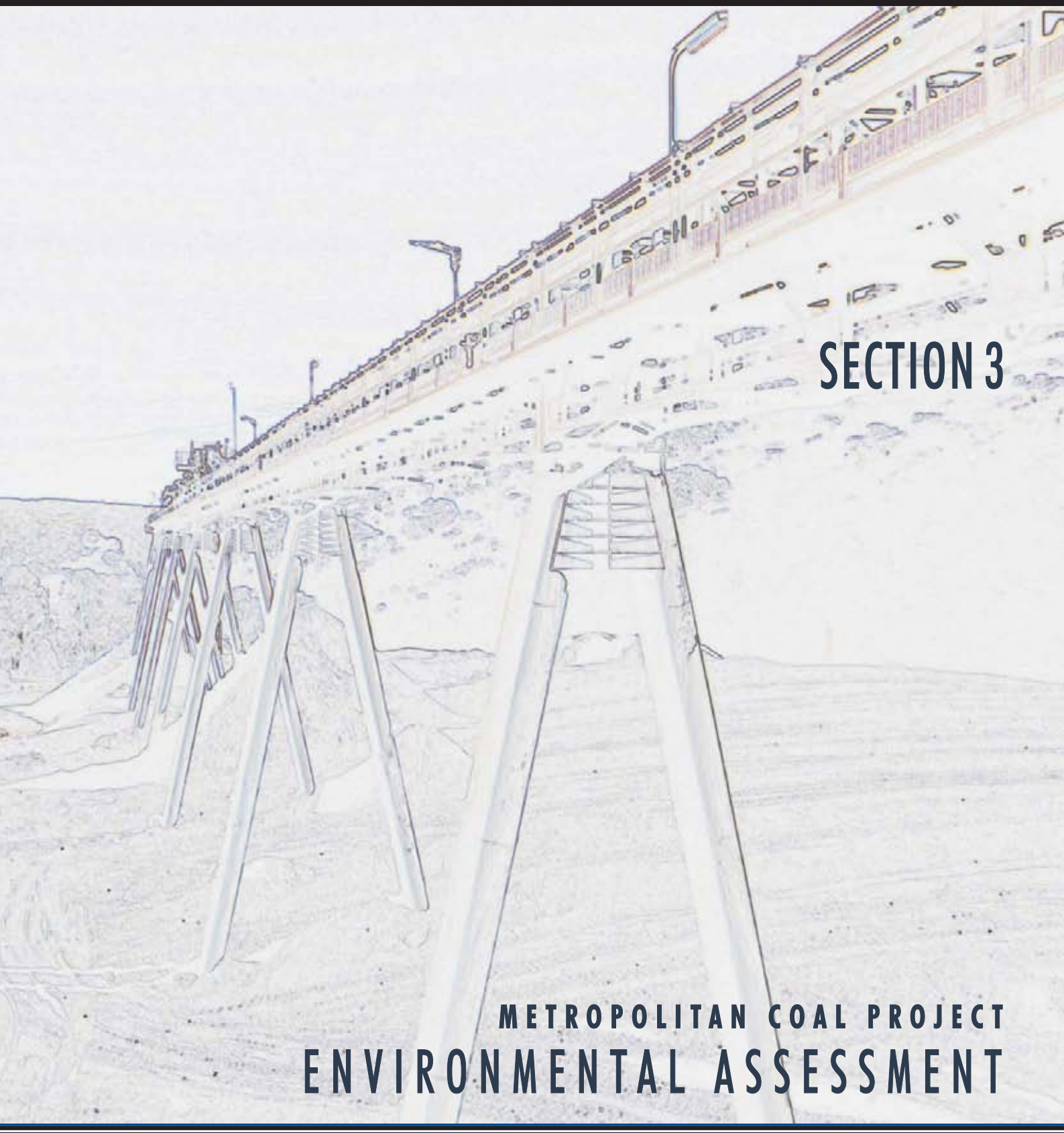

SECTION 3

METROPOLITAN COAL PROJECT

ENVIRONMENTAL ASSESSMENT

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3 PLANNING FRAMEWORK AND PROJECT JUSTIFICATION

This Section outlines the statutory requirements relevant to the assessment of the Project and its justification (i.e. the need for the Project on economic, social and environmental grounds when considered against the objects of the EP&A Act, including the principles of Ecologically Sustainable Development).

The Metropolitan Colliery is located within CCL 703 and a portion of CCL 724 (Figure 1-2) which is sub-leased from BHP Billiton Endeavour Coal Pty Ltd. The Project would extend into two proposed MLA areas (MLA 1 and MLA 2) which adjoin CCL 703 to the west and north-west (Figure 1-2). The Project would also involve the transfer of the sub-leased portion of CCL 724 from BHP Billiton Endeavour Coal Pty Ltd to HCPL (Section 1.1.4).

Metropolitan Colliery operates under a number of statutory approvals, permits and licenses granted by the NSW Government.

Key existing Metropolitan Colliery licenses and approvals include EPL No. 767 issued by the NSW Department of Environment and Climate Change (DECC) and applicable mining tenement conditions (e.g. CCL 703 and CCL 724) and SMP approvals *Metropolitan Colliery SMP Approval Conditions LW14-17* (DPI-MR, 2006a) and *Subsidence Management Plan Approval Metropolitan LW 18-19A* (DPI-MR, 2008) obtained from the Department of Primary Industries (DPI).

Other existing approvals include water extraction licences granted by the NSW Department of Water and Energy (DWE) and mining and occupational health and safety related approvals granted by the DPI and WorkCover NSW. In addition, supplementary approvals are obtained from the Sydney Catchment Authority (SCA) for surface activities within the Woronora Special Area in accordance with the requirements of the conditions of CCL 703 and CCL 724, where relevant.

HCPL holds a development consent granted in 1991 by WCC (*Coal Reject Emplacement and Colliery Upgrading Metropolitan Colliery Helensburgh* - DA 90/832) that relates to a historical upgrade of the CHPP at the Major Surface Facilities Area and the Camp Gully Coal Reject Emplacement which has not been built to date (Section 2.8.5).

The Project will be assessed in accordance with the framework established by the EP&A Act and the EP&A Regulation.

3.1 MAJOR PROJECTS

Part 3A of the EP&A Act provides an approval process for projects deemed to be Major Projects.

Section 75B(1) of the EP&A Act defines projects to which Part 3A applies:

> *This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:*
>
> *(a) by a State environmental planning policy, or*
>
> *(b) by order of the Minister published in the Gazette (including by an order that amends such a policy). …*

Schedule 1 of the State Environmental Planning Policy (SEPP) (Major Projects) 2005 (Major Projects SEPP) describes development that is declared to be a project to which Part 3A of the EP&A Act applies. The Metropolitan Coal Project was considered to be a project to which Part 3A of the EP&A Act applies under Schedule 1, Group 2 (*Mining, petroleum production, extractive industries and related industries)* clause 5, subclause (1)(a) and (1)(c) of the Major Projects SEPP:

> *5 Mining*
>
> *(1) Development for the purpose of mining that:*
>
> *(a) is coal … mining, or*
>
> *…, or*
>
> *(c) has a capital investment value of more than $30 million or employs 100 or more people.*

On 8 October 2007, the Director-General of the DoP, under delegation from the Minister for Planning (the Minister), formed the opinion that the Project is of a kind that meets the description in the Major Projects SEPP (set out above), and pursuant to clause 6(1) of the Major Projects SEPP, declared the Project to be a project to which Part 3A of the EP&A Act applies. In accordance with section 75D(1) of the EP&A Act, the Minister is the approval authority for the Project.

