

Appin Mine  
Surface Gas Management Project

# Environmental Management Strategy



## Rehabilitation Management Plan

## Review History

Revision	Description of Changes	Date	Approved
R1	New Document	Feb 2012	BB

Persons involved in the development of this document include:

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# 1 OBJECTIVES

The objectives of this Rehabilitation Management Plan (RMP) are:

- Comply with all regulatory requirements set out in the Appin Mine Surface Gas Management Project Approval (08\_0256) and other legislation with regards to rehabilitation management and monitoring;
- Ensure BHP Billiton environmental and other relevant Strategies and Policies are met and upheld;
- Implement progressive rehabilitation of temporary construction-phase impacts associated with drilling operations;
- Rehabilitation of all areas at the completion of operations;
- Outline monitoring and performance evaluation measures that are practical; and
- Provide procedures associated with reporting the results of the monitoring.

The following sections provide some background and details on the management measures required to ensure rehabilitation is undertaken progressively during the construction phases of the Appin Mine Surface Gas Management project, as well as final rehabilitation once gas management operations are no longer required. It also outlines how this plan aligns with the rehabilitation aspects included in other Appin Management Plans.

## 2 LEGISLATIVE AND OTHER REQUIREMENTS

### 2.1 Legislative Requirements

Legislation applicable to rehabilitation management includes but is not limited to:

- Mining Act 1992
- Mining Amendment Act 2008
- Threatened Species Conservation Act 1995 (TSC Act)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Environment Planning and Assessment Act 1979 (EP&A Act)
- Protection of the Environment Operations Act 1997
- Water Management Act 2000

### 2.2 Mining Lease Requirements

Appin Mine's mining operations are governed by Consolidated Coal Lease (CCL) 767. The portion of CCL 767 relating to Appin was issued on 29 October 1991. In accordance with CCL767 it is required that, upon completion of operations, BHPBIC rehabilitate the subject area and establish vegetation to the satisfaction of the Minister and other relevant stakeholders.

### 2.3 Project Approval Conditions.

Project Approval for the Appin Mine Surface Gas Drainage Project was granted by the Director General of Planning on 2 October 2009 and is available at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au). Two modifications have also been granted during December 2010 and February 2012.

Two Conditions in this Approval are directly related to rehabilitation of the Appin Mine Surface Gas Management Project works. These are:

*Condition 3.14: The Proponent shall carry out rehabilitation of the site progressively, that is as soon as reasonably practicable following disturbance.*

*Condition 3.15: The Proponent shall prepare and implement a Rehabilitation Management Plan for the Project, to the satisfaction of the Executive Director Mineral Resource. This Plan must*

- (a) be prepared in accordance with any relevant DRE guidelines;*
- (b) include details of rehabilitation of surface infrastructure during the operational phase;*
- (c) include details of final decommissioning of surface infrastructure and rehabilitation of sites; and*

*(d) Include a conceptual final landform plan showing remaining infrastructure, the expected final landform topography and vegetation types.*

