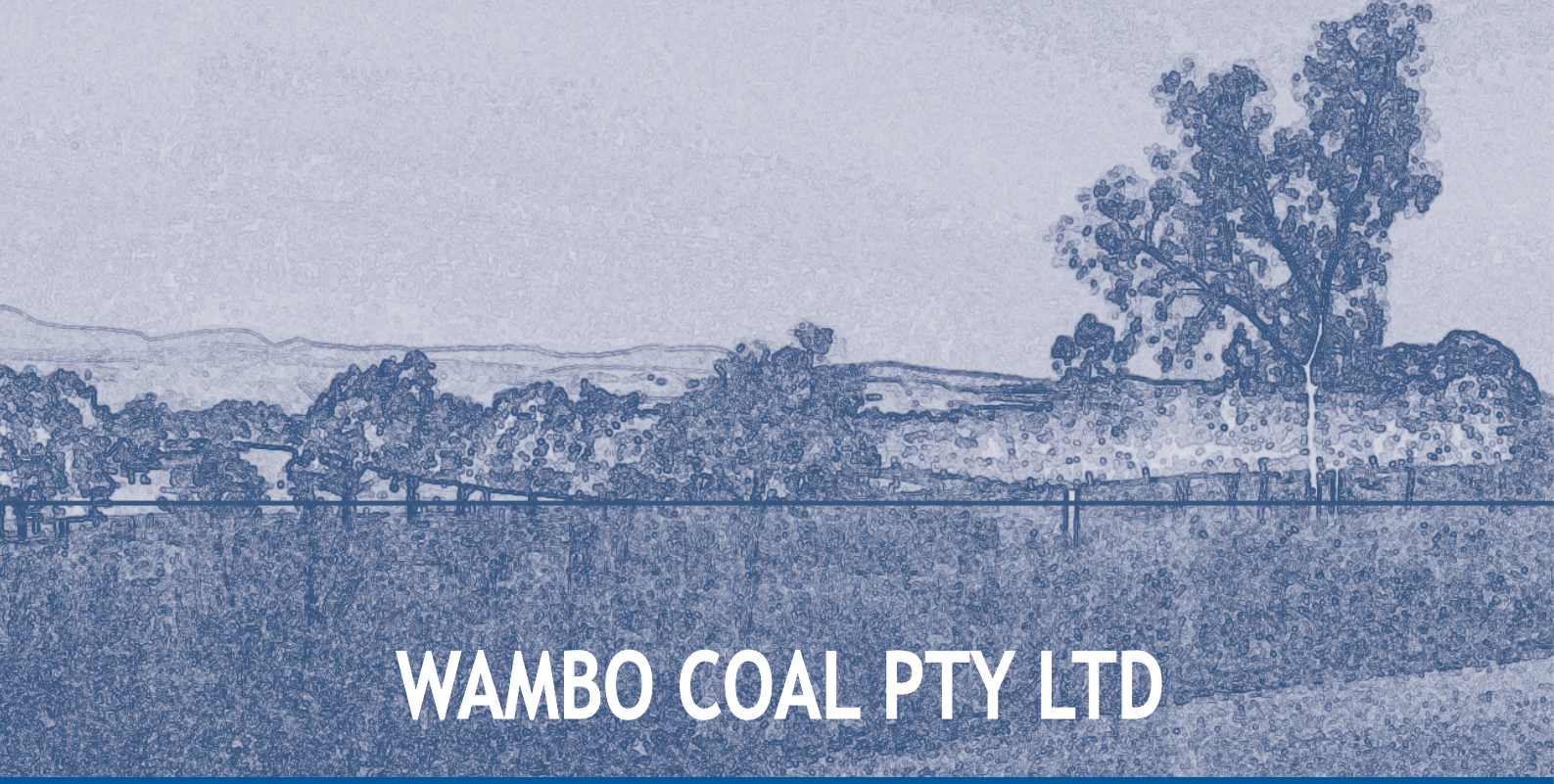


WAMBO COAL PTY LTD

NORTH WAMBO UNDERGROUND MINE

EXTRACTION PLAN
LONGWALLS 8 TO 10A

APPENDIX B
LAND MANAGEMENT PLAN

Peabody ENERGY

WAMBO COAL PTY LTD
NORTH WAMBO UNDERGROUND MINE

LAND MANAGEMENT PLAN
LONGWALLS 8 - 10A

PREPARED BY
WAMBO COAL PTY LTD AND
RESOURCE STRATEGIES PTY LTD

APRIL 2015
Project No. WAM-09-15
Document No. 00645227

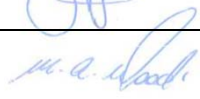
DOCUMENT CONTROL

Document No.	LMP LW8-10A
Title	Land Management Plan for North Wambo Underground Mine Longwalls 8 – 10A
General Description	Management of potential subsidence effects, subsidence impacts and environmental consequences on land in general for mining of Longwalls 8 to 10A at the North Wambo Underground Mine
Key Support Documents	Wambo Coal Erosion and Sediment Control Plan

Revisions

Rev No	Date	Description	By	Checked
A	November 2012	Original Draft	WCPL and Resource Strategies	-
B	December 2012	Final for Submission	WCPL and Resource Strategies	T. Favell
C	February 2014	Revised to include Longwalls 9 and 10	WCPL and Resource Strategies	T. Favell
D	June 2014	Revised to Address DRE-ESU Comments	WCPL and Resource Strategies	T. Favell
E	April 2015	Revised to include Longwall 10A	WCPL and Resource Strategies	P. Jaeger

Approvals

	Name	Position	Signed	Date
Originator	T. Favell	Environment and Community Manager		10/04/2015
Checked	T. Britten	Technical Services Manager		10/04/2015
Confirmed	M. Wood	NWU Manager of Mining Engineering		10/04/2015

The nominated Coordinator for this document is	Environment and Community Manager

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1 INTRODUCTION

The Wambo Coal Mine is an open cut and underground coal mining operation located approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (NSW). The Wambo Coal Mine is owned and operated by Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited.

The North Wambo Underground Mine is a component of the approved Wambo Coal Mine. The North Wambo Underground Mine commenced in 2005 and involves extraction of coal by longwall mining methods from the Wambo Seam within Mining Lease (ML) 1402, ML 1594, Coal Lease 397 and Consolidated Coal Lease 743 (**Figure 1**).

The potential environmental impacts of the existing Wambo Coal Mine were assessed in the *Wambo Development Project Environmental Impact Statement* (the Wambo Development Project EIS) (WCPL, 2003). Development Consent DA 305-7-2003 for the Wambo Coal Mine was granted on 4 February 2004 by the then NSW Minister for Urban Affairs and Planning under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979*.

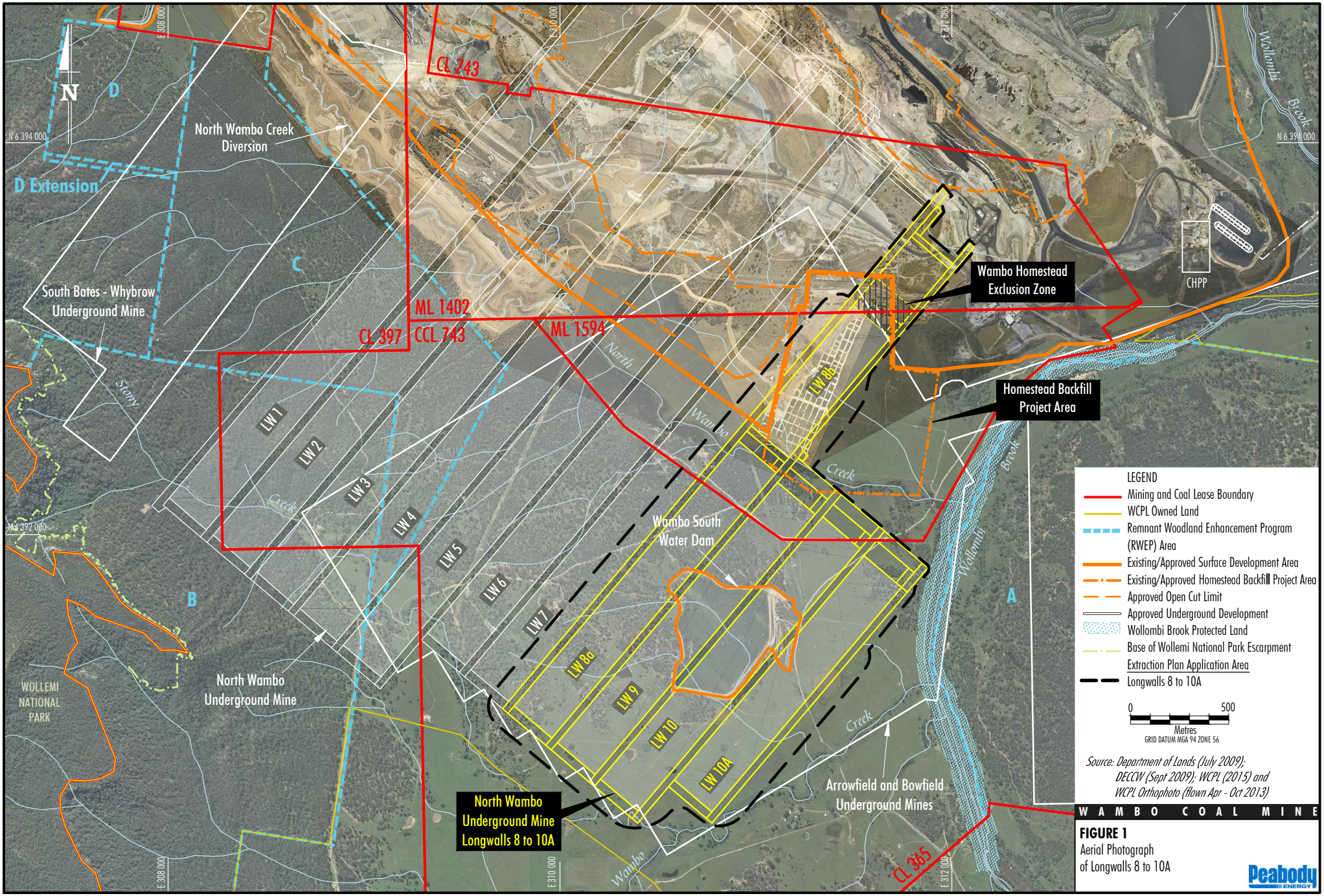
An application to modify the Development Consent (DA 305-7-2003 MOD 2) was lodged in January 2005 to facilitate the re-orientation of the North Wambo Underground Mine longwall panels and allow access to the Wambo Seam via the open cut highwall and was approved on 4 May 2005. The application was accompanied by the *Wambo Development Project – Wambo Seam Underground Mine Modification Statement of Environmental Effects* (North Wambo SEE) (WCPL, 2005).

A subsequent application to modify the Development Consent (DA 305-7-2003 MOD 13) was lodged in December 2012 to allow an extension to the approved North Wambo Underground Mine to include two additional longwalls (Longwalls 9 and 10) and was approved on 8 July 2013. The application was accompanied by the *North Wambo Underground Mine Modification Environmental Assessment* (North Wambo Modification EA) (WCPL, 2012).

