BULLI SEAM OPERATIONS

Project Description Report and Preliminary Assessment

August 2008

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ILLAWARRA COAL - BULLI SEAM OPERATIONS
PROJECT DESCRIPTION REPORT AND PRELIMINARY ASSESSMENT

AUGUST 2008
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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This Project Description Report and Preliminary Assessment has been prepared for the continuation of underground mining operations at the Appin and West Cliff Collieries (herein referred to as the Bulli Seam Operations) in accordance with Part 3A of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation). The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in New South Wales (NSW). Part 3A of the EP&A Act provides an approval framework for projects deemed by the NSW Minister for Planning to be Major Projects.

In accordance with the *Steps in the Assessment and Approval of Major Projects under Part 3A* (the Draft Major Project Guideline) (Department of Infrastructure, Planning and Natural Resources [DIPNR], 2005a), this Project Description Report and Preliminary Assessment provides the information outlined in Table 1.

The Preliminary Assessment (Section 5) identifies key environmental assessment issues of particular relevance to the Project, and provides the following for each issue:

- a summary description of the existing environment;
- an analysis of the likely extent and nature of potential impacts; and
- identification of the proposed level and scope of environmental impact assessments to be undertaken for the Environmental Assessment (EA).

The Preliminary Assessment has been undertaken generally in accordance with the draft *Guideline: What is the Level and Scope of Assessment for Major Projects? Preliminary Assessment* (the draft Preliminary Assessment Guideline) (DIPNR, 2005b).

Table 1
Draft Major Project Guideline Requirements – Reference Summary

Draft Major Project Guideline Requirement*	Relevant Section(s)
Information to confirm that the project is a project to which Part 3A of the EP&A Act applies.	Section 3
Information to confirm whether a Concept Plan will be required or authorised by the Minister.	Section 3
A description of the project and any ancillary components.	Section 2
The location of the project and a map identifying the site.	Sections 1.2.1 and 2.1 Figures 1 to 4
The capital investment value and other relevant information in relation to parameters set out in the *State Environmental Planning Policy (Major Projects), 2005* (Major Projects SEPP) for determining whether Part 3A applies to the project.	Section 2.10 and Section 3
The planning provisions applying to the site.	Section 3
Stakeholder consultation.	Section 4
Any other approvals required. In particular, if a licence from the Department of Environment and Climate Change (DECC) is required under the *Protection of the Environment Operations Act 1997* (POEO Act).	Section 3
Justification as to why the project should be considered to be a major project under Part 3A of the EP&A Act, taking into consideration the relevant criteria.	Section 3
A Preliminary Assessment to identify the likely environmental issues.	Section 5

* Adapted from DIPNR (2005a).

1.2 BACKGROUND

1.2.1 Existing Bulli Seam Longwall Mining Operations

Illawarra Coal Holdings Pty Ltd (ICHPL) (a wholly owned subsidiary of BHP Billiton Pty Limited) owns and operates the Bulli Seam longwall mining operations at the Appin and West Cliff Collieries approximately 25 kilometres (km) north-west of Wollongong in NSW (Figure 1).

ICHPL also owns and operates the Dendrobium Mine located approximately 10 km north-west of Wollongong (Figure 1) in accordance with Development Consent (DA 60-03-2001) granted by the NSW Minister for Urban Affairs and Planning on 20 November 2001.

The extent of ICHPL's previous and current underground mining operations at the Appin and West Cliff Collieries are shown on Figures 2 and 3.

Run-of mine (ROM) coal extracted from the underground mining operations is transferred by conveyor and winder to either the Appin Colliery or West Cliff Colliery pit tops, respectively (Figure 2). ROM coal from the Appin Colliery pit top is transported via road to the West Cliff Colliery Washery. ROM coal is also transported via the public road network to the Dendrobium Washery in Port Kembla (Figure 1).

ROM coal is reclaimed, crushed, screened and washed at the West Cliff Colliery Washery. The West Cliff Colliery Washery has a throughput of approximately 6 Mtpa. Coal wash material from the West Cliff Colliery Washery and the Dendrobium Washery is emplaced at the West Cliff Colliery Coal Wash Emplacement (Figure 2).

Product coal from the West Cliff Colliery Washery is transported by road to the Port Kembla Coal Terminal (PKCT) or to the BlueScope Steelworks. Product coal from the Appin and West Cliff Collieries is blended with coal from the Dendrobium Mine (from the Wongawilli Seam) to produce the "Illawarra Blend" premium coking coal which is known for its high quality steel-making qualities.

A summary description of the Appin and West Cliff Collieries and other major supporting infrastructure at the Bulli Seam longwall mining operations is provided below.

West Cliff Colliery

The following mining leases are held by ICHPL's subsidiary Endeavour Coal Pty Ltd at the West Cliff Colliery (Figure 2):

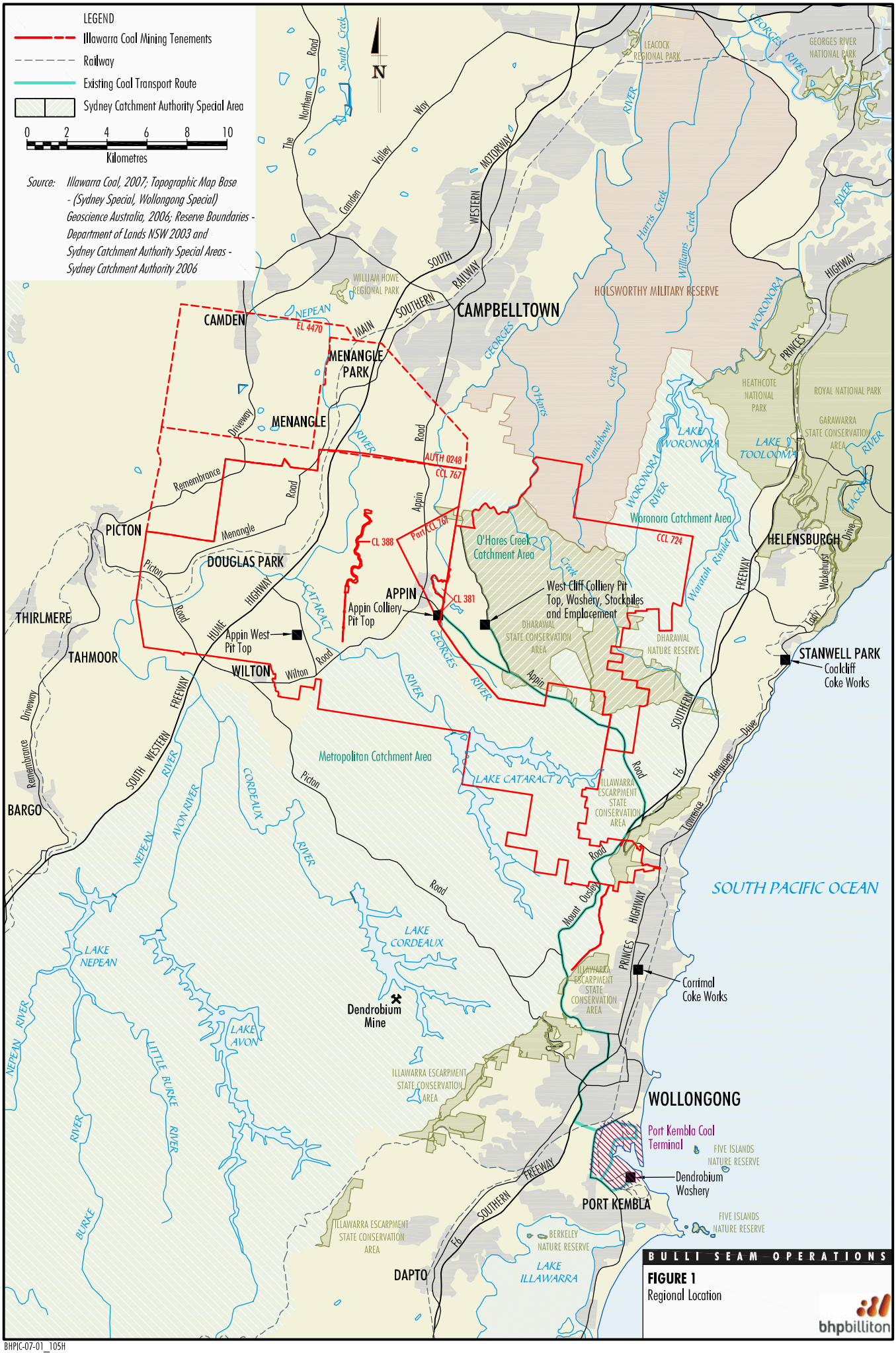
- Part Consolidated Coal Lease (CCL) No. 767.
- Coal Lease (CL) No. 724.
- CL No. 381.

ICHPL has been conducting underground mining at the West Cliff Colliery since April 1997; prior to 1997 the mine was owned and operated by CRA Limited. Underground mining at the West Cliff Colliery is currently undertaken using longwall methods in accordance with approval under Section 138 of the *Coal Mines Regulation Act, 1982* and Subsidence Management Plan (SMP) Approval for Longwalls 29, 30 and Part Longwalls 31-33 within West Cliff Area 5 (Figure 2) granted by the Department of Primary Industries – Mineral Resources (DPI-MR) on 24 December 2003 and Part Longwalls 31-33 granted on 7 November 2006.

The West Cliff Colliery produces up to 3.5 Mtpa of ROM coal.

Existing surface infrastructure at the West Cliff Colliery pit top includes the following (Figure 4):

- ROM and product coal stockpiles;
- Coal Preparation Plant (CPP) and associated conveyors, transfer points and buffer bins;
- coal wash emplacement;
- gas drainage, capture and beneficiation equipment; including West Cliff Ventilation Air Methane Project (WestVAMP);
- product coal road transport loading facilities;
- drift and shafts;
- internal haul roads; and
- administration complex, bath house, ablution and workshop facilities.



