

# WAMBO COAL EROSION AND SEDIMENT CONTROL PLAN

Document No. WA-ENV-MP-509.3 November 2015



# **Document Control**

Document No.	WA-ENV-MP-509.3
Title	Erosion and Sediment Control Plan
General Description	Management of erosion and sediment impacts at WCPL
Document Owner	Environment & Community Manager

# Revisions

Rev No	Date	Description	Ву	Checked	Signature
0	June 2005	Original Draft	Gilbert & Associates Pty Ltd	JT/TS	
1	July 2005	Revised Draft	Gilbert & Associates Pty Ltd	JT/TS	
2	July 2005	Final Draft	Gilbert & Associates Pty Ltd	JT/TS	
3	February 2006	Management Plan Consolidation	WCPL	JT/JH	
4	August 2007	Management Plan Consolidation	Hansen Bailey	SW	
5	February 2010	Consent Modification	WCPL	SB	
6	September 2014	Revision 6	WCPL	TF	
7	October 2015	New management plan format and revision	WCPL/Palaris	SP	C.



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# 1.0 Introduction

### 1.1 Background

The Wambo Coal Mine (the Mine) is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (**Figure 1**). Wambo is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

A range of open cut and underground mine operations have been conducted at WCPL since mining operations commenced in 1969. Mining under the current Development Consent (DA 305-7-2003) commenced in 2004 and permits both open cut, underground operations and associated activities to be conducted.

The approved run-of-mine (ROM) coal production rate is 14.7 million tonnes per annum and all product coal is transported from WCPL by rail. A summary of the approved Wambo Coal Mine is provided in **Table 1**.

Component	Approved Wambo Coal Mine <sup>1</sup>
Life of Mine	21 years (from the date of the commencement of Development Consent [DA305-7-2003]). 1 <sup>st</sup> March 2025
Open Cut Mining	Open cut mining at a rate of up to 8 Mtpa of ROM coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams
	An estimated total open cut ROM coal reserve of 98 Mt
	Open cut mining operations under current approved MOP
Underground Mining	Underground mining of up to 7.5 Mtpa of ROM coal from the Whybrow, Wambo, Arrowfield and Bowfield Seams. Underground ROM coal reserves are estimated at 109.3 Mt.
Subsidence commitments and management.	The subsidence performance measures listed in Conditions 22 and 22A of the Development Consent (DA305-7-2003).
ROM Coal Production Rate	Up to 14.7 Mtpa of ROM coal
Total ROM Coal Mined	207.3 Mt
Waste Rock Management	Waste rock deposited in open cut voids and in waste rock emplacements adjacent open cut operations
Total Waste Rock	640 million bank cubic metres (Mbcm)
Coal Washing	Coal handling and preparation plant (CHPP) capable of processing approximately 1,800 tonnes per hour (tph)
Product Coal	Production of up to 11.3 Mtpa of thermal coal predominantly for export
CHPP Reject Management	Coarse rejects and tailings would be incorporated, encapsulated and/or capped within open cut voids in accordance with existing Wambo management practices
Total CHPP Rejects	Approximately 28.2 Mt of coarse rejects and approximately 18.6 Mt of tailings
Water Supply	Make-up water demand to be met from runoff recovered from tailings storage areas, operational areas, dewatering, licensed extraction from Wollombi Brook and Hunter River
Mining Tenements	Coal Lease (CL) 365, CL374, CL397, Consolidated Coal Lease (CCL) 743, Mining Lease (ML) 1402, ML1572, ML1594, Authorisation (A) 444, Exploration Licence (EL) 7211.

**Note:** <sup>1</sup> Development Consent DA305-7-2003 (as modified)





Figure 1: Wambo Coal Regional Location



In accordance with Schedule 4, Condition 30 of DA305-7-2003, WCPL are required to prepare a Site Water Management Plan (WMP). This Erosion and Sediment Control Plan (ESCP) is a component of the WCPL Site Water Management Plan. **Figure 2** shows the components of the WCPL Site Water Management Plan. This ESCP should be read in conjunction with the other components of the WCPL Site WCPL Site Water Management Plan, in particular the Surface Water Monitoring Program (SWMP) and the Surface and Ground Water Response Plan (SGWRP).



Figure 2: WCPL Site Water Management Plan

In accordance with WCPL's continuous improvement and review processes and Conditions 4 & 6, Schedule 6 of DA305-7-2003, a review of the ESCP has been undertaken to ensure that erosion and sediment impacts from the Mine are managed and minimised where possible.

# 1.2 Purpose

This ESCP has been developed to address the relevant requirements of relevant consent conditions and regulatory requirements. In accordance with Condition 32, Schedule 4 of DA305-7-2003, WCPL have prepared this ESCP to:

- Be consistent with the requirements of the Department of Housing's *Managing Urban Stormwater: Soils and Construction* manual;
- Identify activities that could cause soil erosion and generate sediment;
- Describe the location, function, and capacity of erosion and sediment control structures; and
- Describe measures to minimise soil erosion and the potential for the migration of sediments to downstream waters.

# 1.3 Scope

This ESCP applies to all surface disturbance activities undertaken within WCPL's mining authorisations and approved mining areas (**Figure 3**). This ESCP has been prepared to:

- Minimise erosion and sediment generation from disturbed areas;
- Maintain water quality in downstream water systems (primarily turbidity or sediment load, as indicated by Total Suspended Solids (TSS)); and
- Reduce the loss of valuable topsoil from land disturbed by mining activities.

This ESCP forms part of WCPL's Environmental Management System (EMS).





Figure 3: Approved Wambo Coal Mine Layout



# **1.4 Statutory Requirements**

This ESCP has been prepared to address the relevant Development Approval (DA) consent conditions within DA305-7-2003 and DA177-8-2004 (**Table 2**).

### 1.4.1 Environmental Planning & Assessment Act 1979

WCPL received Development Consent (DA305-7-2003) in accordance with the *Environmental Planning & Assessment Act 1979* (EP&A Act) from the NSW Department of Planning and Environment (DP&E), formerly NSW Department of Planning, on 4 February 2004. Conditions within DA305-7-2003 relevant to erosion and sediment control at the Mine are summarised in **Table 2**.

WCPL received Development Consent (DA177-8-2004) in accordance with the EP&A Act from the NSW DP&E on 16 December 2004. Conditions within DA177-8-2004 relevant to erosion and sediment control at the Mine are summarised in **Table 2**.