## **2.4 Guidelines and Standards**

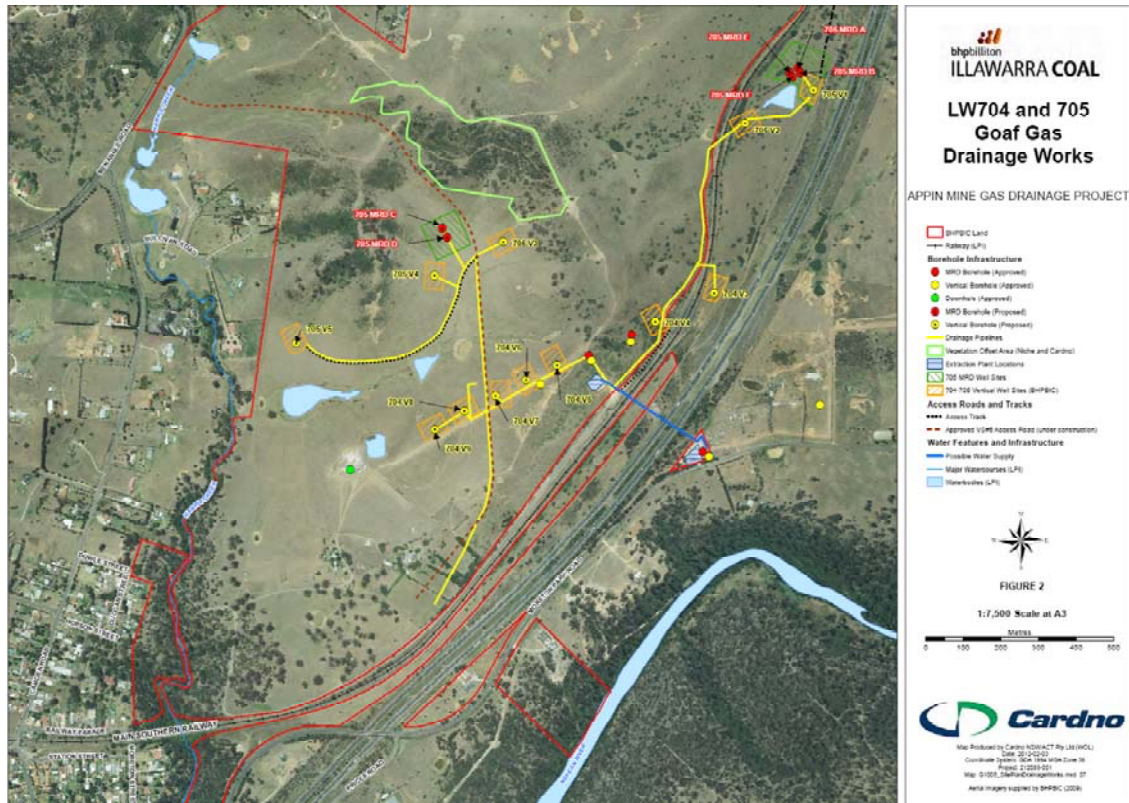
A number of guidelines and standards exist which govern and inform the mine closure and rehabilitation process. Such are outlined in Appin Mine's Conceptual Closure Plan. BHPBIC will always refer to the appropriate Standards and Guidelines available at the time. At present, relevant guidelines include:

- EDG01 Borehole Sealing Requirements on Land;
- EDG03 Guidelines to the Mining Rehabilitation and Environmental Management Process – MREMP Guideline
- Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia).
- Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth of Australia).
- Strategic Framework for Mine Closure (ANZMEC).
- Other relevant DRE NSW guidelines.
- Appropriate BHPBIC guidelines and procedures.

