Centennial Coal

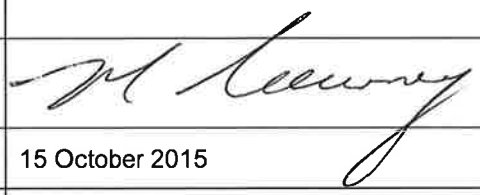
Mining Operations Plan

Charbon Colliery

Lot 8 DP 593262 & Lot 1 DP 1148217

October 2015 – October 2022

Title Block

CHARBON COLLIERY Mining Operations Plan Lot 8 DP 593262 and Lot 1 DP 1148217	
Name of Mine	Charbon Colliery
MOP Commencement Date	16 October 2015
MOP Completion Date	16 October 2022
Mining Authorisations	ML1647 and ML1545
Name of Authorisation / Authorisation holder(s)	Charbon Coal Pty Limited and SK Networks Resources Australia Pty Ltd
Name and Contact Details of the Mine Manager	Neil Larcombe (Mine Manager) Phone: (02) 6357 9201 Email: neil.larcombe@centennialcoal.com.au
Name and Contact Details of Environmental Representative	Sam Price (Environmental Coordinator) Phone: (02) 6359 2108 Email: sam.price@centennialcoal.com.au
Name of Representative(s) of the Authorisation Holder(s)	Mick Cairney
Title of Representative(s) of the Authorisation Holder(s)	Executive General Manager – Operations
Signature of Representative(s) of the Authorisation Holder(s)	
Date	15 October 2015
Version	Final

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1. INTRODUCTION

1.1. History of Operations

Charbon Colliery is an underground (bord and pillar) and open-cut coal mine operated by Charbon Coal Pty Limited (Charbon Coal), a joint venture between Centennial Coal Company Limited (Centennial) (95 percent) and SK Networks Resources Australia Pty Ltd (5 percent).

Charbon Colliery is located in the Western Coalfields of NSW, approximately 87 kilometres north-west of Lithgow and 3 kilometres south of Kandos (see **Figure 1**). The Colliery has been in operation since the 1920s and initially supplied coal for the former Charbon Cement Works until its closure in 1977. Underground mining operations were completed at Charbon Colliery on 7 March 2014. Open Cut mining operations ceased on 14 August 2015.

On 27 July 2015, Charbon Coal and SK Networks Resources Australia Pty Ltd were issued with a notice under Section 240(1)(a) of the Mining Act 1992 (see **Appendix 1**). The Section 240 notice, issued by the Division of Resources and Energy within the Department of Industry, Skills and Regional Development (the Department), directed Charbon Coal and SK Networks Resources Australia Pty Ltd to prepare a Mining Operations Plan (MOP), that includes a Closure Plan, for the areas where mining activities have ceased within the boundaries of Lot 8 DP 593262 and Lot 1 DP 1148217.

This MOP has been prepared to satisfy the direction provided by the Section 240 Notice and the requirements of that direction.

1.2. Current Consents, Authorisations and Licences

Charbon Colliery is classed as a Level 1 Mine as per the Mining Operations Plan (MOP) Guidelines (September 2013) as it is classed as a large mine.

Charbon Colliery operates under a number of different approvals including:

- Project Approval (PA08_0211);
- Mining Leases;
- Environmental Protection Licence (EPL528);
- Mining Operations Plans; and
- Compensation Agreements
- Negotiated Agreements.

These approvals are detailed below.

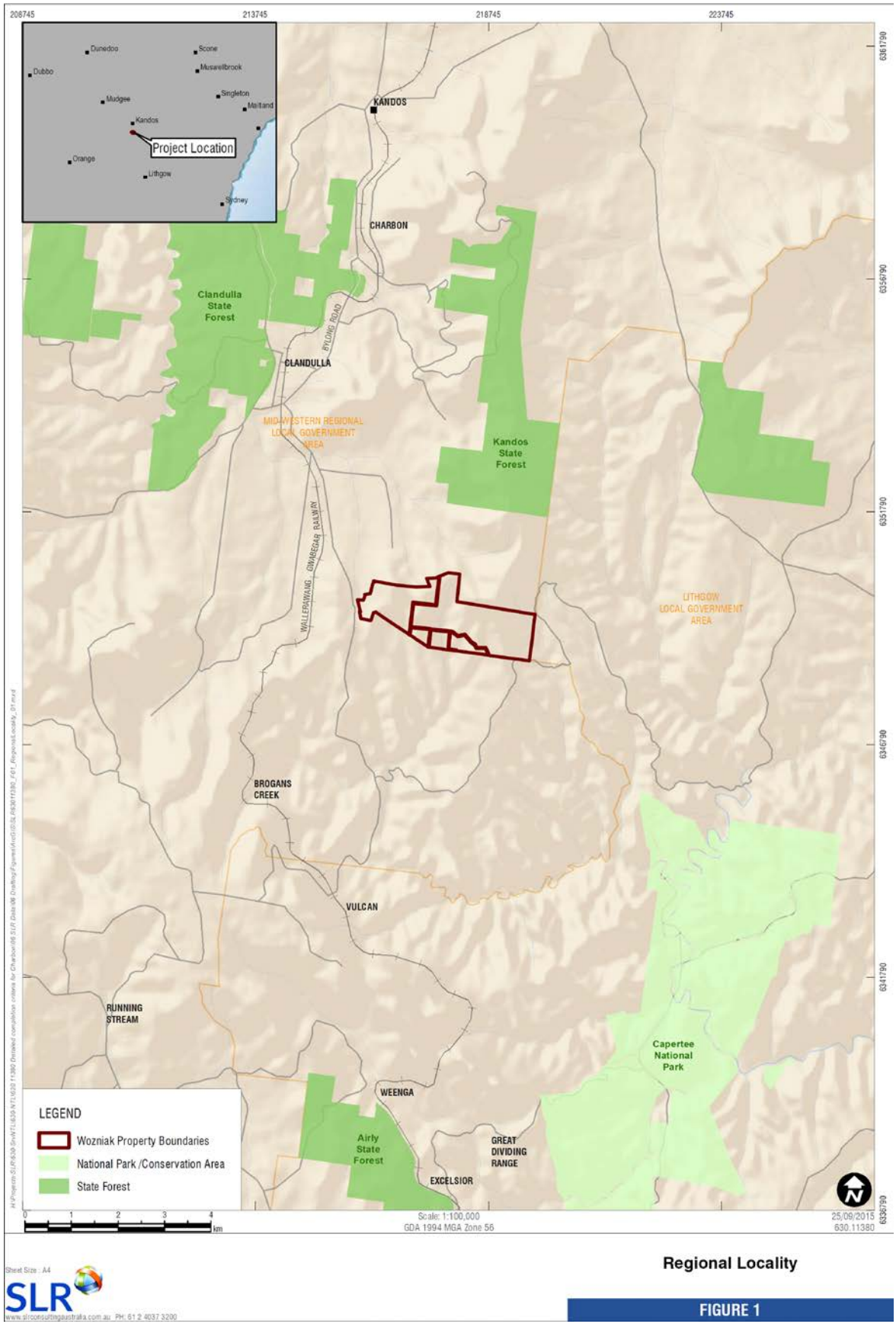
1.2.1. Development Consent

Charbon Coal received Project Approval 08_0211 for the continuation of operations at Charbon Colliery on 7 September 2010. Project Approval was granted pursuant to Part 3A of the Environmental Planning and Assessment Act 1979 following the submission of an Environmental Assessment dated November 2009.

1.2.2. Mining Authorities

Two mining leases are relevant to the area covered by this MOP being Mining Lease ML1647 and ML1545.

Figure 1 – Property Boundary Locality Plan



1.2.3. Environmental Protection Licence

The Charbon Colliery is licensed for the scheduled activity of coal mines under the Protection of the Environment Operations Act (2005) in the Mine's Environmental Protection Licence EPL528.

1.2.4. Agreements

The land subject to this MOP is covered by three compensation agreements and one negotiated agreement with the landowner. These agreements state that consultation with the landowner in regards to final landform and rehabilitation is required.

1.3. Land Ownership and Land Use

The land subject to this MOP, comprising mine disturbance areas within Lot 8 DP 593262 and Lot 1 DP 1148217, is freehold land.

1.4. Stakeholder Consultation

A stakeholder consultation plan was prepared as part of the preparation of this MOP. Key stakeholders identified for consultation include:

- Mr V. and Mrs A. Wozniak (the landowner); and
- The Division of Resources and Energy (DRE).

A summary of the consultation undertaken as part of the preparation of this MOP is provided in **Table 1** below.

Table 1 - Summary of Consultation

Date	Description
22 May 2015	Discuss with the landowner land use requirements. This identified areas of fencing to be installed and removed and the indicative location where gates are to be installed. The outcomes of these discussions were incorporated into the plans developed for this MOP
19 June 2015	Meeting with DRE to discuss the Section 240 notices for the property. These notices include the Stoney Creek Gully and the remainder of the property.
27 August 2015	Meeting with DRE to discuss the land holder consultation requirements in relation to the rehabilitation planning.
25 September 2015	Meeting with landowner and DRE to discuss final landform design, rehabilitation domains species mix to be used in rehabilitation and proposed new dam locations.
2 October 2015	Distribution of draft MOP for review to landowner and DRE
9 October 2015	Site visit with the landowner and DRE to discuss specific rehabilitation requirements and goals. The outcomes of this site visit have been incorporated into this MOP.

13 October	Email from Mr V. and Mrs A. Wozniak regarding issues for consideration in the MOP as an outcome of the meeting held 9 October.

Notes from the consultation undertaken with the landowner on 22 May 2015 and 25 September have been provided as **Appendix 6**.

2. PROPOSED MINING ACTIVITIES

2.1. Project Description

Charbon Coal received Project Approval PA 08_0211 for the continuation of operations at Charbon Colliery on 7 September 2010. PA 08_0211 authorises:

- Mining of approximately 5.2 million tonne (Mt) of coal over 15 years at a maximum rate of 1.5 Mtpa comprising up to:
    I. 700 000t per year using open cut mining methods in the Western and Southern Outliers, Southern Open Cut Extension and 8 Trunk, Central and Western Open Cuts; and
    II. 900 000t per year using underground mining methods in the Western Underground.
- Transportation of ROM coal from the mining areas to the CHPP using underground coal transportation infrastructure and internal haul roads.
- Processing of a maximum of 1.5Mt per year ROM coal at the existing CHPP.
- Transportation of a maximum of 250 000t of ROM and product coal per year to customers by public road.
- Transportation of a maximum of 20 000t product coal per year to the Charbon Lime Works by private road.
- Transportation of a maximum of 1.5Mt ROM and product coal per year to customers by rail.
- Placement of waste rock material within proposed in-pit waste rock emplacements.
- Expansion and upgrades to the existing reject emplacement area to allow for placement of Project-related fine and coarse reject material.
- Construction of associated infrastructure, including:
    I. three new pollution control dams;
    II. the Western Underground surface facilities area;
    III. new and upgraded haul roads; and
    IV. the 2 Trunk ROM Coal Loading Facility.
- Progressive rehabilitation to create a final landform that would generally mimic the existing landform.
- Continued use of existing site infrastructure for the life of the Project.

The approved activities undertaken within the boundaries of this MOP include:

- Extraction of coal using open cut mining methods within the Southern Outlier and portions of the Western Outlier and Southern Open Cut Extension areas;
- Placement of waste rock; and
- Construction and operation of haul roads.

All open cut mining operations ceased within the extraction areas bounded by this MOP on 14 August 2015. No further mining activities are proposed. To-date, some progressive rehabilitation activity has been undertaken towards a final landform within the Western Outlier and Southern Open Cut areas.

2.2. Asset Register

Apart from surface disturbance areas associated with mining activities, no mine assets are located within the area covered by this MOP.

2.3. Activities over the MOP Term

Apart from rehabilitation of areas disturbed by mining activities, no other activities are proposed during the term of this MOP. The rehabilitation activities to be undertaken during the term of this MOP are detailed in **Section 5.3**.

3. ENVIRONMENTAL ISSUES MANAGEMENT

3.1. Environmental Risk Assessment

In August 2015, a Risk Assessment was undertaken to identify and evaluate risks to both the successful rehabilitation of land subject to this MOP and the rehabilitation meeting community and government standards and expectations. The risk assessment was specifically undertaken to address the MOP Guidelines.

The risk assessment was undertaken in accordance with the Centennial Coal Risk Management Process using the probability and consequence ratings, risk matrix and classification listed in **Figure 2** below. The methodology used is a qualitative risk assessment methodology in accordance with the Risk Management Handbook for the Mining Industry (MDG1010) and the requirements of the Joint Australian & New Zealand Standard AS/NZS 31000:2009 Risk Management- Principles and Guidelines.

The risk assessment identified 24 risks. 12 risks were considered low, 10 risks were considered moderate and two risks were considered significant. No high or extreme risks were identified.

A summary of the key risks and controls is provided in **Table 2** below. A copy of the risk assessment is provided as **Appendix 2**.

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Figure 2 - Centennial Risk Matrix Management Standard - 004

CENTENNIAL RISK MATRIX							Likelihood					
							A Certain	B Probable	C Possible	D Remote	E Improbable	Description (D)
Rating	Consequence Note: Consequence may result from a single event or may represent a cumulative impact over a period of 12 months. Use the worst case reasonable consequence if there is more than one.						Common	Has Happened within Centennial	Could Happen & has happened in non-CEY operations	Not Likely	Practically impossible	Probability (Pb)
	Financial Impact to Annual Business Plan (F)	Personal Injury (PI)	Business Interruption (BI)	Legal (L)	Reputation (R)	Environment (E)	Frequent incidents	Regular incidents	Infrequent incidents	Unlikely to occur. Very few recorded or known incidents	May occur in exceptional circumstances. Almost no recorded incidents.	Incident Frequency (IF)
							Operations – within 3 months	Operations – within 2 years	Operations – within 5 years	Operations – within 10 years	Operations – within 30 years	Operations (Op)
							Project – Every project	Project – Every 2 projects	Project – Every 5 projects	Project – Every 10 projects	Project – Every 30 projects	Project (Pr)
5. Catastrophic	>$50m	Multiple Fatalities	> 1month	Prolonged litigation, heavy fines, potential jail term	Prolonged International media attention	Long term impairment habitats/ ecosystem	25 (E)	24 (E)	21 (H)	19 (H)	15 (S)	
4. Major	$10m - $50m	Single Fatality	1 week to 1 month	Major breach/ major litigation	International media attention	Long term effects of ecosystem	23 (E)	22 (E)	18 (H)	14 (S)	10 (M)	
3. Moderate	$1m - $10m	Serious/ Disabling Injury	1 day to 1 week	Serious breach of regulation. prosecution/ fine	National media attention	Serious medium term environmental effects	20 (H)	17 (H)	13 (S)	9 (M)	6 (L)	
2. Minor	$100k - $1m	Lost Time Injury	12 hrs to 1 day	Non-compliance, breaches in regulation	Adverse local public attention	Minor effects to physical environment	16 (S)	12 (S)	8 (M)	5 (L)	3 (L)	
1. Insignificant	<$100k	First Aid Treatment Only	< 12 hrs	Low level compliance issue	Local complaints	Limited physical damage	11 (S)	7 (M)	4 (L)	2 (L)	1 (L)	

Risk Rating	Risk Category		Generic Management Actions
22 to 25	E	Extreme	Immediate intervention required from senior management to eliminate or reduce this risk
17 to 21	H	High	Imperative to eliminate or reduce risk to a lower level by the introduction of control measures. Management planning required at senior levels
11 to 16	S	Significant	Corrective action required, senior management attention needed to eliminate or reduce risk
7 to 10	M	Moderate	Corrective action to be determined, management responsibility must be specified
1 to 6	L	Low	Monitor and manage by corrective action where practicable

Table 2 - Summary of Key Risks and Controls

Risk	Risk Ranking	Current and Proposed Controls
Weeds	Significant	Quarterly monitoring and management of weed control program to be implemented. A land management strategy will be developed for the property which will include a weed management programme.
Inappropriate Land Use	Significant	Ensure area is secured with stock proof fencing. Restricting general access. Limiting vehicular access to access tracks only.
Erosion and sedimentation from disturbed mining areas	Moderate	Existing sediment control dams are in place with an inspection and maintenance protocol implemented. Development of a detailed drainage design for the site.
Poor topsoil quality/availability	Moderate	Topsoil resources undergoing review for suitability for the desired rehabilitation outcomes. Undertake soil amelioration measures where required. Identify alternative sources of topsoil substitutes and utilise benign bare spoil areas for targeted forest rehabilitation.
Unsuitable species used in rehabilitation	Moderate	Seed sourcing for vegetation representative of the region is undertaken to ensure similar species as to the surrounding vegetation communities. Utilise experienced seed supplier with extensive knowledge of surrounding vegetation community.
Feral animals	Moderate	A land management strategy will be developed for the property which will include a feral animal control programme taking into consideration a wider area of feral animal control.
Contamination of watercourses	Moderate	Development of a detailed drainage design for the site with pollution control structures designed to meet engineering design requirements.
Air quality impacts	Moderate	An existing air quality monitoring network is in place which will continue throughout rehabilitation activities.

Risk	Risk Ranking	Current and Proposed Controls
		Adaptive management of activities will be undertaken to ensure compliance with relevant air quality criteria.
Noise impacts	Moderate	An existing noise monitoring network is in place which will continue throughout rehabilitation activities. Adaptive management of activities will be undertaken to ensure compliance with relevant noise criteria.
Bushfire	Moderate	The site will review the bushfire management plan and update accordingly.
Drought	Moderate	Seed sourcing to ensure species types representative of the surrounding vegetation communities hence suited to the climatic conditions of the region.
Community	Moderate	Consultation with the land owner has been undertaken regarding rehabilitation objectives and expectations. A land management strategy will be developed for the property.

3.2. Environmental Risk Management

Environmental management at Charbon Colliery is regulated by the Consents, leases and approvals as shown in Section 1.2. Additionally, the Charbon Colliery Environmental Management System (EMS) provides a framework under which environmental issues are managed on site.

The EMS incorporates a number of environmental management plans that are designed to assist in meeting community and regulatory expectations. Charbon Colliery has the following management plans:

- Aboriginal Cultural Heritage Management Plan;
- Air Quality Management Plan;
- Compensatory Habitat Management Plan;
- Environmental Management Strategy;
- Erosion & Sediment Control Plan;
- Greenhouse Gas and Energy Management Plan;
- Landscape Management Plan;
- Noise Management Plan;
- Subsidence Monitoring and Contingency Plan;
- Transportation Management Plan; and
- Water Management Plan.

3.2.1. Specific Risks relating to Rehabilitation

Geology and Geochemistry

Charbon Colliery is located in the Western Coalfield of New South Wales with the extracted coal resources within the Colliery boundary situated within the Upper Permian aged Illawarra Coal Measures. The Illawarra Coal Measures are overlain by the Triassic-aged Narrabeen Group which comprises sandstone and claystone and typically occurs on the mid to upper slopes of the hills and ranges within and surrounding the site. The massive sandstone units within this Group form the distinctive surrounding sandstone cliffs.

Waste rock material has been produced as a by-product of mining which has typically being emplaced in pit. There have been no recorded incidents of acidic leachate generation associated with any of the waste rock emplacements or reject storage facilities.

Three geological and geochemical risks have been identified:

1. Discharge of contaminated surface runoff sourced from contaminated material (medium);
2. Acid mine drainage caused by geochemistry of fill material (low); and
3. Erosion and sedimentation caused by the exposure of dispersive material (significant).

To manage and/or mitigate the above risks Charbon Colliery has developed a detailed drainage design for the proposed final landform. Where possible, catchment boundaries have been formed between Centennial owned land and other private landowners to reduce the risk of surface runoff contamination. Characterisation of material will be undertaken to identify any potential acid mine drainage issues within the material to be used in the rehabilitation.

Material prone to spontaneous combustion

There have been no incidents of spontaneous combustion within the Colliery since Centennial Coal purchased the Colliery in 1994. Centennial Coal is not aware of any incidents of spontaneous combustion prior to 1994. However there was a single incident of significant stockpile heating in 2000. This incident was the result of coal being stockpiled for an extended period and was resolved by removal of the stockpile and application of water. Charbon Coal has since implemented stockpile management and temperature monitoring procedures to manage this issue.

Given the sites history, the risk of spontaneous combustion occurring was deemed low and is managed by the ongoing implementation of the site's Spontaneous Combustion Management Plan.

Material prone to generating acid mine drainage

Waste rock material has been produced as a by-product of mining which has typically being emplaced in pit. There have been no recorded incidents of acidic leachate generation associated with any of the waste rock emplacements or reject storage facilities.

Characterisation of material will be undertaken to identify any potential acid mine drainage issues within the material to be used in the rehabilitation and a detailed drainage design for the final landform has been developed for a further control against acid mine drainage.

Mine Subsidence

A small area of historical underground mine workings are located within Lot 8 DP 593262. Underground mining within the boundaries of Lot 8 DP 593262 consisted of a combination of first

workings, partial extraction and full extraction. All extraction from within the boundaries of Lot 8 DP 593262 was completed in 2010. The extracted coal seam is approximately 750 metres below the surface. There is no evidence of sinkholes or subsidence induced cracking at the surface. The risk of sinkholes/subsidence cracks was therefore assessed as low. No additional mitigation or management measures are required or proposed to manage the risk of mine subsidence.

Erosion and sediment control

Erosion and sediment control structures will be implemented prior to any clearing of vegetation, soil stripping or other surface disturbance associated with the open cut development. Any exposed areas where erosion hazards exist are controlled to avoid sedimentation impacts on downstream waterways.

Appropriate temporary sediment controls are installed and maintained to manage material stockpiles in accordance with the site's Erosion and Sediment Control Plan. Rainfall runoff has typically been managed using settling ponds prior to water reuse as dust suppression or discharge offsite.

Erosion and/or sediment risks on disturbed mining areas were considered moderate. The development of a detailed drainage design for the final landform and specific erosion and sediment controls seek to reduce the risk level.

Soil type(s) and suitability

Topsoil was generally stripped ahead of mining activities and then respread. In general, the topsoil resources of the Southern end of Charbon Colliery were typical forest skeletal soils which present a thin A-horizon. Hence, topsoil resources for the area were minimal. Some areas of clay subsoil have also been able to be reclaimed and stockpiled. The area to be revegetated will use topsoil resources strategically, with the option of utilising bare benign weathered sandstone and Permian materials for the establishment of native forest vegetation.

Direct placement is the best management option as it reduces soil degradation and minimises associated compaction. Where direct placement was not possible topsoil stockpiling occurred. A maximum stockpile depth of 3 metres was maintained where possible to preserve viability and reduce soil deterioration of seed, nutrients and soil biota. Longer term soil stockpiles were sown with fast-growing species as soon as possible after stockpiling.

Poor quality top soil and availability of top soil was considered a medium risk with the option of substituting subsoil media if necessary. The site has developed a top soil inventory to determine the availably of topsoil across the site. The option of utilising bare benign spoil material for the establishment of native trees and shrubs in a forest ecosystem will provide a viable alternative where soil resources are not available. Where possible, soil resources will be utilised, and especially in the areas targeted for woodland rehabilitation. Consideration will also be given to the use of bio-solids as a top soil substitute.

Flora

The following management measures are generally implemented at Charbon Colliery to minimise impacts on flora within and surrounding the Charbon Colliery:

- Removing only those areas of native vegetation, including areas of regenerating vegetation, required for operational purposes.
- Collecting seed of species to be used during rehabilitation operations, including seed of the Capertee Stringybark, from within and adjacent to the site.

- Managing grazing pressure in areas undergoing rehabilitation.
- Fencing areas of completed rehabilitation to limit pest access.
- Managing bushfire risks to minimise the potential for bushfires to adversely impact on areas of native vegetation or areas undergoing rehabilitation.
- Implementation of a weed management program.

Three flora risks have been identified:

1. Failure to manage weeds/noxious (significant). To minimise this risk, a detailed weed management program will be implemented by the site.
2. Use of unsuitable rehabilitation species (moderate). To minimise this risk, seed representative of local vegetation species has been sourced for use in the rehabilitation of the site.
3. Disturbance caused to undisturbed/rehabilitated areas due to poor land management (moderate). Physical survey controls and barriers are to be implemented around undisturbed/rehabilitation areas and a land management strategy will be developed and implemented.

Fauna

The following management measures are generally implemented at Charbon Colliery to minimise impacts on fauna within and surrounding the Charbon Colliery:

- A fauna Handling and Management Plan which includes procedures such as inspection of tree hollows prior to clearing, care of any injured fauna, relocation strategy and reuse of tree trucks for fauna habitat.
- Remove large, mature trees during late spring to early autumn to avoid impacting on spring nesting birds and over-wintering bats.
- Excise felled tree hollows or retain the tree and stockpile or use immediately in areas undergoing progressive rehabilitation.
- Inform all employees, contractors and others of the importance of appropriate management of the ecological resources and where possible avoiding injury to native fauna, including reptiles and snakes.

Failure to manage feral animals was identified as a medium risk to achieving successful rehabilitation. To manage this risk, a feral animal control programme will be developed and implemented.

Other Risks

- Long term stability and slope failure was considered a moderate risk and will be managed through the development of a detailed drainage design for the site, and development of a detailed landform design by qualified and experienced specialists.
- Surface and groundwater contamination from contaminated sources such as fill was assessed as a low risk which will be mitigated and managed through the development of a detailed drainage design and characterisation of material to identify any potential acid mine drainage issues within the material to be used in the rehabilitation.
- Hazardous materials and dangerous goods are considered to pose a low risk given no hazardous materials or dangerous goods are stored on site.

- Due to the low concentration of methane in the surrounding coal seams, the risk of significant greenhouse gas emissions from the underground workings or exposed coal seams are considered low.
- The risk of noise and air quality impacts to surrounding receptors from rehabilitation activities was considered a medium risk and will be managed through the adaptive management of activities and consultation with the nearby residences to ensure noise and air quality is maintained below agreed or accepted limits.
- Impacts to the community from visual and lighting sources were assessed as a low risk to be managed through ongoing consultation with sensitive receptors.
- Heritage impacts from the proposed rehabilitation of the site were assessed as low risk as all activities will be within existing disturbed areas.
- Risks from bushfire and drought were considered moderate.

4. Post Mining Land Use

The Post mining land use has been developed with consideration to various requirements under existing leases, licences and agreements. These regulatory requirements are detailed below.

4.1. Regulatory Requirements

Section 240 Notices

On 27 July 2015, Charbon Colliery was issued with a notice under Section 240(1)(a) of the Mining Act 1992 by the Department. The notice directed Charbon Coal to prepare a Mining Operations Plan (MOP) that includes a Closure Plan, for the areas where mining activities have ceased within the boundaries of Lot 8 DP 593262 and Lot 1 DP 1148217.

The conditions of the Section 240 notices relating to rehabilitation are provided in **Table 3** and **Table 4** below.

Table 3 – Section 240 Notice for ML1545 Conditions Relating to Rehabilitation

Condition Number	Condition Description
Condition 1	In accordance with Condition 2 of ML 1545, prepare a Mining Operation Plan (the Plan) that amends the current approved Plan to include a closure plan for areas of the mine where extraction will cease during the term of the Plan.
Condition 2	The closure plan applies to areas of the mine that extraction operations have ceased or will cease during the life of the Plan and that have been advised to the Department as on land comprising that part of Lot 8, DP593262 on which ML 1545 is located.
Condition 3	In accordance with Condition 2(2), the MOP must be prepared in accordance with the ESG3 Guidelines as published on the Department's website.
Condition 4	In accordance with Condition 2(3), the Plan must be lodged with the Department by 16 October 2015 and prior to the commencement of final rehabilitation operations on the land.
Condition 5	In accordance with Condition 2(4), the Plan must include final rehabilitation objectives/methods and post mining land use/vegetation outcomes.
Condition 6	Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.
Condition 7	The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8 DP593262.

Table 4 - Section 240 Notice for ML1647 Conditions Relating to Rehabilitation

Condition Number	Condition Description
Condition 1	In accordance with Condition 3(a) of ML 1647 and Chapter 5.3 of the current approved Mining Operations Plan (MOP), prepare a Final Rehabilitation Plan (the Plan) that amends the current approved MOP to include the Plan for areas of the mine where extraction has completed or will complete within two years.
Condition 2	The Plan applies to areas of the mine that extraction operations have completed or will complete within the two years and that have been advised to the Department as on land comprising that part of Lot 8, DP593262 and Lot 1, DP1148217 on which ML 1647 is located.
Condition 3	In accordance with Condition 3(b)(v) of ML 1647, the Plan must have regard to the ESG3 Guidelines as published on the Department's website and reflect the conditions of approval under: a) The Environmental Planning and Assessment Act 1979 b) The Protection of the Environment Operations Act 1997 c) And any other approvals relevant to the development including the conditions of ML 1647.
Condition 4	The Plan must be lodged with the Department by 16 October 2015.
Condition 5	In accordance with Condition 3(a) of ML 1647, rehabilitation operations must not be carried out otherwise than in accordance with the Plan which has been approved by the Secretary.
Condition 6	The Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.
Condition 7	The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8, DP593262.

Mining Lease Conditions

The principal regulatory instrument related to mine closure are the conditions attached to the Mining Lease issued by the Minister in accordance with the requirements of the Mining Act 1992 (NSW).

The following mining leases have been considered in the preparation of this mine closure plan:

- Mining Lease (ML) 1647; and
- Mining Lease (ML) 1545.

The conditions relating to rehabilitation and mine closure from the relevant mining leases are provided in **Table 5** and **Table 6** below.

Table 5 - ML1545 Conditions Relating to Rehabilitation

Condition Number	Condition Description
Condition 2 **Mining, Rehabilitation, Environmental Management Process (MREMP) Mining Operations Plan (MOP)**	1) Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:- (a) ongoing mining operations and environmental management; and (b) ongoing monitoring of the project. 2) The Plan must be prepared in accordance with the Director General's guidelines current at the time of lodgement. 3) A Plan must be lodged with the Director-General:- (a) prior to the commencement of operations; (b) subsequently as appropriate prior to the expiry of any current Plan; and (c) in accordance with any direction issued by the Director General. 4) The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:- (a) area(s) proposed to be disturbed under the Plan; (b) mining and rehabilitation method(s) to be used and their sequence; (c) areas to be used for disposal of tailings/waste; (d) existing and proposed surface infrastructure; (e) progressive rehabilitation schedules; (f) areas of particular environmental sensitivity; (g) water management systems (including erosion and sediment controls);

Condition Number	Condition Description
	(h) proposed resource recovery; and (i) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining land use/vegetation. 5) The Plan when lodged will be reviewed by the Department of Mineral Resources. 6) The Director-General may within two (2) months of the lodgement of a Plan, require modification and re-lodgement. 7) If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, lease holder may proceed with implementation of the Plan submitted subject to the lodgement of the required security deposit within the specified time. 8) During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5)- (7) above.
Condition 3 **Annual Environmental Management Report (AEMR)**	1) Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as maybe allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director General. 2) The AEMR must be prepared in accordance with the Director Generals guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:- (a) the accepted Mining Operations Plan; (b) development consent requirements and conditions; (c) Department of Environment and Conservation and Department of Infrastructure, Planning and Natural Resources licences and approvals; (d) any other statutory environmental requirements; (e) details of any variations to environmental approvals applicable to the lease area, and (f) where relevant, progress towards final rehabilitation objectives. 3) After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in

Condition Number	Condition Description
	accordance with sound mining and environmental practice. 4) The lease holder shall, as and when directed by the Minister, cooperate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies.
Condition 18 – 25 **Management and Rehabilitation of Lands (General)**	The lease holder shall not interfere in any way with any fences on or adjacent to the subject area unless with the prior written approval of the owner thereof or the Minister and subject to such conditions as the Minister may stipulate. The lease holder shall observe any instruction given or which may be given by the Minister with a view to minimising or preventing public inconvenience or damage to public or private property. If required to do so by the Minister and within such time as may be stipulated by the Minister the lease holder shall carry out to the satisfaction of the Minister surveys of structures, buildings and pipelines on adjacent landholdings to determine the effect of operations on any such structures, buildings and pipelines. 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 lease holder. Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this authority or any renewal thereof, the lease 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. If so directed by the Minister the 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 area which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the lease holder. The lease holder shall take all precautions against causing outbreak of fire on the subject area.