Schedule	Condition	Requirements	ESCP Section
		DA305-7-2003	
4	30	Before carrying out any development, the Applicant shall prepare a Site Water Management Plan for the development in consultation with DRE and NOW, and to the satisfaction of the Secretary. This plan must include:	This ESCP
		(d) an Erosion and Sediment Control Plan; By the end of October 2009, the Applicant shall revise the Site Water Management Plan in consultation with DII, DECCW, and NOW, and to the satisfaction of the Director-General.*	
4	32	The Erosion and Sediment Control Plan shall include:	
		(a) Be consistent with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual;	Section 3.1.1
		(b) Identify activities that could cause soil erosion and generate sediment;	Section 2.0
		(c) Describe the location, function, and capacity of erosion and sediment control structures; and	Section 3.1.2
		(d) Describe measures to minimise soil erosion and the potential for the migration of sediments to downstream waters.	Sections 3.0 and 4.0
6	3	Adaptive Management The Applicant must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 4.	Refer SGWRP
		Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.	
		Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:	

#### Table 2: Development Consent Requirements for the Erosion and Sediment Control Plan



Schedule	Condition	Requirements	ESCP Section
		<ul> <li>(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</li> <li>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</li> <li>(c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.</li> </ul>	
6	4	Management Plan Requirements The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data;	N/A to the
		<ul> <li>(b) a description of:</li> <li>the relevant statutory requirements (including any relevant consent, licence or lease conditions);</li> <li>any relevant limits or performance measures/criteria;</li> </ul>	ESCP Section 1.4 N/A to the
		- the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of the project or any management measures:	ESCP Section 3.8
		<ul> <li>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/ criteria;</li> </ul>	Section 3.0
		<ul> <li>(d) a program to monitor and report on the:</li> <li>impacts and environmental performance of the Wambo Mining Complex;</li> <li>effectiveness of any management measures (see c above);</li> </ul>	Sections 4.0 and 6.0
		<ul> <li>(e) a contingency plan to manage any unpredicted impacts and their consequences;</li> <li>(f) a program to investigate and implement ways to improve the environmental performance of the Wambo Mining Complex over time:</li> </ul>	Refer SGWRP Section 6.2
		<ul> <li>(g) a protocol for managing and reporting any:</li> <li>- incidents;</li> <li>- complaints;</li> </ul>	Section 6.4 Section 5.0
		- non-compliances with statutory requirements; and	Refer SGWRP
		<ul> <li>exceedances of the impact assessment criteria and/or performance criteria; and</li> <li>(h) a protocol for periodic review of the plan.</li> </ul>	Refer SGWRP Section 6.1
		DA177-8-2004	
4	17	Before carrying out any development, the Applicant shall prepare and implement a Soil and Water Management Plan for the development, to the satisfaction of the Director- General. This plan must include:	This ESCP
		(a) an Erosion and Sediment Control Plan that: - is consistent with the requirements of the Departments of Housing's Managing Urban Stormwater: Soils and Construction manual;	Section 3.1.1



Schedule	Condition	Requirements	ESCP Section
		<ul> <li>identifies activities that could cause soil erosion and generate sediment;</li> <li>describes the location, function and capacity of erosion and sediment control structures; and</li> <li>describes measures to minimise soil erosion and the potential for the migration of sediments to downstream waters;</li> </ul>	Section 2.0 Section 3.1.2 Section 3.0

\* In September 2009, DP&E granted WCPL an extension to the submission date to 30/4/2010 to allow for DII and EPA review and comment.

## **1.5 Stakeholder Consultation**

In accordance with Condition 30, Schedule 4 of DA 305-7-2003, this revision of the ESCP (Revision 7) has been undertaken in consultation with Department of Industry and Investment (formerly the Department of Primary Industries or DPI), Environment Protection Authority (formerly the Department of Environment, Climate Change and Water or DECCW) and NSW Office of Water (NOW), prior to submitting to the Secretary of the DP&E for approval.

This review of the ESCP (Revision 7) includes:

- Updating the format and layout of the ESCP, consistent with WCPL's current document management procedures and templates; and
- Including additional information to ensure the ESCP addresses Condition 4, Schedule 6 of DA305-7-2003.



# 2.0 Potential Sources and Impacts

Mining activities involve disturbance to the lands surface, which has the potential to result in erosion and sediment impacts to the surrounding natural environment. Erosion may result in increased sediment load in downstream drainage systems if appropriate control measures are not implemented. The potential sources and impacts of erosion and sedimentation are listed in **Table 3** below.

Table 3: Sources and Impacts of Erosion and Sedimentation				
Impact Source	Potential Impact	Controls		
Runoff from disturbed land	Pollution of clean water	Disturbance management, diversion drains, hay bales, rock structures, sediment fences, sediment dams.		
Inadequate vegetative cover to stabilise soil	Increased soil erosion on disturbed and rehabilitated areas	Disturbance management, progressive rehabilitation, diversion drains, hay bales, rock structures, sediment fences, sediment dams.		
Increased sedimentation of natural water systems and water bodies	Degradation of water quality (increased turbidity/TSS)	Diversion drains, hay bales, rock structures, sediment fences, sediment dams		
Altered water flows from deposition of sediment	Increased erosion and sedimentation downstream	Sediment fences, hay bales, in-stream rehabilitation and stabilisation works.		
Soil compaction for roads and other infrastructure	Increased runoff velocities and erosion of soils	Sediment fences, hay bales, diversion drains, infrastructure drainage design.		
Subsidence impacts	Ponding along natural water systems	Subsidence monitoring and rehabilitation, diversion drains, sediment dams.		
Surface cracking around subsidence areas causing increased erosion	Sediment-laden water entering natural water systems	Subsidence monitoring and rehabilitation, diversion drains, hay bales, rock structures, sediment fences, sediment dams		
Alteration of flow characteristics and velocities in natural water systems	Increased erosion to stream banks	Diversion drains, hay bales, rock structures, sediment fences, sediment dams, in-stream rehabilitation and stabilisation works.		
Changes in surface topography	Alteration of surface water flows	Diversion drains, contour drains, sediment fences, rock structures.		
Diversion of surface water flows	Increased erosion and sedimentation	Diversion drains, hay bales, rock structures, sediment fences, sediment dams.		



# 3.0 Erosion and Sediment Controls

### 3.1 Introduction

### 3.1.1 Principles

The following principles provide the foundation for this ESCP:

- Ensure erosion and sediment control measures are designed and constructed effectively;
- Minimise surface disturbance and restrict access to undisturbed areas;
- Progressively rehabilitate and stabilize disturbed areas;
- Maximise sediment retention onsite;
- Separate disturbed and undisturbed catchment runoff, where practicable;
- Minimise soil erosion where possible rather than applying down slope sediment controls;
- Utilise existing topography and adopt construction practices that minimise soil erosion and sediment discharge from the area;
- Integrate erosion and sediment control issues/measures into the planning phases of the mine operation;
- Choose the erosion and sediment control technique to account for site conditions such as soil, weather and construction conditions;
- Correct design of surface drains to facilitate the efficient transport of surface runoff (drains will generally be designed using trapezoidal or parabolic cross-sections);
- Construct sediment control structures, or utilize existing mine water storages, to contain runoff from disturbed areas;
- Maintain all erosion and sediment control measures in proper working order at all times; and
- Monitor the site and adjust erosion and sediment control practices to maintain the required performance standard.

