

Illawarra Coal



Appin Area 9

Appin Area 9 Longwalls 901 to 904 Extraction Plan
Annex H – Built Features Management Plan, 31 October 2013

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ATTACHMENT E- SYDNEY WATER MP (SYDNEY WATER)
ATTACHMENT F- TELECOMMUNICATIONS MP - (TELSTRA AND POWERTEL)

Review History

Revision	Description of Changes	Date	Approved
A	New Document	22 February 2012	
B	Final Document - Revised with comments from BHPBIC	14 March 2012	
C	Final Document – Updated with new Mine Plan	13 June 2012	
D	Final – Updated with Agency Comments	31 October 2013	

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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 Built Features Management Plan (BFMP) supports the Longwall 901 to 904 Extraction Plan for Appin Area 9 (AA9). The relationship between this BFMP and the other components of the Extraction Plan is shown in Figure 1 of the Extraction Plan.

1.2 SCOPE

This BFMP has been prepared by Cardno on behalf of BHPBIC in accordance with the BSO Approval *Condition 5 (g), Schedule 3* as follows:

5. *The Proponent shall prepare and implement an Extraction Plan for first and second workings within each longwall mining domain to the satisfaction of the Director-General. Each extraction plan must:*

(g) *include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:*

- addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;*
- has been prepared following appropriate consultation with the owner/s of potentially affected features;*
- recommends appropriate pre-mining measures to reduce subsidence impacts;*
- recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and*
- in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports, external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact infrastructure.*

The Study Area for the Extraction Plan (refer **Figure 1**) 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 m and 510 m 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 20 mm subsidence zone or 35° Angle of Draw line have been assessed.

1.3 OBJECTIVES

The objectives of this BFMP are to identify key infrastructure, which may potentially be affected by the proposed mining of Longwalls 901 to 904 and to describe the processes implemented by BHPBIC to develop asset specific Infrastructure Management Plans (IMPs) and Property Subsidence Management Plans (PSMP) for these assets. The BFMP will act as a covering document for the updated IMPs and PSMPs.

Agreements with individual asset owners (referred to as IMPs) are currently in place (for Appin Area 7 [AA7]) and will be updated in consultation with those owners and the relevant agencies, and submitted to DP&I prior to the extraction of Longwalls 901 to 904. This BFMP provides an overview the potential impacts to these features from the extraction of these longwalls and documents the arrangements that are currently in place which will be adopted (as relevant) for AA9.

The aim of these IMPs is to manage the potential key subsidence impacts and/or environmental consequences on affected infrastructure and all classes of other built features in consultation with the asset owner. PSMPs will be prepared on an as needs basis with private landowners in relation to assets such as houses and farm dams. The public infrastructure and other classes of built features identified in the Study Area are shown on the MSEC (2012) figures, MSEC448-13 to MSEC448-32.

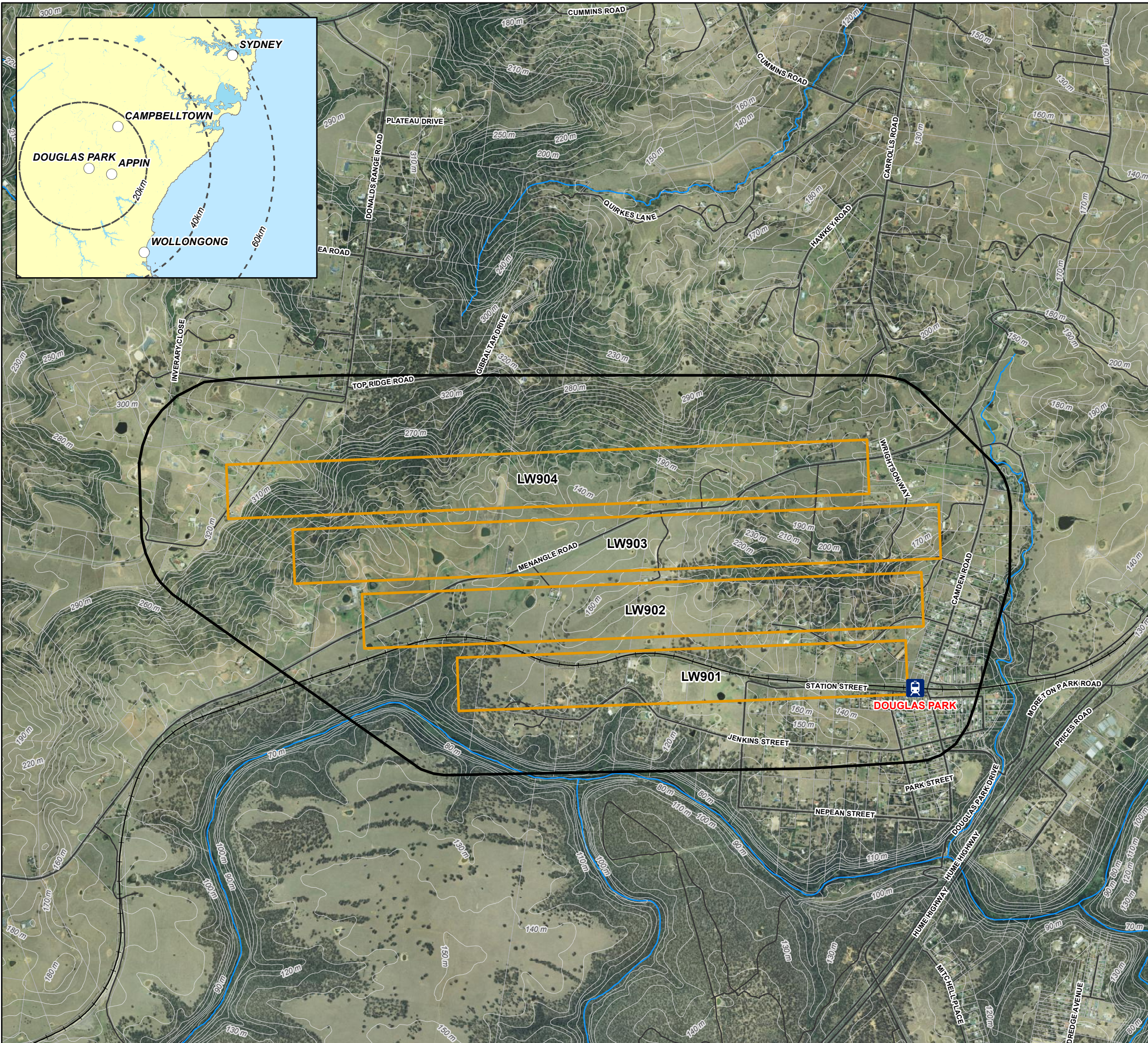
1.4 DISTRIBUTION

The finalised BFMP (and applicable IMPs) will be distributed to:

- Department of Planning and Infrastructure (DP&I)
- Department Trade and Investment (DTI – formally DRE)
- Owners of Affected Infrastructure.

The BSO Project Approval requires that the BFMP be developed in consultation with any potentially affected public authorities. This will be achieved through the consultation methods detailed in **Section 7.2** and **Section 7.3**.

BHPBIC will make the BFMP publicly available on the BHPBIC website (*Condition 11, Schedule 6*). The PSMPs and the IMPs are the agreements between the asset owners and BHPBIC and will not be made public if they include sensitive information.



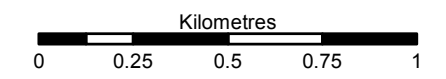
**Appin Area 9
(LW 901- 904)
Study Area**

- 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 STATUTORY REQUIREMENTS

Extraction of coal from Longwalls 901 to 904 will be in accordance with the conditions set out in the BSO Approval, applicable legislation as detailed in **Section 2.2** and the requirements of relevant licenses and permits (including conditions attached to mining leases).