Condition Number	Condition Description
	The lease holder shall provide and maintain to the satisfaction of the Minister efficient means to prevent contamination, pollution, erosion or siltation of any river, stream, creek, tributary, lake, dam, reservoir, watercourse or catchment area or any undue interference to fish or their environment and shall observe any instruction given or which may be given by the Minister with a view to preventing or minimising the contamination, pollution, erosion or siltation of any river, stream, creek, tributary, lake, dam, reservoir, watercourse or catchment area or any undue interference to fish or their environment.
Condition 30 **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.
Condition 32 **Roads**	In the event of operations being conducted on the surface of any road, track or fire trail traversing the subject area or in the event of such operations causing damage to or interference with any such road, track or fire trail the lease holder, at his own expense, shall if directed to do so by the Minister provide to the satisfaction of the Minister an alternate road, track or fire trail in a position as required by the Minister and shall allow free and uninterrupted access along such alternate road, track or fire trail and, if required to do so by the Minister, the lease holder shall upon completion of operations rehabilitate the surface of the original road, track or fire trail to a condition satisfactory to the Minister.
Condition 50 **Prospecting (General)**	a) Where the lease holder desires to commence prospecting operations in the subject area 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.

Table 6 - ML1647 Conditions Relating to Rehabilitation

Condition Number	Condition Description
Condition 2 **Environmental Harm**	a) The lease holder must implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of any activities under this lease. b) For the purposes of this condition: i. environment means components of the earth, including: A. land, air and water, and B. any layer of the atmosphere, and C. any organic or inorganic matter and any living organism, and D. human-made or modified structures and areas, and includes interacting natural ecosystems that include components referred to in paragraphs (A)-(C). ii. (ii) harm to the environment includes any direct or indirect alteration 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 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.
Condition 3 **Mining Operations Plan**	a) Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan (MOP) which has been approved by the Director-General. b) The MOP must: i. identify areas that will be disturbed by mining operations; ii. detail the staging of specific mining operations; iii. identify how the mine will be managed to allow mine closure; iv. identify how mining operations will be carried out in order to prevent and or minimise harm to the environment; v. reflect the conditions of approval under: • the Environmental Planning and Assessment Act 1979 • the Protection of the Environment Operations

Condition Number	Condition Description
	Act 1997 • and any other approvals relevant to the development including the conditions of this lease; and • have regard to any relevant guidelines adopted by the Director-General. c) The leaseholder may apply to the Director-General to amend an approved MOP at any time. d) It is not a breach of this condition if: i. the operations constituting the breach were necessary to comply with a lawful order or direction given under the Mining Act 1992, the Environmental Planning and Assessment Act 1979, Protection of the Environment Operations Act 199 7, Mine Health and Safety Act 2004 I Coal Mine Health and Safety Act 2002 and Mine Health and Safety Regulation 2007 I Coal Mine Health and Safety Regulation 2006 or the Occupational Health and Safety Act 2000; and ii. the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out. e) A MOP ceases to have effect 7 years after date of approval or other such period as identified by the Director-General.
Condition 4 **Environment Management Report**	a) The lease holder must lodge Environmental Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General. b) The EMR must: (i) report against compliance with the MOP; (ii) report on progress in respect of rehabilitation completion criteria; (iii) report on the extent of compliance with regulatory requirements; and (iv) have regard to any relevant guidelines adopted by the Director-General.
Condition 7 **Rehabilitation**	Any disturbance as a result of activities under this lease must be rehabilitated to the satisfaction of the Director-General.
Condition 14 **Roads and Tracks**	(a) The lease holder must pay to the relevant roads authority in control of the road or track the reasonable costs incurred by the roads authority in making good any damage to roads or

Condition Number	Condition Description
	tracks caused by operations carried out under this lease less any amount paid or payable from the Mine Subsidence Compensation Fund. (b) During wet weather the use of any road or track must be restricted so as to prevent damage to the road or track. (c) Existing access tracks should be used for all operations where reasonably practicable. New access tracks must be kept to a minimum and be positioned in order to minimise damage to the land, watercourses or vegetation. (d) Temporary access tracks must be rehabilitated and revegetated to the satisfaction of the Director-General as soon as reasonably practicable after they are no longer required under this lease.
Condition 24 **Cooperation Agreement**	The lease holder must make every reasonable attempt, and be able to demonstrate their attempts, to enter into a cooperation agreement with the holder(s) of any overlapping title(s). The cooperation agreement should address but not be limited to issues such as: • access arrangements • operational interaction procedures • dispute resolution • information exchange • well location • timing of drilling • potential resource extraction conflicts and • rehabilitation issues. The lease holder must lodge reports to the satisfaction of the Director-General in accordance with section 163C of the Mining Act 1992 and in accordance with clause 57 of the Mining Regulation 2010. Reports must be prepared in accordance with Exploration Reporting: A guide for repo1tinq on exploration and prospecting in New South Wales (Department of Industry and Investment, 2010).

Environment Protection Licence (EPL)

The Protection of the Environment Operations Act 1997 (POEO Act) requires all extractive industries, including coal mines, to hold an Environment Protection Licence (EPL). The EPL contains specific conditions relating to the protection of the environment and as such the relevant conditions of

Charbon Coal's EPL 528, issued under the POEO Act 1997, granted by the EPA on 8 August 2011 for the mining of coal, have been considered.

Project Approval Conditions

The Project Approval for Charbon Coal includes the conditions that are relevant to mine closure for the final rehabilitation and/or landform design. They also include other conditions that contain the requirements to undertake monitoring beyond the cessation of mining. Where appropriate these conditions have been considered in the preparation of this mine closure plan.

Table 7 includes the conditions of the Charbon Coal Project Approval that are specifically related to mine closure.

Table 7 - Project Approval Conditions Relating to Rehabilitation

Condition Number	Condition Description
Schedule 2 **Condition 1**	The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.
Schedule 2 **Condition 5**	Mining operations may take place until 31 August 2025. *Note: Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings to the satisfaction of the Director-General and 1&1 NSW. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been properly rehabilitated."*
Schedule 4 **Condition 3**	Within 6 months of the approval of the Landscape Management Plan (see condition 6. below), the Proponent shall lodge a conservation and biodiversity bond with the Department to ensure that the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Landscape Management Plan. The sum of the bond shall be determined by: a) calculating the full cost of implementing the offset strategy; and b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Director-General. Notes: • If the offset strategy is completed to the satisfaction of the Director-General, the Director-Genera! will release the conservation bond. • If the offset strategy is not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the conservation bond, and arrange for the

Condition Number	Condition Description
	satisfactory completion of the relevant works. • If amendments to the Mining Act 1992 allow the Minister for Mineral Resources to require rehabilitation securities under a mining lease which apply to the implementation of rehabilitation works outside the boundary of a mining lease, then the Proponent may transfer the conservation bond required under this approval to the Minister of Mineral Resources, provided the Director General and I&I NSW agree.
Schedule 4 **Condition 4**	The Proponent shall rehabilitate the site to the satisfaction of the Director-General and I&I NSW in accordance with the rehabilitation objectives in Table 2.
Schedule 4 **Condition 5**	To the extent that mining operations permit, the Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following the disturbance.
Schedule 4 **Condition 6**	The Proponent shall prepare a Landscape Management Plan for the project to encompass all proposed mine activities and potential impacts associated with landscape management for the site and subsequently implement this Plan to the satisfaction of the Director-General. This plan must: a) be submitted to the Director-General for approval within 12 months of the date of this approval; b) be prepared by suitably qualified experts whose appointments have been endorsed by the Director-General; c) be prepared in consultation with I&I, NOW, DECCW and Council; and d) include a: • Rehabilitation and Offsets Management Plan; and • Mine Closure Plan.
Schedule 4 **Condition 7**	The Rehabilitation and Offsets Management Plan must include: a) the rehabilitation objectives for the site, including those listed in Table 2 above, and as otherwise proposed for offset areas; b) a strategic description of how the rehabilitation of the site would be integrated with surrounding land use; c) detailed performance and completion criteria for site rehabilitation and the implementation of the offset strategy; d) a detailed description of the short and long-term measures that would be implemented to:

Condition Number	Condition Description
	• rehabilitate the site in accordance with the rehabilitation objectives; • implement the offset strategy (see condition 1 above); and • manage the remnant vegetation and habitat on the site and in the offset areas, including the existing Compensatory Habitat Area (see Appendix 2); e) a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for: • progressively rehabilitating disturbed areas; • implementing revegetation and regeneration within the disturbance areas and offset areas; • protecting vegetation and soils outside the disturbance areas; • undertaking pre-clearance surveys; • managing remnant vegetation and habitat on site; • minimising impacts on fauna; • minimising visual impacts; • conserving and reusing topsoil, timber, seed and habitat resources (rocks and logs); • controlling weeds, feral pests, and access; • rehabilitating creeks and drainage lines, both within and outside of disturbance areas on the site; • managing potentially acid-forming materials (including effective isolation of these materials in reject emplacement areas); • managing bushfires; and • managing any potential conflicts between the rehabilitation works and Aboriginal cultural heritage; f) a detailed description of how the performance of the rehabilitation works and offsets would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria; g) a program to review this plan at least every 3 years; and h) details of who is responsible for monitoring, reviewing and implementing the plan;
Schedule 4	The Mine Closure Plan must:

Condition Number	Condition Description
Condition 8	a) define the objectives and criteria for mine closure; b) investigate options for the future use of the site; c) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment levels; d) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the project; and e) describe how the performance of these measures would be monitored over time. Note: The plan should reflect the indicative Final Landform shown in Appendix 5.

State & Commonwealth Policy and Guidelines

Policies and guidelines considered as part of the preparation of this MOP include:

- ESG03: Mining Operations Plan (MOP) Guidelines (NSW Trade & Investment - Mineral Resources, September 2013);
- ESG01: Rehabilitation Cost Estimate Guidelines (NSW Trade & Investment - Mineral Resources 2012)
- Strategic Framework for Mine Closure (ANZMEC & MCA, 2000); and
- Leading Practice Sustainable Development Program for the Mining Industry: Mine Closure and Completion (DITR, 2006).

4.2. Post Mining Land Use Goal

The long term mine rehabilitation goal is to:

- Re-establish land disturbed by the mining operations of Charbon Coal within the boundaries of Lot 8 DP 593262 and Lot 1 DP 1148217;
- Reflects and satisfies the desired land holder requirements as identified through the consultation phase;
- Provides a landform that is consistent with the rehabilitation objectives and goals for the remainder of the Charbon Colliery;
- satisfy the s240 directions issued by DRE;
- Minimise any identified risk that may prevent the successful rehabilitation of the land;
- Relinquish the relevant mining leases as rehabilitation objectives are achieved; and
- Comply with appropriate Company and regulatory policies and guidelines.

4.3. Rehabilitation Objectives

The objectives of this MOP is to establish clear and agreed criteria with all relevant stakeholders, which can be used to provide the standard to which the final mine rehabilitation and post mining land use can be assessed against.

The short term rehabilitation objective is to create a stable post-mining landform developed in consultation with the landowners and approved by DRE that is consistent with the surrounding landform, minimises the risk of erosion and ensures that there is no safety hazard beyond that existing prior to mining. This will be achieved through progressive reshaping, spreading of topsoil and seeding of the open cut mining areas, temporary haul roads and other areas of disturbance associated with mining activities that are no longer required.

The long term rehabilitation objective will be to achieve a self-sustaining vegetation cover developed in consultation with the landowner and approved by DRE that is low maintenance and stable. This will be achieved by setting clear rehabilitation success criteria and developing a detailed monitoring and management strategy to ensure the criteria are accomplished. The post-mining land use for the disturbance areas is intended to be a combination of native bushland and mixed native grasses commensurate with the pre-mining conditions.

5. Rehabilitation Planning and Management

5.1. Domain Selection

The Primary Domains within the MOP boundary are shown in **Figure 3** and comprise:

- Domain – Stockpiled Material;
- Domain – Final Voids; and
- Domain – Mine Disturbance Areas (General).

Land beyond the extent of mine disturbance and within the boundaries of this MOP is Private Property. The land identified as Private Property is managed and controlled by the landowner.

The Secondary Domains that will be created following rehabilitation for all mining disturbance area within the MOP boundary are shown in **Figure 4** and will comprise a mix of:

- Domain – Water Management Infrastructure
- Domain – Rehabilitation Area Woodland (comprising a mixture of native trees and grasses); and
- Domain – Rehabilitation Area Forest (comprising native trees).

Figure 3 – Primary Domains

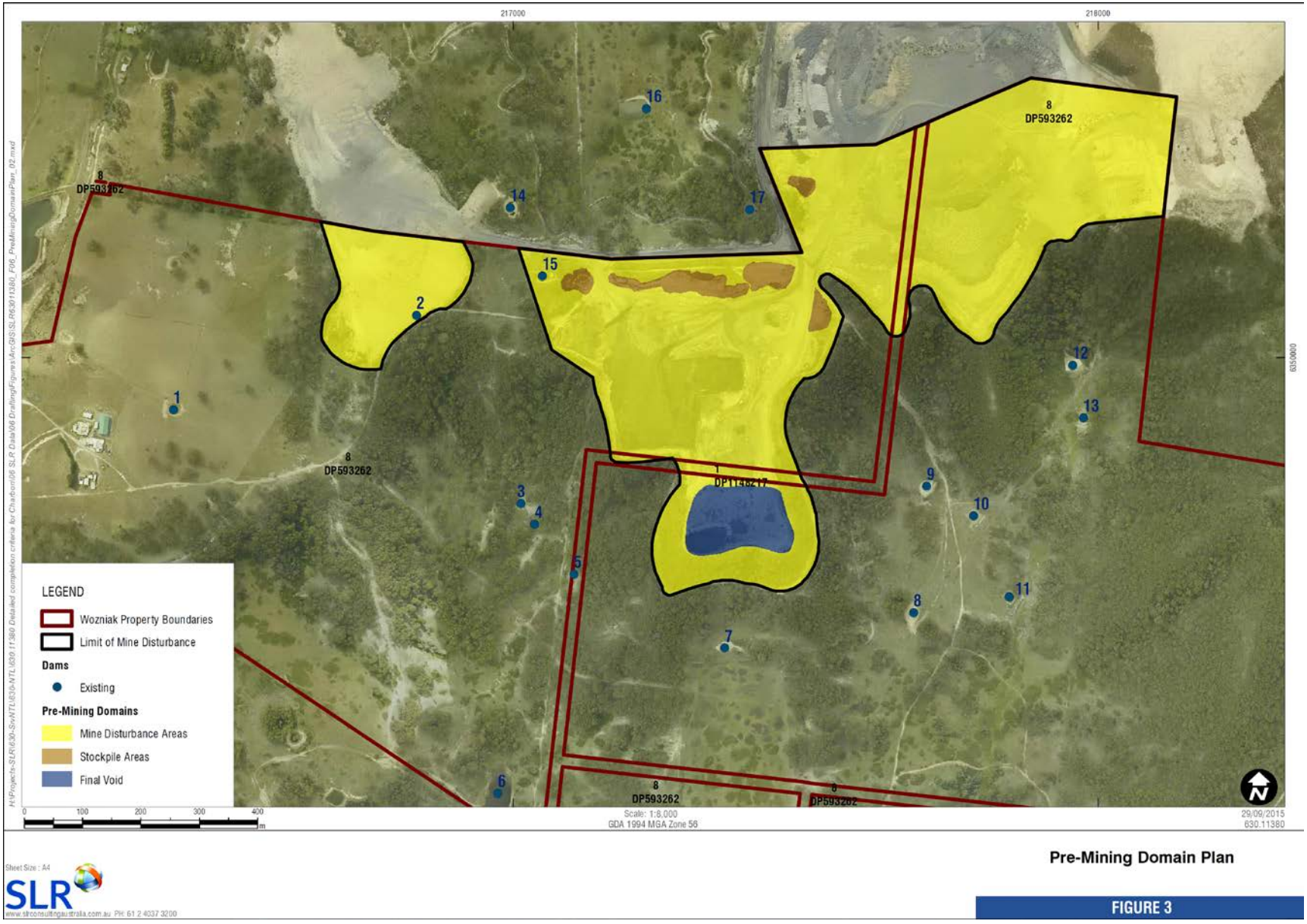
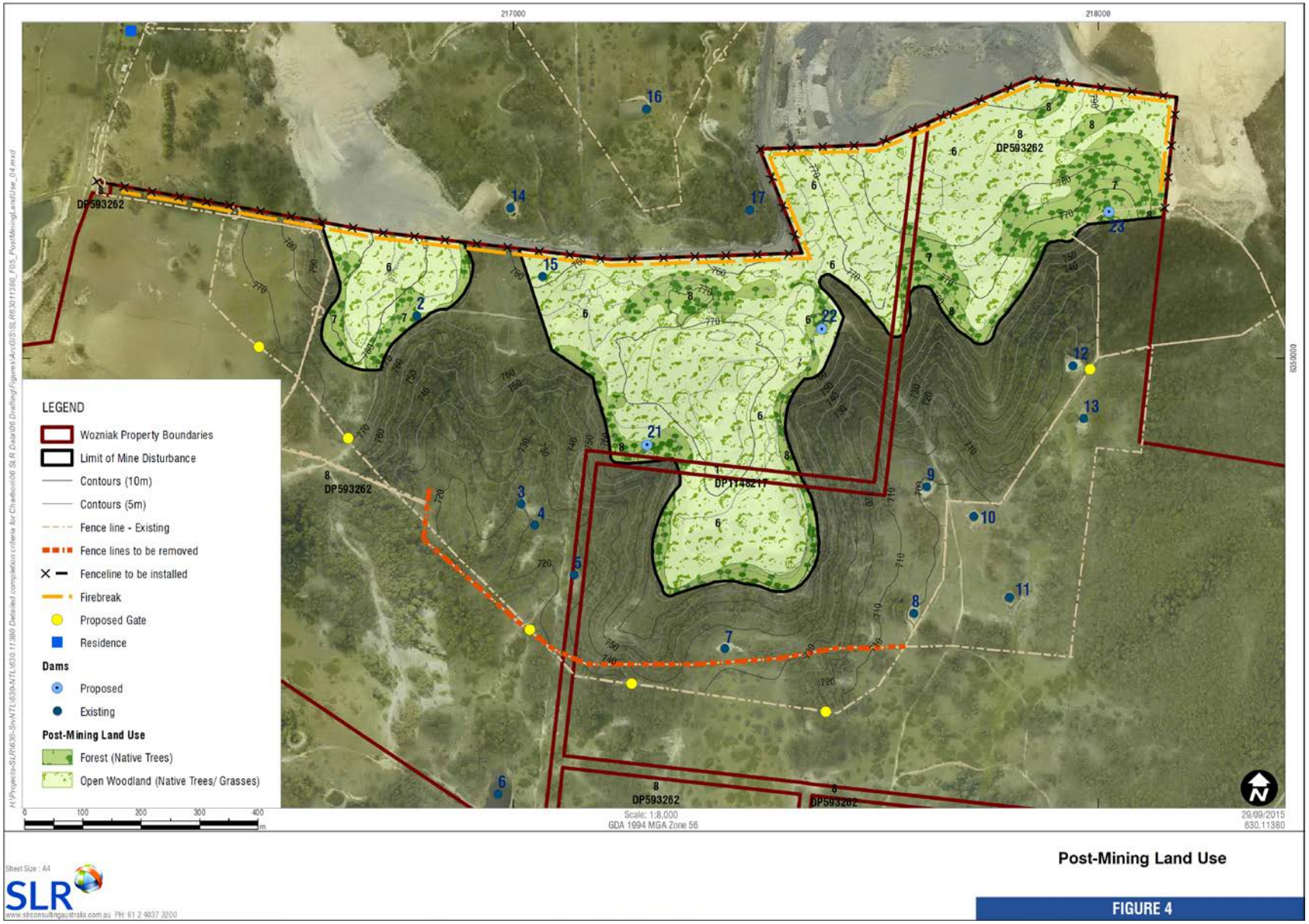


Figure 4 – Post Mining Secondary Domains



The final post mining closure rehabilitation domains have been determined using the NSW Land and Soil Capability (LSC) Guideline (OEH, 2012) and consultation with the landowner. The LSC classes from the LSC Guideline are based on two main considerations:

- 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 biophysical features of the land that are associated with various hazards are broadly soil, climate and landform and more specifically: slope, landform position, acidity, salinity, drainage, rockiness; and climate.

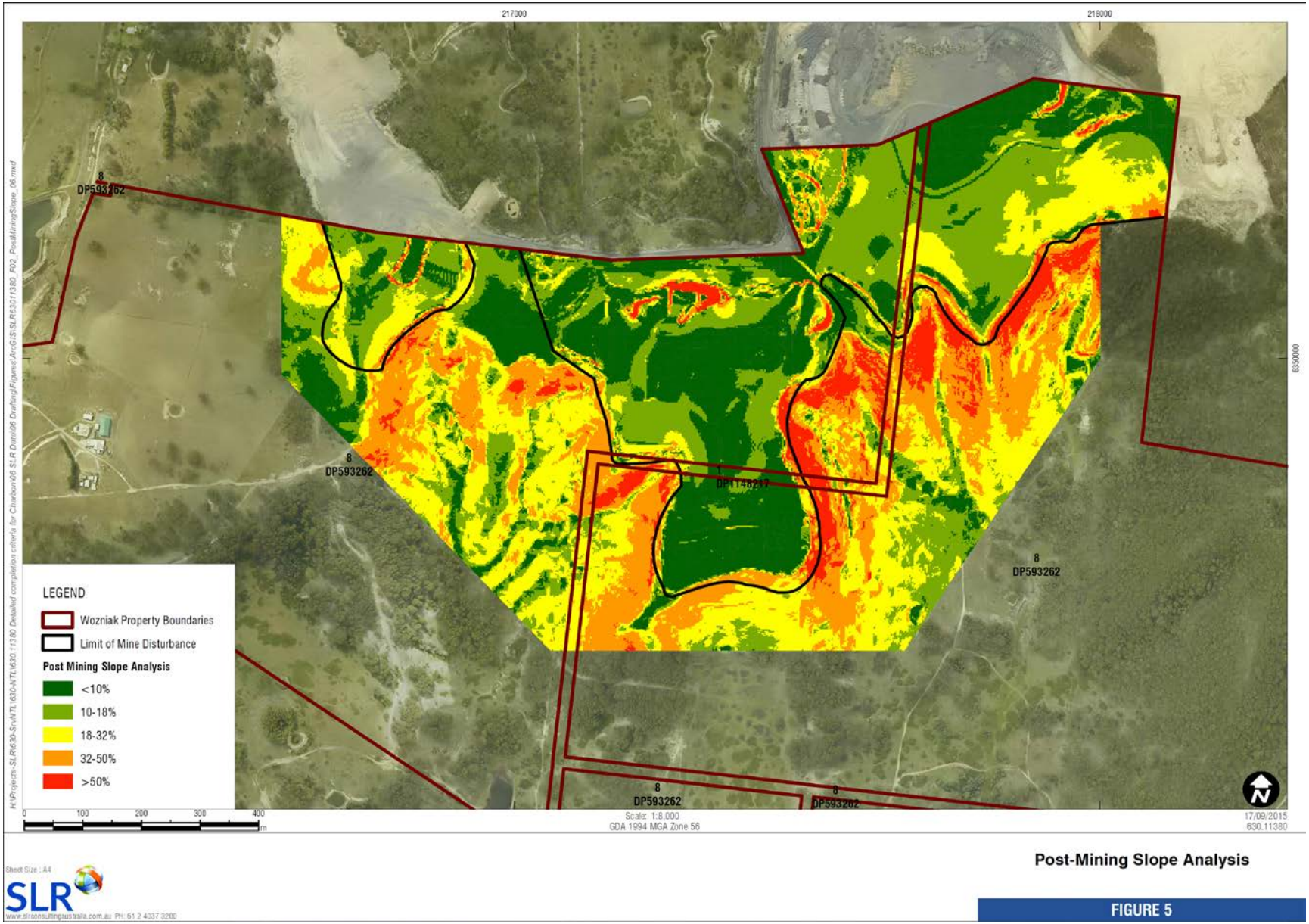
The eight hazards associated with these biophysical features that are assessed by the scheme are:

1. Water erosion;
2. Wind erosion;
3. Soil structure decline;
4. Soil acidification;
5. Salinity;
6. Water logging;
7. Shallow soils and rockiness; and
8. Mass movement.

Each hazard is assessed against set criteria tables, as described in the LSC Guideline; each hazard for the land is ranked from 1 through to 8 with the overall ranking of the land determined by its most significant limitation.

Assessment of the water erosion hazard is almost solely dependent on the slope percentage of the land; therefore, a slope analysis of the proposed final landform was undertaken as part of this consideration. The detailed slope analysis of the proposed final landform is provided as **Figure 5**.

Figure 5 – Proposed Final Landform Slope Analysis



Based on the assessment using the LSC Guideline and slope analysis, a preliminary post mining Land Capability Classification plan was developed (see **Figure 6**). Three post mining LSC Classes were identified being:

- Class 6 Land
- Class 7 Land; and
- Class 8 Land.

A portion of the mined and re-contoured land presents some slopes that are of a somewhat lower grade of steepness (10 – 18%), however, overall the rehabilitation landform is dominated by Class 6 LSC due to:

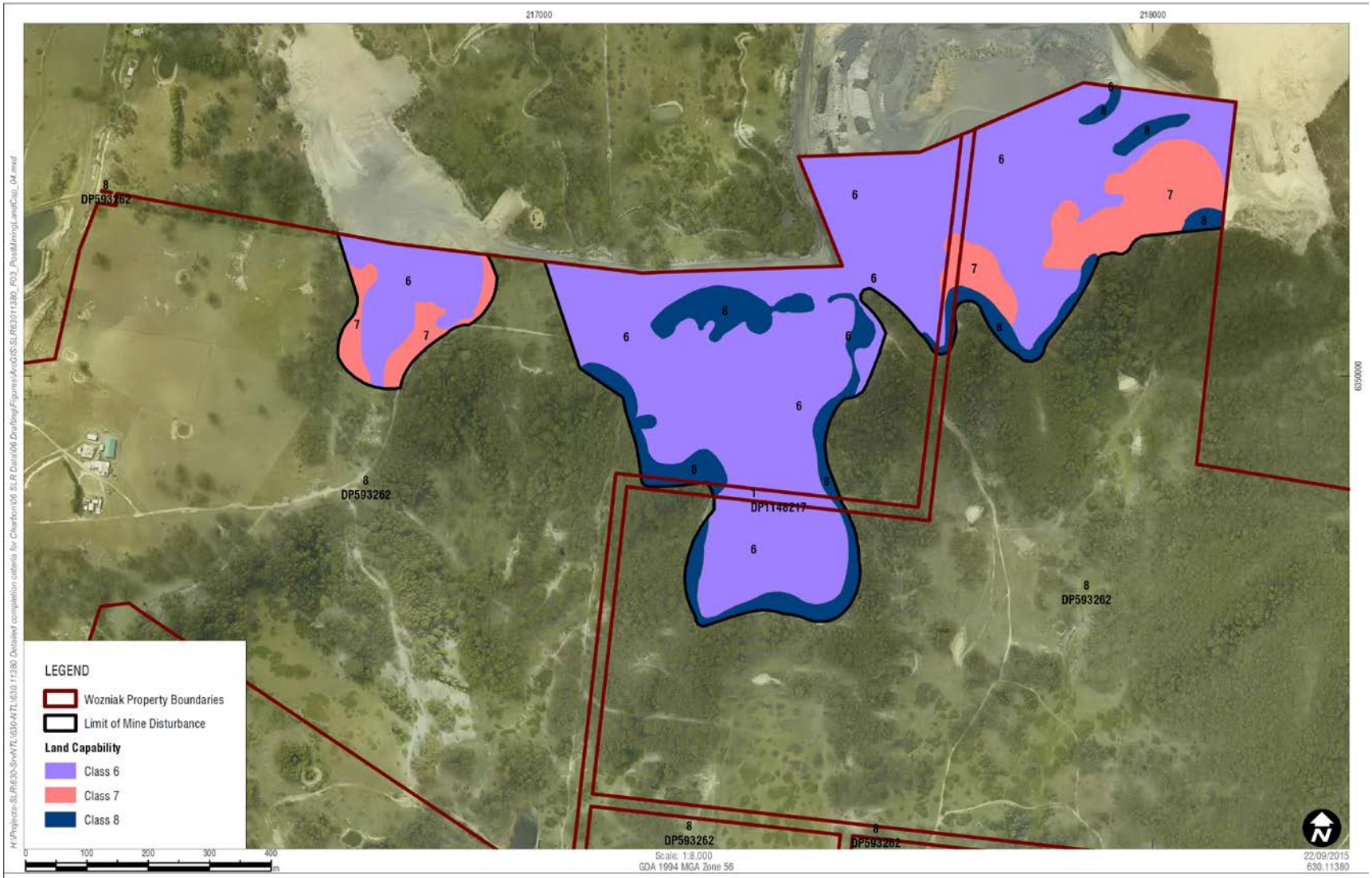
- Moderate rainfall;
- High wind exposure;
- Coarse textured and shallow soils;
- Low fertility;
- Moderately sodic subsoils;
- Reconstructed soil profile (topsoil & subsoil) ‹ 50 cm; and
- Rockiness.

The description of the three LSC Classes from the LSC Guideline is reproduced in **Table 8** below.

Table 8 - LSC Class Definition

LSC Class		General Definition
Land capable of a limited set of land uses (grazing, forestry and nature conservation, some horticulture)		
6	Low capability land Very high limitations for high-impact land uses	Land 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.
Land generally incapable of agricultural land use (selective forestry and nature conservation)		
7	Very low capability land Severe limitations that restrict most land uses	Limitations generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations are not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability land	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.

Figure 6 – Post Mining Land Capability Classes



Based on the LSC Class, a determination on the species mix to be utilised in the rehabilitation was made. The land identified as Class 6 (having a limited capability for agriculture), was identified as land to be rehabilitated using a woodland species containing a mix of trees and grasses. This land, subject to careful management, will be suitable to low level grazing activities. Land identified as being Class 7 or 8 (having no agricultural land use), was identified as land to be rehabilitated using a forest species mix containing various native tree species.

A review of the pre-mining slope and land use was undertaken to compare the post mining land use to the pre-mining land use. The slope analysis and land use of the pre-mining landscape is shown in **Figure 7** and **Figure 8** respectively. This review demonstrates that the post mining land form overall consists of lower grade glops when compared to the pre-mining environment and the proposed final land use will consist of a greater area of woodland species when compared to the pre-mining land use.

Table 9 below details the pre-mining and post mining land use areas.

