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Illawarra Coal



Appin Area 9

Appin Area 9 Longwalls 901 to 904 Extraction Plan
Annex I – Coal Resource Recovery Plan, 31 October 2013



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Review History

Revision	Description of Changes	Date	Approved
A	New Document	5 December 2011	
B	Final Document – Updated with Agency Comments	31 October 2013	

Persons involved in the development of this document include:

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

BHP Billiton Illawarra Coal (BHPBIC) operates the Bulli Seam Operations (BSO) (Appin and West Cliff Collieries) extracting hard coking coal used for steel production.

On 22 December 2011 the Planning and Assessment Commission (PAC), under delegation of the Minister for Planning, approved BSO Project (MP 08_0150) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to continue mining operations until 31 December 2041.

This Coal Resource Recovery Plan (CRRP) supports the Longwalls 901 to 904 Extraction Plan for mining of coal from Appin Area 9 (AA9). The relationship between this CRRP and the components of the Extraction Plan is shown in Figure 1 of the Extraction Plan.

The CRRP describes the proposed mining geometry, extraction sequence and the quality of the coal resource to demonstrate the effective recovery of the resource.

1.2 SCOPE

This CRRP has been prepared by Cardno on behalf of BHPBIC in accordance with the mining lease requirements as detailed in the **Table 1.1**.

Table 1.1 – Appin Mine Leases, Licences and other Reference Documents

Mining Lease - Document Number	Issue Date	Expiry Date/ Anniversary Date
CCL 767	29/10/1991	08/07/2029
CL 388	22/1/1992	21/01/2013
		Renewal Pending
ML 1382	20/12/1995	19/12/2016
ML 1433	24/7/1998	23/07/2019

1.3 OBJECTIVES

The objectives of this CRRP are to detail the efficient and effective extraction of coal from Longwalls 901 to 904 to ensure compliance with the BSO Approval and mining lease conditions.