An application to modify the Development Consent (DA 305-7-2003 MOD 14) was lodged in September 2014 to allow a minor extension to the approved North Wambo Underground Mine to include an additional longwall (Longwall 10A). The application was accompanied by the *North Wambo Underground Mine Longwall 10A Modification Environmental Assessment* (North Wambo Longwall 10A Modification EA) (WCPL, 2014).

A Subsidence Management Plan (SMP) for Longwalls 1 to 6 at the North Wambo Underground Mine (WCPL, 2006) was approved by the NSW Department of Primary Industries – Mineral Resources on 11 December 2006. An Extraction Plan for Longwalls 7 and 8 was approved by the NSW Department of Planning and Infrastructure (DP&I) for Longwall 7 on 16 May 2013 and for Longwall 8 on 24 September 2013. Subsequently, a revised Extraction Plan for Longwalls 7 to 10 was approved by the Department of Planning and Environment (DP&E) on 4 July 2014.

The approved Extraction Plan for Longwalls 7 to 10 has been revised to include the remaining longwall within the North Wambo Underground Mine extent (Longwall 10A) for a consolidated Extraction Plan for Longwalls 8 to 10A (**Figure 1**).



WAMBO COAL MINE

FIGURE 1
Aerial Photograph
of Longwalls 8 to 10A

Peabody ENERGY

WAM-09-15_EP LW8-10A_LMP_101B

1.1 PURPOSE AND SCOPE

Purpose: This Land Management Plan for Longwalls 8 to 10A (LMP) outlines the management of potential environmental consequences of the proposed secondary workings described in the Extraction Plan on land in general.

Scope: This LMP covers land in general within the Longwalls 8 to 10A Application Area (**Figure 1**).

This LMP has been prepared in accordance with Condition 22C(h) of Schedule 4 of the Development Consent (DA 305-7-2003) as a component of the North Wambo Underground Mine Longwalls 8 to 10A Extraction Plan.

Management plan requirements applicable to the preparation of this LMP, and where each of these requirements is addressed within this LMP, are summarised in **Table 1**.

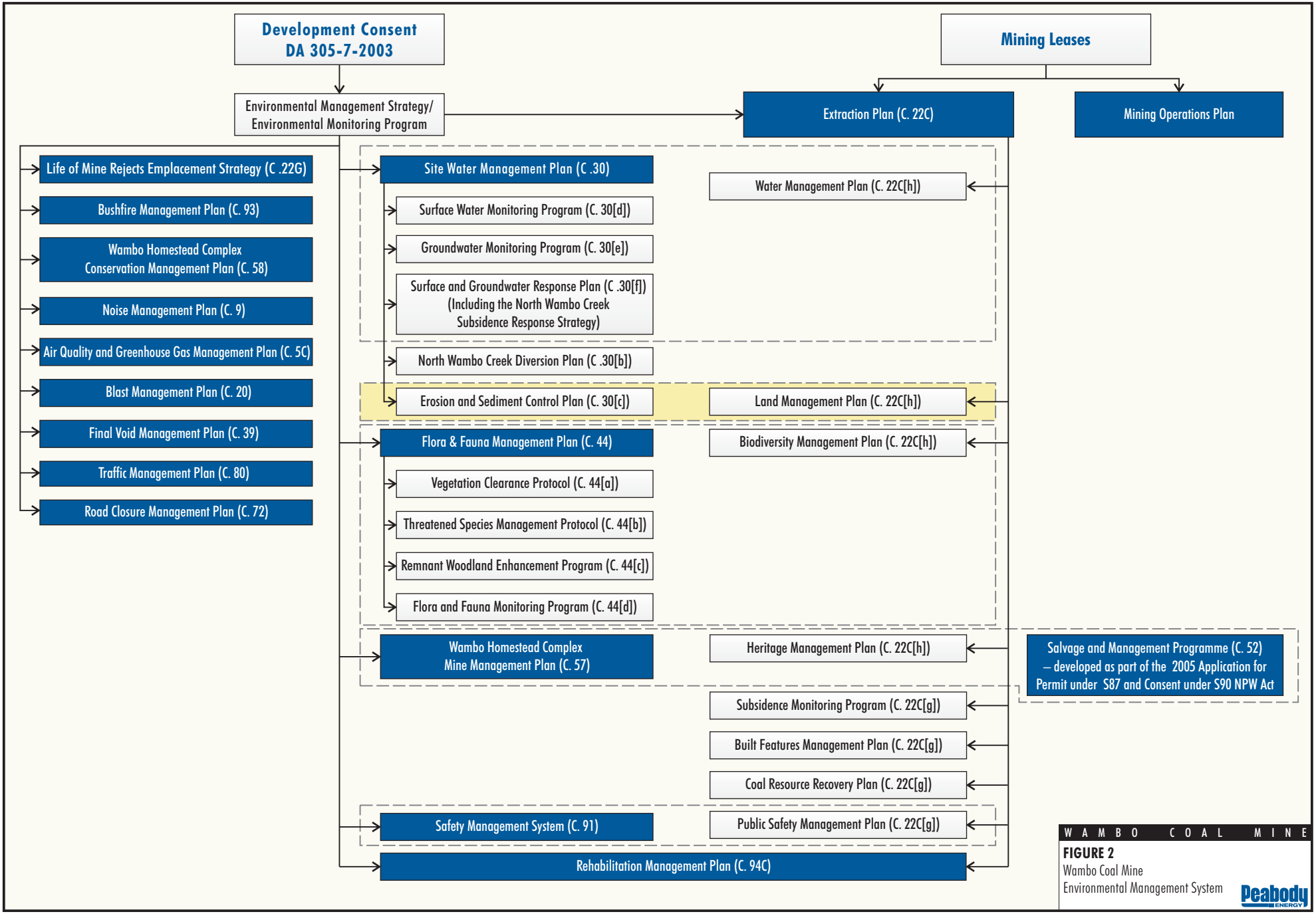
This LMP has been prepared by WCPL, with assistance from Resource Strategies. The appointment of the team of suitably qualified and experienced experts (which includes representatives from WCPL and Resource Strategies) have been endorsed by the Secretary of the DP&E.

Table 1
Land Management Plan Requirements

Development Consent (DA 305-7-2003) Condition	LMP Section
Condition 22C(h) of Schedule 4	
22C. The Applicant shall prepare and implement an Extraction Plan for the second workings within each seam to be mined to the satisfaction of the Secretary. Each Extraction Plan must:	
...	
(h) include a:	
...	
• *Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;*	Management of potential impacts and/or environmental consequences on land in general are addressed in **Table 2** and **Section 5**.
...	
Condition 22D of Schedule 4	
22D. The Applicant shall ensure that the management plans required under condition 22C(h) above include:	
(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this consent;	Addressed in **Section 3**.
(b) a detailed description of the measures that would be implemented to remediate predicted impacts; and	Addressed in **Table 2** and **Section 5**.
(c) a contingency plan that expressly provides for adaptive management.	Addressed in **Section 7**.

1.2 STRUCTURE OF THE LAND MANAGEMENT PLAN

This LMP forms part of WCPL's Environmental Management System for the Wambo Coal Mine. The relationship of this LMP to the Wambo Coal Mine Environmental Management System is shown on **Figure 2**.



WAMBO COAL MINE

FIGURE 2
Wambo Coal Mine
Environmental Management System

Peabody ENERGY

WAM-09-15_EP LW 8-10A_Land MP_001A

The Longwalls 8 to 10A Application Area is located wholly within WCPL-owned land. No privately held land or public roads are located within the Longwalls 8 to 10A Application Area and therefore this LMP applies to WCPL-owned land only. A right-of-way access arrangement in favour of several private properties across WCPL-owned land is situated within the Longwalls 8 to 10A Application Area.

To avoid duplication of existing Environmental Management Plans this LMP references components of the existing Wambo Coal Mine Erosion and Sediment Control Plan (ESCP). The sections of the ESCP relevant to the LMP are summarised in **Table 2**. The ESCP is included as **Attachment 2**.

If the ESCP is revised separately in accordance with the Development Consent (DA 305-7-2003) **Attachment 2** of this LMP will be updated with the most recent ESCP.

Table 2
Erosion and Sediment Control Plan - Reference Summary

LMP Component	ESCP Reference	Section Description
Management Measures	Section 4.1.1 - Principles	Section 4.1.1 of the ESCP describes the principles for erosion and sediment control at the Wambo Coal Mine.
	Section 4.1.2 - Existing Erosion and Sediment Controls	Section 4.1.2 of the ESCP describes the existing erosion and sediment controls in place at the Wambo Coal Mine.
	Section 4.1.3 - Design Criteria	Section 4.1.3 of the ESCP describes the design criteria for existing/future erosion and sediment control structures at the Wambo Coal Mine.
	Section 4.5.4 - Sediment Fences	Sediment fencing is a temporary management measure used where flow is not concentrated such as for low gradient disturbance areas. If required, sediment fencing will be installed in accordance with Section 4.5.4 of the ESCP.
	Section 4.5.5 - Hay Bales	Hay bales are a temporary sediment control measure used to decrease the velocity of water in areas of concentrated flow. If required, hay bales will be installed in accordance with Section 4.5.5 of the ESCP.
Monitoring	Section 5 - Inspections, Monitoring and Maintenance	Section 5 of the ESCP describes the inspection, maintenance and monitoring of erosion and sediment controls at the Wambo Coal Mine.
Responsibilities[1]	Section 7 – Responsibilities	This section summarises the ESCP responsibilities and timing of ESCP tasks.

[1] Not a specific requirement of this LMP under Condition 22C(h) of Schedule 4 of the Development Consent (DA 305-7-2003).

An overview of the main text sections and attachments of this LMP is presented below:

Section 1 Provides an introduction to the LMP, including the purpose and scope of the LMP and the context of the LMP in relation to WCPL's Environmental Management System for the Wambo Coal Mine.

Section 2 Discusses performance measures listed in the Development Consent (DA 305-7-2003).

Section 3 Summarises the predicted subsidence impacts and environmental consequences resulting from the extraction of Longwalls 8 to 10A.

Section 4 Describes the monitoring program that will be implemented.

Section 5 Describes the management measures that will be implemented.

Section 6 Describes how monitoring data will be used to assess environmental consequences on land in general due to the extraction of Longwalls 8 to 10A.

Section 7 Provides a Contingency Plan to manage any unpredicted impacts and their consequences.

Section 8 Summaries the roles and responsibilities of this LMP.

Section 9 Lists the documents referred to in **Sections 1 to 8** of this LMP.

Attachment 1 Provides a Trigger Action Response Plan (TARP) for this LMP which is a simple and transparent snapshot of the monitoring of environmental performance and where required the implementation of management and/or contingency measures.

Attachment 2 Provides a copy of the existing ESCP.

2 PERFORMANCE MEASURES

This LMP has been developed to manage the potential environmental consequences of the proposed secondary workings described in the Extraction Plan on land in general in accordance with Condition 22C(h) of Schedule 4 of the Development Consent (DA 305-7-2003).