Table 9 – Pre and Post Mining Land Use Areas

Land Use	Pre-mining Area (ha)	Post-mining Area (ha)
Woodland	19.82	31.81
Forest	23.39	11.40
Total	**43.21**	**43.21**

Figure 7 – Pre Mining Slope Analysis

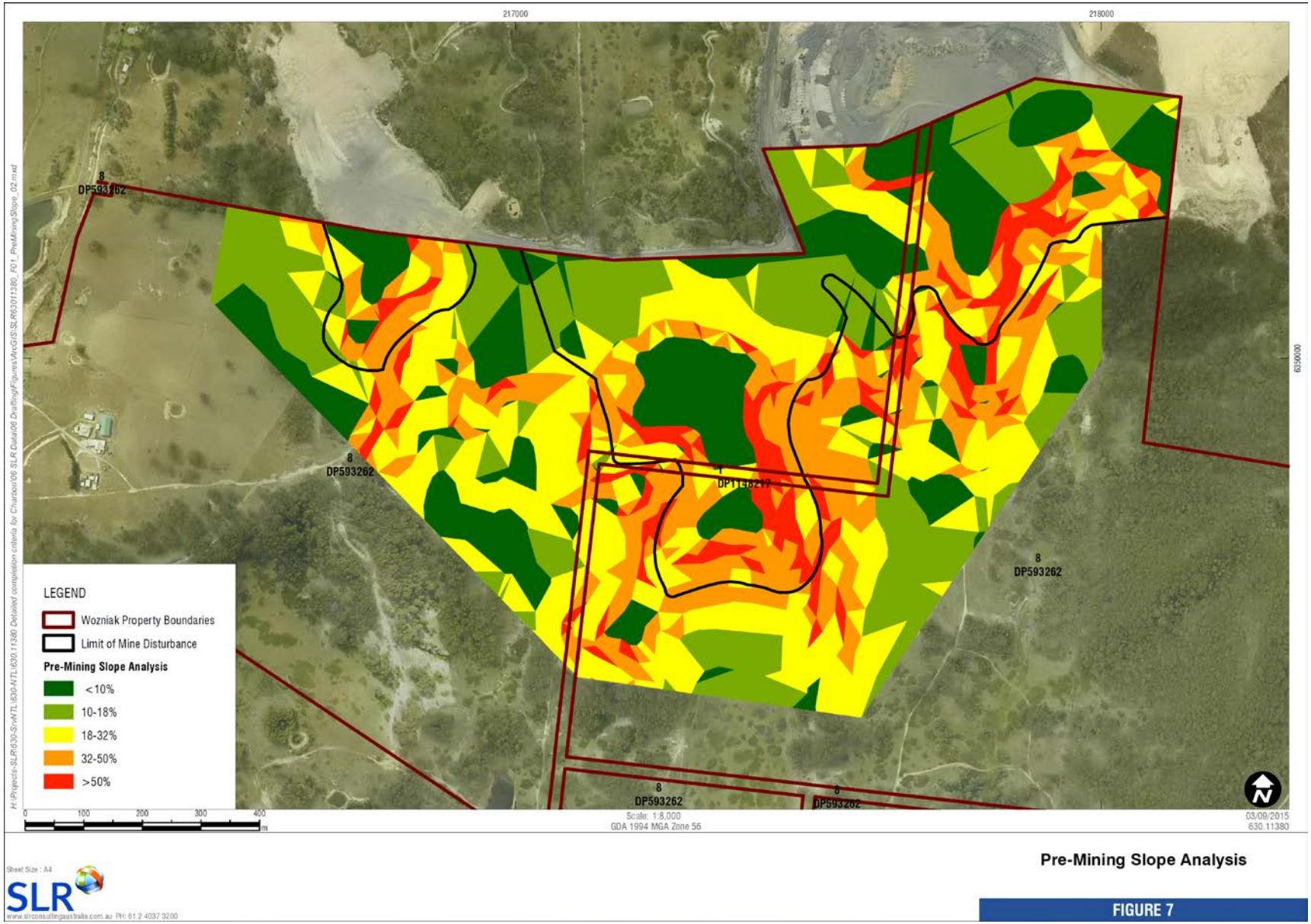
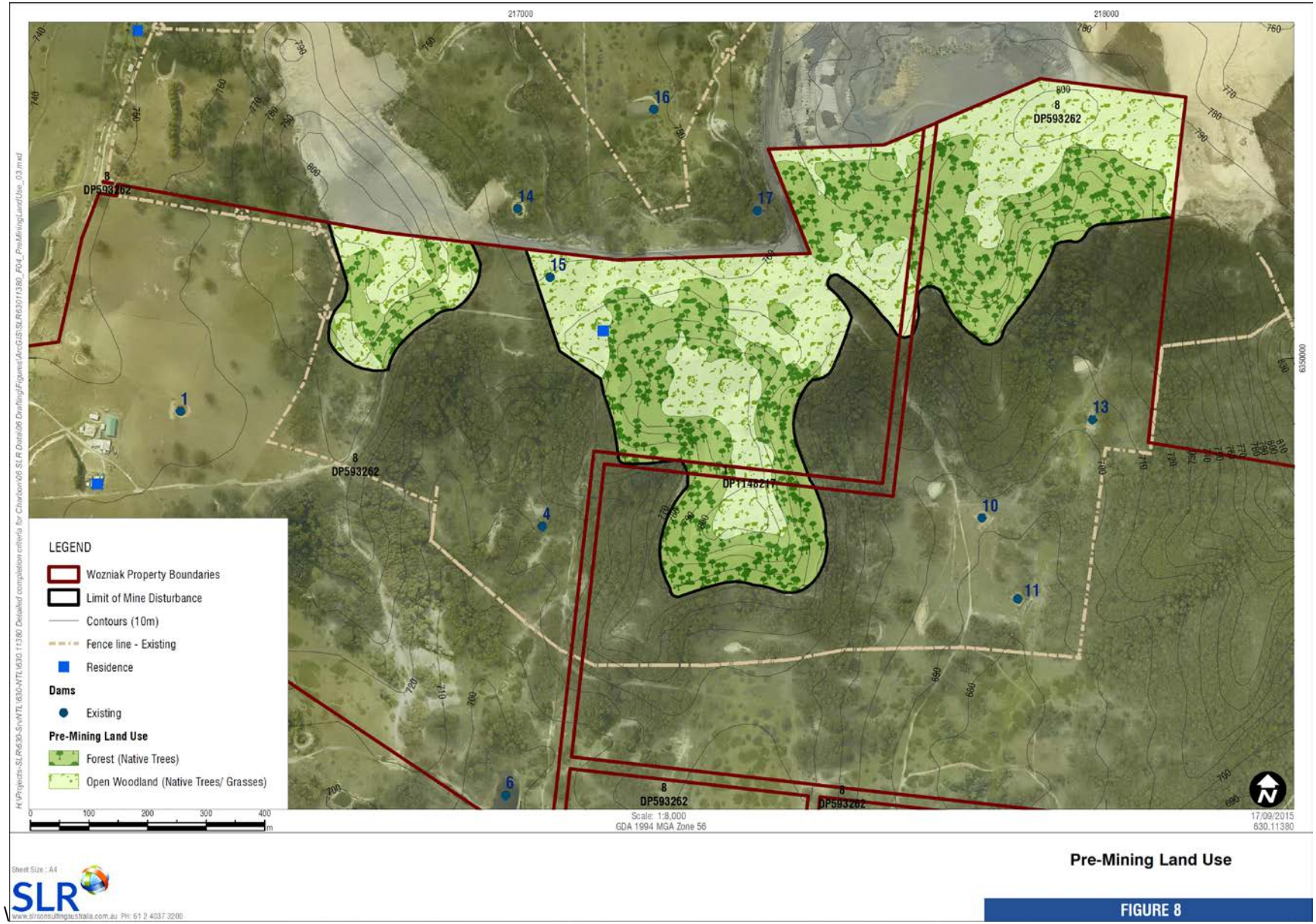


Figure 8 – Pre Mining Land Use



5.2. Domain Rehabilitation Objectives

Table 10 details the rehabilitation objectives for each domain.

Table 10 – Rehabilitation Domain Objectives

Domain	Rehabilitation Objectives
Domain – Rehabilitation Area - Woodland	• Final landforms are safe, stable, non-polluting and free-draining. • Final landform is consistent with the agreed final landform described in this MOP that has been developed in consultation with the landowner and DRE. • Erosion does not compromise the post mining land capability. • Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community • Weeds and feral animals do not pose a risk to rehabilitation success. • Vegetation meets the long term completion criteria being low maintenance and self sustaining.
Domain – Rehabilitation Area Forest	• Final landforms are safe, stable, non-polluting and free-draining. • Final landform is consistent with the agreed final landform described in this MOP that has been developed in consultation with the landowner and DRE. • Erosion does not compromise the post mining land capability. • Forest rehabilitation areas species diversity is comparable to analogue native vegetation community • Weeds and feral animals do not pose a risk to rehabilitation success. • Vegetation meets the long term completion criteria being low maintenance and self sustaining.

5.3. Rehabilitation Phases

The achievement of the agreed post disturbance land use is recognised as a series of rehabilitation phases which include:

- Phase 1 – General Land Management
- Phase 2 – Landform Establishment
- Phase 3 – Growth Medium Development
- Phase 4 – Ecosystem and Land Use Establishment
- Phase 5 – Ecosystem and Land Use Sustainability
- Phase 6 – Relinquishment

A description of each of these rehabilitation phases is provided in **Table 11** below.

Table 11 - Description of Rehabilitation Phases

Phase	Description
General Property Management	Establishment of new stock proof fences and gates, removal of redundant fences, establishment of fire breaks and making existing access tracks accessible.
Landform Establishment	The process of shaping unformed rock of other sub-stratum material into a desired land surface profile including final landform drainage features. This phase includes earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics.
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 topsoil substitutes and applying ameliorants.
Ecosystem and Land Use 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.
Ecosystem and Land Use Sustainability	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.
Relinquishment	Completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

Phase 1 – General Land Management

New fencing on the property will be constructed with any areas of redundant fencing removed. The locations of new fence lines and fence lines to be removed have been determined in consultation with the landowner and are shown in **Figure 4**. The type of stock proof fencing to be installed will be determine in consultation with the landowner and detailed within the Land Management Strategy to be developed subsequent to this MOP.

The boundary fence line will be surveyed and pegged out by a qualified surveyor to ensure the fence aligns with the property boundary. An opportunity for the landholder to be present during these surveys will be offered. The fence to be erected will be an 8-90-30 hinge joint with two top strands of barbed wire. Star posts will be spaced approximately 4 metres apart with waratah MaxY posts installed every 12 post (approximately 50m).

A 10 metre fire break will be established between the boundary fence line and the newly rehabilitated areas as shown on **Figure 4**. Firebreaks will be established once land is considered stable and does not pose a risk of erosion.

Timber located along an existing access track at the southern end of the Southern Outlier will be removed. All timber will be transported to an area agreed to by the landowner and the track will be made accessible.

Existing and proposed dams will be cleaned out and maintained until vegetation has been established and sediment runoff from the site has stabilised. A final clean out of all existing and proposed dams will be undertaken following stabilisation of runoff from the site.

Remnants of a rock retaining wall around the southern end of the Southern open cut will be removed. Parts of the retaining wall have already been removed as a result of mining activities and the remaining sections are damaged. The remaining damaged sections provide a safety issue and impediment to achieving a stable landform on the site. As, such, the remnant sections of the wall will be removed.

Boulders that have rolled into gullies from the disturbance area will be removed where appropriate and safe to do so.

Phase 2 - Landform Establishment

All surface disturbance areas will be reshaped, graded and trimmed to make a landform that is consistent with the surrounding topography. The reshaping will be such that it will enable the free drainage of surface runoff from the site. Surface water management structures (contour banks, drains and settlement ponds) will also be constructed to ensure the water leaving the site does not result in erosion of the landform. Any rocky materials that are on the surface will remain as these provide a number of distinct advantages including an armouring effect on the slopes, assist in mitigating erosive forces and providing good niche areas for fauna to begin to colonise the area.

There are limitations on the final configuration due to the initial landform, material volumes being moved, and the fixed surrounds of undisturbed land that the rehabilitation must integrate into.

A detailed drainage design on the final landform has been prepared by GHD. A copy of the drainage design report (GHD 2015) is provided as **Appendix 3** to this MOP. All drainage controls will be installed in accordance with the drainage design report. Additional dams requested by the landowner during consultation are inconsistent with the drainage design for the property and inconsistent with the overall rehabilitation objectives. As such additional dams rover and above what has been recommended by GHD will not be installed as part of the rehabilitation works on the property.

As an outcome of the drainage design work undertaken, it has been determine that the final landform design has resulted in the pre-mining and post mining catchment areas remaining relatively consistent with an overall increase in catchment area within the boundary of this MOP of 0.84 hectares. **Table 12** below details the pre-mining and post mining catchment areas within the MOP boundary and the change in catchment areas as a result.

Table 12 – Pre and Post Mining Catchment Area

Catchment	Pre-mining Area (ha)	Design Area (ha)	Difference (ha)
W1	40.35	39.48	-0.87
S1	38.78	38.4	-0.38
S2	9.36	10	0.64
S3	67.08	68.62	1.54
N1	16.16	16.23	0.07
N2	1.81	1.65	-0.16

Catchment	Pre-mining Area (ha)	Design Area (ha)	Difference (ha)
TOTAL	**173.54**	**174.38**	**0.84**

Fourteen existing dams are located within the boundary of this MOP as shown on **Figure 8**. These dams will be retained for the retention of clean water for use by native animals and stock.

Given the steep nature of the terrain and a number of small disturbed sub-catchments, it is noted that establishing additional sediment control dams at the immediate downslope extent of disturbed areas is not considered cost-effective or feasible in many cases. Erosion control structures that may assist in mitigating downslope runoff accumulation and formation of rills will be an option to be implemented in-slope.

Three new sediment control dams are proposed to be constructed within the disturbance area to assist in managing erosion from the site and ensure that water leaving disturbed areas is adequately treated during rehabilitation. These three dams are shown on **Figure 4**.

Dam 21 will be constructed to an approximate capacity of 1.75 ML, Dam 22 would be constructed to an approximate capacity of 2 ML and Dam 23 will be constructed to an approximate capacity of 0.5 ML.

Minor upgrades and repairs will be conducted on these dams as required to ensure they are functioning to design. Existing and proposed dams will be cleaned out and maintained until vegetation has been established and sediment runoff from the site has stabilised. A final clean out of all existing and proposed dams will be undertaken following stabilisation of runoff from the site.

Due to the limited ability to install large sediment control dams within the disturbance area, the strategy for erosion and sediment control will focus on erosion management with options including mulching, slope breaks (i.e. contour berms – earthen, timber debris, coir logs), hydroseeding or jute mesh, f required.

Phase 3 – Growth Medium Development

Growth Medium Development incorporates the processes involved to achieve a soil which is capable of supporting a sustainable plant community. It includes consideration of the chemical, physical and biological properties of the media.

Where topsoil or suitable subsoil material is available, it will be spread, treated with fertiliser and seeded in one consecutive operation. This strategy will allow mitigation of the potential for topsoil loss to wind and water erosion.

Where topsoil is limited, an appropriate topsoil substitute material may be used (e.g. bio-solids), and in some areas, where the spoil is benign and favourable for the establishment of native trees and shrubs, direct vegetation establishment may be utilised as an option.

Thorough seedbed preparation will be undertaken to ensure optimum establishment and growth of vegetation. All areas will be contour ripped where safe to complete and, where possible, immediately prior to sowing. If required, the re-spread material surface may be scarified prior to, or during seeding, to reduce run-off and increase infiltration. The sequence of rehabilitation activity will be carried out as much as possible in a way that enhances plant germination and establishment to allow rapid colonisation of the area.

Phase 4 – Ecosystem and Land Use Establishment

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.

Revegetation

Revegetation activities will be scheduled to occur promptly following the completion preparatory earthworks, soil application and drainage works.

Following the completion of all preparatory earthworks, final trim requirements, erosion control structures and deep ripping where appropriate and where safely possible, seeding will be best completed as the warmer spring weather allows the ground temperatures to climb to beneficial levels. Prior seeding due to low temperatures and frost conditions can result in loss of viable seed applied. Later seeding can see poor conditions of extended drier times and high temperatures which can be detrimental to plant establishment and colonisation of the rehabilitated areas. Where possible, the timing of seeding will coincide with the preferred native grass and tree seasonal sowing periods in autumn or spring.

Seeding will be carried out through a range of means as the project logistics require and may include hand seeding, machine application, chopper spread, and hydro-mulching.

Rehabilitation will be completed with that aim of establishing tree and shrub species commensurate with the nominated post-mine ecosystem.

Species selection for areas to be rehabilitated to native bushland and mixed grasses will focus on those species commensurate with the surrounding forest native vegetation of the local area. 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.

Some species have been included in the rehabilitation species mix at the request of the landowner through the consultation undertaken as part of the preparation of this MOP.

There are two species mixes proposed to be used in the rehabilitation. The species proposed in each species mix is detailed in **Table 13** below.

Weed Control

A program for the control of weeds on the site will be developed and implemented. Early control of naturally introduced weeds will minimise competition and maximise early growth and survival of desired species. This can be achieved by physical removal or by chemical control where appropriate.

Weed management will be a component of rehabilitation activities.

Weeds will be managed across the site (comprising both the rehabilitation areas, the larger Charbon Access Area on the Wozniak property and the wider Charbon Colliery Mining Leases) which will comprise:

- Regular inspections of the site (particularly rehabilitated areas) to identify potential weed infestations; and
- Identifying, removing and/or spraying 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.

Weeds will be managed until no significant weed infestations are present and they do not pose a threat to the rehabilitation success.

Feral Animal Control

Feral animals are a recognised predator of endangered native fauna species. The impact of feral animals on the emerging vegetation can be significant and reduce the likelihood of revegetation success. Other detrimental impacts of feral animals include damage to juvenile vegetation from grazing, spreading weed seeds and erosion. A feral animal control programme will be developed and implemented.

Bushfire

A 10 metre fire break will be established between the newly rehabilitated areas and the boundary fence line as shown on **Figure 4**. Firebreaks will be established once land is considered stable and does not pose a risk of erosion.

Table 13 - Rehabilitation Species Mix

Woodland Species	
Trees	**Pasture**
Acacia melanoxylon (Australian Blackwood)	Japanese millet (cover crop)
Eucalyptus albens (White Box)	Couch
Eucalyptus blakelyi (Blakely's Red Gum)	Kikuyu
Eucalyptus melliodora (Yellow Box)	Wimmera Ryegrass
Eucalyptus macrorhyncha (Red Stringybark)	Perennial Ryegrass
Eucalyptus punctate (Grey Gum)	Sub-Clover
Eucalyptus globoidea (White Stringybark)	Lucerne
	Green Panic
	Cocksfoot
	Phalaris

Forest Species	
Trees	**Pasture**
Acacia buxifolia (Box-leaf Wattle)	Japanese millet (cover crop)
Acacia clandullensis (Gold-dust Wattle)	Couch
Acacia dawsonii (Dawson Wattle)	Perennial Ryegrass
Acacia dealbata (Silver Wattle)	Wimmera Ryegrass
Acacia decurrens (Black Wattle)	
Acacia falciformis (Hickory Wattle)	
Acacia filicifolia (Fern-leaf Wattle)	
Acacia implexa (Broad Leaf Wattle)	
Acacia melanoxylon (Australian Blackwood)	
Acacia obtusifolia (Blunt Leaf Wattle)	
Acacia terminalis (Sunshine Wattle)	
Eucalyptus albens (White Box)	
Eucalyptus blakelyi (Blakely's Red Gum)	
Eucalyptus bridgesiana (Apple Box)	

Trees	Pasture
Eucalyptus cannonii (Capertee Stringybark)	
Eucalyptus cypellocarpa (Mountain Grey Gum)	
Eucalyptus globoidea (White Stringybark)	
Eucalyptus macrorhyncha (Red Stringybark)	
Eucalyptus mannifera (Brittle Gum)	
Eucalyptus melliodora (Yellow Box)	
Eucalyptus parramattensis (Parramatta Red Gum)	
Eucalyptus pauciflora (Snow Gum)	
Eucalyptus polyanthemos (Red Box)	
Eucalyptus praecox (Brittle Gum)	
Eucalyptus punctate (Grey Gum)	
Eucalyptus rossii (Inland Scribbly Gum)	
Eucalyptus stellulata (Black Sallee)	
Eucalyptus viminalis (Ribbon Gum)	
Callitris endlicheri (Black Cypress Pine)	
Callistemon linearis (Narrow-leaved Bottlebrush)	
Callistemon pallidus (Lemon Bottlebrush)	
Leptospermum continentale (Prickly Tea-tree)	
Melaleuca linarifolia (Narrow-leaved Paperbark)	
Melaleuca styphelioides (Prickly Paperbark)	
Cassinia arcuate (Drooping Cassinia)	
Cassinia quinquenefavia (Cough Bush)	
Bursaria spinosa (Australian Blackthorn)	
Hakea decurrens (Bushy Needlewood)	
Brachychiton populensis (Kurrajong)	

Photographs showing the desired rehabilitation outcomes for each vegetation community are provided in **Appendix 5**.

Phase 5 - Ecosystem and Land Use Sustainability

The ecosystem development phase of rehabilitation is characterised as the period of time required to demonstrate that an ecosystem is on a sustainable successional trajectory towards the desired post disturbance land use. Key activities in this phase include rehabilitation monitoring, rehabilitation maintenance and adaptive management.

A commitment to effective rehabilitation involves an on-going monitoring and maintenance program throughout and beyond the rehabilitation of the site. Areas being rehabilitated will be regularly inspected and assessed against the long and short-term rehabilitation objectives as outlined in **Section 5** of this MOP. Rehabilitation monitoring is detailed further in **Section 8** of this MOP. Monitoring and restoration works will continue until the completion criteria is realised and relinquishment of the tenement is agreed.

Phase 6 – Relinquished Lands

Once rehabilitation is completed, Charbon Coal will apply to DRE to determine if they are satisfied with the rehabilitation of the site and to request for relinquish of the lease/ licence.

Table 14 shows the relevant rehabilitation phases each domain and where it is predicted to be at the end of the MOP period.

Table 14 - Rehabilitation Phases for each Domain at the end of the MOP Term

Rehabilitation Phase \ Domain	Rehabilitation Area – Forest	Rehabilitation Area – Woodland
Phase 1 – General Land Management	✓	✓
Phase 2 – Landform Establishment	✓	✓
Phase 3 – Growth Medium Development	✓	✓
Phase 4 – Ecosystem and Land Use establishment	✓	✓
Phase 5 – Ecosystem and Land Use Sustainability	✓	✓
Phase 6 – Relinquished Lands	✓	✓

5.4. Closure Timeline

Table 15 below provides an indicative closure timeline.

Table 15 - Indicative Closure Timeline

	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	2017	2018	2019	2020	2021	2022
Rehabilitation Phases											
1) General Land Management (installation of fences and gates/ removal of timber/boulders/ re-establishment of access track)											
2) Landform Establishment (bulk earthworks)											
3) Growth Media Development (including spreading of topsoil)											
4) Establishment of new drainage structures											
5) Ecosystem & Land use Establishment (Woodland)*											
6) Ecosystem & Land use Establishment (Forest)*											
7) Ecosystem & Land use Development											

	Q4 2015	Q1 2016	Q2 2016	Q3 2016	Q4 2016	2017	2018	2019	2020	2021	2022
8) Relinquished Lands											
Monitoring and Inspections											

*Note – Seeding of both woodland and forest species mix to be undertaken concurrently. Cover crop to be included in species mix. Seeding to be undertaken in Spring 2016.

6. Performance Indicators, and Completion Criteria

The below tables detail the performance and completion criteria for each rehabilitation phase to be undertaken under this MOP.

Table 16 - General Land Management Phase

Domain Objective	Performance Indicator	Completion Criteria
All Primary Domains		
Fencing	Site Security	All new fencing and gates are installed and redundant fencing is removed in accordance with the MOP plan.
Fire Breaks	Bushfire Management	A firebreak is established around the perimeter of the boundary fence adjacent to newly rehabilitated areas.
Access Road	Accessibility	The existing access road around the southern end of the Southern Outlier is free of timber, timber has been transported to the landowner and the access road is passible.

Table 17 - Landform Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria
All Primary Domains		
Final landforms are safe, stable, non-polluting and free-draining. Final landforms are safe, stable, non-polluting and free-draining.	Void	The void will be backfilled to a level consistent with the agreed post mining landform.
	Landform Stability	Landforms are assessed to be stable and free draining to local watercourses. There is to be no ponded water remaining on the mine landforms.
	Erosion	There is no evidence of slumping in the landform or uncontrolled erosion that would cause a safety issue or compromise the preferred post mining land uses.
		Erosion mitigation measures have been applied to ensure slope stability.
	As built survey	Landform survey verifies constructed landform is generally in accordance with

Domain Objective	Performance Indicator	Completion Criteria
All Primary Domains		
		the approved landform design detailed in this MOP.
	Surface water drainage	The landform is stable and contour banks and water diversion drains are installed to direct water into stable areas or into sediment control basins sized generally in accordance with the *Managing Urban Stormwater: Soils and Construction, Volume 1* (the Blue Book) (Landcom, 2004) and *Volume 2E Mines and Quarries (DECC, 2008)* and the GHD drainage report provided as an appendix to this MOP.
		Drainage structures are assessed to be stable with no active gully heads, tunnel erosion or bank failure.

Table 18 - Growth Medium Development Phase

Domain Objective	Performance Indicator	Completion Criteria
All Secondary Domains		
Growing media appropriate for the intended final land use is reinstated at all rehabilitation areas.	Topsoil depth	Where available, topsoil or a suitable alternative has been spread uniformly at the specified depth similar to that which was stripped for the final land use. Some areas of benign bare spoil utilised for targeted native vegetation establishment have leaf litter accumulating.
	Topsoil characterisation	Where available, topsoil and topsoil substitutes have been tested to determine the characterisation of the topdressing material and treat if necessary with soil conditioners, ameliorants or fertilisers.
	Amelioration	Where required appropriate soil ameliorants (e.g. gypsum, fertilisers, mulch) have been applied in accordance with specifications.
	pH	Soil pH is between 5.5 and 8.5.

Domain Objective	Performance Indicator	Completion Criteria
All Secondary Domains		
Final landforms are safe, stable, non-polluting and free-draining	Temporary erosion and sediment control	Temporary erosion and sediment control measures are installed prior to seeding and the establishment of a vegetation cover.

Table 19 - Ecosystem and Land Use Establishment Phase

Domain Objective	Performance Indicator	Completion Criteria
All Secondary Domains		
Weeds and feral animal species do not present a risk to rehabilitation.	Weed presence	Monitoring verifies there are no significant weed infestations and weeds do not comprise a significant proportion of the species in any stratum.
		Monitoring records indicate that noxious weeds are controlled in accordance with legislation and the MOP.
	Feral animal density	Monitoring records indicate that feral animal pests are controlled in accordance with legislation and the MOP.
Erosion does not present a safety hazard or compromise the post mining land capability.	Erosion and Sediment Control	Visual monitoring indicates there is no significant erosion that compromises land capability or the intended final land use.
Domain – Forest Rehabilitation		
Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community.	Species Selection	A mixture of native trees, shrubs and grasses representative of regionally occurring woodland is present.
	Vegetation health	Rehabilitation monitoring verifies more than 75% of trees are healthy and growing as indicated by rehabilitation monitoring at Year 5 following establishment.
	Species composition	Rehabilitation monitoring verifies species diversity for each stratum is comparable to analogue sites at Year 5 following establishment.

Domain Objective	Performance Indicator	Completion Criteria
	Tree Density	Tree density is commensurate with that observed in the analogue forest site.
Domain – Woodland Rehabilitation		
Effective maintenance and management of rehabilitation areas.	Species Selection	A mixture of native trees, shrubs and grasses representative of regionally occurring woodland is present.
Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community.	Vegetation health	Rehabilitation monitoring verifies more than 75% of trees are healthy and growing as indicated by rehabilitation monitoring at Year 5 following establishment.
	Species composition	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is commensurate with relevant analogue sites at Year 5 following establishment.
Domain – Water Management Area		
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion.	Geomorphic stability	Drainage structures are assessed to be stable by a suitably qualified at Year 5 following establishment.

Table 20 - Ecosystem and Land Use Sustainability Phase

Domain Objective	Performance Indicator	Completion Criteria
All Secondary Domains (Forest and Woodland)		
Weeds and feral animals that present a risk to rehabilitation success at the site will be managed.	Weed presence	Rehabilitation monitoring verifies weed presence is broadly comparable to analogue sites and does not present a risk to rehabilitation.
		Monitoring records indicate that noxious weeds are controlled in accordance with legislation and the MOP.
	Feral animal density	Monitoring records indicate that feral animal pests are controlled in accordance with legislation and the

Domain Objective	Performance Indicator	Completion Criteria
		MOP.
A range of fauna species are present	Invertebrate Species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes when compared to the analogue sites.
Ecosystem Health and sustainability	Vegetation health	Rehabilitation monitoring verifies that more than 75% of trees are healthy and growing as indicated by rehabilitation monitoring.
	Species composition	Rehabilitation monitoring verifies that species diversity for each stratum (canopy, mid storey and ground cover) is generally comparable to relevant analogue sites.
	Reproduction	Rehabilitation monitoring verifies second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites.
	Nutrient Cycling	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other micro symbionts. Adequate macro and micro-nutrients are present.
	Resilience	Evidence of reproduction in tree/shrub species through presence of viable seed, flowers or presence of seedlings.
	Soil Quality	Rehabilitation monitoring verifies soil characteristics (pH, EC and ESP, nitrogen and phosphorus) are in the range of analogue sites.
Domain – Woodland		
Grazing	Grazing Impacts	There is no evidence of impact on the landforms as a result of grazing in the woodlands areas. This includes erosion relating to stock tracks or measurable impacts on the establishment of suitable groundcover.

Table 21 - Relinquishment

Domain Objective	Performance Indicator	Completion Criteria
All Domains		
Site will be restored to a landform capable of sustaining the post-mining land uses	Completion Criteria	All relevant completion criteria for the land proposed for relinquishment (Rehabilitation Phases) are acknowledged to be met by the DRE (or contemporary equivalent).
	Monitoring Points	Any ancillary disturbance or equipment associated with surface water and rehabilitation monitoring points is removed and/or rehabilitated.

7. Rehabilitation Implementation

7.1. Status at MOP Commencement

The status of rehabilitation of each of the domains is provided in **Table 22** below.

Table 22 - Rehabilitation Status

Domain	Status Description
Domain – Material Stockpile Areas	Placement of material within stockpile areas has ceased.
Domain - Final Voids	All coal extraction from mining areas has ceased. No further mining proposed. Bulk earth works has been undertaken towards developing a final landform within the Western Outlier, Southern Outlier, and within the relevant portions of the Southern Open-Cut areas.
Domain – Mine Disturbance Areas	Established mine disturbance areas are no longer in use.

7.2. Proposed Rehabilitation Activities during the MOP Term

Table 23 details the areas that are anticipated to be rehabilitated during the term of this MOP.

Table 23 - Rehabilitation Progression during the term of the MOP

Year	Total Disturbance (ha)	Total Rehabilitation Area (ha) in MOP Year	Cumulative Rehabilitation (ha)	Description
As at 1 October 2015	43.21	0	0	
As at 31December 2015	40.71	2.5	2.5	Rehabilitation of the Stony Creek Gully Area completed. Contract awarded for rehabilitation bulk earthworks for the remainder of the site.
As at 31 December 2016	0	40.71	43.21	All bulk earthworks completed. All surface water management structures constructed. Initial seeding completed. Ongoing management actions identified for implementation. All fencing and gates installed as

Year	Total Disturbance (ha)	Total Rehabilitation Area (ha) in MOP Year	Cumulative Rehabilitation (ha)	Description
				detailed within this MOP.
As at 31 December 2017	0	0	43.21	Any areas requiring reseeding completed. Management actions implemented
1 January 2018\7 – 1 October 2022	0	0	43.21	Ongoing management and monitoring actions implemented until long term rehabilitation objectives achieved

7.3. Summary of Rehabilitation Areas during the MOP Term

All mine disturbance areas within the MOP boundary (totalling 43.21 hectares) will be rehabilitated during the MOP term.