2.1 BSO APPROVAL

Condition 5 (g), Schedule 3 of the BSO Approval (MP 08_0150) requires the preparation of a BFMP to manage the potential impacts and/or environmental consequences of the proposed second workings on public infrastructure and other built features (refer **Section 1.2**).

The specific IMPs will also address the requirements detailed in *Condition 6 Schedule 3* and *Condition 2, Schedule 6* of the BSO Approval as shown in **Table 2.1**.

Table 2.1 – Management Plan Requirements

Project Approval Condition	Relevant BFMP Section
<p>Condition 6 - Schedule 3</p> <p>The Proponent shall ensure that the management plans required under <i>Condition 5 (g)-(l)</i> above include:</p> <ul style="list-style-type: none"> (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; (b) a detailed description of the measures that would be implemented to remediate predicted impacts. 	<p>Section 4</p> <p>Section 7</p>
<p>Condition 2 - Schedule 6</p> <p>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <ul style="list-style-type: none"> (a) detailed baseline data; (b) a description of: <ul style="list-style-type: none"> - the relevant statutory requirements (including any relevant approval, licence or lease conditions); - any relevant limits or performance measures/criteria; (c) a description of the measures that would be implemented to comply with the relevant statutory, limits, requirements or performance measures/criteria; (d) a program to monitor and report on the: <ul style="list-style-type: none"> - impacts and environmental performance of the project; - effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: <ul style="list-style-type: none"> - incidents; - complaints; - non-compliances with statutory requirements; and 	<p>Section 3</p> <p>Section 2</p> <p>Section 5</p> <p>Sections 5 to 8</p> <p>Sections 5 to 8</p> <p>Section 6</p> <p>Section 8</p> <p>Section 10</p> <p>Section 9</p> <p>Section 10</p>

Project Approval Condition	Relevant BFMP Section
- exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	Section 10

Due consideration will be given to all the BSO Approval Conditions in the preparation of this BFMP, including those relating to auditing, rehabilitation and environmental management.

2.2 LEGISLATION AND GUIDELINES

This BFMP conforms to the requirements of the relevant legislation and advisory documents and guidelines.

Details of specific legislation and guidelines applicable to each IMP will be contained within that particular plan.

2.2.1 Relevant Leases and Licences

The following leases and licences may be applicable to BHPBIC's operations in AA9:

- Mining Leases as per **Table 2.2**.
- Environmental Protection Licence (EPL) 2504 which applies to BSO, including Appin and West Cliff Mines. A copy of the licence can be accessed at the EPA website via the following link <http://www.epa.nsw.gov.au/prpoeo/index.htm>.
- BSO Mining Operation Plan (MOP) 1/10/2012 to 30/09/2019 (V1)
- All relevant OH&S and HSEC approvals
- Any additional leases, licences and approvals resulting from the BSO Approval.

Table 2.2 – 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

3 BASELINE ASSESSMENT

Built features within the Longwalls 901 to 904 Study Area were identified and assessed in the MSEC Report (MSEC, 2012), drawing numbers MSEC448-13 to MSEC448-32, appended to the Extraction Plan as Annex A. The built features are listed below in **Table 3.1** and shown in **Figure 1**.

These assets are largely the same as the assets present in the currently mined AA7. As such there are existing IMPs in place for most of this infrastructure, detailing the management and mitigation measures agreed between BHPBIC and the asset owners (refer **Table 3.1**). These IMPs will be updated in consultation with asset owners to address the extraction of Longwalls 901 to 904.

Descriptions of these assets, and the potential impacts on them from the extraction of Longwalls 901 to 904, are provided in **Section 4**.

A summary of potential mitigation and management measures are provided in **Section 7**, however these will be further developed in consultation with the asset owners and included in the updated IMPs for each item prior to mining.

Table 3.1 – Occurrence and Management Documentation for Built Features in AA9

Public Utilities	AA7	AA9	Management Plan (to be updated if required)
Railways (Main Southern Railway)	✓	✓	Management Plan for Longwall Mining beneath the Main Southern Railway. Revision C April 2011
Roads (Hume Highway HW2 and local roads)	✓	✓	Management Plan for Longwall mining beneath the Hume Highway. Revision C March 2011 Public Road Management Plan for Longwall Mining Revision 9 June 2010
Bridges (associated with Road and Railways see above)	✓	✓	See above
Culverts (associated with Road and Railways see above)	✓	✓	See above
Water, Gas or Sewerage Pipelines (Sydney Water and United Utilities)		✓	LW Mining Beneath the Macarthur Water Supply Pipeline Revision 4 May 2011
Electricity Transmission Lines or associated plants	✓	✓	Integral Energy Transmission Infrastructure Monitoring & Management Plan Revision 1 Oct 2009
Telecommunications Lines or associated Plants	✓	✓	Telstra Management Plan
Schools		✓	Specific PSMP will be negotiated with the Property owner
Farm buildings or sheds	✓	✓	Specific PSMP will be negotiated with the Property owner
Tanks	✓	✓	Specific PSMP will be negotiated with the Property owner
Gas or Fuel Storages	✓	✓	Specific PSMP will be negotiated with the Property owner
Fences	✓	✓	Specific PSMP will be negotiated with the Property owner
Farm Dams	✓	✓	Specific PSMP will be negotiated with the Property owner

Public Utilities	AA7	AA9	Management Plan (to be updated if required)
Wells or Bores	✓	✓	Specific PSMP will be negotiated with the Property owner
Business or Commercial Establishments and Improvements		✓	Specific PSMP will be negotiated with the Property owner
Commercial Gas or Fuel Storages or Associated Plants		✓	Specific PSMP will be negotiated with the Property owner
Mine Infrastructure Including Tailings dams or Emplacement Areas		✓	Specific PSMP will be negotiated with the Property owner
Areas of Heritage or Archaeological significance	✓	✓	Specific PSMP will be negotiated with the Property owner
Permanent Survey Control Marks	✓	✓	Specific PSMP will be negotiated with the Property owner BHPBIC will restore any survey marks disrupted by mining
Houses	✓	✓	Specific PSMP will be negotiated with the Property owner
Associated structures such as Workshops, Garages, on-site Waste Water Systems, Water or Gas Tanks, Swimming Pools or Tennis Courts	✓	✓	Specific PSMP will be negotiated with the Property owner

4 PREDICTED IMPACTS

4.1 THE MAIN SOUTHERN RAILWAY

The Main Southern Railway is a key national transport route that carries significant freight and passenger services between Sydney and Melbourne. Approximately 3.8 km of track is located within the Study Area with 2.9 km of track located directly above proposed Longwalls 901 to 902.

A number of major railway structures also occur within the Study Area, including:

- Culverts, embankments and cuttings
- A partially filled Subway
- An emergency crossover
- Douglas Park Station
- Automated vehicular level crossing at Camden Road, Douglas Park
- Two small level crossings for private property access
- Signalling and communications systems, including a communications tower.

The maximum predicted subsidence effects on the Main Southern Railway, based on the Extraction Plan Layout, are less than those predicted based on the longwall layout assessed in the BSO Application.

Predicted changes in track geometry resulting from conventional subsidence are an order of magnitude less than the maximum allowable deviations specified in the ARTC's Base Operating Standards (MSEC, 2012). For example, the maximum allowable change in cant is 75 mm over a length of 1.435 m before the trains are stopped. This represents a tilt of approximately 50 mm/m, which is substantially greater than the maximum predicted conventional tilt of 6.5 mm/m.