### 3 BACKGROUND DATA

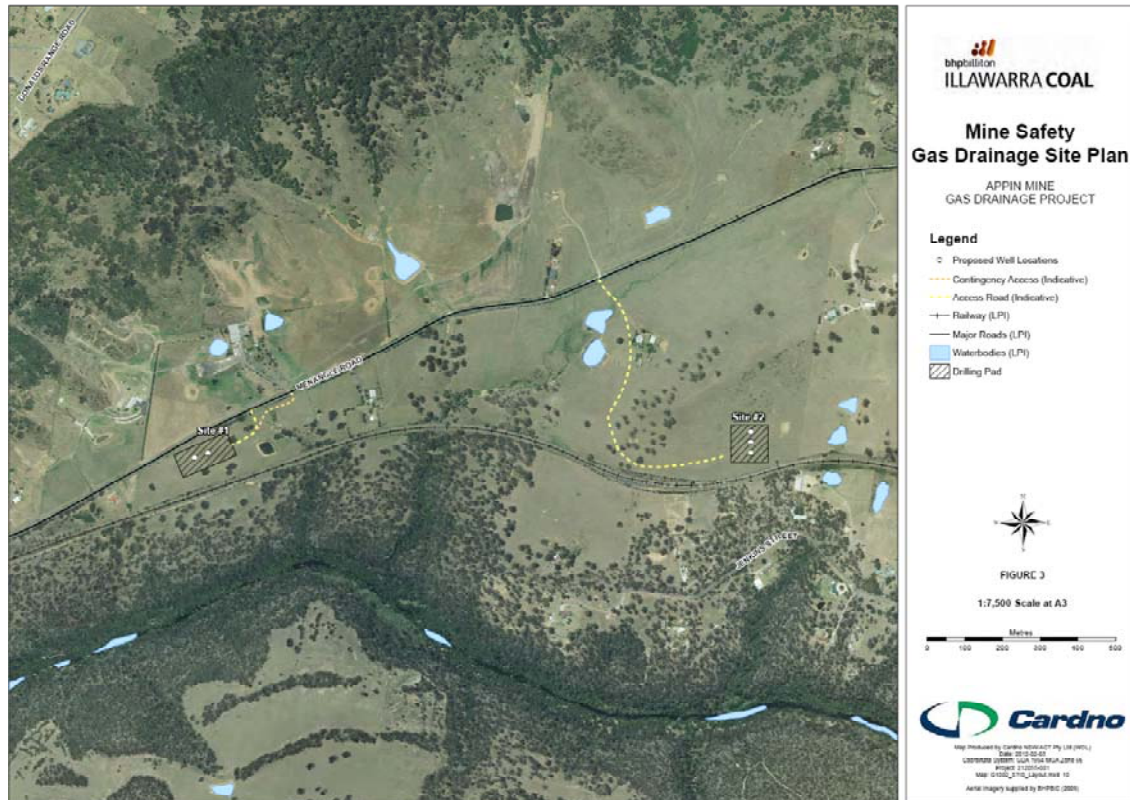
#### 3.1 Site Location

The site is located near the township of Douglas Park as shown in **Figure 3.1** and **Figure 3.2**.



**Figure 3.1. Appin Mine (Area 7) Surface Gas Management - Location and Layout.**





**Figure 3.2. Appin Mine (Area 9) Surface Gas Management - Location and Layout**

### 3.2 Baseline Condition and Existing Use

The Appin Mine Surface Gas Management project and associated surface infrastructure will be constructed both on land owned by BHPBIC and private landholdings. The landscape is characterized by undulating to hilly topography which, prior to the Appin Mine Surface Gas Management Project, was being used for stock grazing. BHPBIC are also undertaking other projects in the area in accordance with relevant Project Approvals.

Photos of the pre-existing for the Appin Mine Surface Gas Management sites are shown in Figure 3.3.



<p>LW 704 v4</p>	<p>LW 704 v5 - v9</p>	<p>LW 705 v3/v4/v5 and LW705 MRD C/D</p>
<p>LW 705 MRD A/B/E/F and LW705v1/2/3</p>	<p>MSGD Site #1</p>	<p>MSGD Site #2</p>

**Figure 3.3. Pre-existing state of Appin Mine Surface Gas Management sites.**

### **3.3 Environmental Factors**

#### **Vegetation**

A detailed description of the environmental characteristics of the land associated with the Project is outlined in the Environmental Assessments for the Appin Mine Surface Gas Management Project.

The existing landscape within the Project Area is primarily cleared, open land, dominated by pasture and grasslands. A variety of weeds and exotic plants exist.

#### **Soil and Water**

The local soil landscape is a clayey saline sodic Ashfield Shale-based type. For all local soils likely to be encountered there will be a moderate to high erosion risk for denuded soils and subsoils. These conditions have the potential to result in the rapid formation and expansion of drainage gullies. A Water Management Plan, incorporating an Erosion and Sediment Control Management Plan, has been developed to manage the areas within the Project Area.

### **3.4 Proposed Construction Phase Activities**

To establish the surface gas management site, the following works will be undertaken:

- Clearing native and exotic pasture from the access road and drill pad sites;
- Topsoil stripping (stockpiled on site for later rehabilitation of site).
- Installation of temporary site sheds and other ancillary facilities.
- Installation of surface water and noise management measures
- Construction of internal access roads.
- Construction of drilling pads.
- Construction of gas reticulation pipelines.
- Mobilisation of drill rigs and assembly of equipment on site.
- Drilling of gas extraction wells and installation of equipment such as well heads, flares, water tanks and pumps.

The above activities will cause impacts to the surface gas management sites.

### **3.5 Proposed Operation Phase Activities**

As an operational site activities that will be undertaken will include:

- Operation of extraction plant to draw gas from surface gas management wells.

- Operation of water pumps and gas flaring units to manage gas from surface gas management wells.
- Removal of water from the site by road and traffic associated with routine operations, inspections and maintenance.

During the Operation Phase the footprint from the construction phase will have been reduced, where possible, as progressive rehabilitation will have been undertaken during/post the construction phase.

### 3.6 Appin Mine Conceptual Closure Plan

Appin Mine already has a Conceptual Closure Plan document (110023-04) which covers existing infrastructure and sites associated with Appin Mine. The scope of the Conceptual Closure Plan and Appin Mine Surface Gas Management Rehabilitation Plan are as per the following Table:

Appin Mine Conceptual Closure Plan Scope	Appin Mine Surface Gas Management Rehabilitation Plan Scope
<ul style="list-style-type: none"> <li>• Appin East Pit Top</li> <li>• Appin West Pit Top</li> <li>• Appin No. 1, 2 and 3 Vent Shaft Sites</li> <li>• Douglas North Substation</li> <li>• Goaf Gas Drainage Infrastructure.</li> <li>• Appin No. 6 Vent Shaft</li> </ul>	<ul style="list-style-type: none"> <li>• Drill pads</li> <li>• Wells, well heads and associated infrastructure such as pumps/flares, extraction plant.</li> <li>• Pipelines.</li> </ul>

The Conceptual Closure Plan is revised at a nominal three year frequency. At this time the plan is updated to capture what has progressively been rehabilitated and to capture new facilities.