3.1.1 Application of Other Provisions of the Environmental Planning and Assessment Act, 1979

Section 75R of the EP&A Act outlines the applicability of other provisions of the EP&A Act in the assessment and approval of a Project under Part 3A:

- Parts 4 and 5 of the EP&A Act do not, except as provided by Part 3A, apply to a project approved under Part 3A, including the declaration of a project as a project to which Part 3A applies, and any approval or other requirement under Part 3A for the Project.
- Part 3 of the EP&A Act and SEPPs apply to the declaration of a project as a project to which Part 3A applies and the carrying out of a project to which Part 3A applies.
- Non-SEPP Environmental Planning Instruments (e.g. Local Environmental Plans and Regional Environmental Plans) do not apply to a project approved under Part 3A.
- Notwithstanding the above, under section 75J(3), the provisions of any environmental planning instruments that would ordinarily apply to the project if it were not to be assessed under Part 3A, may be taken into account by the Minister in deciding whether or not to approve the carrying out of the Project.
- Further, clause 8N(1) of the EP&A Regulation provides that a project to which Part 3A applies (other than a critical infrastructure project) may not be given project approval if that project, or any part of that project, is located within an environmentally sensitive area of State significance or a sensitive coastal location and would be prohibited by an environmental planning instrument if Part 3A of the EP&A Act did not apply.
- Similarly, clause 8O(1) of the EP&A Regulation provides that a project to which Part 3A applies (other than a critical infrastructure project) may not be given project approval if that project, or any part of that project, is not the subject of an authorisation or requirement under section 75M of the EP&A Act to apply for approval of a concept plan and would be prohibited by an environmental planning instrument if Part 3A of the EP&A Act did not apply.
- Divisions 6 (Contributions) and 6A (Affordable Housing Contributions) of Part 4 of the EP&A Act also apply to a project to which Part 3A applies.

3.1.2 Other Approvals

Approvals and Legislation that do not Apply to Approved Part 3A Projects

Sections 75U(1) and (2) of the EP&A Act outline the authorisations that are not required for a Project approved under Part 3A. These authorisations are those ordinarily required under the following legislative provisions:

- Part 3 of the *Coastal Protection Act, 1979*;
- Sections 201, 205 and 219 of the *Fisheries Management Act, 1994*;
- Division 8 of Part 6, Part 4 and Section 139 of the *Heritage Act, 1977*;
- Section 87 and 90 of the *National Parks and Wildlife Act, 1974*;
- Section 12 of the *Native Vegetation Act, 2003;*
- Part 3A of the *Rivers and Foreshores Improvement Act, 1948*;
- Section 100B of the *Rural Fires Act, 1997*; and
- Section 89, 90 and 91 of the *Water Management Act, 2000*.

Approvals and Legislation that must be Applied Consistently

Section 75V(1) of the EP&A Act outlines the authorisations that cannot be refused if they are necessary for the carrying out of a project approved under Part 3A and those authorisations must be substantially consistent with the Part 3A approval. These authorisations are those required under the following legislative provisions:

- Section 144 of the *Fisheries Management Act, 1994*;
- Section 15 of the *Mine Subsidence Compensation Act, 1961*;
- mining lease under the *Mining Act, 1992*;
- production lease under the *Petroleum (Onshore) Act, 1991*;
- environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act, 1997*;
- Section 138 of the *Roads Act, 1993*; and
- a licence under the *Pipelines Act, 1967.*

3.2 ENVIRONMENTAL PLANNING INSTRUMENTS

3.2.1 Illawarra Regional Environmental Plan No 1

The *Illawarra Regional Environmental Plan No 1* (Illawarra REP) applies to land within the Wollongong local government area (LGA).

Aims

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, having regard to the relevant objectives specified in those Parts of the Illawarra REP that are relevant to the Project.

The Project is consistent with these aims, in that it is an employment generating development that would contribute to the economic well-being of the community. Environmental impact mitigation and environmental management and monitoring measures for the Project which relate to the management of land resources at the Project are presented in Section 4, where relevant.

Provision Relating to Coal

Part 4 of the Illawarra REP contains provisions relating to coal. The clauses that are relevant to the Project are set out below.

Clause 36 of the Illawarra REP provides objectives relating to coal as follows:

> *(a) to ensure that proposed development is assessed in relation to the feasibility of its rendering coal resources unavailable,*
>
> *(b) to eliminate haulage of coal on public roads as far as practicable in order to overcome conflict with other road users and the adverse environmental impact of such haulage, and*
>
> *(c) to provide guidelines for ensuring coal washery refuse emplacements are located and designed with minimum adverse environmental impact.*

With respect to Clause 36, subclause (a), the Project proposes the efficient recovery of coal resources. However in developing the Project, there would be areas of coal that would not be recovered and would no longer be available for mining (e.g. pillars left between each longwall) that are required for roof support during mining and to comply with the requirements of the NSW Dams Safety Committee (DSC) with respect to mining within the Woronora Notification Area (Section 3.3.2).

Up to 120,000 tpa of product coal would continue to be transported by road from the Metropolitan Colliery to local coking works (Section 2.7.1). The transport of product coal by road to Corrimal and Coalcliff would not increase as product coal road transport would be capped at the current maximum rate. While alternative coal transport arrangements were considered (Section 3.9.2), given the lack of rail access to the coking works, road transport remains the most appropriate transport method for the small proportion of the Project product coal being delivered to the coking works. As the majority of product coal (i.e. up to 2.68 Mtpa) would continue to be transported by train, it is considered that the objectives of clause 36, subclause (b) are met by the Project.

The objective contained in clause 36, subclause (c) is addressed in the discussion on clause 41 below.

Clause 37 of the Illawarra REP outlines requirements that should be satisfied prior to the consent authority granting consent:

> *The consent authority shall not grant development consent to a new coal mine, the expansion of an existing coal mine or other major coal industry unless it is satisfied that:*
>
> *(a) there is a proposed environmentally acceptable mode of transport associated with the development which is, or is capable of being, integrated into a comprehensive system for handling all coal movements within the region, and*
>
> *(b) if public road haulage is the only feasible mode of transport, it is restricted to the most environmentally acceptable route.*

Road haulage is the only feasible mode of transport for the small portion of product coal delivered to the Corrimal and Coalcliff coking works. The environmental acceptability of the current transport route was considered by Masson Wilson Twiney in the Traffic Assessment (Appendix L). This assessment concluded that the current transport route was the most environmentally acceptable route (Section 3.9.2 and Appendix L).

Clause 41 of the Illawarra REP outlines criteria that must be considered in relation to the location and design of coal washery refuse emplacements:

> *The location and design of coal washery refuse emplacements shall be determined after consideration of the following criteria:*
>
> *(a) the emplacement will be stable and will not create any problems of instability in the emplacement area or the underlying foundation material,*
>
> *(b) the emplacement will be so designed and managed as to prevent water pollution,*
>
> *(c) the coal washery refuse will be placed where it will ultimately blend with the existing landscape or will be placed behind tree screen barriers or berms so as to reduce the visual impact of the emplacement on surrounding areas,*
>
> *(d) the emplacement will be adequately compacted and sealed to prevent fire risk,*
>
> *(e) the site of the emplacement will be the subject of a progressive revegetation program using species indigenous to the region,*
>
> *(f) adequate dust control measures will be employed,*
>
> *(g) the manner of emplacement so as to allow future accessibility and resource recovery should there be a demand for the material has been considered,*
>
> *(h) the site is not adjacent to urban areas,*
>
> *(i) a system of transportation of the coal washery refuse will be utilised which will minimise potential conflicts with public road users and have a minimal adverse environmental impact, and*
>
> *(j) the site is the most suitable of a number of alternative sites and that disused quarries and joint user emplacement have been taken into consideration in the selection of the site.*

As described in section 2.8.5, HCPL holds an existing development consent for development of a Coal Reject Emplacement in Camp Gully, adjacent to the Major Surface Facilities Area. While the development of the Camp Gully coal reject emplacement is already approved, HCPL does not currently intend to build this facility as a component of the Project, and has identified alternative coal reject management strategies including the continued transport of coal rejects to the Glenlee Washery for off-site disposal and on-site underground disposal via goaf cavity injection (Section 2.8.5 and 3.9.2).

The existing Glenlee Washery is located at the boundary of the Campbelltown and Camden LGAs and the Illawarra REP does not apply to these LGAs. Therefore, the following discussion focuses on Project coal reject management within the Wollongong LGA.