Mine subsidence will result in changes to rail stress and preventative measures will be implemented to ensure the rails remain within designated operating standards during the mining of the proposed longwalls.

Table 4.1 provides an assessment of the potential impacts to associated railway features.

Table 4.1 – Impact Assessment for Features of Main Southern Railway

Feature	Impact Assessment (MSEC, 2012)
Culverts	<p>It is expected that mining-induced conventional tilts will not significantly impact the drainage flows in the culverts. It is, however, recommended that the culverts be cleared of ballast which may have accumulated in the culvert prior to mining.</p> <p>It is possible that brick arch culverts will experience some cracking and spalling of the masonry as a result of mining the longwalls. Cracking may occur in the masonry arch or in the headwalls. The predicted movements are not considered likely to result in collapse of the culvert.</p>
Subway	<p>It is possible that the Subway will experience some cracking and spalling of the masonry as a result of mining the longwalls. Cracking may occur in the masonry arch or in the headwalls. The predicted movements are not considered likely to result in collapse of the Subway.</p>
Cuttings	<p>The cuttings have been inspected by the geotechnical engineer David Christie (2011). The batters consist of weathered shale and some are steeply sided. No significant geological structures are visible in the cutting faces.</p> <p>David Christie (2011) has concluded that in the unlikely event that the face of these cuttings fail, the failure is likely to be very minor (in the form of small fragments of rock) and likely to fall into the clear area adjacent to the railway, referred to as the cess.</p>
Embankments	<p>BHPBIC has commissioned studies and reviews on potential changes to embankment stability as a result of mine subsidence for an embankment located above proposed longwalls at AA7 at 69 km.</p> <p>The study site at 69 km is close to and appears to be similar in material to the embankments in the Study Area. As such this information will assist with understanding the potential for impacts on the embankments in the Longwalls 901 to 904 Study Area. In this case, culverts pass through three of the four embankments in the Study Area and it is important that these culverts are clear and serviceable.</p>
Emergency Crossover	<p>ARTC are considering replacing the Emergency Crossover. If the crossover remains operational during the mining of Longwalls 901 and 902, the Rail Technical Committee will conduct an engineering assessment on the potential impacts of mine subsidence on the crossover and potential effects on its operations following the implementation of the track expansion system. Management measures will be developed to ensure that the crossover is serviceable during mining.</p>
Douglas Park Station	<p>Given that the proposed longwalls will not mine directly beneath the station, the potential for physical impacts on the structures is considered to be low. ARTC's Base Operating Standards provide for allowable clearances between the track and the railway platforms. It is possible, though unlikely that differential horizontal movements between the track and platforms will result in an exceedance of the Base Operating Standards. The likelihood is assessed as low as the clearances from the Base Operating Standards between the track and the platforms and between the two tracks are typically of an order of magnitude greater than predicted differential movements.</p>
Level Crossings	<p>It is unlikely that the gaps between the rails and the timbers will close as a result of differential horizontal movements between the rails and the timbers as the timbers rest on top of the stiff concrete sleepers. The potential impacts at level crossings can, however, be managed by visual inspections during mining.</p> <p>At the Railway Station there is a gated crossing, it is unlikely that the boom gate structures will experience impacts due to mining. Mining-induced ground strains are unlikely to affect the structures, which consist of isolated single poles. Mining-induced ground tilts are unlikely to result in impacts, as the boom gates consist of single horizontal bars with substantial ground clearance.</p>
Signals and Communication Infrastructure	<p>The probability of Wrong Side Failure of signal cables as a result of the mining of the proposed longwalls is considered to be extremely low. It is possible, however, that cable breakages could develop if severe ground deformations occur in the vicinity of the cables, such as ground stepping at a fault, even when the overall ground strains are compressive.</p>

Feature	Impact Assessment (MSEC, 2012)
	<p>In such situations, however, it is possible to relieve the stress in the cables by exposing them to the surface. This will allow the cables to drape over the ground deformation.</p> <p>Mining-induced ground strains are unlikely to affect the isolated single pole structure of the communications tower near Camden Rd Level Crossing. Mining-induced ground tilts may, however, affect the communications system if the signal strength is sensitive to small changes in height and orientation.</p>

Mitigation measures for the Main Southern Railway and associated features are detailed in **Section 7.4.1**. It is considered that with the adoption of appropriate management measures, potential impacts can be managed, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.

4.2 THE HW2 HUME HIGHWAY

The HW2 Hume Highway is an important road corridor linking Sydney with Canberra and Melbourne. The highway is under the management of Roads and Maritime Services (RMS). It carries approximately 20 Mtpa of road freight and current traffic volumes are in excess of 37,000 vehicles per day (MSEC, 2009). At its closest point to the proposed longwalls the Hume Highway is located at a distance of 750 m south-east of Longwall 901.

The Hume Highway is predicted to experience less than 20 mm of vertical subsidence. However, the highway could experience subsidence slightly greater than 20 mm, as the result of far-field vertical movements but, it would not be expected to experience any significant conventional tilts, curvatures or strains.

Incremental far-field horizontal movements of around 50 mm have been observed at distances of 1 km from extracted longwalls. These movements tend to be bodily movements, towards the extracted goaf area, and are accompanied by very low levels of strain, which are generally less than the order of survey tolerance.

Therefore, it is unlikely that the highway pavement would experience any significant impacts resulting from the extraction of the proposed longwalls. Similarly, it is not expected that the drainage culverts, cuttings, embankments, emergency phone system and road signage would experience any significant impacts resulting from the extraction of the proposed longwalls. Management is anticipated to be undertaken in accordance with the current IMP, as adapted to AA9 (refer **Section 7.4**).

4.2.1 Bridges

The Twin Bridges over the Nepean River and the Moreton Park Road Bridge (South) could be sensitive to the far-field movements resulting from the extraction of the proposed longwalls.

The Twin Bridges (Hume Highway) cross the Nepean River at a distance of 1 km south of the proposed Longwall 901. The bridges are sensitive to the relative horizontal movements between the supporting columns. Previous data taken from the bridge during the extraction of longwalls at the Appin and Tower Collieries have recorded these movements in the vicinity of 50 mm without any significant adverse impacts on the bridge.

Existing management measures are in place for the Twin Bridges and these will be reviewed, in consultation with RMS, based on the potential movements resulting from the extraction of the proposed longwalls.

The study will include input from structural and geotechnical engineers and subsidence engineers. The management measures may include a combination of:-

- Mitigation measures prior to mining;
- Installation of a monitoring system, which includes, among other things, the monitoring of ground movements, structure movements, sub-surface ground movements, bridge joint displacements and visual inspections;
- Implementation of a response plan, where actions are triggered by monitoring results; and
- Implementation of a reporting and communication plan.

Moreton Park Road Bridge (South) is located at a distance of 1 km east of Longwall 901, at its closest point. The concrete bridge crosses over the HW2 Hume Highway and has an overall length of 98 m. The bridge is supported on three single piers, spaced at approximately 30 m, with abutments at each end. It is expected that the relative horizontal movements at the Moreton Park Road Bridge (South), resulting from the extracting of the proposed longwalls, would also be small.

Existing management measures are in place for Moreton Park Road Bridge and these will be reviewed, in consultation RMS, based on the potential movements resulting from the extraction of the proposed longwalls.

4.3 LOCAL ROADS

The locations of local roads within the Study Area are illustrated in MSEC drawing MSEC448-14 located at Annex A of the Extraction Plan. The main local roads within AA9 include Douglas Park Drive, Menangle Road, Moreton Park Road and Remembrance Drive. The local roads are managed by RMS and Wollondilly Shire Council (WSC). The local roads typically have bitumen seals of asphaltic pavements. Some of the minor local roads within the Study Area are unsealed.