Both the Appin Mine Closure Plan and Appin Mine Surface Gas Drainage Rehabilitation Management Plan are structured to address the external requirements listed in Section 2 of this document, in addition to BHPB corporate requirements for rehabilitation and closure.

### 3.7 Review of Appin Mine Surface Gas Drainage Rehabilitation Plan

It is envisaged that the Appin Mine Surface Gas Drainage Rehabilitation Management Plan will be incorporated into the Appin Mine Conceptual Closure Plan at its next revision. As such the Appin Mine Surface Gas Drainage Rehabilitation Management Plan will also have a nominal three year review.

## 4 PROPOSED CLOSURE APPROACH

This rehabilitation and closure concept has been developed based on:

- The pre-existing environment of the Appin Mine Surface Gas Drainage Project Areas;
- Management measures and criteria proposed in existing Environmental Management Plans; as well as
- Current legislation, guidelines and approvals.

Existing Environmental Management Plans for Appin Mine Surface Gas Drainage address most aspects of the progressive rehabilitation to be undertaken during the Construction and Operation Phases of the Project.

The extent and scope of final rehabilitation/closure works will be more clearly defined closer to the end of the operation phase in consultation with landowners. However, the default position is to rehabilitate the disturbed sites to its pre-project landform and landuse.

### 4.1 Post-Construction Rehabilitation

#### 4.1.1 Timing of Construction and Rehabilitation

Construction works will initially be focused on the access tracks, drill pads and pipelines. The amount of clearing undertaken during construction will be minimized to reduce the project footprint at any time and subsequently the area that requires rehabilitation.

Where possible, rehabilitation works will be staged progressively to improve the ongoing aesthetics and environmental condition of the site, as well as limit the amount of rehabilitation required post-construction. The types of rehabilitation works that can be undertaken progressively during the Construction Phase will include:

- Rehabilitation of the disturbed areas alongside the access road.
- Top soiling and spray grassing of drill pad batters.
- Rehabilitating of any Construction Phase disturbance areas once they are no longer required.
- Remove equipment and temporary infrastructure as it is no longer required.

Progressive rehabilitation of the above items will include the stabilisation, re-shaping and revegetating of exposed areas. Exposed areas will typically be revegetated with spray grass.

At the completion of the Construction Phase the remaining rehabilitation activities will be undertaken, including:

- Removing drilling equipment and temporary infrastructure not required during the operational phase.
- Rehabilitation of any remaining Construction Phase disturbance areas including drilling sumps and some of the drill pad area.
- Rehabilitating the surface of buried pipeline routes

Expected outcomes of the rehabilitation are outlined in the following sections.



**Figure 4.1.** Progressive rehabilitation will include the battering down of constructed road verges and re-vegetating to promote soil stability as was done previously for the Longwall 704 Surface Gas Management Project.

#### **4.1.2 Collection of Materials**

Materials for rehabilitation will be stored throughout the Construction Phase. This includes topsoil which will be stockpiled on site

#### **4.1.3 Post-Construction Infrastructure & Landscape Rehabilitation Outcomes**

At the completion of the Construction Phase, rehabilitation works associated with the Appin Mine Surface Gas Drainage sites are proposed to have been undertaken. At this time, the following outcomes should have been achieved:

**Access Road Verges and Internal Roads**

As sections of road are completed the exposed verges will be shaped to facilitate controlled runoff and minimise the potential for erosion. These verges will be spray grassed to further assist in stabilising soils and to improve aesthetics.

When any internal roads required for the Construction Phase are no longer required they will also be rehabilitated by re-shaping to fit the existing landscape and then spray grassed. However, access to the well heads will still be needed for the operational phase.

**Top Soil Stockpiling**

It is likely topsoil will be required to enable pasture to establish on access track and drill pad verges. Topsoil will generally be sourced from site as it will be stockpiled whenever clearing works are undertaken.

**Removal of Infrastructure**

Throughout the Construction Phase a number of pieces of infrastructure and equipment will need to be stored on site. Temporary infrastructure will include demountable buildings and sheds which will be required for people, equipment and materials. As parts of the construction are completed some of these facilities will no longer be required and therefore will be removed from site as appropriate.