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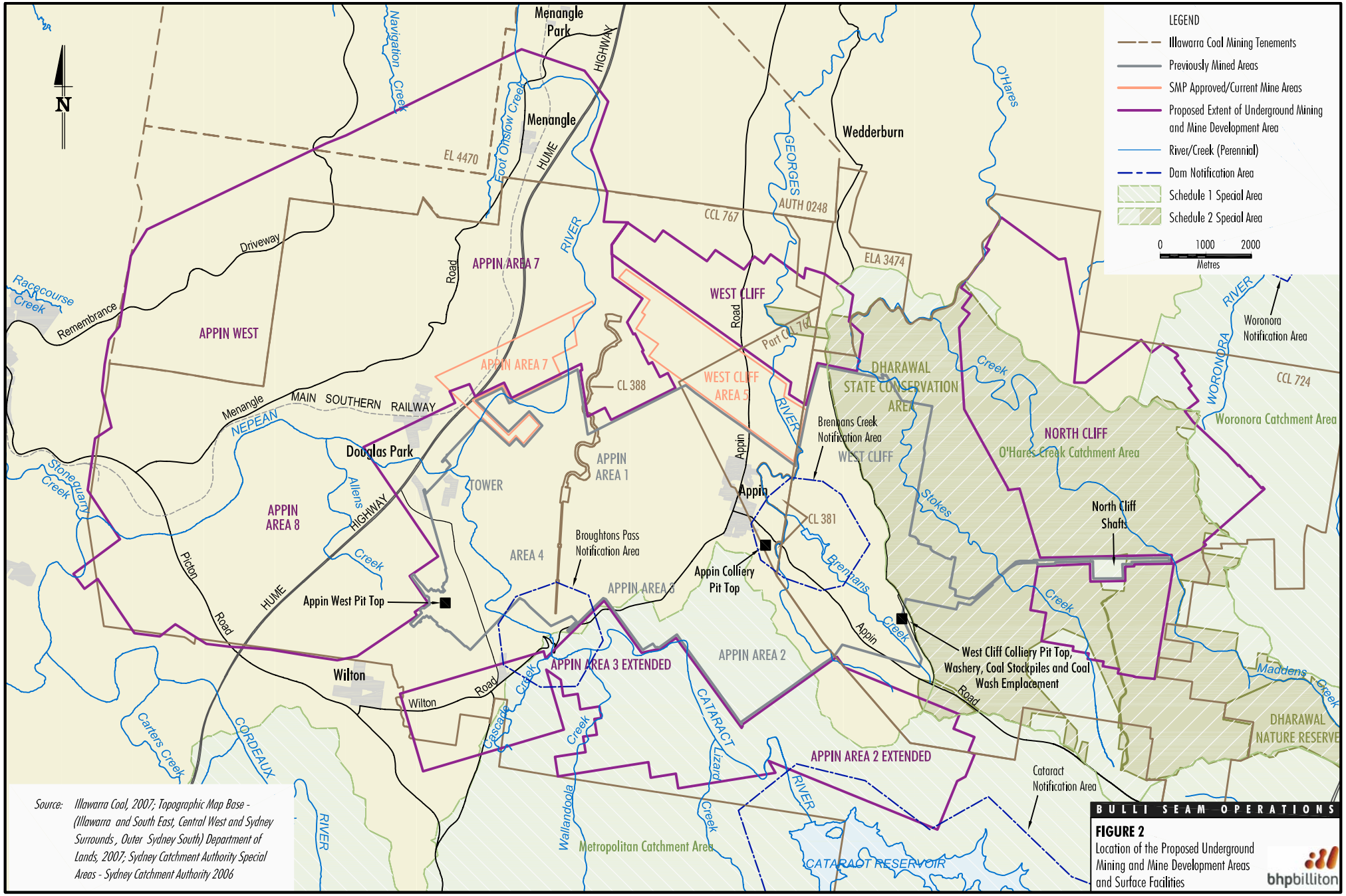

Source: *Illawarra Coal, 2007; Topographic Map Base - (Illawarra and South East, Central West and Sydney Surrounds, Outer Sydney South) Department of Lands, 2007; Sydney Catchment Authority Special Areas - Sydney Catchment Authority 2006*

BULLI SEAM OPERATIONS

FIGURE 2
Location of the Proposed Underground Mining and Mine Development Areas and Surface Facilities

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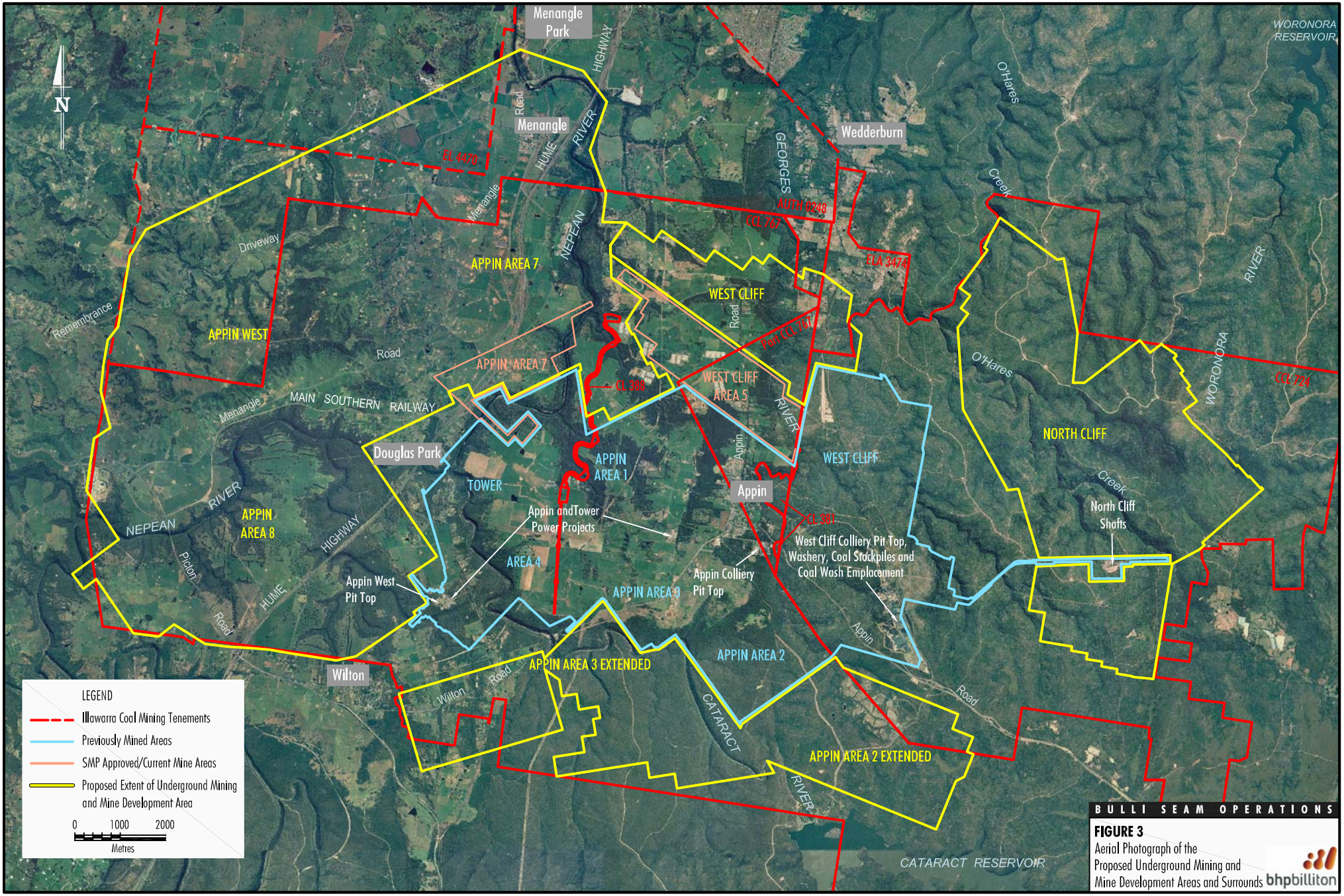

BULLI SEAM OPERATIONS

FIGURE 3
Aerial Photograph of the Proposed Underground Mining and Mine Development Areas and Surrounds

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FIGURE 4
West Cliff Colliery - Major Surface Facilities Area

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Existing water management infrastructure at the West Cliff Colliery pit top includes the following:

- Brennans Creek Dam;
- water treatment plant;
- water collection and settlement ponds;
- water diversions; and
- water reticulation systems (e.g. tanks, pumps and pipelines).

The North Cliff Shafts are located approximately 5 km east of the West Cliff Colliery pit top (Figure 3).

Appin Colliery

Mining Leases CCL 767 and CL 388 are held by ICHPL's subsidiary Endeavour Coal Pty Ltd at the Appin Colliery.

ICHPL is currently conducting underground mining at the Appin Colliery within Area 7 (Figure 2). Underground mining at the Appin Colliery is undertaken using longwall methods in accordance with SMP Approval for Longwalls 701-704 within Area 7 granted by the DPI-MR on 1 November 2006.

ICHPL lodged an SMP application for Longwall 409 within Area 4 (Figure 2) which was approved by the DPI-MR on 13 November 2007.

The Appin Colliery produces up to 4 Mtpa of ROM coal.

Existing surface infrastructure at the Appin Colliery pit top includes the following:

- men and materials drift and coal drift belt and ventilation shaft;
- coal handling infrastructure and bins;
- ROM coal stockpiles and truck loading facilities;
- internal haul roads; and
- administration complex, bath house, ablution and workshop facilities.

The Appin West pit top currently provides access to the Appin Colliery Area 7 area (Figure 3) for underground personnel and mine equipment and supplies.

Surface facilities at the Appin West pit top include the following:

- two shafts;
- men and materials winder;
- water filtration plant;
- administration office;
- employee facilities and bathhouse; and
- Appin-Tower Power Project infrastructure.

The Appin-Tower Power Project generates electricity by utilising coal bed methane drained from the Bulli Seam. The Appin-Tower Power Project consists of 94 gas engines, each capable of generating 1 MW of electricity. Components of the Appin-Tower Power Project are located at the Appin West pit top and approximately 2 km west of the Appin Colliery pit top (Figure 3). The Appin-Tower Power Project is one of the most significant greenhouse gas abatement projects in Australia.

The water filtration plant located at the Appin West pit top includes a reverse osmosis system that processes underground mine water into water that is reused.

Shaft and fan sites exist in the vicinity of the Appin West and Appin Colliery pit tops including the Appin No. 1 and 2 shaft and fan site, and the Appin No. 3 (former Tower No. 3) shaft and fan site.

The Appin Colliery also incorporates four disused shafts from the former Bulli Mine that lie to the south of the Appin Colliery pit top in lands managed by the Sydney Catchment Authority. These shafts have previously been sealed to the DPI-MR standards.

1.2.2 Project Integration

The Project would involve the continuation of underground mining operations at the Appin and West Cliff Collieries into new underground mining and mine development areas as shown on Figure 3. A description of the Project is provided in Section 2. The Project would extend the life of the existing Bulli Seam longwall mining operations by approximately 30 years.

ICHPL is seeking Project Approval from the Minister for Planning under Part 3A of the EP&A Act for the Project. It is anticipated that the Project Approval would consolidate existing approvals for the existing activities at the Appin and West Cliff Collieries that will form part of the Bulli Seam Operations. The existing Development Consent (DA 60-03-2001) for the Dendrobium Mine would not be modified or superseded by this Project Approval.

2 PROJECT DESCRIPTION

2.1 LOCATION AND MINING TENEMENTS

The Bulli Seam Operations are located within the existing mining tenements CCL 724, CCL 767, CCL 381 and CL 388 as provided in Table 2 and shown on Figure 2. The Project would extend into Authorisation (AUTH) 0248 and Exploration Licence (EL) 4470 to the north of CCL 767 shown on Figure 2. ICHPL will lodge Mining Lease Applications separately with the DPI-MR for Project development areas outside the existing mining tenements.

Table 2
ICHPL Existing Mining and Exploration Tenements

Tenements		Expiry Date
Mining	CCL 724[1]	26 September 2011
	CCL 767[1]	3 September 2010
	CCL 381[1]	24 October 2012
	CL 3881[1]	22 January 2013
Exploration	EL 4470	19 December 2007*
	AUTH 0199[1]	27 June 2009
	AUTH 0201[1]	27 June 2009
	AUTH 0248	19 December 2007*
	AUTH 0306[1]	27 June 2009
	AUTH 0312[1]	10 August 2008
	AUTH 0370[1]	27 June 2009
	AUTH 0395[1]	10 August 2008
	AUTH 0396[1]	27 June 2009
	AUTH 0397[1]	27 June 2009
	AUTH 0432[1]	31 August 2008

* Renewal applications for AUTH 0248 and EL 4470 were submitted to the DPI-MR on 23 October 2007.