The above principles take into account the general recommendations for site drainage works as specified in "Managing Urban Stormwater – Soils and Construction Volume 1" (Section of housing, 2004) and "Managing Urban Stormwater – Soils and Construction Volume 2E: Mines and Quarries" (DECCW, 2008) (Blue Book) as well as the International Erosion and Control Association (IECA) "Best Practice Erosion and Sediment Control Guidelines (IECA, 2008), as referenced in Peabody's Erosion and Sediment Control Guideline (October 2014).

In addition to these principles, activities will occur in the following order:

- Employees and contractors working on-site will complete a general site induction which will include details on erosion and sediment control and management;
- The operational manager (or delegate) will complete a Surface Disturbance Permit ( Appendix C) in consultation with the Wambo's Environmental Personnel;



- As part of the Surface Disturbance Permit process, the operational manager will identify and document the potential erosion and sediment issues in consultation with the Wambo's Environmental Personnel;
- Construction of diversion drains, sediment dams and other erosion and sediment control structures, will be undertaken in accordance with design criteria discussed in **Section 3.1.4** below, as required;
- Construction of berms, levees and catch drains to collect runoff from disturbed areas and divert water to sediment dams or other mine water storages, will be undertaken in accordance with **Section 3.5.3**, as required; and
- Construction or mining activities will not commence until erosion and sediment controls are in place.

### 3.1.2 Erosion and Sediment Control Matrix

The decision as to which combination of erosion and sediment control measures will be adopted lies with the Site Supervisor with input from onsite Environmental personnel. The decision is based on several factors including:

- Site topography;
- Material/soil/surface/strata type;
- Current disturbance category e.g.spoil, topsoil or peripheral lands (such as haul roads, exploration tracks etc);
- Site specific constraints e,g, proximity of a local water course;
- Length of time that the area will remain at this disturbance category;
- Overall purpose of implementing erosion and sediment control at a [particular location; and
- Applicability of the erosion and sediment control measure as per Figure 4.

**Figure 4** shows a matrix of land uses and erosion and sediment control measures developed to assist in determining which erosion and sediment control measure is applicable (Peabody, 2014). This tool for selecting appropriate erosion and sediment control measures is based on:

- The phase of the mine site (operational, non-operational or construction);
- Land use type (specific to the mining application), adjacent land usage/classification and proximity to watercourses;
- Level of priority in providing erosion and sediment control measures.

Where multiple erosion and sediment control measures can be applied to the same situation, the onsite Environmental personnel will be consulted.

### 3.1.3 Existing Erosion and Sediment Controls

**Figure 5** provides the locations of existing erosion and sediment control structures at the Mine. The purpose and storage capacity of the main sediment control structures on-site are provided in **Table 4**.



	 		d	Drainage Control					Erosion Control					Sediment Control												
Q	Phase (O = Operational; Non-operational; C=Construction)	C=Construction) Land use type	Land use type	Land use type	Land use type	Land use type	Land use type	ESC Priority (L= Iow, M = Medium, H = High, HH = to priority	Contour Banks	Check Dams	Grass	Cellular Confinement System	Rock Mattress	Rock Lining	Level Spreader	Rock Chutes	Cellular Confinement System	Compost Blanket	Mulching	Revegetation	Rock Mulch	Soil Binders	Check Dam Sediment Trap	Sediment Basin (QLD & NSW)	Buffer Zone	Sediment Fence
1	0	Spoil - Draining Externally	нн	~							~	~	~	~	~	~	~	~	~	~	~					
2	0	Spoil - Draining Internally	м	~	~						~			~				~	~		~					
3	0	Spoil Topsoiled (to be revegetated)	н	<	~									~	~		~	~	~	~	~					
4	0	Spoil Topsoiled, ripped and seeded	L	~	~	~												~	~	~	~					
5	0	Topsoil stripping area	м	~	~									~				~	~	~	~					
6	0	Topsoil Stockpiles	м	$\checkmark$	$\checkmark$	$\checkmark$							$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$					
7	0	Exploratory and access tracks	м	~	$\checkmark$	~	~			~		~		~	✓	✓	~	~		~	~					
8	0	Haul Roads	Н	~	$\checkmark$	<b>~</b>	~	$\checkmark$	~	$\checkmark$								$\checkmark$	~	$\checkmark$	~					
9	0	Industrial Areas	L	~	$\checkmark$	✓	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	✓	✓	$\checkmark$		$\checkmark$		$\checkmark$	$\checkmark$	~	$\checkmark$	$\checkmark$					
10	N	Exploration Activity	м	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			$\checkmark$			$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$		✓	$\checkmark$	$\checkmark$					
11	С	Land clearing (woody vegetation)	м	✓	~					~				~					~	~	~					
12	0	Drainage channels	HH	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	<b>~</b>	$\checkmark$	$\checkmark$	✓															
13	N	Licenced stream diversions / Levees	Н			~	~	~	~						~	~										
14	С	Construction / excavation work	м	~	$\checkmark$	~	~	~	~	~	~	~	~	~	~	~	~		~	~	~					

Figure 4: Erosion and Sediment Control Matrix (Peabody, 2014)





Figure 5: Wambo Coal Erosion and Sediment Control Structures



Site	Purpose	Approximate Storage Capacity (ML)
Wambo Admin Dam	Clean Water Storage/Sediment	305
	Control	
Eagles Nest Dam	Process Water	245
Gordon Below Franklin Dam	Sediment Control/Mine Water	82
	Management	
Gordon Below Franklin Sediment	Sediment Control	0.5
Control Structures (ROM Pad		
Catchment)		
C11 Area Dam	Sediment Control/ Mine Water	410
	Management	
Chitter Dam	Sediment Control/ Mine Water	988
	Management	
West Cut Sediment Dam (Wollemi	Sediment Control	0.05
pump out)		
NWU Sump	Sediment Control	0.35
Hunter Pit	Mine Water Management	800
Homestead Pit	Mine Water Management	521
Wollemi Box cut dam	Sediment Control	0.75
Wollombi Brook Sediment control	Sediment Control	0.06
structures (Hales Crossing)		(4x 0.015)
Wambo Rail Line Catchment	Sediment Control	Various
Dams		

#### Table 4: Wambo Coal Erosion and Sediment Control Structures

# 3.1.4 Design Criteria

In addition to the guidelines presented in the Blue Book, sediment control structures at Wambo are constructed in accordance with design criteria summarised in **Table 5**.

