriginal people.	
CCL727, CCL746, CCL763 and CCL764 Condition 5 CCL762 Condition 4(b)	CCL Area	The EMR must: (a) report against compliance with the MOMP; (b) report on progress in respect of rehabilitation completion criteria; (c) report on the extent of compliance with regulatory requirements; and (d) have regard to any relevant guidelines adopted by the Director-General.	<b>Sections 1.4, 3.2 and 9.0</b>
CCL727, CCL746, CCL762, CCL763 and CCL764 Condition 7	CCL Area	Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.	<b>Section 6.0</b>
MPL327 and MPL328 Condition 10	MPL Areas	(a) The lease holder shall each year once operations have commenced, submit for the Minister's approval an "Annual Environmental Management Report" relating to the operations of the lease holder on the subject area. (b) The date by which the Report must be submitted will be determined by the Minister after consulting with the lease holder. (c) The Report shall comprise: (i) a plan showing short, medium and long term mining plans; (ii) a rehabilitation report (in respect of open cut operations) and/or a surface environmental management report (in respect of underground operations); (iii) a review of performance in terms of Environment Protection Authority and Department of Water Resources licence and approval conditions (related to the Clean Air Act 1961, the Clean Waters Act 1970, the Noise Control Act 1975, the Environmentally Hazardous Chemical Act 1985, the Pollution Control Act 1970 and the Water Act 1912) applicable to the subject area; (iv) a review of performance in terms of Development Consent conditions for the subject area; (v) a listing of any variations obtained to approvals applicable to the subject area during the previous year. (d) The Minister may, by notice in writing, direct the lease holder to undertake any operations or remedial actions in such manner and within such period as may be specified in that notice so as to ensure that operations on the subject area conform to the requirements of relevant stator approvals or licences. (e) The lease holder shall conduct operations on the subject area in accordance with an "open cut application" approved by the Minister and any conditions contained in the Minister's approval of that application. Where the lease holder is of the opinion that the approved operations should be amended the lease holder shall submit an amendment for the Minister's approval.	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>
ML1587 Condition 13	ML Areas	(f) Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that:- (i) there is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. (ii) the state of the land is compatible with the surrounding land and land use requirements. (iii) the landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land. (iv) in cases where revegetation is required and native	<b>Sections 1.3, 5.3, 8.0 and 9.0</b>

Condition	Area	Requirement	Addressed in Report
		<p>vegetation has been removed or damaged, the original species must be re-established with close reference to the flora survey included in the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density.</p> <p>(v) the land does not pose a threat to public safety.</p> <p>(g) Any topsoil that is removed must be stored and maintained in a manner acceptable to the Director-General.</p>	
ML1587 Condition 14	ML Area	The lease holder must comply with any direction given by the Director-General regarding the stabilisation and revegetation of any mine residues, tailings or overburden dumps situated on the lease area.	All
ML1480 Condition 15	ML Area	The registered holder shall comply with any direction, given or which may be given by the Minister, including directions regarding the stabilisation and revegetation of any dumps of coal, minerals, mine residues or tailings situated on the subject area.	Sections 1.3, 3.0, 8.0 and 9.0
ML 1587 Condition 20	ML Area	Access tracks must be kept to a minimum and be positioned so that they do not cause any unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible after they are no longer required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Infrastructure, Planning and Natural Resources.	Sections 1.3, 3.0, 8.0 and 9.0
ML 1480 Condition 21 MPL327 and MPL328 Condition 11	ML Area	If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister any lands within the subject area which may have been disturbed by the operations hereby authorised.	Sections 1.3, 3.0, 8.0 and 9.0
MPL329 Condition 8	MPL Area	If so directed by the Minister the registered holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject area which may have been disturbed by the registered holder.	Sections 1.3, 3.0, 8.0 and 9.0
ML 1480 Condition 22 MPL340 and MPL305 Condition 37 MPL327 and MPL328 Condition 12	ML Area	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this concession or authorisation, as the case may be, or any renewal thereof, the registered holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Section 8.1
MPL329 Condition 9	MPL Areas	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this authority of any renewal thereof, the registered holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Section 8.1
MPL304 and MPL305 Condition 36 MPL327 and MPL328 Condition 13	MPL Areas	If so directed by the Minister the registered/lease holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject areas which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the registered holder.	Sections 1.3, 3.0, 8.0 and 9.0
CCL727, CCL746, CCL762, CCL763 and CCL764 Condition 18  ML1587 Condition 16	CCL Area	Prevention of Soil Erosion and Pollution Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion, unless otherwise authorized by a relevant approval, and in accordance with a Mining Operations Plan. For the purpose of this condition, water shall be taken to include any watercourse, waterbody or groundwaters. The lease holder must observe and perform any instructions given by the Director-General in this regard.	Sections 3.0 and 8.3.3

<b>Condition</b>	<b>Area</b>	<b>Requirement</b>	<b>Addressed in Report</b>
ML1480 Condition 30	ML Areas	Soil Erosion The lease holder shall conduct operations in such a manner as not to cause or aggravate soil erosion and the lease holder shall observe and perform any instructions given or which may be given by the Minister with a view to minimising or preventing soil erosion.	<b>Sections 3.0 and 8.3.3</b>
MPL304 and MPL305 Condition 16 MPL327 and MPL328 Condition 23 MPL329 Condition 20	MPL Areas	The registered/lease holder shall conduct operations in such a manner as not to cause or aggravate soil erosion and the registered holder shall observe and perform any instructions given or which may be given by the Minister (or the Director-General) with a view to minimising or preventing soil erosion.	<b>Sections 3.0 and 8.3.3</b>
ML 1480 Condition 50	ML Areas	Prospecting (General) (a) Where the lease holder desires to commence prospecting operations in the subject areas the lease holder shall notify the Director General in writing and shall comply with such additional conditions as the Minister may impose including any condition requiring the lodgement of an additional bond or other form of security for rehabilitation of the area affected by such operations. (b) Where the lease holder notifies the Director General pursuant to sub paragraph (a) of the condition the lease holder shall furnish with that notification details of the type of prospecting methods that would be adopted and the extent and location of the area that would be affected by them.	<b>Section 3.0</b>
MPL304 and MPL305 Condition 3	MPL Area	If so directed by the Minister and at any time or times as may be stipulated by the Minister the registered holder shall lodge for the Minister's approval a management plan comprising such details as he may specify including detailed proposals for rehabilitation of the subject area and erosion and pollution control. The Minister may at any time amend any such plan and the registered holder shall conduct operations in accordance with any such management plan as may be approved or amended by the Minister.	<b>Section 3.0</b>
MPL304 and MPL305 Condition 14	MPL Areas	The registered holder shall observe any instruction given or which may be given by the responsible authority with the view to the eradication of noxious weeds within the subject area.	<b>Section 8.4.4</b>
MPL304 and MPL305 Condition 19	MPL Areas	The registered holder shall ensure that any topsoil which may be disturbed during operation shall be removed separately for replacement as far as may be practicable.	<b>Section 8.3.2</b>
MPL327 and MPL328 Condition 24 MPL 329 Condition 21	MPL Areas	The lease holder shall ensure that any topsoil or other materials suitable for topdressing purposes which may be disturbed during operations shall be removed separately for replacement as far as may be practicable and the lease holder shall plant or sow such grasses, shrubs or trees in the replaced surface material as may be considered necessary by the Minister to control or prevent soil erosion.	<b>Section 8.3</b>
MPL327 and MPL328 Condition 25 MPL329 Condition 22	MPL Areas	In the event of any excavations being made the lease holder shall ensure that such are refilled and the topsoil previously removed is replaced and levelled. All such refilling and levelling shall be done to the satisfaction of the Minister.	<b>Section 8.3</b>
MPL304 and MPL305 Condition 30	MPL Areas	If directed so to do by the Minister the registered holder shall plant such grasses, trees or shrubs or such other vegetation as may be required by the Minister and care for same during the currency of this lease.	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>
MPL327 and MPL328 Condition 20 MPL329 Condition 16	MPL Areas	The lease/registered holder shall plant such grasses, trees or shrubs or such other vegetation as may be required by the Minister and care for same during the currency of this authority of any renewal thereof, to the satisfaction of the Minister.	<b>Section 8.4</b>
MPL304 and MPL305 Condition 32	MPL Areas	If so directed by the Minister the registered holder shall cover the topsoil, to the Minister's satisfaction, such parts of the subject area as may be stipulated by the Minister and shall plant and maintain, to the Minister's satisfaction, such grasses, trees or shrubs or such other	<b>Section 8.3</b>

<b>Condition</b>	<b>Area</b>	<b>Requirement</b>	<b>Addressed in Report</b>
		vegetation as may be required by the Minister.	
MPL327 and MPL328 Condition 22 MPL Condition 19	MPL Areas	The lease holder shall cover with top dressing material, to the Minister's satisfaction, such parts of the subject area as may be stipulated by the Minister and shall plant and maintain, to the Minister's satisfaction, such grasses, trees or shrubs or such other vegetation as may be required by the Minister.	<b>Section 8.3</b>
MPL304 and MPL305 Condition 33	MPL Areas	The registered holder shall ensure that any topsoil which may be disturbed during operations shall be removed separately for replacement as far as may be practicable.	<b>Section 8.3</b>
MPL304 and MPL305 Condition 34	MPL Areas	The registered shall plant or sow such grasses, shrubs or trees in the replaced surface material as may be considered necessary by the Minister to control or prevent erosion.	<b>Sections 3.0, 8.3 and 8.4</b>
MPL304 and MPL305 Condition 35	MPL Areas	If so directed by the Minister the registered holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any land within the subject area which may have been disturbed by the operations hereby authorised.	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>
MPL340 and MPL305 Condition 38	MPL Areas	On completion of operations the registered holder shall rehabilitate all areas disturbed as a result of operations having been carried out within the subject area and shall ensure that such areas are adequately maintained for such a period as is necessary to satisfy the Minister that long term rehabilitation standards and environmental safeguards have been fulfilled.	<b>Sections 1.3, 3.0, 8.0, 9.0 and 10.0</b>
MPL327 and MPL328 Condition 8 MPL329 Condition 5	MPL Areas	Subject to any specific condition of this authority providing for rehabilitation of any particular part of the subject area affected by mining or activities associated therewith, the lease holder shall; (a) shape and revegetate to the satisfaction of the Minister, any part of the subject area that may, in the opinion of the Minister have been damaged or deleteriously affected by mining operations and ensure such areas are permanently stabilised, and, (b) reinstate and make safe, including sealing and/or fencing, any excavation within the subject area.	<b>Sections 1.3, 3.0, 8.0 and 9.0</b>

## 4.0 THE GENERAL ENVIRONMENT

This section provides a description of the existing environment which sets the basis on which a number of potential post disturbance land uses have been considered as part of this Strategy.

### 4.1 Existing Land Use

The historic land use for the Project Application Area and surrounds includes mining, with the wider area having been extensively undermined since around 1887. The Project Application Area includes a range of surface infrastructure associated with the Newstan Colliery and Mandalong Mine (Cooranbong Entry Site), along with Hawkmount Quarry and private haul roads.

The land use around the Newstan Colliery Surface Site is predominantly undeveloped bush land, along with residential and rural-residential properties associated with Fassifern and Wakefield. The Main Northern Railway Line traverses on a north-south alignment immediately to the east of the Newstan Colliery Surface Site.

The Cooranbong Entry Site is surrounded by a mix of remnant woodland, utility corridors, residential and rural-residential properties associated with Dora Creek. The Main Northern Railway Line traverses on a north-south alignment approximately 360 metres to the east of Cooranbong Entry Site, and Eraring Power Station is located approximately 1 kilometre to the east.