The disposal of coal rejects in the goaf effectively removes the potential for impacts on water resources, as it would be deposited in the mining voids at depths of 420 m or more from the surface, within the geological strata from which it was mined. Underground disposal would provide for long-term stability of the emplacement, and also potentially result in a very minor reduction in subsidence. Notwithstanding, a Surface Water Management Plan (Section 4.4) would be developed for the Project.

The combination of disposal of coal rejects at the Glenlee Washery and via goaf cavity injection would result in lesser visual impacts than the alternative of developing the approved Camp Gully coal reject emplacement adjacent to the Major Surface Facilities Area in Helensburgh.

Goaf cavity injection of coal reject at significant depth underground would result in the integration of the coal reject material with the collapsed rock in the goaf (Section 2.8.4). The moisture content of the coal reject combined with the long-term presence of groundwater seepage would minimise the risk of fire and eliminate dust generation potential. As described in Section 4.11, dust management measures would be applied to minimise potential air quality emissions associated with the operation of the Major Surface Facilities Area, including the handling of coal reject.

The existing off-site transport of coal reject to Glenlee Washery is managed in a manner to minimise the production of dust, as truck loads are covered and the trucks are washed prior to departure (Section 4.11).

The use of goaf cavity injection for disposal of coal reject would preclude the future accessibility of the material due to safety constraints, if a demand for such materials occurred in the future.

The emplacement of coal reject underground by goaf cavity injection would reduce the potential need to develop the approved Camp Gully coal reject emplacement adjacent to the suburban areas of Helensburgh.

The continued transport of coal reject from the Metropolitan Colliery Major Surface Facilities Area to the Glenlee Washery would be capped at the existing maximum annual truck movements (Section 2.3). In accordance with the existing management measures, these movements would be restricted to Monday to Friday and within generally daytime hours. The on-site paste backfill plant and disposal of coal reject via goaf cavity injection would reduce the number of coal reject truck movements associated with transporting the rejects to Glenlee Washery, once these facilities are developed (Section 2.8.4). Various alternative coal reject disposal options were examined for the Project (Section 3.9.2) and the disposal of coal rejects via goaf cavity injection underground was considered to be the most appropriate (in addition to the continued use of the Glenlee Washery). There are no joint user emplacement opportunities superior to the utilisation of completed mine workings. Therefore it is considered that the requirements of clause 41(j) of the Illawarra REP have been satisfied.

Accordingly, the Minister can be satisfied as to these matters with respect to the management of coal reject at the Project.

Provisions Relating to Transport and Service Corridors

Part 9 of the Illawarra REP contains provisions relating to transport and service corridors. The clauses that are potentially relevant to the Project are set out below.

Clause 80, subclauses (c) and (f) of the Illawarra REP outline objectives relating to transport and service corridors that are potentially of relevance to the Project:

> *(c) to improve road safety and protect public investment in main and arterial roads by the control of adjacent land uses,*
>
> *…*
>
> *(f) to reduce the adverse environmental impact of road haulage of extractive materials and other bulk freight.*

In addition, Clause 87 of the Illawarra REP requires:

> *The consent authority should consider attaching conditions requiring transport of extractive materials or other bulk freight by other than road transport to appropriate development consents.*

Consideration of the potential impacts on road safety of the Princes Highway and F6 Southern Freeway associated with Project mine subsidence and associated management measures are provided in Appendix A.

Consideration of the issue of public road haulage of product coal and coal reject haulage is discussed above with respect to the requirements of Part 4 of the Illawarra REP. The Minister, in his determination of the Project, may consider attaching conditions which limit the Project transport of product coal and coal reject on the public road network.

Accordingly, the Minister can be satisfied as to these matters with respect to the management of transport and service corridors at the Project.

Provisions Relating to Coastal Lands, Wetlands and Other Waterbodies

Part 13 of the Illawarra REP contains provisions relating to coastal lands, wetlands and other water bodies. While there are no coastal lands of wetlands of relevance to the Project, clause 105, subclause (c) of the Illawarra REP outlines objectives relating to other waterbodies that are potentially of relevance to the Project and the (man-made) Woronora Reservoir:

> *(c) to protect the productive ecosystems and natural habitats of the region's estuaries, wetlands, lakes and lagoons and their scenic attributes.*

Consideration of the potential impacts of the Project on the ecosystems and habitats of the Woronora Reservoir (a man made water storage reservoir) are addressed in Appendices C, D and G and Sections 4.4 and 4.5. Consideration of the potential scenic (aesthetic) impacts of the Project is provided in Section 4.16. The scenic attributes of the Woronora Reservoir are not expected to be materially modified. Further, open public access to the reservoir is not permitted.

Accordingly, the Minister can be satisfied as to these matters with respect to the management of waterbodies at the Project.

Provisions Relating to Environmental Heritage

Part 15 of the Illawarra REP contains provisions relating to environmental heritage. Items of environmental heritage are defined as a building, work, relic, or place of historic, scientific, cultural, social, architectural, archaeological, natural or aesthetic significance described in Schedule 1 of the Illawarra REP. Schedule 1 of the Illawarra REP includes the following items at the Metropolitan Colliery (Appendix I):

- Power Pylon;
- Shaft No 1 head frame;
- Shaft No 2 fan evase;
- No 4 tunnel (Illawarra Railway); and
- No 5 tunnel (Illawarra Railway).

Clause 124 of the Illawarra REP outlines the objectives with respect to such listed items of environmental heritage:

(a) to encourage the conservation of the environmental heritage of the region, and

(b) to control the demolition and renovation of items identified by this plan as items of the environmental heritage of the region.

Clauses 126, and 128 of the Illawarra REP are also of potential relevance to the Project development at, or in the vicinity of, the above listed heritage items at the Metropolitan Colliery:

126 Conservation of items of the environmental heritage

(1) A person shall not, in respect of a building, work, or relic or place that is an item of the environmental heritage:

(a) demolish, renovate or extend that building or work,

(b damage or despoil that relic or place or any part of that relic or place,

(c) excavate any land for the purpose of exposing or removing that relic,

(d) erect a building on the land on which that building, work or relic is situated or the land which comprises the place, or

(e) subdivide the land on which that building, work or relic is situated or the land which comprises that place, except with the consent of the consent authority.

(2) The consent authority shall not grant consent pursuant to subclause (1) in respect of an item of the environmental heritage unless it has made an assessment of:

(a) the significance of the item as an item of the environmental heritage of the local government area in which the item is situated,

(b) the extent to which the carrying out of development in accordance with the consent would affect the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item and its site,

(c) whether the setting of the item, and in particular, whether any stylistic, horticultural or archaeological features of the setting should be retained, and

(d) whether the item constitutes a danger to the users or occupiers of that item or to the public.

(3) The consent authority shall not grant consent pursuant to subclause (1) to the renovation of a building that is an item of the environmental heritage unless it has made an assessment of:

(a) the colour, texture, style, size and type of finish of any materials to be used on the exterior of the building and the effect which the use of these materials will have on the appearance of the exterior of the building and of any other building in its vicinity,

(b) the style, size, proportion and position of openings for any windows and doors which will result from, or be affected by, the carrying out of the development, and

(c) the pitch and form of the roof, it any.

128 Development in the vicinity of an item of the environmental heritage

The consent authority shall not consent to the carrying out of development in the vicinity of an item of the environmental heritage unless it has made an assessment of the effect which the carrying out of that development would have on the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item of the environmental heritage and its setting.

HCPL has committed to develop a Conservation Management Plan (CMP) for the non-Aboriginal heritage items at the Major Surface Facilities Area, including those listed in Schedule 1 of the Illawarra REP (Section 4.9 and Appendix I). The CMP would be developed to satisfy the requirements of the Illawarra REP (and *Wollongong Local Environmental Plan, 1990*) where relevant, prior to any demolition or renovation of any listed items of heritage significance at the Metropolitan Colliery as a result of the Project.