In accordance with Condition 22 and 22A of Schedule 4 of the Development Consent (DA 305-7-2003), WCPL must ensure that there is no exceedance of the performance measures listed in Tables 14A and 14B of Schedule 4 of the Development Consent (DA 305-7-2003).

No performance measures listed in Tables 14A and 14B of Schedule 4 of the Development Consent (DA 305-7-2003) specifically relate to land in general. The performance measures specified in Tables 14A and 14B of Schedule 4 of the Development Consent (DA 305-7-2003) relating to the Wollemi National Park and associated escarpment are addressed in the Biodiversity Management Plan for Longwalls 8 to 10A.

3 PREDICTED SUBSIDENCE IMPACTS AND ENVIRONMENTAL CONSEQUENCES

3.1 LAND USE

The Wambo Coal Mine is located in the Upper Hunter Valley region where landforms are characterised by gently sloping floodplains associated with the Hunter River and the undulating foothills, ridges and escarpments of the Mount Royal Range and Great Dividing Range.

Land use in the vicinity of the Wambo Coal Mine is characterised by a combination of coal mining operations, agricultural land uses and the village of Warkworth. WCPL owned lands that are not subject to mining operations are utilised for the agistment of stock (WCPL, 2003).

The Longwalls 8 to 10A Application Area is wholly located on WCPL-owned land and land uses include cleared grazing land (rain-fed unimproved pasture) and patches of remnant native woodland.

Potential impacts on agricultural activities within the Longwalls 8 to 10A Application Area include:

- possible injury to persons undertaking agricultural activities;
- possible injury to livestock caused by surface cracking;
- loss of integrity of stock fences; and
- loss of water storage of small farm dams through tilting or surface cracking.

In regard to the potential impacts of subsidence on the land surface, Section 4.2.2 of the Wambo Development Project EIS (WCPL, 2003) stated:

> *Subsidence may result in surface cracking, increased erosion potential and the potential for ponding in areas where isolated depressions form. These impacts have been observed to occur in the existing underground mining areas at the Wambo Coal Mine. Where subsidence occurs within, or adjacent to, an existing flood plain it may result in an increase in the depth and duration of inundation during flood events*.

In addition, in relation to subsidence induced surface cracking, Section 4.2.2 of the Wambo Development Project EIS (WCPL, 2003) stated:

> *As subsidence occurs surface cracking may develop above the extracted longwall panels. Surface cracking would primarily occur across each panel (during extraction of the coal) and along the sides of each panel (after extraction of the coal). The cracks that occur across the panel would be temporary in nature and would be expected to close as the longwall extraction progresses. The cracks along the sides of the longwall panels would be expected to remain until such time as they in-fill due to natural processes (e.g. sedimentation) or are manually infilled (e.g. with soil or mulch material).*
>
> *… The greatest extent of cracking would be expected to occur over the shallower underground workings (i.e. Whybrow and Wambo Seams).*

Further, in relation to subsidence induced ponding, Section 4.2.2 of the Wambo Development Project EIS (WCPL, 2003) stated:

> *Subsidence would alter existing surface drainage patterns to some extent, which may result in areas of isolated ponding. Based on maximum subsidence predictions, isolated ponding would potentially occur in low-lying areas within the flood plains of the creeks crossing the Project underground mining areas (i.e. North Wambo, Wambo and Stony Creeks).*

In regard to the potential impacts of subsidence on the land surface, Section 3.1.1 of the North Wambo SEE stated:

> *The likely impacts on the land surface remains as discussed in the Wambo Development Project Subsidence Assessment (Holt, 2003).*

Section 4.3.2 of the North Wambo Longwall 10A Modification EA concluded:

> *Frazier et al. (2010) found no significant effect of longwall mining subsidence on agricultural production, including cattle grazing, in the Hunter Valley region. Given the above, there is a low potential for impact to agricultural productivity in the Modification area.*

As described in Section 2.1 of the Extraction Plan, the magnitude of the revised tilt and strain predictions for Longwalls 8 to 10A are generally consistent with those presented in the Wambo Development Project EIS, North Wambo SEE, North Wambo Modification EA and North Wambo Longwall 10A Modification EA.

Potential subsidence impacts to the land in general are predicted to include surface cracking, erosion, changes in stream bed gradients, depressurisation of groundwater aquifers and ponding (Ditton Geotechnical Services [DgS], 2012; Mine Subsidence Engineering Consultants [MSEC], 2014a; MSEC, 2014b).

Surface cracking above the previously extracted longwalls at the North Wambo Underground Mine has been typically in the order of 25 mm to 50 mm, with surface cracks in some locations greater than 150 mm (MSEC, 2014b). Similar incidence of surface cracking is anticipated above Longwalls 8 to 10A.

Longwall mining is expected to cause increased ponding above Longwalls 8 to 10A (MSEC, 2014b). Potential ponding is dependent on a number of factors, including rainfall, catchment sizes, surface water runoff, permeation and evaporation and, therefore, the actual extents and depths of ponding are expected to be smaller than the topographical depressions. The maximum depth of topographical depressions in the extent of subsidence from of Longwalls 8 to 10A is expected to be approximately 2 m.

3.2 LAND CAPABILITY

Land capability within the Longwalls 8 to 10A Application Area includes Class IV, V and VI. Class IV to VI land is considered land suitable for grazing.

Class IV land is defined as (Wambo Mining Corporation [WMC], 2000):

> *Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation with soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal cultivation for the establishment or reestablishment of permanent pasture.*

Class V land is defined as (WMC, 2000):

> *Land not capable of being regularly cultivated but suitable for grazing with occasional cultivation and structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class IV.*

Class VI land is defined as (WMC, 2000):

> *Land not capable of being regularly cultivated but suitable for grazing with soil conservation practices including limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. This class may require some structural works.*

No long-term impacts on land capability are expected to result from the extraction of Longwalls 8 to 10A.

3.3 SURFACE WATER

The Wambo Coal Mine is situated adjacent to Wollombi Brook, south-west of its confluence with the Hunter River. The majority of land within WCPL mining tenements drains via Wambo Creek (also known as South Wambo Creek), Stony Creek, North Wambo Creek and Redbank Creek to Wollombi Brook, while Waterfall Creek drains directly to the Hunter River.

Wambo South Water Dam situated directly above Longwalls 9 and 10 would be drained prior to directly mining beneath the dam.

Subsidence resulting from the extraction of Longwalls 8 to 10A has the potential to impact on surface water resources. A detailed description of potential impacts on surface water resources and the relevant mitigation and management measures is provided in the Water Management Plan for Longwalls 8 to 10A.

3.4 STEEP SLOPES

The surface topography overlying the Longwalls 8 to 10A Application Area is gently to moderately undulated, with slope angles less than 18 degrees (°) (i.e. no natural steep slopes occur within the Longwalls 8 to 10A Application Area with the exception of localised areas around the creek banks and walls of the farm dams and water storage dam) (DgS, 2012; MSEC, 2014a; MSEC, 2014b).

Potential impacts on steep slopes associated with the Wollemi National Park escarpment resulting from the extraction of Longwalls 8 to 10A and the relevant mitigation and management measures are provided in the Biodiversity Management Plan for Longwalls 8 to 10A.

4 MONITORING

A monitoring program will be implemented to monitor the impacts and environmental performance of Longwalls 8 to 10A on land in general. Key components of the monitoring program are summarised in **Table 3**.

Details of any subsidence impacts observed will be recorded in the Subsidence Impact Register and relevant assessment forms as provided in Attachment 2 of the Subsidence Monitoring Program for Longwalls 8 to 10A. The Subsidence Impact Register will be maintained as an electronic spreadsheet on-site, with hard copies of assessment forms filed in a folder. The Subsidence Impact Register is discussed further in the Subsidence Monitoring Program for Longwalls 8 to 10A.

Table 3
Land Management Plan Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
Pre-Mining			
Visual inspection of stock fences.	Initial condition of fences.	Prior to secondary extraction of Longwalls 8 to 10A.	Mine Surveyor
Visual assessment of ground surface.	Initial condition of ground surface.	Prior to secondary extraction of Longwalls 8 to 10A.	Underground Mine Engineer
During Mining			
Longwalls 8 to 10A subsidence monitoring lines as described in the Subsidence Monitoring Program.	Monitoring parameters include: • subsidence; • tilt; • tensile strain; • compressive strain; and • absolute horizontal translation.	Monitoring during secondary extraction of Longwalls 8 to 10A in accordance with the Subsidence Monitoring Program.	Mine Surveyor
Visual inspection of the ground surface behind the longwall face.	Surface cracks and/or potholes.	Monthly inspections during secondary extraction of Longwalls 8 to 10A, increased to weekly inspections during extraction of Longwall 8b.	Underground Mine Engineer

Table 3 (Continued)
Land Management Plan Monitoring Program Overview

Monitoring Component	Parameter	Timing/Frequency	Responsibility
***Pre-Mining* (Cont.)**			
Visual inspection of low lying areas.	Surface ponding.	Monthly inspections during secondary extraction of Longwalls 8 to 10A and/or following a significant rainfall event (i.e. 20 mm within 24 hours, midnight to midnight).	Underground Mine Engineer
Visual inspection of farm dams.	Monitoring parameters include: • condition of embankment; • freeboard; • evidence of erosion; and • general safety.	Prior to secondary extraction within 100 m of any WCPL asset and undertaken at 50 m intervals until the active mining face is 100 m past the WCPL asset.	Infrastructure Coordinator
Post-Mining			
Visual inspection of stock fences.	Condition of fences following extraction of Longwalls 8 to 10A.	Following completion of secondary extraction of Longwalls 8 to 10A.	Mine Surveyor

5 MANAGEMENT MEASURES

A number of potential management measures are available to mitigate/remediate subsidence impacts on land in general resulting from the extraction of Longwalls 8 to 10A. The requirement and methodology for any subsidence remediation techniques will be determined in consideration of:

- Potential impacts of the unmitigated impact, including potential risks to public safety and the potential for self-healing or long-term degradation.
- Potential impacts of the remediation technique, including site accessibility.

If surface crack remediation works are required in remnant vegetation areas, compact mobile equipment will be utilised, where practicable, to minimise damage to surrounding vegetation. If the remediation work requires clearing of remnant vegetation to an extent that would exceed the benefit of the remediation, the requirement for remediation will be revised. Vegetation that requires clearance will be subject to the Vegetation Clearance Protocol (refer to the Biodiversity Management Plan for Longwalls 8 to 10A).

The key management measures are summarised in **Table 4**.