Control Structure	Function	Design Capacity
Upslope diversion	Divert clean water runoff	1 in 10 year critical duration rainfall event
drains	(undisturbed areas) away from	[Section 5.4.3(b)-(d)]
	disturbed areas	
Down slope	Intercept and convey disturbed	1 in 10 year critical duration rainfall event
collection drains	area runoff water to sediment	[Section 5.4.3(b)-(d)]
	dams	

 Table 5: Design Criteria for Erosion and Sediment Control structures



Control Structure	Function	Design Capacity			
Sediment dams/mine	Containment of sediment-laden	Settling Zone:	Sediment Storage		
water dams	runoff from disturbed areas	Capacity to store	Zone: Two months		
		the runoff produced	calculated soil loss		
		from	estimated using		
		the 80th percentile,	RUSLE* [Section		
		5- day rainfall event	6.3.4(i)(ii)		
		[Section 6.3.4(f)(i)]			
Sediment Fencing	Retention/filtration of suspended	Limit flow to < 50 L/s	in design 1 in 10		
	sediments from water runoff	year critical duration	rainfall event		
		(Section 6.3.7(e))			
Hay Bales	Retention/filtration of suspended	Limit flow to < 50 L/s	in design 1 in 10		
	sediments	year critical duration	rainfall event		
		(Section 6.3.7(e))			

# 3.2 Construction

For activities or projects not currently approved as part of existing operations, the requirement for a project specific ESCP will be identified during the planning phase. A project specific ESCP will be devised in consultation with Wambo's Environmental Personnel. A Surface Disturbance Permit will also be required (**Appendix C**). The project ESCP will:

- Be generally consistent with the requirements for an ESCP, as detailed in Peabody's Erosion and Sediment Control Guideline (October 2014);
- Consider the objectives of this ESCP;
- Incorporate the principles of this ESCP;
- Include potential erosion and sedimentation impacts and sources ; and
- Detail the controls proposed to control those impacts.

All sediment control structures will be constructed in accordance with the design criteria provided in **Table 5** and **Section 3.1.4** in consultation with Wambo's Environmental Personnel.

### 3.3 Operations

### 3.3.1 Infrastructure Areas

Wambo has implemented erosion and sediment control measures to capture sediment movement from infrastructure areas and ensure minimal impacts on surrounding water quality. Surface runoff from these areas is either captured by mine water management system or diverted through sediment control structures prior to leaving site.

### 3.3.2 Land Disturbance

In accordance with the erosion and sediment control principles outlined in **Section 3.1.1**, land disturbance at Wambo will be minimised, and limited to those areas outlined in the Wambo Open Cut Mining Operations Plan (MOP). Prior to any disturbance of land, a Surface



Disturbance Permit (SDP) must be completed by the operational manager (or delegate), in consultation with Wambo's Environmental Personnel (**Appendix D**). The SDP process identifies potential erosion and sediment risks associated with proposed disturbance projects, and requires appropriate erosion and sediment control measures to be implemented prior to disturbance commencing.

### 3.3.3 Land Rehabilitation

Progressive rehabilitation is an essential part of Wambo's erosion and sediment control strategy. Mining disturbed land (with altered topography, surface conditions and increased catchment sizes) represents a high potential for erosion and sediment impacts. The potential for erosion and sedimentation impacts decreases substantially as disturbed land is reshaped and revegetated as part of the land rehabilitation process. In order to minimise erosion and sedimentation impacts until the rehabilitated area is suitably stable, sediment control structures (such as contour drains, drop structures and sediment control ponds) will be designed and constructed in accordance with the design criteria provided in **Table 5** and **Section 3.1.4** and Peabody's Erosion and Sediment Control Guideline (October 2014).

## 3.4 Clean Water Diversion

Consistent with the principles provided in **Section 3.1.1**, runoff water from undisturbed catchments will be diverted around disturbed areas, where practical. Diversion drains will be suitably designed, grassed and (if required) protected with rock armouring, geotextile fabric, or similar. Water will be discharged downstream of the disturbed area into a suitable receiving environment. Drain outlets will be appropriately designed, in consultation with Wambo's Environmental Personnel.

# 3.5 Mine Water Management

Runoff from disturbed areas is generally captured in the mine-water management system for operational re-use on-site. Where potentially sediment-laden runoff is not captured by the mine-water management system, sediment control structures have been installed to intercept and capture sediment prior to leaving site. The mine-water management system, and suitable sediment control structures, are outlined in the following sections.

### 3.5.1 Mine Water Management System

The mine-water management system collects runoff from disturbed land (such as infrastructure areas and open cut mined areas) at Wambo and retains it in mine-water dams on-site for operational re-use. Mine-water passes through a series of drains and sediment control structures prior to discharge into these dams. These structures divert water and separate sediment, enabling water re-use on-site and maintaining dam capacity. Design criteria for mine water dams and sediment control structures are provided in **Section 3.1.4** and **Appendix D**.

### 3.5.2 Sediment Dams

Sediment dams will be constructed to capture sediment from runoff flowing through site drains and diversions prior to its onsite re-use, or discharge from site. Design criteria for these sediment dams are provided in **Section 3.1.4** and **Appendix D**.

### 3.5.3 Diversion Banks / Drains

Diversion drains are used to transport mine water around the mine-water management system, or divert clean water around disturbed catchments. Drains should be designed to transport required volumes of water in a safe and stable manner, without excessive erosion of the drain or receiving environments. This will largely be achieved by excavating an



appropriate cross-sectional drain area, but may also require additional protection such as vegetation cover, rock armouring or geotextile fabric, especially in the vicinity of drain outlets. Design criteria for diversion drains are provided in **Section 3.1.4** and **Appendix D**.

### 3.5.4 Sediment Fences

Sediment fencing is a temporary measure used to slow the velocity of sheet runoff, allowing coarse sediment to settle out and be captured by the fence, whilst allowing the runoff water to continue. Sediment fencing is generally used where flow is not concentrated such as stockpile sites or low gradient disturbance areas. Fences should not be excessive in length and multiple parallel fences may be required if a large catchment requires management. Design criteria for sediment fencing are provided in **Table 5** and **Appendix D**.

**Figure 6** below shows a sediment fence installed adjacent to the rail line. Water is diverted to this low lying area where it must filter through this sediment fencing prior to leaving site.