In addition, clause 131 of the Illawarra REP identifies general principles of relevance to the Project Aboriginal Cultural Heritage Assessment (Appendix H):

The consent authority and determining authorities shall have regard to the findings and recommendations of the Illawarra Region Aboriginal Resources Study published by the Department of Environment and Planning in 1980 when considering development proposals or activities for the region.

The Aboriginal Cultural Resources Study Illawarra Region (Sefton, 1980) describes a range of aspects including the importance of Aboriginal resources, legal protection, prehistory and history, categories of relics, physical environment, known Aboriginal sites and areas of significance as per the level of knowledge at the time it was drafted, and may be of relevance to the Minister's consideration of the Project. However, the Project Aboriginal Heritage Assessment (Appendix H) presents the results of contemporary desktop research, field survey and consultation with the Aboriginal community with respect to the Project Underground Mining Area and surrounds.

Accordingly, the Minister can be satisfied as to these matters with respect to the management of items of environmental heritage at the Project.

3.2.2 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 Wollongong City. The Greater Metropolitan REP contains planning principles to help councils prepare local environmental plans that apply to the land within the catchment.

Aims and Objectives

Clause 5 outlines the aims and objectives of the Greater Metropolitan REP:

5 Aims and objectives

(1) The general aims and objectives of this plan are as follows:

(a) to maintain and improve the water quality and river flows of the Georges River and its tributaries and ensure that development is managed in a manner that is in keeping with the national, State, regional and local significance of the Catchment,

(b) to protect and enhance the environmental quality of the Catchment for the benefit of all users through the management and use of the resources in the Catchment in an ecologically sustainable manner,

(c) to ensure consistency with local environmental plans and also in the delivery of the principles of ecologically sustainable development in the assessment of development within the Catchment where there is potential to impact adversely on groundwater and on the water quality and river flows within the Georges River or its tributaries,

(d) to establish a consistent and coordinated approach to environmental planning and assessment for land along the Georges River and its tributaries and to promote integrated catchment management policies and programs in the planning and management of the Catchment,

(e) *to encourage more effective consultation between local government and State Government agencies in executing the responsibility for environmental planning within the Catchment,*

(f) *to provide a mechanism that assists in achieving the water quality objectives and river flow objectives agreed under the Water Reform Package.*

(2) *The specific aims and objectives of this plan are as follows:*

Environmental protection and water quality and river flows

(a) *to preserve and protect and to encourage the restoration or rehabilitation of regionally significant sensitive natural environments such as wetlands (including mangroves, saltmarsh and seagrass areas), bushland and open space corridors within the Catchment, by identifying environmentally sensitive areas and providing for appropriate land use planning and development controls,*

(b) *to preserve, enhance and protect the freshwater and estuarine ecosystems within the Catchment by providing appropriate development,*

(c) *to ensure that development achieves the environmental objectives for the Catchment.*

Regional role and land use

(a) *to identify land uses in the Catchment which have the potential to impact adversely on the water quality and river flows in the Georges River and its tributaries and to provide appropriate planning controls aimed at reducing adverse impacts on the water quality and river flows,*

(b) *to conserve, manage and improve the aquatic environment within the Catchment which is a significant resource base for the aquaculture industry, by providing controls aimed at reducing pollution entering the Catchment's watercourses,*

(c) *to protect the safety and well being of the local and regional community in accordance with standards and processes aimed at improving the water quality and river flows in the Catchment to enable recreation,*

(d) *to aid in the improvement of the environmental quality of Botany Bay in conjunction with other regional planning instruments.*

Planning Principles

Planning principles are contained in clauses 7 and 8 in Part 2 of the Greater Metropolitan REP. Clause 8 provides general planning principles as follows:

(a) *the aims, objectives and planning principles of this plan,*

(b) *the likely effect of the proposed plan, development or activity on adjacent or downstream local government areas,*

(c) *the cumulative impact of the proposed development or activity on the Georges River or its tributaries,*

(d) *any relevant plans of management including any River and Water Management Plans approved by the Minister for Environment and the Minister for Land and Water Conservation and best practice guidelines approved by the Department of Urban Affairs and Planning (all of which are available from the respective offices of those Departments),*

(e) *the Georges River Catchment Regional Planning Strategy (prepared by, and available from the offices of, the Department of Urban Affairs and Planning),*

(f) *all relevant State Government policies, manuals and guidelines of which the council, consent authority, public authority or person has notice,*

(g) *whether there are any feasible alternatives to the development or other proposal concerned.*

Clause 9 of the Greater Metropolitan REP provides specific planning principles. The following subclauses of clause 9 are potentially relevant to the Project:

(2) *Bank disturbance*

Disturbance of the bank or foreshore along the Georges River and its tributaries is to be avoided and those areas and any adjoining open space or vegetated buffer area must be protected from degradation.

…

(5) Land degradation

Land degradation processes, such as:

(a) erosion,

(b) sedimentation,

(c) deterioration of soil structure,

(d) significant loss of native vegetation,

(e) pollution of ground or surface water,

(f) soil salinity and acidity, and

(g) adverse effects on habitats and sensitive natural environments (aquatic and terrestrial) within the Catchment, must be avoided where possible, and minimised where avoidance is not possible.

…

(12) Water quality and river flows

Water quality and river flows within the Catchment are to be improved through the implementation of environmental objectives for water quality and river flows agreed between the Minister for Environment and the Minister for Land and Water Conservation and by the application of consistent decisions affecting the use and management of land.

…

The Minister's Consideration

In deciding whether or not to approve the carrying out of the Project, the Minister may, take into account:

- the aims and objectives of the Greater Metropolitan REP (as set out above);
- the general planning principles of the Greater Metropolitan REP (as set out above);
- the specific planning principles (where relevant) of the Greater Metropolitan REP; and
- the likely effect of the Project on adjacent or downstream LGAs.

As described in Sections 4.1 and 4.4, surface disturbance associated with the development of the Project and potential sources of erosion, sedimentation and pollution would be minimised. There would be no significant loss of native vegetation from the Project, as the mining operation is underground and clearing would be minimised (Section 4.6). The potential impacts of the Project on water resources, aquatic habitats and terrestrial habitats are addressed in Sections 4.3 to 4.7.

There would be no significant cumulative effects on water quality or quantity in adjacent or downstream LGAs as a result of the Project. Similarly, identified potential effects of the Project on aquatic and terrestrial habitats (Sections 4.5 to 4.7) would be localised and would not result in significant downstream impacts within the Georges River Catchment. Relevant general principles of the Greater Metropolitan REP and plans of management and practice guidelines relating to water management have been considered in the preparation of the Surface Water Assessment (Appendix C) and in preparation of sections of this EA.

Planning Requirements and Consultation

Part 3 of the Greater Metropolitan REP outlines planning and consultation requirements. As the Project is potentially a development to which *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) applies (Section 3.2.5), in accordance with the planning control and consultation table set out in clause 11 of the Greater Metropolitan REP, the Minister may take into account in deciding whether or not to approve the Project under Part 3A:

- *Whether adequate provisions have been made to contain water that may be contaminated by its use for fire control purposes.*
- *Whether the proposal meets the requirements of the local council's stormwater management plan or, if no such plan has been prepared, the local council's stormwater management objectives or policy determined by the council in consultation with the relevant Catchment Management Committees, the community, the Environment Protection Authority and the Department of Land and Water Conservation.*
- *Whether the proposal is in accordance with the Council's soil erosion and sediment management plan or policy.*
- *Whether any potential impacts will arise in regard to groundwater.*
- *Whether adequate provisions for on-site bushfire hazard reduction are made.*
- *Whether the proposal is in accordance with any water management plan approved by the Minister for the Environment and the Minister for Land and Water Conservation where such a plan has been prepared.*

The existing Metropolitan Colliery is operated in accordance with the Water Savings Action Plan, completed by Sydney Water and HCPL (DoC, 2007) (Section 2.9). A site water balance has been completed for the Major Surface Facilities Area as a component of the Surface Water Assessment (Appendix C) and the Project incorporates suitable drainage and water retention structures to contain runoff from the surface facilities area in accordance with the applicable erosion, sediment control and stormwater management guidelines and criteria (e.g. Landcom, 2004) (Section 4.4).