Hawkmount Quarry is located in a bushland setting between Newstan-Eraring Private Haul Road and the Cooranbong Private Road. The Main Northern Railway Line traverses through this site and Eraring Power Station is located to the south-east.

### 4.2 Soil Landscape Units

As reported in the *Soil and Land Capability Assessment* (SLR 2014) prepared for the Project, eight soil landscape units were identified within the proposed Northern Coal Logistics Project Application Area, these being Awaba, Wyong, Warners Bay, Doyalson, Killingsworth, Gateshead, Sugarloaf and Cockle Creek soil landscape units. The dominant soil landscape units were Doyalson (13.9ha) and Gateshead (7.5ha)

The soil landscapes identified within the proposed disturbance areas at the Newstan Colliery Surface Site and Hawkmount Quarry are the Gateshead and Doyalson soil landscape units, respectively (SLR 2014). These units are described by SLR (2014) as follows:

#### Gateshead

The Gateshead soil landscape unit consists of undulating to rolling rises on Permian conglomerate, shale and sandstone in the Awaba Hills. Slope gradients from 5-15 per cent with local relief to 100 m and elevation to 130 m. The land is predominately cleared woodland and open-forest. The soils are dominated by moderately deep, moderately well to imperfectly drained Yellow Podzolic Soils (Kurosols, Chromosols) and Yellow Soloths (Sodosols) on conglomerate crests and sideslopes, with some shallow, rapidly drained Tenosols. Moderately deep to deep, well to imperfectly drained Red Podzolic Soils (Kurosols, Chromosols), Red and Yellow Soloths (Sodosols) are found on shale parent material.

The representative soil type within the proposed disturbance area at Newstan Colliery Surface Site is a Dystrophic Brown Kurosol. Kurosols are soils that have strong texture contrast between the A (topsoil) and B (main subsoil) horizons and have strongly acidic subsoil. This soil is characterised by a dominant colour class of brown and is strongly acidic. The soil consists of a very dark greyish-brown loam to dark greyish-brown silty loam topsoil overlying a subsoil of light yellowish-brown heavy clay. The topsoil texture is dominated by coarse sand, with an abrupt increase in clay at 30 cm. The profile is rapidly drained in the top 100 mm and then poorly drained thereafter.

#### Doyalson

The Doyalson soil landscape unit consists of gently undulating rises on Munmorah Conglomerate. Slope gradients are less than 10 percent and local relief is to 30 metres. The landscape is characterised by broad crests and ridges and long gently inclined slopes. The land is partially cleared eucalypt open-forest. The

soils are dominated by moderately deep Yellow Earths (Kandosols), Yellow Podzolic Soils (Kurosols, Chromosols) and Soloths (Sodosols) on sandstones and conglomerates. Moderately deep Yellow Podzolic Soils (Kurosols, Chromosols) and Soloths (Sodosols) occur on fine grained siltstones and claystone.

The Doyalson soil landscape unit occurs throughout the proposed disturbance area at Hawkmount Quarry, however, this land has previously been disturbed by quarrying and there is minimal naturally occurring soil remaining. Therefore no soil type is associated with this area and it is considered "Disturbed Terrain".

### 4.3 Ecology

The *Flora and Fauna Assessment* (RPS 2014) prepared for the Project assessed the proposed disturbance areas at the Newstan Colliery Surface Site and Hawkmount Quarry.. Relevant findings of this assessment include:

- Habitat within the proposed disturbance area at Newstan Colliery Surface Site was found to be in good condition, with a mixture of mature trees and a juvenile understorey. Fallen timber and a dense groundcover provides suitable shelter for a wide range of terrestrial species, with hollow-bearing trees providing suitable breeding and nesting habitat for avifauna and arboreal species.
- The cave (disused mine entrance) adjacent to the proposed disturbance area at Newstan Colliery Surface Site, which is known as "Bat Alley", provides potentially important roosting habitat for cave-dwelling bat species. This potentially important bat roost has been avoided and protected to ensure that no impact to potential breeding opportunities for the Little Bentwing Bat and Eastern Bentwing Bat occurs.
- The proposed disturbance area at Hawkmount Quarry was found to be native vegetation that was mostly regrowth with large areas of cleared land and old quarry workings which have since filled with water.
- Two threatened flora species were detected within the proposed disturbance areas, namely *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea) and *Tetradlea juncea* (*Black-eyed Susan*), which are both listed as Vulnerable under the *NSW Threatened Species Conservation Act 1995 (TSC Act)* and *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. As a result of the Project, one individual of *G. parviflora* subsp. *parviflora* and 375 clumps of *T. juncea* will be removed.
- Four threatened fauna species were recorded, namely the Little Lorikeet (*Glossopsitta pusilla*), Grey-headed Flying-fox (*Pteropus poliocephalus*), Little Bentwing-bat (*Miniopterus australis*) and Large-eared Pied Bat (*Chalinolobus dwyeri*). Each of these species are listed as Vulnerable under the TSC Act. In addition, the Grey-headed Flying-fox and Large-eared Pied Bat are listed as Vulnerable under the EPBC Act.
- No threatened ecological communities or populations listed under the TSC Act or EPBC Act were detected within the proposed disturbance areas.
- Both of the proposed disturbance areas are adjacent to large areas of native vegetation providing additional habitat opportunities for threatened fauna species. The relatively small area (8.75 hectares) of native vegetation proposed to be disturbed is not expected to significantly impact upon the threatened fauna species considered, either by direct habitat loss or fragmentation.
- The seven-part tests conducted for threatened flora and fauna species and endangered ecological communities (EECs) recorded or considered likely to occur within the two proposed disturbance areas and surface water discharge locations concluded that the Project is unlikely to have a significant impact. The EPBC Act Assessment of Significance concluded that no threatened species which were detected or considered likely to occur will be significantly impacted by the Project.

### 4.4 Topography and Hydrology

The topography of the Project Application Area generally consists of undulating to rolling rises, with short side slopes and numerous closely spaced drainage lines. Slope gradients are generally 10 to 25 percent and local relief is between 20 and 110 metres Australian Height Datum (AHD).

The Project Application Area is drained by the upper tributaries of Palmers Creek, which is a tributary of Stony Creek. Stony Creek flows into Lake Macquarie, which is a coastal saltwater lake. Due to its linear components, the Project Application Area traverses several creeks and catchments, including LT Creek, Dora Creek, Jigadee Creek, Palmers Creek, Stony Creek, Lords Creek and Stockyard Creek.

The Newstan Colliery Surface Site is located within the LT Creek catchment. LT Creek flows through the Newstan Colliery Surface Site and then into Fennell Bay, on the north-western shore of Lake Macquarie. LT Creek divides within the Newstan Colliery Surface Site to form a T-shaped depression that opens to the south-east. The Newstan Colliery Environment Protection Licence EPL 395 permits the discharge of water from the Newstan Colliery Surface Site via three licensed discharge points:

- Newstan LDP001 and Newstan LDP002 in to LT Creek, which reports to the western side of Lake Macquarie; and
- Newstan LDP017 in to Stony Creek, which also reports to western side of Lake Macquarie.

The Project proposes a new licensed discharge point for the SREA at the Newstan Colliery Surface Site.

The Cooranbong Entry Site drains to an unnamed drainage path that reports to Muddy Lake on the western side of Lake Macquarie. The Mandalong Mine EPL 365 permits the discharge of water from the Cooranbong Entry Site via two licensed discharge points known as Cooranbong LDP001 and Cooranbong LDP002 in to the unnamed drainage path.

The Project proposes a new licensed discharge point for Hawkmount Quarry.

## 4.5 Land and Soil Capability

The *Soil and Land Capability Assessment* (SLR 2014) undertaken for the Project assessed land and soil capability (LSC) within the proposed two disturbance areas in accordance with *The Land and Soil Capability (LSC) Assessment Scheme; Second approximation* (OEH 2012). The aim of this assessment was to delineate the various classes of rural lands on the basis of their capability to remain stable under particular land uses.

The scheme consists of eight classes (Classes 1 to 8), which classify the land based on the severity of long-term limitations in consideration of:

- The biophysical features of the land to derive the LSC classes associated with various hazards; and
- The management of the hazards including the level of inputs, expertise and investment required to manage the land sustainably.

The LSC classes are described by SLR (2014) as listed in **Table 6**.

**Table 6 – Land and Soil Capability Classes**

<b>Class</b>	<b>Land and Soil Capability</b>
<b>Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)</b>	
1	<b>Extremely high capability land:</b> Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	<b>Very high capability land:</b> Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	<b>High capability land:</b> Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
<b>Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)</b>	
4	<b>Moderate capability land:</b> Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	<b>Moderate–low capability land:</b> Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
<b>Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)</b>	
6	<b>Low capability land:</b> Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation
<b>Land generally incapable of agricultural land use (selective forestry and nature conservation)</b>	
7	<b>Very low capability land:</b> Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	<b>Extremely low capability land:</b> Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation

SLR (2014) found that the proposed disturbance area at the Newstan Colliery Surface Site comprises a pre-disturbance LSC of Class 4. This indicates that the land is moderately capable for a range of land uses, however specialised practices would be necessary to overcome some very severe limitations. The primary constraints to this land class are a slope of up to 15 percent, acidic and sandy textured topsoil with rapid drainage characteristics, and occasional high coarse fragment presence.

The proposed disturbance area at Hawkmount Quarry, given its existing “disturbed terrain”, was designated by SLR (2014) as “Class of Mining”. This indicates that the land is not suitable for agriculture due to severe limitations associated with previous land use activities (i.e. quarrying).

SLR (2014) concluded that the Project will result in a 7.5 ha decrease in LSC Class 4 and a 13.9 hectare increase in LSC Class 6 through the commitment to rehabilitation the Hawkmount quarry once it is filled with rejects.

#### **4.6 Agricultural Suitability Assessment**

The *Soil and Land Capability Assessment* (SLR 2014) also assessed the agricultural suitability of the two proposed disturbance areas in accordance with the *Agricultural Suitability Maps – uses and limitations* (NSW Agricultural and Fisheries 1990). The system consists of five classes (Classes 1 to 5), which provide a ranking of rural lands according to their productivity for a wide range of agricultural activities with the

objective of determining the potential for crop growth within certain limits. A description of each agricultural suitability class, as provided by SLR (2014), is listed in **Table 7**.

**Table 7 – Agricultural Suitability Classes**

Class	Land Use	Management Options
1	Highly production land suited to both row and field crops.	Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.
2	Highly productive land suited to both row and field crops.	Arable land suitable for regular cultivation for crops but not suited to continuous cultivation.
3	Moderately productive lands suited to improved pasture and to cropping within a pasture rotation.	Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture.
4	Marginal lands not suitable for cultivation and with a low to very low productivity for grazing.	Land suitable for grazing but not for cultivation. Agriculture is based on native or improved pastures established using minimum tillage.
5	Marginal lands not suitable for cultivation and with a low to very low productivity for grazing.	Land unsuitable for agriculture or at best suited only to light grazing.

SLR (2014) determined that the proposed disturbance area at the Newstan Colliery Surface Site comprises a pre-disturbance agricultural suitability of Class 3. This indicates that the most suitable agricultural activity is grazing. The cultivation production level would be low as a result of constraints such as high erodibility associated with slope and the chemical limitation of strong acidity on vegetation growth.

The proposed disturbance area at Hawkmount Quarry, given its existing “disturbed terrain”, is not considered suitable for agriculture due to severe limitations associated with previous land use activities (i.e. quarrying).