Table 4
Land Management Plan Key Management Measures

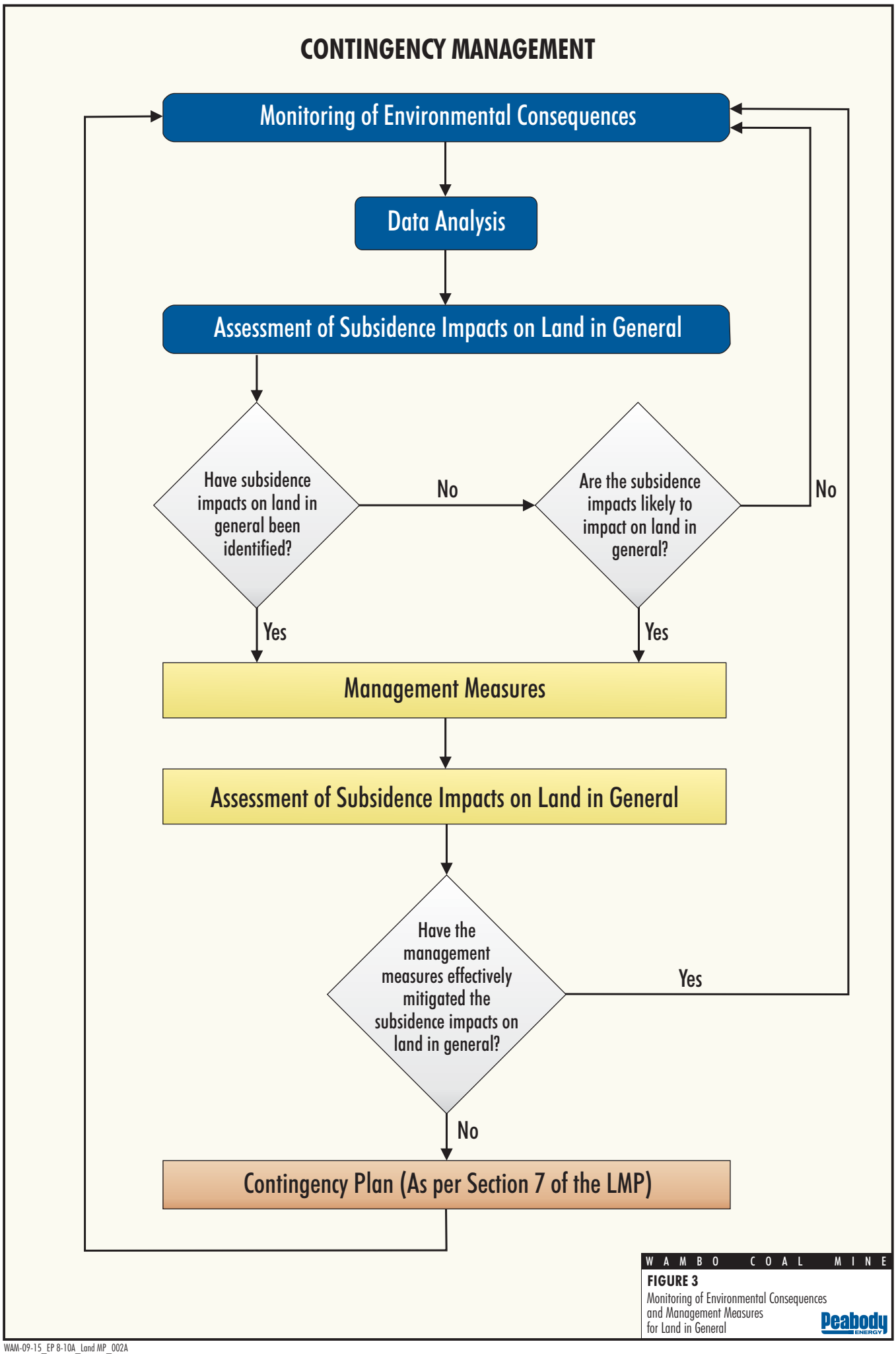
Management Measure	Timing/Frequency	Responsibility
Pre-Mining		
Notification to agistees of areas of longwall mining and active subsidence, and exclusion of agistment grazing from areas where surface cracking presents a reasonable risk to people and/or livestock.	Prior to commencement of secondary extraction of Longwalls 8 to 10A.	Environment and Community Manager
During Mining		
Remediation of surface cracks[1] where practicable using conventional earthmoving equipment (e.g. a backhoe) including: • infilling of surface cracks with soil or other suitable materials; or • locally re-grading and re-compacting the surface.	When required during secondary extraction of Longwalls 8 to 10A.	Environment and Community Manager
Stabilisation of any areas of surface cracking using erosion protection measures (e.g. vegetation planting).	When required during secondary extraction of Longwalls 8 to 10A.	Environment and Community Manager
Drainage works and rehabilitation of subsidence troughs (i.e. areas of induced ponding) as necessary.	When required during secondary extraction of Longwalls 8 to 10A.	Environment and Community Manager
Post-Mining		
Repair of stock fences prior to allowing access for agistment grazing.	Following completion of secondary extraction of Longwalls 8 to 10A.	Environment and Community Manager
Remediation of farm dams where it presents a risk to people, livestock and/or the environment.	Following completion of secondary extraction of Longwalls 8 to 10A.	Infrastructure Coordinator

[1] Minor cracks that develop are not expected to require remediation as geomorphologic process will result in natural filling of these cracks over time.

6 ASSESSMENT OF MANAGEMENT MEASURES

Monitoring conducted to inform the assessment of the secondary extraction of Longwalls 8 to 10A in regard to subsidence impacts on land in general is outlined in **Section 4** of this LMP. The monitoring process and subsequent assessment of subsidence impacts on land in general is outlined in **Figure 3**.

If subsidence impacts on land in general have occurred and are not effectively mitigated by the management measures outlined in **Section 5**, the Contingency Plan outlined in **Section 7** of this LMP will be implemented.



WAMBO COAL MINE

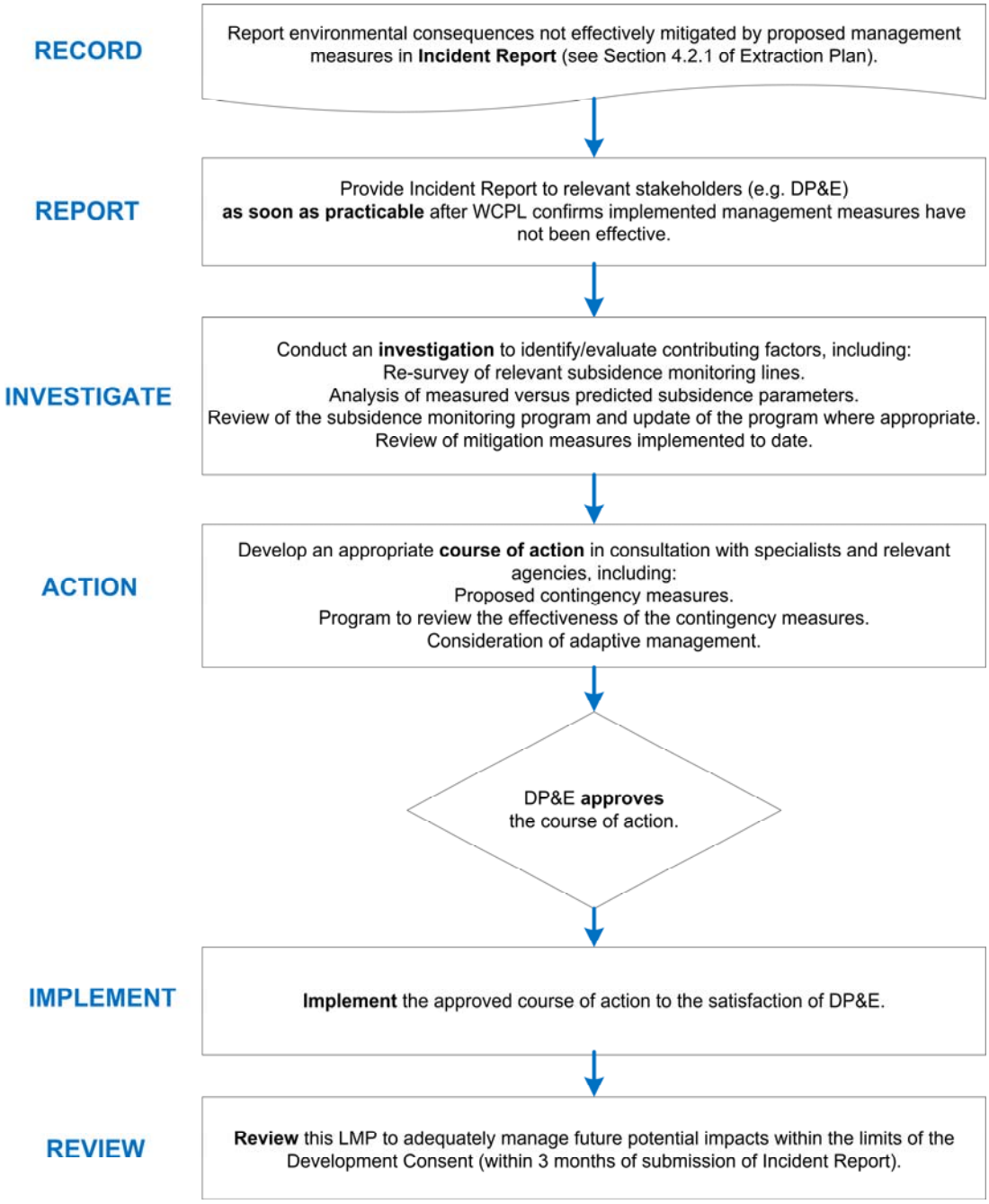
FIGURE 3

Monitoring of Environmental Consequences and Management Measures for Land in General

Peabody ENERGY

7 CONTINGENCY PLAN

In the event that impacts to land in general have occurred and are not effectively mitigated by the management measures outlined in **Section 5**, in accordance with the schematic presented in **Figure 3**, WCPL will implement the following Contingency Plan:



The framework for the various components of the LMP are summarised in the LMP TARP which is included as **Attachment 1**. The LMP TARP illustrates how the various predicted subsidence impacts, monitoring components and responsibilities are structured to achieve compliance with the relevant statutory requirements, and the framework for management and contingency actions.

8 ROLES AND RESPONSIBILITIES

Key responsibilities of WCPL personnel in relation to this LMP are summarised in **Table 5**. Responsibilities may be delegated as required.

Table 5
Land Management Plan Responsibilities Summary

Responsibility	Task
General Manager	• Ensure resources are available to WCPL personnel to facilitate the completion of responsibilities under this LMP.
Underground Mine Manager	• Ensure resources are available to WCPL personnel to facilitate the completion of responsibilities under this LMP.
Director: Technical Services and Projects	• Ensure the Subsidence Monitoring Program is implemented. • Ensure resources are available to assist the Environment and Community Manager to implement this LMP.
Environment and Community Manager	• Ensure this LMP is implemented. • Liaise with relevant stakeholders regarding subsidence impact management and related environmental consequences. • Notify agistees of areas of longwall mining and active subsidence, and ensure agistment is excluded from areas where surface cracking presents a reasonable risk to people and/or livestock. • Ensure implementation of management measures summarised in **Table 4**.
Underground Mine Engineer	• Assist to ensure the Subsidence Monitoring Program and this LMP are implemented. • Undertaken monitoring summarised in **Table 3**.
Mine Surveyor	• Undertake all subsidence monitoring to the required standard within the specified timeframes and ensure data are adequately checked, processed and recorded. • Undertake monitoring summarised in **Table 3**.