Potential impacts of the Project on groundwater resources are described in Section 4.3 and Appendix B. The implementation of erosion, sediment and pollution controls for Project surface activities within the Woronora Special Area are described in Section 4.4.3. Project bushfire hazard reduction measures are described in Sections 4.1.3 and 4.15.

In addition, as the Project would potentially involve development which adjoins, and is within 100 m of, a drainage line or creek, in accordance with the planning control and consultation table set out in clause 11 of the Greater Metropolitan REP, the Minister may take into account in deciding whether or not to approve the Project under Part 3A:

- *Bushfire hazard reduction measures are not to be confined to the vegetated buffer area.*
- *Whether the proposed vegetated buffer will act as a buffer between developed land and environmentally sensitive areas, including adjacent waterways.*
- *Whether the following specifications have been satisfied for the proposed vegetated buffer area:*
  - *(a) 100 metre minimum buffer width from the edge of the gorge or the top of the banks of the Georges River and its tributaries on currently forested Crown lands and natural bushland classified as community land under the Local Government Act 1993,*
  - *(b) 40 metre minimum buffer width from the edge of the gorge or the top of the banks of the Georges River and its tributaries on freehold land that has not been previously developed or cleared,*
  - *(c) 40 metre minimum buffer widths from wetlands identified by the National Parks and Wildlife Service and local council State of the Environment Reports required under the Local Government Act 1993,*
  - *(d) 40 metre minimum buffer width from other environmentally sensitive areas, including remnant vegetation and steep slopes, identified on maps prepared by and available from the National Parks and Wildlife Service.*
- *The requirements of the document entitled Planning for Bush Fire Protection, ISBN 0 9751033 2 6, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning, dated December 2006.*
- *The requirements of the NSW State Rivers and Estuaries Policy prepared by and available from the Department of Land and Water Conservation and the NSW Wetlands Management Policy prepared by and available from that Department where the development proposals are likely to impact on the quality of water and river flows of the Georges River or its tributaries.*
- *The need to filter runoff from developed areas to improve water quality within the Georges River and its tributaries.*
- *The need to reduce the loss of riparian vegetation and to remove invasive weed species.*
- *The need to minimise damage to river banks and channels so as to reduce bank erosion.*
- *The need to increase or maintain terrestrial and aquatic biological diversity and to provide fauna habitat and corridors.*

While only limited surface activities are proposed in the Woronora Special Area, it is anticipated that Project stream restoration works (Section 5) would be undertaken in close proximity to and within 40 m of streams at key rock bar features.

Project bushfire hazard reduction measures are described in Section 4.1.3 and would be applied to all Project activities, where relevant.

Where Project activities are undertaken in the vicinity of streams, suitable drainage and water retention structures to contain runoff with the applicable erosion, sediment control and stormwater management guidelines and criteria (e.g. Landcom, 2004) would be incorporated. Implementation of erosion, sediment and pollution controls for Project surface activities (including works in the Woronora Special Area) are described in Section 4.4.3.

A large portion of the Project Underground Mining Area drains to the Woronora Reservoir. Overflow from the Woronora Reservoir flows into the lower reaches of the Woronora River (Figure 1-1) and ultimately the Georges River.

Based on the analysis of the effects of mining at the Metropolitan Colliery on inflows to the Woronora Reservoir summarised in Section 4.4.1, the Surface Water Assessment (Appendix C) concluded that past mining at the Metropolitan Colliery has had no discernable effect on the inflow to, or yield from, the reservoir. The geological and hydrogeological regimes area are such that there is no mechanism by which the Project could result in a detectable loss of groundwater contribution to reservoir yield (Appendix B).

As described in Section 4.4 and Appendix C, extensive water quality monitoring data indicates that mine subsidence effects have not had any measurable effect on water quality in Woronora Reservoir downstream (Appendix C).

Accordingly, the quality of water and river flows of the Georges River or its tributaries downstream of the Woronora Reservoir are unlikely to be impacted by the Project.

Relevant general principles of the Greater Metropolitan REP and plans of management and practice guidelines relating to water management have been considered in the preparation of the Surface Water Assessment (Appendix C) and in preparation of sections of this EA.

Consideration of terrestrial and aquatic biodiversity impacts and Project management and mitigation measures is provided in Sections 4.5 to 4.7, including potential impacts on riparian vegetation and invasive weed management.

3.2.3 Drinking Water Catchments Regional Environmental Plan No 1

The *Drinking Water Catchments Regional Environmental Plan No 1* (Drinking Water Catchments REP) commenced on 1 January 2007 and *State Environmental Policy 58 - Protecting Sydney's Water Supply* was repealed. The Drinking Water Catchments REP 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 River catchment (clause 6).

Aims of the Plan

The aims of the Drinking Water Catchments REP are detailed in clause 3:

This plan aims:

(a) to create healthy water catchments that will deliver high quality water while sustaining diverse and prosperous communities, and

(b) to provide the statutory components in Sustaining the Catchments that, together with the non-statutory components in Sustaining the Catchments, will achieve the aim set out in paragraph (a), and

(c) to achieve the water quality management goals of:

(i) improving water quality in degraded areas and critical locations where water quality is not suitable for the relevant environmental values, and

(ii) maintaining or improving water quality where it is currently suitable for the relevant environmental values.

Assessment and Approval of Development Activities

The Minister may take into account clauses 25 and 26 of the Drinking Water Catchments REP in deciding whether or not to approve the Project under Part 3A.

Clause 25 provides:

25 Recommended practices and performance standards of the Sydney Catchment Authority

(1) Any development or activity proposed to be carried out on land to which this plan applies should incorporate any current recommended practices and performance standards endorsed or published by the Sydney Catchment Authority that relate to the protection of water quality (the Authority's current recommended practices and standards).

(2) If any development or activity does not incorporate the Authority's current recommended practices and standards, the development or activity should demonstrate to the satisfaction of the consent authority or determining authority how the practices and performance standards proposed to be adopted will achieve outcomes not less than the Authority's current recommended practices and standards.

…

Clause 26 provides:

> *26 Development consent cannot be granted unless neutral or beneficial effect on water quality*
>
> *A consent authority must not grant consent to the carrying out of development under Part 4 of the Act on land in the hydrological catchment unless:*
>
> *(a) it has considered whether the proposed development will have a neutral or beneficial effect on water quality, and*
>
> *(b) it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality.*

The water quality protection measures implemented for the Project would be generally consistent with the recommended practices and performance standards of the SCA, where applicable to the protection of water quality (Section 4.4).

Potential impacts on water quality as a result of Longwalls 20 to 44 would be localised (i.e. localised changes in Waratah Rivulet and tributaries). Water quality issues can be effectively managed on-site such that there are no adverse water quality impacts occurring off-site. Gilbert and Associates (Appendix C) indicates that although subsidence effects have resulted in isolated, episodic pulses in iron, manganese, aluminium and electrical conductivity in Waratah Rivulet, these pulses have not had any measurable effect on water quality in the Woronora Reservoir. The Project would not impact on the performance of Woronora Reservoir. Based on this, it is considered that the Project would have a neutral effect on water quality.

This is supported by the findings of the report *Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield – Strategic Review* (herein described as the Southern Coalfield Panel Report or SCPR) (DoP, 2008) which states:

> *No evidence was presented to the Panel to support the view that subsidence impacts on rivers and significant streams, valley infill or headwater swamps, or shallow or deep aquifers have resulted in any measurable reduction in runoff to the water supply system operated by the Sydney Catchment Authority or to otherwise represent a threat to the water supply of Sydney or the Illawarra region.*

In addition, clause 28 of the Drinking Water Catchments REP creates a concurrence requirement for the Chief Executive of the SCA in respect of development on land in the "hydrological catchment" as follows:

> *28 Development that needs concurrence of Chief Executive*
>
> *(1) A person must not carry out development on land in the hydrological catchment except with the concurrence of the Chief Executive (except as provided by subclause (3)).*
>
> *…*
>
> *(6) This clause does not apply to where the Minister is the consent authority.*

Pursuant to clause 28(6), since the Minister is the consent authority for the Project Application, concurrence of the Chief Executive of the SCA to the Project approval is not required under clause 28 of the Drinking Water Catchments REP.