7.4. Relinquishment Phase Achieved During MOP Period

It is considered likely that the long term completion criteria will be achieved within the term of this MOP with landowner and government agency approval of the rehabilitation success being obtained to allow for the partial relinquishment of the mining leases applicable to Lot 8 DP 593262 and Lot 1 DP 1148217.

8. Rehabilitation Monitoring and Research

8.1. Rehabilitation Monitoring

Charbon Coal's long term rehabilitation objectives are to provide a low maintenance, geotechnically stable and safe landform which blends with surrounding landforms and provides land suitable for the intended final land use. The intended final land use is a mixture of native forest and open woodland consisting of native trees and grasses.

The objective of the rehabilitation monitoring program is to:

- Assess the long term stability and functioning of re-established ecosystems on mine affected land when compared to adjacent analogue sites;
- Assess rehabilitation performance against the closure criteria; and
- Facilitate continuous improvement in rehabilitation practices.

Broadly, the long term rehabilitation monitoring program will include vegetation monitoring, habitat assessment and geotechnical stability monitoring. The monitoring program will also include at least two reference sites to allow for comparison and evaluation of success. The monitoring results will provide the basis to measure the success of the rehabilitation against the closure criteria.

8.1.1. Rehabilitation Methodology Records

Charbon Coal will record the details of each rehabilitation effort on the land covered by this MOP so that they are available for later interpretation of rehabilitation monitoring results with the aim of continually improving rehabilitation standards. Amongst the key monitoring parameters to be included in the program relate to the following:

- Landform design details (recorded as survey data);
- Drainage details for the areas being rehabilitated;
- Site preparation techniques (e.g. topsoil source, time of sowing, soil ameliorants used etc.);
- Revegetation methodologies (e.g. rate and type of fertiliser, cover crop and rate, seed viability including watering and weed management);
- Photographic records; and
- Initial follow-up care and maintenance works (including watering and weed management).

8.1.2. Rehabilitation Inspections

Following the completion of rehabilitation, an initial establishment inspection will be conducted within 12 months to determine whether issues have occurred or are emerging, which have the potential to delay revegetation establishment. Such issues may include erosion that has occurred due to storm events, failure of drainage structures and a lack of germination or establishment of ground cover etc. The objective of this process will be to identify potential issues early in order to minimise the extent of areas affected as well as develop mitigation strategies in a timely and cost effective manner. It will also provide the baseline data for surveys over the life of the MOP.

Bi-annual (every 2 years) inspections of rehabilitated areas will be undertaken over the life of the MOP to assess:

- soil conditions,

- landform condition,
- drainage and sediment control structures,
- presence of microorganisms and invertebrates,
- revegetation germination rates,
- plant health; and
- weed infestation.

Outcomes of the annual rehabilitation inspection will be recorded and any required management actions that are identified as part of the inspection implemented as soon as practical as part of the rehabilitation care and maintenance program. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards.

Quarterly rehabilitation inspection will be undertaken with the landowner and an annual rehabilitation report prepared and provided to the landowner.

8.1.3. Rehabilitation Monitoring

Flora Monitoring

Flora monitoring will be conducted 12 months after revegetation of disturbed areas and then every 2 years to assess development of regenerating Forest and Open Woodland rehabilitation areas. For specific detail of survey effort see

Table 24**Table 24**.

Table 24 - Rehabilitation Monitoring Survey Effort

Elements to be Monitored	Requirements	Monitoring Frequency
Ecosystem Establishment		
General Description (flora)	Describe the vegetation in general terms, e.g. Mixed eucalypt woodland with grass understorey	12 months after establishment and then every 2 years
2m x 2m quadrats	Count the number of all species.	12 months after establishment and then every 2 years
	Measure live vegetation cover for understorey and grasses (separately) using a line intercept method	
	Record details of ground cover	
20m x 10m plots	Count by species, all trees >1.6m tall	12 months after establishment and then every 2 years
	Tag and measure diameter at breast height of trees >1.6m tall, to a maximum of 10 for any one species	
	Record canopy cover over the whole 20m centreline when trees are tall enough.	

Elements to be Monitored	Requirements	Monitoring Frequency
Ecosystem Establishment		
	Subjectively describe tree health, by species if relevant, noting signs of drought stress, nutrient deficiencies, disease and severe insect attack. Where health problems are noted, record the percentage of unhealthy trees.	
	Record any new plant species not present in the smaller plots, including any problem and declared noxious weeds.	
	Take five surface soil samples (e.g. at approx. 5m intervals along the centreline) and bulk these for analyses of: pH, EC, chloride and sulphate; exchangeable Ca/Mg/K/Na; cation exchange capacity; particle size analysis and R1 dispersion index; 15 bar and field capacity moisture content; organic carbon; total nitrate and nitrogen; total and extractable phosphorus; Cu, Mn and Zn.	
50m transect	Along the 50m erosion monitoring transect, record the location, number and dimension of all gullies >30cm wide and/or 30cm deep.	12 months after establishment and then every 2 years
	Erosion pins should be established in plots located in newer rehabilitation to record sheet erosion if present.	
Rehabilitation in general	When traversing between monitoring plots, note the presence of species of interest not previously recorded (e.g. key functional or structural species, protected species, noxious weeds), as well as obvious problems including any extensive bare areas (e.g. those greater than 0.1ha).	12 months after establishment and then every 2 years
Photographic Record	For each 20m x 10m plot, a photograph should be taken at each end of the plot, along the centreline looking in.	12 months after establishment and then every 2 years
Habitat	General observations relating to the availability and variety of food sources (e.g. flowering/fruiting trees, presence of invertebrates etc).	12 months after establishment and then every 2 years
	Availability and variety of shelter (e.g. depth of leaf litter, presence of logs, hollows etc).	
	Presence/absence of free water in the rehabilitated areas.	

The location of quadrats, plots and transects will be identified in a Land Management Strategy to be developed subsequent to this MOP.

Weeds and Pests

Weeds and pests will be monitored quarterly with particular attention paid to species identity and level of infestation and observations of impact on rehabilitation.

Monitoring of Microorganisms

Microorganisms in rehabilitation areas will be monitored annually as the presence of microorganisms is considered a key indicator of rehabilitation success. This microorganism monitoring will be conducted every two years for the life of the MOP term, recording microbial biomass and function.

Geotechnical Stability Monitoring

This will include annual assessments throughout the MOP term of the stability of batters and surface settlements (sink holes). Particular attention is paid to where the surface features could impact on the performance of any surface water management system. Surface integrity of the landform is also to be assessed, including the presence of any landform slumping.

Habitat Analysis

The list below includes the information that will be collected as part of the monitoring programme:

- Flowering/fruiting trees;
- Availability and variety of shelter;
- Depth and presence of leaf litter;
- Weed cover and level of impact;
- Presence of noxious species;
- Tree health; and
- Grass cover, particularly in open woodland vegetation.

8.2. Research and Rehabilitation Trials and Use of Analogue Sites

Two analogue sited will be established in similar vegetation communities proposed to be established on the land covered by this MOP. Monitoring of these analogue sites will provide comparative data for determining the success of rehabilitation.

9. Intervention and Adaptive Management

9.1. Threats to Rehabilitation

Where rehabilitation performance is not trending to the nominated completion criteria this may indicate that there is a threat to long term rehabilitation success. The key threats to rehabilitation success, as identified in the risk assessment and detailed in **Section 3** of this MOP, include:

- Weed infestations;
- Erosion of the final landform;
- Poor topsoil quality and availability;
- Unsuitable species selected for use in rehabilitation;
- Inappropriate land management practices (i.e. grazing of land prior to rehabilitation success being achieved); and
- Feral animals.

A number of controls as detailed in the risk assessment and **Section 3** of this MOP have been identified to reduce these identified threats to rehabilitation including:

- The development of a detailed final landform that is designed to be stable and reduce slope gradients as far as practicable.
- The development of a detailed drainage design for the site.
- The development and implementation of a detailed monitoring programme of rehabilitation against the completion criteria.
- The development and implementation of a weed management plan.
- The development and implementation of a feral animal control programme.
- The selection and sourcing of appropriate seed of species that are suited to the local environment for use in the rehabilitation activities.
- Ensuring topsoil is utilised for the desired rehabilitation outcomes, complemented by seeding of some benign overburden materials directly to native tree and shrubs and the implementation of soil amelioration measures where required.
- Identify alternative sources of topsoil substitutes and benign beneficial overburden materials as required.

Where rehabilitation monitoring indicates that there is a significant threat to rehabilitation, Charbon Coal will implement adaptive management measures in accordance with the Rehabilitation Trigger Action Response Plan (TARP) described in **Section 9.2** below.

9.2. Trigger Action Response Plan

A TARP has been developed and provided in **Table 25** below to identify and respond to the identified significant threats to rehabilitation success.

Table 25 - Trigger Action Response Plan

Aspect/ Category	Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
Weeds	Weed presence	1	Trigger	Twelve months following revegetation, no significant weed infestations present.	Twelve months following revegetation, >10% but <25% cover of undesirable species present.	Twelve months following revegetation, >25% cover of undesirable species present.
			Response	No response required. Continue monitoring program and weed management programme as planned.	Engage weed management contractor to remove introduced species from the site, review the weed management programme and adapt it accordingly.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Review the weed management programme and adapt it accordingly. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate.
Landform	Erosion control	2	Trigger	No gully or tunnel erosion. No rilling present.	Minor gully or tunnel erosion present and/or rilling <200 mm deep.	Significant gully or tunnel erosion present and/or rilling >200 mm deep.
			Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.

Aspect/ Category	Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
	Drainage Condition	3	Trigger	Drainage structures operating as per design.	Drainage structures exhibiting minor drainage issues but does not threaten to cause rehabilitation failure.	Landforms exhibiting significant drainage issues, threatening or causing rehabilitation failure.
			Response	No response required. Continue monitoring program and continue to maintain drainage structures as required.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate and continue to maintain drainage structures as required.	Undertake a review of the drainage design and implement any additional drainage control structures as recommended. Identify measures to appropriately remediate the area and remediate as soon as practicable.
Topsoil	Topsoil quantity	4	Trigger	Sufficient topsoil, benign overburden material, or appropriate topsoil substitute material is identified for rehabilitation over the MOP term and for the Life of the Mine.	Topsoil balance indicates a deficiency in topsoil available (and an alternate media or benign overburden material is not available) for rehabilitation and there is a chance that the required rehabilitation outcomes may not be met.	Deficiency significant and alternate not available such that it will delay rehabilitation progression during the MOP term and the likelihood of rehabilitation success is low.

Aspect/ Category	Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
			Response	No response required.	Investigate options and alternatives (e.g. Organic Growth Medium (OGM)) to be able to meet future topsoil requirements. Continue direct seeding into ,material where possible and monitor	Source and budget for purchasing topsoil for use in rehabilitation. Investigate use of alternatives such as OGM.
	Topsoil quality	5	Trigger	Properties of soil are within 20% from relevant analogue site after 5 years from establishment or clearly show well established vegetation	Properties of soil are more than 20% from results at relevant analogue site after 5 years from establishment; however area is able to sustain selected vegetation species.	Properties of soil are more than 20% from results at relevant analogue site after 5 years from establishment; however area is not able to sustain selected vegetation species.
			Response	No response required. Continue monitoring program.	Investigate application of additional soil, and/or use of appropriate soil ameliorants or management options to address soil or overburden quality if deemed necessary.	Consultant to be engaged to assist with recommendations to appropriately remediate soil or overburden quality. Remediate as soon as practicable.
Revegetation	Ground cover	6	Trigger	Five years following revegetation to forest/woodland, a minimum of 75% total ground cover (vegetation, leaf litter, mulch) is present within rehabilitated areas.	Five years following revegetation to forest/woodland, total ground cover (vegetation, leaf litter, mulch) of between 60-75% in rehabilitated areas.	Five years following revegetation to forest/woodland, total ground cover (vegetation, leaf litter, mulch) is <60% within rehabilitated areas.

Aspect/ Category	Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
			Response	No response required. Continue monitoring program.	Review procedures where required to increase vegetation cover.	A suitably trained person to inspect the site. Investigate use of appropriate management options to remediate. Remediate as appropriate.
	Species composition	7	Trigger	Five years following revegetation to forest/woodland, species composition comprises native tree and shrub species >75% consistent with analogue site.	Five years following revegetation to woodland, native tree and shrub species composition comprises <75% but >60% consistent with analogue site.	Five years following revegetation to woodland, native tree and shrub species composition comprises <60% consistent with analogue site.
			Response	No response required. Continue monitoring program.	Review native seed mix and amend accordingly. Consider remedial actions such as tube stock planting or re-seeding to achieve required species composition.	An inspection of the site will be undertaken by a suitably trained person. Investigate remedial options to achieve required species composition. Review native seed mix and amend accordingly. Consider remedial actions such as tube stock planting or re-seeding to achieve required species composition.
Feral animal	Feral animals impacting rehabilitated	8	Response	Rehabilitated areas unaffected by feral animals.	Rehabilitated areas are experiencing moderate to minor impacts from feral animals.	Rehabilitated areas are experiencing significant impacts from feral animals

Aspect/ Category	Key Element	Element Number	Trigger Response	Condition Green	Condition Amber	Condition Red
	areas		Trigger	No response required. Continue monitoring program and feral animal control programme as planned.	Engage feral animal control contractor to review the feral animal control programme and adapt it accordingly.	Engage feral animal control contractor to review the feral animal control programme and adapt it accordingly. Investigate management measures to exclude feral animals from rehabilitated areas including fencing.

10. Reporting

Charbon Colliery prepares an Annual Environmental Management Report (AEMR) as part of the DRE's Mining, Rehabilitation and Environmental Management Process framework. This report compiles monitoring results and discusses trends, system changes and responses to any potential issues identified during monitoring, and an update on the progress of rehabilitation. Progress on rehabilitation and a review or rehabilitation against the performance indicators and rehabilitation objectives within this MOP will be included in the Charbon Colliery AEMR.

Charbon Coal will also report to the landholder on the progress of rehabilitation activities via the following:

- Quarterly site visit; and
- Annual rehabilitation report.

11. Review and Implementation of the MOP

11.1. Review of the MOP

It is not intended for there to be any modifications to the final landform and rehabilitation beyond what has been proposed in this MOP. Any modifications, however, will be undertaken in consultation with the landholder and appropriate government agencies.

Charbon Coal will continue to apply best practice principles to rehabilitation. Progress will be monitored against performance indicators contained within this MOP and adaptive management implemented to ensure the final rehabilitation objectives are achieved.

11.2. Implementation

The ultimate responsibility for the implementation of the MOP lies with the Mine Manager. However the responsibility for implementation, monitoring and review of the MOP will be carried by the Charbon Environment and Community Coordinator.

Table 26 outlines the positions of those people responsible for implementing the MOP and the tasks they are accountable for.

Table 26 – Responsibilities and Accountabilities

Position	Accountable Task
Mine Manager	• Ensure all mine personnel are aware of various rehabilitation procedures; • Ensure all rehabilitation procedures are followed; and • Ensure sufficient soil and seed resources are available to meet the rehabilitation schedule and outcomes.
Environment and Community Coordinator	• Coordinate, in consultation with the Mine Manager, rehabilitation; • Provide advice and support for the Mine Manager in relation to natural resource management, e.g. soil, seed etc; and • Review and analyse rehabilitation monitoring and advise on requirement for rehabilitation maintenance. • Inspect and maintain the property boundary fence between the Charbon Colliery and the privately property covered by this MOP.
Equipment Operators	• Ensure all rehabilitation is undertaken in accordance with the rehabilitation procedures and commitments in this MOP.
Landowner	• Ensure access and grazing of the

	rehabilitation areas until final completion criteria is achieved. • Maintain all fences within the private property to ensure access is restricted. • Ensure vehicle access to rehabilitation areas is restricted to existing access tracks only.

Appendix 1 – Section 240 Notices

Department of Industry
Resources & Energy

Section 240(1)(a) of the Mining Act 1992

Notice to give effect to a condition of an authorisation

Charbon Coal Pty Ltd
ACN 064237118
Bt Tower Level 18,
1 Market Street,
SYDNEY, NSW, 2000

Contact: Michael Young
Phone: 02 6360 5346
Fax: 02 6360 5363
Email: michael.young@trade.nsw.gov.au

Our ref: OUT15/18236

27th July 2015

BY REGISTERED POST

NOTICE UNDER s.240(1)(a) MINING ACT 1992

DIRECTION TO GIVE EFFECT TO A CONDITION OF AN AUTHORISATION

BACKGROUND

A. The Division of Resources and Energy within the Department of Industry, Skills and Regional Development ("the Department") has responsibility for the administration and enforcement of the *Mining Act 1992* ("**Mining Act**") and the Mining Regulation 2010.

B. You, Charbon Coal Pty Ltd, are a responsible person in relation to the authorisation **Mining Lease 1545 (ML1545).**

C. Condition 2 of ML1545 states:

MINING, REHABILITATION, ENVIRONMENTAL MANAGEMENT PROCESS (MREMP) MINING OPERATIONS PLAN (MOP)

(1) Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:-

(a)ongoing mining operations and environmental management; and

(b)ongoing monitoring of the project.

(2) The Plan must be prepared in accordance with the Director-General's guidelines current at the time of lodgment.

(3) A Plan must be lodged with the Director-General:-

(a) prior to the commencement of operations;

(b)subsequently as appropriate prior to the expiry of any current Plan; and

(c) in accordance with any direction issued by the Director-General.

(4) The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:-

(a) area(s) proposed to be disturbed under the Plan;

(b) mining and rehabilitation method(s) to be used and their sequence;

(c) areas to be used for disposal of tailings/waste;

(d) existing and proposed surface infrastructure;

(e) progressive rehabilitation schedules;

(f) areas of particular environmental sensitivity;

(g) water management systems (including erosion and sediment controls);

(h) proposed resource recovery; and

(i) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining landuse/vegetation

(5) The Plan when lodged will be reviewed by the Department of Mineral Resources.

(6) The Director-General may within two (2) months of the lodgement of a Plan, require modification and relodgement.

(7) If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, lease holder may proceed with implementation of the Plan submitted subject to the lodgement of the required security deposit within the specified time.

(8) During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) - (7) above.

D. The Department has been advised by the authorisation holder that the mine will cease extraction on the land identified as Lot 8, DP593262 in September 2015.

DIRECTION

In accordance with section 240(1)(a) of the Mining Act, I, Michael Young, an inspector appointed by the Secretary of the Department in accordance with s361of the Mining Act, direct Charbon Coal Pty Ltd, to take the measures specified below under the heading "Specified Measures" to give effect to Condition 2 of ML1545.

SPECIFIED MEASURES

1. In accordance with Condition 2 of ML1545, prepare a Mining Operation Plan (**the Plan**) that amends the current approved Plan to include a closure plan for areas of the mine where extraction will cease during the term of the Plan.

2. The closure plan applies to areas of the mine that extraction operations have ceased or will cease during the life of the Plan and that have been advised to the Department as on land comprising that part of Lot 8, DP593262 on which ML1545 is located.

3. In accordance with Condition 2(2), the MOP must be prepared in accordance with the ESG3 Guidelines as published on the Department's website.

4. In accordance with Condition 2(3), the Plan must be lodged with the Department by 16 October 2015 and prior to the commencement of final rehabilitation operations on the land.

5. In accordance with Condition 2(4), the Plan must include final rehabilitation objectives / methods and post mining land use / vegetation outcomes.

6. Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.

7. The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8 DP593262.

MICHAEL YOUNG
MANAGER & PRINCIPAL INSPECTOR ENVIRONMENT
Division of Resources and Energy
(By authorisation)

WARNING AND INFORMATION ABOUT THIS NOTICE

- It is an offence under section 240C of the Mining Act to fail to comply with this direction.

- The maximum penalty for this offence is, for a corporation, $1,100,000 and a further $110,000 for each day the offence continues, and, for an individual person, $220,000 and a further $22,000 for each day the offence continues.

- If you fail to take the measures specified above the Minister may take any action necessary to give effect to the direction including authorising another person to take those measures and recover the costs and expenses so incurred from you or apply to the Land and Environment Court for an injunction directing you to comply with this direction.

- The serving of this direction and the matters required of you pursuant to this direction in no way preclude, hinder or otherwise restrain the Department from taking further action against you including by commencing legal proceedings.

- This Notice is issued in accordance with section 240 of the Mining Act.

- The words and expressions used in this direction have the same meaning as they have in the Mining Act.

Department of Industry
Resources & Energy

Section 240(1)(a) of the Mining Act 1992

Notice to give effect to a condition of an authorisation

SK Network Resources Australia Pty Ltd
ACN 003964225
Suite 2404 Level 24, 44 Market Street,
SYDNEY NSW 2000

Contact: Michael Young
Phone: 02 6360 5346
Fax: 02 6360 5363
Email: michael.young@trade.nsw.gov.au

Our ref: OUT15/18989

27th July 2015

BY REGISTERED POST

NOTICE UNDER s.240(1)(a) MINING ACT 1992
DIRECTION TO GIVE EFFECT TO A CONDITION OF AN AUTHORISATION

BACKGROUND

A. The Division of Resources and Energy within the Department of Industry, Skills and Regional Development ("the Department") has responsibility for the administration and enforcement of the *Mining Act 1992* ("**Mining Act**") and the Mining Regulation 2010.

B. You, SK Networks Resources Australia Pty Ltd, are a responsible person in relation to the authorisation **Mining Lease 1545 (ML1545).**

C. Condition 2 of ML1545 states:

MINING, REHABILITATION, ENVIRONMENTAL MANAGEMENT PROCESS (MREMP) MINING OPERATIONS PLAN (MOP)

(1) Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The Plan together with environmental conditions of development consent and other approvals will form the basis for:-

(a) ongoing mining operations and environmental management; and

(b) ongoing monitoring of the project.

(2) The Plan must be prepared in accordance with the Director-General's guidelines current at the time of lodgment.

(3) A Plan must be lodged with the Director-General:-

(a) prior to the commencement of operations;

(b) subsequently as appropriate prior to the expiry of any current Plan; and

(c) in accordance with any direction issued by the Director-General.

(4) The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:-

(a) area(s) proposed to be disturbed under the Plan;

(b) mining and rehabilitation method(s) to be used and their sequence;

(c) areas to be used for disposal of tailings/waste;

(d) existing and proposed surface infrastructure;

(e) progressive rehabilitation schedules;

(f) areas of particular environmental sensitivity;

(g) water management systems (including erosion and sediment controls);

(h) proposed resource recovery; and

(i) where the mine will cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining landuse/vegetation

(5) The Plan when lodged will be reviewed by the Department of Mineral Resources.

(6) The Director-General may within two (2) months of the lodgement of a Plan, require modification and relodgement.

(7) If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, lease holder may proceed with implementation of the Plan submitted subject to the lodgement of the required security deposit within the specified time.

(8) During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) - (7) above.

D. The Department has been advised by the authorisation holder that the mine will cease extraction on the land identified as Lot 8, DP593262 in September 2015.

DIRECTION

In accordance with section 240(1)(a) of the Mining Act, I, Michael Young, an inspector appointed by the Secretary of the Department in accordance with s361of the Mining Act, direct SK Networks Resources Australia Pty Ltd, to take the measures specified below under the heading "Specified Measures" to give effect to Condition 2 of ML1545.

SPECIFIED MEASURES

1. In accordance with Condition 2 of ML1545, prepare a Mining Operation Plan (**the Plan**) that amends the current approved Plan to include a closure plan for areas of the mine where extraction will cease during the term of the Plan.

2. The closure plan applies to areas of the mine that extraction operations have ceased or will cease during the life of the Plan and that have been advised to the Department as on land comprising that part of Lot 8, DP593262 on which ML1545 is located.

3. In accordance with Condition 2(2), the MOP must be prepared in accordance with the ESG3 Guidelines as published on the Department's website.

4. In accordance with Condition 2(3), the Plan must be lodged with the Department by 16 October 2015 and prior to the commencement of final rehabilitation operations on the land.

5. In accordance with Condition 2(4), the Plan must include final rehabilitation objectives / methods and post mining land use / vegetation outcomes.

6. Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.

7. The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8 DP593262.

MICHAEL YOUNG
MANAGER & PRINCIPAL INSPECTOR, ENVIRONMENT
Division of Resources and Energy
(By authorisation)

WARNING AND INFORMATION ABOUT THIS NOTICE

- It is an offence under section 240C of the Mining Act to fail to comply with this direction.

- The maximum penalty for this offence is, for a corporation, $1,100,000 and a further $110,000 for each day the offence continues, and, for an individual person, $220,000 and a further $22,000 for each day the offence continues.

- If you fail to take the measures specified above the Minister may take any action necessary to give effect to the direction including authorising another person to take those measures and recover the costs and expenses so incurred from you or apply to the Land and Environment Court for an injunction directing you to comply with this direction.

- The serving of this direction and the matters required of you pursuant to this direction in no way preclude, hinder or otherwise restrain the Department from taking further action against you including by commencing legal proceedings.

- This Notice is issued in accordance with section 240 of the Mining Act.

- The words and expressions used in this direction have the same meaning as they have in the Mining Act.
-

Department of Industry
Resources & Energy

Section 240(1)(a) of the Mining Act 1992

Notice to give effect to a condition of an authorisation

SK Network Resources Australia Pty Ltd
ACN 003964225
Suite 2404 Level 24, 44 Market Street
SYDNEY NSW 2000

Contact: Michael Young
Phone: 02 6360 5346
Fax: 02 6360 5363
Email: michael.young@trade.nsw.gov.au

Our ref: OUT15/18990

27th July 2015

BY REGISTERED POST

NOTICE UNDER s.240(1)(a) MINING ACT 1992
DIRECTION TO GIVE EFFECT TO A CONDITION OF AN AUTHORISATION

BACKGROUND

A. The Division of Resources and Energy within the Department of Industry, Skills and Regional Development ("the Department") has responsibility for the administration and enforcement of the *Mining Act 1992* ("**Mining Act**") and the Mining Regulation 2010.

B. You, SK Networks Resources Australia Pty Ltd, are a responsible person in relation to the authorisation **Mining Lease 1647 (ML1647).**

C. Condition 3 of ML1647 states:

Mining Operations Plan

(a) Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan (MOP) which has been approved by the Director-General.

(b)The MOP must:

(i) identify areas that will be disturbed by mining operations;

(ii) detail the staging of specific mining operations;

(iii) identify how the mine will be managed to allow mine closure;

(iv) identify how mining operations will be carried out in order to prevent and or minimise harm to the environment;

(v) reflect the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979*
- the *Protection of the Environment Operations Act 1997*
- and any other approvals relevant to the development including the conditions of this lease; and
- have regard to any relevant guidelines adopted by the Director-General.

(c) The leaseholder may apply to the Director-General to amend an approved MOP at any time.

(d)It is not a breach of this condition if:

(i) the operations constituting the breach were necessary to comply with a lawful order or direction given under the *Mining Act 1992*, the *Environmental Planning and Assessment Act 1979*, *Protection of the Environment Operations Act 1997*, *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Occupational Health and Safety Act 2000*; and

(ii) the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(e) A MOP ceases to have effect 7 years after date of approval or other such period as identified by the Director-General.

D. The current Mining Operations Plan for the Charbon Colliery, incorporating ML1647 at Chapter 5.3 states:

5.3 Rehabilitation Planning Criteria
A final rehabilitation plan will be completed within two (2) years of the scheduled completion date and will be prepared in consultation with relevant government departments to achieve the following outcomes:

- To provide a safe and clean self-sustaining landform that will not require ongoing environmental management in the long term;
- To provide additional habitat for native flora and fauna, as well as wildlife corridors to connect existing undisturbed vegetation; and,
- Provide additional habitat areas for endangered species such as the Regent Honeyeater, Brown Treecreeper and the Yellow Box Woodland that are known from the region.

E. The Department has been advised by the authorisation holder that the scheduled completion date on the land identified as Lot 8, DP593262 and Lot 1, DP1148217 is September 2015.

DIRECTION
In accordance with section 240(1)(a) of the Mining Act, I, Michael Young, an inspector appointed by the Secretary of the Department in accordance with s361of the Mining Act, direct SK Networks Resources Australia Pty Ltd , to take the measures specified below under the heading "Specified Measures" to give effect to Condition 3 of ML1647.

SPECIFIED MEASURES

1. In accordance with Condition 3(a) of ML1647 and Chapter 5.3 of the current approved Mining Operations Plan (MOP), prepare a Final Rehabilitation Plan (**the Plan**) that amends the current approved MOP to include the Plan for areas of the mine where extraction has completed or will complete within two years.

2. The Plan applies to areas of the mine that extraction operations have completed or will complete within the two years and that have been advised to the Department as on land

comprising that part of Lot 8, DP593262 and Lot 1, DP1148217 on which ML1647 is located.

3. In accordance with Condition 3(b)(v) of ML1647, the Plan must have regard to the ESG3 Guidelines as published on the Department's website and reflect the conditions of approval under:
    a. The Environmental Planning and Assessment Act 1979
    b. The Protection of the Environment Operations Act 1997
    c. And any other approvals relevant to the development including the conditions of ML1647.

4. The Plan must be lodged with the Department by 16 October 2015.

5. In accordance with Condition 3(a) of ML1647, rehabilitation operations must not be carried out otherwise than in accordance with the Plan which has been approved by the Secretary.

6. The Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.

7. The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8, DP593262.

MICHAEL YOUNG
MANAGER & PRINCIPAL INSPECTOR, ENVIRONMENT
Division of Resources and Energy
(By authorisation)

WARNING AND INFORMATION ABOUT THIS NOTICE

- It is an offence under section 240C of the Mining Act to fail to comply with this direction.

- The maximum penalty for this offence is, for a corporation, $1,100,000 and a further $110,000 for each day the offence continues, and, for an individual person, $220,000 and a further $22,000 for each day the offence continues.

- If you fail to take the measures specified above the Minister may take any action necessary to give effect to the direction including authorising another person to take those measures and recover the costs and expenses so incurred from you or apply to the Land and Environment Court for an injunction directing you to comply with this direction.

- The serving of this direction and the matters required of you pursuant to this direction in no way preclude, hinder or otherwise restrain the Department from taking further action against you including by commencing legal proceedings.

- This Notice is issued in accordance with section 240 of the Mining Act.

- The words and expressions used in this direction have the same meaning as they have in the Mining Act.

Department of Industry
Resources & Energy

Section 240(1)(a) of the Mining Act 1992

Notice to give effect to a condition of an authorisation

Charbon Coal Pty Ltd
ACN 064237118
Bt Tower Level 18, 1 Market Street
SYDNEY NSW 2000

Contact: Michael Young
Phone: 02 6360 5346
Fax: 02 6360 5363
Email: michael.young@trade.nsw.gov.au

Our ref: OUT15/18987

27th July 2015

BY REGISTERED POST

NOTICE UNDER s.240(1)(a) MINING ACT 1992
DIRECTION TO GIVE EFFECT TO A CONDITION OF AN AUTHORISATION

BACKGROUND

A. The Division of Resources and Energy within the Department of Industry, Skills and Regional Development ("the Department") has responsibility for the administration and enforcement of the *Mining Act 1992* ("**Mining Act**") and the Mining Regulation 2010.

B. You, Charbon Coal Pty Ltd, are a responsible person in relation to the authorisation **Mining Lease 1647 (ML1647).**

C. Condition 3 of ML1647 states:

Mining Operations Plan

(a) Mining operations must not be carried out otherwise than in accordance with a Mining Operations Plan (MOP) which has been approved by the Director-General.

(b)The MOP must:

(i) identify areas that will be disturbed by mining operations;

(ii) detail the staging of specific mining operations;

(iii) identify how the mine will be managed to allow mine closure;

(iv) identify how mining operations will be carried out in order to prevent and or minimise harm to the environment;

(v) reflect the conditions of approval under:

- the *Environmental Planning and Assessment Act 1979*
- the *Protection of the Environment Operations Act 1997*
- and any other approvals relevant to the development including the conditions of this lease; and
- have regard to any relevant guidelines adopted by the Director-General.