9 REFERENCES

Ditton Geotechnical Services (2012) *Revised Predictions of Subsidence Effects and Subsidence Impacts for Longwalls 7 and 8 at North Wambo Underground Mine, Warkworth*.

Mine Subsidence Engineering Consultants (2014a) *North Wambo Underground Longwalls 7 – 10 Extraction Plan Subsidence Assessment.*

Mine Subsidence Engineering Consultants (2014b) *North Wambo Underground Longwall 10A Subsidence Assessment.*

Wambo Coal Pty Limited (2003) *Wambo Development Project Environmental Impact Statement.*

Wambo Coal Pty Limited (2005) *Wambo Development Project – Wambo Seam Underground Mine Modification Statement of Environmental Effects.*

Wambo Coal Pty Limited (2006) *Wambo Development Project – North Wambo Underground Mine Subsidence Management Plan*.

Wambo Coal Pty Limited (2012) *North Wambo Underground Mine Modification Environmental Assessment*.

Wambo Coal Pty Limited (2014) *North Wambo Underground Mine Longwall 10A Modification Environmental Assessment.*

Wambo Mining Corporation (2000) *Land Management Plan.* Report prepared by R.J. Connolly Environment Management Consulting Pty Limited.

ATTACHMENT 1

LAND MANAGEMENT PLAN
TRIGGER ACTION RESPONSE PLAN

Table A1-1
Land Management Plan Trigger Action Response Plan

Condition	Normal	Level 1	Level 2
	Predicted Impacts	**Management Measures**	**Restoration/Contingency Phase**
Trigger	• Predicted impacts on land in general, described in **Section 3**.	• Crack or ponding presents significant risk to safety of people or livestock. • Crack is greater than 100 mm after longwall face has passed and presents long-term degradation or erosion risk. • Increased erosion or land degradation compared to past monitoring results.	• Management measures implemented to date have not effectively mitigated the subsidence impacts on land in general, for example: – observations of increased erosion or land degradation compared to past monitoring results; and – revegetation not progressing in remediated areas.
Action	• Conduct monitoring, consistent with **Table 3**, the ESCP and the Subsidence Monitoring Program (Appendix H of the Extraction Plan). • Compare results against past monitoring results in the Subsidence Impact Register. • Assess the environmental consequences of the subsidence in accordance with **Section 6**. • Assess the need for management measures in accordance with **Table 4** and the ESCP.	• Compare results against past monitoring results in the Subsidence Impact Register. • Implement management measures, as required, in accordance with the ESCP. (With regard to the specific circumstances of the subsidence impact [e.g. the location, nature and extent of the impact] and the assessment of environmental consequences, in accordance with **Section 5** and the ESCP).	• Implement Contingency Plan described in **Section 7**. • Compare impacts against past monitoring results in the Subsidence Impact Register.
Frequency	• Frequency consistent with **Table 3** and the ESCP. (Including inspections of the active mining area monthly and following a significant rainfall event.)	• As required, in accordance with **Section 5** and the ESCP (monthly inspections of remediated areas), until: – monitoring confirms stabilisation of erosion; and – groundcover is >60%.	• As required, in accordance with **Section 7** (increased frequency to be determined during implementation of the Contingency Plan) until: – monitoring confirms stabilisation of erosion; and – groundcover is >60%.
Position of Decision Making	• Environment and Community Manager.	• Environment and Community Manager.	• General Manager.

Note: ESCP refers to the Wambo Coal Erosion and Sediment Control Plan.

ATTACHMENT 2

WAMBO COAL MINE
EROSION AND SEDIMENT CONTROL PLAN

Erosion and Sediment Control Plan

(Water Management Plan)

PREPARED BY

WAMBO COAL PTY LIMITED

September 2014

Wambo Coal Environmental Management System

Erosion and Sediment Control Plan

Document Control

Document No.	EMP009(c)
Title	Erosion and Sediment Control Plan
General Description	Management of erosion and sediment impacts
Key Support Documents	Wambo Coal Site Water Management Program – (WMP- EMP009) DA 305 – 7 -2003, DA 177-8-2004, EIS 2003, EPL 529

Revisions

Rev No	Date	Description	By	Checked
0	June 05	Original Draft	Gilbert and Associates Pty Ltd	JT/TS
1	July 05	Revised Draft	Gilbert and Associates Pty Ltd	JT/TS
2	July 05	Final Draft	Gilbert and Associates Pty Ltd	JT/TS
3	Feb 06	Management Plan Consolidation	WCPL	JT/JH
4	August 07	Management Plan Consolidation	Hansen Bailey	SW
5	February 10	Consent Modification	WCPL	SB
6	Sept 14	Review	WCPL	TF

The nominated document coordinator	Environmental Advisor

Approver:	Manager: Environment and Community
Date:	September 2014
Name:	Troy Favell
Signature:	

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1 INTRODUCTION

Wambo Coal Pty Limited (WCPL) operates the Wambo Coal Mine (Wambo) which consists of an open cut and underground mine, a Coal Handling and Preparation Plan (CHPP), rail loop and associated rail load-out facilities. Wambo is located approximately 15 kilometres (km) west of Singleton (**Figure 1**), near the village of Warkworth.

Wambo's activities are undertaken in accordance with the Development Consents and Environmental Protection Licence (EPL) Conditions listed in **Table 1**. All correspondence related to this management plan is included in **Appendix 1**.

Table 1: Wambo Coal Development Consents

Consent / Licence No.	Activity	Date of Approval	Issuing Agency
DA 305-7-2003	Wambo Mine - Open Cut & Underground Mining	February 2004	Department of Planning
DA 177-8-2004	Wambo Rail Spur & Coal Loading Facility	December 2004	Department of Planning
DA 235/97.3	Wambo Rail Line	July 1998	Singleton Shire Council
EPBC 2003/1138	Wambo Mine - Open Cut & Underground Mining	November 2004	Department of Environment Water Heritage and the Arts
EPL 529	Mining for coal Coal works	Review date 6/08/2014	Department of Environment, Climate Change and Water

Figure 2 below illustrates the Wambo Coal Site Water Management Plan and constituent components, including the Surface & Groundwater Response Plan.

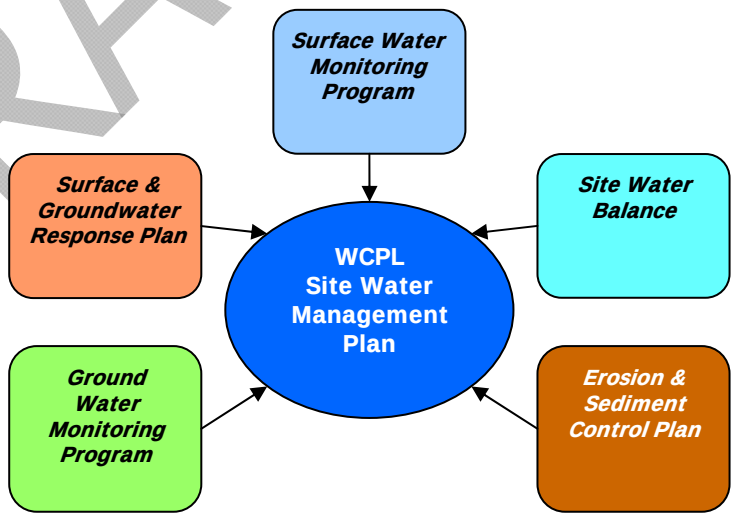


Figure 1: Regional Location

2 EROSION AND SEDIMENT CONTROL PLAN REQUIREMENT

Development consent (DA 305-7-2003) was modified in 2009 to allow for the installation of water management infrastructure. As shown in **Table 2**, this revision of the Erosion and Sediment Control Plan (ESCP) was required following the modification .

The objectives of the ESCP are 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.

Table 2: Erosion and Sediment Control Plan Requirement

Consent Requirement	Condition
Wambo Mine Development Consent (DA 305-7-2003) Schedule 4, Conditions 30(c) and 32	***Site Water Management Plan*** *30. Before carrying out any development, the Applicant shall prepare a Site Water Management Plan for the development in consultation with DPI and DNR, and to the satisfaction of the Director-General. This plan must include: ...* *(c) an Erosion and Sediment Control Plan; ...* *By the end of October 2009, the applicant shall revise the Site Water Management Plan in consultation with the DII, DECCW and OoW, and to the satisfaction of the director-General.* [An extension to this submission date was granted on 4 November 2009]. *32. The Erosion and Sediment Control Plan shall:* *(a) be consistent with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual;* *(b) identify activities that could cause soil erosion and generate sediment;* *(c) describe the location, function, and capacity of erosion and sediment control structures; and* *(d) describe measures to minimise soil erosion and the potential for the migration of sediments to downstream waters."*
Wambo Rail Spur Development Consent (DA 177-4-2004) Schedule 4, Condition 7	***Soil and Water Management Plan*** *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:* *(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;* • *identifies activities that could cause soil erosion and generate sediment;* • *describes the location, function and capacity of erosion and*

Consent Requirement	Condition
	sediment control structures; and • *describes measures to minimise soil erosion and the potential for the migration of sediments to downstream waters;*
Wambo Development Project EPBC Approval 2003/1138	***Erosion and Sediment Control Plan*** *2) Prior to the commencement of the mine expansion, the person taking the action must submit for the Minster's approval a plan for managing the impacts of the mine expansion on listed threatened and migratory species. The plan must include measures to:* *(e) define and implement a Project Area Rehabilitation program that includes progressive rehabilitation,* ***erosion and sediment control*** *,revegetation, and maintenance and monitoring;* *The approved plan must be implemented.*
Wambo Rail Line Development Consent (DA 235/97.3) Schedule 4, Condition 9	***Erosion and Sediment Control*** *11) Prior to commencement of each stage of construction the Applicant shall prepare, and then subsequently implement, an Erosion and Sediment Control Plan for the development, to the satisfaction of the Singleton Shire Council. This plan must include:* *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:* • *identifies activities that could cause soil erosion and generate sediment:* • *describes the location, function and capacity of erosion and sediment control structures; and* • *describes measures to minimise soil erosion and the potential for the migration of sediments to downstream waters;*

Note: DII – Industry & Investment NSW (formerly DPI - NSW Department of Primary Industries); OoW – Office of Water (formerly DWE); and DECCW – Department of Environment and Climate change.

3 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, instream 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, instream 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.

4 EROSION & SEDIMENT CONTROLS

4.1 INTRODUCTION

4.1.1 Principles

The following principles provide the foundation for the Wambo ESCP:

- Minimise surface disturbance and restrict access to undisturbed areas;
- Progressively rehabilitate and stabilise disturbed areas;
- Separate disturbed and undisturbed catchment runoff, where practicable;
- Correct design of surface drains to facilitate the efficient transport of surface runoff (drains will generally be designed using trapezoidal or parabolic cross-sections); and
- Construct sediment control structures, or utilise existing mine water storages, to contain runoff from disturbed areas.

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).