Once drilling has been completed and the rig has been removed the construction area will be able to be reduced to the remaining infrastructure and the area outside the reduced footprint can be rehabilitated.

**Drilling Sumps**

Drilling sumps will be:

- Drained and all contaminated or unsuitable fill material removed or treated as appropriate.
- Backfilled with suitable fill material and/or material as appropriate.
- Re-profiled and compacted to create a final landform with non-erodible sustainable grades and no pooled areas, as close as possible to the original topography and/or consistent with the surrounding area.
- Topsoiled and revegetated (if access requirements allow).

**Pad Consolidation**

Drill pads will be:

- Consolidated to an area sufficient for well head and gas management infrastructure;
- Topsoiled and revegetated where access is not longer required for operational purposes.

#### **4.1.4 Post-Construction General Rehabilitation Outcomes**

##### ***Removal of Infrastructure***

At the completion of gas extraction, all site infrastructure such as well heads, pipelines, tanks/pumps/flares, and extraction plants will be removed.

##### ***Well Plugging***

All wells will be plugged with cement based grout to avoid any cross contamination or interference with aquifers. Well plugging will be undertaken in accordance with EDF01 Borehole Sealing Requirements on Land: Coal Exploration. Prepared by Mineral Resources New South Wales Environmental Management Guidelines for Industry. NSW Department of Mineral Resources, 1 December 1997. The well head will be removed approximately 2 m from below ground level.

##### ***Landform Establishment***

Drill pads will be contoured to match the pre-project landform, unless otherwise requested by the landowner or infrastructure owner.

##### ***Pasture establishment***

The re-contoured drill pad area will be covered with top soil and then spray grassed with a pasture mix. All disturbed land will be revegetated to a self supporting and stable landform.

#### **4.1.5 Final Land Use Objectives**

At this stage it is anticipated that post-rehabilitation land use for the Appin Surface Gas Drainage Project sites would be rural agricultural as that is the pre-existing use at the site. However this is subject to the legislative, stakeholder and landowner requirements at the time of rehabilitation.

Examples of the progressive rehabilitation of Appin Surface Gas Management Project infrastructure are shown in Figure 4.2.





**Figure 4.2.** Stages of progressive rehabilitation from previous BHPBIC surface gas management projects.

## **5 MONITORING & REPORTING**

### **5.1 Construction Phase**

During the Construction Phase the Approvals Advisor (Surface) and/or site Project Manager will ensure weekly inspections are undertaken to determine the success of management measures in place for aspects including sedimentation, erosion, and vegetation. These inspections will incorporate criteria extracted from key commitments in Environmental Management Plans. Criteria will include:

- Erosion controls in are in place and maintained to prevent erosion.
- Minimization of cleared areas and the undertaking of progressive rehabilitation where appropriate.
- Soils are separated and stockpiled to enable reuse for rehabilitation works.

These inspections are referred to in Section 4 of this Management Plan, however in general the success of rehabilitation will be determined by achieving ground cover sufficient to provide a stable, non-erodible land surface that does not require routine maintenance.

### **5.2 Operation Phase**

During the Operation Phase the environment and community responsibilities for the Appin Mine Surface Gas Management project site will be managed the Approvals Advisor (Surface). By the Operation Phase the cleared footprint will have been reduced as the extended construction area will have been progressively rehabilitated during the Construction Phase.

During the Operation Phase the monitoring required for the sites will have reduced significantly. Inspections will continue to be undertaken of the site and general maintenance of drainage facilities, vegetation and weed management will occur.

### **5.3 Project Completion**

At the completion of the Operation Phase final rehabilitation for the sites will occur. Inspections will continue to be undertaken of the site and general maintenance of drainage facilities, vegetation and weed management will occur until the site is deemed to be stable and self supporting

### **5.4 Reporting**

Rehabilitation reporting will be in accordance with the consent conditions of the Project Approval.

Rehabilitation programs undertaken for the prior year and expected for the following year will be reported in the Annual Review.

## **6 REFERENCES**

BHP Billiton Illawarra Coal 2012, Appin Mine Surface Gas Management Project – Environmental Management Strategy.

Cardno, 2010, Appin Mine Conceptual Closure Plan

Cardno 2012, Environmental Assessment, BHP Billiton Illawarra Coal Appin Mine Surface Gas Management Project (Modification 2).

Summerhayes, G. (1997) EDF01 Borehole Sealing Requirements on Land: Coal Exploration. Prepared by Mineral Resources New South Wales Environmental Management Guidelines for Industry. NSW Department of Mineral Resources, 1 December 1997.