#### 4.7 Biophysical Strategic Agricultural Land

While a Strategic Regional Land Use Plans (SRLUP) covering the Project Application Area has not yet been released, Northern Coal Services adopted a precautionary approach and carried out an assessment of the proposed two disturbance areas against the biophysical strategic agricultural land (BSAL) criteria in accordance with the *Strategic Regional Land Use Plan for the Upper Hunter* (DP&I 2012) and the *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (OEH & DPI-OASFS, 2013). Although there is significant overlap between the two documents, they contain differing BSAL assessment criteria and, therefore, an assessment was undertaken in the *Soil and Land Capability Assessment* (SLR 2014) using both references.

Based on the findings of the two assessment procedures, SLR (2014) concluded that there is no BSAL present within the proposed disturbance areas within the Project Application Area.

## 5.0 ASSIGNING REHABILITATION AND CLOSURE DOMAINS

This section describes the rehabilitation domains within the Project Application Area. Domain selection for the Project has been undertaken in accordance with the methodology described in DRE's *ESG3: – Mining Operations Plans Guidelines (2013c)*. The domains and domain objectives defined in this Strategy will be able to be adopted in the Project MOP following development consent.

### 5.1 Primary Domains

The DRE defines “primary domains” as land management units within a mine site, usually with unique operational and functional purpose and therefore similar geophysical characteristics (DRE 2013c). Accordingly, the Project's operational areas have been divided into three primary domains shown in **Figure 3** and described in **Table 8**.

**Table 8 – Primary Domains**

Domains	Description	No.
<b>Primary Domains</b> (refer <b>Figure 3</b> )		
Mining Infrastructure Areas	The infrastructure to be decommissioned and rehabilitated in Domain 1 includes both the existing and proposed mining infrastructure at Newstan Colliery Surface Site and Cooranbong Entry Site.	1
Tailings and Reject Storage Facilities	The tailings and reject storage facilities to be decommissioned and rehabilitated in Domain 2 includes the NREA and SREA at Newstan Colliery Surface Site, and the Hawkmount Quarry (including the associated infrastructure).	2
Other Lands (Including Haul Roads)	Domain 3 includes all areas of the Project Application Area not captured within Domains 1 and 2. This will include the Cooranbong Private Haul Road and Awaba Private Haul Road. These haul roads are sealed and include surface water management infrastructure.  The Newstan-Eraring Private Haul Road is located within the Project Application Area, however it is owned by Eraring Energy and, as such, is not included in this Decommissioning and Rehabilitation Strategy.	3

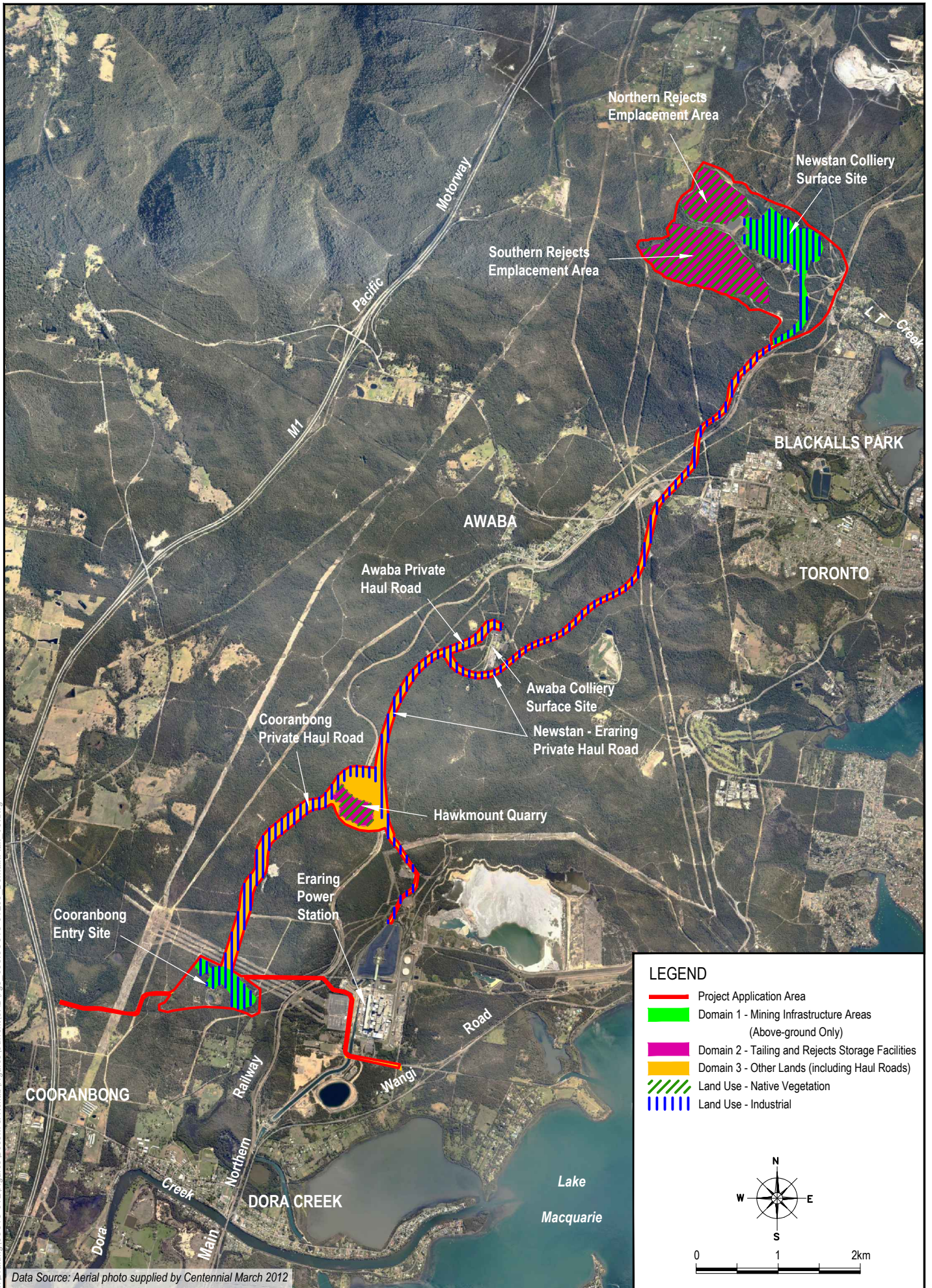
#### 5.1.1 Domain 1: Mining Infrastructure Areas

The infrastructure to be decommissioned and rehabilitated in Domain 1 includes both the existing and proposed mining infrastructure at Newstan Colliery Surface Site and Cooranbong Entry Site, as shown in **Figures 3A** and **3B**, respectively.

##### Newstan Colliery Surface Site

The main features of the Newstan Colliery Surface Site include:

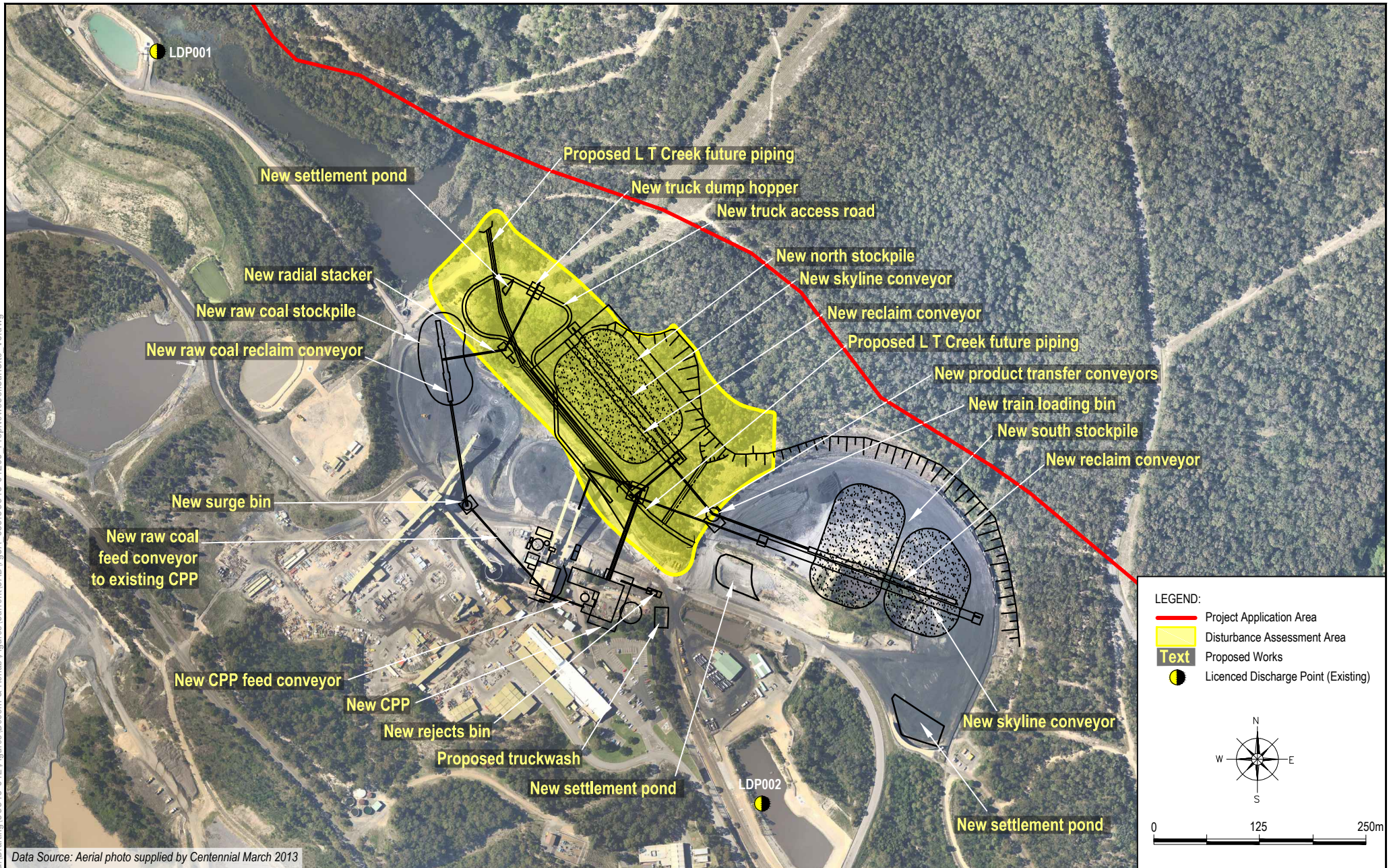
- The Coal Handling Plant (CHP), including road receival facility, transfer and sizing stations, transfer conveyors, radial stacker, ROM coal stockpile area, ROM coal reclaim tunnel, product and reject bins and an automated train loading system;
- The Coal Preparation Plant (CPP), including coal preparation equipment utilising large, fine and ultra-fine circuits;
- Administration buildings, bathhouse and car parks;
- Mechanical workshop, store and sheds (i.e. including refuelling station, air compressors, and machinery wash-down bay);
- Other infrastructure, including equipment and materials storage areas, electrical sub-station, fuel and hydrocarbon storage, solcenic tanks and emergency services helipad.