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

1. Employees and contractors working on-site will complete a general site induction which will include details on erosion and sediment control and management;
2. The operational manager (or delegate) will complete a Surface Disturbance Permit (See **Appendix B**) in consultation with the Wambo's Environmental Personnel;
3. 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;
4. Construction of diversion drains, sediment dams and other erosion and sediment control structures, will be undertaken in accordance with design criteria discussed in **Section 4.1.3** below, as required;
5. 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 4.4**, as required; and
6. Construction or mining activities will not commence until erosion and sediment controls are in place.

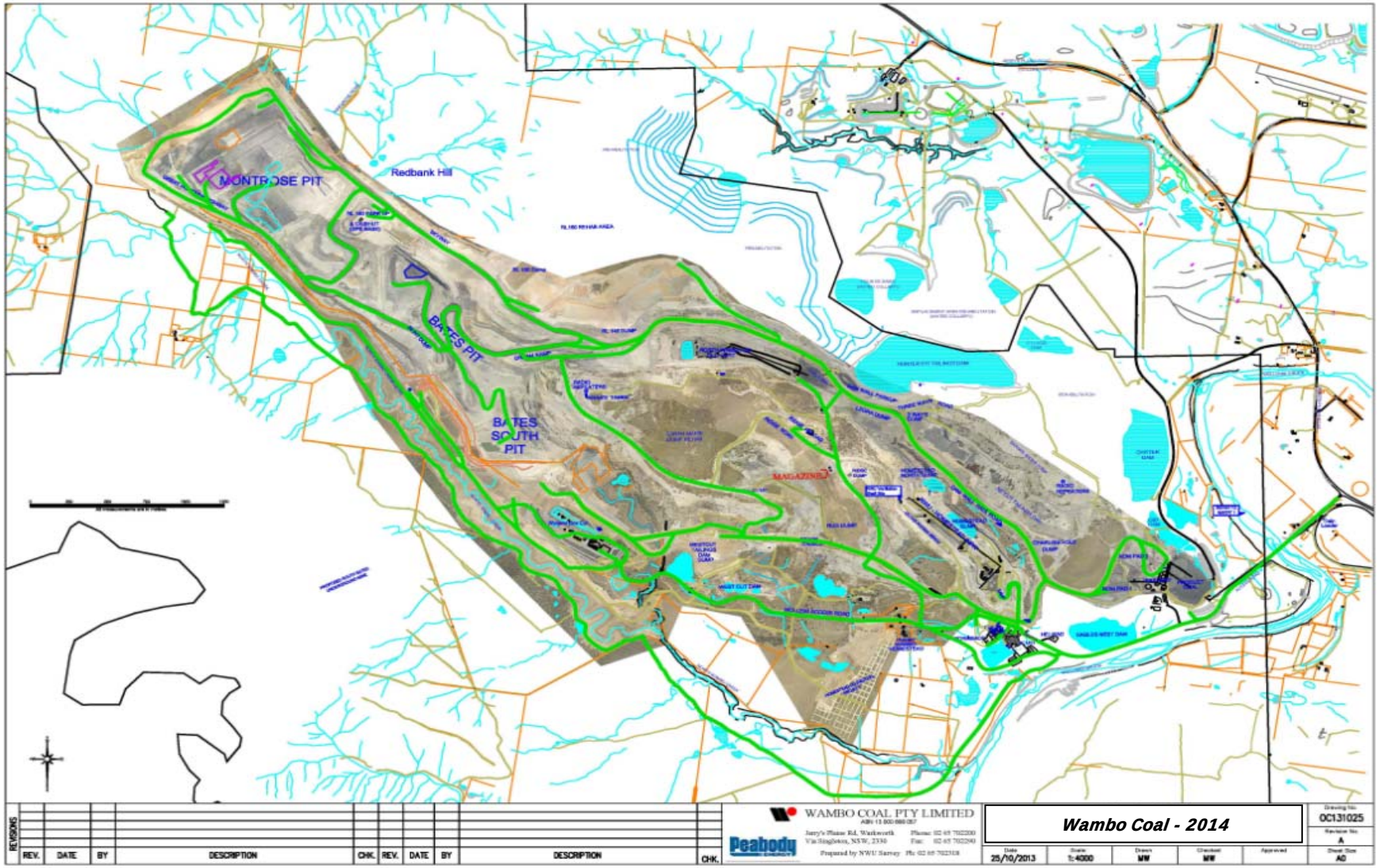
4.1.2 Existing Erosion and Sediment Controls

Figure 3 provides the locations of existing erosion and sediment control structures at Wambo Coal. Purpose and storage capacity of main sediment control structures on-site are provided in **Table 4**.

Table 4: Wambo Coal Erosion and Sediment Control Structures

Site	Purpose	Approximate Storage Capacity (ML)
Wambo Admin Dam	Clean Water Storage/Sediment Control	305
Eagles Nest Dam	Process Water	240
Gordon Below Franklin Dam	Sediment Control/Mine Water Management	62
Gordon Below Franklin Sediment Control Structures (ROM Pad Catchment)	Sediment Control	0.5
C11 Area Dam	Sediment Control/Mine Water Management (decommissioning commenced 2009)	449
West Cut Dam	Sediment Control/Mine Water Management (decommissioning commenced 2009)	288
West Cut Sedimentation Dam (Wollemi Pump Out)	Sediment Control	0.05
NWU Sump	Sediment Control	0.35
Hunter Pit	Mine Water Management	8,335
Homestead Pit	Mine Water Management	521
Wollemi Box Cut Dam	Sediment Control	0.75
Wollombi Brook Sediment control structures (Hales Crossing)	Sediment Control	0.06 (4 x 0.015)
Wambo Rail Line Catchment Dams	Sediment Control	Various
Western Drain	Sediment Control	N/A
Wombat Drain	Sediment Control	N/A
Kangaroo Dam	Sediment Control	10
Milk Can Dam	Sediment Control	3
South Dam	Mine Water Management	870
Chitter Dam	Mine Water Management	988

Figure 3: Wambo Coal Erosion and Sediment Control Structures



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**.

Table 5: Design Criteria for Erosion and Sediment Control Structures

Control Structure	Function	Design Capacity	
Upslope diversion drains	Divert clean water runoff (undisturbed areas) away from disturbed areas	1 in 10 year critical duration rainfall event [Section 5.4.3(b)-(d)]	
Down slope collection drains	Intercept and convey disturbed area runoff water to sediment dams	1 in 10 year critical duration rainfall event [Section 5.4.3(b)-(d)]	
Sediment dams/mine water dams	Containment of sediment-laden runoff from disturbed areas	**Settling Zone:** Capacity to store the runoff produced from the 80th percentile, 5-day rainfall event [Section 6.3.4(f)(i)]	**Sediment Storage Zone:** Two months calculated soil loss estimated using RUSLE* [Section 6.3.4(i)(ii)]
Sediment Fencing	Retention/filtration of suspended sediments from water runoff	Limit flow to < 50 L/s in design 1 in 10 year critical duration rainfall event (Section 6.3.7(e))	
Hay Bales	Retention/filtration of suspended sediments	Limit flow to < 50 L/s in design 1 in 10 year critical duration rainfall event (Section 6.3.7(e))	

* Revised Universal Soil Loss Equation

As recommended by OoW, sediment control structures will be designed to deal with a 1 in every 10 year storm event of a critical duration, to ensure that sediment control structures can capture and treat water runoff in all except very rare storm events.

The 80th percentile 5-day rainfall event, used in calculating the sediment dam settling zone capacity, was calculated to be 23.5 mm from the average of values for Cessnock and Scone taken from Table 6.3a in the Blue Book.

The use of two months of calculated soil loss in estimating the sediment storage zone capacity (rather than 50% of the settling zone capacity), was based on an assumption of high erosion hazard – this in turn was based on Figure 4.6 from the Blue Book with a calculated R-factor for Wambo of 1,459 and slopes typically greater than 15%.

4.2 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. Project specific ESCP will be devised in consultation with Wambo's Environmental Personnel. The project ESCP will:

- 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 4.1.3** and in consultation with Wambo's Environmental Personnel

4.3 OPERATIONS

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 the mine water management system or diverted through sediment control structures prior to leaving site.

Land Disturbance

In accordance with the erosion and sediment control principles outlined in **Section 4.1.1**, 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 (See **Appendix B**). 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.

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 4.1.3**.

4.4 CLEAN WATER DIVERSION

Consistent with the principles provided in **Section 4.1.1**, 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.

4.5 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.

4.5.1 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 4.1.3** and **Appendix C**.

4.5.2 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 4.1.3** and **Appendix C**.

4.5.3 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 4.1.3** and **Appendix C**

4.5.4 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 C**.

Plate 1 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.

Plate 1: Example of Sediment Fencing

4.5.5 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.

Plate 2 below shows a combination of hay bales and re seeding to reduce water flow and minimise scouring.

Plate 2: Hay Bales in Water Catch Drain

4.6 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.

4.7 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.

5 INSPECTIONS, MONITORING AND MAINTENANCE

Sediment control structures will be inspected on a monthly basis, or following rainfall events =/> 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 =/> 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, 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.

See **Appendix D** for Sediment Control Structure Inspection Checklist.

6 REPORTING AND REVIEW

This ESCP will be reviewed, and updated as necessary, by Wambo's Senior Environmental Coordinator (or delegate):

- Every 3 years;
- When there are changes to consent or licence conditions related to any aspect of this ESCP;
- In response to a relevant change in technology or legislation; or
- Where there are significant changes to the ESCP structures as illustrated in **Figure 2** or listed in **Table 4**.

Erosion and sediment control works, including any environmental incidents, will be reported on an annual basis in the AEMR.

7 RESPONSIBILITIES

Table 6 below summarises responsibilities documented in the ESCP, and should be read in conjunction with this document.

Table 6: Erosion and Sediment Control Plan Responsibilities

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 Wambo's Environmental Personnel.	Operational Managers and supervisors	Prior to general construction/mining activities
3	Identify project specific potential erosion and sediment impacts	Wambo's Environmental Personnel.	Prior to general construction/mining activities
4	Facilitate the design and implementation of control measures described in this ESCP	Operational Managers/ Wambo's Environmental Personnel.	Prior to general construction/mining activities
5	Inspect sediment and erosion control structures	Wambo's Environmental Personnel (or delegate).	Monthly, and following rainfall events =/>20mm/day
6	Maintain erosion and sediment control structures	Operational Managers (or delegate)	As required
7	Review ESCP	Environment and Community Manager (or delegate)	As required under **Section 6.0**

8 REFERENCES

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.

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

REGULATORY CORRESPONDENCE

NSW GOVERNMENT | Industry & Investment

13 April 2010

File Ref: L93/0257

General Manager
Wambo Mine
PMB 1
SINGLETON NSW 2330

ATTENTION: Sarah Bailey – Environment & Community Manager

Dear ~~Sir~~ Sarah,

WAMBO COAL
REVISED SITE WATER MANAGEMENT PLAN DOCUMENTS

I refer to your letter of 1 March 2010 providing to I&I NSW for review the Site Water Management Plan (SWMP) according to Wambo Consent Condition 33. I refer also to your related letter of 9 April 2010 providing tables summarising changes to each of the plans.