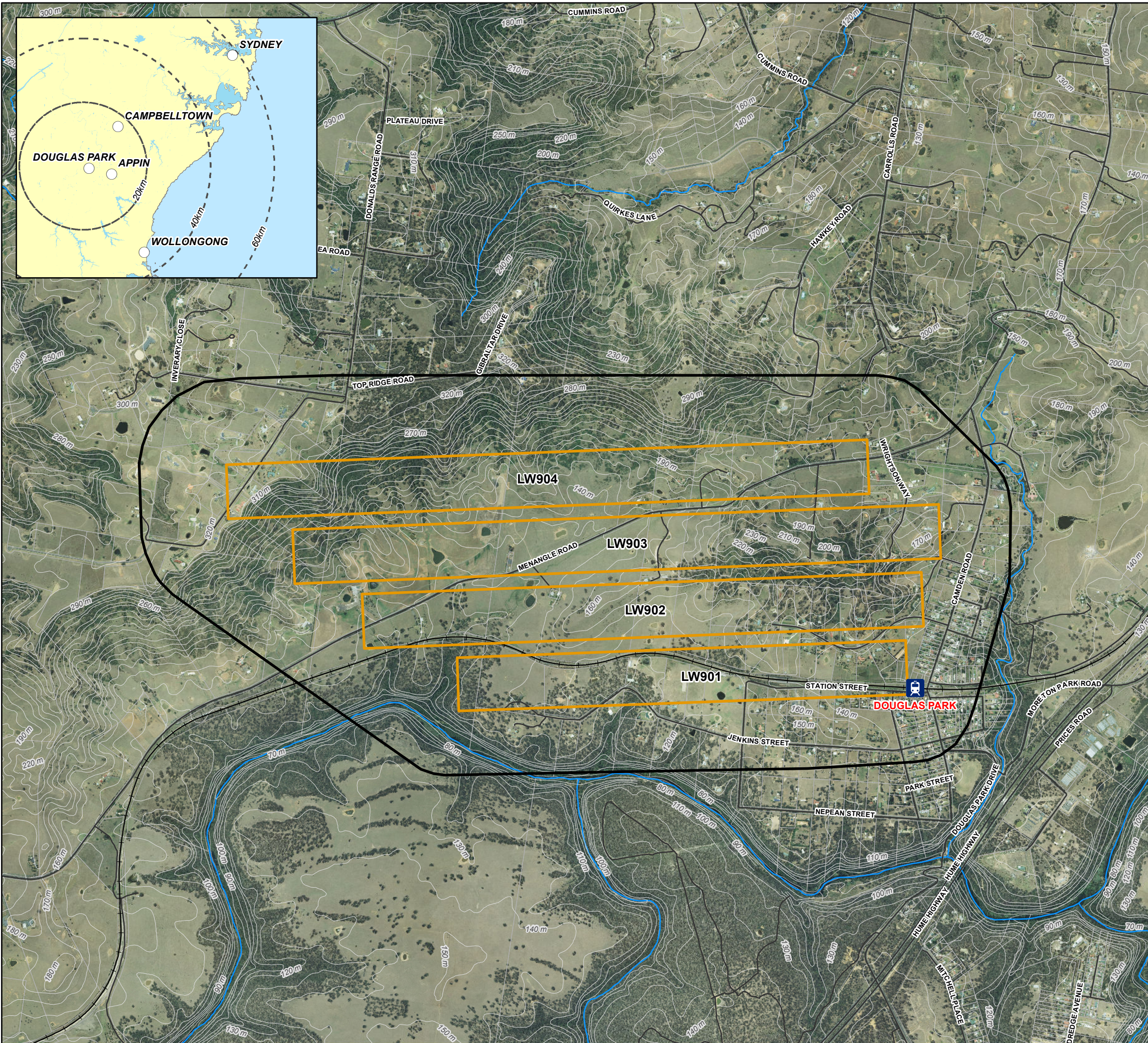
1.4 STUDY AREA

The Study Area for the EP is defined in accordance with MSEC (2012) as *the surface area predicted to be affected by the proposed mining of Longwalls 901 to 904 and encompasses the areas bounded by the following limits:-*

- *A 35° Angle of Draw line from the maximum depth of cover, which equates to a horizontal distance varying between 345 metres and 510 metres around the limits of the proposed extraction areas proposed for Longwalls 901 to 904, and*
- *The predicted limit of vertical subsidence, taken as the 20 mm subsidence contour, resulting from the extraction of the proposed Longwalls 901 to 904.*

Additionally, features potentially sensitive to far field movements, which includes horizontal, valley closure and upsidence movements that may be outside the 20mm subsidence zone or 35° Angle of Draw line have been assessed..

The location of the Study Area within the BSO for Longwalls 901 to 904 is shown in **Figure 1**.



**Appin Area 9
(LW 901- 904)
Study Area**

Legend

- Railway Stations (LPI)
- Local Roads (LPI)
- Railway (LPI)
- 10m Contours (LPI)
- Watercourses (LPI)
- Cadastre (LPI)
- AA9 Longwall Layout
- Longwalls 901-904 Study Area

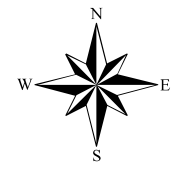
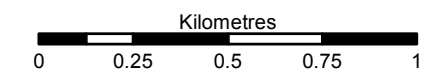


FIGURE 1

Scale 1:20,000 (at A3)



Map Produced by Cardno Wollongong
Date: 31/10/2013
Coordinate System: GDA 1994 MGA Zone 56
Project: 109012-03
Map: 1801_AppinArea9_LW_StudyArea.mxd 07
Aerial imagery supplied by BHPBIC (2009)

2 THE RESOURCE

AA9 lies in the southern part of the Permo-Triassic Sydney Basin, within which the main coal bearing sequence is the Illawarra Coal Measures of Late Permian age. The Illawarra Coal Measures contain several seams, the uppermost of which is the Bulli Seam.

BHPBIC plan to extract high quality coking coal from the Bulli Seam in the Illawarra Coal Measures.

Three stratigraphic divisions form the overburden to the Bulli Seam. All three belong to the Hawkesbury Tectonic Stage. The lowest division is the Narrabeen Group which is subdivided into a series of interbedded sandstone and claystone units. Overlying the Narrabeen Group is the Hawkesbury Sandstone Group, which is a series of bedded sandstone units. Above the Hawkesbury Sandstone is the Wianamatta Group, which consists of shales and siltstones.

The depth of cover directly above the proposed longwalls varies between a minimum of 485 m, above the western end of the proposed Longwall 901, and a maximum of 725 m, above the western end of the proposed Longwall 904.

The depth of cover to the Bulli Seam across the entire Study Area varies between a minimum of 430 m, in the base of the Nepean River valley, and a maximum of 750 m, in the northern part of the Study Area.