1 Mining and exploration tenements held by ICHPL's subsidiary Endeavour Coal Pty Ltd.

2.2 PROPONENT

ICHPL is the Project proponent. ICHPL is a wholly owned subsidiary of BHP Billiton Pty Limited. The contact details for ICHPL are:

BHP Billiton Illawarra Coal Holdings Pty Ltd
Post Office Box 514
UNANDERRA NSW 2526
Telephone: (02) 4255 3200

2.3 PROJECT SUMMARY

ICHPL intends to obtain a Project Approval for the Bulli Seam Operations that incorporates all activities associated with the ongoing operation of the Appin and West Cliff Collieries. Table 3 provides a summary of the existing Appin and West Cliff Collieries operation, and the proposed alterations for the Project.

2.4 UNDERGROUND MINING

ICHPL is currently mining Longwalls 33 and 702 in accordance with SMP approvals by the DPI-MR. ICHPL was granted SMP approval to mine Longwall 409 within Area 4 on 13 November 2007 (Figure 2).

Longwall mining involves extraction of rectangular panels of coal defined by underground roadways constructed around each longwall panel. The longwall mining machine travels back and forth across the width of the coal face progressively removing coal from the panel. Mined coal is sent to the surface via a series of connecting underground conveyors. The exposed roof is held up by mechanical roof supports. As mining progresses, the mechanical roof supports are moved forward and the roof above the mined seam collapses into the void that is left behind (BHP Billiton, 2006). This process results in some deformation of the ground surface (generically referred to as subsidence).

Additional and/or replacement underground mining equipment would be required over the life of the Project in order to initially maintain and subsequently increase production capacity.

It is anticipated that if the Project is approved, the Project Approval would include all the current and previously mined areas, as well as the proposed underground mining and mine development areas (Figure 2).

Table 3
Project Summary

Project Development Component	Summary of Existing Appin and West Cliff Collieries Operations	Summary of the Project
Underground Mining and ROM Coal Production	• Longwall mining methods to extract coal from the Bulli Seam. • ROM coal production is approximately 7.5 Mtpa. • There is no maximum on coal production from the current operations.	• Continuation of longwall mining operations to extract coal from the Bulli Seam from the following areas (Figure 2): - Appin West. - West Cliff. - North Cliff. - Appin Area 7. - Appin Area 8. - Area 3 Extended. - Area 2 Extended. • ROM coal production of up to approximately 10.5 Mtpa.
Coal Washing	• The West Cliff Colliery Washery has an existing throughput of approximately 6 Mtpa.	• The West Cliff Colliery Washery would be upgraded to increase throughput up to approximately 10.5 Mtpa.
Product Coal	• Production of up to approximately 5.4 Mtpa of product coal for export and domestic markets.	• Production of up to approximately 9.2 Mtpa of product coal for export and domestic markets.
Pit Top and Surface Stockpiles	• Appin Colliery pit top: - ROM coal stockpiles. • Appin West pit top. - No coal stockpiles. • West Cliff Colliery pit top: - ROM and product coal stockpiles. - Coal wash emplacement.	• Existing facilities would be utilised. • The Project would include extensions/ upgrades to ROM coal, product coal and coal wash stockpiles and materials handling facilities.
Coal Wash Emplacement	• Coal wash produced at the West Cliff Colliery Washery and Dendrobium Washery is emplaced at the West Cliff Colliery Stage 2 Coal Wash Emplacement. • ICHPL received a Notice of Staged Development Approval for the development of the West Cliff Colliery Stage 3 Coal Wash Emplacement on 20 December 2007.	• Coal wash would continue to be produced, with production to increase in line with ROM and product coal rate upgrades. • Coal wash produced by the Project would be placed at the approved West Cliff Colliery Stage 3 Coal Wash Emplacement. • Subject to the outcomes of further engineering and feasibility studies (Section 5.3.2), coal wash produced by the Project would be placed at the West Cliff Colliery Stage 4 Coal Wash Emplacement. • Alternative coal wash management options would also be considered in the EA.
General Surface Facilities and Supporting Infrastructure	• Existing general surface facilities include administration buildings, coal handling infrastructure, bath house, workshops, equipment service facilities, car park, washdown and fuel storage facilities. • Extensive supporting infrastructure including systems associated with: - underground drift access and conveyors; - electricity supply, reticulation and control; and - ventilation and gas management. • Remote services sites existing or under construction for provision of mine services by borehole such as power, compressed air, communication, monitoring, etc.	• Existing surface facilities would be utilised. • The Project would include the upgrade of some infrastructure and progressive construction of additional components as required (e.g. service boreholes, ventilation shafts, gas drainage equipment, waste water treatment and waste water disposal). • Supporting infrastructure systems would be upgraded as required. • Development of new remote services sites utilising boreholes for installation of down-hole power, compressed air, communication, monitoring, etc.

Table 3 (Continued)
Project Summary

Project Development Component	Summary of Existing Appin and West Cliff Collieries Operations	Summary of the Project
Gas Drainage	• Progressive installation of gas drainage equipment. • Progressive rehabilitation of gas drainage equipment areas.	• Continued progressive installation of gas drainage equipment. • Continued progressive rehabilitation of gas drainage equipment areas.
Water Management	• Groundwater inflows to the mine are stored and utilised for underground workings and surface facilities. • A network of water storages is utilised to manage water on-site at the surface facilities. • Make-up water demand is met by sourcing groundwater from historical and active workings, surface water runoff recovered from mine operational areas and purchase from Sydney Water as required.	• Continued use and (where required) upgrade of existing water management infrastructure.
Monitoring of Subsidence Impacts	• Monitoring of subsidence and subsidence impacts over current and previously mined areas (e.g. subsidence monitoring [ground movement], ecological monitoring and groundwater monitoring), including the use of reference areas.	• Monitoring of subsidence and subsidence impacts over proposed underground mining and mine development areas, including the use of reference areas.
Exploration	• Exploration activities (e.g. borehole drilling, seismic and aeromagnetic surveys).	• Ongoing exploration activities within existing exploration tenements.
Remediation Works	• Surface rehabilitation of West Cliff Colliery Coal Wash Emplacement and other progressive surface disturbance areas (e.g. exploration drill pads). • Remediation of previously mined areas impacted by subsidence effects, where required.	• Ongoing surface rehabilitation, mitigation and remediation works. • Rehabilitation of mine related infrastructure areas that are no longer required.
Life of Mine	• The Appin and West Cliff Collieries require approval under Part 3A of the EP&A Act 1979 by August 2010 to facilitate ongoing operations.	• Current mine planning indicates an additional mine life of at least 30 years.
Employment	• The Appin and West Cliff Collieries currently have a combined operational workforce (employees and on-site contractors) of approximately 875 people.	• Continued long-term employment of more than 1,000 employees and contractors. • It is anticipated that a short-term construction workforce of up to 100 employees would be required at various stages of the Project life.
Hours of Operation	• 24 hour operations, seven days a week.	• 24 hour operations, seven days a week.

2.5 WEST CLIFF COLLIERY WASHERY UPGRADE

The West Cliff Colliery Washery (Figure 4) reclaims, crushes, screens and washes the ROM coal to separate coal wash materials from product coal. As a component of the Project, the West Cliff Colliery Washery would be upgraded and some components would be altered, replaced and/or duplicated to increase current throughput from 6 Mtpa to 10.5 Mtpa and to improve coal recovery and efficiency.

2.6 ROM AND PRODUCT COAL TRANSPORT

ROM coal from the Appin Colliery pit top would continue to be transported via road to the West Cliff Colliery Washery and/or the existing Dendrobium Washery (Figure 1). ROM coal from the West Cliff Colliery pit top would continue to be stockpiled for washing, and/or would be transported to the existing Dendrobium Washery.

Product coal from the West Cliff Colliery Washery would continue to be stockpiled prior to being transported off-site. Product coal from the West Cliff Colliery Washery would continue to be transported via road to BlueScope Steelworks and Port Kembla Coal Terminal (Figure 1). The transport of Product coal to BlueScope Steelworks and Port Kembla Coal Terminal would increase to 24 hours a day, seven days a week (dependant on separate Port Kembla Coal Terminal approvals). Small amounts of product coal would also continue to be transported via road to the Illawarra Coke Company's Coalcliff and Corrimal Coke Works (Figure 1).

Project product coal from the Dendrobium Washery would continue to be transported to market in accordance with Development Consent (DA 60-03-2001).

2.7 COAL WASH MANAGEMENT

Approximately 1 Mtpa of coal wash is currently produced by the West Cliff Colliery Washery. Coal wash is currently emplaced on-site at the West Cliff Colliery Stage 2 Coal Wash Emplacement (Figure 4). Up to approximately 1.5 Mtpa of coal wash from the Dendrobium Washery are also trucked and emplaced at the West Cliff Colliery Stage 2 Coal Wash Emplacement.

Over the life of the Project, it is estimated that up to approximately 80 Mt of coal wash would be produced from the Bulli Seam Operations.

ICHPL obtained a Notice of Staged Development Approval on 20 December 2007, for the development of the West Cliff Colliery Stage 3 Coal Wash Emplacement in accordance with the requirements of the Development Consent (DA 60-03-2001) for the Dendrobium Mine. Coal wash produced by the Project would be placed at the approved West Cliff Colliery Stage 3 Coal Wash Emplacement (Figure 4).

Subject to the outcomes of further engineering and feasibility studies (Section 5.3.2), coal wash produced by the Project would be placed at the West Cliff Colliery Stage 4 Coal Wash Emplacement (Figure 4).

Alternative coal wash management options would also be considered in the EA.

2.8 WATER SUPPLY

Existing water supply arrangements at the Appin and West Cliff Collieries include the following:

- Brennans Creek Dam;
- West Cliff to Appin water supply pipeline;
- Sydney Water supply to the Appin Colliery and Appin West pit tops; and
- water filtration plant at the Appin West pit top.

The development of the proposed underground mining and development areas would increase the area underground that requires water supply and/or water management.

The increased West Cliff Colliery Washery processing rate would increase process water demand at the surface facilities. Management requirements for rainfall runoff within surface operational areas would also increase as a result of the development of the West Cliff Colliery Stage 4 Coal Wash Emplacement (Section 2.7).

Water management infrastructure such as sumps, pumps, pipelines and water storages would be upgraded/extended or replaced as required over the Project life.

2.9 UPGRADE OF GENERAL SUPPORTING INFRASTRUCTURE

The existing surface facilities and supporting infrastructure would be utilised, however, the Bulli Seam Operations would require the upgrade of some infrastructure and progressive construction of additional components (e.g. service boreholes, ventilation shafts, gas drainage equipment, waste water treatment and waste water disposal) at various stages of the Project life.

Gas drainage equipment would continue to be installed over operational areas and consist of a gas extraction plant (including generator and fuel tank), gas flares, compressors, water management structure, drill rig and trailer and associated access track(s). Gas drainage equipment would be located to minimise surface disturbance and contained within an approximate 30 m by 40 m fenced area.