Local roads may be subjected to the full range of predicted subsidence effects. The predicted subsidence impacts to local roads within the Study Area are expected to be similar to those observed and predicted at the local roads which have been mined directly beneath by previously extracted longwalls in the Southern Coalfield. It is expected, therefore, that the local roads can be maintained in a safe and serviceable condition throughout the mining period using normal road maintenance techniques.

Predicted tilts are less than 1% and are unlikely to result in any significant impacts on the serviceability or surface water drainage for the local roads. If any additional ponding or adverse changes in surface water drainage were to occur as the result of mining, the roads could be repaired using normal road maintenance techniques.

Some local roads pass in the locality of cliffs and steep slopes within the Study Area which may be affected by subsidence. As such, due consideration will be given to the potential impacts that these features may have on the serviceability of these local roads as discussed in the Land Management Plan (LMP).

Existing management measures are in place for the local roads and these will be reviewed, in consultation with WSC and RMS, based on the potential movements resulting from the extraction of the proposed longwalls.

4.3.1 Local Road Bridges

Moreton Park Road Bridge (South) is associated with the HW2 Hume Highway and is discussed in **Section 4.2** (above).

Blades Bridge is located at a distance of 650 m south-east of the proposed Longwall 901. The bridge crosses Harris Creek and connects Moreton Park Road with Douglas Park Drive. The original bridge has recently been replaced with a Bailey type bridge, simply supported by concrete abutments, designed to accommodate mine subsidence movements as approved by the Mine Subsidence Board (MSB).

The predicted subsidence, upsidence and closure at Blades Bridge are all less than 20 mm. Blades Bridge crosses Harris Creek, and therefore, could experience valley related movements. The effective height within a half-depth of cover from the bridge, which is used to calculate the valley related movements, is 30 m. The maximum predicted upsidence and closure at Blades Bridge, resulting from the extraction of the proposed longwalls, are both less than 20 mm.

In addition to this, the new Blades Bridge was designed to accommodate mine subsidence movements which are significantly greater than those predicted.

It is unlikely, therefore, that Blades Bridge would experience any significant impacts resulting from the extraction of the proposed longwalls. Consultation with WSC based on the potential movements resulting from the extraction of the proposed longwalls will be undertaken.

4.3.2 Culverts

Previously extracted longwalls throughout the NSW Coalfields have mined directly beneath drainage culverts. The incidence of impacts on drainage culverts has been found to be low, where the depths of cover were greater than 400 m, which is the case within the Study Area. Impacts have generally been limited to cracking in the concrete headwalls which can be readily remediated. In some cases, however, cracking in the culvert pipes occurred which required the culverts to be replaced.

Subject to the implementation of management measures, it is expected that the drainage culverts within the Study Area could be maintained in serviceable conditions throughout the mining period.

4.4 SYDNEY WATER INFRASTRUCTURE

The locations of Sydney Water infrastructure within the Study Area are shown in MSEC drawing MSEC448-15 located at Annex A of the Extraction Plan. Sydney Water owns and maintains a number of water pipelines within the Study Area which supply the township of Appin. There are no Sewage Treatment Plants currently located within the Study Area. The NSW Government have proposed a new Sewage Treatment Plant near Douglas Park and BHPBIC are consulting with Sydney Water in relation to this proposed infrastructure.

BHPBIC will maintain contact with Sydney Water and put in place the appropriate management measures for any new infrastructure which is proposed to come online prior to or during mining.

The water pipelines are pressure mains and are unlikely to be affected to any great extent by changes in gradient due to subsidence or tilt. The maximum predicted ground curvatures and the range of potential strains at the water infrastructure, resulting from the extraction of the proposed longwalls, are similar to those typically experienced elsewhere in the Southern Coalfield which have been successfully undermined.

Based on this experience, it is expected that some minor leakages of the water pipelines could occur, as the result of the extraction of the proposed longwalls, however, the incidence of impacts is expected to be low. Impacts are more likely to occur in the locations of non-conventional movements, and at creek crossings, due to valley related movements.

Any impacts are expected to be of a minor nature and will be remediated.

Existing management measures are in place for the local water infrastructure (West Cliff Area 5 near Appin) and will be reviewed, in consultation with Sydney Water, based on the potential movements resulting from the extraction of the proposed longwalls.

4.5 SYDNEY CATCHMENT AUTHORITY INFRASTRUCTURE

The Sydney Catchment Authority (SCA) owns the Maldon and Douglas Park weirs, which are located along the Nepean River within or immediately adjacent to the Study Area. The weirs are used to control water flows and levels along the river, as well as to measure water flows.

The Douglas Park Weir, which is in AA9, is located immediately upstream of Douglas Park Bridges where the HW2 Hume Hwy crosses the Nepean River.

The SCA have also installed fish passages along the Nepean River (designed in consultation with the MSB). The structures provide a channel for the fish to swim around the weirs in the river. These have been constructed from reinforced concrete supported on piers into the bedrock.

The predicted mine subsidence movements at the SCA infrastructure are small, in the order of survey tolerance and, therefore, are unlikely to result in any significant impacts.

Existing management measures are in place for the SCA infrastructure and will be reviewed, in consultation with SCA, based on the potential movements resulting from the extraction of the proposed longwalls.

4.6 ELECTRICAL INFRASTRUCTURE

The locations of electrical infrastructure are provided in MSEC drawing MSEC448-16 located at Annex A of the Extraction Plan. Integral Energy owns and maintains a number of 66kV, 11kV and low voltage aerial powerlines within the Study Area. All conductors within the distribution network consist of overhead cables, supported by power poles.

Low voltage service connections from the distribution network to houses and other structures are predominantly via overhead cables. There are, however a small number of buried low voltage services connections. The majority of which have recently been installed at new subdivisions.

The aerial powerlines will not be directly affected by the ground strains, as the cables are supported by poles above ground level. The cables may, however, be affected by changes in the bay lengths, i.e. the distances between the poles at the levels of the cables, resulting from differential subsidence, horizontal movements, and tilt at the pole locations. The stabilities of the poles may also be affected by conventional tilt, and by changes in the catenary profiles of the cables.

The maximum predicted subsidence and tilts at the powerlines, resulting from the extraction of the proposed longwalls, are similar to those typically experienced elsewhere in the Southern Coalfield. Longwalls in the Southern Coalfield have successfully mined directly beneath powerlines in the past, with impacts expected to be relatively infrequent and easily repaired. Remedial measures may include some adjustments of the cable catenaries, pole tilts and the consumer cables.

Existing management measures are in place for the local power distribution network and will be reviewed, in consultation with Integral, based on the potential movements resulting from the extraction of the proposed longwalls as detailed in **Section 7.4**.

4.7 TELECOMMUNICATIONS INFRASTRUCTURE

The location of the telecommunications infrastructure within the Study Area is illustrated in MSEC drawing MSEC448-17 located at Annex A of the Extraction Plan. The telecommunications infrastructure within the Study Area comprises a direct buried optical fibre cable, aerial and direct buried copper cables and a mobile phone telecommunications tower.

The optical fibre cables are direct buried and are unlikely, therefore, to be impacted by tilt. The cables are also unlikely to be impacted by curvature, as the cables are flexible and

would be expected to tolerate the predicted minimum radius of curvature within the Study Area of 9 km.

There have been no significant impacts on direct buried copper telecommunications cables elsewhere in the NSW Coalfields, where the depths of cover were greater than 400 m, such as the case above the proposed longwalls.