3.2.4 Wollongong LEP

The *Wollongong Local Environmental Plan, 1990* (Wollongong LEP) applies to land within the Wollongong LGA, and therefore applies to the Project land.

Part 4 of the EP&A Act does not apply to a project approved under Part 3A of the EP&A Act, including the declaration of a project as a project to which Part 3A applies, and any approval or other requirement under Part 3A for the project (Section 3.1.1). Accordingly, references throughout the Wollongong LEP to “consent authority” for the purposes of assessment of development under Part 4 of the EP&A Act are not applicable to a project to which Part 3A applies.

However, certain clauses of the Wollongong LEP that would ordinarily be applicable but for the Project being assessed under Part 3A, may be taken into account by the Minister in deciding whether or not to approve the carrying out of the Project (Section 3.1.1).

Objectives of the Wollongong LEP

Clause 4 of the Wollongong LEP outlines the aim to provide a framework for land use management in the City of Wollongong to achieve certain objectives. Those objectives relevant to the Project are:

> *(a) to encourage the proper management, development and conservation of natural and man-made resources (including agricultural land, natural areas, forest, minerals, water and the built environment) for the purpose of promoting the social and economic welfare of the community and a better environment,*
>
> *(b) to protect the environment from degradation and despoliation by protecting environmentally sensitive areas from development and minimising adverse impacts of urban development on both the built and natural environment,*
>
> *(c) to protect and improve the quality of life and the social well-being and amenity of local residents,*
>
> *(d) to encourage economic diversification and growth of the business and industrial base to increase employment,*
>
> *(e) to conserve the environmental heritage of the land to which this plan applies ….*

The Project is consistent with these objectives of the Wollongong LEP, in that it would develop mineral resources, facilitate the continued employment of some 320 HCPL staff and on-site contractors and continued HCPL regional economic investment, and would be developed in a manner that would minimise potential impacts on the environment (Section 4).

Zone Objectives/Permissibility

Pursuant to clauses 8N(1) and 8O(1) of the EP&A Regulation, a project to which Part 3A applies (other than a critical infrastructure project) may not be given project approval if that project, or any part of that project, is:

- located within an environmentally sensitive area of State significance or a sensitive coastal location; or
- is not the subject of an authorisation or requirement under section 75M of the EP&A Act to apply for approval of a concept plan and would be prohibited by an environmental planning instrument if Part 3A of the EP&A Act did not apply.

Clause 9 of the Wollongong LEP sets out the zone objectives and the development control table that is relevant in determining whether the Project, or any part of the Project, is prohibited by the Wollongong LEP in any of the zones within the Project land. Further, clause 9(3) provides:

> *Except as otherwise provided by this plan, the Council shall not grant consent to the carrying out of development on land to which this plan applies unless the Council is of the opinion that the carrying out of the development is consistent with the objectives of the zone within which the development is proposed to be carried out.*

The Project land is situated wholly within the Wollongong LGA.

The Project Underground Mining Area includes land zoned:

- 5a (Special Uses);
- 5c (Special Uses - Main Roads);
- 7a (Special Environmental Protection); and
- 7d (Hacking River Environmental Protection)

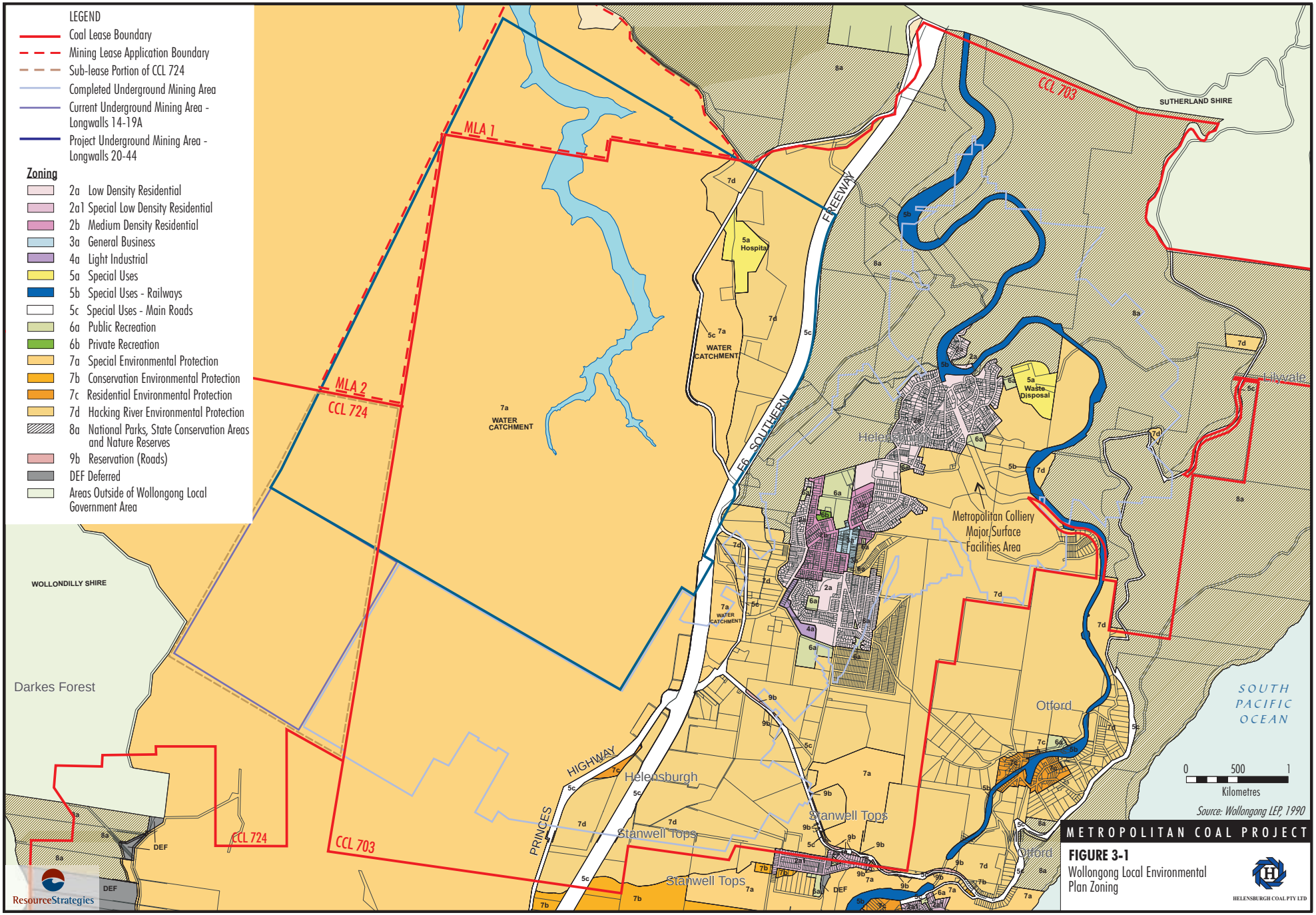
The majority of the Project Underground Mining Area is zoned 7a (Special Environmental Protection).

The locations of the zones described above are shown on Figure 3-1.

The existing Metropolitan Colliery Major Surface Facilities Area is situated on land zoned 7d (Hacking River Environmental Protection) (Figure 3-1). A variety of land zonings apply to the Completed Underground Mining Area (Figure 3-1).