(c) The leaseholder may apply to the Director-General to amend an approved MOP at any time.

(d)It is not a breach of this condition if:

(i) the operations constituting the breach were necessary to comply with a lawful order or direction given under the *Mining Act 1992*, the *Environmental Planning and Assessment Act 1979*, *Protection of the Environment Operations Act 1997*, *Mine Health and Safety Act 2004 / Coal Mine Health and Safety Act 2002* and *Mine Health and Safety Regulation 2007 / Coal Mine Health and Safety Regulation 2006* or the *Occupational Health and Safety Act 2000*; and

(ii) the Director-General had been notified in writing of the terms of the order or direction prior to the operations constituting the breach being carried out.

(e) A MOP ceases to have effect 7 years after date of approval or other such period as identified by the Director-General.

D. The current Mining Operations Plan for the Charbon Colliery, incorporating ML1647 at Chapter 5.3 states:

5.3 Rehabilitation Planning Criteria
A final rehabilitation plan will be completed within two (2) years of the scheduled completion date and will be prepared in consultation with relevant government departments to achieve the following outcomes:

- To provide a safe and clean self-sustaining landform that will not require ongoing environmental management in the long term;
- To provide additional habitat for native flora and fauna, as well as wildlife corridors to connect existing undisturbed vegetation; and,
- Provide additional habitat areas for endangered species such as the Regent Honeyeater, Brown Treecreeper and the Yellow Box Woodland that are known from the region.

E. The Department has been advised by the authorisation holder that the scheduled completion date on the land identified as Lot 8, DP593262 and Lot 1, DP1148217 is September 2015.

DIRECTION
In accordance with section 240(1)(a) of the Mining Act, I, Michael Young, an inspector appointed by the Secretary of the Department in accordance with s361of the Mining Act, direct Charbon Coal Pty Ltd, to take the measures specified below under the heading "Specified Measures" to give effect to Condition 2 of ML1647.

SPECIFIED MEASURES

1. In accordance with Condition 3(a) of ML1647 and Chapter 5.3 of the current approved Mining Operations Plan (MOP), prepare a Final Rehabilitation Plan (**the Plan**) that amends the current approved MOP to include the Plan for areas of the mine where extraction has completed or will complete within two years.

2. The Plan applies to areas of the mine that extraction operations have completed or will complete within the two years and that have been advised to the Department as on land

comprising that part of Lot 8, DP593262 and Lot 1, DP1148217 on which ML1647 is located.

3. In accordance with Condition 3(b)(v) of ML1647, the Plan must have regard to the ESG3 Guidelines as published on the Department's website and reflect the conditions of approval under:
    a. The Environmental Planning and Assessment Act 1979
    b. The Protection of the Environment Operations Act 1997
    c. And any other approvals relevant to the development including the conditions of ML1647.

4. The Plan must be lodged with the Department by 16 October 2015.

5. In accordance with Condition 3(a) of ML1647, rehabilitation operations must not be carried out otherwise than in accordance with the Plan which has been approved by the Secretary.

6. The Plan must include a Rehabilitation Cost Estimate of the rehabilitation operations to be carried out in accordance with the Plan.

7. The Plan must be prepared following appropriate consultation with all relevant stakeholders including the affected landholder of Lot 8, DP593262.

MICHAEL YOUNG
MANAGER & PRINCIPAL INSPECTOR ENVIRONMENT
Division of Resources and Energy
(By authorisation)

WARNING AND INFORMATION ABOUT THIS NOTICE

- It is an offence under section 240C of the Mining Act to fail to comply with this direction.

- The maximum penalty for this offence is, for a corporation, $1,100,000 and a further $110,000 for each day the offence continues, and, for an individual person, $220,000 and a further $22,000 for each day the offence continues.

- If you fail to take the measures specified above the Minister may take any action necessary to give effect to the direction including authorising another person to take those measures and recover the costs and expenses so incurred from you or apply to the Land and Environment Court for an injunction directing you to comply with this direction.

- The serving of this direction and the matters required of you pursuant to this direction in no way preclude, hinder or otherwise restrain the Department from taking further action against you including by commencing legal proceedings.

- This Notice is issued in accordance with section 240 of the Mining Act.

- The words and expressions used in this direction have the same meaning as they have in the Mining Act.

Appendix 2 – Rehabilitation Risk Assessment

Stature for Risk Management:

Risk Assessment Title: Wozniak Rehabilitation and Closure Criteria

Version: 1

Region: West

Site: Charbon Colliery

Stature Risk Assessment No.: 1001114034

Introduction

In accordance with the NSW Department of Trade and Investment, Regional Infrastructure and Services (NSW Trade & Investment) ESG3: Mining Operations Plan (MOP) Guidelines (2013) Centennial is required to undertake a risk assessment to identify specific environmental issues associated with activities conducted under relevant mining leases as well as specific measures to be implemented to mitigate those risks. It is understood that it will have a key focus on mine closure and rehabilitation based issues, but will also meet the general requirements of the MOP Guidelines.

Purpose

The following Hierarchy of Controls offers a framework for considering the effectiveness of controls. Note that the effectiveness of a control that is intended to reduce a risk decreases from top to bottom of the list. In other words, the closer the control type is to the top of the hierarchy, the more potentially effective the control.

·Eliminate the hazard or energy source (do not use the energy)

·Minimise or replace the hazard or energy source (reduce the amount of energy to a less damaging level or replace the energy with another that has less potential negative consequences)

·Control the hazard or energy using engineered devices (ex. Lock outs, chemical containers, mechanical roof support, gas monitors, etc.)

·Control the hazard or energy by using physical barriers (ex. machine guarding, warning signs, etc.)

·Control the hazard or energy with procedures (ex. Isolation procedures, standard operating procedures, etc.)

·Control the hazard or energy with personal protective equipment (ex. hard hats, boots with toe caps, gloves, safety glasses, welding gear, etc.)

·Control the hazard or energy with warnings and awareness (ex. posters, labels, stickers, verbal warnings, etc.)

The purpose of the Risk Assessment is to:

• Identification of risks for all work areas on the Wozniak property;

• Identify the specific nature of the risk/hazard;

• Identify the existing controls that are in place to manage the risk/hazard;

• Evaluate the consequence and likelihood of the risk/hazard;

• Develop a series of controls/actions to reduce all risk/hazard to an acceptable level

• Provide a final rehabilitation plan that reflects landholder consultation, desired end use, satisfies the s240 directions issued by DRE for the Stony Creek Gully and remainder of the Wozniak land.

• Minimise any identified risk that may prevent the successful rehabilitation of the Wozniak property.

Risks

Hazards and associated risks following final rehabilitation/mine closure associated with the Wozniak property boundary rehabilitation include:

- Surface water pollution
- Groundwater pollution
- Landform stability issues causing sediment/erosion impacts
- Impacts to biodiversity
- Impacts to Aboriginal and European heritage
- Air quality and noise impacts to surrounding receptors
- Public safety

Reference Documents

Document Name	Title	Referenced Document Date
Risk Assessment	Charbon Site Rehabilitation and Mine Closure Risk Assessment	11-Dec-2014
Risk Assessment	Charbon OC & CHPP Closure Plan Risks plus Opportunities	12-May-2014
DRE Guidelines	ESG3 Mining Operations Plan (MOP) Guidelines, September 2013	22-Sep-2013
Risk Assessment	Charbon Colliery Rehabilitation and Closure Criteria Risk Assessment	24-Jul-2015

Participants

Name	Title	Company	E-Mail Address	Attendance	
				1. 05-Aug-2015	2. 05-Aug-2015
Iain Hornshaw	Approvals Coordinator	Centennial Coal Company Limited	iain.hornshaw@centennialcoal.com.au	P	A
James Wearne	Group Manager Approvals	Centennial Coal Company Limited	james.wearne@centennialcoal.com.au	P	P
James Marshall	Group Manager Stakeholder Engagement	Centennial Coal Company Limited	james.marshall@centennialcoal.com.au	P	P

WRAC Analysis

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
1. Geology and Geochemistry	There is a risk to Charbon UJV from ::: Acid Mine Drainage ::: Caused by: Inadequate knowledge of potential contamination sources/geochemistry or Pollution of surface water by contaminated material and failure to capture and contain or Use of contaminated fill material Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impacts to water courses.	1.2.a. Implementation Site Water Management Plan 1.2.b. Water Monitoring Program 1.2.c. No significant historical evidence of AMD 1.3.c. Sediment control dams 1.3.d. Inspections and maintenance protocols	**D** (Pb)	2 (E)	**5** **(L)**	1. GHD to develop detailed drainage design
2. Spontaneous Combustion	There is a risk to Charbon UJV from ::: Spontaneous combustion of exposed coal seams ::: Caused by: Spontaneous combustion Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Public safety issues.	2.1.a. No historical issues concerning spontaneous combustion 2.1.b. Implementation of Spontaneous Combustion Management Plan	**E** (D)	2 (F)	**3** **(L)**	
3. Mine Subsidence	There is a risk to Charbon UJV from ::: Sinkholes/subsidence cracks ::: Caused by: Shallow depth of cover or Water storage above previously mined areas Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Public safety issues.	3.1.a. Limited historical underground mining within the property 3.1.b. No evidence of surface cracking or sinkholes	**E** (Pj)	1 (F)	**1** **(L)**	
4. Erosion and Sediment Control	There is a risk to Charbon UJV from ::: Erosion and/or sediment from disturbed mining areas ::: Caused by:	4.1.a. Implementation Site Water Management Plan 4.1.b. Inspections and maintenance protocols	**C** (D)	2 (F)	**8** **(M)**	1. GHD to develop detailed drainage design 16. Landform to be designed to be stable and reduce erosion potential by minimizing slope gradients as far as practicable. 10. Develop and implement an erosion and sediment control plan

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Failure of existing rehabilitation efforts or not implementing surface water design. Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impacts to water courses.	4.1.c. Sediment control dams 4.1.d. Water Monitoring Program				11. Develop and implement a Land Management Plan specific for the Wozniak property
	There is a risk to Charbon UJV from ::: Erosion and/or sediment on disturbed haul road areas ::: Caused by: Failure of existing rehabilitation efforts or not implementing surface water design. Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impacts to water courses.	4.2.a. Implementation Site Water Management Plan 4.2.b. Inspections and maintenance protocols 4.2.c. Sediment control dams 4.2.d. Water Monitoring Program	**D** (D)	2 (F)	**5** **(L)**	1. GHD to develop detailed drainage design 8. Consultation with Wozniak re landform and justification to landform plan
5. Soil Type and Suitability	There is a risk to Charbon UJV from ::: Poor rehabilitation success ::: Caused by: Poor top soil quality/availability Resulting in: Failure to meeting rehabilitation and closure criteria objectives.	5.1.a. Use of subsoil as a top soil substitute 5.1.b. Monitoring and inspections 5.1.c. Benign spoil materials are amenable to colonisation by native trees and shrubs	**C** (D)	2 (E)	**8** **(M)**	3. Top soil map and inventory to be generated 12. Ensure topsoil is suitable for the desired rehabilitation outcomes 19. Identify measures required to improve topsoil condition 20. Identify alternatives for topsoil use and/or import topsoil
6. Flora	There is a risk to Charbon UJV from ::: Poor rehabilitation success ::: Caused by: Failure to manage weeds/noxious species Resulting in: Failure to meeting rehabilitation and closure criteria objectives.	6.1.a. Rehabilitation completed to date has not been hampered by weeds 6.1.b. Annual weed spraying program	**B** (D)	2 (F)	**12** **(S)**	13. Consider weed spraying programme as part of the Land Management Plan for the Wozniak property.
	There is a risk to Charbon UJV from ::: Poor rehabilitation success ::: Caused by: Unsuitable species used in the rehabilitation.	6.2.a. Local provenance seed sourcing to ensure similar species types 6.2.b. Use of specialist seed supplier who has local knowledge of surrounding vegetation	**C** (Pb)	2 (F)	**8** **(M)**	14. Justification of species used to be incorporated into the Land Management Plan 15. Direction provided in the s240 notice

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Failure to meeting rehabilitation and closure criteria objectives.					
	There is a risk to Charbon UJV from ::: Impact to existing remnant native species ::: Caused by: Disturbance caused to undisturbed/rehabilitated areas Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to land/soil.	6.3.a. Personnel Induction training package	**D** (Pb)	2 (F)	**5** **(L)**	17. Landform to be designed to be within existing disturbed areas.
	There is a risk to Charbon UJV from ::: Impact to rehabilitation areas ::: Caused by: Inappropriate land use, grazing land prior to rehabilitation success being achieved or vehicles on rehabilitated areas Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to land/soil.		**C** (Pj)	3 (E)	**13** **(S)**	20. Development of a land management strategy. 21. Restrict vehicular access to access tracks only. 22. Ensure stock proof fencing is installed and maintained.
7. Fauna	There is a risk to Charbon UJV from ::: Poor rehabilitation success ::: Caused by: Failure to manage feral animals Resulting in: Failure to meeting rehabilitation and closure criteria objectives.	7.1.a. Inspection and monitoring protocols	**C** (Pj)	2 (E)	**8** **(M)**	4. Consider feral animal control in the Land Management Strategy for the Wozniak property taking into consideration a wider area of feral animal control
	There is a risk to Charbon UJV from ::: Impact to habitat for existing species ::: Caused by: Use of incorrect rehabilitation species	7.2.a. Local provenance seed sourcing to ensure similar species types 7.2.b. Use of specialist seed supplier who has local knowledge of surrounding vegetation	**D** (Pb)	2 (E)	**5** **(L)**	14. Justification of species used to be incorporated into the Land Management Plan

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Failure to meeting rehabilitation and closure criteria objectives.					
8. Slopes and Slope Management	There is a risk to Charbon UJV from ::: Long term stability failure and slopes ::: Caused by: Geotechnical failure Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to land/soil or Impacts to water courses or Public safety issues.	8.1.a. Detailed landform plan being developed	**D** (Pb)	2 (E)	**5** **(L)**	1. GHD to develop detailed drainage design 8. Consultation with Wozniak re landform and justification to landform plan 16. Landform to be designed to be stable and reduce erosion potential by minimizing slope gradients as far as practicable.
9. Surface Water and Groundwater	There is a risk to Charbon UJV from ::: Contamination of water courses ::: Caused by: Disturbance caused to undisturbed/rehabilitated areas or Failure of existing rehabilitation efforts or inadequate surface water management or Geotechnical failure or Inadequate knowledge of potential contamination sources/geochemistry or Pollution of surface water by contaminated material and failure to capture and contain or Use of contaminated fill material Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impacts to water courses.	9.1.a. Implementation Site Water Management Plan 9.1.b. Inspection and monitoring protocols 9.1.c. Pollution control structures meet engineering design requirements 9.1.d. Water Monitoring Program	**C** (D)	2 (E)	**8** **(M)**	1. GHD to develop detailed drainage design 18. Undertake timely rehabilitation of disturbed areas. 16. Landform to be designed to be stable and reduce erosion potential by minimizing slope gradients as far as practicable. 17. Landform to be designed to be within existing disturbed areas.
10. Hazardous Materials and Dangerous Goods	There is a risk to Charbon UJV from ::: Poor rehabilitation success ::: Caused by: Failure to identify HAZMAT at closure or hazardous materials and dangerous goods remaining on site at closure Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to	10.1.a. No hazardous materials stored on site	**E** (Pb)	1 (F)	**1** **(L)**	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	ecology or Impact to land/soil or Impacts to water courses or Public safety issues.					
11. Greenhouse Gas	There is a risk to Charbon UJV from ::: Emission of greenhouse gasses ::: Caused by: Methane gas from underground workings/exposed coal seam Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to air.	11.1.a. Implementation of Greenhouse Gas and Energy Management Plan	**E** (Pb)	1 (F)	**1** **(L)**	
12. Air Quality	There is a risk to Charbon UJV from ::: Emission of particulate matter ::: Caused by: Exposed disturbed areas or Rehabilitation activities and heavy plant use or Use of incorrect rehabilitation species Resulting in: Community complaints or Failure to meeting rehabilitation and closure criteria objectives or Impact to air or Public safety issues.	12.1.a. Implementation of Air Quality Monitoring Program 12.1.b. HVAS installed and operational 12.1.c. Implementation of Stakeholder Engagement Plan 12.1.d. Negotiated agreement in place with the Wozniaks	**C** (D)	2 (R)	**8** **(M)**	5. Air quality impacts associated with rehabilitation and mine closure to be modelled 19. Heavy machinery work to be completed ASAP 20. Ongoing monitoring of air quality to ensure compliance of activities with relevant criteria
13. Noise	There is a risk to Charbon UJV from ::: Noise emissions ::: Caused by: Rehabilitation activities and heavy plant use Resulting in: Community complaints or Failure to meeting rehabilitation and closure criteria objectives or Impact to air or Public safety issues.	13.1.a. Implementation of Noise Monitoring Program 13.1.b. Implementation of Stakeholder Engagement Plan 13.1.c. Negotiated agreement in place with the Wozniaks	**C** (D)	2 (R)	**8** **(M)**	6. Ongoing noise monitoring to ensure compliance of activities with relevant criteria
14. Visual and Lighting	There is a risk to Charbon UJV from ::: Visual impacts ::: Caused by: Disturbance caused to undisturbed/rehabilitated areas or Exposed disturbed areas or Failure to	14.1.a. Proposed land form to align with pre-existing original contour	**D** (Pb)	2 (R)	**5** **(L)**	8. Consultation with Wozniak re landform and justification to landform plan

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	manage pests or Failure to manage weeds/noxious species or Possible use of additional shifts (N/S) or Rehabilitation activities and heavy plant use or Use of incorrect rehabilitation species Resulting in: Community complaints or Failure to meeting rehabilitation and closure criteria objectives.					
15. Aboriginal Cultural Heritage	There is a risk to Charbon UJV from ::: Disturbance of Aboriginal site or artifact ::: Caused by: Unintended interaction with Aboriginal site or artifact Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to Aboriginal site or artifact.	15.1.a. Implementation of Cultural Heritage Management Plan 15.1.b. Historic Aboriginal Cultural Heritage surveys	**D** (Pb)	2 (R)	**5 (L)**	
16. European Heritage	There is a risk to Charbon UJV from ::: Disturbance of European heritage site or artifact ::: Caused by: Unintended interaction with European heritage site or artifact Resulting in: Failure to meeting rehabilitation and closure criteria objectives or Impact to European heritage site or artifact.	16.1.a. No European heritage sites on Wozniak property	**D** (Pb)	2 (R)	**5 (L)**	
17. Bushfire	There is a risk to Charbon UJV from ::: Poor rehabilitation success or complete failure of rehabilitation ::: Caused by: Inadequate bushfire management Resulting in: Failure to meeting rehabilitation and closure criteria objectives.	17.1.a. Implementation of Bushfire Management Plan	**C** (D)	2 (F)	**8 (M)**	7. Site to review and update Bushfire Management Plan
18. Drought	There is a risk to Charbon UJV from	18.1.a. Local provenance seed sourcing to ensure similar	**C** (D)	2 (BI)	**8 (M)**	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	::: Poor rehabilitation success ::: Caused by: Drought Resulting in: Failure to meeting rehabilitation and closure criteria objectives.	species types 18.1.b. Rehabilitation monitoring undertaken				
19. Community (Wozniak)	There is a risk to Charbon UJV from ::: Poor rehabilitation success and failure to meet rehabilitation criteria ::: Caused by: Bushfire or Connectivity between surface water interface or Disturbance caused to undisturbed/rehabilitated areas or Exposed disturbed areas or Failure of existing rehabilitation efforts or inadequate surface water management or Failure to manage pests or Failure to manage weeds/noxious species or Pollution of surface water by contaminated material and failure to capture and contain or Poor top soil quality/availability or Rehabilitation activities and heavy plant use or Shallow depth of cover or Use of contaminated fill material or Use of incorrect rehabilitation species Resulting in: Complaints.	19.1.a. Detailed landform plan being developed 19.1.b. Local provenance seed sourcing to ensure similar species types 19.1.c. Monitoring and inspections 19.1.d. Use of specialist seed supplier who has local knowledge of surrounding vegetation	**B** (IF)	1 (R)	**7** **(M)**	8. Consultation with Wozniak re landform and justification to landform plan 11. Develop and implement a Land Management Plan specific for the Wozniak property

CENTENNIAL RISK MATRIX							Likelihood					
							A Certain	B Probable	C Possible	D Remote	E Improbable	Description (D)
Rating	Consequence Note: Consequence may result from a single event or may represent a cumulative impact over a period of 12 months. Use the worst case reasonable consequence if there is more than one.						Common	Has Happened within Centennial	Could Happen & has happened in non-CEY operations	Not Likely	Practically impossible	Probability (Pb)
	Financial Impact to Annual Business Plan (F)	Personal Injury (PI)	Business Interruption (BI)	Legal (L)	Reputation (R)	Environment (E)	Frequent incidents	Regular incidents	Infrequent incidents	Unlikely to occur. Very few recorded or known incidents	May occur in exceptional circumstances. Almost no recorded incidents.	Incident Frequency (IF)
							Operations – within 3 months	Operations – within 2 years	Operations – within 5 years	Operations – within 10 years	Operations – within 30 years	Operations (Op)
							Project – Every project	Project – Every 2 projects	Project – Every 5 projects	Project – Every 10 projects	Project – Every 30 projects	Project (Pr)
5. Catastrophic	>$50m	Multiple Fatalities	> 1month	Prolonged litigation, heavy fines, potential jail term	Prolonged International media attention	Long term impairment habitats/ ecosystem	25 (E)	24 (E)	21 (H)	19 (H)	15 (S)	
4. Major	$10m - $50m	Single Fatality	1 week to 1 month	Major breach/ major litigation	International media attention	Long term effects of ecosystem	23 (E)	22 (E)	18 (H)	14 (S)	10 (M)	
3. Moderate	$1m - $10m	Serious/ Disabling Injury	1 day to 1 week	Serious breach of regulation. prosecution/ fine	National media attention	Serious medium term environmental effects	20 (H)	17 (H)	13 (S)	9 (M)	6 (L)	
2. Minor	$100k - $1m	Lost Time Injury	12 hrs to 1 day	Non-compliance, breaches in regulation	Adverse local public attention	Minor effects to physical environment	16 (S)	12 (S)	8 (M)	5 (L)	3 (L)	
1. Insignificant	<$100k	First Aid Treatment Only	< 12 hrs	Low level compliance issue	Local complaints	Limited physical damage	11 (S)	7 (M)	4 (L)	2 (L)	1 (L)	

Risk Rating	Risk Category		Generic Management Actions
22 to 25	E	Extreme	Immediate intervention required from senior management to eliminate or reduce this risk
17 to 21	H	High	Imperative to eliminate or reduce risk to a lower level by the introduction of control measures. Management planning required at senior levels
11 to 16	S	Significant	Corrective action required, senior management attention needed to eliminate or reduce risk
7 to 10	M	Moderate	Corrective action to be determined, management responsibility must be specified
1 to 6	L	Low	Monitor and manage by corrective action where practicable

Appendix 3 – Drainage Design Report (GHD 2015)

7 October 2015

Iain Hornshaw
Centennial Coal Company Limited
100 Miller Road
Fassifern NSW 2283

Our ref: 22/17973
Your ref: 110715

Dear Iain

Charbon Colliery - Landform Rehabilitation, "Section 240" Area
Surface Water Management and Erosion and Sediment Control Advice

1 Introduction

GHD Pty Ltd (GHD) was engaged by Centennial Coal Pty Ltd (Centennial) to provide surface water, erosion and sediment control management advice to support an application to the NSW Department of Resources and Energy (DRE) to undertake rehabilitation of previously mined areas within the southern extent of the Charbon Colliery. A direction from DRE to undertake the rehabilitation works has been received under Section 240 of the *Mining Act 1992*.

Specifically, the “Section 240” (S240) rehabilitation area consists of all areas disturbed as a result of past mining activities on Lot 8 DP593262 and Lot 1 DP 1148217 (refer to attached).

Mining activities within these lots have occurred in mining areas (refer to Figure 1 attached), namely:

- The Western Outlier (WOL).
- The Southern Outlier (SOL).
- The Southern Open Cut (SOC).

Additional disturbance within these areas has also occurred as a result of the construction of haul roads linking the mining areas, as well as the construction of sediment dams downslope of mining areas.

The rehabilitation of the S240 area of Charbon requires:

- Modification of existing sedimentation dams and construction of new sedimentation dams to manage sediment-laden runoff generated during the rehabilitation process.
- Reshaping, where practicable, to reinstate the pre-mining catchment areas to minimise potential changes to runoff volumes to downstream areas.
- Regrading to provide hill slope gradients that are likely to remain stable over the long term that will support the establishment of groundcover vegetation and not be subject to excessive erosion.

The purpose of this letter is to detail the results of the surface water assessment and provide recommendations for sediment and erosion control works that should be undertaken as part of the rehabilitation of the S240 area.

2 Background

Charbon Colliery (the Project Area) lies on the western slopes of the north-south oriented sandstone ridgeline of the Great Dividing Range. Topography within the Project Area generally consists of asymmetric rolling hills up to approximately 900 mAHD and valley floors between approximately 700 mAHD and 750 mAHD. The hill slopes are typically steep and rocky while the valley floors are typically gently sloping and flat. Within the valley floors, the Illawarra coal measures occur beneath a thin cover of colluvial and alluvial deposits.

The Great Dividing Range passes through the eastern portion of the Project Area, with most of the Project Area being located within the Macquarie-Bogan catchment. The Southwest Open Cuts are located on a natural ridgeline that forms a catchment divide between the Macquarie-Bogan River catchment to the north and the Hawkesbury-Nepean catchment to the south. It is noted however that the majority of the S240 area, including the WOL and most of the SOL, are within the Macquarie-Bogan Catchment.

Four named watercourses area located within the Project Area: Reedy Creek, Rileys Creek, Stony Creek and Deep Creek (refer to Figure 1). Deep Creek and Stony Creek are located within the south-eastern areas of the Project Area within the Hawkesbury-Nepean catchment, flowing approximately south-east of the Project Area via the Ulumbra Creek, the Capertree River the Colo River and the Hawkesbury River. Reedy Creek and Rileys Creek are located within the western portions of the Project Area within the Macquarie-Bogan catchment, flowing approximately north-west of the project Area to Lake Windamere via Cumber Melon Creek and Carwell Creek respectively. Lake Windamere (Windamere Dam) discharges into the Cudgegong River before meeting the Macquarie River.

2.1 Assumptions

The calculations undertaken to estimate the required sediment basin capacities for the S240 area are based on the assumed parameters summarised in Table 1. These parameters are based on reference values for the soil types, topography and climatic conditions that are typical of the Project Area.

From Table 1 it can be seen that the Project Area includes relatively high soil erodibility combined with steep design landforms. Estimate soil loss rates within the site are based on the revised Universal Soil Loss Equation (RUSLE), which is dependent on the slope length of the erodible area (in addition to the R and K factors: refer to Table 1) assuming no groundcover. The slope length of the rehabilitated area has a significant influence on the estimated soil loss. Much of the S240 area will include slope lengths in excess of 10 m and is therefore expected to result in high significant soil loss (Soil Loss Class of greater than 3).

Generally, the capacity of the sedimentation dams includes an allowance for a twelve month sediment accumulation zone, to allow sufficient time of the rehabilitation and establishment of ground covering vegetation within the various sub-catchment areas within the S240 area. In this way it is expected that the need to remove accumulated sediments from the sedimentation dams will be minimised or potentially avoided. Accumulated sediments will remain within the sedimentation dams, which will be retained (albeit with a reduced storage capacity) for agricultural purposes following the rehabilitation process.

Table 1 Assumptions summary

Aspect	Assumption
Soil Landscape/Type	Collingwood
Soil Texture Group	D
Soil Hydrologic Group	D
Rainfall Erosivity - R Factor	1360
Soil Erodibility - K Factor	0.05
Rainfall Intensity, 90th Percentile 5 day	40 mm
Inherent Soil Fertility	Moderate
Overall Slope Gradients	Design landforms typically less than 10% but increases to up to 20% in some isolated areas.
Volumetric Runoff Coefficients	0.74
Gypsum Application Rates (if required)	Approximately 10-25 t/ha, dependent on ESP

2.2 References

This letter has been prepared with reference to the following:

Landcom (2004) *Soils and Construction, Managing Urban Stormwater, Volume 1* (The Blue Book).

NSW Office of Environment & Heritage (OEH) (2015) *espade, NSW Soil and Land Information*, sourced: http://www.environment.nsw.gov.au/eSpadeWebapp/

3 Surface Hydrology Impacts

The S240 area includes six sub-catchments of Stony Creek and Rileys Creek (refer to Figure 1), specifically:

- Southern sub-catchments (S1, S2 and S3) –tributaries of Stony Creek. It should be noted that sub-catchment S3 (refer to Figure 1) includes the main named channel of Stony Creek.
- Northern sub-catchments (N1 and N2) - tributaries of Rileys Creek (refer to Figure 1).
- Western sub-catchment (W1) – a tributary of Rileys Creek (refer to Figure 1).

Changes to these sub-catchment boundaries have the potential to impact flow volumes within Stony Creek and Rileys Creek. Any appreciable changes to flow volumes have the potential to impact on downstream water users (both human and environmental).

3.1 Catchment Area changes

Mining activities within the S240 area have resulted in changes to the sub-catchment areas. As far as is reasonably practicable, the proposed rehabilitated landform aims to restore the pre-mining sub-catchment areas (refer to Figure 1). The magnitude of these changes in pre-mining and the proposed rehabilitated sub-catchment areas are summarised in Table 2. From Table 2 it can be seen that the estimated changes to sub-catchment areas are relatively small, with a slight increase area in the Stony Creek catchment (South) area of 1.8 ha (1.6%), and a slight decrease in the Rileys Creek catchment (North and West) area of approximately 0.9 ha (2.1%). Such small changes are unlikely to result in any measurable change in local catchment runoff, and are therefore not expected to affect water availability to downstream water users.

Table 2 Summary of Catchment Area Changes

Catchment ID	Pre-mining Area (ha)	Design Landform Area (ha)	Change (%)
S1	38.78	38.40	-1.0%
S2	9.36	10.00	+6.8%
S3	67.08	68.62	+2.3%
Total (South)	**115.22**	**117.02**	**+1.6%**
N1	16.16	16.23	+0.4%
N2	1.81	1.65	-8.8%
W1	27.29	26.42	-3.2%
Total (North and West)	**45.26**	**44.3**	**-2.1%**

3.2 Design Landform Gradients

The proposed landform gradients within the S240 area are typically less than 15 degrees, with most of the area less than 10 degrees. The WOL includes proposed landform grades that are typically 1 to 15 degrees, with small localised areas in excess of 15 degrees, while the SOL includes proposed landform grades that are generally less than 10 degrees (refer to Figure 2).

The current landform design includes grades that are typically less than 15 degrees, however there are areas with steeper grades (refer to Figure 2). These areas are generally associated with existing topsoil or topsoil substitute stockpiles of unknown depth and have therefore not been included in the design process to date. Such areas would be reshaped to appropriate grades (less than 15 degrees where possible) during rehabilitation. However, grades of 20 to 30 degrees will remain in an area on the eastern side of WOL_S3_B in order to merge the rehabilitated landform with the adjoining naturally steep undisturbed terrain.

Undisturbed areas downslope of the S240 area exhibit grades that are in excess of 20 degrees, with some areas in excess of 30 degrees (refer to Figure 2). The proposed landform gradients are therefore considered to provide a reasonable compromise between the typical natural landform slopes of the surrounding topography and slopes that can be practically and safely constructed and rehabilitated.