Only minor impacts on aerial copper telecommunications cables have been recorded as a result of subsidence in the Southern Coalfield. Remedial measures including, adjustments to cable catenaries, pole tilts and consumer cables which connect between the poles and houses may be required in isolated cases.

A telecommunications tower is located approximately 340 m north of the proposed Longwall 904 Maingate. While it is possible that the tower could experience subsidence slightly greater than 20 mm, as the result of far-field vertical movements, it would not be expected to experience any significant conventional tilts, curvatures or strains.

The tower is likely to experience far-field horizontal movements, as incremental far-field horizontal movements of around 100 mm have been observed at distances of 500 m from previously extracted longwalls. These movements tend to be bodily movements, towards the extracted goaf area, and are accompanied by very low levels of strain, which are generally less than the order of survey tolerance.

It is unlikely that the telecommunications tower would experience any significant impacts resulting from the extraction of the proposed longwalls. Similarly, it is not expected that the associated lightweight sheds would experience any significant impacts resulting from the extraction of the proposed longwalls.

Existing management measures are in place for the communications infrastructure and will be reviewed, in consultation with Telstra and Optus, based on the potential movements resulting from the extraction of the proposed longwalls.

4.8 BUILDINGS, HOUSES AND OTHER ASSETS

There are 655 rural building structures (Structure Type R) identified within the Study Area, which includes sheds, garages, gazebos, pergolas, greenhouses, playhouses, shade structures and other non-residential building structures.

Other built features within the Study Area include, houses, tanks, farm dams, gas and fuel storages, shops and a school.

All these features will be managed in accordance with specific PSMPs as described in **Section 7.4**.

5 PERFORMANCE MEASURES AND INDICATORS

The BSO Approval provides Subsidence Impact Performance Measures (*Condition 3, Schedule 3*). **Table 5.1** below details the conditions relevant to built features within the Study Area.

In order to mitigate the potential subsidence impacts and environmental consequences from the mining of Longwalls 901 to 904 monitoring and recording will be undertaken prior to mining, throughout the extraction and at the completion of subsidence (refer **Section 6**).

In the event that any subsidence impact is recorded, consideration would be given to implementing appropriate management, remediation and/or mitigation measures in consultation with relevant stakeholders (refer **Section 7**).

If the subsidence impact performance measures are exceeded, BHPBIC will notify the appropriate stakeholders and implement the Contingency Plan (**Section 8**).

Table 5.1 – Subsidence Impact Performance Measures

Built features (Condition 3, Schedule 3)	
Key public infrastructure; <ul style="list-style-type: none"> • Main Southern Railway • Hume Highway; and • Key SCA Infrastructure (SCA infrastructure, Cataract Tunnel, Upper Canal, Broughtons Pass Weir and other Weirs) 	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repaired.
Other public infrastructure (including water supply pipelines, high pressure gas pipelines; high pressure gas pipelines and the gas distribution network; electricity transmission and distribution lines; telecommunications cables and optical fibre networks; roads, trails and associated structures). Other built features (including houses, industrial premises, swimming pools, farm dams and other improvements)	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated, or else the damaged built feature or damaged infrastructure component must be replaced.

**Note. Not all of the above mentioned features are present in the LW 901 to 904 Study Area as the subsidence impact performance measures in Schedule 3 relate to the entire BSO Area.*

6 MONITORING AND REPORTING

6.1 MONITORING PROGRAM

The aim of monitoring and review programs is to ensure relevant and accurate data is gathered in a timely manner to allow appropriate decision making. Monitoring programs will be developed in consultation with the relevant infrastructure owner and undertaken with their prior consent. Further monitoring detail will be provided in the revised IMPs or PSMPs for each infrastructure item as appropriate.

6.2 REPORTING

Monitoring results will be presented and reviewed at the monthly BHPBIC Subsidence Management Meetings. However, if the findings of monitoring are deemed to warrant an immediate response the Manager Infrastructure and/or Manager Property will initiate the requirements of the TARP's developed as part of the IMPs and PSMPs.

Monitoring results will be provided to infrastructure owners such as Roads and Maritime Services (RMS), Wollondilly Shire Council (WSC), Australian Rail Track Corporation (ARTC), Telstra, PowerTel, Sydney Water, Integral Energy the Mine Subsidence Board (MSB) and relevant government regulators as appropriate.

Monitoring results will be made publicly available in accordance with BSO Approval *Condition 8 & 11, Schedule 6* and will also be included in the Annual Reporting *Condition 4, Schedule 6*.

7 MANAGEMENT AND MITIGATION STRATEGIES

7.1 BUILT FEATURES MANAGEMENT PLAN PROCESS

The management of potential subsidence impacts on built features has been successfully undertaken by BHPBIC for several decades. Examples of the successful management in recent years have been publicly recognised via the NSW Premiers Infrastructure Award for innovation on the Hume Highway in 2011 and in the 2010 Australian Institute of Project Management Achievement Awards for the "Upper Canal Longwall 409 Mining Project."

The BFMP Process involves frequent consultation with infrastructure owners and key stakeholders, as well as thorough revision and planning. Each IMP is a live document and

may be modified at any time (with relevant stakeholder input as required) to reflect monitoring outcomes and lessons learnt. The process of mine planning and updates to IMPs is summarised in the Illawarra Coal Mine Planning Cycle (refer **Figure 2**).

Given the longevity of interaction with each of the key infrastructure owners it is proposed that the management of the built features in AA9 will be facilitated by an extension to the existing IMPs and development of individual PSMPs as required. A general summary of these plans and the measures to be incorporated is provided in the following sections. Management Plans prepared in consultation with asset owners for AA7 are provided in **Attachments A – F**.

7.2 CONSULTATION

BHPBIC has engaged with numerous infrastructure owners and service providers within AA9 as well as other areas of Appin Mine and West Cliff Colliery. The following infrastructure owners attended BHPBIC's Interagency Consultation Day held on March 5 2008 for the BSO Project, which also included project specific consultation for the Study Area.

- ARTC
- Integral Energy
- PowerTel
- Sydney Water
- Telstra
- Optus.

BHPBIC continues to consult with these stakeholders on a regular basis as part of current IMP's with regards to the management of their assets in current and future mining areas.

Each IMP and PSMP is developed in consultation with the relevant owner and will be provided to the infrastructure owner/manager prior to longwall extraction. These Plans will include the following information:

- Background information on BHPBIC and the mining operations.
- Specific features identified on the property and where applicable, any proposed additional infrastructure.
- Details of predicted subsidence impacts and associated probabilities of these impacts occurring.
- The expected timing of mine subsidence.
- A monitoring program to be undertaken by BHPBIC and the infrastructure owner.
- Performance measures and indicators.
- Appropriate pre-mining mitigatory measures.
- Process for identifying and managing impacts, including the assistance BHPBIC and the MSB would provide to the infrastructure owner.
- A Trigger Action Response Plan (TARP) developed in consultation with the infrastructure owners.
- Contact details and any further information from BHPBIC for improvements to the process defined above.