Figure 6: Example of Sediment Fencing

### 3.5.5 Hay Bales

Hay bales may also be used as a temporary sediment control measure. Hay bales are mainly used to decrease the velocity of water in areas of concentrated flow, such as drains or drainage lines. Hay bales should be installed at an appropriate interval (maximum 50 metres) to slow water velocity and reduce scouring. Hay bales will be secured in place with star pickets. Hay bales may also be used in conjunction with sediment fencing to further improve the efficiency of sediment control.

Figure 7 below shows a combination of hay bales and re seeding to reduce water flow and minimise scouring.





Figure 7: Hay Bales in Water Catch Drain

## 3.6 Topsoil Management

Topsoil will be stripped in accordance with the Wambo Coal Surface Disturbance Procedure. Erosion and sediment control measures, as identified in the completed SDP, will be implemented prior to topsoil removal.

Once topsoil is stripped, it will either be placed directly onto shaped overburden and seeded or will be stockpiled for later use. If stockpiling is required, stockpiles will be managed in accordance with the Topsoil Stockpile Management Procedure.

# 3.7 Surface Cracking Management

Regular monitoring of ground subsidence and associated surface cracking is undertaken in accordance with the requirements of the North Wambo Underground Subsidence Management Plan (SMP). Should surface cracking be identified as presenting a safety or environmental hazard (including erosion hazard), the area will be repaired and rehabilitated in accordance with SMP commitments. Sediment control measures may be required to minimise impacts until the area is suitably stabilised.

# 3.8 Performance Indicators

The performance indicators in **Table 6** will be used to assess the performance of the Mine against the predicted impacts.

Table 6: Performance Indicators						
Performance Indicator	Number					
Number of complaints received relating to erosion and sediment control	Nil					
Number of reportable environmental incidents relating to erosion and sediment control	Nil					

WCPL will report on progress against these performance indicators in the Annual Review (**Section 6.2**). In the event that a complaint is received relating to erosion and sediment control, it will be handled in accordance with the complaints management protocol (**Section 5.0**). Contingency plans for unpredicted erosion and sediment control impacts are discussed in the SGWRP.



# 4.0 Inspections, Monitoring and Maintenance

Sediment control structures will be inspected on a monthly basis, or following rainfall events  $\geq$  20 mm/day\* (midnight to midnight), as recorded by the Wambo Meteorological Station. If no rain is received for at least a 24 hour period, any subsequent rain event  $\geq$  20 mm/day will trigger a new inspection. The sediment control structures will be inspected for capacity, structural integrity and effectiveness by Wambo's Environmental Personnel.

Any overflow water from sediment control structures will be tested of for pH, EC and total suspended solids (TSS), and compared to water quality criteria provided in the Wambo Surface Water Monitoring Program (SWMP), to assess the effectiveness of the sediment control structures.

Details of inspections and monitoring results will be recorded on the erosion and sediment structure inspection sheet. Any required maintenance work will be scheduled following the inspection.

Wambo's Sediment Control Structure Inspection Checklist is included in Appendix E.



# 5.0 Community Complaint Response

All erosion and sediment control related community complaints received by WCPL will be recorded within the Community Complaints Register. The E&C Manager will investigate the complaint, which will include, where possible, contacting the complainant within 24 hours to discuss the complaint. A review of the effectiveness of the corrective or preventative actions will be conducted within a month of the complaint and the relevant work procedures updated if required.

Preliminary investigations will commence as soon as practicable upon receipt of a complaint to establish if WCPL is responsible. All efforts will be made to determine the likely causes contributing to the complainants concerns.

WCPL will attempt to address the complainants concerns such that a mutually acceptable outcome is achieved. However, if required, the Independent Dispute Resolution Process would be referred to (**Appendix B**).

Details of all community complaints will be included in the Monthly Environment Monitoring Report. WCPL will retain a copy of the Community Complaints Register for at least four years. The E&C Manager will ensure the latest Community Complaints Register is posted on the WCPL website.



# 6.0 Review and Reporting

### 6.1 Review

A complete review of the ESCP will occur:

- Every two years
- When there are changes to consent or licence conditions related to any aspect of this ESCP
- Where there are significant changes to erosion and sediment control structures, as illustrated in **Figure 5** or listed in **Table 4**
- Following significant erosion and sediment control related incidents at WCPL
- Following an independent environmental audit which requires ESCP review; or
- If there is a relevant change in technology, practice or legislation.

The revised ESCP will be re-submitted to the Secretary for approval as required by Condition 30, Schedule 4 of DA305-7-2003.

### 6.2 Annual Review

Prior to the end of March each year, WCPL will review the environmental performance of the Mine and submit an Annual Review report to the DP&E. This report will:

- Describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year
- Include a comprehensive review of the monitoring results and complaints records of the Project over the past year, which includes a comparison of these results against the:
  - Relevant statutory requirements, limits or performance measures/criteria
  - Monitoring results of previous years; and
  - Relevant predictions in the EA;
- Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance
- Identify any trends in the monitoring data over the life of the Project
- Identify any discrepancies between the predicted and actual impacts of the Project, and analyse the potential cause of any significant discrepancies; and
- Describe what measures will be implemented over the next year to improve the environmental performance of the Project.

# 6.3 Website Updates

A comprehensive summary of any monitoring results relevant to this ESCP will be made publicly available at WCPL website:

http://www.peabodyenergy.com/content/404/australia-mining/new-south-wales/wambo-mine)



Information on the website will be updated regularly as required by DA305-7-2003.

WCPL will also ensure that any information relevant to the management of erosion and sediment control is uploaded to the website (and kept up to date). This includes:

- Current statutory approvals
- Approved strategies, plans or programs required under the DA305-7-2003
- A community complaints register
- Minutes of Community Consultative Committee (CCC) meetings
- Annual Reviews
- A copy of any Independent Audits and WCPL's response to any recommendations in any audit; and
- Any other matter required by the Secretary.

## 6.4 Reportable Environmental Incidents

All reportable incidents will be reported via the EPA's Environmental Line on **131 555** by the E&C Manager in accordance with WCPL's Pollution Incident Response Management Plan (PIRMP).

In accordance with the PIRMP, WCPL must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of *Part 5.7* of the *POEO Act*.

For all other incidents that do not cause threatening material harm to the environment associated with the Project, WCPL will notify the Secretary and any other relevant agencies as soon as practicable after WCPL becomes aware of the incident.

Within 7 days of the date of the incident, WCPL will provide the Secretary and any relevant agencies with a detailed report on the incident to include:

- The cause, time and duration of the event
- Where possible the type, volume and concentration of every pollutant discharged as a result of the event
- The name, address and business hours telephone number of employees or agents of the licensee who witnessed the event
- The name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort
- Action taken by the licensee in relation to the event, including any follow-up contact with any complainants
- Implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary
- Details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
- Any other relevant matters.