ICHPL may in the future consider developing a new pit top in the proposed underground mining and mine development area. However, a new pit top is no longer being considered as a component of this Project and will not be assessed in this EA. If required in the future, any new pit top would be subject to a separate assessment, consultation and approval process.

2.10 CAPITAL INVESTMENT VALUE

The estimated total capital cost for the Project is approximately AUD $367 million (M).

2.11 WORKFORCE

The operational workforce at the Bulli Seam Operations is expected to increase up to approximately 1,000 employees and contractors.

It is anticipated that an additional workforce of approximately 100 employees and contractors would be required for progressive construction activities at various stages of the Project life.

3 PLANNING PROVISIONS AND PROJECT APPROVAL CONSIDERATIONS

NSW Environmental Planning and Assessment Act, 1979

Approval for the Project would be sought under Part 3A of the EP&A Act. The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. Part 3A of the EP&A Act provides an approval process for Major Projects. The Project is considered a project to which Part 3A of the EP&A Act applies under Schedule 1, Group 2 of *State Environmental Planning Policy (Major Projects), 2005* (Major Projects SEPP), as the project represents development for the purpose of mining that is coal mining, has a capital investment value of more than $30 million and would employ more than 100 people.

Project Approval would be sought from the NSW Minister for Planning. The Project is not considered to require concept approval, and therefore a Concept Plan is not required.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive industries) 2007*, which became operational on 16 February 2007, rationalises the various environmental planning instruments which previously controlled mining activities. As part of this rationalisation, *State Environmental Planning Policy No. 37 – Continued Mines and Extractive Industries 1993* was repealed.

Under Part 2, Clause 7 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive industries) 2007*, 'underground mining carried out on any land' is listed as an activity permissible with consent. Project Approval would be sought from the NSW Minister for Planning under Part 3A of the EP&A Act as outlined above.

Wollondilly Local Environmental Plan 1991

The West Cliff Colliery major surface infrastructure (Figure 4) is situated on land zoned 1(a1) (Rural 'A1') in the *Wollondilly Local Environmental Plan 1991* (Wollondilly LEP). Table 4 provides the Wollondilly LEP zoning details of the land within the proposed underground mining and mine development areas (Wollondilly Local Government Area [LGA]).

Table 4
Wollondilly LEP Zoning Details for Project Underground Mining and Mine Development Areas

LEP Zoning	Zoning Description
1(a1)	Rural "A1"
1(a2)	Rural "A2"
1(a3)	Rural "A3"
1(b)	Agricultural Landscape
2(a)	Residential "A"
3(a)	Business
5(a)	Special Uses "A"
5(b)	Special Uses "B" (Railway)
5(c1)	Special Uses "C1" (Water Catchment)
5(c2)	Special Uses "C2" (Water Catchment)
6(a)	Open Space "A" (Recreation)
7(c)	Environmental Protection "C" (Rural Living)
9(e)	Regional Open Space Reservation

A number of land zonings under the LEP also apply to the current and previously mined areas.

Road transport of ROM and product coal would continue to be undertaken within the Wollondilly LGA.

Development Control Plans (DCPs) under the Wollondilly LEP may be applicable to the Project and would be further considered in the Project EA.

Wollongong Local Environmental Plan 1990

Part of the proposed underground mining and mine development areas are within land zoned 7a (Environmental Protection – Special) under the *Wollongong Local Environmental Plan 1990* (Wollongong LEP) (Wollongong LGA).

Road transport of ROM and product coal would continue to be undertaken within the Wollongong LGA.

DCPs under the Wollongong LEP may be applicable to the Project and would be further considered in the Project EA.

Campbelltown Local Environmental Plan No. 1

Part of the proposed underground mining and mine development areas are within land zoned 1(c), 5(a) (Special Uses) and (Rural), 6(a) (Open Space) under the *Campbelltown Local Environmental Plan No. 1* (Campbelltown LEP) (Campbelltown LGA).

DCPs under the Campbelltown LEP may be applicable to the Project and would be further considered in the Project EA.

Illawarra Regional Environmental Plan No. 1

The *Illawarra Regional Environmental Plan No. 1* (Illawarra REP) applies to land within the Wollongong LGA. The aim of the Illawarra REP is to maximise the opportunities for the people of the region and the State to meet their individual and community economic and social needs with particular reference to the way in which these needs are related to the allocation, availability, accessibility and management of the region's land resources.

Greater Metropolitan Regional Environmental Plan No. 2—Georges River Catchment

The *Greater Metropolitan Regional Environmental Plan No. 2—Georges River Catchment* (Greater Metropolitan REP) applies to the catchment of the Greater Metropolitan Region. The catchment consists of parts of a range of LGAs that are within the Georges River Catchment including Wollondilly and Wollongong LGAs. The Greater Metropolitan REP aims to protect the water quality of the Georges River and its tributaries and the environmental quality of the whole catchment.

Sydney Regional Environmental Plan No. 20—Hawkesbury-Nepean River (No. 2 - 1997)

The *Sydney Regional Environmental Plan No. 20—Hawkesbury-Nepean River (No. 2 - 1997)* (Sydney REP) applies to areas within the Greater Metropolitan Region. The Greater Metropolitan Region consists of parts of a range of LGAs including Wollondilly, Campbelltown and Camden LGAs. The Sydney REP aims to protect the Hawkesbury-Nepean River system by managing future land uses.

Drinking Water Catchments Regional Environmental Plan No. 1

The *Drinking Water Catchments Regional Environmental Plan No. 1* applies to land within the 'hydrological catchment', which comprises a number of sub-catchments which contribute to Sydney's (and surrounding regional centres) water supply, including the Woronora, Metropolitan and O'Hares Creek Catchment Areas (Woronora, Metropolitan and O'Hares Creek Special Areas) (Figure 2).

The *Drinking Water Catchments Regional Environmental Plan No. 1* commenced on 1 January 2007 and *State Environmental Policy 58 - Protecting Sydney's Water Supply* was repealed. The *Drinking Water Catchments Regional Environmental Plan No. 1* aims to create healthy water catchments that will deliver high quality water while sustaining diverse and prosperous communities.

The *Drinking Water Catchments Regional Environmental Plan No. 1* requires development on land in the hydrological catchment to have a neutral or beneficial effect on water quality.

Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act, 1997* (POEO Act) and the *Protection of the Environment Operations Regulations, 1997* set out the general obligations for environmental protection.

The Appin and West Cliff Collieries currently operate under three Environmental Protection Licences (EPL) including EPL No. 398 and 758 for the Appin Colliery pit top areas and EPL No. 2504 for the West Cliff Colliery pit top issued by the DECC under the POEO Act. The EPLs contain conditions which relate to discharge, environmental limits, environmental monitoring, recording and reporting. It is expected that the Project would necessitate a revision of the relevant EPLs, if approved.

Commonwealth Environment Protection and Biodiversity Conservation Act, 1999

In January 2007 the Commonwealth and NSW governments signed a Bilateral Agreement which accredits the NSW assessment regime under Part 3A of the EP&A Act for assessment purposes under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The Bilateral Agreement applies to actions that the Commonwealth Environment, Heritage and the Arts Minister has determined are controlled actions under the EPBC Act.

The Project will be referred to the Commonwealth Minister for the Environment, Heritage and the Arts for consideration as to whether it is deemed a controlled action and requires approval under the EPBC Act.

4 STAKEHOLDER CONSULTATION

4.1 CONSULTATION UNDERTAKEN TO DATE

Consultation with NSW Government agencies in regard to the Bulli Seam Operations commenced in 2007. Briefings and/or discussions have been held with the following state agencies and local councils:

- DoP;
- Department of Premier and Cabinet;
- DPI-MR;
- DECC;
- Wollondilly Shire Council;
- Wollongong City Council; and
- Campbelltown City Council.

Further stakeholder consultation (including the local and broader community) will be undertaken during the preparation of the EA following lodgement of this Project Description Report and Preliminary Assessment. A stakeholder engagement strategy will be implemented for the Project as described below.

4.2 STAKEHOLDER ENGAGEMENT STRATEGY

A stakeholder engagement strategy has been developed for the progression of the Project EA approval process. The strategy includes the use of a variety of consultation mechanisms which in summary include:

- Public exhibition of key documents (e.g. Project Application and EA).
- Briefing of existing community working groups (i.e. Appin Area Community Working Group) and may include use of project specific focus groups.
- Provision of information regarding the Project on the BHP Billiton Illawarra Coal website.
- Providing interested parties with briefing information on the Project, EA, approval process and opportunities to contribute to the overall assessment process.
- Meetings with public authorities and other stakeholders.

5 PRELIMINARY ASSESSMENT

5.1 OVERVIEW

The following preliminary assessment has been prepared to identify the potential environmental issues associated with the Project. This information has been prepared to assist the DoP with the issuing of the Director-General's environmental assessment requirements for the Project under s75F(2) of the EP&A Act.

The assessment has been undertaken in accordance with the draft Preliminary Assessment Guideline (DIPNR, 2005b).

In preparing this preliminary assessment, ICHPL has drawn on:

- environmental management experience from ICHPL's existing mining operations in the NSW Southern Coalfield (i.e. Appin and West Cliff Collieries and Dendrobium Mine);
- feedback obtained during stakeholder consultation to date; and
- the outcomes of the Preliminary Assessment Workshop (Section 5.2).

5.2 PRELIMINARY ASSESSMENT WORKSHOP

In order to identify key environmental issues of relevance to the Project, a Preliminary Assessment Workshop was conducted at the BHPB Billiton Illawarra Coal Administration Centre offices on 5 November 2007. The workshop was undertaken in general accordance with the draft Preliminary Assessment Guideline (DIPNR, 2005b). The Preliminary Assessment Workshop participants included:

- Luca Rocchi - Project Manager Bulli Seam Operations.
- Gary Brassington - Manager Environment.
- Richard Walsh - Manager Approvals.
- Rosanne Moore - Manager Communication and Consultation.
- Peter Crowe - GIS Co-ordinator.
- Hank Pinkster - Manager Rehabilitation and Infrastructure.
- Representatives from Resource Strategies Pty Ltd - Environmental Consultants.

The Preliminary Assessment Workshop involved the following steps:

1. **Identification of Potential Issues** - Consideration of how the Project is likely to affect the physical or biological aspects of the environment; natural or community resources; environmentally sensitive areas; areas allocated for conservation purposes; and areas sensitive because of community factors.
2. **Identification of Key Potential Environmental Issues** - From the potential issues identified above, what are the key issues, considering the extent of the impacts; the nature of the impacts; and the impacts on environmentally sensitive areas.
3. **Preliminary Consideration of the Study Requirements** - Each of the key potential environmental issues identified were considered with respect to the level and scope of assessment that would be required for the Project EA.

The summary description of the Project is provided in Table 5 in accordance with the draft Preliminary Assessment Guideline (DIPNR, 2005b). The results of Steps 2 and 3 (above) of the Preliminary Assessment Workshop are presented in Table 6.