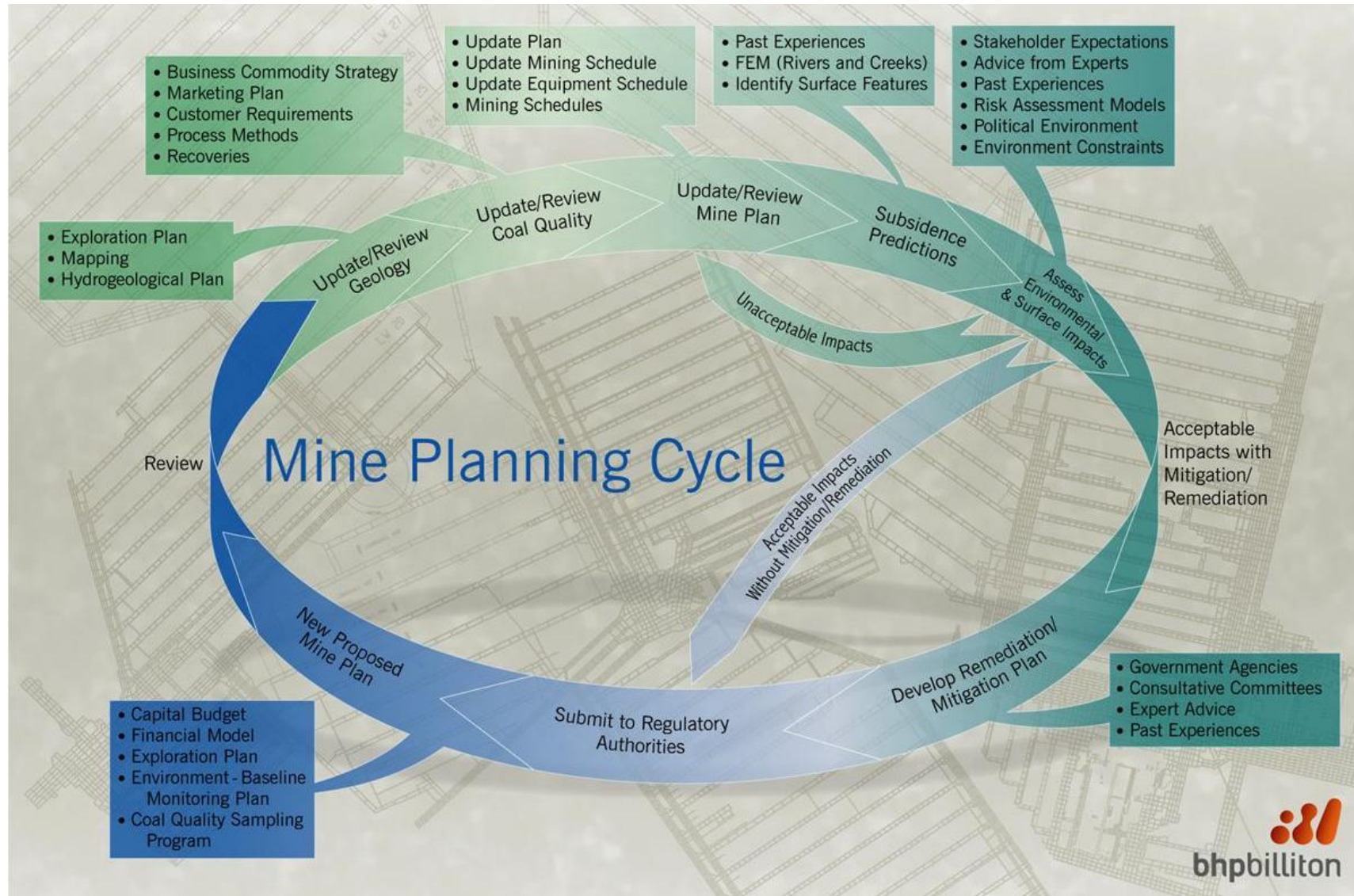


Figure 2. BHPBIC Mine Planning Cycle

7.3 TECHNICAL COMMITTEE

The current process undertaken at BHPBIC for the management of major infrastructure with the potential to be at risk from mining induced subsidence is via the formation of a Technical Committee. The Technical Committee is comprised of a conglomeration of asset owners, technical specialists, and BHPBIC representatives.

Further development of each IMP would involve input from a Technical Committee developed specifically for each built feature. The Technical Committees will include representatives from the infrastructure owner, BHPBIC, MSB and specialist consultants where required, meetings facilitated by the Technical Committee may also be attended by a representative from DRE.

The Technical Committee would further develop management measures to ensure the safe operation of infrastructure during mining and would review the performance of the management measures following the mining of each longwall.

Modification to existing IMPs for AA9 will include a review and update of all relevant management measures.

7.4 MITIGATION MEASURES

The BSO Approval Conditions (*Condition 5 (g), Schedule 3*) require that the BFMP recommends pre-mining mitigatory measures to reduce subsidence impacts where appropriate. The pre-mining mitigatory measures for the infrastructure within the Study Area will be detailed in IMPs. An overview of the proposed management measures for built features within the Study Area is provided below.

7.4.1 Main Southern Rail Line

In accordance with the *Guidelines for Mining Near or Under Railways* the mine is required to obtain agreement of the asset owner when the mine workings fall within a 35 degree angle of draw projected from the ground surface 30 m from the edge of the rail corridor.

Previous experience and risk assessments have shown that subsidence impacts must be undertaken prior to undermining of ARTC assets. Detailed engineering assessments will be undertaken for AA9 as required by an agreed IMP. These assessments will be similar to the assessment undertaken for Appin Longwalls 702 to 705. In this instance newly developed techniques have been successfully used to manage the changes in rail stresses that occur as a result of mining.

Management of ARTC assets will be undertaken in consultation with the Technical Committee (Rail Management Group [RMG]) as detailed in **Section 7.3**.

The primary potential impact on the track results from changes in rail stress, which would be managed through implementation and adjustment of track expansion switches. Other assets such as culverts, rail embankments, signalling and communication devices will be managed to ensure their ongoing safety and serviceability during the period of mining. Generally this would involve:

- Assess pre-mining condition
- Consider and implement mitigation measures to reduce or avoid the potential for subsidence related impacts
- Install a monitoring system, which includes, the monitoring of ground movements around the culvert and change in track geometry and rail stress
- Regularly review and assess the monitoring data
- Conduct regular visual inspections
- Provide additional track and/or structural support in response to actual measurements and observations during mining.

Specific management measures may also be implemented as detailed in **Table 7.1** below. Experience has shown that management measures that address the safety and operational aspects of the rail system are developed and implemented prior to the commencement of the impact to the rail infrastructure – usually many months ahead to facilitate effective baseline measurements for the modifications undertaken. Often these measures require access to routine track closures, which are scheduled infrequently throughout the year.