# 7.0 RESPONSIBILITIES

**Table 7** below summarises responsibilities documented in the ESCP. Responsibilities may<br/>be delegated as required.

No	Task	Responsibility	Timing
1	Conduct environmental training for all contractors and site employees (as part of the site induction)	Site Training Coordinator (or delegate)	Pre start/then every two years.
2	Submit Disturbance Permit prior to disturbance in consultation with Environmental Advisor.	Operational Managers and supervisors	Prior to general construction/mining activities
3	Identify project specific potential erosion and sediment impacts	Environmental Advisor	Prior to general construction/mining activities
4	Facilitate the design and implementation of control measures described in this ESCP	Operational Managers/ Environmental Advisor	Prior to general construction/mining activities
5	Inspect sediment and erosion control structures	Environmental Advisor	Monthly, and following rainfall events ≥20mm/day
6	Maintain erosion and sediment control structures	Operational Managers	As required
7	Review ESCP in accordance with <b>Section 6.0</b> .	Environmental Advisor	As required under <b>Section 6.0</b> .
8	Notify government departments if an incident occurs in accordance with <b>Section 6.4</b>	E&C Manager	As required
9	Submit updated ESCP to DP&E.	E&C Manager	As required
10	Erosion and sediment control related complaints to be responded to in accordance with <b>Section 5.0</b>	E&C Manager	As required
11	Annual Review to include relevant monitoring results, complaints, mitigation measures undertaken and a review of the monitoring undertaken	E&C Manager	Annually
12	Regulator review to be undertaken of the ESCP	E&C Manager	As required
13	Prepare investigation reports and implementation of corrective actions in accordance with <b>Section 6.4</b>	E&C Manager	As required

Table	7: Erosion	and Sedimer	nt Control Plar	Responsibilities



# 8.0 References

- Development Consent (DA305-7-2003)
- Development Consent (DA177-8-2004)
- Wambo Development Project Environmental Impact Statement (EIS), July 2003
- Resource Strategies Pty Ltd (2003) Wambo Coal Mine Project Environmental Impact Statement. Report prepared for Wambo Coal Pty Ltd
- Wambo Environment Protection Licence (529)
- Environmental Planning and Assessment Act 1979
- Environment Protection and Biodiversity Conservation Act 1999
- Barclay Mowlem Construction Limited (2005) Soil and Water Quality Management Plan Wambo Coal Rail Construction Project.
- DECCW NSW (2008) Managing Urban Stormwater Soils and Construction Volume 2E. Mines and Quarries. NSW Government, Parramatta, March.
- Landcom (2004) Managing Urban Stormwater Soils and Construction Volume 1. 4th ed., NSW Government, Parramatta, March.
- Peabody Energy Australia (2014), Erosion and Sediment Control Guideline. October 2014, Version 1.
- Resource Strategies (2003) Wambo Development Project Environmental Impact Statement, prepared for Wambo Coal Pty Limited.
- Resource Strategies (2006a) Modification Statement of Environmental Effects, prepared for Wambo Coal Pty Limited.
- Resource Strategies (2006b) North Wambo Underground Subsidence Management Plan, prepared for Wambo Coal Pty Limited.

# APPENDIX A CORRESPONDENCE WITH REGULATORY AUTHORITIES



Contact: Scott Brooks Phone: 6575 3401 Fax: 6575 3415 Email: scott.brooks@planning.nsw.gv.au Our ref: 305-7-2003

The General Manager Wambo Mine PMB 1 SINGLETON NSW 2330

Attention: Steve Peart

Dear Steve

#### Wambo Coal – Approval of Water Management Plan

Thank you for forwarding the Wambo Water Management Plan and all its parts as required under project approval DA 305-7-2003 for the Department's consideration.

The Water Management Plan is required by Condition 30 Schedule 4 and the following 5 components of the Plan were reviewed:

Site Water Balance (30) Erosion and Sediment Control Plan (32) Surface Water Monitoring Program (33) Ground Water Monitoring Program (34) Surface and Ground Water Response Plan (35).

The Department has reviewed these plans, and is satisfied that they generally address the requirements set out in the relevant conditions of the project approval. Consequently, I would like to advise you that the Secretary has approved the plans.

These plans come into force on the 30<sup>th</sup> November 2015 and remains in force until replaced by any future updated approved Plans.

I am aware that DPI Water are expected to comment on the Extraction Plan for the South Bates U/G (Wybrow seam) LW 11-13. Should this comment require significant changes to any component of the Water Management Plan, I ask if these changes could be made and the plans resubmitted for review and approval.

Could you please forward finalised copies of the above plan (preferably in PDF format with a copy of this approval letter appended) for the Department's records by the end of November 2015.

If you require further information or clarification in this matter please contact Scott Brooks on 6575 3401 or by email to scott.brooks@planning.nsw.gov.au.

Yours sincerely

Scott Brooks Investigations (Lead), Compliance 27 - 17 - 2015 As Nominee for the Secretary, Planning & Environment

# APPENDIX B INDEPENDENT DISPUTE RESOLUTION PROCESS

# **Independent Dispute Resolution Process**



# APPENDIX C WAMBO COAL SURFACE DISTURBANCE PERMIT





# Surface Disturbance Permit

#### SDP Number: (Env. Services only)

# Section 1 - Area of Operations Open Cut Underground CHPP Wambo General Other

ambo General	Other
	(e.g. RWEP Areas)

# Section 2 – SDP Proponent

Job Coordinator / Proponent: (Name & Signature)		
Proponent's Manager: (Name & Signature)		
Area Manager (The Manger for the area of operation where the works will be underfaken): (Name & Signature)		
Project Name/ Type / Description & Location:		
How long will the project take (including any rehabilitation works)	Start Date:	End Date:
Plan or Map Attached: (If available, please provide Environmental Personnel with electronic data)		
GIS Coordinates (Provide Coordinates for disturbance)	E:	N:

# Section 4 – Environment and Approvals

(to be completed by Environmental Personnel)

is the proposed activity within Wambo Land Ownership and Property Boundaries:	Yes/ No
Have all the required project approvals been obtained for proposed activity. (If yes please attached to this SDP)	Yes/ No
Does the proposed activity require approval from government departments?	Yes/ No
is the proposed activity consistent with Wambo's:	
Land Management Practices	Yes/ No
Mining Tenements	Yes/ No
<ul> <li>Development Consent (DA305-7-2003 &amp;DA177-8-2004)</li> </ul>	Yes/ No
EPA Licence Premise Boundary (EPL 529):	Yes/ No
<ul> <li>Mining Operations Plan Limits:</li> </ul>	Yes/ No