5.3 ISSUE ANALYSIS

5.3.1 Subsidence and Longwall Panel Design

Existing Environment

Underground mining undertaken of the Bulli Seam at the Appin and West Cliff Collieries has included mining beneath a range of man-made and natural features (Figures 2 and 3) over a number of decades.

The Bulli Seam thickness ranges from approximately 2.0 m to 3.5 m at a depth of generally more than 400 m below the surface (and up to 850 m depth in the north-west of the proposed underground mining and mine development areas). The longwall panel widths at the Appin and West Cliff Collieries have progressively increased over the years to the current widths of 320 m and 305 m respectively (rib to rib) and chain pillar widths of up to 45 m.

Table 5
Description of the Proposed Project

Project	• Illawarra Coal Bulli Seam Operations.
Objectives	• Continuation of underground mining operations at the Appin and West Cliff Collieries to support a total ROM coal production rate of up to 10.5 Mtpa in the NSW Southern Coalfield.
Major elements	• Continued underground mining operation resulting in potential surface subsidence effects. • Upgrade of the existing West Cliff Colliery Washery (including CPP). • Extensions/upgrades to existing ROM coal and product coal stockpiles, coal wash emplacement and materials handling facilities. • Upgrade of existing surface facilities and supporting infrastructure at the Bulli Seam Operations (e.g. service boreholes, ventilation shafts, gas drainage equipment, waste water treatment and waste water disposal). • Continued and expanded placement of coal wash at the West Cliff Colliery Coal Wash Emplacement. • Continued road transport of ROM coal between the Bulli Seam Operations (i.e. from the Appin Colliery pit top to the West Cliff Colliery Washery) and the Dendrobium Washery at Port Kembla. • Continued road transport of product coal from the West Cliff Colliery Washery via the public road network to BlueScope Steelworks and Port Kembla Coal Terminal. • Ongoing mitigation and rehabilitation (including rehabilitation of mine related infrastructure areas that are no longer required) and remediation works. • Also see Section 2 and Figures 1 to 4.
Ancillary works	• Ongoing exploration activities within existing exploration tenements. • Continued mine gas drainage and capture for beneficial utilisation at Appin-Tower Power Project and WestVAMP. • Gas drainage equipment that is not connected to a utilisation plant. • Continued use of electricity generated by the Appin-Tower Power Project utilising coal bed methane drained from the Bulli Seam. • Development of new remote services sites utilising boreholes for installation of down-hole power, compressed air, communication, monitoring, etc. • Also see Section 2 and Figures 1 to 4.
Outline of construction methods	• Progressive construction and surface rehabilitation/remediation works throughout mine life. • No on-site worker accommodation. • Temporary buildings for administration, meals and toilets/bathhouse. • Offsite fabrication of additional Washery and infrastructure components and delivered to site for assembly. • Also see Section 2 and Figures 1 to 4.
Outline of operations	• Extraction of up to 10.5 Mtpa of ROM coal utilising longwall mining methods 24 hours per day, 7 days per week. • Also see Section 2 and Figures 1 to 4.
Location(s)	• Located in the vicinity of Appin, Douglas Park, Menangle and Wilton townships. • Also see Figures 1 to 3.
Timeframe	• Operations to occur over a period of at least 30 years.

Table 6
Required Level and Scope of Environmental Assessment for Key Issues

Key Issues	Preliminary Consideration of the Study Requirements	Study Extent Required to Avoid, Minimise or Manage Potential Impacts
Potential subsidence related impacts on key surface infrastructure.	• Subsidence impact assessment. • Consideration of management options and associated costs. • Proactive engagement with relevant regulators/stakeholders (infrastructure owners). • Consideration of panel layout, panel width, mining method, pillar width - including mine economics and environmental aspects. • Development of impact management measures. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake subsidence impact assessment in accordance with DPI-MR and other relevant stakeholder requirements for Part 3A approval. • Commit to Subsidence Management Plan. • Work with infrastructure owners to understand engineering specifications. • Apply existing ICHPL infrastructure management technologies.
Potential subsidence related impacts on key natural features (steep slopes, clifflines, aquatic flora and fauna, waterways and wetlands).	• Surface water and groundwater impact assessment. • Aquatic ecology impact assessment. • Flora impact assessment. • Potential safety issues. • Proactive engagement with relevant regulators/stakeholders. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake a surface water and groundwater impact assessment. • Undertake an aquatic ecology impact assessment. • Undertake a flora impact assessment. • Commit to Subsidence Management Plan.
Scope 1-3 Greenhouse Gas Emissions.	• Consideration of management options and associated costs. • Quantification of gas emissions. • Inclusion of existing offsets and consideration of additional offsets. • Consideration of options to avoid, mitigate, manage.	• Undertake an assessment of greenhouse gas emission associated with the Project (Scope 1, 2 and 3) in accordance with the *Greenhouse Gas Protocol* (World Resources Institute, 2004).
Disturbance associated with surface infrastructure development (West Cliff Colliery Stage 4 Emplacement, surface gas drainage equipment) and exploration resulting in vegetation removal, increased traffic, ecological and cultural heritage impacts.	• Surface water and groundwater impact assessment. • Aquatic ecology impact assessment. • Flora and fauna impact assessment. • Proactive engagement with relevant regulators/stakeholders. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake a surface water and groundwater impact assessment. • Undertake an aquatic ecology impact assessment. • Undertake a flora and fauna impact assessment. • Undertake an Aboriginal cultural heritage and non-Aboriginal heritage assessment.
Potential subsidence impacts on community infrastructure.	• Subsidence impact assessment. • Social impact assessment. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake a Socio-Economic Assessment. • Commit to Subsidence Management Plan.
Potential subsidence impacts on private properties and facilities.	• Subsidence impact assessment. • Social impact assessment. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake a Socio-Economic Assessment. • Commit to Subsidence Management Plan.
Potential transport related impacts on surrounding community (road movements, noise and air quality).	• Road transport impact assessment in accordance with RTA guidelines. • Proactive engagement with relevant regulators/stakeholders. • Consideration of options to avoid, mitigate, manage and associated costs.	• Undertake a road transport assessment in accordance with RTA guidelines.

Table 6 (Continued)
Required Level and Scope of Environmental Assessment for Key Issues

Key Issues	Preliminary Consideration of the Study Requirements	Study Extent Required to Avoid, Minimise or Manage Potential Impacts
Continued operation of the mine and continuing economic contribution. Contribution to social infrastructure (Community Partnerships Program and relationships with stakeholders - sponsorships).	• Socio-Economic Assessment (Cost benefit analysis). • Consideration of options to avoid, mitigate, manage. • Project justification and consideration of alternatives.	• Undertake a Socio-Economic Assessment including a cost-benefit analysis.
Mine Closure	• Socio-Economic Assessment (Consideration of mine closure strategy). • Consideration of options to avoid, mitigate, manage and rehabilitate.	• Undertake a Socio-Economic Assessment including commitment to a mine closure strategy.
Potential environmental effects on environmentally sensitive areas.	• To be incorporated into EA studies described above and below. • Consideration of options to avoid, mitigate, manage and associated costs.	• Incorporate into EA studies described above and below.
Potential infrastructure and subsidence related impacts on Aboriginal heritage.	• A cultural heritage impact assessment would be undertaken in accordance with DECC guidelines. • Proactive engagement with relevant regulators/stakeholders. • Consideration of options to avoid, mitigate, manage.	• Undertake a cultural heritage impact assessment in accordance with DECC guidelines. • Review previous archaeological studies and incorporate findings into Project design. • Commit to Subsidence Management Plan.
Potential subsidence related impacts on Non-Aboriginal heritage.	• A non-Aboriginal heritage impact assessment would be undertaken in accordance with Heritage Office guidelines. • Proactive engagement with relevant regulators/stakeholders. • Consideration of options to avoid, mitigate, manage.	• Undertake a non-Aboriginal heritage impact assessment in accordance with Heritage Office guidelines. • Review previous heritage studies and incorporate findings into Project design. • Commit to Subsidence Management Plan.

The proposed underground mining and mine development areas for the Project are located within the existing Appin, Wilton and South Campbelltown Mine Subsidence Districts. However the area to the east of the Georges River is not a Mine Subsidence District.

A number of major surface infrastructure items are situated above or near the proposed underground mining and mine development areas including the Hume Highway and Main Southern Railway (Figures 2 and 3) and associated bridge structures.

Regional and local electricity transmission lines, optical fibre cables and general infrastructure items such as buildings, roads, culverts, pipelines and survey marks are also located above the proposed underground mining and mine development areas.

A number of rural properties, townships and future residential developments are situated above or near the proposed underground mining and mine development areas, as are other non-infrastructure surface and sub-surface features and a range of natural surface and sub-surface features (e.g. watercourses, natural cliffs, aquifers and upland swamps) and cultural heritage features (e.g. Aboriginal heritage sites and non-Aboriginal heritage items).

Likely Extent and Nature of Potential Impacts

Potential subsidence movements include vertical subsidence, tilt, curvature and strain, valley related subsidence movements and far-field subsidence effects. The majority of subsidence movements would generally be defined by an angle of draw of 35 degrees from the perimeter of the longwalls, however, limited far-field effects may also occur.

Impacts on streams can potentially include:

- fracturing in the bed and rockbars;
- water flow diversion to the shallow sub-strata;
- additional erosion, ponding, or dessication;
- changes to stream alignment;
- changes to water quality;
- release of gas in near surface strata; and
- impacts on terrestrial and aquatic flora and fauna.

Impacts on cliffs can include differential movements which can induce additional stresses in the rock mass and potentially reduced stability.

Proposed Level and Scope of Subsidence Assessment

A subsidence impact assessment will be conducted for the EA. It is anticipated that the scope of the subsidence impact assessment would include:

- description of the geology and known geological structures;
- subsidence predictions for the proposed underground mining;
- identification of significant natural features and man-made structures (e.g. roads, bridges, pipelines, etc.) potentially impacted by the Project; and
- measures to avoid, mitigate, monitor and/or remediate potential subsidence impacts on significant surface features.

The proposed underground mining works would be described to a conceptual level in the Project EA. Detailed design of the longwall panels would be undertaken progressively as part of the development of the SMPs over the 30 year Project life.

5.3.2 Coal Wash Management

Existing Environment

Coal wash is a by-product of the coal preparation and washing process and consists of soft sedimentary rock, clay silt, sand and residue coal that has been separated from ROM coal. Coal wash from the West Cliff Colliery Washery was analysed in 2006 to determine its chemical and physical properties. Results indicated that the coal wash has low total sulphur concentrations (i.e. not pyritic) and has a low potential to produce acidity. The pH level of coal wash is high due to high bicarbonate content, and is not contaminated with manufactured chemicals or sulfidic minerals, nor is it mixed with any other wastes (Blunden and Gray, 2006).

Coal wash has been disposed of at the West Cliff Colliery Coal Wash Emplacement (Stages 1 and 2) since approval by Wollondilly Shire Council in 1975 (Figure 4) and currently operates in accordance with a s100 approval previously issued under the *Coal Mines Regulation Act, 1982*.

ICHPL obtained a Notice of Staged Development Approval from the Minister for Planning for development of the West Cliff Colliery Stage 3 Coal Wash Emplacement in accordance with Development Consent (DA 60-03-2001) for the Dendrobium Mine on 20 December 2007.