G:\Drafting\CCC13-012\Figures\Decor & Rehab\Figures\Current\CAD\Fg3\_633.CCC13-01200\_DomainPlan\_V5.dwg

To be printed A4

G:\Drafting\CCC13-012\Figures\Decom & Rehab\Figures\Current\CAD\Fig3A\_633\_CCC13-012000\_PropNewColliSurfSite\_V5.dwg  
To be printed A4





G:\Drafting\CCCC13-012\Figures\Decom & Rehab\Figures\Current\CAD\Fig3B\_633.CCC13-01200\_CoorEntrySite\_V4.dwg

To be printed A4

- Services including the existing connections to Hunter Water Corporation's reticulated potable water system, Ausgrid's reticulated electricity and natural gas network, and Telstra's reticulated telecommunications networks;
- Wastewater treatment plant and holding tank;
- Old mine drift entrance and associated shaft known as Bat Alley (utilised by bat colonies for roosting and breeding); and
- Water management system including:
  - Water treatment plant;
  - Sediment dams; and
  - Licenced Discharge Points LDP001, LDP002, LDP017 and the proposed LDP003.

### **Cooranbong Entry Site**

The main surface facilities at the Cooranbong Entry Site include:

- CHP, including conveyor systems (aerial), coal bins, stockpile areas, truck loading bin, rotary breaker and sizer and crushing plant;
- Mechanical workshop, store and sheds (i.e. including refuelling station, compressor shed and machinery wash-down bay);
- Administration buildings, bathhouse and car parks;
- Services including the existing connections to Hunter Water Corporation's reticulated potable water system, Ausgrid's reticulated electricity and natural gas network, and Telstra's reticulated telecommunications networks;
- Wastewater management system (pump-out system);
- Other infrastructure, including equipment and materials storage areas, electrical sub-station, fuel and hydrocarbon storage and emergency services helipad; and
- Water management system:
  - Sediment dams; and
  - Licenced discharge points LDP001 and LDP002.

### **5.1.2 Domain 2: Tailings and Reject Storage Facilities**

The tailings and coarse reject storage facilities to be decommissioned and rehabilitated in Domain 2 include:

- Newstan Colliery Southern Rejects Emplacement Area (SREA) (active);
- Newstan Colliery Northern Rejects Emplacement Area (NREA) (active); and
- Hawkmount Quarry (proposed).

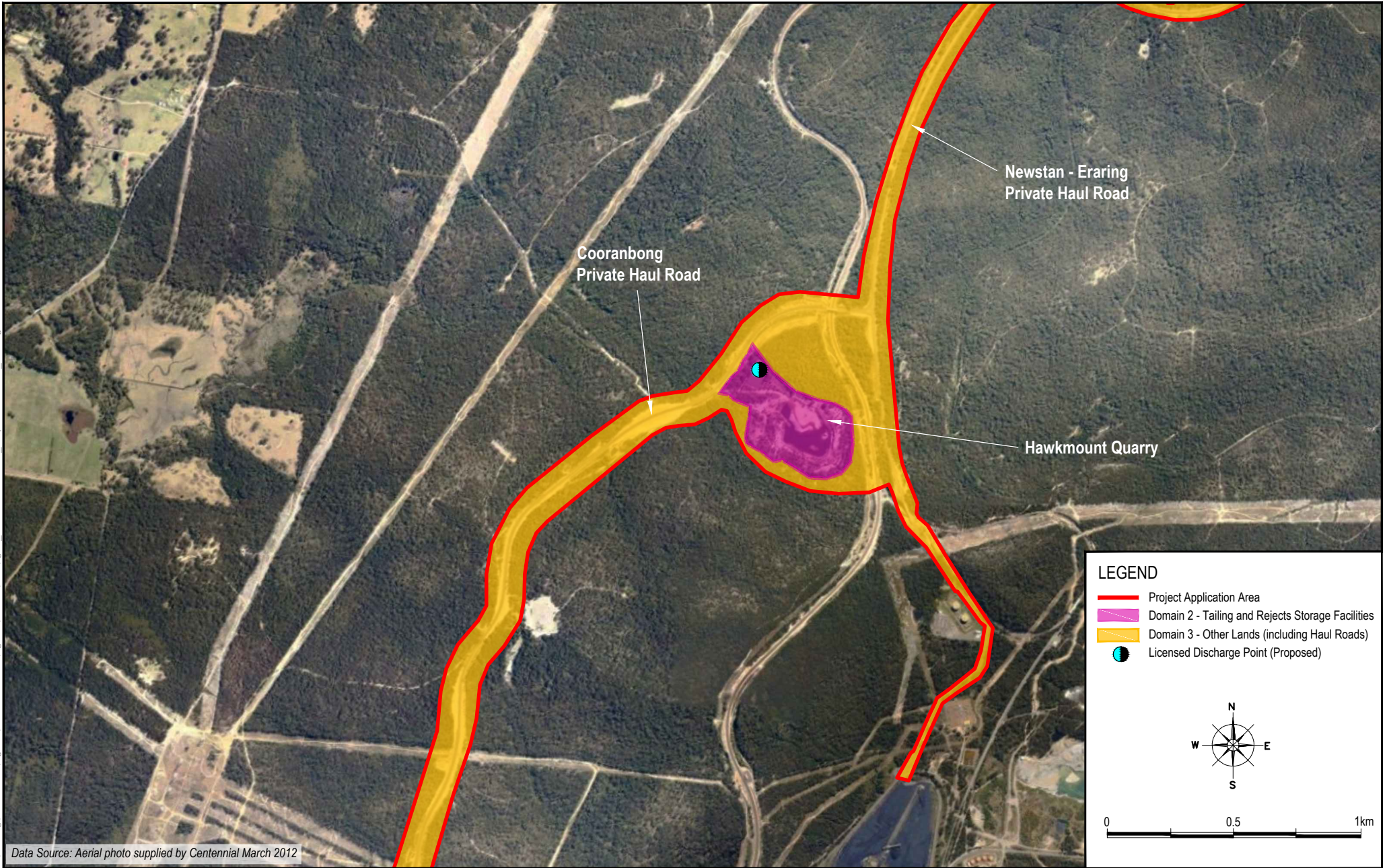
The Hawkmount Quarry is shown in **Figure 3C**.

### **5.1.3 Domain 3: Other Land (including Haul Roads)**

Domain 3 includes all areas of the Project Application Area not captured within Domains 1 and 2. This includes:

- Cooranbong Private Haul Road - approximately 3.4 kilometres long, linking the Newstan Colliery Surface Site and the Cooranbong Entry Site via the Newstan-Eraring Private Haul Road; and
- Awaba Private Haul Road - approximately 770 metres long, linking Awaba Colliery Surface Site to the Newstan-Eraring Private Haul Road.

G:\Drafting\CCCC13-012\Figures\Decom & Rehab\Figures\Current\CAD\Fig3C\_633.CCC13-01200\_PropHawkQRRedev\_V3.dwg



Data Source: Aerial photo supplied by Centennial March 2012

To be printed A4

All infrastructure associated with these haul roads, including culverts, signage, water management infrastructure and fauna crossings, are included within Domain 3.

The Newstan-Eraring Private Haul Road is located within the Project Application Area, however it is owned by Eraring Energy and, as such, is not included in this Decommissioning and Rehabilitation Strategy.

## 5.2 Secondary Domains

Secondary domains are defined as land management units characterised by a similar post disturbance land use objective (DRE 2013c). Two secondary domains, based on the preferred final land uses, are proposed. These are shown in **Figure 3** and described in **9**.

**Table 9 – Secondary Domains**

Domains	Description	No
<b>Secondary Domains</b> (refer <b>Figure 3</b> ) – shown as hatching on the plan.		
Native Vegetation	Native Vegetation (green diagonal hatching) will comprise components of NREA, SREA and Hawkmount Quarry. Areas will be rehabilitated with native grasses and tree species commensurate with adjacent remnant vegetation. This domain will provide wildlife corridors in the post disturbance landscape.	A
Industrial Land Use	Industrial Land Use (blue vertical hatching) comprises the Newstan Colliery Surface Site and Cooranbong Entry Site, as well as the Cooranbong Private Haul Road and Awaba Private Haul Road (to be retained)	B

## 5.3 Domain Rehabilitation Objectives

General rehabilitation objectives for the Project are outlined in **Section 1.3**. Rehabilitation domains require specific management objectives to realise the desired final land use outcome due to the distinct geophysical features associated with the current land function. The rehabilitation objectives for each domain are listed in **Table 10**.

**Table 10 – Primary and Secondary Domain Objectives**

Domain	Rehabilitation Objective
<b>Primary Domains</b> (refer <b>Figure 3</b> )	
Domain 1 – Mining Infrastructure Areas	The principal objectives of Domain 1 are: <ul style="list-style-type: none"> <li>Sediment-laden (dirty) water runoff from disturbance areas will be captured and diverted to retention dams;</li> <li>Dirty water will be treated before discharge from site in accordance with regulatory requirements;</li> <li>Decommission and remove all unwanted built infrastructure prior to closure unless otherwise approved; and</li> <li>Retain a safe and stable landform which will pose no long-term environmental hazard.</li> </ul>
Domain 2 - Tailings and Reject Storage Facilities	The principal objectives of Domain 2 are: <ul style="list-style-type: none"> <li>Form a stable landform which will pose no long-term environmental hazard;</li> <li>Create final landforms suitable for the nominated end land use being native vegetation;</li> <li>Sediment laden (dirty) water runoff from disturbance areas will be captured and diverted to retention dams; and</li> <li>Dirty water will be treated before discharge from site in accordance with regulatory requirements.</li> </ul>
Domain 3 - Other Lands (including Haul Roads)	The principal objective of Domain 3 is to rehabilitate surface impacts arising from ancillary activities within all areas of the Project Application Area not captured in Domains 1 and 2.
<b>Secondary Domains</b> (refer <b>Figure 3</b> )	

Domain	Rehabilitation Objective
Domain A – Native Vegetation	The principal objectives of Domain A are: <ul style="list-style-type: none"> <li>• Form a stable and a self-sustaining landform which will pose no long-term environmental hazard;</li> <li>• Establish native vegetation communities compatible with the immediate surrounds; and</li> <li>• Contribute to the development of wildlife corridors.</li> </ul>
Domain B - Industrial Land Use	The principal objectives of Domain B are: <ul style="list-style-type: none"> <li>• Remove any unwanted plant, equipment and buildings;</li> <li>• Retain all access, power and related services to facilitate attractiveness of site for a future Industrial land use;</li> <li>• Retain the surface water management systems;</li> <li>• Make safe and seal all mine entries;</li> <li>• Identify and remove all hazard materials from the site (including asbestos and polychlorinated biphenyl (PCBs)); and</li> <li>• Investigate and remediate all contamination to a standard suitable for an Industrial land use.</li> </ul>

## 6.0 PRELIMINARY LAND USE OPTIONS ANALYSIS

### 6.1 Proposed Post Disturbance Land Use

#### 6.1.1 Domain 1: Newstan Colliery Surface Site and Cooranbong Entry Site

It is intended to re-develop the existing Newstan Colliery Surface Site and Cooranbong Entry Site for industrial-based land use(s). As outlined in **Section 3.2**, the Newstan Colliery Surface Site is currently covered by numerous land use zones under the provisions of the LEP 2004. The areas within the existing and proposed developed footprint at the Newstan Colliery Surface Site (see **Figure 3**) that present an opportunity for a possible future land use other than native bushland are covered by the following zones under the provisions of the LEP 2004:

- 4(1) Industrial (Core);
- 7(2) Conservation (Secondary);
- 7(3) Environmental (General); and
- 9 Natural Resources.

The developed footprint at the Cooranbong Entry Site (see **Figure 3**) is currently covered by two land use zones under the provisions of the LEP 2004:

- 4(1) Industrial (Core); and
- 9 Natural Resources.

Within the areas zoned 9 Natural Resources and 4(1) Industrial (Core) “industries” are a permissible land use.. Consequently a development application for an industrial-style development within these sites could be lodged with the consent authority. Such an application would be the subject of a merits based assessment under the applicable planning instruments.