I&I NSW acknowledges consultation by Wambo and accepts the SWMP documentation:

Erosion and Sediment Control Plan;

Surface Water Monitoring Program;

Groundwater Monitoring Program;

Site Water Balance

Surface and Groundwater Response Plan.

For clarification or further information please contact me at the Maitland Office on (02)49316705.

Yours faithfully,

Greg Summerhayes
Principal Environmental Officer
Environmental Sustainability Unit

Minerals & Energy Division
PO Box 344 Hunter Region Mail Centre NSW 2310
516 High Street Maitland NSW 2320
Tel: 02 4931 6666 Fax: 02 4931 6790
ABN 51 734 124 190
www.industry.nsw.gov.au

Peabody

WAMBO COAL

1 March 2010

Mr Greg Summerhayes
Department of Industry and Investment
PO Box 344
Hunter Region Mail Centre
NSW 2310

Dear Greg

WAMBO COAL
REVISED SITE WATER MANAGEMENT PLAN DOCUMENTS

In accordance with Consent Condition 33, Schedule 4, DA 305-7-2003, Wambo Coal's Site Water Management Plan (SWMP) must be revised in consultation with Department of Industry and Investment (DII) and Department of Environment, Climate Change and Water (DECCW), prior to submission to the Department of Planning (DoP) by the 30 April 2010.

The SWMP has been revised three times since 2005 in response to consent modifications. The latest revision of the SWMP was triggered by consent modifications relating to the approval of the Chitter Dam and South Dam in June and August 2009, respectively.

Wambo Coal's SWMP is comprised of the following documents which are enclosed for your review:

- The predicted site water balance;
- An Erosion and Sediment Control Plan;
- A Surface Water Monitoring Program;
- A Groundwater Monitoring Program; and
- A Surface and Groundwater Response Plan.

Please review and provide comment by Friday 9 April 2010 to allow changes to be made prior to the DoP submission date.

Please contact me on (02) 6570 2217 if you would like to arrange a meeting to discuss these documents.

Yours sincerely

Sarah Bailey
Environment and Community Manager

Wambo Coal Pty Ltd
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Level 27, AMP Place, 10 Eagle Street
Brisbane Qld 4000

Postal Address:
PMB 1
Singleton NSW 2330

ACN 000 668 057

Phone: +61 2 6570 2200
Fax: +61 2 6570 2290

Peabody

WAMBO COAL

1 March 2010

Mr Fergus Hancock
DECCW – Office of Water
Honeysuckle Drive
Newcastle NSW 2330

Dear Fergus

WAMBO COAL
REVISED SITE WATER MANAGEMENT PLAN DOCUMENTS

In accordance with Consent Condition 33, Schedule 4, DA 305-7-2003, Wambo Coal's Site Water Management Plan (SWMP) must be revised in consultation with Department of Industry and Investment (DII) and Department of Environment, Climate Change and Water (DECCW), prior to submission to the Department of Planning (DoP) by the 30 April 2010.

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Please review and provide comment by Friday 9 April 2010 to allow changes to be made prior to the DoP submission date.

Please contact me on (02) 6570 2217 if you would like to arrange a meeting to discuss these documents.

Yours sincerely

Sarah Bailey
Environment and Community Manager

Wambo Coal Pty Ltd
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Brisbane Qld 4000

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Fax: +61 2 6570 2290

Sarah Bailey

From: Sarah Bailey
Sent: Friday, 9 April 2010 10:38 AM
To: Fergus Hancock
Subject: Wambo Coal SWMP - table of changes to assist DECCW in the review
Attachments: 100409 let to DECCW OoW re revised SWMPs table of changes.pdf

Hi Fergus

I hope all is well and I hope you had a good Easter.

As per my phone message yesterday, we have put together tables summarizing the changes to the revised Site Water Management Plan documents.

In accordance with Consent Condition 33, Schedule 4, DA 305-7-2003, Wambo Coal's Site Water Management Plan (SWMP) must be revised in consultation with Department of Industry and Investment (DII) and Department of Environment, Climate Change and Water (DECCW), prior to submission to the Department of Planning (DoP) by the 30 April 2010.

Please let me know if you did not receive the SWMP which was posted to you on 1st March 2010.

Please let me know if you will be unable to review the SWMP documents in time to allow us to make any requested changes before submitting the SWMP to DoP before 30th April. I will need to talk to DoP re an extension to the submission date if this is the case.

Regards

Sarah Bailey

Manager Environment & Community
Wambo Coal Pty Ltd
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Ms Sarah Bailey
Environment and Community Manager
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Our Ref: S02/02197

Dear Ms Bailey

Wambo Coal Mine (DA 305-7-2003)
Environmental Management Plans

I refer to your letter dated 21 October 2009, requesting an extension to the date for submission of the revised Flora and Fauna Management Plan (Condition 44, Schedule 3) and revised Site Water Management Plan (Condition 30, Schedule 3), for approval by the Director-General, as required under the Minister's consent for the mine (DA 305-7-2003).

The Department has reviewed the information supplied and Wambo's Independent Offset Strategy Audit Report dated 16 October 2009, and is satisfied that the proposed extension would enable:

- the audit recommendations to be included in Wambo's Flora & Fauna Management Plan; and
- a comprehensive review of the Site Water Management Plan, incorporating comments from relevant government agencies.

Consequently, I wish to advise you that the Department accepts your request to delay submission of the Flora and Fauna Management Plan and the Site Water Management Plan. The revised Plans are now required to be submitted to the Department by 30 April 2010.

If you have any queries, please contact Belinda Parker on 9228 6306.

Yours sincerely

DKitto 4/11/09

David Kitto
Director
Major Development Assessment
as delegate for the Director-General

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Now incorporating Department of Mineral Resources
ABN 51 73 412 4190-003

8 August 2008

File Ref: L93/0257

General Manager
Wambo Mine
PMB 1
SINGLETON NSW 2330

ATTENTION: Sarah Bailey – Environmental Specialist

Dear Sir,

WAMBO - GROUND WATER MANAGEMENT PROGRAM

I refer to your letter of 31 July 2008 providing the subject GWMP. The DPI acknowledges and accepts the GWMP documentation.

I also confirm the referenced components of the Wambo Site Water Management Plan have been provided to DPI for review . DPI have been consulted and have provided comment in March 2008.

For clarification or further information please contact me at the DPI Maitland Office on (02)49316705.

Yours faithfully,

Greg Summerhayes
Principal Environmental Officer
Environmental Sustainability Division

NSW GOVERNMENT
Department of Planning

Contact: Colin Phillips
Phone: (02) 9228 6483
Fax: (02) 9228 6466
Email: colin.phillips@planning.nsw.gov.au

Our ref: S02/02197

Mr Chris Millard
General Manager
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Mr Millard

Wambo Coal Mine
Site Water Management Plan

I refer to your letter, dated 18 December 2007, requesting an extension of time to finalise the preparation of the revised Wambo Site Water Management Plan required by condition 30 of schedule 4 of Wambo coal mine's development consent (DA 305-7-2003).

The Department has considered the importance of gaining input from DPI and DWE to this plan and accordingly extends the submission date of this plan until 31 March 2008 to allow consultation with these agencies to be finalised.

Yours sincerely,

Howard Reed 20.12.07
A/Manager
Mining and Extractive Industries
as Delegate for the Director-General

NSW GOVERNMENT
Department of Planning

Contact: Colin Phillips
Phone: (02) 9228 6483
Fax: (02) 9228 6466
Email: colin.phillips@planning.nsw.gov.au

Our ref: S02/02197

Ms Sarah Bailey
Environmental Officer
Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

Dear Sarah

Wambo Coal Mine
Site Water Management Plan

I refer to a letter from Ms Sarah Withell, dated 30 October 2007, requesting an extension of time to finalise the preparation of the revised Wambo Site Water Management Plan required by condition 30 of schedule 4 of Wambo coal mine's development consent (DA 305-7-2003).

The Department has considered the importance of gaining input from DPI and DWE to this plan and accordingly extends the submission date of this plan until 31 December 2007 to allow consultation with these agencies to be finalised.

Yours sincerely,

Howard Reed 12-11-07
A/Manager
Mining and Extractive Industries
as Delegate for the Director-General

NSW GOVERNMENT
Department of Planning

Mining & Extractive Industries
Major Development Assessment
Phone: (02) 9228 6487
Fax: (02) 9228 6466
Email: david.kitto@dipnr.nsw.gov.au
Level 4 Western Gallery
23-33 Bridge Street
GPO Box 39
SYDNEY NSW 2001

24.10.5
→ J-T
WD
RH
GH

Mr Tony Sutherland
Wambo Coal Pty Ltd
PMB 1
SINGLETON NSW 2330

Dear Mr Sutherland

Wambo Development Project
Management Plans and Monitoring Programs

Thank you for forwarding the following documents required under the Wambo development consent (DA 305-7-2003) for the Department's consideration:

- ~~Noise Monitoring Program (condition 9, Schedule 4);~~
- Site Water Balance (condition 25, Schedule 4);
- Erosion and Sediment Control Plan (condition 32, Schedule 4);
- Surface Water Monitoring Program (condition 33, Schedule 4);
- Groundwater Monitoring Program (condition 34, Schedule 4); and
- Environmental Management Strategy (condition 1, Schedule 6).

The Department has reviewed these documents and is generally satisfied they address the requirements of the relevant conditions in the development consent. ~~Consequently, I would like to advise you that the Director-General has approved these documents~~. However, the Surface Water Monitoring Programme has been approved on the proviso that it is revised following the approval of the North Wambo Creek Diversion Plan.

The Director-General has previously approved the Air Quality Monitoring Program, Flora and Fauna Management Plan, and Landowner Notification Strategy for the development, but notes there are several other matters which must be satisfied prior to commencing certain operations under the new consent. These matters include:

- Blast Monitoring Program (condition 19, Schedule 4);
- Blast Management Plan (condition 20, Schedule 4);
- Site Water Management Plan (condition 30, Schedule 4);
- Surface and Groundwater Response Plan (condition 35, Schedule 4);
- Surface and Sub-Surface Investigation Program (condition 36, Schedule 4)
- Archival Record of the Wambo Homestead Complex (condition 62, Schedule 4);
- Assessment of options for reducing the greenhouse gas emissions of the development (condition 87, Schedule 4);
- Environmental Monitoring Program (condition 2, Schedule 6).

The Department also notes that under condition 5 of Schedule 4, the development consent will only commence after all previous development consents for the Wambo coal mine have been surrendered, excluding DA No. 108/91 issued by Singleton Shire Council, to the satisfaction of the Director-General.

I would appreciate it if you would advise the Department of when you expect to commence open cut and underground operations under DA 305-7-2003, and when you are likely to submit the various outstanding documents required under the consent.

If you have any enquiries about this matter, please contact Mike Young on 9228 6481.