As part of the assessment process for approval of the West Cliff Colliery Stage 3 Coal Wash Emplacement, an assessment of alternative uses for coal wash was undertaken by ICHPL. A range of options were examined including:

- optimisation of the existing emplacement site;
- underground disposal;
- coal wash brick making;
- road pavement;
- using coal wash as fuel for power generation; and
- civil fill applications and site rehabilitation.

It was concluded in the assessment that the West Cliff Colliery Stage 3 Coal Wash Emplacement remained the only viable short to medium term option for coal wash disposal, supplemented by a range of possible reuse opportunities negotiated on a project-by-project basis.

ICHPL has however committed to continuing to:

- research and consider alternatives to coal wash emplacement;
- pursue the use of coal wash as an engineering fill material;
- negotiate with owners of suitably located and available sites that could be used as alternative emplacement sites to extend the life of the West Cliff Colliery Stage 3 Coal Wash Emplacement; and
- report progress of these actions to the NSW Government in the Annual Environmental Management Report.

Based on studies to date, ICHPL's preferred coal wash disposal option is at the proposed West Cliff Colliery Stage 4 Coal Wash Emplacement. However, this would be further assessed as part of ICHPL's commitments described above.

Likely Extent and Nature of Potential Impacts

Over the life of the Project, it is estimated that up to approximately 80 Mt of coal wash would be produced from the Bull Seam Operations.

During this period, the Dendrobium Mine would produce in the order of 45 Mt of coal wash which would also require emplacement at the West Cliff Colliery Coal Wash Emplacement.

Potential impacts associated with the development of the West Cliff Colliery Stage 4 Coal Wash Emplacement, or an alternative coal wash management methodology, may include:

- surface disturbance resulting in vegetation clearance and associated impacts on flora, fauna and aquatic habitat;
- potential noise and dust impacts;
- potential impacts on water quality and natural drainage/flood risk;
- potential impacts on Aboriginal cultural heritage and non-Aboriginal heritage;
- potential visual impacts;
- potential spontaneous combustion risk; and
- potential impacts on road transport (in the case of an off-site coal wash management option).

Proposed Level and Scope of Assessment

Each of the environmental studies identified in the Project Description Report and Preliminary Assessment to be included in the EA will assess potential environmental impacts associated with coal wash emplacement (see above) where relevant.

Consistent with ICHPL's commitments described above, a range of alternative coal wash management options would be considered. The scope of the environmental studies would reflect the coal wash management option(s) proposed in the EA.

5.3.3 Surface Water

Existing Environment

The proposed underground mining and mine development areas are situated within the Hawkesbury-Nepean and Georges River catchments.

A number of streams are located in the vicinity of the underground mining and mine development areas including the Nepean River, Cataract River, Georges River, Stokes Creek, O'Hares Creek, Woronora River, Wallandoola Creek, Ousedale Creek (Figure 2) and their tributaries.

Underground mining has previously occurred beneath the Nepean River, Cataract River, Ousedale Creek, Georges River and Stokes Creek (Figure 2).

Lake Cataract is located to the south and up-catchment of the proposed underground mining and mine development areas (Figure 3). Lake Woronora is located to the north-east of the proposed underground mining and mine development areas. These reservoirs supply water to residents of Sydney and surrounds and are managed by the Sydney Catchment Authority (SCA). The Special Areas managed by the SCA as defined under the *Sydney Water Catchment Management Act, 1998* are shown on Figure 1.

The Appin and West Cliff Collieries major surface facilities are situated in the Georges River catchment. Watercourses situated in the vicinity of the major surface facilities include Georges River, Brennans Creek and O'Hares Creek, respectively. The West Cliff Colliery pit top, washery, coal stockpiles and coal wash emplacement are located upstream of the Brennans Creek Dam (Figure 4).

The Appin West pit top major surface facilities and the Appin-Tower Power Project are situated within the Hawkesbury-Nepean Catchment. Watercourses situated in the vicinity of the major surface facilities include the Cataract River and Allens Creek.

Treated water and overflow from the existing water management system is managed in accordance with the requirements of EPL No. 398, EPL No. 758 and EPL No. 2504 for the Appin and West Cliff Collieries.

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on surface water resources include:

- subsidence induced impacts including: cracking; potential gas release; acceleration of erosion; and/or changes in the hydrological aspects of surface water features (e.g. localised effects on water quality and persistence of low flows); and
- water quality impacts associated with surface infrastructure and surface disturbance areas (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment).

A portion of the proposed Appin Area 3 Extended and Appin Area 2 Extended underground mining and mine development areas are situated within the Dams Safety Committee Broughtons Pass and Cataract Notification Areas, respectively (Figure 2).

Proposed Level and Scope of Assessment

A surface water assessment will be conducted for inclusion in the Project EA. It is anticipated that the scope of the surface water assessment would include the following:

- characterisation of existing surface water within the study area;
- review of surface water quality against relevant Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines;
- assessment of potential impacts on surface water flows and water quality in potentially affected stream systems;
- calculation of a water balance for various phases of Project development, including consideration of climatic variability and any water disposal or supplementary water supply requirements; and
- development of measures to avoid, mitigate and/or remediate potential impacts on surface water resources.

5.3.4 Groundwater

Existing Environment

The Project is located in the NSW Southern Coalfield within the southern portion of the Permo-Triassic Sydney Basin.

Underground mining currently occurs in the Bulli Seam of the Late Permian Illawarra Coal Measures. The Bulli Seam is located some 400 to 850 m below the surface and is the seam with the greatest economic importance in the Southern Coalfield. It has a regional dip to the north-west of approximately 1 in 35.

Above the Bulli Seam, the stratigraphy of the area consists of a sequence of sandstone, shale and claystone units including the Narrabeen Group, which are in turn, overlain by Hawkesbury Sandstone. The Wianamatta Group is stratigraphically located above the Hawkesbury Sandstone and has been eroded from most places in this area of the Southern Coalfield.

Near surface groundwater in the vicinity of the Project is likely to include:

- perched groundwater lenses (which may resurface in the form of seeps in hill-slope areas following periods of rainfall); and
- the aquifer of the Hawkesbury Sandstone.

The major claystone unit is the Bald Hill Claystone, which lies above the Bulgo Sandstone at the base of the Hawkesbury Sandstone. This claystone varies in thickness and in some places is more than 25 metres thick. Due to the nature of the clay, which swells when it is wetted, it tends to act as an aquiclude (MSEC, 2006).

Groundwater inflows into the existing underground workings at the Appin and West Cliff Collieries are considered to be low.

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on groundwater resources include:

- subsidence induced impacts including streambed cracking with associated localised changes in sub-surface hydrology of near surface aquifers;

- water quality impacts due to groundwater-rock interactions associated with streambed cracking; and
- groundwater pressure effects at depth due to any limited mine inflows and changes in rock permeability and porosity.

The Project would also include the continued discharge of mine water to the Bulgo Sandstone in accordance with EPL No. 758 for the Appin Colliery.

Proposed Level and Scope of Assessment

A groundwater impact assessment will be conducted for inclusion in the Project EA. It is anticipated that the scope of the groundwater impact assessment would include the following:

- characterisation of the existing groundwater regime including review of geological structures, relevant exploration drilling bore logs, groundwater monitoring data, identification of potential groundwater dependent ecosystems and review of existing mine water management records;
- conduct of additional groundwater investigations where necessary;
- assessment of the potential groundwater impacts of the Project on the local and regional groundwater regime; and
- development of measures to avoid, mitigate and/or remediate potential impacts on groundwater resources.

5.3.5 Aquatic Ecology

Existing Environment

Streams situated above or adjacent to the proposed underground mining and mine development areas include the Nepean River, Cataract River, Georges River, Woronora River, O'Hares Creek, Stokes Creek, Wallandoola Creek and associated tributaries (Figure 3). Aquatic habitats located in the vicinity of the Appin and West Cliff Collieries pit top areas include the Cataract River, Allens Creek, Georges River and Brennans Creek and associated tributaries (Figure 4).

A number of aquatic surveys have been undertaken in streams in the area including those by The Ecology Lab (2005; 2006) and Biosis Research (2005; 2006a).

A range of macroinvertebrates have been recorded from sites within the Georges River (The Ecology Lab, 2005). No threatened aquatic invertebrates listed in the schedules of the NSW *Threatened Species Conservation Act, 1995* (TSC Act), NSW *Fisheries Management Act, 1994* or Commonwealth EPBC Act are known to have been recorded during previous surveys at the Appin and West Cliff Collieries (The Ecology Lab, 2005; 2006) (Figure 3).

Aquatic macrophytes previously recorded in the Nepean River and/or Cataract Rivers include *Hydrilla verticillata, Egeria densa, Potamogeton sulcatus, P. ochretus, Vallisneria americana*, *Myriophyllum papillosum* and emergent *Triglochin* sp. (The Ecology Lab, 2006 and Biosis Research, 2006a).

The Cataract, Nepean and Georges Rivers are known to support a range of fish fauna including the introduced Mosquito Fish (*Gambusia holbrooki*). Native fish species recorded include the Mountain Galaxias (*Galaxias olidus*)*, Flat Head Gudgeon* (*Philypnodum grandiceps*)*,* Firetailed Gudgeon (*Hypseleotris galii*) and Eels (*Anguilla spp.*) (The Ecology Lab, 2006 and Biosis Research, 2006a).

The Macquarie Perch (*Macquaria australasica*), a threatened species under the *Fisheries Management Act, 1994* and the EPBC Act, has been recorded in the Cataract and Nepean Rivers (The Ecology Lab, 2006).

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on aquatic ecology include potential subsidence induced impacts such as the loss and/or alteration of areas of aquatic habitat (e.g. changes in the persistence of stream flow and in-stream pools, stream connectivity and water quality). These effects have the potential to result in changes in stream characteristics and aquatic biota assemblages (e.g. aquatic macroinvertebrates, macrophytes and fish).

Potential impacts of the Project on the aquatic ecology of streams in the vicinity of the surface facilities areas at the Appin and West Cliff Collieries (Figure2 2 and 3) would primarily be confined to potential adverse impacts on water quality (e.g. associated with site runoff/release) from surface disturbance areas (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment).

The proposed development of surface infrastructure such as the proposed West Cliff Colliery Stage 4 Coal Wash Emplacement would result in loss and/or alteration of areas of aquatic habitat.

Proposed Level and Scope of Assessment

An aquatic ecology assessment will be conducted for the Project and would be included in the EA. It is anticipated that the scope of the aquatic ecology assessment would include:

- compilation of existing aquatic ecology information and review of existing data;
- characterisation of aquatic biota (including macroinvertebrate, macrophyte and fish assemblages) and aquatic habitats;
- assessment of potential impacts of the Project on aquatic ecology;
- assessment of threatened aquatic biota; and
- development of measures to avoid, mitigate and/or remediate potential impacts on aquatic ecology.

5.3.6 Terrestrial Flora

Existing Environment

The majority of land above the proposed underground mining and mine development areas in the north and west is cleared land, reflecting the agricultural land use history of the region (Figure 3).

Vegetation above the proposed underground mining and mine development areas and surrounds in the south and east contains areas of intact remnant vegetation.