However, the zoning of this land is set to change to SP1 Special Activities (Mine), under the provisions of the Draft LEP 2013 and industrial development will be a prohibited land use. As a result, an amendment to Draft LEP 2013 (i.e. rezoning of the land) would be required to facilitate a future industrial development on this portion of land. Following any such LEP amendment (if approved), a development application would need to be lodged with the consent authority.

Within the area of land zoned 7(2) Conservation (Secondary) and 7(3) Environmental (General) Zone “industries” are prohibited developments. Additionally, the zoning of this land is set to change to E2 Environmental Conservation under the Draft LEP 2013, and industries will remain prohibited. As a result an amendment to the relevant LEP (i.e. rezoning of the land) would be required to facilitate any future industrial development on this portion of land. Following any such LEP amendment, a development application would need to be lodged and approved by the relevant consent authority. The water supply, quality monitoring and management infrastructure at Newstan Colliery Surface Site and the mine dewatering infrastructure at the Cooranbong Entry Site (including all LDPs) will be decommissioned and the land rehabilitated to native bush land and mixed native grasses to be consistent with surrounding land use. It is likely that the existing potable water supply infrastructure to the Cooranbong Entry Site will remain in situ to service any future land use.

#### Domain 2: Tailings and Rejects Storage Facilities

The post-mining land use for the tailings and rejects storage areas is intended to be a combination of native bushland and mixed native grasses commensurate with the pre-mining conditions. In view of the relatively small surface disturbance areas associated with the rejects emplacement areas, consideration of the potential for integration with other rehabilitation and off-set strategies is minimal.

### Domain 3: Other Lands

Domain 3 includes all areas of the Project Application Area not captured within Domains 1 and 2, including haul roads and associated infrastructure. During closure planning Centennial will liaise with stakeholders to identify a suitable alternative use(s) for the haul roads, which may include use by industry and/or use as public roads. In the event that an alternative post disturbance use is not identified and agreed with relevant stakeholders, the haul roads will be rehabilitated to native bush land and mixed native grasses. Due to the elongated nature of the domain, the post-mining land use is proposed to be consistent with surrounding land use at the time of decommissioning.

## 6.2 Centennial Strategic Land Assessment

In 2012 Centennial completed a strategic land assessment for their off-tenement land holdings, which included the preparation of an internal report titled *Strategic Land Assessment* (GSS Environmental 2012b). This strategic land assessment included the identification of Centennial-owned land that has the potential for current or future alternative land uses (other than mining). Some of the land with the Northern Coal Logistics Project Application Area was considered as part of this assessment and, as such, the outcomes of this work are relevant in terms of establishing future land uses.

The assessment focused on the potential for future residential and employment land uses (including commercial/offices, industrial and retail). The land assessed within the Project Application Area is zoned a mix of 1(1) Rural (Production), 5 Infrastructure, 7(1) Conservation (Primary), 7(2) Conservation (Secondary), 7(3) Environment (General) and 9 Natural Resources pursuant to the LEP 2004. Under the provisions of the LHRS, the land is identified as "Rural Land" and "Environmental Assets" within a "Coal Resource" area.

The land assessed within this 2012 assessment was not identified as having potential for any medium or high density residential land uses (other than single dwelling houses). Furthermore, only the land zoned 9 Natural Resources had the potential (subject to relevant planning approvals) for industrial development. (*Note: The strategic land assessment did not consider whether the land could be rezoned under the provisions of the EP&A Act to facilitate future alternative land uses*).

The results of the strategic land assessment are considered to be generally indicative of the potential future land use options for the entire area. The results of the strategic land assessment are generally consistent with the proposed post closure land use included in this Strategy, namely industrial and native bushland and mixed native grasses.

## 6.3 Stakeholder Engagement

Centennial has a strong commitment to stakeholder engagement, in particular the company's website states that:

*"Centennial recognises both our local neighbours and the broader community as important stakeholders in our business and we aim to maintain effective working relationships with these stakeholders."*

Northern Coal Services has undertaken consultation with State and local government agencies, local Aboriginal groups, the Newstan Colliery Community Consultative Committee (CCC) and Mandalong Mine CCC, surrounding residents and the wider community and service providers during pre-feasibility, feasibility and planning stages of the Northern Coal Logistics Project (detailed of this consultation is provided in the EIS). Such consultation will continue throughout the life of the Project.

Community consultation is undertaken through a number of forums, including:

- Newstan Colliery CCC and Mandalong Mine CCC;
- LT Creek Sustainable Neighbourhood Group;
- Letters to landholders and residents within the surrounding area;
- Publication and updates on Centennial's website and in the local newspaper (the "Lakes Mail"); and

- Meetings with individual landowners.

Centennial Newstan and Centennial Mandalong maintain a community complaints and enquiries line which will also be made available to the community for people to obtain up-to-date and factual information and/or make complaints regarding the Project.

Prior to any proposed major construction or rehabilitation works, Northern Coal Logistics will consult with relevant stakeholders as required. Decommissioning and rehabilitation works to be undertaken at the cessation of mining operations will require additional consultation. Northern Coal Logistics will integrate stakeholder engagement into the detailed closure planning process, and may include:

- Identification of all stakeholders and preparation of a specific stakeholder engagement strategy;
- Discussion regarding the opportunities for the re-use of infrastructure constructed for the Project (including water management structures, roads and tracks); and
- Identification of any other issues, key risks and information needs regarding decommissioning and rehabilitation of the Project.

## 7.0 RISK MANAGEMENT

### 7.1 Environmental Risk Assessment

A Broad Brush Risk Assessment (BBRA) was undertaken during development of the Project Briefing Paper, which was used to seek the DGRs (see **Section 3.4**) for the Project. Centennial's Risk Management Standard Risk Matrix was used to calculate the consequence and likelihood of an event to evaluate the subsequent risk level (risk rank). Risks are ranked as "low", "moderate", "significant", "high" or "extreme". This system operates in accordance with *AS/NZS ISO 31000/2009 Risk Management - Principles and Guidelines*. The primary objectives of the environmental risk analysis include:

- Identification of potential hazards/impacts;
- Determination of the consequence of the hazard/impact occurring;
- Determination of the likelihood of an event occurring;
- Assessment of the risk by determining the probability (likelihood) and consequence (effect) of each hazard/impact; and
- Identification of the controls/safe guards to mitigate the hazard/impact.

Of these risks identified in the Project BBRA, there was one "low" risk identified that is related to decommissioning and rehabilitation and has therefore been considered in the preparation of this Strategy as applicable:

- Visual impacts or complaints regarding impacts to visual amenity.

### 7.2 Environmental Risk Management

The existing Newstan Colliery Environmental Management System (EMS) and Mandalong Mine EMS will be re-developed into a single consolidated EMS for the Northern Coal Logistics Project. The findings and recommendations of the various specialist assessments undertaken as part of the EIS will be considered and incorporated into the EMS, along with the commitments made in the EIS and relevant consent conditions.

The EMS will be supported by a comprehensive set of issue-specific environment management plans (EMPs) to manage the various environmental risks within the Project Application Area, including rehabilitation areas and management of rehabilitation areas. The EMPs will be supported by an environmental monitoring program, which will include monitoring of flora and fauna, meteorological conditions, air quality, noise, surface water and groundwater, and rehabilitation areas.

The EMS, including EMPs and monitoring program, will be regularly reviewed and updated (as necessary) to reflect operation changes and incorporate additional/amended requirements. The EMPs will be made publically available on Centennial's website, and monitoring results will be reported monthly on Centennial's website and on an annual basis in an Annual Review (formerly the Annual Environmental Management Report).

## 8.0 DECOMMISSIONING AND REHABILITATION IMPLEMENTATION

On cessation of all mine related activities, including the tailings and reject emplacement, the Project Application Area will be either fully rehabilitated to create a stable and self-sustaining landform for the nominated end land uses of native vegetation, or parts will be retained for future industrial uses. The achievement of the agreed post disturbance land use is recognised as a series of conceptual rehabilitation phases described in **Table 1**.

**Table 1 – Rehabilitation Phases for Life of Mine**

Phase		Description
1	Decommissioning	The process of removing hardstand areas, plant, equipment, buildings and other structures and all contaminated and hazardous materials.
2	Landform Establishment	The process of shaping unformed rock or other sub-stratum material into a desired land surface profile including final landform drainage features. This phase includes substrate material characterisation, hazardous material encapsulation and earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics.
3	Growth Medium Development	The process of establishing and enhancing the physical structure, chemical properties and biological properties of a soil stratum suitable for plant growth. This includes placing and spreading soil and applying ameliorants.
4	Ecosystem Establishment	The process of seeding, planting and transplanting plant species. Incorporates management actions such as weed and feral pest control to achieve species establishment and growth to juvenile communities, and habitat augmentation.
5	Ecosystem Development	The process of applying management techniques to encourage an ecosystem to grow and develop towards a desired and sustainable post disturbance land use outcome. Incorporates features including species reproduction, nutrient recycling and community structure.
6	Rehabilitation Complete/Relinquishment	Completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

### 8.1 Decommissioning Phase

#### 8.1.1 Domain 1: Mining Infrastructure

It is intended that the Newstan Colliery Surface Site and Cooranbong Entry Site within Domain 1 will be retained for some future post-mining industrial land use. The key attributes of the domain, including location, proximity to the Main Northern Railway Line (and rail loop at Newstan Colliery Surface Site), large hard stand areas, water management infrastructure, available services and connection to the Newstan-Eraring Private Haul Road, all support this option.

It is acknowledged that there are some elements at both sites that are specifically related to underground coal mining and coal handling/processing and these will need to be decommissioned and removed from the site before it could be used for some other beneficial land use. To address this requirement, a decommissioning and demolition strategy will form an integral part of the detailed closure planning to be undertaken as the Project approaches five years from the planned closure. This will include engaging structural engineers and appropriate technical experts with experience in demolition and the application of relevant Australian Standards and guidelines. A detailed investigation of all structures will be completed at this stage to determine the appropriate techniques, equipment required, and the sequence for decommissioning and removal required to execute the demolition activities safely.

Prior to commencement of demolition, an asset register will be distributed to all other Centennial sites to ascertain whether any of the key assets can be reused within the Centennial business.

### 8.1.1.1 Site Investigations

A site investigation will be completed during for the decommissioning and demolition phase. This will include:

- The type, location and extent of underground services such as conduits, cables and pipe work;
- The location and extent of underground structures to be retained and those to be removed;
- The location, type and extent of overhead services and structures such as power cables, conveyors, light poles and pipe work that are owned and/or managed by Northern Coal Services;
- The location and condition of all tanks and vessels (with emphasis on remaining combustible materials and methods required for their removal);
- The presence of contaminated and hazardous materials and the classification and disposal of these materials;
- The general condition of adjacent structures; and
- Any infrastructure to remain following decommissioning (where appropriate).

### 8.1.1.2 Structures Condition Assessment

When planning for decommissioning and demolition an investigation of the structures will be completed to identify the following:

- The structures' current condition with regard to state of disrepair or deterioration;
- The presence of heavy steel within structures that may require specialised demolition equipment and/or techniques; and
- Confined spaces and/or techniques required to be implemented in order to avoid entering such spaces.

### 8.1.1.3 Site Preparation

Prior to the commencement of any demolition activities the following tasks will be undertaken:

- All sumps will be dewatered;
- All items will be decommissioned, de-oiled, depressurised and isolated; and
- All hazardous materials will be removed and transported to appropriately licensed disposal facilities.