4 Erosion and Sediment Controls

Within the constraints of the natural topography and mined form, the rehabilitation landform has been designed to minimise slope gradients and avoid the concentration of flow. As a result, opportunities for erosion and sediment control management during rehabilitation are limited to:

- Use of existing dams for sediment control.
- Provision of new dams for sediment control.
- Landform erosion controls.

These erosion and sediment control measures are further discussed in the following sections.

4.1 Existing Dams

There is the potential for dirty water run-off from the rehabilitation areas to be controlled by a number of existing dams downslope of the disturbed areas. The adequacy of these dams to provide effective sediment control during rehabilitation was determined based on sedimentation dam sizing procedures in the Blue Book (Landcom 2004). The location of the existing dams is included in Figure 3. Figure 3 also includes the disturbed and undisturbed sub-catchment areas reporting to each sedimentation dam.

From Table 3 it can be seen that many of the existing dams are likely to be significantly undersized to provide adequate protection to the downstream environment during the rehabilitation of the S240 area. This is a product of the relatively large catchments which include a high proportion of undisturbed areas given that most dams are located distal from the disturbed areas.

As a result, the existing dams would require substantial modification in order to act as the primary erosion and sediment control measure during rehabilitation. Such modifications to the existing dams would result in additional disturbance, potentially impact on downstream hydrology and are not considered to be cost-effective.

Table 3 Summary of Existing Dams and Upgrade Requirements

Sedimentation Dam	Mining Area	Estimated Existing Dam Volume (ML)	Required Sedimentation Dam Volume (ML)	% Change
1	WOL	320	2430	660%
2	WOL	250	1640	560%
3	SOL	120	2050	1610%
4	SOL	180	2095	1060%
5	SOL	110	305	180%
6	WOL & SOL	3000	14350	380%
7	SOL	330	1635	400%
8 & 9	SOL	620	1710	180%
10 & 11	SOL & SOC	860	8285	860%
12 & 13	SOC	910	16860	1750%
14	WOL	670	-	-
15	WOL & SOL	320	-	-
16	WOL, SOL & SOC	1350	-	-
17	SOL & SOC	650	5770	790%

4.2 Proposed Dams

To minimise catchment area reporting to each sedimentation dam, and therefore minimise the sedimentation dam size, any additional dams should be located within the rehabilitation areas. The landform within these areas is relatively steep which limits the potential to provide dams of the required size. However, potential locations for three sedimentation dams have been identified which are considered to be compatible with the proposed final landform. The location of these proposed dams (21, 22 and 23) are displayed in Figure 3.

An analysis of the final landform indicates that Dams 21 and 22 could have capacities of at least 2 ML each, while Dam 23 could have a capacity of at least 0.5 ML.

It is proposed that Dam 21 treat sediment laden runoff from an approximately 1.4 ha sub-catchment of SOL (SOL_S1_B: refer to Figure 3), with the potential to include a further 1.2 ha sub-catchment of SOL (SOL_S1_A: refer to Figure 3) if a contour berm/drain is installed towards the downslope limit of this area. To provide adequate treatment for the combined SOL sub-catchment, Dam 21 requires a capacity of approximately 1.75 ML.

It is proposed that Dam 22 treat sediment laden runoff from an approximately 3.6 ha sub-catchment area of SOL (SOL_S3_B: refer to Figure 3). A contour berm/drain is required towards the downslope limit of this area. To provide adequate treatment of sediment laden runoff, Dam 22 requires a capacity of approximately 2 ML.

Spatial constrains limit the capacity of Dam 23 to approximately 0.5 ML. Dam 23 is proposed to be located at the toe of the steep slope of a sub-catchment of SOC (SOC_S2_C: refer to Figure 3). However, the adequate treatment of sediment laden runoff from this catchment requires a sedimentation dam of approximately 6 ML, meaning Dam 23 is only likely to provide partial treatment.

All proposed new dams will require appropriately sized and protected spillways. Additionally, Dam 23 will require an appropriately protected overflow path.

4.3 Erosion controls

The inadequate size of existing dams and the limitations of the landform to incorporate new dams mean that erosion and sediment control measures for the rehabilitation of the S240 area will need to incorporated effective erosion management.

The key factors influencing surface erosion potential are the gradient and length of a slope. Given that the gradient has been minimised as far as practical in the landform design, further erosion management will require measures to minimise slope lengths. This will entail the provision of slope breaks running along the contour which can be constructed from a variety of material at hand, including earthen berms, coir logs, straw bales, timber, large rock, or a combination of these. Where the rehabilitated area is to be used for grazing, degradable materials (such as coir logs, straw bales and timber) may be preferred over more permanent materials as over time they will degrade, removing an ongoing hazard to livestock, machinery and grazier. Typical details on various slope break structures are provided in Attachment C.

Slope breaks are not to be installed in such a manner that would result in the concentration of flows (i.e. function as diversion drains). Ideally, slope breaks are to be installed as semi-continuous structures along the contour at intervals of approximately 50 m to 100 m. Typically steeper slopes (greater than 10 degrees) will require more frequent slope breaks to be effective while more gentle slopes (less than 5 degrees) may not require slope breaks at all.

To further reduce the risks of surface erosion within steeper sloped areas, it is also recommended that erosion control (jute or similar) matting be considered for areas with slopes that exceed 15 degrees. Within areas identified as having high erosion risk, either as a result of the soil types present or the length of time the soil is to be exposed, the installation of erosion control (jute or similar) matting provides a means of temporarily stabilising the soil surface, minimising erosion and thereby reducing the volume of sediment to be managed within sedimentation .dams.

5 Recommendations for Surface Water Management

The rehabilitation of the S240 area should be undertaken in stages, preferably on a “sub-catchment by sub-catchment” basis to minimise the duration of rehabilitation and return clean water flows to the downstream systems as soon as possible. Rehabilitation within each sub-catchment should be undertaken in the following order:

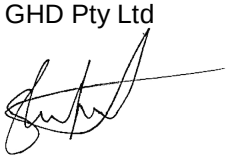
1. Establish erosion and sediment controls, including construction of new sedimentation dams and dirty water catch drains to direct sediment laden runoff into the sedimentation dams.
2. Install any temporary erosion and sediment control measures, including sediment fences, earthen berms and straw bale filters, in areas which will not drain to a sedimentation dam.
3. Carry out sub-catchment reshaping and regrading of *in situ* material to final design levels.
4. Construct permanent watercourses, drop structures, energy dissipaters and other drainage structures.
5. Provide any earthen contour berm slope breaks up to a height of 1m or as required and other drainage structures.
6. Apply top soil cover.
7. Provide temporary erosion control matting to areas with slopes in excess of 15 degrees where practical.
8. Provide any other slope breaks (coir logs, timber windrows).
9. Apply groundcover vegetation seed and mulch mix.
10. Monitor groundcover vegetation to ensure adequate growth and coverage. Irrigation of the rehabilitation areas may be required during extended dry periods to minimise the risk of vegetation die back.
11. Continue to monitor the establishment of groundcover vegetation. Once 90% ground cover is achieved, temporary erosion and sediment controls (i.e. sediment fences and straw bale filters) and any upslope clean water diversions may be removed.
12. Continue to monitor the stability of the rehabilitated hillslope areas, watercourses and sedimentation dams for signs of erosion and scouring. Local remediation measures may be required if scouring of the rehabilitated hillslope areas or watercourses are observed.

During rehabilitation, water intercepted by the sedimentation dams may be reused within the rehabilitation areas for dust control or irrigation purposes. Sedimentation dams should be maintained in a “drawn down” state to ensure that storage capacity is always available to manage sediment laden runoff generated during a storm event. Water that is not reused on site is to be treated to a suitable quality and discharged into the downstream environment. Typically this treatment includes the application of flocculants to promote the settling of sediment, thereby reducing the turbidity of the discharge water. Water samples should be taken of the discharge water (and if possible from the downstream watercourse) prior to discharging occurring.

Following the successful rehabilitation of an area, the associated sedimentation dam(s) can be allowed to “fill and spill”, with the retained water utilised for agricultural purposes (subject to the conditions of a water access license).

We trust that the above advice is meets the requirements of Charbon with respect to the water management and erosion and sediment control for the rehabilitation of the S240 area. If you require any additional information, please do not hesitate to contact myself or Lachlan Hammersley on (02) 4979 9999.

Sincerely
GHD Pty Ltd



Guy Lampert
Senior Geomorphologist
(02) 4979 9999

Attachments:

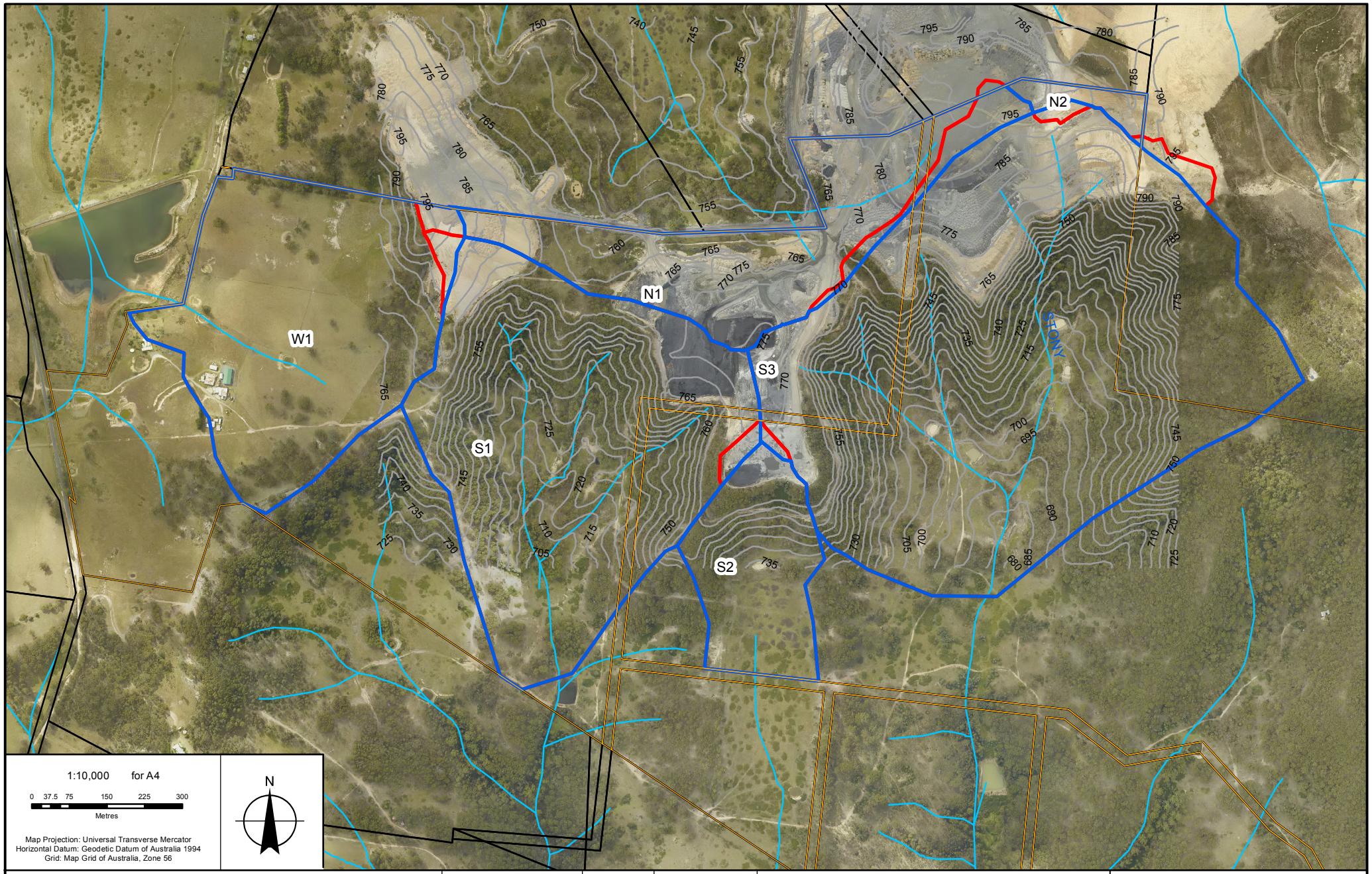
A. Figures

B. Calculations

C. Typical Details

D. Limitations and Disclaimers

Attachment A – Figures



LEGEND

- Subject_Lots
- Pre-mining Catchments
- Closure Catchments
- Cadastre
- Closure Design Contours (5 metre)
- Watercourses

LOCATION	
SEAM	
DRAWN	
CHECKED	
APPROVED	
SCALE	Refer to scalebar

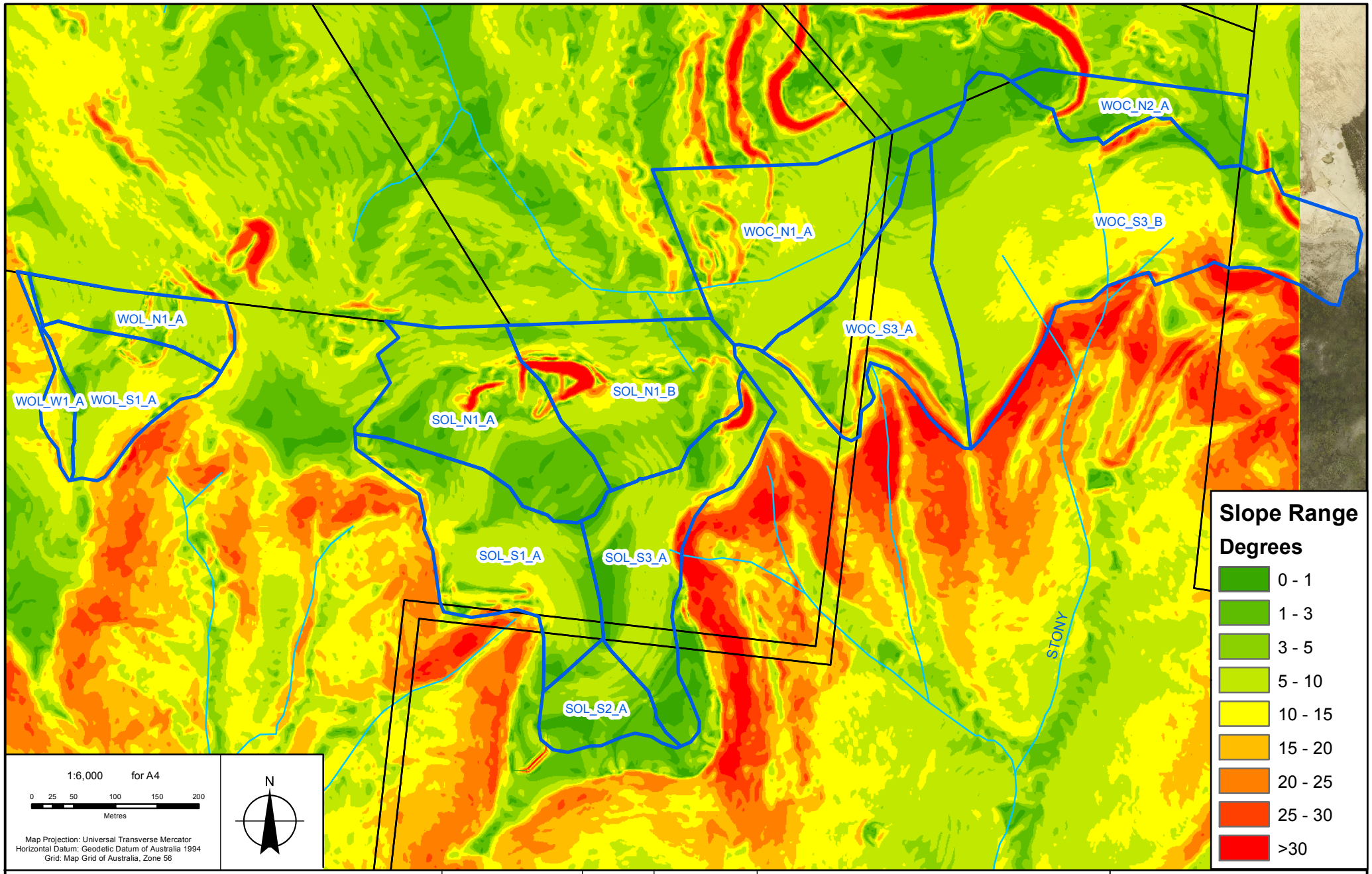
Charbon Section 240 Surface Water
Pre-mining and landform closure design catchments.

Centennial Coal

DATE 7/10/2015

Figure 1

GIS Filename: G:\22\17973\GIS\Maps\Deliverables\S240_Application\22_17973_001_S240_Catchments_R0_20151007.mxd



LEGEND
- Cadastre
- Watercourses
- Disturbed Catchments

LOCATION	
SEAM	
DRAWN	
CHECKED	
APPROVED	
SCALE	Refer to scalebar

Charbon Section 240 Surface Water
Landform closure design slopes.

Centennial Coal

DATE 7/10/2015

Figure 2

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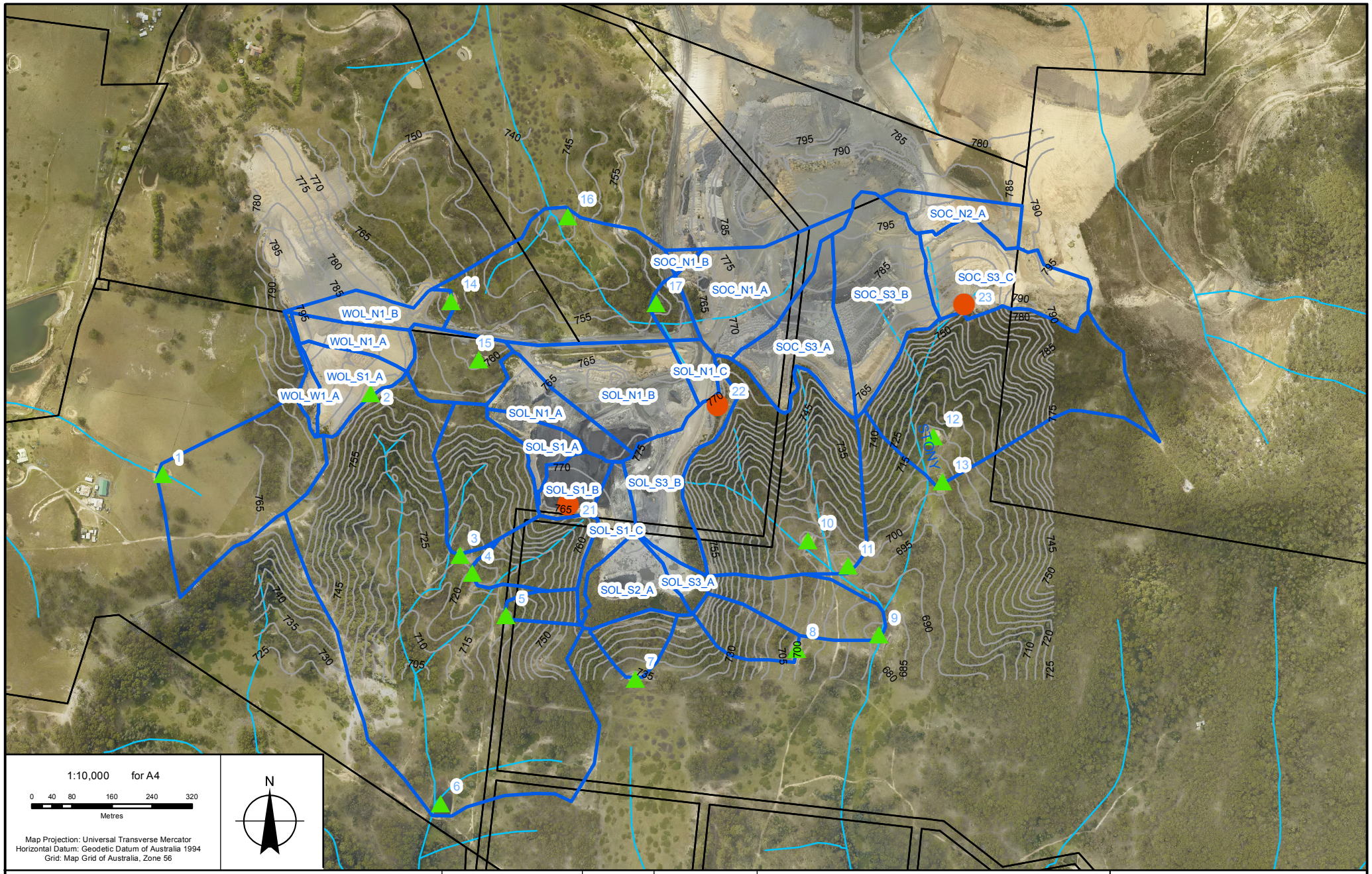


LEGEND

- Sub-catchments
- Cadastre
- Closure Design Contours (5 metre)
- Watercourses

Dams

- Existing
- Proposed

LOCATION	
SEAM	
DRAWN	
CHECKED	
APPROVED	
SCALE	Refer to scalebar

Charbon Section 240 Surface Water
Dams and Catchments

Centennial Coal

DATE 7/10/2015

Figure 3

GIS Filename: G:\22\17973\GIS\Maps\Deliverables\S240_Application\22_17973_003_S240_Water_Management_R0_20151007.mxd

Attachment B – Calculations

Table B1 Existing dams and upgrade requirements

Dam	Catchment			Current Dam Volume (ML)	Sedimentation Dam Requirement		
	ID	Disturbed Area (ha)	Undisturbed Area (ha)		Settling Zone [A] (ML)	Sediment Storage [B] (ML)	Total Capacity (ML)
1	WOL_W1_A	0.44	7.07	320	2223	204	2427
2	WOL_S1_A	2.01	0	250	595	1044	1639
3	SOL_S1_A	1.19	4.35	120	1640	408	2048
4	SOL_S1_B	1.39	2.68	180	1572	522	2094
	SOL_S1_C (part)	1.24					
5	SOL_S1_C (part)	0.17	0.84	110	299	6	305
6	WOL_S1_A	2.01	38.57	3000	11415	2934	14349
	SOL_S1_A	1.19					
	SOL_S1_B	1.39					
	SOL_S1_C	1.41					
7	SOL_S2_A	2.31	1.45	330	1113	522	1635
8 & 9	SOL_S3_A	0.63	4.77	620	1598	114	1712
10 & 11	SOL_S3_B	3.57	11.74	860	5639	2646	8285
	SOC_S3_A	3.74					
12 & 13	SOC_S3_B	10.14	11.88	910	6518	10338	16856
14	-	-	-	670	-	-	-
15	WOL_N1_A	1.41	2.51	320	-	-	-
	SOL_N1_A	2					
16	-	-	-	1350	-	-	-
17	SOL_N1_C	0.76	0.77	650	1826	3942	5768
	SOC_N1_A	4.64					

[A] Settling zone based on the 90th percentile 5-day rainfall event

[B] 12 month sediment storage zone based on 6x 2 month sediment storage zone

Attachment C – Typical Details

Typical details have been sourced from *Managing Urban Stormwater, Soils and Construction, Volume 1* (Landcom, 2004) and *Best Practice Erosion & Sediment Control* (IECA, 2008).

Typical Details provided include:

- CFB-01 Compost Filter Berm (IECA, 2008)
- Log-01 Geo Logs (coir logs) (IECA, 2008)
- SD 5-5 Earth Bank (low flow) (Landcom, 2004)
- SD 6-7 Straw Bale Filter (Landcom, 2004)

MATERIALS

COMPOSTS MUST COMPLY WITH THE REQUIREMENTS OF AS4454.

(i) WELL-DECOMPOSED 100% ORGANIC MATTER PRODUCED BY CONTROLLED AEROBIC (BIOLOGICAL) DECOMPOSITION.

(ii) MAXIMUM OF 1% OF INERT MATERIAL.

(iii) MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m, AND pH RANGE OF 5.0 TO 8.5.

(iv) MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND EXTENT. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, MATERIAL TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. WHEN SELECTING THE LOCATION OF A COMPOST FILTER BERM, TO THE MAXIMUM DEGREE PRACTICABLE, ENSURE THE BERM IS LOCATED:

(i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;

(ii) ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL);

(iii) AT LEAST 1m, IDEALLY 3m, FROM THE TOE OF A FILL EMBANKMENT;

(iv) AWAY FROM AREAS OF CONCENTRATED FLOW.

3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE BERM.

4. ENSURE THE BERM HAS BEEN PLACED ALONG THE CONTOUR SUCH THAT WATER WILL POND EVENLY ALONG THE LENGTH OF THE BERM.

5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOPE TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.

6. ENSURE 100% CONTACT WITH THE SOIL SURFACE.

7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT THE BERM AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR OR REPLACE ANY DAMAGED SECTIONS.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 100mm OR 1/3 THE HEIGHT OF THE BERM.

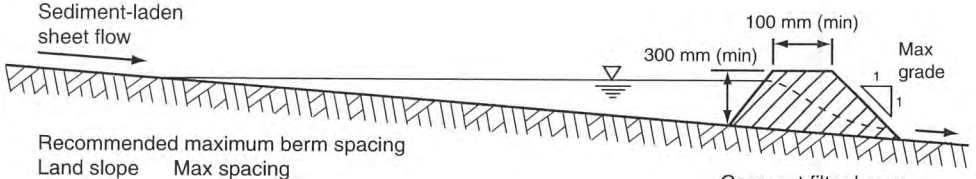
5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL (IF REQUIRED)

1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAYBE REMOVED.

2. REMOVE ANY COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.



Recommended maximum berm spacing

Land slope	Max spacing
< 2%	35 m
5%	25 m
10%	20 m
20%	12.5 m
25%	10 m

Figure 1 - Typical profile of a compost filter berm

Drawn:	Date:		
GMW	Apr-10	Compost Filter Berm	CFB-01

MATERIALS

GEO LOGS: MANUFACTURED FROM 100% JUTE, COIR (COCONUT FIBRE) OR A COMBINATION OF BOTH.

STAKES: MINIMUM 50 X 50mm X 0.9m HARDWOOD. STAKE LENGTH AND WIDTH MAY NEED TO VARY SLIGHTLY DEPENDING ON THE GROUND CONDITIONS.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO INSTALLATION ON CHANNEL/RIVER BANKS, PLACE A SUITABLE EROSION CONTROL MAT OVER ANY AREA WHERE THE LOGS ARE TO BE PLACED ABOVE AN EXPOSED SOIL.

3. WHEN PLACED ACROSS THE INVERT OF DRAINAGE CHANNELS, ENSURE THE LOGS ARE PLACED SUCH THAT:
(i) THE CREST OF THE DOWNSTREAM LOG IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM SOCK (IF ANY).
(ii) EACH LOG CHECK DAM EXTENDS UP THE CHANNEL BANKS SUCH THAT THE CREST OF THE CHECK DAM AT ITS LOWEST POINT IS LOWER THAN GROUND LEVEL AT EITHER END OF THE CHECK DAM.

4. WHEN PLACED ALONG A CHANNEL/RIVER BANK, DO NOT RECESS THE LOG MORE THAN 1/3 THE LOG DIAMETER INTO THE BANK.

5. ENSURE THE LOGS ARE PLACED TIGHTLY, END TO END.

6. WHERE PRACTICAL, THE EXTREME ENDS OF A ROW OF LOGS SHOULD BE ROTATED UP THE BANK AND SECURED WELL WITH STAKES.

7. SECURE THE LOGS BY DRIVING THE STAKES BETWEEN THE OUTER NETTING AND THE CORE MATERIAL EACH SIDE OF THE LOGS AND SECURED INTO THE GROUND, NOT THROUGH THE CENTRE OF THE LOG.

8. ENSURE THE SPACING OF STAKES (ONE ON EITHER SIDE) DOES NOT EXCEED AN INTERVAL OF 1m.

9. ONCE DRIVEN INTO THE GROUND, THE STAKES SHOULD IDEALLY SIT AT LEAST TWO-THIRDS BELOW THE GROUND AND ONE-THIRD ABOVE, AND IDEALLY SIT FLUSH WITH THE TOP OF THE LOG.

10. WHERE DIRECTED, INTERLACE COIR ROPE, GALVANISED WIRE, OR PLASTIC TREE TIES BETWEEN THE STAKES TO PROVIDE ADDITIONAL ANCHORAGE.

11. FILL AND SHAPE BEHIND THE LOGS IF REQUIRED.

12. IF STREAM FLOWS ARE LIKELY TO OVERTOP THE LOGS, THEN TAKE APPROPRIATE STEPS TO PREVENT HIGH VELOCITY FLOW ALONG THE LANDWARD SIDE OF THE LOGS. THIS CAN BE ACHIEVED WITH THE PLACEMENT OF ROCK CHECKS AT A SPACING NOT EXCEEDING 3m, OR THE PLACEMENT OF LOGS LATERALLY UP THE CHANNEL BANK.

MAINTENANCE

1. WHILE ON-SITE WORKS CONTINUE, INSPECT ALL GEO LOGS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.

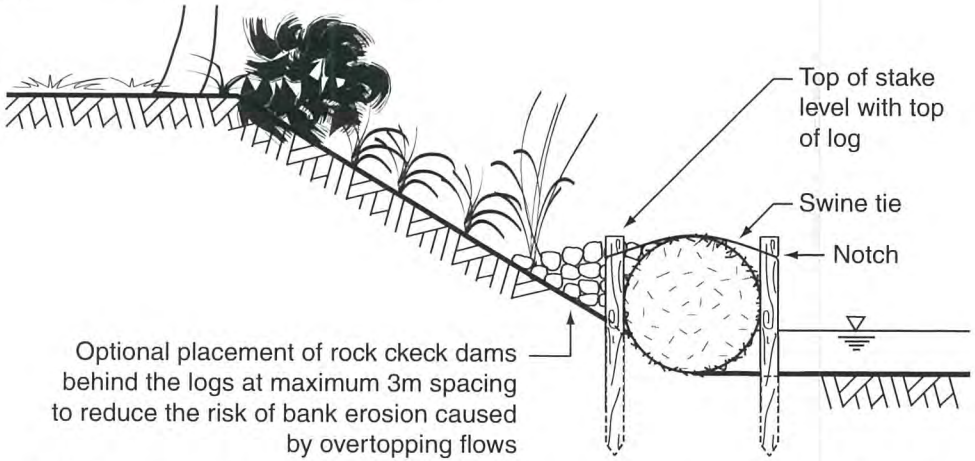
2. REPAIR OR REPLACE DISPLACED LOGS THAT ARE LIKELY TO CAUSE EROSION PROBLEMS.

POST INSTALLATION MONITORING

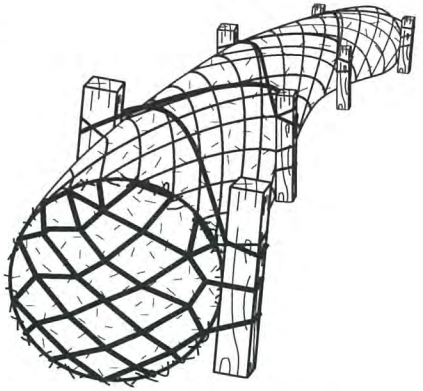
1. MONITORING OF WORKS CAN INVOLVE SEVERAL DIFFERENT TECHNIQUES, SUCH AS PHOTO POINT MONITORING, AERIAL PHOTOGRAPHIC MONITORING, MEASURING PLANT SURVIVAL AND GROWTH, AND FLORA AND FAUNA SURVEYING.

2. INSPECT AND MAINTAIN GEO LOGS AFTER EACH HIGH FLOW EVENT FOR THE FIRST YEAR. MAINTENANCE MAY INVOLVE RESECURING LOGS, REPLACING LOGS, AND REPAIRING BREAKS IN THE NETTING.