Keith (1994) has mapped remnant vegetation of the O'Hares Creek Catchment, NPWS (2003) has mapped vegetation of the Woronora, O'Hares Creek and Metropolitan catchments and Tozer *et al.* (2006) has mapped vegetation for the coast and eastern tablelands of southeast NSW. Vegetation types include Cumberland Shale Sandstone, Cumberland Shale Woodland, Sandstone Riparian Scrub, Sandstone Forest, Sandstone Woodland, Heath and Upland Swamp vegetation.

A number of endangered ecological communities have been recorded in the area or surrounds including the Cumberland Plain Woodland, Moist Shale Woodland, Shale Sandstone Transition Forest and O'Hares Creek Shale Forest.

The area may provide potential habitat for other threatened flora. A number of threatened flora species have been recorded in the area or surrounds including *Acacia bynoeana*, *Persoonia hirsuta* and *Pultenaea aristata.*

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on flora primarily relate to potential subsidence-induced effects on habitat (e.g. alteration of hydrological processes) above the proposed underground mining areas.

Other potential impacts on flora include vegetation clearance and/or modification from the progressive construction/development of surface infrastructure (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment), introduction or spread of weed species and dust generation.

Proposed Level and Scope of Assessment

A flora assessment will be conducted for the Project and included in the EA. It is anticipated that the scope of the flora assessment would include the following:

- compilation and review of existing terrestrial flora information;
- review of existing vegetation community mapping;
- vegetation community mapping;
- conduct of flora surveys including targeted searches for threatened flora (listed in the schedules of the TSC Act and Commonwealth EPBC Act) that may potentially occur in the study area;
- assessment of the potential impacts of the Project on terrestrial flora;
- assessment of threatened flora; and
- development of measures to avoid, mitigate and/or remediate potential impacts on flora.

5.3.7 Terrestrial Fauna

Existing Environment

Remnant vegetation, sandstone formations, watercourses and other natural features provide terrestrial fauna with opportunities (to varying degrees) for foraging, breeding, nesting, shelter and movement between areas.

A diversity of terrestrial fauna species have been recorded in the area and surrounds including a number of threatened terrestrial fauna species.

Likely Extent and Nature of Potential Impacts

Similar to terrestrial flora, potential impacts on terrestrial vertebrate fauna primarily relate to potential subsidence-induced effects on habitat and those associated with vegetation clearing (i.e. habitat removal/modification, habitat fragmentation, introduction or spread of vertebrate pests) at surface disturbance areas (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment) and potential impacts on fauna behavioural patterns (e.g. noise and artificial lighting) associated with the development of surface infrastructure.

Proposed Level and Scope of Assessment

A terrestrial vertebrate fauna assessment will be conducted for the Project and included in the EA. It is anticipated that the scope of the terrestrial vertebrate fauna assessment would include the following:

- compilation and review of existing information on terrestrial vertebrate fauna;
- identification of major habitat types present;
- conduct of terrestrial vertebrate fauna surveys including targeted searches for threatened fauna species (listed in the schedules of the TSC Act and Commonwealth EPBC Act) that may potentially occur in the study area;
- assessment of the potential impacts of the Project on terrestrial vertebrate fauna;
- assessment of threatened vertebrate fauna; and
- development of measures to avoid, mitigate and/or remediate potential impacts on terrestrial vertebrate fauna.

5.3.8 Environmentally Sensitive Areas

Existing Environment

A preliminary investigation of environmentally sensitive areas has identified the following:

- No land protected or preserved under *SEPP No. 14 - Coastal Wetlands* or *SEPP 26 - Littoral Rainforests* is known to occur above or proximal to the proposed underground mining and mine development areas or surface infrastructure areas.
- The Dharawal State Conservation Area and Dharawal Nature Reserve are generally situated to the east and south-east of the proposed underground mining and mine development areas, respectively (Figure 2). The Dharawal State Conservation Area is subject to a Conservation Agreement under the *National Parks and Wildlife Act, 1974*.
- No declared aquatic reserves under the *Fisheries Management Act, 1994* occur above or proximal to the proposed underground mining and mine development areas or surface infrastructure areas.
- No land declared as wilderness under the *Wilderness Act, 1987* occurs above or proximal to the proposed underground mining and mine development areas or surface infrastructure areas.
- No Ramsar wetlands are known to occur above or proximal to the proposed underground mining and mine development areas or surface infrastructure areas. The closest Ramsar wetland, namely the Towra Point Nature Reserve, is situated more than 20 km north-east of the Project.
- No land declared as critical habitat under the TSC Act is known to occur above or proximal to the proposed underground mining and mine development areas or surface infrastructure areas.

Likely Extent and Nature of Potential Impacts

Potential impacts on environmentally sensitive areas include subsidence-induced effects above the proposed underground mining areas and/or disturbance to surface features as a result of progressive construction/development of surface infrastructure (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment).

Proposed Level and Scope of Assessment

Further assessment of the occurrence and potential impacts on environmentally sensitive areas will be undertaken during the preparation of the EA as part of the studies identified in the Project Description Report and Preliminary Assessment.

5.3.9 Aboriginal Cultural Heritage

Existing Environment

Large-scale surveys of the Hawkesbury sandstone region of the Woronora Plateau have been conducted by the Illawarra Prehistory Group (Illawarra Prehistory Group, 2007). Surveys of previous and current mining areas have been undertaken by Biosis Research (2006b; 2007) and Sefton (1996). Types of Aboriginal cultural heritage sites which have been recorded in the general vicinity of the Project include (DEC, 2006a, Illawarra Prehistory Group, 2007, Biosis Research, 2006b; 2007 and Sefton, 1996):

- open sites;
- sandstone overhangs containing art;
- sandstone overhangs containing potential archaeological deposits;
- potential archaeological deposits;
- grinding groove sites; and
- rock engravings.

Nine Aboriginal heritage sites in the vicinity of the Project are listed on the Register of the National Estate, including the Cubbitch Barta National Estate Area.

Likely Extent and Nature of Potential Impacts

Potential impacts on Aboriginal cultural heritage include subsidence-induced effects above the proposed underground mining areas and/or disturbance to heritage sites as a result of progressive construction/development of surface infrastructure (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment).

Proposed Level and Scope of Assessment

An Aboriginal cultural heritage assessment will be undertaken for the EA in accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC, 2005a). The assessment process would also be undertaken with consideration of the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC, 1997).

It is anticipated that the scope of the Aboriginal cultural heritage assessment would include the following:

- review of existing Aboriginal cultural heritage information (e.g. DECC databases) and relevant past studies;
- targeted field survey/site inspection of Aboriginal cultural heritage sites/areas;
- cultural and archaeological assessment of Aboriginal cultural heritage items or places identified;
- consultation with relevant Aboriginal groups/representatives in consideration of the *Interim Community Consultation Requirements for Applicants* (DEC, 2004); and
- development of measures to avoid, mitigate and/or remediate potential impacts on Aboriginal cultural heritage.

5.3.10 Non-Aboriginal Heritage

Existing Environment

The NSW State Heritage Inventory contains information about the heritage items included in statutory lists in NSW. This includes items listed by local councils (including those listed under the Wollondilly, Campbelltown and Wollongong LEPs) and state government agencies.

The Australian Heritage Database contains places listed in the World Heritage List, the National Heritage List, the Commonwealth Heritage List and the Register of the National Estate. The Register of the National Estate lists a number of places situated proximal to the Project, including:

- Camden Park;
- Jarvisfield Group;
- Maldon Bridge;
- Menangle House;
- Menangle Railway Viaduct;
- St Bedes Catholic Church and Graveyard;
- St James Anglican Church;
- St Mark the Evangelist Anglican Church;
- St Marys Towers; and
- Wilton Park Stables Group.

Likely Extent and Nature of Potential Impacts

Potential impacts of the Project on non-Aboriginal heritage include subsidence-induced effects above the proposed underground mining areas and/or disturbance to heritage items as a result of progressive construction/development of surface infrastructure (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, exploration and remediation activities and gas drainage equipment).

Proposed Level and Scope of Assessment

A non-Aboriginal heritage assessment will be undertaken for the EA. It is anticipated that the scope of the assessment would include the following:

- review of existing heritage information and relevant National and State databases;
- review of known heritage sites and survey of Project surface infrastructure areas;
- assessment of the heritage significance of any identified items within proposed disturbance areas in accordance with the relevant guidelines (i.e. the NSW Heritage Manual);
- identification of the potential impacts of the Project on sites of heritage significance; and
- development of measures to avoid, mitigate and/or remediate potential impacts on non-Aboriginal heritage.

5.3.11 Road Transport

Existing Environment

The major road in the vicinity of the Project is the Hume Highway, which provides a multi-lane road transport route between Sydney and Melbourne. Other roads include Appin Road, Wilton Road, Picton Road, Remembrance Driveway and numerous local roads. The proposed underground mining and mine development areas extend beneath these roads (Figure 2). The Appin and West Cliff Collieries surface facilities are accessed via Appin Road (Figure 2). The Appin West surface facilities are accessed via Douglas Park Drive.

Up to 5.4 Mtpa of product coal is currently transported by truck from the West Cliff Colliery to BlueScope Steelworks and Port Kembla Coal Terminal (Figure 1). The current transport route from the West Cliff Colliery Washery to BlueScope Steelworks and Port Kembla Coal Terminal includes Appin Road, Princes Highway, F6 Southern Freeway, Mt Ousley Road, F6 Southern Freeway, Masters Road and Springhill Road. The Project would continue to use the same road transport route (Figure 1).

Up to 4 Mtpa of ROM coal is currently transported by truck from the Appin Colliery to the West Cliff Colliery Washery. ROM coal is also transported directly to the Dendrobium Washery in Port Kembla. The Project would continue to use the same road transport route (Figure 1).

Likely Extent and Nature of Potential Impacts

It is proposed to increase the current annual average road haul movements associated with product coal transport from the West Cliff Colliery to the Port Kembla Coal Terminal and BlueScope Steelworks to facilitate the increased coal production rate. The transport of Product coal to the Port Kembla Coal Terminal and BlueScope Steelworks would increase to 24 hours a day, seven days a week (dependant on separate Port Kembla Coal Terminal approvals). There would also be some increase in average road haul movements of ROM coal from the Appin Colliery to the West Cliff Colliery Washery and the Dendrobium Washery.

A temporary increase in heavy vehicle movements may occur for the delivery of materials and equipment during progressive construction/upgrade of on-site facilities in support of the Project. An increase in light vehicles accessing the site would also be expected as a result of the increased number of employees during construction at various stage of the Project (Section 2.11).

The proposed increase in the ROM coal production rate may also result in some incremental increases in regular transport movements associated with delivery of general consumables.

Proposed Level and Scope of Assessment

An assessment of the potential impacts of Project traffic will be undertaken for the EA considering the requirements of the Roads and Traffic Authority (RTA) *Guide to Traffic Generating Developments* (RTA, 2002) and the *Road Design Guide* (RTA, 2000) or their revision. It is anticipated that the scope of the road transport assessment would include:

- Characterisation of the existing road transport environment.
- Consultation with the RTA, local councils and PKCT regarding traffic issues.
- Collation of existing traffic count data including additional traffic counts if required.
- Preparation of a road transport assessment including:
  - identification of impacts of the Bulli Seam Operations relating to the public road network;

- quantification of traffic generated by the Project during operational phases and short-term construction phases (including considering of potential future traffic flows associated with other coal mining and related Projects);
- potential impacts on traffic conditions, levels of service and intersection operation during peak periods; and
- development of suitable traffic management measures.