### 8.1.1.4 Contamination

Centennial completed a Phase 1 desktop contaminated land assessment for the Newstan Colliery and Mandalong Mine (including the Newstan Colliery Surface Site and Cooranbong Entry Site) in December 2010. Based on the results of the Phase 1 assessment, potential contamination at the surface sites was identified to be generally associated with fuel storage and handling and equipment storage and maintenance. The risk associated with potential contamination at the Newstan Colliery Surface Site and Cooranbong Entry Site was considered to be moderate.

In February 2012, as an outcome of the Phase 1 assessment, Centennial submitted Contamination Notifications to the Environment Protection Authority (EPA) in accordance with section 60 of the *Contaminated Land Management Act 1997*. In accordance with commitments made to the EPA in the Notifications, Centennial has completed a Phase 2 assessment of Newstan Colliery and has commenced a Phase 2 assessment for the Cooranbong Entry Site. Following the completion of the Phase 2 assessments, remediation plans will be developed and implemented in consultation with the EPA and an accredited contaminated land auditor to address any contamination issues identified. In a letter dated the 6 July 2012 the EPA confirmed acceptance of the approach proposed by Centennial Newstan and Centennial Mandalong.

Further to this, Centennial will undertake additional contamination assessments and, if needed, remediation activities, at the Newstan Colliery Surface Site and Cooranbong Entry Site well in advance of final closure.

Where possible all identified sources of contamination will be remediated during the operational phase of the Project. In some cases, however, this may not be possible (for example, under existing slabs, and workshops) and in these circumstances the remediation will be undertaken following closure and during decommissioning.

#### **8.1.1.5 Hazardous Materials**

Prior to the demolition of any structures, a hazardous materials assessment will be undertaken to determine whether there are any hazardous materials present, including asbestos. Where hazardous materials are identified, they will be assessed and quantified to enable appropriate safety measures to be implemented during removal by a licensed contractor. All hazardous material removed will be recorded and disposed of at an approved waste management facility.

#### **8.1.1.6 Site Services**

All services, including power, water, data and telephone, that are not required for some other commercial post disturbance land use will be safely isolated, disconnected and terminated. Generally all underground services will be made safe and left buried in-situ. Overhead power lines will be removed and the materials, including poles and wire, recovered for potential re-sale or recycling where practicable. Where they are retained the site services plans will be updated to ensure all services are adequately recorded.

Where also practicable, pipelines and cables will be capped and remain in-situ. This is due to the risk of disturbing the re-established vegetation by excavation and removal. The location of pipelines that are to remain in-situ and that are not required for some other land use will be recorded in an abandoned services register and signs will be erected where appropriate.

#### **8.1.1.7 Equipment and Buildings**

All demountable/transportable buildings not required for some other commercial post disturbance land use will be removed from the surface facility sites. All remaining permanent buildings, including the CHP, CPP and associated coal chain infrastructure will then be demolished, with the component materials being recycled or re-sold where practicable.

Any materials not recycled or re-sold will be disposed of in a suitable location either on-site or off-site at a licensed waste management facility. Opportunities for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible. Material assessed as "not hazardous or contaminated" by a suitably qualified person will be crushed and disposed of within associated portal entries or placed as fill into shafts.

Concrete footings and pads will be broken up and removed. Options for the re-use of this material (for example, crushed and used for road and track stabilisation) will be investigated as the Project approaches closure. If re-use or recycling opportunities are not available or viable, all non-contaminated waste material will be disposed of in a suitable location on-site, filling nearby drifts, or off-site at an approved waste management facility.

All sumps will be de-watered and de-silted prior to the commencement of demolition. In addition, all items of equipment will be de-oiled, degassed, depressurised and isolated, and all hazardous materials will be removed from the Project Application Area. All recoverable scrap steel will be sold and/or recycled. Prior to disposal, all wastes will be assessed and classified in accordance with the relevant regulatory requirements.

Where structures are removed, the associated concrete slabs will also be removed, with all areas will then be reshaped, deep ripped, topsoiled and seeded. Where suitable quantities of topsoil material is not available at the site, the use of other organics such as bio-solids and/or compost will be assessed as an appropriate addition to enable the establishment of an appropriate vegetation cover.

### **8.1.1.8 Reclaim Tunnels**

Where practicable the material overlaying the reclaim tunnels will be removed to expose the roof of the tunnels. Once the roof is exposed the concrete will be broken up and placed back into the tunnel or disposed of in a suitable location on-site, filling nearby drifts/shafts or off-site at an approved waste management facility. These works will aim to leave minimal cavities prior to backfilling the tunnel. Once the reclaim tunnels are backfilled, a geotechnical assessment will be undertaken to determine whether the areas can be built over or whether they should be quarantined from future development.

### **8.1.1.9 Bitumen Roads, Tracks and Hardstand Areas**

Roadways and/or tracks may be required to remain to provide access to some other post disturbance land use as well as being required for the on-going access for monitoring and maintenance activities. Alternatively, roads and/or tracks may remain on-site if agreed in writing by the landowner.

Access roads, tracks, car parks and hard stand areas that are not required will be scalped to remove stabilised and compacted material. The inert waste will be disposed of in a suitable location on-site or off-site at an approved waste management facility. Material assessed as "not hazardous or contaminated" by a suitably qualified person can be crushed and disposed of within associated portal entries or placed as fill into the shafts.

Minor reshaping work may be undertaken to ensure surface level consistency with the surrounding areas and rehabilitated. Any creek crossings (such as culverts) will be removed and the pre-existing drainage line re-instated.

### **8.1.1.10 Fuel Farms and Chemical Storage Areas**

Prior to closure any remaining fuel and/or chemicals will be recycled or disposed of at an appropriately licensed facility. All items of equipment will be de-oiled, degassed, depressurised and isolated, and all hazardous materials removed from the site. All infrastructure associated with fuel farms and chemical storage areas will be demolished and disposed of off-site at a licensed waste management facility. Opportunities for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible.

Concrete footings and pads will be broken up and removed. Options for the re-use of this material (for example, crushed and used for road and track stabilisation) will be investigated as the operation approaches closure. If re-use or recycling opportunities are not available or viable, all non-contaminated waste material will be disposed of in a suitable location on-site or off-site at an approved waste management facility. Material assessed as "not hazardous or contaminated" by a suitably qualified person can be crushed and disposed of within the associated portal entries or placed as fill into shafts.

### **8.1.1.11 Conveyors**

All conveyors will be dismantled and removed from site. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Over-head conveyors will be dismantled and lowered to the ground before being cut up. On ground conveyors will be cut up in-situ. All gearboxes and other vessels will be drained of oil and depressurised to remove any potential for contamination prior to demolition.

The carbonaceous material below and in the vicinity of the surface conveyors will be stripped. Where possible the material will be considered for reprocessing. If this is not possible, it will be pushed up and stockpiled to be used to backfill portals or shafts, or to be placed against the cuttings and highwalls as a buttress.

### **8.1.1.12 Stockpile Areas**

The carbonaceous material will be stripped and where possible the material will be considered for reprocessing. If this is not possible, it will be pushed up and stockpiled to be used to backfill portals or shafts, or to be placed against the earthworks cuttings and highwalls as a buttress. All areas should then be reshaped, deep ripped, topsoiled and seeded.

### **8.1.1.13 Rail Loading Infrastructure**

The rail loading facilities will be removed only if they are not required for some other beneficial land use. The rail track will be reused or recycled and ballast material will be used to backfill portals or shafts, or to be placed against the earthworks cuttings and highwalls as a buttress.

Opportunities, for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible.

### **8.1.1.14 Old Mine Drift Entrance and Associated Shaft (Bat Alley)**

Prior to sealing the old drift entrance referred to as Bat Alley, either during operations or during detailed closure planning, a detailed strategy will be developed in consultation with relevant government agencies, including the Office of Environment and Heritage (OEH) and DRE (Mine Safety). Suitably qualified experts will also be consulted during the preparation of the old drift entrance sealing strategy.

Primary consideration will be given to ensuring that the old drift entrance is made safe and does not pose a potential risk to human health. However, the on-going access of bats to the workings via the old drift entrance will also be given consideration. For example, the practicability of sealing the old drift access with a grate that prohibits public access but allows the bats to enter the workings will be considered, along with any on-going maintenance requirements.

The old drift entrance sealing strategy will consider:

- Sealing method that facilitates bat movement;
- The extent of the workings and the potential for toxic gases to accumulate, such as methane, and the propensity for spontaneous combustion;
- Water management requirements, including surface water diversions to prevent surface water draining into the workings;
- Fencings and signage to prevent public access within 50 metres of the old drift entrance; and
- On-going management requirements.

Studies will also be undertaken to provide detailed information regarding the bat populations and support the sealing strategy, including:

- Number and species of bats roosting in the workings;
- Estimate bat population;
- Roosting type, including maternity and over-wintering; and
- Other habitat in the area, including both natural and man-made.

### **8.1.1.15 Cuttings and Highwalls**

There are some earthworks cuttings and highwalls adjacent to the workshop within the Newstan Colliery Surface Site and the rail loop areas that will be retained. Where possible clean fill material will be benched against the walls to provide buttressing to ensure they are long-term stable. If this is not possible a suitably qualified geotechnical engineer will be engaged to inspect the walls at closure and provide a suitable long-term engineering treatment to ensure the benches/highwalls are stable and do not present a safety hazard. This may include, but not be limited to, rock bolting and shot-creting. Where a highwall face of greater than 5 metres is retained, the top of the will be fenced and sign-posted to limit access and advise of the hazard.

### **8.1.1.16 Water Management Facilities**

#### **Water Management Dams**

All water management infrastructure will be removed unless it is required for on-going water management, (for example to prevent erosion and to ensure runoff does not cause off-site contamination). Generally all

water management infrastructure will be made safe and left buried in-situ. The location of water management infrastructure that is to remain in-situ will be recorded in an abandoned services register and signs will be erected where appropriate.

Pipelines located in critical locations, for example infrastructure crossings of environmentally sensitive areas and/or riparian zones, will be filled with inert a material (such as concrete) to avoid additional disturbance of the environment.

### **Surface Water Management Infrastructure**

Where practicable, contour banks, berms and other structures installed as part of the surface water management system will be re-contoured to be aligned with the surrounding environment. Concrete structures will be broken and removed.

#### **8.1.1.17 LT Creek Piping**

If an industrial-type development is progressed as the post-operational land use, the lengths of LT Creek piped through the Newstan Colliery Surface Site will be retained and left in-situ. If the site is to be rehabilitated back to native vegetation, an assessment will be undertaken to determine if the pipework should be removed and the natural regime of the creek re-established or whether this would cause unnecessary disturbance and impact to the aquatic environment and, as such, whether the pipework should remain.

If the decision is made to remove the pipework, a suitably qualified consultant will be engaged to design the re-establishment of the natural creek channel. The decommissioning and rehabilitation activities associated with the re-establishing LT Creek as a natural waterway (i.e. not piped) will include:

- Re-instatement of the creek channel in accordance with designs developed by a suitably qualified expert during detailed closure planning;
- Installing rock armouring where necessary, for example at significant bends; and
- Installing rock drains where drainage lines enter the creek to minimise scouring and to assist dissipation of run-off.

#### **8.1.2 Domain 2: Tailings and Rejects Storage Facilities**

All above ground pipes and pumps dispatching tailings shall be removed and disposed of appropriately. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Generally all underground services will be made safe and left buried in-situ. The location of pipelines that are to remain in-situ will be recorded in an abandoned services register.