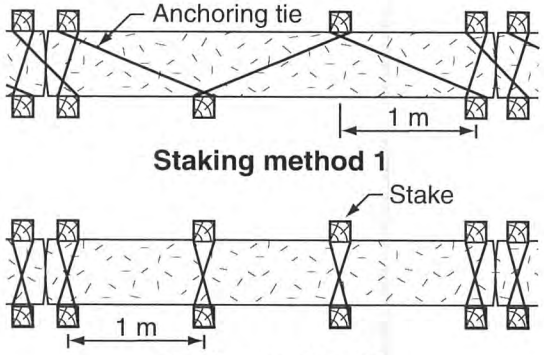
3. ANY NON-BIODEGRADABLE OR POTENTIALLY HAZARDOUS MATERIALS (INCLUDING HARDWOOD STAKES AND SYNTHETIC TWINE OR NETTING) SHOULD BE REMOVED ONCE WORKS HAVE REACHED THE END OF THEIR LIFE.



(a) Typical placement of geo log at toe of stream bank

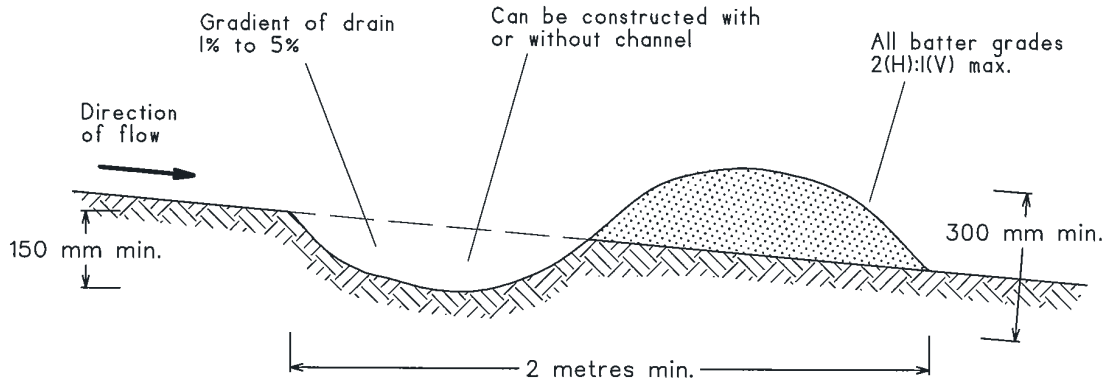


(b) Typical anchorage of geo log



(c) Methods of stake placement

Drawn:	Date:		
GMW	May-10	Geo Logs (coir logs)	Log-01

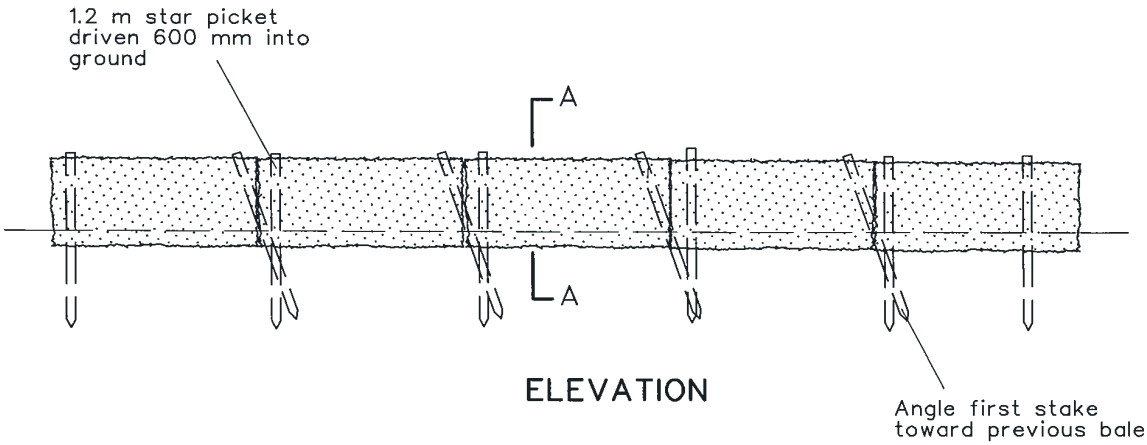


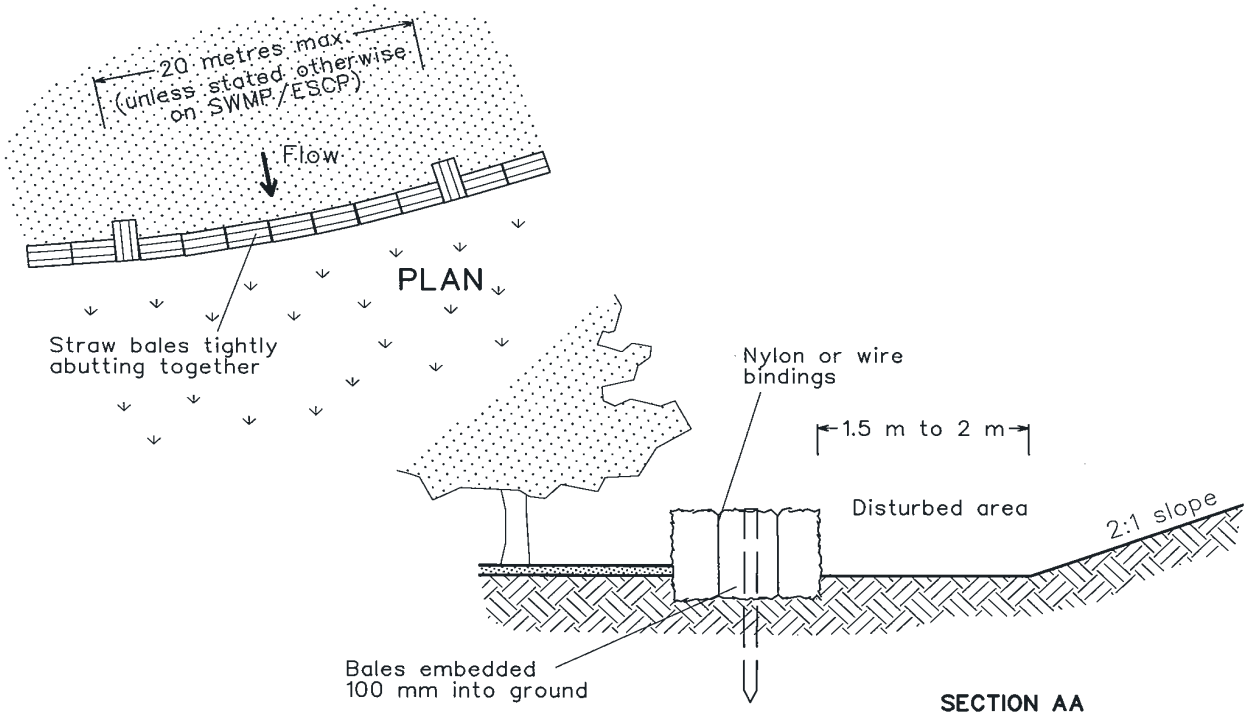
NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

EARTH BANK (LOW FLOW) SD 5-5





Construction Notes

1. Construct the straw bale filter as close as possible to being parallel to the contours of the site.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
3. Ensure that the maximum height of the filter is one bale.
4. Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
5. Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the toe.
6. Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER SD 6-7

Attachment D – Limitations and Disclaimers

This report has been prepared by GHD for Centennial Coal Company Limited and may only be used and relied on by Centennial Coal Company Limited for the purpose agreed between GHD and the Centennial Coal Company Limited as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Centennial Coal Company Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Appendix 4 – Rehabilitation Cost Estimate

Amendments to Spreadsheet

Version	Sheet	Change Made	Date	Cell
V1.6	UG_Metal Infrastructure	Change Coal Prep Plant to Mill Area	14/06/2006	A12
V1.6	UG_Metal Infrastructure	Changed reference to thickener tank to leach tank	14/06/2006	B20
V1.6	UG_Metal Tailings & Rejects (1-3)	Removed reference to coal fines	14/06/2006	B14
V1.6	Summary Report	Updated reference in summary sheet to include sheet (2) of each group in calculations. Inclusion of Third Party Project Management items in total	14/06/2006	J38
V1.7	Rate Change Justification	Added justification sheet for rates change	20/07/2006	NA
V1.7	Summary Report	Inclusion of tick box to state that proposed rehabilitation design is generally consistent with the development consent for the project	20/07/2006	NA
V1.7	Summary Report	Removed GST from total cost estimate	20/07/2006	J50
V1.7	UG_Metal Infrastructure	Total for Hardstand/Laydown Areas now calculates all cells within the management precinct	20/07/2006	F70
V1.7	Cost Schedule	Drill and blast highwall costs updated. Initial number was typographical error.	10/08/2006	F35
V1.7	Quarry Infrastructure	Admin Buildings/Disconnect and Terminate Services - Value linked to cost schedule	10/08/2006	F34
V1.7	Management & Contingencies	Project Management and Surveying contingency changed to 10% as per ESB20 Guideline	9/10/2006	C16
V1.7	Infrastructure Domains	Added line item - Deconstruct Small Tanks (e.g. thickener or leach)		NA
V1.7	Various 'Other' Pages	Added line item - construct/deconstruct bridges/crossings and construction of fencing		NA
V1.7	Cost Schedule	Altered page to allow global changes to be made to line item costs		NA
V1.7	Cost Schedule	Added line items: "shaft capping/sealing" and "shaft filling"	15/01/2006	NA
V1.8	Cost Schedule	Re-Ajusted with current CPI at http://www.ato.gov.au/taxprofessionals/PrintFriendly.aspx?ms=taxprofessionals&doc=/content/1566.htm (Note: This document refers to ABS figures)	10/10/2012	
V1.8	Cost Schedule	Altered figure for Drill and Blast Highwall (to rectify error in previous version)	14/08/2012	D36
V1.9	Cost Schedule	Altered figures for Unit Rates to rectify a calculation error in previous version	17/10/2012	NA
V1.10	Cost Schedule	Re-ajusted with current CPI at http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0. Amended incorrect calculation for creek diversion and reset care and maintenance of historical items to 0. Updated logo on Rate Change Justification form.	5/11/2012	NA
V1.11	Cost Schedule	Re-ajusted using December 2012 CPI at http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0.	8/02/2013	Cost Schedule
V1.12	Cost Schedule	Re-ajusted using March and July 2013 CPI at http://www.abs.gov.au/ausstats/abs@.nsf/mf/6401.0.	8/02/2013	Cost Schedule

Note: Cells in yellow can be changed and will make a global change to the values in the spreadsheet. Unit prices may also be edited on an individual basis within the appropriate domain worksheet where applicable.

Activity / Description	Unit	Unit Prices 7/08/2013
Termination of Services and Demolition Works		
Disconnect and terminate services (CHPP, process plant, mill)	@	$31,933.23
Disconnect and terminate services (quarry workshops, rock crusher, product stockpile)	@	$12,773.29
Disconnect and terminate services (admin buildings, workshops)	@	$6,386.65
Disconnect and terminate services (sewerage plants, water treatment plants)	@	$3,193.32
Disconnect and terminate powerlines (based on cost to construct)	m^2	$14,050.62
Demolish and remove small buildings / tanks	m^2	$89.41
Demolish and remove industrial buildings	m^2	$204.37
Demolish and remove CHPP	m^2	$204.37
Demolish and remove Mill / Processing Plant	m^2	$204.37
Demolish and remove conveyors & gantries (includes overland conveyors)	m	$70.25
Demolish / relocate crushers	@	$12,773.29
Deconstruct Large Tanks (e.g.thickener or leach)	@	$191,599.38
Deconstruct Small Tanks (e.g.thickener or leach)	@	$60,883.94
Removal of UG tank (including pipes, bunds, etc) (include all facilities on site)	@	$95,799.69
Remove concrete pads, footings and bitumen	m^2	$12.77
Rail Infrastructure		
Remove rail loop and spur	m	$7.66
1. Reshape rail spur and load out area 2. Reshape deep rip and ameliorate sealed unsealed roads 3. Reshape walls / buttress around the dam / emplacement - earthworks only 4. Reshape, deep rip, ameliorate and seed highwall / internal access roads and tracks	Ha	$6,386.65
Contaminated Materials		
1. Remove contaminated material from workshop and hardstand areas for disposal in the decline void 2. Remove contaminated material from areas for disposal (ie. chemical spillage in / around storage sheds) 3. Remove contaminated material from areas for disposal (ie. chemical/hydrocarbon spillage in the hard stand area)	m^3	$2.55
Remove contaminated material (spillage or otherwise) from footprint of the Mill / Process Plant, ROM Stockpiles, conveyors and workshops	m^3	$3.19
On site remediation of contaminated soil (<1000m^3)	m^3	$63.87
On site remediation of contaminated soil (1000-10,000m^3)	m^3	$51.09
On site remediation of contaminated soil (>10,000m^3)	m^3	$38.32
Mining and Exploration Works		
Active pit area - benches blasted and doze to < 18^o	m^3	$1.41
Drill & Blast Highwall	m^3	$0.89
Security fence around steep section of highwall	m	$63.87
High wall treatment - (trench + safety berm)	m	$73.45
Seal Portal / Decline Entry	@	$28,101.24
Shaft filling	m^3	$24.35

Activity / Description	Unit	Unit Prices 7/08/2013
Shaft capping/sealing	@	$12,176.79
Seal & rehabilitate ventilation fans.	@	$31,933.23
De-watering Bores (pluggers)	@	$3,831.99
Cap exploration holes	@	$319.33
Structural Works		
Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	Ha	$57,479.81
1. Structural works, banks waterways 2. Structural works, banks, rock lined waterways	Ha	$1,788.26
Major bulk pushing to achieve grades nominated in the MOP (i.e. < 18o)	m^3	$1.41
Construction / deconstruction of bridges and crossings	quote	$0.00
Construction of fencing - general	m	$63.87
Water Management		
Clean water dams to be retained after mine closure -make safe and minor earthworks.	@	$2,554.66
Dirty Water Dams (Drain and remove sediments to make dam clean water)	m^3	$4.09
Creek Diversions		
Creek diversion - Channel maintenance through spoil / backfill (20% of estimated diversion construction costs due to unknown in landform stability)	m	$1,915.99
Creek diversion - Channel maintenance insitu (10% of estimated construction cost for diversion)	m	$1,915.99
Creek diversion - Vegetation maintenance	m^2	$0.38
Heritage Items		
The restoration and care and maintenance of items that have historical significance and are to be retained after the cessation of mining	@	$25,546.58
Rehabilitation		
Areas cleared ahead of mining - re-establish vegetation commensurate with surrounding vegetation	Ha	$2,682.39
1. Remove carbonaceous material (spillage or otherwise) from footprint of the CHPP, ROM & Product stockpiles, conveyors and workshops 2. Remove carbonaceous material from roadways (coal / rejects spillage)	m^3	$3.32
Reshaping, capping, sealing of material presenting environmental difficulties (AMD, Hydrocarbon material, etc)	Ha	$57,479.81
Source, cart and spread topsoil (@ 20cm).	m^3	$1.53
1. Source, cart and spread suitable material to cap the tailings emplacement (cap thickness determined by MOP) 2. Source, cart and spread suitable material to cap the coarse rejects emplacement (cap thickness determined by MOP) 3 .Source, cart and spread topsoil 4. Areas topsoil stripped ahead of mining - source cart and respread topsoil	m^3	$2.55
1. Spoil amelioration and supply and spread seed and fertiliser 2. Spoil amelioration and supply and spread / tree pasture seed and fertiliser 3. Reshape, deep rip, ameliorate and seed exploration lines / areas	Ha	$4,726.12
1. Final trim, rock rake & deep rip 2. Minor pushing, final trim, rock rake & deep rip 3. Deep rip hard stand / laydown areas	Ha	$638.66
Maintenance of Rehabilitated Areas (up to 5 years)		
Maintenance of **established** rehabilitated areas	Ha	$830.26
Maintenance of Shaped Topsoiled and Seeded Areas	Ha	$830.26
Minor earthworks and maintenance of mine subsidence areas	Ha	$1,277.33
Other		
DRE Tender Preparation and Assessment	1	$6,386.65
Development of Unplanned Closure Plan	1	$31,933.23
Third Party Project Management and Contingencies		
Contingency	Total	10%
Mobilisation and Demobilisation (third party contractor rates apply)	Total	1%

Activity / Description	Unit	Unit Prices 7/08/2013
Post Closure Environmental Monitoring	Total	5%
Project Management & Surveying	Total	10%

NSW GOVERNMENT Resources & Energy

ESB26: DPI-MR Rehabilitation Cost Calculation Tool

CPI values have been obtained from the Australian Bureau of Statistics

The objective of this "tool" is to provide mine operators with general guidance in calculating an appropriate Rehabilitation Estimate for the wide range of Mining Operations in NSW. It is acknowledged that the calculation of an appropriate Rehabilitation Estimate varies across the wide range of mine types in the State of NSW. With this in mind the intent of this "workbook" approach is to work towards a consistent approach in estimating Rehabilitation Costs in NSW.

For this reason this workbook is based on the principle that the most effective basis for unit costs is dependant on the specific rehabilitation approach nominated by the individual mine. Importantly, while the mine has the opportunity to nominate unit rates, they MUST be based on a THIRD PARTY cost as it is assumed that if the mine defaults on their responsibility to rehabilitate the mine site, a contractor will be engaged. Notwithstanding this the mine operator is to ensure that the appropriate consideration of individual site variations and complexities is given.

This workbook is also useful for determining mine closure costings and in this instance site specific unit rates can be used as it is assumed the mining company will undertake the mine closure and decommissioning works.

The framework of the workbook has been developed along a tiered approach which establishes the level of detail required based on the scale and type of the mine operation. In order to best address the complexity of different land uses across the site, the mine operation is divided into a series of domains. Each domain represents a unique area of the operating mine and comprises a number of precincts. By selecting the relevant type of mining operation (below), followed by the ENTER button, the relevant domain worksheets will be activated. A worksheet must be completed for each domain to calculate the total mine closure costs.

Note: Quarterly changes to the CPI (as announced by the Australian Bureau of Statistics) will be regularly applied and updates made to the spreadsheet as necessary.

Step 1:

Type of Mining Operations

- (●) Open Cut Coal Mine
- ( ) Underground Coal Mine
- ( ) Open Cut AND Underground Coal Mine
- ( ) Open Cut Metals Mine
- ( ) Underground Metals Mine
- ( ) Open Cut AND Underground Metals
- ( ) Hard Rock, Alluvial & Other Quarry

Step 2:

NOTE: Following selection of the ENTER button, the relevant worksheets are opened. Each time the workbook is opened, the type of mining operation (Step 1) must first be selected following the ENTER button (Step 2) to re-open active worksheets.

Site Registration

Complete the following fields prior to calculating the security bond.

Mine Name:	Charbon Colliery		
Lease(s)	ML1647 and ML1545		
Mine Owner	Charbon Coal Pty Ltd and SK Networks Resources Australia Pty Ltd		
Mine Operator	Charbon Coal		
Expiry of MOP	31/10/2022		
Current Security	$ 5,312,000.00	**Date of last Security Bond review**	24/08/2011
Mine Contact	James Wearne		
Position	Group Approvals Manager		
Address	PO Box 1000 Toronto NSW 2283		
Phone	0407 207 530	**e-mail**	james.wearne@centennialcoal.com.au

Site Description

The following site specific information is requested to provide background information in the context of calculating the security bond.

Summary of Mine Activities

Total annual production (tonnes):	0
Mine lease area (ha):	775.6
Area of extraction (ha):	0
Area of disturbance (ha):	43.21
Rehabilitation in progress (ha):	43.21
Rehabilitation complete (ha):	0
Estimate based on Plan(s): include version and date	See MOP
Plan(s) outlining Domain Areas include version and date	MOP Figure 3

☑ Plan(s) attached

NOTE:
Ensure rehabilitation cost calculation reflects all environmental issues affecting the lease. Contingencies should be allocated where costs have not been incorportated elsewhere in the estimation.

Environmental Sensitivities

Surrounding land use (tick all that apply):

- ☐ Cropping
- ☑ Pasture
- ☑ Forest
- ☐ Undisturbed habitat
- ☐ Urban

Environmental Issues affecting site (tick all that apply)

- ☐ Threatened flora
- ☐ Threatened fauna
- ☐ Cultural heritage items
- ☐ Natural heritage features
- ☐ Mine subsidence
- ☐ Surface water pollution
- ☐ Ground water pollution
- ☐ Hydrocarbon contamination
- ☐ Methane drainage/venting
- ☐ Spontaneous combustion
- ☐ Acid Mine Drainage
- ☐ Within drinking water catchment
- ☐ Other (describe below)

NSW GOVERNMENT Resources & Energy

Summary Rehabilitation Cost Calculation

Note: Sections of this page are automatically filled in from the registration page

Mine Name:	Charbon Colliery
Lease(s):	ML1647 and ML1545
Mine Owner:	Charbon Coal Pty Ltd and SK Networks Resources Australia Pty Ltd
Mine Operator:	Charbon Coal
Expiry of MOP:	31/10/2022
Current Security:	$ 5,312,000.00
Date of Last Security Bond Review:	24/08/2011
Mine Contact:	James Wearne
Position:	Group Approvals Manager
Address:	PO Box 1000 Toronto NSW 2283
Phone:	0407 207 530
email:	james.wearne@centennialcoal.com.au

Domain	Security Deposit
Domain 1: Infrastructure Areas	$29,821.80
Domain 2: Tailings & Rejects Emplacements (1)	
Domain 2: Tailings & Rejects Emplacements (2)	
Domain 2: Tailings & Rejects Emplacements (3)	
Domain 3: Overburden & Waste Dumps	$383,822.73
Domain 4: Active Mine & Voids	$4,866.62
Domain 5: Other	$124,539.60
Sub-Total (Domains and Sundry Items)	**$543,050.76**
Contingency	$66,282.83
Third Party Project Management	$119,777.49
Total Security Deposit for the Mining Project (excl. of GST)	**$729,111.08**

Note: GST is not included in the above calculation or as part of rehabilitation security deposits required by the Department

☐ Alterations have been made to unit prices within this spreadsheet. (Attach a separate sheet providing details of changes)

☑ The proposed rehabilitation design is generally consistent with the development consent for the project

This Registration Form, Summary Report and calculation pages are to be printed and attached as an appendix the AEMR.

This mine security calculation has been estimated using the best available information at the time.
It is a true and accurate reflection of the total rehabilitation liability held by this mine.

Signature General Manager	Mick Cairney	26.10.15 Date:
Signature Accepted: DRE Reporting Officer	Print Name	Date:

Domain 1: Infrastructure Areas

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Aprovals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Coal Handling and Preparation Plant (CHPP)	Disconnect and terminate services	0	@	$31,933.23	**$0.00**	This item includes disconnecting and terminating all services such as power, water and sewer. It is a "one off" cost
	Disconnect and terminate powerlines	0	km	$14,050.62	**$0.00**	This item includes the cost to terminate and remove powerlines, and is based on the average cost to construct.
	Demolish and remove small buildings	0	m^2	$89.41	**$0.00**	Enter the total area of small buildings and offices in the CHPP area. It should not include demountables which can be removed from site. It does not include workshops.
	Demolish and remove industrial buildings	0	m^2	$204.37	**$0.00**	Enter the total area of workshop facilities in the CHPP area.
	Demolish and remove CHPP	0	m^2	$204.37	**$0.00**	Enter the total surface area of the CHPP. If the CHPP is multi-story the entry should be the sum of the surface area for all floors.
	Demolish and remove conveyors & gantries (includes overland conveyors)	0	m	$70.25	**$0.00**	Enter the sum of the total length of conveyor and gantries. This includes conveyor to rail load out areas of conveyor from hoppers feeding back to the CHPP.
	Remove Concrete pads and Footings	0	m^2	$12.77	**$0.00**	Enter the total area of the CHPP, workshops and buildings.
	Deconstruct Large Tanks (e.g. Thickener)	0	@	$191,599.38	**$0.00**	Enter the number of Thickener tanks to be removed from the site.
	Deconstruct Small Tanks (e.g. Thickener)	0	@	$60,883.94	**$0.00**	
	Remove carbonaceous material (spillage or otherwise) from footprint of the CHPP, ROM & Product stockpiles, conveyors and workshops	0	m^3	$3.32	**$0.00**	Enter the total volume (ie. area x depth of material) to be scalped off for disposal. **UNIT RATE:** Depends on the haulage distance to the point where the material is to be disposed.
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the entire area of the CHPP.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
				Precinct Security Deposit	**$0.00**	
Rail Line and Loop	Remove Rail Loop and spur	0	m	$7.66	**$0.00**	This item includes the pulling up and removal from site of railway line and sleepers. Calculated as a lineal metre
	Reshape rail spur and load out area	0	Ha	$6,386.65	**$0.00**	Enter the total area of the rail line footprint required to be covered with fertiliser (and/or lime & gypsum) prior to seeding **UNIT RATE:** Depends the required rehabilitation commitment (ie. Trees will be more expensive than grass)

	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Spoil amelioration and supply and spread pasture seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$0.00**	
Main Workshop Area	Disconnect and terminate services	0	@	$6,386.65	**$0.00**	This item includes disconnecting and terminating all services such as power, water and sewer. It is a "one off" cost
	Demolish and remove small buildings	0	m^2	$89.41	**$0.00**	Enter the total area of small buildings and offices in the workshop area. It should not include demountables which can be removed from site. It does not include workshops (they are industrial).
	Demolish and remove industrial buildings	0	m^2	$204.37	**$0.00**	Enter the total area of workshop facilities in the area. Include all remote or field based workshop areas.
	Remove Concrete pads, Footings and bitumen (car park) for dumping in a void on the site	0	m^2	$12.77	**$0.00**	Enter the total area the workshops and buildings. Include the area of any bitumen car parks (or similar). It would also include vehicle washdown pads, bulk fuel bunding area and refueling areas (i.e. all concrete areas in the workshop precinct)
	Remove contaminated material from workshop and hardstand areas for disposal in the decline void **AND/OR**	0	m^3	$2.55	**$0.00**	I) Enter the total volume (ie. area x depth of material) to be scalped off for disposal. **UNIT RATE:** Depends on the haulage distance to the point where the material is to be disposed.
	Reshaping, capping, sealing of material presenting environmental difficulties (AMD, Hydrocarbon material, etc)	0	Ha	$57,479.81	**$0.00**	Enter the total area of material requiring capping or sealing. Where assessments have already been made and the presence/absence of contaminated material is know (and quantified) an alternative rate can be used. If this work has not been undertaken, a de
	Removal of UG tank (including pipes, bunds, etc) (include all facilities on site)	0	@	$95,799.69	**$0.00**	A default rate per UGT is to be utilised.
	On site remediation of contaminated soil (<1000m^3)	0	m^3	$63.87	**$0.00**	where an assessment of the volume of contaminated soil has been made this volume is to be included. Where the volume in not known or has not been quantified a default volume of 3000m^3 per fuel storage facility is to be used in cell C:37
	On site remediation of contaminated soil (1000-10,000m^3)	0	m^3	$51.09	**$0.00**	where an assessment of the volume of contaminated material has been made this volume is to be included. Where the volume in not know or has not been quantified a default volume of 3000m^3 per fuel storage facility is to be used
	On site remediation of contaminated soil (>10,000m^3)	0	m^3	$38.32	**$0.00**	where an assessment of the volume of contaminated soil has been made this volume is to be included. Where the volume in not known or has not been quantified a default volume of 3000m^3 per fuel storage facility is to be used in cell C:37
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program. It is assumed that the entire workshop area will require ripping.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the entire workshop area
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$0.00**	
Admin Buildings	Disconnect and terminate services	0	@	$6,386.65	**$0.00**	This item includes disconnecting and terminating all services such as power, water and sewer. It is a "one off" cost

	Demolish and remove small buildings	0	m^2	$89.41	**$0.00**	Enter the total area of small buildings and offices in the admin area. It should not include demountables which can be removed from site. It does not include workshops.
	Demolish and remove industrial buildings	0	m^2	$204.37	**$0.00**	Enter the total area of workshop facilities in the admin area.
	Remove Concrete pads, Footings and bitumen (car park)	0	m^2	$12.77	**$0.00**	Enter the total area the workshops and buildings. Include the area of any bitumen car parks (or similar)
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the admin area and car parks, etc.
	Spoil amelioration and supply and spread pasture seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	Enter the total area of the admin, etc footprint requiring to be covered with fertiliser (and/or lime & gypsum) prior to seeding **UNIT RATE:** Depends the required rehabilitation commitment (ie. Trees will be more expensive than grass)
			Precinct Security Deposit		**$0.00**	
Access & Haul Roads	Remove carbonaceous material from roadways (coal / rejects spillage)	1565	m^3	$3.32	**$5,197.45**	Enter the total volume (ie. area x depth of material) to be scalped off for disposal. **UNIT RATE:** Depends on the haulage distance to the point where the material is to be disposed.
	Reshape deep rip and ameliorate sealed unsealed roads	2	Ha	$6,386.65	**$12,773.29**	Enter the total area of the road footprint requiring to be covered with fertiliser (and/or lime & gypsum) prior to seeding **UNIT RATE:** Depends on the required rehabilitation commitment (ie. Trees will be more expensive than grass)
	Source, cart and spread topsoil.	1565	m^3	$1.53	**$2,398.82**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	2	Ha	$4,726.12	**$9,452.24**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$29,821.80**	
Sewerage / Water Treatment Plant	Disconnect and terminate services	0	@	$3,193.32	**$0.00**	This item includes disconnecting and terminating all services such as power, water and sewer. It is a "one off" cost
	Demolish and remove small buildings / tanks	0	m^2	$89.41	**$0.00**	Enter the total area of small buildings and tanks.
	Remove contaminated material from areas for disposal (ie. chemical spillage in / around storage sheds).	0	m^3	$2.55	**$0.00**	Enter the total volume (ie. area x depth of material) to be scalped off for disposal. **UNIT RATE:** Depends on the haulage distance to the point where the material is to be disposed.
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the sewerage & water treatment plant area.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$0.00**	
Hardstand /Laydown Areas	Remove contaminated material from areas for disposal (ie. chemical/hydrocarbon spillage in the hard stand area).	0	m^3	$2.55	**$0.00**	Enter the total volume (ie. area x depth of material) to be scalped off for disposal. **UNIT RATE:** Depends on the haulage distance to the point where the material is to be disposed.

	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover all hardstand and laydown areas.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
				Precinct Security Deposit	**$0.00**	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
				Precinct Security Deposit	**$0.00**	

Total Security Deposit for the "Domain" **$29,821.80**

Domain 2: Tailings & Rejects Emplacements (1)

Complete a separate sheet for each tailings dam/impoundment on the site.

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Tailings Dam / Impoundment (Key Information):

Materials Stored (ie. coal fines, coarse or co-disposed)	
Volume Stored (m3)	
Maximum Embankment Height (m)	
Maximum Embankment Length (m)	
Year Dam / Emplacement Commissioned	
Storage area (ha)	
Catchment Area of Tailings Dam / Emplacement (ha)	
Briefly describe embankment construction. (earthen, clay /rejects core, etc)	

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Tailings Dams / Emplacements	Source, cart and spread suitable material to cap the tailings emplacement (cap thickness determined by MOP)	0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the tailings emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Reshape walls / buttress around the dam / emplacement - *earthworks only*	0	Ha	$6,386.65	**$0.00**	This includes the area that requires stabilisation and reshaping works around the walls of the emplacement (i.e. removal of rills and pipes that may present long term stability issues)
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser

	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
		Precinct Security Deposit			**$0.00**	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	
Coarse Rejects Emplacements	Source, cart and spread suitable material to cap the coarse rejects emplacement (cap thickness determined by MOP)	0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the coarse rejects emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
					$0.00	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	

Total Security Deposit for the "Domain" $0.00

Domain 2: Tailings & Rejects Emplacements (2)

Complete a separate sheet for each tailings dam/impoundment on the site.