Table 7.1 – Mitigation Measures for Railway Features

Feature	Impact Assessment (MSEC, 2010)
Culverts	<p>Given the potentially severe consequences of culvert collapse, the Rail Technical Committee will consider mitigation measures prior to each culvert experiencing subsidence movements. Mitigation works could include, for example, sleeving the masonry arch with new structural steel pipes. Alternatively, a steel baulk structure could be placed above the culvert to prevent impacts on the track in the event of culvert collapse.</p> <p>More significant mitigation measures are expected to be introduced for the larger culverts, which may include replacement of the culvert with a bridge structure, or substantial strengthening of the culvert. Substantial strengthening of the culvert has successfully been undertaken at a large culvert above Longwall 25 at Tahmoor Colliery.</p> <p>The concrete pipe and Armco extensions to some culverts are less susceptible to impacts due to their inherent strength.</p>
Subway	<p>Given the potentially severe consequences of collapse, the Rail Technical Committee will introduce mitigation measures prior to the Subway experiencing subsidence movements. Mitigation works may include, for example, a complete filling of the Subway opening, or construction of structural support. A steel baulk structure could be placed above the Subway to prevent impacts on the track in the event of collapse.</p>
Cuttings	<p>The Rail Technical Committee will consider mitigation measures before the cuttings experience subsidence movements. Mitigation works could include, for example, scaling the cutting faces and removing debris from the cess.</p>
Embankments	<p>The Rail Technical Committee will consider mitigation measures before each embankment experiences subsidence movements. Mitigation works could include, for example, cleaning out or strengthening of the culverts.</p>
Emergency Crossover	<p>It is considered that with the adoption of appropriate management measures, the potential impacts on the crossover can be managed, even if actual subsidence movements are greater than the predictions or substantial non-conventional movements occur.</p>
Douglas Park Station	<p>A plan for managing potential impacts on railway stations has been developed by the Rail Technical Committee during the mining of Tahmoor Colliery. A management plan using similar management measures will likely be adopted during the mining of the proposed Longwalls 901 to 902.</p>
Level Crossings	<p>A plan for managing potential impacts on automated level crossings with gates has been developed by the Rail Technical Committee during the mining at Tahmoor Colliery. A management plan using similar management measures will likely be adopted during the mining of the proposed Longwalls 901 to 902.</p>
Signals and Communication Infrastructure	<p>A plan for managing potential impacts on signalling and communications systems has been developed by the Rail Technical Committee during the mining of Appin Longwall 703. A management plan using similar management measures will likely be adopted during the mining of the proposed Longwalls 901 to 902.</p> <p>The Rail Technical Committee will introduce management measures prior to the Tower experiencing subsidence movements.</p>

7.4.2 The HW2 Hume Highway

BHPBIC has developed management strategies for the HW2 Hume Highway to address extraction in AA7 directly beneath the road. These existing management strategies will be reviewed, in consultation with the RMS based on the potential movements resulting from the extraction of the proposed longwalls.

7.4.3 Twin Bridges

Previous experience has identified mining related impacts to the bridges from far field movements, which necessitated remedial works to restore the bridges to their pre-mining conditions. RMS as asset owner of this infrastructure has specified that a detailed assessment of the potential impacts to the bridges needs to be undertaken and that a subsequent detailed management plan be developed in response to the issues identified. All necessary management measures will be in place before mine subsidence impacts occur at the bridges.

7.4.4 Local Roads

BHPBIC has developed a Public Road Management Plan for the longwalls at West Cliff and AA7 to manage the potential impacts on public roads. The IMP was developed in consultation with the WSC, the RMS and the MSB.

The IMP will be reviewed and, where required, revised to include the local roads within the Study Area. Specific management strategies developed from the *Razorback Range Steep Slope Assessment* (Coffey, 2013) and *Harris Creek Cliff Line Assessment* (GHD, 2011) will also be included in the Public Road Management Plan. With the implementation of these management strategies, it is considered that the local roads could be maintained in a safe and serviceable condition during and after the extraction of the proposed longwalls.

7.4.4.1 Local Road Bridges

Moreton Park Road Bridge (South) will be managed by the RMS and the technical committee in accordance with the existing Management Plan, which will be updated to include the proposed longwalls. Blades Bridge has been designed to tolerate subsidence impacts and it will be added to the Public Roads Management Plan.

7.4.5 Sydney Water Infrastructure

Management strategies have been developed by BHPBIC, in consultation with Sydney Water, to manage the impacts on water infrastructure in Appin Areas 3 and 7 and at West Cliff Colliery. These management strategies will be extended to include proposed Longwalls 901 to 904. It is considered that the implementation of these management strategies would maintain water infrastructure in safe and serviceable conditions during and after the extraction of the proposed longwalls.

7.4.6 Electrical Infrastructure

BHPBIC has developed an Integral Energy Transmission Structure Monitoring and Management Plan for AA7, West Cliff and Dendrobium to manage the potential impacts on the electrical infrastructure. The IMP was developed in consultation with Integral Energy. The plan will be reviewed and, where required, revised to incorporate the powerlines within the Study Area. With the implementation of these management strategies, it would be expected that the powerlines could be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

7.4.7 Telecommunications Infrastructure

BHPBIC has developed specific telecommunication IMPs for the longwalls at AA7 and West Cliff to manage the potential impacts on copper and optical fibre cables owned by Telstra, Optus, NextGen and PowerTel. The IMPs were developed in consultation with telecommunications experts and the infrastructure owners. These plans will be reviewed and, where required, revised to incorporate the telecommunications infrastructure within the Study Area. With the implementation of these management strategies, it would be expected that the telecommunications infrastructure can be maintained in safe and serviceable conditions during and after the extraction of the proposed longwalls.

7.4.8 Other Assets

BHPBIC will prepare PSMP for all landholders within the Study Area. The PSMPs will be based on those prepared for the properties at AA7 and West Cliff Colliery.

The PSMPs will address the management of all surface infrastructure including rural buildings and commercial structures. The PSMPs will be negotiated with the individual property and asset owners in consultation with the MSB prior to the commencement of longwall mining. Any mitigation measures will also be developed in consultation with the asset owner and the MSB.

8 CONTINGENCY AND RESPONSE PLANS

8.1 CONTINGENCY PLAN

In the event the Subsidence Performance Measures detailed in **Section 5** of this BFMP are considered to have been exceeded, or are likely to be exceeded, BHPBIC will implement a Contingency Plan to manage any unpredicted impacts and their consequences.

This would involve:

- Capture photographic record immediately
- Notify relevant stakeholders (including owners and tenants) soon as practicable
- Notify relevant agencies and specialists soon as practicable
- Conduct site visits with stakeholders as required
- Contract specialists to investigate and report on changes identified
- Provide incident report to relevant agencies and/or owners/tenants
- Develop site Corrective Management Action (CMA) in consultation with key stakeholders if required, (pending stakeholder availability) and seek approvals
- Implement CMA as agreed with stakeholders following approvals
- Conduct initial follow up monitoring and reporting
- Review Management Plan
- Report in regular reporting and AEMR.

BHPBIC will consult with appropriate specialists and relevant agencies in order to devise an appropriate response in respect to the identified exceedance.

The development and implementation of contingency measures will be specifically designed to address the specific circumstances of the exceedance and assessment of environmental consequences.

If the contingency measures implemented by BHPBIC fail to remediate the impact or the Director-General determines that it is not reasonable or feasible to remediate the impact BHPBIC will provide a suitable offset to compensate for the impact to the satisfaction of the Director-General of DP&I in accordance with the BSO Approval *Condition 2, Schedule 3*.

All incidents will be reported internally through BHPBIC's Incident Procedure and related records will be maintained in accordance with the Records Management Procedure (refer **Section 10.4**).

8.2 TARPS

A Trigger Action Response Plan (TARP) will be developed in consultation with the infrastructure owners and provided in the IMPs.

9 INCIDENTS, COMPLAINTS, EXCEEDANCES AND NON-CONFORMANCES

9.1 INCIDENTS

BHPBIC will notify DP&I and any other relevant agencies of any incident associated with the Bulli Seam Operations as soon as practicable after BHPBIC becomes aware of the incident. BHPBIC will provide DP&I and any relevant agencies with a detailed report on the incident within seven days of the date of the occurrence.

9.2 COMPLAINTS HANDLING

BHPBIC will:

- Provide a readily accessible contact point through a 24 hour toll-free Community Call Line (1800 102 210). The number will be displayed prominently on BHPBIC sites in a position visible by the public as well as on publications sent to the local community.
- Respond to complaints in accordance with the BHPBIC Community Complaints and Enquiry Procedure.
- Maintain good relations and communication lines between the community and BHPBIC staff.
- Keep a register of any complaints, including the details of the complaint with information such as:
 - Time and date
 - Person receiving the complaint
 - Complainant's contact name and phone number
 - Description of the complaint
 - Work area where complaint relates to
 - Details of any verbal response
 - Details of any written response where appropriate.