#### **8.1.3 Domain 3: Other lands (including Haul Roads)**

With the exception of LDPs within the Project Application Area, there will not be any significant infrastructure located within Domain 3 that will require decommissioning. The infrastructure within Domain 3 that would require some consideration includes:

- Tracks and access roads;
- Laydown areas;
- Cooranbong Private Haul Road;
- Awaba Private Haul Road; and
- All infrastructure associated with these two haul roads, including culverts, signage, water management infrastructure and fauna crossings.

Given the proximity of the Project Application Area to populated areas and infrastructure (for example, local power stations and the M1 Pacific Motorway), there is a high potential that all, or part of, the haul roads will be used either as public roadways or by industry. These options will be considered further during detailed closure planning. Once the final future use for the haul roads is identified, consultation with the relevant stakeholders will be undertaken.

In the unlikely event that an ongoing use of the private haul roads is not identified, or a suitable agreement cannot be reached, the haul roads and associated infrastructure will be decommissioning and rehabilitated as outlined below.

### **8.1.3.1 Haul Roads**

In the situation where the private haul roads require removal and rehabilitation (either in part or in full) the following decommissioning and rehabilitation activities will occur:

- Remove bitumen layer including scraping any stabilised material and excess carbonaceous material and dispose of in an appropriate location. It is recommended that at least the wearing course, base layer and sub-base layer be removed; and
- Establish erosion deflection berms to prevent erosion.

All crossings, including bridges and culverts, will be removed. Any cuttings will be assessed by a qualified geotechnical engineer and appropriate treatments applied (where required). In addition, all creek crossings will be reinstated, with any culverts removed and riparian vegetation re-established.

Additional care will be required when decommissioning the bridge over the north-south Main Northern Railway Line to ensure that the rail service is not disrupted. Appropriately qualified personnel, for example geotechnical engineers and structural engineers, will be engaged during the preparation of the dismantling strategy for the bridge.

Where practicable, all associated infrastructure, including fencing and signage, water management infrastructure and fauna crossings will be removed. Re-use and/or recycling opportunities will be investigated, or alternately all “non-contaminated” waste material will be disposed of in a suitable approved location.

## **8.2 Landform Establishment**

### **8.2.1 Domain 1: Mining Infrastructure**

It is intended that Domain 1 will generally be retained for some future post-mining industrial land use, and on this basis the need for significant landform establishment is expected to be limited. For the areas where the mine-related infrastructure is to be decommissioned, there will be a requirement to undertake some re-profiling including establishing final landform drainage features. This will also include hazardous material encapsulation and earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics

### **8.2.2 Domain 2: Tailings and Rejects Storage Facilities**

#### **8.2.2.1 Southern Rejects Emplacement Area**

The SREA has been designed to be developed in a series of stages to minimise the land area that needs to be cleared and disturbed at any one time. This sequential development also allows a free draining and stable final landform to be achieved if emplacement in this area ceases at any stage of the development. The closure plan for the SREA will require consultation with technical specialist to design and implement an appropriate closure strategy.

The operational performance of the SREA and decant water management will have a significant influence on the final strength and consolidation properties of the materials. Strategies that will be further considered during development of rehabilitation plans will include:

- On-going monitoring and maintenance of the final landform to assess the rate of on-going settlement and to maintain the surface integrity of the landform; and
- Design the landform to the approved average finished landform level of 50 m AHD whilst maintain a surface that promotes sheet flow of surface water to eliminate the need for engineered drainage structures across the final landform surface t. .

Progressive rehabilitation will continue to be undertaken as the SREA is developed in stages, and the volume of the tailings dam will be progressively increased by lifts of the dam wall. Rehabilitation of the dam will only start once the tailings discharge operation is complete and sufficient drying is achieved to allow the placement of permanent capping material.

During detailed closure planning for the SREA a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include:

- Providing a stable landform;
- Providing a landform surface that is resistant to erosion;
- Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and
- Minimises the risk of environmental harm from seepage.

Detailed mine closure planning will include a materials balance to determine the volumes of capping material and select fill required to encapsulate the rejects and construct a free draining landform.

Prior to the re-establishment of vegetation, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials in accordance with "Blue Book" requirements and the approved Erosion and Sediment Control Plan.

### **8.2.2.2 Northern Reject Emplacement Area**

The NREA is nearing capacity and on-going progressive rehabilitation is being undertaken. The closure of the NREA will require consultation with technical specialist to design and implement an appropriate closure strategy.

All above ground pipes dispatching tailings shall be removed and disposed of appropriately. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Generally all underground services will be made safe and left buried in-situ. The location of pipelines that are to remain in-situ will be recorded in an abandoned services register.

During detailed closure planning for the NREA a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include:

- Providing a stable landform;
- Providing a landform surface that is resistant to erosion;
- Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and
- Minimises the risk of environmental harm from seepage.

The capping of the NREA will be designed and constructed so that the surface will be free draining. Topsoil will be used to resurface the area which will then be revegetated. This will inhibit the ponding and infiltration of surface water and minimise the potential for leachate. Rock armouring will also be considered if required to prevent excessive slope erosion.

### 8.2.2.3 Hawkmount Quarry

Progressive rehabilitation of Hawkmount Quarry will be required during operation as possible. During detailed closure planning for the Hawkmount Quarry a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include:

- Providing a stable landform;
- Providing a landform surface that is resistant to erosion;
- Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and
- Minimises the risk of environmental harm from seepage.

The capping of the Hawkmount Quarry will be designed and constructed so that the surface will be free draining. Topsoil will be used to resurface the area which will then be revegetated. This will inhibit the ponding and infiltration of surface water and minimise the potential for leachate. Rock armouring will also be considered if required to prevent excessive slope erosion.

Detailed mine closure planning will include a materials balance to determine the volumes of capping material and select fill required to encapsulate the rejects and construct a free draining landform.

Prior to the re-establishment of vegetation, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials in accordance with “Blue Book” requirements and the approved Erosion and Sediment Control Plan.

### 8.2.3 Domain 3: Other lands (including Haul Roads)

It is intended that the Cooranbong and Awaba Private Haul Roads will be retained and therefore there is no requirement for landform establishment. However in the unlikely event where the private haul roads are required to be rehabilitation (either in part or in full) the following landform establishment activities will occur:

- Reshaping to be commensurate with the surrounding landform;
- Ensure the final profile of the fill is convex so that drainage occurs radially outwards; and
- Rip and scarify the road alignment, verges and berms, etc.

Further to the haul roads, all the LDPs within the Project Application Area will be removed and the disturbance footprints reshaped to be commensurate with the surrounding landform.

## 8.3 Growth Medium Development (all Domains)

### 8.3.1 Progressive Rehabilitation

Due to the nature of operations proposed as part of the Northern Coal Logistics Project, including the minor areas of surface disturbance, the ability to undertake progressive rehabilitation, particularly revegetation, will be relatively limited compared to extractive mining operations. However, Northern Coal Services will adopt a progressive approach to rehabilitation (as needed) in accordance with a series of approved management plans, including on-going maintenance of all previously rehabilitated areas within the Project Application Area.

### 8.3.2 Topsoil Stripping

Determination of suitable soil to conserve for later use in rehabilitation activities was been conducted by SLR as part of the *Soil and Land Capability Assessment* (2014).

#### Proposed Disturbance Area at Newstan Colliery Surface Site

The soil within proposed disturbance area at the Newstan Colliery Surface Site is a texture contrast soil with high acidity throughout the profile. As recommended by SLR (2014), the topsoil should be stripped prior to significant surface disturbance and later respread in focused rehabilitation efforts.

This topsoil is generally suitable to facilitate germination and appropriate management of this soil through amelioration (such as treatment with gypsum or lime to raise pH) will provide an acceptable and stable medium for revegetation. Whilst topsoil structure is generally poor, the material may be stripped to a depth of approximately 0.3 metres and reused in rehabilitation provided appropriate erosion and sediment controls are in place.

The subsoil resources are acidic and display a moderate erosion hazard, however may be stripped below 0.30 metres to approximately 0.70 metres. The subsoil should be treated with lime to raise the pH, stockpiled and used for rehabilitation as an intermediate layer between highly disturbed material and the topdressing layer.

#### Proposed Disturbance Area at Hawkmount Quarry

Given the existing level of disturbance at Hawkmount Quarry, SLR (2014) found minimal naturally occurring soil remaining.

### **8.3.3 Topdressing Management**

Where soil stripping and transportation is required, the following handling techniques, as recommended by SLR (2014), should be adopted to prevent excessive soil deterioration:

- Topsoil should be maintained in a slightly moist condition during stripping, and material not stripped in either an excessively dry or wet condition.
- Stripping should be timed to take place in unison with any vegetation clearing activity. If planning to mix groundcover/grass with the soil (i.e. not removing groundcover prior to soil stripping), a weed assessment should be undertaken prior to stripping.
- Where possible, grading or pushing soil into windrows with graders or dozers for later collection should be undertaken as a preferential less aggressive soil handling systems.
- The surface of soil stockpiles should be left coarsely structured (as much as possible) in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming.
- Topsoil stockpiles should generally be maintained no higher than 3 metres.
- If long-term stockpiling is planned (i.e. greater than three months), the stockpiles should be seeded and fertilised as soon as possible. An annual cover crop species that produces sterile florets or seeds should be sown. A rapid growing and healthy annual pasture sward will provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species will not persist in the rehabilitation areas, however will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil.
- Prior to re-spreading stockpiled topsoil, an assessment of weed infestation on stockpiles should be undertaken to determine if individual stockpiles require herbicide application and/or scalping of weed species prior to topsoil spreading.

An inventory of available soil should be maintained to keep track of soil materials available for planned rehabilitation activities.

### **8.3.4 Soil Re-Spreading and Seedbed Preparation**

Soil should be re-spread directly onto stripped areas where practical. As recommended by SLR (2014), topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, where possible, to

reduce the potential for topsoil loss to wind and water erosion. Soil should be re-spread to the approximate depth from which it was stripped.

Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation. All topsoiled areas should be lightly contour ripped (after topsoil spreading) and, where possible, ripped when the soil is moist and immediately prior to sowing. If required, the re-spread topsoil surface should be scarified prior to, or during seeding, to reduce run-off and increase infiltration.

### **8.3.5 Erosion and Sediment Control**

Where additional disturbance is required, a suite of mitigation measures should be implemented prior to the commencement of disturbance activities in order to minimise the potential for erosion and sediment-laden runoff from disturbed areas.

## **8.4 Ecosystem Establishment (all Domains)**

### **8.4.1 Revegetation Implementation Program**

The ecosystem establishment phase constitutes activities associated with establishing the desired post disturbance vegetation communities including seeding and land management activities such as weed and feral animal control and bushfire management.

A revegetation strategy will be developed for the Project and documented in the MOP to meet the post-mining land-use objectives and maintain effective erosion and weed controls.

Revegetation activities will be scheduled to occur promptly following the completion of topsoil spreading and drainage works. Where possible, the timing of seeding will coincide with the preferred native grass and tree seasonal sowing periods in autumn or spring.

On prepared surfaces, selected tree, shrub and pasture species will be sown using seed stock and/or planted depending on the species, slope gradients and area to be revegetated. Tree and shrub species will be established at a density and richness consistent with the nominated post-mine ecosystem

### **8.4.2 Species to be used for Revegetation**

Species selection for areas to be rehabilitated to native bushland and mixed grasses will focus on those species that will successfully establish on the available growth medium, bind the soil and result in a variety of structure and food/habitat resources. Whilst every attempt will be made to use species that existed prior to the commencement of mining, some additional species may be required to ensure suitable initial groundcover for site stabilisation.