If Part 3A of the EP&A Act did not apply to the Project, the Project would be permissible in all of the zones within the Project Underground Mining Area, the existing Metropolitan Colliery Major Surface Facilities Area, as well as other zones of the Project land, being land zoned:

- 4(a) (Light Industrial);
- 5a (Special Uses);
- 5(a) (Special Uses - Waste Disposal);
- 5b (Special Uses - Railways);
- 5c (Special Uses - Main Roads);



METROPOLITAN COAL PROJECT

FIGURE 3-1
Wollongong Local Environmental Plan Zoning

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- 7a (Special Environmental Protection);
- 7b (Environmental Protection Conservation); and
- 7d (Hacking River Environmental Protection).

However, if Part 3A of the EP&A Act did not apply to the Project, the Project would also not be permissible in the zones of some of the Completed Underground Mining Area, being land zoned:

- 6(a) (Public Recreation);
- 6(b) (Private Recreation);
- 2(a) (Low Density Residential);
- 2(a1) (Special Low Density Residential);
- 2(b) (Medium Density Residential);
- 3(a) (General Business);
- 7(c) (Environmental Protection Residential);
- 8 (a) (National Parks, State Conservation Areas and Nature Reserves); and
- 9(b) (Reservation - Roads).

Clause 8N(1) of the EP&A Regulation provides that a project to which Part 3A applies may not be given Project Approval if that project, or any part of the project, is located within an environmentally sensitive area of State significance or a sensitive coastal location and would be prohibited by an environmental planning instrument if Part 3A did not apply (Section 3.1.1). Given that part of the Project is prohibited under the Wollongong LEP, in order to ensure that clause 8N(1) will not operate to preclude the Minister from granting Project Approval, it is necessary to consider whether another environmental planning instrument can operate to override the prohibition under the Wollongong LEP and provide for the permissibility of the Project in those zones under the Wollongong LEP where part of the Project is prohibited.

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP) commenced operation on 16 February 2007.

Clause 4 of the Mining SEPP states:

> *4. This Policy applies to the State.*

Clause 5(3) gives the Mining SEPP primacy where there is an inconsistency between its provisions and the provisions in any other environmental planning instrument. Clause 5(3) relevantly provides:

> *5(3) ….. if this Policy is inconsistent with any other environmental planning instrument, whether made before or after this Policy, this Policy prevails to the extent of the inconsistency.*

The practical effect of clause 5(3), for the Project, is that if there is any inconsistency between the provisions in the SEPP and those contained in the Wollongong LEP, the provisions of the Mining SEPP will prevail.

The aims of the Mining SEPP are set out in clause 2 as follows:

> *2. The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:*
>
> *(a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
>
> *(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
>
> *(c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*

Clauses 6 and 7 of the Mining SEPP provide what types of mining development are permissible without consent and what types are permissible with development consent. In this regard, cl 7(1) relevantly states:

> *7(1) Mining*
>
> *Development for any of the following purposes may be carried out only with development consent:*
>
> *(a) underground mining carried out on any land,*
>
> *…*

The effect of clause 7(1)(a), in conjunction with the operation of clause 5(3) of the Mining SEPP, is that notwithstanding any prohibition contained in the landuse table of the Wollongong LEP, development for the purpose of underground mining may be carried out with development consent. Accordingly, clauses 8N(1) and 8O(1) of the EP&A Regulation have no effect and therefore the Minister is not precluded from granting approval under section 75J to the Project in respect of those parts of the Project land where mining is prohibited under the Wollongong LEP.

In addition, clause 8 of the Mining SEPP states:

8 Determination of permissibility under local environmental plans

(1) If a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if provisions of the plan are satisfied:

(a) development for that purpose may be carried out on that land with development consent without those provisions having to be satisfied, and

(b) those provisions have no effect in determining whether or not development for that purpose may be carried out on that land or on the determination of a development application for consent to carry out development for that purpose on that land.

(2) Without limiting subclause (1), if a local environmental plan provides that development for the purposes of mining, petroleum production or extractive industry may be carried out on land with development consent if the consent authority is satisfied as to certain matters specified in the plan, development for that purpose may be carried out on that land with development consent without the consent authority having to be satisfied as to those specified matters.

Zone Objectives

Clause 9(3) of the Wollongong LEP provides that consent shall not be granted to the carrying out of development on land to which the Wollongong LEP applies, unless Council is of the opinion that the carrying out of the development is consistent with the objectives of the zone within which the development is proposed to be carried out.

Whilst the Minister would not be precluded from granting approval on this basis, the Minister may still, pursuant to section 75J(3), take into account the zone objectives, where they are not inconsistent with clauses in the Mining SEPP.

The following provides the zone objectives of lands relevant to the Project.

2(a) Low Density Residential Zone

(a) to provide land primarily for detached housing with gardens in an environment free from commercial and unsympathetic activities and buildings, and

(b) to allow some diversity of activities and housing types provided:

(i) densities, scale and height are comparable to those of detached housing, and

(ii) there is little increase in traffic generation, and

(iii) there will be no significant detraction from the character of the locality or the amenity of any existing or proposed development nearby.

2(a1) Special Low Density Residential Zone

(a) to cater for residential development in selected areas affected by environmental hazards, a limited supply of infrastructure or a lack of adequate utility services, and

(b) to allow some diversity of activities that will not prejudice achievement of the objective referred to in paragraph (a) or detrimentally affect the environmental quality or character of the locality or the amenity of the locality.

2(b) Medium Density Residential Zone

(a) to cater for a wide range of housing types, essentially domestic in scale and character, and

(b) to allow for a range of residential densities and for urban consolidation in appropriate locations, and

(c) to allow some diversity of activities and densities provided:

(i) scale and height are comparable to those of the locality, and

(ii) there is little increase in traffic generation, and

(iii) there will be no significant detraction from the character of the locality or the amenity of any existing or proposed development nearby.

3(a) General Business Zone

(a) to allow for high density residential development close to the regional centre, and

(b) to allow some diversity of activities and densities provided:

(i) scale and height are comparable with those in the locality, and

(ii) there is little increase in traffic generation, and

(iii) there will be no significant detraction from the character of the locality or the amenity of any existing or proposed development nearby.

4(a) Light Industrial Zone

(a) to cater for a wide range of manufacturing and service activities that will not interfere with the amenity of nearby residents, and

(b) to allow some diversity of activities that will not prejudice achievement of the objective referred to in paragraph (a) or significantly detract from the operation of existing or proposed manufacturing and service industries or the amenity of nearby residents.

5 Special Uses

The objective of the zone is to cater for the provision of community and public facilities and services.

6(a) Public Recreation Zone

(a) to identify areas where recreation facilities for the general use of the community for active and passive recreation may be developed, and

(b) to cater for the development of a wide range of facilities for the benefit of nearby communities.

6(b) Private Recreation Zone

(a) to identify areas where private recreation facilities are and may be developed, and

(b) to allow some diversity of activities that will not prejudice achievement of the objective referred to in paragraph (a) or significantly detract from the character of the locality or the amenity of any existing or proposed development in the locality.

7(a) Special Environmental Protection Zone [Water Catchment]

(a) to protect environmentally important land having special aesthetic, ecological or conservational value, and

(b) to identify and protect the foreshore environment that enhances the visual amenity and possesses ecological or conservational value, and

(c) to identify and protect land forming part of the catchment areas for water supply, and

(d) to allow some diversity of activities on degraded land that will not prejudice achievement of the objectives referred to in paragraphs (a), (b) and (c) or significantly detract from the environmental or visual quality or character of the locality or the amenity or operation of any existing or proposed development in the locality.

7(b) Environmental Protection Conservation Zone

(a) to identify, protect and enhance areas that have special conservational, aesthetic or scenic qualities that enhance the environment, and

(b) to identify and protect escarpment areas that enhance the visual amenity and possess special aesthetic or conservational value, and

(c) to allow some diversity of activities on degraded land that will not prejudice achievement of the objectives referred to in paragraphs (a) and (b) or significantly detract from the environmental or visual quality or character of the locality or the amenity or operation of any existing or proposed development in the locality.