The road transport assessment would also consider the relevant outcomes of the separate EA being prepared by PKCT for the increased road receival hours at the Port Kembla Coal Terminal.

5.3.12 Noise

Existing Environment

Operational and transport noise generated from the existing Appin and West Cliff Collieries contribute to the existing acoustic environment at the township of Appin and surrounds. Noise emissions associated with minor surface works (including gas drainage equipment) and ventilation infrastructure above the longwall mining panels are limited in nature and are generally removed from population centres and private receptors.

Road transport noise associated with the haulage of ROM and product coal is a component of existing road transport noise on the existing coal transport routes (Figure 1 and Section 5.3.11).

Likely Extent and Nature of Potential Impacts

Noise and vibration may occur as a result of the following activities associated with the Project:

- upgrade and operation of the West Cliff Colliery Washery;
- fixed and mobile plant for coal handling and stockpiling;
- use of other surface infrastructure items (e.g. ventilation fans, pumps etc);
- short-term construction/development activities and remediation/rehabilitation at various stages of the Project life;
- ROM coal loading, road transport and emplacement of coal wash at the West Cliff Colliery Stage 4 Coal Wash Emplacement (or at alternative coal wash emplacement options);
- loading and road transport of product coal;
- transport of construction materials, consumables, waste materials and personnel to and from the Project site; and
- exploration, installation of monitoring equipment, and other Project-related surface activities.

Proposed Level and Scope of Assessment

A noise impact assessment will be undertaken in accordance with the *Industrial Noise Policy* (INP) (EPA, 2000), *Environmental Noise Control Manual* (EPA, 2004)*, Environmental Criteria for Road Traffic Noise* (EPA, 1999) and *Assessing Vibration: A Technical Guideline* (DEC, 2006b), where relevant. It is anticipated that the scope of the noise impact assessment would include:

- characterisation of background noise levels and determining Project specific noise criteria;
- compilation and evaluation of available meteorological data;
- development of a predictive noise model;
- assessment of the potential noise impacts (including road transport) associated with progressive construction, rehabilitation and operation of the Project;
- comparison of the predicted Project emissions against relevant criteria; and
- development of measures to avoid and/or mitigate potential impacts.

5.3.13 Air Quality

Existing Environment

Air quality emissions from the Appin and West Cliff Collieries are monitored and managed in accordance with the requirements of EPL No. 398, EPL No. 758 and EPL No. 2504. ICHPL has implemented a range of air quality management measures at the Appin and West Cliff Collieries, which include:

- covers on conveyor systems;
- regular cart watering of haul roads and stockpiles;
- fixed water sprays at strategic locations at the West Cliff Colliery Washery and stockpiles;
- sealed carparks and permanent internal access roadways;
- use of covered trucks for public road haulage of product coal and coal wash;
- gas drainage and capture for beneficial utilisation at WestVAMP; and

- gas drainage coal bed methane for use in electricity generated by the Appin-Tower Power Project.

ICHPL currently maintains a monitoring network of dust gauges at the Appin Colliery.

Likely Extent and Nature of Potential Impacts

Potential air quality impacts associated with the Project primarily relate to surface activities such as the operation of the West Cliff Colliery Washery (including conveying, stockpiling and crushing activities), short-term construction/development, exploration and remediation/rehabilitation activities, windblown emissions from exposed stockpiles, product coal and coal wash handling, surface operation of mobile plant and emissions from the ventilation systems.

Potential greenhouse gas emissions associated with the Project include carbon dioxide (CO_2) emissions from the use of fixed and mobile plant (e.g. diesel usage), capture and beneficial utilisation of coal seam gas, as well as indirect emissions through the use of electricity, and fugitive or coal seam or strata gas emissions.

Proposed Level and Scope of Assessment

An air quality impact assessment will be undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South* Wales (DEC, 2005b). It is anticipated that the scope of the assessment would include:

- characterisation of background air quality, including dust deposition and suspended particulates (total suspended particulates and PM_{10});
- compilation and evaluation of relevant meteorological data;
- development of a predictive air quality model;
- assessment of the potential air quality impacts associated with the Project;
- comparison of the predicted dust deposition and suspended particulates levels against relevant criteria;
- assessment of potential fugitive gas emissions;
- assessment of potential greenhouse gas emissions (including consideration of Scope 1 to 3 emissions including those associated with the use of product coal); and
- development of measures to avoid, mitigate or offset potential air quality impacts.

5.3.14 Socio-Economics

Existing Environment

The Bulli Seam Operations are located in the Wollondilly, Campbelltown and Wollongong LGAs and within the Illawarra Statistical Division of NSW.

The Appin and West Cliff Collieries have an operational workforce of approximately 875 people and have resulted in flow-on economic effects such as the creation of indirect employment opportunities and significant expenditure at a local and State level.

The Illawarra Regional Information Service (IRIS) undertook a project to analyse the direct and indirect economic impacts of ICHPL operations (including the Appin and West Cliff Collieries) on the Illawarra and Wollondilly regions in 2006. In the 12 months to June 2006, ICHPL sold 6.38 Mt of coal, spent $324 Million on regional goods and services, provided jobs for 997 employees and approximately 400 contractors, and directly contributed $800,000 dollars to the local community through donations and sponsorships.

Product coal from the Appin and West Cliff Collieries is sold to domestic and overseas markets. Approximately 50% of product coal sales are to BlueScope Steelworks. Other customers include One Steel (15%) and Illawarra Coke (3%) and export (32%).

Likely Extent and Nature of Potential Impacts

The Project represents continuing significant capital and operating investment in the local and regional economy, enabling continued employment, expendable income, export earnings and government revenue. The Project would provide continuing and increased employment for up to approximately 1,000 employees and contractors and up to an additional 100 short-term construction jobs for employees and contractors at various stages of the Project life.

Capital expenditure for the Project is estimated at $367 Million.

Proposed Level and Scope of Assessment

A socio-economic assessment will be conducted for the Project and included in the EA. It is anticipated that the scope of the Project socio-economic assessment would include:

- a benefit cost analysis (threshold value analysis);
- a regional economic impact assessment;

- an employment, population and community infrastructure assessment; and
- development of measures to avoid or mitigate potential socio-economic impacts (e.g. at mine closure).

The socio-economic assessment would also include analysis of costs and benefits associated with alternative longwall conceptual layouts in proximity to significant sensitive features.

5.3.15 Visual Amenity

Existing Environment

Views of existing major surface infrastructure at the Appin and West Cliff Collieries are largely restricted due to heavily vegetated slopes which limit views from potential sensitive receiver locations (e.g. public roads).

Likely Extent and Nature of Potential Impacts

Potential visual impacts would primarily be associated with the construction/development of surface infrastructure at the West Cliff Colliery Washery (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement).

Some minor and temporary visual impacts may also result from exploration and remediation activities and the progressive installation/decommissioning of gas drainage equipment over the life of the Project.

Proposed Level and Scope of Assessment

Given the limited views of the surface infrastructure described above, a detailed visual assessment is not proposed to be undertaken for the EA. However, the EA would include measures to manage/mitigate/avoid potential visual impacts as appropriate.

5.4 LEVEL AND SCOPE OF ASSESSMENT

The key potential environmental issues associated with the Project identified in this Project Description Report and Preliminary Assessment are summarised in Table 7 along with associated proposed EA requirements.

Table 7
Key Environmental Issues, Key Potential Impacts and Proposed Environmental Assessment Requirements

Key Environmental Issue	Key Potential Impacts	Proposed Environmental Assessment Requirements
Subsidence and Surface Features	• Potential subsidence related impacts on key man-made surface infrastructure. • Potential subsidence related impacts on significant natural features.	• Subsidence predictions for key surface infrastructure and significant natural features. • Consideration of avoidance, mitigation, management and remediation options.
Surface Water and Groundwater	• Potential impacts of subsidence on surface water features. • Potential hydrological impacts of surface infrastructure development works (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, gas drainage equipment) and ongoing operational discharge/water release. • Potential impacts of mining and subsidence on groundwater systems.	• Assessment of potential impacts on surface water and groundwater, including impacts on water quality and quantity. • Consideration of avoidance, mitigation, management and remediation options.
Aquatic Ecology	• Potential subsidence related impacts on aquatic ecology (e.g. hydrological change or alteration of habitat). • Potential disturbance of aquatic habitat associated with surface infrastructure development works (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement) and exploration.	• Assessment of potential impacts on aquatic ecology, including threatened aquatic biota. • Consideration of avoidance, mitigation and management options.

Table 7 (Continued)
Key Environmental Issues, Key Potential Impacts and
Proposed Environmental Assessment Requirements

Key Environmental Issue	Key Potential Impacts	Proposed Environmental Assessment Requirements
Terrestrial Flora and Fauna	• Potential subsidence related impacts on flora, fauna and their habitats. • Potential impacts from vegetation disturbance associated with surface disturbance associated with the Project (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, gas drainage equipment) and exploration.	• Assessment of potential impacts on terrestrial flora. • Assessment of potential impacts on terrestrial fauna. • Assessment of threatened flora and fauna species, populations, ecological communities, and their habitats. • Consideration of avoidance, mitigation and management options.
Environmentally Sensitive Areas	• Potential impacts on environmentally sensitive areas.	• Assessment of potential impacts on environmentally sensitive areas. • Consideration of avoidance, mitigation and management options.
Aboriginal and Non-Aboriginal Heritage	• Potential subsidence related and infrastructure development (e.g. West Cliff Colliery Stage 4 Coal Wash Emplacement, gas drainage equipment) and exploration impacts on Aboriginal and Non-Aboriginal heritage.	• Assessment of potential impacts on Aboriginal cultural heritage. • Assessment of potential impacts on non-Aboriginal heritage. • Consideration of avoidance, mitigation and management options.
Road Transport	• Potential traffic impacts on the road network.	• Assessment of potential traffic impacts on the surrounding road network. • Consideration of avoidance, mitigation and management options.
Noise	• Potential noise impacts on the surrounding community (including construction, operation and road transport noise).	• Assessment of potential noise impacts on the surrounding community, including construction and operation noise and road and transport noise. • Consideration of avoidance, mitigation and management options.
Air Quality	• Potential fugitive gas emissions. • Potential air quality impacts associated with surface operations on the surrounding community. • Scope 1-3 greenhouse gas emissions.	• Quantification and assessment of potential fugitive gas emissions. • Assessment of potential air quality impacts, including dust deposition and suspended particulates. • Assessment of potential greenhouse gas emissions. • Inclusion of existing offsets and consideration of additional offsets. • Consideration of avoidance, mitigation and management options.
Socio-Economics	• Continued operation of the mine and continuing economic contribution. • Mine closure. • Potential impacts on community infrastructure, private properties and facilities. • Contribution to social infrastructure.	• Assessment of the potential socio-economic impacts and benefits (cost benefit analysis). • Development of a framework for a mine closure strategy. • Consideration of avoidance, mitigation and management options.

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