Yours sincerely

per David Kitto 10/10/05
Manager
Mining & Extractive Industries
as delegate for the Director-General

Department of
Environment and Conservation (NSW)

Your reference :
Our reference : 270075A12; NEF17395; 17455; 17093; 17579
Contact : Karen Marler; ph: 49086803

Wambo Coal Pty Limited
PMB 1
SINGLETON NSW 2330

- 7 SEP 2005

Attention: Mr Tony Sutherland

Dear Mr Sutherland

WAMBO DEVELOPMENT PROJECT:

1. **SURFACE WATER MONITORING PROGRAM (31 August 2005)**
2. **GROUNDWATER MONIOTRING PROGRAM (31 August 2005)**
3. **AIR QUALITY MONITORING PROGRAM (ORIGINAL (7 June 2005) AND REVISIONS 16 June 2005 AND 31 August 2005)**
4. **EROSION AND SEDIMENT CONTROL PLAN (29 July 2005)**
5. **LANDOWNER NOTIFICATION PROCEDURE – AIR QUALITY (9 August 2005)**

I refer to the above documents sent to the Department of Environment and Conservation (DEC) on the dates indicated. With regard to these documents the DEC provides the following advice:

1. **SURFACE WATER MONITORING PROGRAM**
2. **GROUNDWATER MONIOTRING PROGRAM**
3. **AIR QUALITY MONITORING PROGRAM**
4. **EROSION AND SEDIMENT CONTROL PLAN**

The DEC encourages the preparation of strategies, programs and plans as useful tools for industry to ensure that it meets the environmental objectives specified in conditions of Environment Protection Licences. As a regulatory authority, the DEC does not review or comment on these plans.

5. **LANDOWNER NOTIFICATION PROCEDURE – AIR QUALITY**

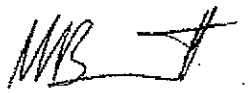
The fact sheet contains comprehensive advice regarding what particulate emissions are. You should contact NSW Health for comment on the adequacy of the information provided about the potential health impacts that may result from exposure to particulate matter.

PO Box 488G, Newcastle NSW 2300
117 Bull Street, Newcastle West NSW 2302
Telephone (02) 4908 6800
Facsimile (02) 4908 6810
ABN 30 841 387 271
www.environment.nsw.gov.au

The DEC understands that the primary aim of this procedure is to provide tenants and prospective tenants with information on likely health-related impacts associated with air quality at the place they are leasing or considering leasing. It will be important to ensure that landowners, tenants or prospective tenants are provided with site specific information regarding the predicted future particulate matter levels for each residence (particularly those Warkworth Mining Limited owned dwellings on Wallaby Scrub Road). The fact sheet should be provided to assist tenants to interpret this information and understand the likely future impacts of mining on air quality and potentially their health and amenity when making a decision to live in these residences.

If you have any questions regarding this matter, please contact Karen Marler on 4908 6803.

Yours sincerely



MITCHELL BENNETT
Head – Regional Operations Unit - Hunter
North East Branch
Environment Protection and Regulation Division

APPENDIX B

WAMBO COAL SURFACE DISTURBANCE PERMIT

Surface Disturbance Permit

SDP Number: (Env. Services only)	

Section 1 - Area of Operations

Open Cut	☐	Rail	☐
Underground	☐	CHPP	☐
Wambo 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 undertaken):* ***(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
• Development Consent (DA305-7-2003 &DA177-8-2004)	Yes/ No
• EPA Licence Premise Boundary (EPL 529):	Yes/ No
• Mining Operations Plan Limits:	Yes/ No

• Relevant Environmental Management Plans: **E.g. Flora & Fauna Management Plan (FFMP), Erosion and Sediment Control Management Plan (ESCP)**	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 & Faun 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 plan 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

Special
Comments/ Conditions

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: (Please return a signed copy of the completed SDP to Environmental Services)	**Name:**	**Signature:**	**Date:**

Section 7– SDP Compliance Report

(to be completed by the Environmental Personnel)

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.

Section 8 - Figure

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

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

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 Requirements**

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**

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.

- **Topsoil 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.

- **Noise**

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**

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.

APPENDIX C

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.

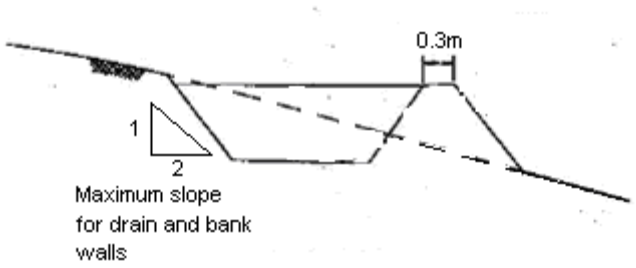


Figure C-1
Diversion Bank and Drain Design Dimensions

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.

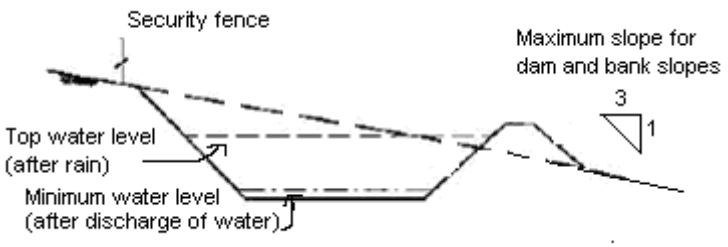


Figure C-2
Temporary Sediment Dam Design

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.

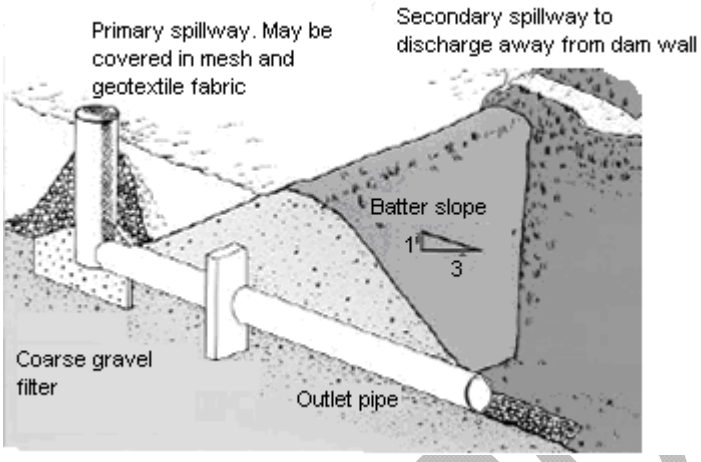


Figure C-3
Large, Long Term Sediment Dam Design*

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.

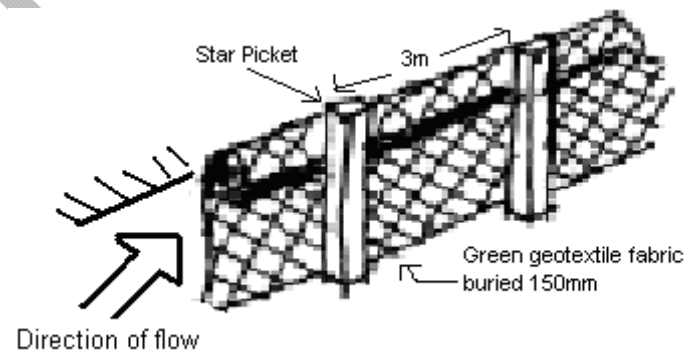


Figure C-4
Sediment Fence Design

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.

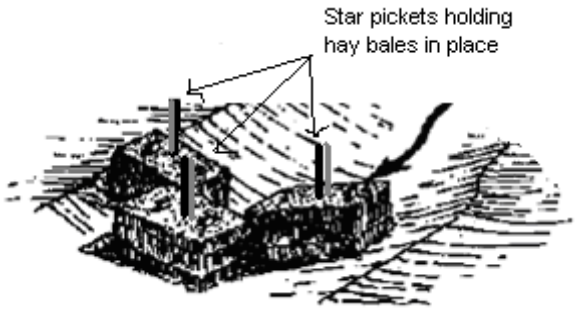


Figure C-5
Use of Hay Bales in Diversion Drain

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.

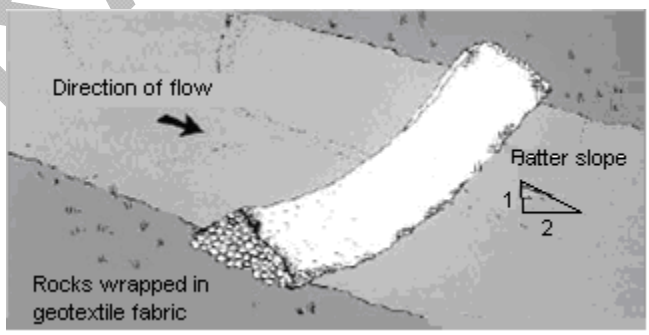


Figure C-6
Rock Structure as an Embankment*

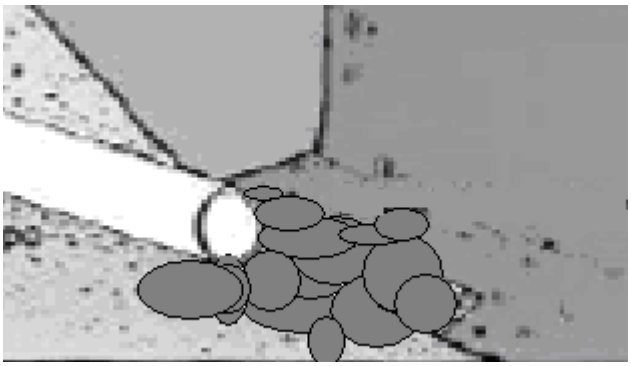


Figure C-7
Rock Structure at the Outlet of Pipe

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

APPENDIX D

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 Dam	Clean Water Storage/Sediment Control	Y / N		
Eagles Nest Dam	Process Water	Y / N		
Gordon Below Franklin Dam	Sediment Control/Mine Water Management	Y / N		
Gordon Below Franklin Sediment Control Structures (ROM Pad Catchment)	Sediment Control	Y / N		
C11 Area Dam	Sediment Control/Mine Water Management (decommissioning commenced 2009)	Y / N		
West Cut Dam	Sediment Control/Mine Water Management (decommissioning commenced 2009)	Y / N		
West Cut Sedimentation Dam (Wollemi Pump Out)	Sediment Control	Y / N		
NWU Sump	Sediment Control	Y / N		
Hunter Pit	Mine Water Management	Y / N		
Homestead Pit	Mine Water Management	Y / N		
Wollemi Box Cut Dam	Sediment Control	Y / N		
Wollombi Brook Sediment control structures (Hales Crossing)	Sediment Control	Y / N		
Wambo Rail Line Catchment Dams	Sediment Control	Y / N		
Western Drain	Sediment Control	Y / N		
Wombat Drain	Sediment Control	Y / N		
Kangaroo Dam	Sediment Control	Y / N		
Milk Can Dam	Sediment Control	Y / N		
North Wambo Creek Diversion		Y / N		
South Dam	Mine Water Management	Y / N		
Chitter Dam	Mine Water Management	Y / N		

Name	Signed	Date