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<ul> <li>Relevant Environmental Management Plans: E.g. Flora &amp; Fauna Management Plan (FFMP), Erosion and Sediment Control Management Plan (ESCP)</li> </ul>	Yes/ No
Has a site inspection been completed by Environmental Personnel (if Yes please add comments/findings at the end of this section):	Yes/ No
Flora/fauna restriction (described within EMP, Licence or Development Consent) E.g. All proposed activities with WCPL RWEP Areas must be in accordance with WCPL Flora & Foun Management Plan	Yes/ No
Is a pre-clearance flora and fauna survey required? (If yes, please attach to this document).	Yes/ No
Have all likely drainage impacts been identified? An appropriate erosion and sediment control pian must be supplied	Yes/ No
Are there any monitoring sites within the area (eg. blast, groundwater, surface water, dust, noise, flora/fauna, Aboriginal and European heritage)	Yes/ No
Is the proposed activity within a Rehabilitated area (If Yes, the Rehabilitation specialist is to be notified):	Yes/ No
Are there any Services (electricity easements, pipelines, etc.):	Yes/ No
Are there likely to be dust impacts:	Yes/ No
Are there likely to be noise impacts:	Yes/ No
Are there other known issues such as lighting:	Yes/ No
Will fencing or pegging be required:	Yes/ No
Has the WCPL Archaeological database been consulted	Yes/No
Will the proposed activity be within 40m of a riparian zone? No disturbance shall be allowed within 40m from the top of the upper bank of a defined Creek line, stream or defined natural water course, unless otherwise authorised by a Peabody Wambo Coal Environmental representative –	Yes/No

#### General

#### Comments/ Conditions

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comments/ Conditions	

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# Section 5 – SDP Approval

This SDP is valid until:			
	Name:	Signature:	Date:
Job Coordinator / Proponent:			
Environmental Personnel			
Environment & Community Manager	Troy Favell		

### Section 6- SDP Completion (to be completed by the Proponent)

Works associated with this SDP were completed on:

Project Coordinator/Advocate:	Name:	Signature:	Date:	
(Please return a signed copy of the completed SDP to Environmental Services)				

### Section 7-SDP Compliance Report

During Project (the project may be audited against conditions detailed within this SDP)			
SDP compliance Inspection undertaken By: (Name & Role)		Date:	

Project Completion (at the end of the project a compliance inspection may be undertaken)			
	Name:	Signature:	Date:
The Final SDP Compliance Report Completed:			

Please attach any additional SDP Compliance Inspection documentation (e.g photos) to this document.

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Section 8 - Figure

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Section 8 - Attach Pre - clearance survey here (if required as part of the SDP application)

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#### Surface Disturbance Procedure

#### Purpose

The purpose of this procedure is to detail the environmental controls that need to be addressed prior to any surface disturbance being permitted on:

- Wambo owned land.
- United owned land covered by Wambo's mining lease.
- Privately owned land where the disturbance is subject to agreement with the landowner.

Surface disturbance includes:

- Felling trees on undisturbed or rehabilitated land.
- Pushing up or removing topsoil on any land whether undisturbed or rehabilitated.
- Dumping over any undisturbed or rehabilitated land.
- Construction of any earthworks across undisturbed or rehabilitated land.

Surface disturbance does not include the following:

- Maintenance of existing infrastructure.
- Maintenance of bushfire trails.
- Maintenance of drains.
- Maintenance of garden and car park areas.
- Maintenance of clearance for existing powerlines.
- Activities on un-rehabilitated previously disturbed areas.

This procedure will be a checklist of items that need some management to ensure that minimal environmental impact will occur from mining or disturbance on site. Further detail on the background to this procedure can be obtained from the Environmental Management Plans that have been developed by Wambo.

#### Areas to be Addressed

The person managing the task needs to ensure each of the following areas is addressed and adequate controls are put in place. This will assist in the processing of the permit.

While the person managing this disturbance is responsible for addressing each of these areas, the Environmental Department is available to provide assistance and advice.

Application can be made for a staged approach to the disturbance. However, surface disturbance should not occur more than 6 months prior to the area being required.

#### Area Description

The area to be disturbed needs to be delineated. The level of delineation needs to be proportional to the environmental risk. Survey controls needs to be placed in the field and a plan of the proposed disturbed area has to be attached to the checklist. A copy of the plan must be held in the office for audit purposes and a copy has to

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be provided to the personnel undertaking the work in the field. This should reduce the potential for disturbance to be carried out in a non approved area. Should any disturbance occur outside of the approved area, an incident form and corresponding investigation will be required.

#### Statutory Regulrements

All statutory requirements need to be met. This should include reference to MOP boundaries, DC boundaries, lease and authorisation conditions, land ownership, management plans. If required, relevant government agencies need to be notified. For example DPI and DoP must be notified of exploration activities in EL's.

#### Pre Disturbance Flora and Fauna Assessments

No disturbance of RWEP Areas can proceed until consultation with appropriate government authority has been undertaken (refer to FFMP). Flora and fauna assessment is required prior to any disturbance. The level of the assessment required will be determined after initial investigations of the area that needs to be disturbed are undertaken. These assessments may be comprehensive and may need to be undertaken by external consultants. Consequently, there may be a number of weeks between an application to disturb being lodged and an approval to disturb being granted.

During pre-disturbance surveys, habitat trees and seed collection trees may be identified. These trees will be handled differently to the normal clearing process. Habitat trees potentially house native fauna and also provide a source of habitat features (hollows) which have to be collected for use on rehabilitated surfaces. Seed collection trees provide a source of seed for natural rehabilitation.

The area should be cleared initially of all vegetation except for the habitat trees. Once the non habitat vegetation has been cleared and removed from the area, the habitat trees should be felled. They should be left where they fall. At that time, recovery of features such as hollows should commence. After the hollows have been recovered, the remaining parts of the habitat trees can be treated as normal vegetation and pushed up with the other material. These surveys may identify threatened flora and fauna species, which will need to be managed and may restrict disturbance to certain months of the year.

#### Archaeological and European Heritage Assessment

Archaeological and European Heritage surveys were completed during EIS development. Aboriginal artefacts have been salvaged for all areas of the open cut in the five year MOP foot print. However, mining or disturbance outside those areas cannot begin until the possible artefact recovery has been completed. There are requirements for handling European Heritage items prior to any disturbance taking place. As with the pre-disturbance flora and fauna surveys, these steps will add time to the process and can be in the order of 3 months.