The Bulli Seam floor within the Study Area generally dips from the south to the north. The seam thickness within the proposed longwall goaf areas varies between 2.65 m and 3.15 m. The proposed longwalls will extract the full seam height.

The proposed layout of Longwalls 901 to 904 is shown in **Figure 1**. A summary of the proposed longwall dimensions is provided in **Table 2.1**.

Table 2.1 – Geometry of the Proposed Longwalls 901 to 904

LW	Overall Void Length Including Installation Heading (m)	Overall Void Width Including First Workings (m)	Overall Tailgate Chain Pillar Width (m)
901	2445	305	-
902	3065	305	45
903	3505	305	45
904	3515	305	45

The layout and dimensions of the proposed longwalls in AA9 has been modified from the layout of the BSO Part 3A Application. The Part 3A Layout within AA9 comprised longwalls having overall lengths varying between 1675 m and 3900 m, overall void widths of 320 m and chain pillars of 45 m.

Two important objectives which formed part of the longwall layout optimisation were:

- Setback from the Nepean River and the cliffs within the valley, so as to minimise potential for impact, and
- Minimisation of the volume of sterilised coal which could be efficiently extracted while meeting the stream impact minimisation criteria from the BSO EA and the requirements of the Project Approval.

2.1 EXTRACTION SEQUENCE

BHPBIC intends to mine coal from the Bulli Seam in the Study Area, using longwall mining methods.

Extraction of the longwalls will occur in a staged process commencing with Longwall 901 and continuing consecutively to Longwall 904. The estimated timing schedule for mining of Longwalls 901 to 904 is shown in **Table 2.2**.

Table 2.2 – Expected Schedule for Longwall Extraction 901 to 904

LW	Start	End
901	February 2016	December 2016
902	January 2017	February 2018
903	March 2018	May 2019
904	June 2019	July 2020

2.2 ESTIMATED RECOVERY

Longwalls 901 to 904 contain approximately 16.5 million tonnes of coal with 1.6 million tonnes recoverable from roadway development totalling 18.1 million tonnes of resource recovery.

2.3 POSSIBLE EFFECTS ON OTHER SEAMS

The Bulli Seam is the top seam in the Illawarra Coal Measures and consequently, mining this seam does not preclude future extraction of the seams below. There are currently no workings in other seams in the area.

There are five coal seams below the Bulli Seam ranging in thickness from 0.8 m to 9.0 m. The adjacent Balgownie seam is from 5.0 m to 10.0 m below the Bulli seam, but is only approximately 1.2 m thick and is not considered economically viable to mine. The mining of Longwalls 901 to 904 will not preclude the future mining of the lower seams.

Using available technology the Bulli Seam is currently the only economic seam in the area and there are no existing plans for mining other seams.

3 PLAN ADMINISTRATION

3.1 DISTRIBUTION

BHPBIC will make the Extraction Plan and other relevant environmental documentation publicly available on the BHPBIC website (*Condition 11, Schedule 6*).

Individual Management Plans will be developed in consultation with, and copies will be provided to, the relevant agencies and stakeholders as detailed in the appropriate plan.

3.2 REVIEW AND UPDATE

The Extraction Plan, and all of its components, will be reviewed on a regular basis to ensure that it incorporates any recommended measures to improve the environmental performance of the project.

A comprehensive review of the objectives and targets associated with the BSO is undertaken on an annual basis via the BHPBIC Balanced Planning (1 year outlook) and Balanced Strategy (5 year outlook) processes. These reviews, which include involvement from senior management and other key site personnel, assess the performance of the mine over the previous year and develop goals and targets for the following period.

An annual review of the environmental performance of the BSO will also be undertaken in accordance with (*Condition 4, Schedule 6*).

If deficiencies in the EMS and/or Extraction Plan are identified in the interim period, the plans will be modified as required. This process has been designed to ensure that all environmental documentation continues to meet current environmental requirements, including changes in technology and operational practice, and the expectations of stakeholders.

4 REFERENCES

Mine Subsidence Engineering Consultants (2012), *Appin Colliery – Longwalls 901-904. Subsidence Predictions and Impact Assessments for the Natural Features and Surface Infrastructure in support of the Extraction Plan: Report Number: MSEC448 Revision 3*. A report to BHPBIC.