9.3 NON-CONFORMANCE PROTOCOL

The requirement to comply with all approvals, plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with the BSO. Regular inspections, internal audits and initiation of any remediation/rectification work will be undertaken by the Manager Infrastructure and/or Manager Landholders.

Non-conformities, corrective actions and preventative actions are managed in accordance with the BHPBIC *Non-Conformance, Preventative and Corrective Action Procedure (IHP0107)*. This procedure details the processes to be utilised with respect to the identification of non-conformances, the application of appropriate corrective actions(s) to address non-conformances and the establishment of preventative actions to avoid non-conformances. The key elements of the process include:

- Identification of non-conformance and/or non-compliances
- Recording of non-conformance and/or non-compliance
- Evaluation of the non-conformance and/or non-compliance to determine specific corrective and preventative actions
- Corrective and preventative actions to be assigned to a responsible person
- Management review of corrective actions to ensure the status and effectiveness of the actions.

An Annual Review will be undertaken to assess BHPBIC's compliance with all conditions of the BSO Approval, mining leases and all other approvals and licences.

An independent environmental audit will also be undertaken (*Condition 9, Schedule 6*) to review the adequacy of strategies, plans or programs under these approvals and if appropriate, recommend actions to improve the environmental performance of the BSO. The independent environmental audit will be undertaken by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General of DP&I.

10 PLAN ADMINISTRATION

This BFMP will be administered in accordance with the requirements of the AA9 EMS and the BSO Approval Conditions. A summary of the administrative requirements is provided below.

10.1 ROLES AND RESPONSIBILITIES

All statutory obligations applicable to the AA9 operations are identified and managed via an online compliance management system (TICKIT). The online system can be accessed by the responsible BHPBIC managers from the below link.

<https://illawarracoal.tod.net.au/login>

The overall responsibility for the implementation of this BFMP resides with the Manager Infrastructure who shall be the BFMP's authorising officer.

Parties responsible for environmental management in AA9 and the implementation of the BFMP include:

Head of External Affairs

- Ensure that the requisite personnel and equipment are provided to enable this BFMP to be implemented effectively.

Manager Infrastructure

- Authorise the BFMP and any amendments thereto.
- Delegate to an appropriately qualified person the responsibility to document any changes to the BFMP, recognising the potential for those changes to affect other aspects of the BFMP.
- Provide regular updates to BHPBIC on the results of the BFMP.
- Arrange information forums for key stakeholders as required.
- Prepare any report in accordance with the BFMP. Maintain records required by the BFMP.
- Organise and participate in assessment meetings called to review mining impacts.
- Within 72 hours, respond to any queries or complaints made by members of the public in relation to aspects of the BFMP.
- Organise audits and reviews of the BFMP.

- Address any identified non-conformances, assess improvement ideas submitted and implement if considered appropriate.
- Arrange for the implementation of any agreed actions, responses or remedial measures.
- Ensure surveys required by this BFMP are conducted and record details of instances where circumstances prevent these from taking place.

Survey Coordinator

- Collate survey data and present in an acceptable form for review at assessment meetings.
- Bring to the attention of the Manager Infrastructure any findings indicating an immediate response may be warranted.
- Bring to the attention of the Manager Infrastructure any non-conformances identified with the Plan provisions or ideas aimed at improving the BFMP.

Technical Experts

- Conduct the roles assigned to them in a competent and timely manner to the satisfaction of the Manager Infrastructure and formally provide expert opinion as requested.

Person(s) Performing Inspections

- Formally bring to the attention of the Manager Infrastructure any non-conformances identified with the Plan, or ideas aimed at improving the Plan.
- Conduct inspections in a safe manner.

10.2 RESOURCES REQUIRED

The Head of External Affairs provides resources sufficient to support this BFMP.

Equipment will be needed for the TARPs provisions of the IMPs and PSMPs identified in this BFMP. Where this equipment is of a specialised nature, it will be provided by the supplier of the relevant service. All equipment is to be appropriately maintained, calibrated and serviced as required in operation manuals.

It shall be the responsibility of the Manager Infrastructure to ensure that personnel and equipment are provided as required to allow the provisions of this Plan to be implemented.

10.3 TRAINING

All staff and contractors working on BHPBIC sites are required to complete the BHPBIC training program which includes:

- An initial site induction (incl. all relevant aspects of environment, safety and community).
- Safe Work Methods Statements and Job Safety Analyses, Toolbox Talks and Pre-shift communications.
- On-going job specific training and re-training (where required).

All training records are maintained by the BHPBIC Safety and Training Department (STAX database system), which can be accessed by BHPBIC staff via the online information system iPick.

It shall be the responsibility of the Manager Infrastructure to ensure that all persons and organisations having responsibilities under this BFMP are trained and understand their responsibilities.

The person(s) performing regular inspections shall be under the supervision of the Manager Infrastructure and be trained in observation and reporting. The Manager Infrastructure shall be satisfied that the person(s) performing the inspections are capable of meeting and maintaining this standard.

10.4 RECORD KEEPING AND CONTROL

Environmental Records are maintained in accordance with the BHPBIC procedure *Records Management (IHP0108)*.

10.5 DOCUMENT CONTROL

The BHPBIC *Document Control procedure (IHP0103)* outlines the method for control of defined 'business critical' documentation for all BHPBIC operations. The system has been designed in such a manner to ensure that:

- Documents are approved for adequacy by authorised personnel prior to use.
- Obsolete documents are promptly removed from circulation.
- Documents are reissued, or made available, to relevant persons in a timely fashion after changes have been made and the authorisation process is complete.

The BFMP and other relevant documentation will be made available on the BHPBIC website (*Condition 11, Schedule 6*).

10.6 MANAGEMENT PLAN REVIEW

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 BSO will also be undertaken in accordance with *Condition 4, Schedule 6*. More specifically this BFMP will be subject to review (and revision if necessary, to the satisfaction of the Director-General) within three months of:

- The submission of an annual review under *Condition 4, Schedule 6*.
- The submission of an incident report under *Condition 7, Schedule 6*.
- The submission of an audit report under *Condition 9, Schedule 6*.
- Any modification to the conditions of the BSO Approval.

If deficiencies in the EMS and/or BFMP are identified in the interim period, the plans will be modified and approvals for these modifications sought 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.

11 REFERENCES

Coffey Geotechnics, 2013. *Landslide Risk Assessment from Mine Subsidence Effects - Appin Area 9 Proposed Longwalls, Razorback Range, Douglas Park, NSW*. Report prepared for BHP Billiton Illawarra Coal.

GHD Geotechnics, 2011. *Harris Creek Cliff Line, Douglas Park*. Report prepared for BHP Billiton Illawarra Coal.

Mine Subsidence Engineering Consultants, 2009. *The Prediction of Subsidence parameters and the Assessment of Mine Subsidence Impacts on Natural Features and Surface Infrastructure Resulting from the Bulli Seam Operations in Support of the Part 3A Application*. Report prepared for BHP Billiton Illawarra Coal. Revision D, August 2009.

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: MSEC Revision B*. A report to BHPBIC.

Attachment A - AA7 Main Southern Rail Line (ARTC)

Attachment B - AA7 Hume Hwy and Twin Bridge MP (RMS)

Attachment C - AA7 Public Roads MP (WSC)

Attachment D- Electricity Assets MP (Integral Energy)

Attachment E- Sydney Water MP (Sydney Water)

Attachment F- Telecommunications MP - (Telstra and PowerTel)