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Envirnment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Tailings Dam / Impoundment (Key Information):

Materials Stored (ie. coal fines, coarse or co-disposed)	
Volume Stored (m3)	
Maximum Embankment Height (m)	
Maximum Embankment Length (m)	
Year Dam / Emplacement Commissioned	
Storage area (ha)	
Catchment Area of Tailings Dam / Emplacement (ha)	
Briefly describe embankment construction. (earthen, clay /rejects core, etc)	

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Tailings Dams / Emplacements	Source, cart and spread suitable material to cap the tailings emplacement (cap thickness determined by MOP)	0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the tailings emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Reshape walls / buttress around the dam / emplacement - *earthworks only*	0	Ha	$6,386.65	**$0.00**	This includes the area that requires stabilisation and reshaping works around the walls of the emplacement (i.e. removal of rills and pipes that may present long term stability issues)
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser

	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
		Precinct Security Deposit			**$0.00**	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	
Coarse Rejects Emplacements	Source, cart and spread suitable material to cap the coarse rejects emplacement (cap thickness determined by MOP)	0.0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the coarse rejects emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0.0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Final trim, rock rake & deep rip		Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0.0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0.0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0.0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	0.0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
					$0.00	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	

Total Security Deposit for the "Domain" $0.00

Domain 2: Tailings & Rejects Emplacements (3)

Complete a separate sheet for each tailings dam/impoundment on the site.

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Tailings Dam / Impoundment (Key Information):

Materials Stored (ie. coal fines, coarse or co-disposed)	
Volume Stored (m3)	
Maximum Embankment Height (m)	
Maximum Embankment Length (m)	
Year Dam / Emplacement Commissioned	
Storage area (ha)	
Catchment Area of Tailings Dam / Emplacement (ha)	
Briefly describe embankment construction. (earthen, clay /rejects core, etc)	

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Tailings Dams / Emplacements	Source, cart and spread suitable material to cap the tailings emplacement (cap thickness determined by MOP)	0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the tailings emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Reshape walls / buttress around the dam / emplacement - *earthworks only*	0	Ha	$6,386.65	**$0.00**	This includes the area that requires stabilisation and reshaping works around the walls of the emplacement (i.e. removal of rills and pipes that may present long term stability issues)
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser

	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
		Precinct Security Deposit			**$0.00**	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	
Coarse Rejects Emplacements	Source, cart and spread suitable material to cap the coarse rejects emplacement (cap thickness determined by MOP)	0	m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume material to cap the coarse rejects emplacement. The material must have appropriate chemical & physical properties.
	Apply engineered treatment as required (i.e. capping, capillary breaks, etc) - design in accordance with the MOP commitments.	0	Ha	$57,479.81	**$0.00**	This includes the area that requires engineering treatment is required to satisfy conditions of the MOP, This may include compaction or addition of multiple layers and / or capillary breaks.
	Final trim, rock rake & deep rip	0	Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Structural works, banks waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the cap.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
					$0.00	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
		Precinct Security Deposit			**$0.00**	

Total Security Deposit for the "Domain" $0.00

Domain 3: Overburden & Waste Dumps

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Successful Rehabilitation	Maintenance of **Established** Revegetated Area (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
	Maintenance of Shaped Topsoiled and Seeded Areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area of that have been shaped, topsoiled and seeded and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
				Precinct Security Deposit	**$0.00**	
Shaped Overburden Dumps	Final trim, rock rake & deep rip	17.61	Ha	$638.66	**$11,246.88**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.
	Structural works, banks, rock lined waterways	17.61	Ha	$1,788.26	**$31,491.27**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the dump.
	Source, cart and spread topsoil.	17,610	m^3	$1.53	**$26,992.52**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the shaped overburden dumps.
	Spoil amelioration and supply and spread seed and fertiliser.	17.61	Ha	$4,726.12	**$83,226.94**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	17.61	Ha	$830.26	**$14,620.95**	This item includes the total area of that have been shaped, topsoiled and seeded and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment
				Precinct Security Deposit	**$167,578.57**	
Unshaped Overburden Dumps (minor reshaping required)	Minor pushing, final trim, rock rake & deep rip	23.2	Ha	$638.66	**$14,817.02**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.
	Structural works, banks, rock lined waterways	21	Ha	$1,788.26	**$37,553.48**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the dump.
	Source, cart and spread topsoil.	21120	m^3	$1.53	**$32,372.63**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	21	Ha	$4,726.12	**$99,248.48**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	21	Ha	$830.26	**$17,435.54**	This item includes the total area that has been shaped, topsoiled and seeded and requires subsequent fertiliser application. It assumes maintenance for a period of (5) years after establishment, including application of fertiliser twice during this time.
				Precinct Security Deposit	**$201,427.15**	

Unshaped Overburden Dumps (major earthworks required) - this excludes Low walls	Major bulk pushing to achieve grades nominated in the MOP (i.e. < 18^{o})	0	m^3	$1.41	**$0.00**	This item includes the volume requiring **major** reshaping, rock raking and deep ripping (only as required) to enhance revegetation program
	Minor pushing, final trim, rock rake & deep rip	23.2	Ha	$638.66	**$14,817.02**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.
	Structural works, banks, rock lined waterways	0	Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the dump.
	Source, cart and spread topsoil.	0	m^3	$1.53	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread seed and fertiliser.	0	Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Maintenance of rehabilitated areas (up to 5 years)	0	Ha	$830.26	**$0.00**	This item includes the total area that has been shaped, topsoiled and seeded and requires subsequent fertiliser application. It assumes maintenance for a period of (5) years after establishment, including application of fertiliser twice during this time.
			Precinct Security Deposit		**$14,817.02**	
Other	Construction of fencing		m		**$0.00**	Boundary fencing establishment
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
			Precinct Security Deposit		**$0.00**	

Total Security Deposit for the "Domain" **$383,822.73**

Domain 4: Active Mine & Voids

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Active Pit (including the voids and any internal benches or mine strips)	Major bulk pushing of the low wall to achieve grades nominated in the MOP (i.e. < 18°)		m^3	$1.41	**$0.00**	This item includes the volume requiring **major** reshaping, rock raking and deep ripping (only as required) to enhance revegetation program **UNIT RATE:** dozer push rate
	Active pit area - benches blasted and doze to < 18°		m^3	$1.41	**$0.00**	This item includes the total area of rehabilitation that has been established and requires subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment **UNIT RATE:** drill & blast + dozer push
	Final trim, rock rake & deep rip		Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.
	Structural works, banks waterways		Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the reshaped areas
	Source, cart and spread topsoil.		m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the tailings dam / emplacement.
	Spoil amelioration and supply and spread / tree pasture seed and fertiliser.		Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$0.00**	
Ramps	Major bulk pushing of the low wall to achieve grades nominated in the MOP (i.e. < 18°)		m^3	$1.41	**$0.00**	This item includes the volume requiring **major** reshaping.
	Final trim, rock rake & deep rip		Ha	$638.66	**$0.00**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.
	Structural works, banks waterways		Ha	$1,788.26	**$0.00**	This item includes the area requiring earthworks (banks, & drains, etc) to manage all surface water on the top of the emplacement to ensure that it is shed off the reshaped areas
	Source, cart and spread topsoil.		m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the reshaped ramps
	Spoil amelioration and supply and spread pasture / tree seed and fertiliser.		Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
			Precinct Security Deposit		**$0.00**	
Highwall treatment	Drill & Blast Highwall		m^3	$0.89	**$0.00**	This item includes the total area of rehabilitation that have been established and require subsequent fertiliser application. It assumes application twice on the first five (5) years after establishment **UNIT RATE:** drill & blast + dozer push
	Major bulk pushing of the high wall to achieve grades nominated in the MOP (i.e. < 18°)	1500	m^3	$1.41	**$2,107.59**	This item includes the volume requiring **major** reshaping, rock raking and deep ripping (only as required) to enhance revegetation program **UNIT RATE:** dozer push rate
	Final trim, rock rake & deep rip	0.4	Ha	$638.66	**$255.47**	This item includes the area requiring minor reshaping, rock raking and deep ripping to enhance revegetation program.

	Source, cart and spread topsoil (at 20cm)	400	m^3	$1.53	**$613.12**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the reshaped area.
	Spoil amelioration and supply and spread pasture seed and fertiliser.	0.4	Ha	$4,726.12	**$1,890.45**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass seed and fertiliser
	Security fence around steep section of highwall		m	$63.87	**$0.00**	This item includes the erection of a 2m security fence (lineal metre) around the void and other dangerous areas.
	High wall treatment - (trench + safety berm)		m	$73.45	**$0.00**	This item includes the construction of a safety berm and rill (lineal metre) around the highwall to stop all vehicles, act accidentally driving over haul road (engineered control).
			Precinct Security Deposit		**$4,866.62**	
Disturbance ahead of Mining + water management structures	Areas cleared ahead of mining - re-establish vegetation commensurate with surround vegetation		Ha	$2,682.39	**$0.00**	This includes the direct application of seed to restore the vegetation that was disturbed as part of clearing operations ahead of the mine.
	Areas topsoil stripped ahead of mining - source cart and respread topsoil		m^3	$2.55	**$0.00**	This includes sourcing, carting and spreading of a suitable volume of topsoil to cover the that have been disturbed
	Reshape, deep rip, ameliorate and seed highwall / internal access roads and tracks		Ha	$6,386.65	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass / tree seed and fertiliser
	Reshape, deep rip, ameliorate and seed exploration lines / areas		Ha	$4,726.12	**$0.00**	This item includes the area requiring the addition of ameliorates such as lime or gypsum prior to the application of grass / tree seed and fertiliser
	Clean water dams to be retained after mine closure -make safe and minor earthworks.		@	$2,554.66	**$0.00**	This item includes making the dam spillway, and walls stable and ensuring the integrity of the dam wall, etc.
	Dirty Water Dams (Drain and remove sediments to make dam clean water)		m^3	$4.09	**$0.00**	This item includes draining the dam and removing 500mm of potentially contaminated (saline) sediments to be buried in the pit. **UNIT RATE:** must consider the distance from the dam to the disposal area.
			Precinct Security Deposit		**$0.00**	
River & Creek Diversions	Creek diversion - Channel maintenance through spoil / backfill (20% of estimated diversion construction costs due to unknown in landform stability)		m	$383.20	**$0.00**	This item includes the length (m) requiring ongoing maintenance of diversions constructed through unconsolidated overburden. This will include earthworks repairs and stabilisation following flow events. It assumes a suitably qualified engineer has designed and signed off on construction of the diversion
	Creek diversion - Channel maintenance insitu (10% of estimated construction cost for diversion)		m	$191.60	**$0.00**	This item includes the length (m) requiring ongoing maintenance of diversions constructed through unnatural ground. This will include earthworks repairs and stabilisation following flow events. It assumes a suitably qualified engineer has designed and signed off on construction of the diversion
	Creek diversion - Vegetation maintenance		m^2	$0.38	**$0.00**	This item includes the ongoing maintenance of vegetation within the diversion channel & batters.
			Precinct Security Deposit		**$0.00**	
Other	Other 1 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 3 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
			Precinct Security Deposit		**$0.00**	

Total Security Deposit for the "Domain" $4,866.62

Domain 5: Other

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals Manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Management Precinct	Activity / Description	Quantity	Unit	Unit Price	Total Cost	Description / Notes:
Other (eg. site contamination, closure plan preparation, etc)	The restoration and care and maintenance of items that have historical significance and are to be retained after the cessation of mining		@	$25,546.58	**$0.00**	This item includes ensuring that sufficient resources are made available to restore items of heritage significance and also provide money to enable the ongoing care and maintenance of the structure (if not the responsibility of any another stakeholder i.e. council, historical society)
	Cap exploration holes		@	$319.33	**$0.00**	This includes capping & rehabilitation of all old Cap exploration holes around the site
	Construction / Deconstruction of Bridges and crossings			$0.00	**$0.00**	Value to be provided by company
	Construction of Fencing - general	1950	m	$63.87	**$124,539.60**	Includes general fencing around site or site works
	Other 5 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 6 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 7 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 8 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 9 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
	Other 10 <insert>				**$0.00**	This item includes **<<to be added by the operator>>**
				Precinct Security Deposit	**$124,539.60**	

Total Security Deposit for the "Domain" **$124,539.60**

Third Party Project Management & Contingencies

Detail of person filling out the Worksheet:

Name	James Wearne
Position	Group Approvals manager
Department	Environment
Date	22/10/2015

Legend:

	Item fixed no entry required
	Input from site optional (if information available)
	Input mandatory

Item	Activity / Description	Quantity	Unit	Cost	Total Cost	Description / Notes:
				Sub-Total (Domains)	**$543,050.76**	
Third Party Project Management	Mobilisation & Demobilisation (third party contractor rates apply).	1	@	$0.00	**$0.00**	Cost would have to be determined (justified) on the basis of the equipment required and the distance of the mine from the likely contractor to be used.
	DRE Tender Preparation and Assessment	1	@	$6,386.65	**$6,386.65**	Values provided in this cell are provided as a minimum, and should be assessed based on the size of the site, and works required.
	Development of Unplanned Closure Plan	1	@	$31,933.23	**$31,933.23**	Values provided in this cell are provided as a minimum, and should be assessed based on the size of the site, and works required.
	Post closure environmental monitoring	5%	%	$27,152.54	**$27,152.54**	% of the subtotal for all domains
	Project Management & Surveying	10%	%	$54,305.08	**$54,305.08**	% of the subtotal for all domains
	Indexation		@		**$0.00**	
	Other <insert>		@		**$0.00**	
	Other <insert>		@		**$0.00**	
				Sub-Total (Sundry Items)	**$119,777.49**	
				Sub-Total (Domain and Sundry Items)	**$662,828.25**	
Contingency	Contingency	10%	%	$662,828.25	**$66,282.83**	
				Precinct Security Deposit	**$729,111.08**	**exclusive of GST**

Sub-Total Rehabilitation Estimate for "Domains"	$543,050.76
Total Rehabilitation Estimate for "Sundry Items"	$119,777.49
Contingency (based on Sundry and Domains)	$66,282.83

NSW GOVERNMENT Resources & Energy

Justification for Change of Rates in Resources & Energy Rehabilitation Cost Calculation Tool

Domain	Activity	DRE unit/rate	Adopted Rates	Justification

In completing the R&E Rehabilitation Cost Calculation, we are seeking an adjustment to the rates currently utilised in the R&E Rehabilitation Cost Calculation Tool. A justification for the rate change by a third party has been included and I confirm that only the rates identified in the above table have been altered in the Rehabilitation Cost Calculation Tool.

General Manager ---------- **Signature** ---------- **Date** ----------

DRE Reporting Officer ---------- **Signature** ---------- **Date** ----------

Appendix 5 – Rehabilitation Photographs

Example of final landform shaping undertaken prior to planting

Forest to be planted on steep slopes

Example of woodland

Example of woodland with grasses

Existing forest and rehabilitation

Existing forest and rehabilitation

Appendix 6 – Landowner Consultation Notes

Wozniak Consultation 22 May 2015 - Rehabilitation Requirements.

Formal consultation has commenced in relation to the land form and rehabilitation of Wozniak owned land. The notes below and information included in Tables 1 and 2 summarise the key discussion points. Figure 1 is a diagrammatic representation of the discussion.

General:
Generally speaking, Mr and Mrs Wozniak wish to utilise the area currently leased by Centennial Charbon as they did before. This basically includes large fenced paddocks used for grazing sheep and cattle. No new or additional land use has been identified.

Land Use:
General points that were discussed include that the planting of trees and creation of grazing / pasture areas to follow, as far as practical, the pre-mining land characteristics. Additional to this, additional dams / waterholes have been requested and areas indicative of the locations identified in Figure 1 to assist with grazing / pasture.

In summary Mr and Mrs Wozniak request that:

- where possible planting etc. to follow original land characteristics;
- open areas to allow for pasture;
- understanding that steep areas will be planted with trees.

Fencing:
With the installation of the new fence along the ML boundary, some sections of the original fence have been cut and in some areas completely removed. There are also some remaining sections of the original fence that serve no purpose.

The old fence generally needs to be 'tidied up' in some areas. This will include removal of old / obsolete sections; disposal of old sections of fence that were removed and have been left on the property and tie off sections of fence that have been cut. F

urther, the new section of fence is long, and without the installation of additional gates, access into the area is limited (note some gates can be taken from the old fence and moved to the new fence). Six gates along this section of fence have been identified. Refer comments Table 2 and Figure 1.

Planting and Species Selection:

- Requested no 'Kangaroo Grass' in the areas identified for grazing / pasture.
- Trees to include hardwoods such as 'Red gum', 'Yellow Box' and 'Iron Bark'.

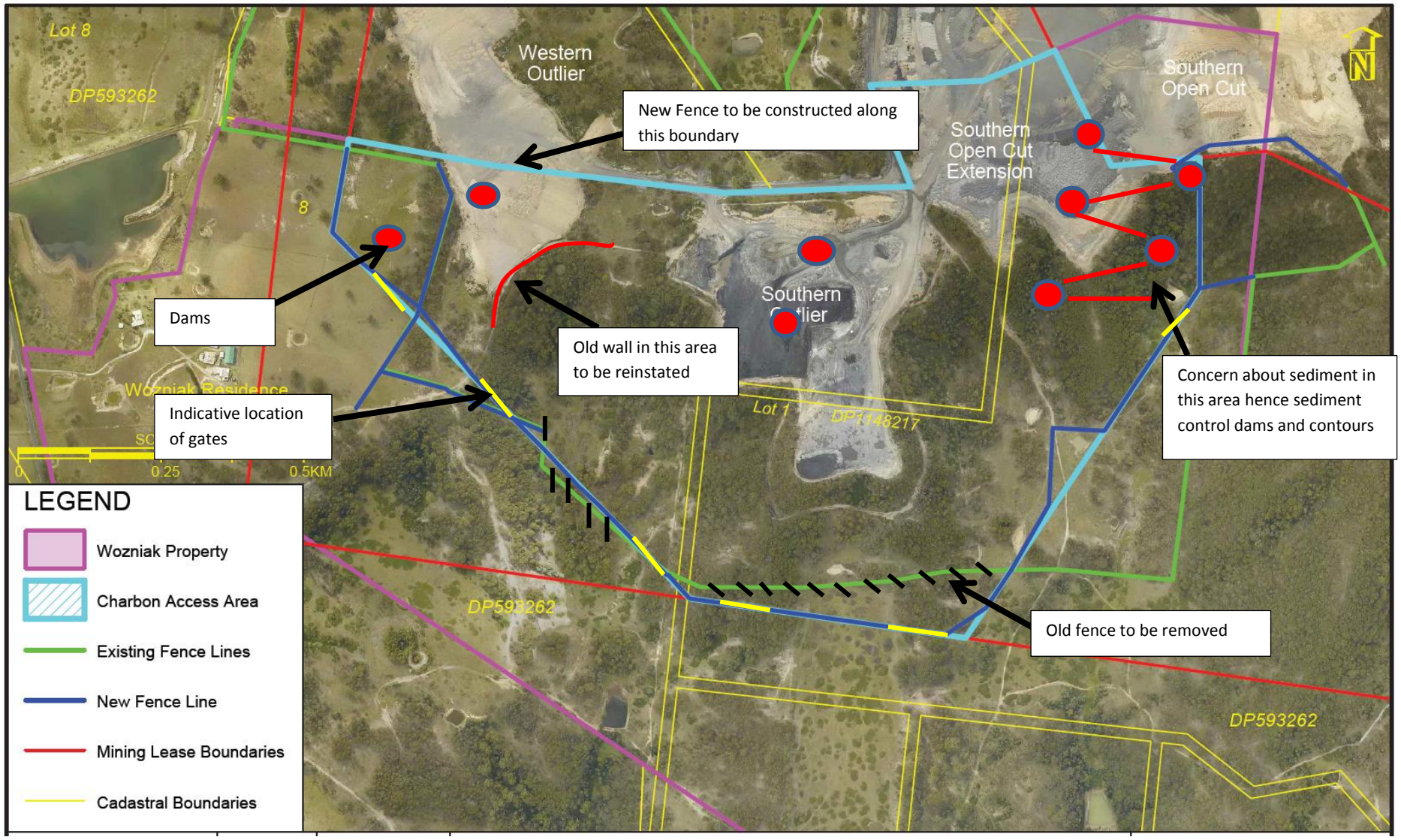
Refer to the following Tables and Figure.

Table 1: Comments re Rehabilitation and Landform

Area	Notes from Discussion / Landform and Rehab Requirements
Western Outlier	• Trees and pasture • Final Landform on the top of the Western Outlier to have flat section • Inclusion of dam in this section and dam at the bottom of the hill to the left of the mine area in the undisturbed pasture area • Reinstate stone wall in this area (unsure to exact location but understood to follow track)
Southern Outlier	• Trees and pasture • Dams
Southern Open Cut Extension	• Trees and pasture • Dams
Southern Open Cut	• Trees and pasture • Concerned about the amount of sediment coming from the Southern Open Cut and therefore request that sediment control dams and contours be placed in the area to prevent this from occurring into the future.

Table 2: Fencing

Area	Notes from Discussion / Fencing Requirements
Charbon Access Area Boundary	Boundary fence to be installed along Charbon Access Area (i.e. Charbon / Wozniak Property Boundary)
Mine Lease Boundary	Fencing along the ML boundary to remain
	Areas requiring clean up resulting from the fence installation along the ML boundary to be undertaken. This includes: • Removal of old fence. • Areas of fencing which have been cut to be tied to new fence or removed. • Some additional fencing required to join to other fence / make paddock. • Gates (five identified) to be installed along new fence to allow access into paddocks ➢ Indicative location and number of gates shown on Figure 1. ➢ Some gates in the old section of fence can be used.



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Conclusion:
While it is understood that some matters identified above may not be feasible, it is important that the general principles are considered and include where possible. Where elements are not feasible a justification will be required. This approach will assist in the subsequent phases of consultation.

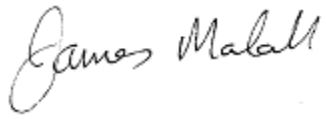
I understand that more detailed design of the rehabilitation plan can be made once DRE have issued their 240 Direction and when detailed landform, contours etc. are finalised.

The planting regime and rational for tube stock choices (i.e. acacias for quick growth, cover and land use stability) will also need to be justified.

Information required for the next phase(s) of consultation should include:

- Recommended land form and drainage.
- Timeframe for rehabilitation - commencement to completion.
- Staging of work.
- Planting, including species types, timeframe (seasonal) and justification.
- Feasibility, location and schedule of other works including dams, fencing.

Yours sincerely



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28 May 2015

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Centennial Coal

Rehabilitation Overview

Mr and Mrs Wozniak

"Eagle Vale"
477 Brogans Creek Road
CLANDULLA NSW 2848

Rehabilitation overview for the Wozniak property including landform, drainage, planting and timeframe.

1. Rehabilitation Planning and Management

As set out in the various agreements between Mr and Mrs Wozniak and Centennial Charbon, rehabilitation of the mine access area is required once mining is completed.

The last coal was mined on 14 August 2015 and rehabilitation is now to commence.

Rehabilitation means the restoration of the land to a sustainable end use, taking into account the following:

- altered landform as a result of mining activities,
- the surrounding vegetation and habitat,
- landholder requirements,
- Department and regulatory requirements.

The approach undertaken to date includes the following:

- Meeting with Mr and Mrs Wozniak on 22 May 2015 to discuss land use requirements. This information has been included in the final land form and drainage design.
- Meeting with DRE on19 June 2015 to discuss the s 240 notices for the property. These notices include the Stoney Creek Gully and the remainder of the property.
- Completion of a site wide (Charbon Colliery) risk assessment and risk assessment of the land owned by Mr and Mrs Wozniak
- Land and Soil Capability (LSC) Classification Definitions and calculation of these definitions on Mr and Mrs Wozniak's property to assist with rehabilitation (planting).

2. Desired Outcome:

The overall goals are to:

- Provide a final rehabilitation plan that reflects landholder consultation, desired end use, satisfies the s240 directions issued by DRE for the Stony Creek Gully and remainder of the Wozniak land.
- Minimise any identified risk that may prevent the successful rehabilitation of the Wozniak property.

3. Required Consultation / Stages:

Table 1 outlines the consultation requirement for the Wozniak property.

Table 1: Consultation Requirements

Task	Status
Landholder consultation to understand their expectations / areas of concern.	Completed 22 May 2015. Minutes attached (Appendix 1)
Minutes of the 22 May 2015 meeting to be considered against the final landform design and drainage design.	Landform Design completed GHD currently preparing the drainage plan
Rehab (planting) plan to be undertaken by SLR	Completed
Overlay final landform and rehab (planting) plan onto landholder consultation outcome (22 May minutes).	Commenced
Drainage plan to be completed to assist determine location of sediment control dams	Commenced
Consult with the landholder on proposed final landform, drainage and planting domains to support final land use. Planting domains will be labelled 'trees' and 'trees with grasses'. Document the outcome of this consultation.	Underway – scheduled for Thursday 17 September.
Prepare a final rehabilitation plan that shows specific detail in relation to landform and surface features, fencing / gates, dams, species selection and rationale. Include in this plan: • Landform and drainage • Dams, water courses and run-off contours • Location of fences and gates, • Species and rationale, • Sequence and timeframe for work • Land Management Plan.	Underway

4. How has the landform and soil capability been determined?

Centennial commissioned SLR to provide input into the planning for post mining land use. SLR have developed pre mining and post mining slope analysis which informs a post mining land capability plan on the final landform given that Land Capability Classification is the primary driver for post mining land use objectives. The slope analysis indicates that the Land and Soil Capability are:

- Class 6: a slope of < 10 – 32%
- Class 7: a slope of > 32 – 50%
- Class 8: a slope of > 50%.

The definitions of these classifications and their land use capability are set out in Table 2.

Table 2: Land and Soil Capability Scheme

LSC Class	General Definition	
Land capable of a limited set of land uses (grazing, forestry and nature conservation, some horticulture)		
6	Low capability land Very high limitations for high-impact land uses	Land 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.
Land generally incapable of agricultural land use (selective forestry and nature conservation)		
7	Very low capability land Severe limitations that restrict most land uses	Limitations generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations are not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability land	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.

Based on the Land and Soil Capability, a determination on the species mix to be utilised in the rehabilitation was made as follows:

- The land identified as Class 6 (having a limited capability for agriculture), was identified as land to be rehabilitated using a **woodland species** containing a mix of trees and grasses. This land, subject to careful management, will be suitable to low level grazing activities.
- Land identified as being Class 7 or 8 (having no agricultural land use), was identified as land to be rehabilitated using a **forest species** mix containing various native tree species.

A review of the pre-mining slope and land use was undertaken to compare the post mining land use to the pre-mining land use. The slope analysis and land use of the pre-mining landscape is shown in the attached figures. This review demonstrates that the proposed final landform and land use is not significantly different to pre-mining landform and land use (refer Table 3).

Table 3: Areas of Pre and Post Mining

Areas for Pre-mining land use		**Areas for Post-mining land**	
Type	**Area**	**Type**	**Area**
Forests	23.39 ha	Forests	11.40 ha
Open Woodland	19.82 ha	Open Woodland	31.81 ha
Total: 43.21		**Total: 43.21**	

Table 4 identifies the domains that will be created following rehabilitation for all of the mining disturbance area will comprise a mix of:

- Rehabilitation Area Woodland (comprising a mixture of native trees and grasses); and
- Rehabilitation Area Forest (comprising native trees).

Table 4: Rehabilitation Areas

Domain	**Rehabilitation Objectives**
Rehabilitation Area Woodland	• Final landforms are safe, stable, non-polluting and free-draining. • Erosion does not compromise the post mining land capability. • Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community • Weeds and feral animals do not pose a risk to rehabilitation success. • Vegetation meets the long term completion criteria being low maintenance and self sustaining.
Rehabilitation Area Forest	• Final landforms are safe, stable, non-polluting and free-draining. • Erosion does not compromise the post mining land capability. • Forrest rehabilitation areas species diversity is comparable to analogue native vegetation community • Weeds and feral animals do not pose a risk to rehabilitation success. • Vegetation meets the long term completion criteria being low maintenance and self sustaining.

5. Rehabilitation Phases

It is proposed that rehabilitation on your land will involve the following phases:

- Phase 1 – General Property Management
- Phase 2 – Landform Establishment
- Phase 3 – Growth Medium Development
- Phase 4 – Ecosystem and Land Use Establishment
- Phase 5 – Ecosystem and Land Use Sustainability
- Phase 6 – Relinquishment

A description of each of these rehabilitation phases is provided in Table 5.

Table 5: Description of Rehabilitation Phases

Phase	Description
General Property Management	Establishment of new fences and gates, removal of redundant fences and general property management.
Landform Establishment	The process of shaping unformed rock of other sub-stratum material into a desired land surface profile including final landform drainage features. This phase includes earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics.
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.
Ecosystem and Land Use 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.
Ecosystem and Land Use Sustainability	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.
Relinquishment	Completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

Table 6 lists the species mix for the rehabilitation. The justification for the species mix is as follows:

- Species proposed are local provenance with some seed collected locally and on site. Other seed is sourced within the district.

- Species commensurate with surrounding vegetation communities which will provide continuity of vegetation and habitat corridors.

- Species are suitable to local wildlife and provides appropriate habitat for species within the region.
- Species selected are suited to the local climatic conditions.
- Using local species will improve the likelihood of rehabilitation success.
- A cover crop is included within the species mix which is quick growing to provide soil stability and reduce erosion potential. Enhancing success of long term species to become established.
- The acacia species within the mix are nitrogen fixing which improves soil quality for other plant species used in the rehabilitation. The acacia have a life span of 15 years following which they will die off.

Table 6 - Rehabilitation Species Mix

Woodland Species	
Trees	**Pasture**
Acacia melanoxylon	Japanese millet (cover crop)
Eucalyptus albens	Couch
Eucalyptus blakelyi	Kikuyu
Eucalyptus melliodora	Wimmera Ryegrass
Eucalyptus macrorhyncha	Perennial Ryegrass
Eucalyptus punctate	Sub-Clover
Eucalyptus globoidea	Lucerne
	Green Panic
	Cocksfoot
Forest Species	
Trees	**Pasture**
cacia buxifolia	Japanese millet (cover crop)
Acacia clandullensis	Couch
Acacia dawsonii	Perennial Ryegrass
Acacia dealbata	Wimmera Ryegrass
Acacia decurrens	
Acacia falciformis	
Acacia filicifolia	
Acacia implexa	
Acacia melanoxylon	
Acacia obtusifolia	
Acacia terminalis	
Eucalyptus albens	
Eucalyptus blakelyi	
Eucalyptus bridgesiana	
Eucalyptus cannonii	

Trees	Pasture
Eucalyptus cypellocarpa	
Eucalyptus globoidea	
Eucalyptus macrorhyncha	
Eucalyptus mannifera	
Eucalyptus melliodora	
Eucalyptus parramattensis	
Eucalyptus pauciflora	
Eucalyptus polyanthemos	
Eucalyptus praecox	
Eucalyptus punctate	
Eucalyptus rossii	
Eucalyptus stellulata	
Eucalyptus viminalis	
Callitris endlicheri	
Callistemon linearis	
Callistemon pallidus	
Leptospermum continentale	
Melaleuca linarifolia	
Melaleuca styphelioides	
Cassinia arcuate	
Cassinia quinquenefavia	
Bursaria spinosa	
Hakea decurrens	
Brachychiton populensis	

Example of final landform shaping undertaken prior to planting

Forest to be planted on steep slopes

Example of woodland

Example of woodland with grasses

Existing forest and rehabilitation

Existing forest and rehabilitation