### Water Management and Erosion and Sedimentation Control

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Once the area is cleared, any rain / water that comes in contact with or is captured in the area must be treated. Generally, the water falling into the pit cannot leave site.

Plans will be developed to manage erosion and sediment control, surface water and groundwater. The water management strategy for this area will be discussed with Wambo personnel to ensure they fit with site water management plans.

### Topsoll Removal

The MOP defines topsoil stripping depths. All topsoil must be recovered for Wambo to accomplish rehabilitation to the agreed standards. Thus, every endeavour should be made to ensure that topsoil is recovered. Direction should be obtained from Wambo as to where the topsoil, once moved, should be placed. Preference should be given to placing topsoil on areas available for rehabilitation. Topsoil depths will be determined at the time of removal.

#### Nolse

Noise management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by considering location of neighbours, reducing the area disturbed, managing tree cover near the disturbed area and disturbing areas at an appropriate time during the day / year. A strategy to manage noise must be developed.

#### Dust Generation

Dust management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by reducing the area disturbed, managing tree cover near the disturbed area, disturbing areas at an appropriate time during the year and under favourable weather conditions, and utilising water carts as appropriate. A strategy to manage dust must be developed.

#### Lighting

Light management is important as Wambo have neighbours that are particularly sensitive to this type of intrusion into their lives. This can be accomplished by clearing during daylight hours only. A strategy to manage lighting must be developed.

#### Other Issues

Other issues may need to be considered as part of the disturbance work that are outside the scope and purpose of this checklist. These may include but not limited to power lines, pipe lines, underground services and working on steep grades. Approval of this documentation does not negate the requirement to complete other work permits if applicable. Should there be any potential for underground services to be impacted by the work being done, a "Permit to Dig" may need to be established.

### Rehabilitation of Disturbed Areas

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All disturbed areas of the mine have to be rehabilitated. Depending on the area there may be considerable time between disturbance and rehabilitation. When and how the rehabilitation is to be performed needs to be addressed.

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**APPENDIX D** 

# **USE AND DESIGN OF SEDIMENT CONTROL STRUCTURES**

### **Diversion Banks and Drains**

The purpose of diversion structures is to intercept water runoff (either clean or mine water) and to divert it at low velocities either around disturbed land or into sediment control\ structures for treatment. To minimise the level of erosion, the velocity of runoff water can be reduced by implementing controls such as hay bales and rock structures which are described below.

Design and dimensions of diversion banks and drains in relation to slope are shown below.



Figure C-1 Diversion Bank and Drain Design Dimensions

### **Sediment Dams**

There are two types of sediment dams, those that are for temporary use (less than 6 months), and those that are larger and expected to be used for a longer period of time.

Small, temporary sediment dams are used to capture water and sediment runoff from disturbed areas to allow the sediment to settle and the clean water to evaporate or released from the system. These temporary dams are constructed to treat runoff water from rehabilitation or disturbed land for sediment until vegetation establishes.

Typical design is shown below.



Figure C-2 Temporary Sediment Dam Design

Larger, long term sediment dams are used to intercept sediment laden runoff. The sediment is retained in the dam while the water is allowed to be released from a pipe outlet wrapped in the same geotextile fabric used for sediment fencing.

The typical design is shown below.



Figure C-3 Large, Long Term Sediment Dam Design\*

### **Sediment Fences**

Sediment fences are used to intercept sheet flow runoff from disturbed areas containing sediment. Sheet flow is flow which is parallel to the sediment fence, not hitting the fence directly. Green geotextile fabric made specifically for sediment fencing is pegged at least every 3 m and the bottom of the cloth is buried 150 mm into the ground. Black geotextile fabric is a weed mat, and is not an effective sediment control. Green textile fabric is designed to capture the sediment in runoff, but allow the clean water through the fabric at a rate which will not destroy the sediment structure.

Design is shown below.



Figure C-4 Sediment Fence Design

### Hay Bales and Rock Structures

Hay bales and rock structures are used on drainage lines or upstream of other controls (such as sediment dams), and often in conjunction with sediment fences to minimise erosion. Hay bales are used in areas where a temporary form of control is required until vegetation establishes to provide natural erosion and sediment control.

The typical design is shown below.



Figure C-5 Use of Hay Bales in Diversion Drain

Rock structures can also be used in areas where temporary control is required, but can also be used as a permanent erosion and sediment control. The rocks receive the initial force of the flow and disperse it, slowing down the flow and therefore minimising the erosion potential, similar to the hay bales. Rock structures can be used in two ways, one is at the outlet of pipes or culverts where the rocks are simply placed under and around the outlet, and the other is in a kind of embankment wrapped in geotextile fabric at intervals to slow the flow further.

Designs are shown below.



Figure C-6 Rock Structure as an Embankment\*



Figure C-7 Rock Structure at the Outlet of Pipe

\*Referenced from Environment ACT, Erosion and Sediment Control During Land Development, Canberra, 1998.

# **APPENDIX E**

# SEDIMENT CONTROL STRUCTURE INSPECTION CHECKLIST



# Wambo Coal Sediment Control Structure Inspection Checklist

Rainfall in last 24 hrs\*:

Date of Inspection:

\*During consecutive days of rain, a new inspection is only required after 48 hours of no rain following the first

Site	Purpose	Has the structure been inspected?	Inspected by (initial)	Comments/ Remedial works required
Wambo Admin	Clean Water	Y/N		
Dam	Storage/Sediment	.,		
	Control			
Eagles Nest Dam	Process Water	Y/N		
Gordon Below	Sediment Control/Mine	Y/N		
Franklin	Water Management			
Dam				
C11 Area Dam	Sediment Control/Mine	Y/N		
	Water Management			
	(decommissioning			
	commenced 2009)			
West Cut Dam	Sediment Control/Mine	Y/N		
	Water Management			
	(decommissioning			
	commenced 2009)			
West Cut	Sediment Control	Y/N		
Sedimentation Dam				
(Wollemi Pump				
Out)				
NWU Sump	Sediment Control	Y/N		
Hunter Pit	Mine Water			
	Management			
Homestead Pit	Mine Water			
	Management			
Wollemi Box Cut	Sediment Control			
Dam				
Wollombi Brook	Sediment Control			
Sediment control				
structures (Hales				
Crossing)				
Wambo Rail Line Catchment Dams	Sediment Control			
Western Drain	Sediment Control			
Wombat Drain	Sediment Control			
Kangaroo Drain	Sediment Control			
Milk Can Drain	Sediment Control			
North Wambo				
Creek Diversion				
South DAM	Mine Water Management	Y/N		
Chitter Dam	Mine Water Management	Y/N		

Name	Signed	Date