Deep rooting native trees will generally not be used on the REAs, instead they will be revegetated with native shrubs and native grasses. A combination of native trees and grasses will be used for all other areas with a native bushland proposed post-mining land use.

A combination of native and introduced pasture species may be used on the disturbance areas to ensure the quick establishment of a continuous groundcover, thereby reducing the risk of erosion. Legumes may also be selected to assist in the supply of bio-available nitrogen to the soil.

### **8.4.3 Feral Animal and Weed Management**

Feral animal and weed management strategies will be developed and documented in the MOP following development consent. Controls will be implemented to contain the spread of weeds within the entire Project Application Area.

The presence of weed species within topsoil spread on the rehabilitated areas has the potential to have a major impact on re-vegetation and regeneration outcomes. The presence of weed species within the surrounding land also has the potential to significantly impact on the biodiversity value of the rehabilitated areas. Weed management will be a critical component of rehabilitation activities.

Weeds will be managed across the site through a series of control measures, including:

- Regular inspections of the rehabilitated areas to identify potential weed infestations; and
- Identifying and spraying existing weed populations.

The spread of declared noxious weeds will be prevented by using the measures above. Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Herbicides will be used in accordance with regulatory requirements. Records will be maintained of weed infestations and control programs will be implemented according to best management practice for the weed species concerned.

Feral animals are a recognised predator for endangered native fauna species. Other detrimental impacts of feral animals include damage to juvenile vegetation from grazing, spreading weed seeds and erosion. Where required, feral animal control programs will be undertaken in accordance with legislation and in consultation with the Livestock Health and Pest Authority.

## **8.5 Ecosystem Development**

The ecosystem development phase of rehabilitation is characterised as the period of time required to demonstrate that an ecosystem is on a sustainable trajectory towards the desired post disturbance land use. Key activities in this phase include rehabilitation monitoring, rehabilitation maintenance and adaptive management. Key activities are outlined below. Preliminary completion criteria are presented in **Section 9.0**.

### **8.5.1 Rehabilitation Monitoring and Maintenance**

A commitment to effective rehabilitation involves an on-going monitoring and maintenance program throughout and beyond the operation of the Project. Areas being rehabilitated will be regularly inspected and assessed against the long and short-term rehabilitation objectives.

A dedicated monitoring system will be established in order to assess effectiveness of implementation of the rehabilitation measures as well as to identify the need for corrective action as soon as required. The monitoring program will be developed for each closure domain, incorporating the most appropriate indicators and methods that:

- Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives;
- Are reproducible;
- Utilise scientific recognised techniques; and
- Are cost-effective.

## 9.0 CONCEPTUAL REHABILITATION SUCCESS CRITERIA

Conceptual rehabilitation success criteria developed in this Decommissioning and Rehabilitation Strategy provide a framework to guide the development of specific success criteria to demonstrate the completion of each phase of rehabilitation for each domain. The Project is within the planning phase and, therefore, the rehabilitation success criteria are considered conceptual. They will be further developed following detailed design of the final landform during the detailed mine closure planning process and further stakeholder consultation regarding final land use. Mine closure planning will be undertaken during the life of Project and documented in successive MOPs.

Success criteria will be refined throughout the life of the Project by considering:

- An ongoing review of industry research and best practice;
- Outcomes of rehabilitation trials within the Project Application Area and other Centennial operations; and
- Monitoring outcomes for rehabilitation areas and representative analogue sites.

Conceptual rehabilitation success criteria are provided in **Table 2**. Each criterion is designed as a performance objective or standard against which rehabilitation success can be demonstrated. Meeting the success criteria (as indicated by monitoring results) demonstrates that the rehabilitated landscape is in a sustainable condition, ready to be relinquished, and handed back to the appropriate stakeholders.

The success criteria comprise indicators for vegetation, fauna, soil, stability, land use and safety on a landform-type basis that reflects the nominated post-mine land use of industrial and native bushland/mixed native grasses.

**Table 12 – Preliminary Rehabilitation Success Criteria**

Rehabilitation Element	Domain	Indicator	Criteria
<b>Phase 1 – Decommissioning</b>			
Infrastructure	Domain 1	Land use (Industrial)	All buildings, water storage, roads and other infrastructure (except those used by the public) have been removed unless agreed with stakeholders for their retention.
	Domain 3*	Haul Roads	All infrastructure associated with the haul roads have been removed unless agreed with stakeholders for their retention.
	All Domains	No contamination	All sites have been assessed by a suitably qualified expert as not containing contaminants above the relevant criteria for the proposed final land use.
Rejects/Tailings Dams	Domain 2	Capping	All tailings and rejects are capped to a depth approved by regulators, including topsoil and the landform is free draining.
Safety	Domain 1	Physical	Excavations to be rendered safe. All holes/pits and other openings are to be securely capped, filled or otherwise made safe. Access to members of the public and livestock is restricted as appropriate to site conditions. No rubbish should remain at the surface, or at risk of being exposed through erosion.
<b>Phase 2 – Landform Establishment</b>			
Landform Stability	Domain 1, 2 and 3*	Surface water drainage	The landform is stable and contour banks and diversion drains are installed to direct water into stable areas or sediment control basins.

Rehabilitation Element	Domain	Indicator	Criteria
	Domain 1, 2 and 3*	Erosion control	Erosion control structures are installed at intervals commensurate with the slope of the landform.
	Domain 2	Surface Water Drainage	Drainage control measures are installed. No water is observed leaching from the facility.
Water Storage	Domain 1, 2 and 3*	Stable landform	Water storages to be rehabilitated to a stable non-polluting condition.
<b>Phase 3 – Growth Media Development</b>			
Top soil	Domain 1	Physical and chemical parameters	Where practical, previously stockpiled topsoil will be used to sustain the proposed post-mining land use. Where it is assessed as not being suitable and alternative top-soil substitute will be considered (for example bio-solids, organics, etc.)
<b>Phase 4 – Ecosystem Establishment</b>			
Vegetation	Domain 2 and 3*	Species composition	Where relevant, for example areas where the post-mining land use is native bush and mixed grasses, vegetation present is commensurate with the pre-mining environment and/or nearby undisturbed reference sites.
Water Quality	Domain 2	Chemical Composition	Ensure receiving waters affected by surface water runoff have not been impacted by appropriate water quality objectives.
<b>Phase 5 – Ecosystem Development</b>			
Vegetation	Domain 2 and 3*	Community structure	That the community structure is commensurate with pre-mining conditions and/or nearby undisturbed reference sites.
	Domain 2 and 3*	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing. Evidence of second generation of tree/shrub species.
Fauna	Domain 2 and 3*	Vertebrate Species	The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine lease relinquishment or by more than 40% over the two successive seasons prior to mine lease relinquishment.
	Domain 2 and 3*	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes.
	Domain 2 and 3*	Habitat structure	Typical food and water sources required by the majority of vertebrate and invertebrate inhabitants of that ecosystem type are present.
Land Use	Domain 1, 2 and 3*	Land use	The site can be managed for its designated land use without any greater management inputs than other land in the area being used for a similar purpose.

Note: \* Applicable if a suitable post disturbance land use is not identified and agreed upon.

## 10.0 INDICATIVE CLOSURE TIMELINE

An indicative closure timeline is shown in **Table 13** below, including the key rehabilitation and closure activities throughout the life of the Project. In particular the key activities include:

- Closure planning;
- Decommissioning and rehabilitation;
- Maintenance and monitoring;
- Relinquishment; and
- Post relinquishment activities.

**Table 13– Indicative Closure Timeline**

Years From Closure	Closure Planning					Decommissioning and Rehabilitation				Monitoring and Maintenance				Relinquishment	
	-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
<b>Closure Planning</b>															
Stakeholder consultation regarding closure															
Agreed final detailed closure strategy															
Develop an infrastructure demolition plan															
<b>Closure Activities</b>															
Tailings and Rejects Emplacement Capping															
Demolition of infrastructure															
Landform establishment															
Growth media establishment															
Ecosystem establishment															
Ecosystem development															
<b>Post Closure Activities</b>															
Maintenance of Rehabilitated Areas															
Monitoring and Inspections															

## 11.0 REFERENCES

- Australian Government Department of Industry Tourism and Resources, 2011, Leading Practice Sustainable Development Program for the Mining Industry, a Guide to Leading Practise Sustainable Development in Mining.
- Australian Government Department of Industry Tourism and Resources, 2007, Leading Practice sustainable Development Program for the Mining Industry: Biodiversity Management.
- Australian Government Department of Industry Tourism and Resources, 2009, Leading Practice sustainable Development Program for the Mining Industry: Community Engagement and Development.
- Australian Government Department of Industry Tourism and Resources, 2009, Leading Practice sustainable Development Program for the Mining Industry: Hazardous Materials Management.
- Australian Government Department of Industry Tourism and Resources, 2009, Leading Practice sustainable Development Program for the Mining Industry: Mine Closure and Completion.
- Australian Government Department of Industry Tourism and Resources, 2006, Leading Practice sustainable Development Program for the Mining Industry: Mine Rehabilitation.
- Australian Government Department of Industry Tourism and Resources, 2007, Leading Practice sustainable Development Program for the Mining Industry: Tailings Management.
- Australian Government Department of Industry Tourism and Resources, 2008, Leading Practice sustainable Development Program for the Mining Industry: Water Management.
- Australian and New Zealand Minerals and Energy Council (ANZMEC) and Minerals Council of Australia, 2000, "Strategic Framework for Mine Closure".
- Centennial Coal, 2012, Northern Coal Services, Coal Logistics Project, Briefing Paper.
- Department of Planning and Infrastructure (NSW), 2006, Lower Hunter Region Strategy.
- Department of Trade and Investment, Regional Infrastructure and Services, DPI-MR Guideline EDG 01: – Borehole Sealing Requirements on Lands: Coal Exploration Management of Exploration and Mining in NSW.
- Department of Trade and Investment, Regional Infrastructure and Services, 1997b, DPI-MR Guideline EDG 02: – Borehole Sealing Requirements on the Beds of Water Bodies: Coal Exploration Management of Exploration and Mining in NSW.
- Department of Trade and Investment, Regional Infrastructure and Services, DPI-MR Guideline EDG 03: – Guidelines to the Mining, Rehabilitation and Environmental Management Process.
- Department of Trade and Investment, Regional Infrastructure and Services, DPI-MR Guideline EDG 14: – Reporting Requirements for Mine Closure and Lease Relinquishment.
- Department of Trade and Investment, Regional Infrastructure and Services, 2006, DPI-MR Guideline ESB20 V1.0: – Rehabilitation Security Deposit Requirements for Mining and Petroleum Titles.

- Department of Trade and Investment, Regional Infrastructure and Services, 2007, DPI-MR: ESB26: – Rehabilitation Cost Calculation Tool V1.7 Excel Spreadsheet Tool used to calculate mine security deposits.
- Department of Trade and Investment, Regional Infrastructure and Services, 2005, DPI-MR Policy EDP11 – Security Deposit Policy.
- Department of Trade and Investment, Regional Infrastructure and Services, 2011, ESG1 Rehabilitation Cost Estimate Guidelines.
- SLR Consulting Australia, 2014, Northern Coal Logistics – Northern Coal Logistics Project, Soil and Land Capability Assessment.
- GSS Environmental, 2012b, Strategic Land Assessment.
- International Council of Mining and Metals, 2006, Guidance Paper – Financial Assurance for Mine Closure and Reclamation.
- Lake Macquarie City Council, Lifestyle 2030 Strategy.
- RPS Australia East Pty Ltd, 2014, Flora and Fauna Impact Assessment, Northern Coal Services, Northern Coal Logistics Project.