7(c) Environmental Protection Residential Zone

(a) to cater for limited residential and village development in selected areas possessing special environmental qualities or that may be affected by environmental hazards, and

(b) to allow some diversity of activities that will not prejudice achievement of the objective referred to in paragraph (a) or detrimentally affect the environmental quality or character of the locality or the amenity of any existing or proposed development in the locality.

7(d) Hacking River Environmental Protection Zone

(a) to identify and protect the conservation value of the relatively pristine tributaries of the Hacking River Catchment and thereby safeguard the natural qualities of the area to complement the Royal National Park, and

(b) to allow some diversity of activities on degraded land that will not prejudice achievement of the objective referred to in paragraph (a) or detrimentally affect the environmental quality or character of the locality or the amenity of any existing or proposed development in the locality.

8(a) National Parks, State Conservation Areas and Nature Reserves Zone

(a) to identify land that is reserved or dedicated under the National Parks and Wildlife Act, 1974, and

(b) to allow for the management and appropriate use of that land as provided for in the National Parks and Wildlife Act, 1974.

9(b) Reservation Zone - Roads

(a) to ensure that land required for future essential services, roads, open space and community purposes is clearly designated, and

(b) to provide for the acquisition of land within the zone, and

(c) to permit development of land within the zone where it is not immediately required, and

(d) to allow continued use of land within the zone until it is required.

The Project is considered to be generally consistent with the above zone objectives, because, as described in Section 4, management and mitigation measures would be implemented where practicable, to minimise the potential impacts of the Project on other landuses, and the environment.

It is noted that many of the above zonings (notably, the residential zones, business zone, public and private recreation zones, reservation zone and national parks, state conservation areas and nature reserve zone) are not within the Project Underground Mining Area, nor the Metropolitan Colliery Major Surface Facilities Area. Further, the surface of these lands (to a depth of 50 m) are not included in the Project Area and fall within the Completed Underground Mining Area (i.e. areas of historical Metropolitan Colliery mining development).

Special Provisions

Part 3 of the Wollongong LEP provides a number of miscellaneous provisions of relevant to the Project, including the following:

- ***Clause 17***

17 Development in Zone No 7 (a), 7 (b) or 7 (d)

(1) In deciding whether to grant consent to a development application to carry out development of any land within Zone No 7 (a), 7 (b) or 7 (d), the Council shall:

(a) consider the visual impact of the proposed development when viewed from a public place, and take such measures as will, in its opinion, minimise any visual impact, and

(b) be satisfied that the development minimises any detrimental impact on the environment by way of vegetation clearance, drainage pollution or bushfire risk.

(2) The Council shall not grant development consent to an application to carry out development on land within Zone No 7 (a), 7 (b) or 7 (d) unless, after consultation with the Director-General of the Department of Environment and Conservation, it is satisfied that:

(a) the development will not have a detrimental effect on the rainforest or rainforest species, or

(b) any detrimental effect on the rainforest or rainforest species can be justified by other factors.

…

(4) The Council shall not grant consent to the carrying out of development having the effect of bridging, obstructing or otherwise affecting waterways on land within Zone No 7 (a), 7 (b) or 7 (d) unless it has consulted with the Director-General of the Department of Environment and Conservation, Director-General of the Department of Infrastructure, Planning and Natural Resources and Director-General of the Department of Primary Industries and is satisfied that reasonable opportunities for wildlife movement will be maintained.

…

As described above, the Project Underground Mining Area and the existing Metropolitan Colliery Major Surface Facilities Area are located within land zoned 7(a) and 7(d), respectively.

The potential visual impacts of the Project are limited by the localised nature of any effects and the lack of public or private viewpoints of the Project Underground Mining Area and the existing Metropolitan Colliery Major Surface Facilities Area (Section 4.16).

The Project would be developed with the implementation of management and mitigation measures to minimise the need for vegetation clearance (Section 4.6), and to minimise the potential for water pollution and/or bushfire risk (Sections 4.1, 4.4 and 4.15).

The potential impacts of the Project on flora and fauna (including rainforest and rainforest species and wildlife movement) are discussed in Sections 4.6 and 4.7. No significant effects are expected in this regard.

Accordingly the Minister can be satisfied as to these matters.

- ***Clause 18***

18 Lake Illawarra and the Hacking River

(1) In deciding whether to grant consent to any application to carry out development of land which, in its opinion, may have a potential adverse impact on Lake Illawarra or the Hacking River, the Council shall take into consideration the effect of the proposed development on the water quality and ecology of the lake and river and the need to prevent sedimentation.

…

As described in Section 4.4, any runoff or treated water releases from the existing Metropolitan Colliery Major Surface Facilities Area that are made in accordance with the requirements of EPL No. 767 would drain via Camp Gully to the Hacking River. As described in Sections 4.4 and 4.5, no potential impacts on the downstream water quality or ecology of Lake Illawarra or the Hacking River are anticipated from such licensed releases, as the water is treated prior to release. As described in Section 6, a Surface Water Management Plan (SWMP) would be developed for the Project. The SWMP would include on-site water management measures and erosion and sediment controls to minimise the potential for off-site sedimentation during construction activities (Sections 4.4 and 6).

Accordingly, the Minister can be satisfied as to these matters.

- ***Clause 24***

24 Extractive industries and mines

(1) In determining an application to carry out development on land for the purposes of an extractive industry or mine, the Council shall take into consideration measures proposed by the applicant:

(a) to reinstate the land,

(b) to remove waste material or refuse,

(c) to secure public safety in the surrounding area, and

(d) to protect the amenity of the neighbourhood.

(2) The Council shall not grant development consent to the carrying out of development for the purposes of a new coal mine, or the expansion of an existing coal mine or other major coal industry, unless it is satisfied that:

(a) there is a proposed environmentally acceptable mode of transport associated with the development which is, or is capable of being, integrated into a comprehensive system for handling all coal movements within the area of the land to which this plan applies, and

(b) if public road haulage is the only feasible mode of transport, it is restricted to the most environmentally acceptable route.

…

At the cessation of the Project, a comprehensive programme would be implemented for the rehabilitation of the Metropolitan Colliery Major Surface Facilities Area and any ancillary surface developments (e.g. ventilation shaft installations) (Section 5).

The proposed management of coal reject material under the Project is discussed in Section 2.8.

The majority of product coal would be transported from the Project to Port Kembla by train. Notwithstanding, a small proportion of product coal would continue to be transported off-site by road (Section 2.7.1). Up to approximately 0.32 Mtpa of coal reject from the CHPP would also continue to be transported by road to the Glenlee Washery (Section 2.8.2).

Public safety issues for the Project are considered in the Preliminary Hazard Analysis and Traffic Assessment (Appendices N and L respectively). Consideration of neighbourhood amenity with respect to noise and air quality impacts associated with on-site and off-site activities is provided in Appendices J and K. A summary of the findings of these assessments is provided in Sections 4.10 and 4.11.

Consideration of issues associated with the acceptability of the route used for road transport of a small proportion of the Project product coal is discussed in Sections 3.2.1 and 3.9.2.

Accordingly the Minister can be satisfied as to these matters.

- ***Clause 27***

27 Protection of heritage items and heritage conservation areas

(1) When is consent required?

The following development may be carried out only with development consent:

(a) demolishing or moving the whole or part of a heritage item or a building, work, relic, tree or place within a heritage conservation area,

(b) altering a heritage item or a building, work, relic, tree or place within a heritage conservation area by making structural or non-structural changes to its exterior, such as to its detail, fabric, finish or appearance,

(c) altering a heritage item by making structural changes to its interior,

(d) disturbing or excavating a place of Aboriginal heritage significance or an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,

(e) erecting a building on, or subdividing, land on which a heritage item is located or that is within a heritage conservation area.

(2) What exceptions are there?

Development consent is not required by this clause if:

(a) in the opinion of the consent authority:

(i) the proposed development is of a minor nature or consists of maintenance of the heritage item or of a building, work, archaeological site, tree or place within a heritage conservation area, and

(ii) the proposed development would not adversely affect the significance of the heritage item or heritage conservation area, and

(b) the proponent has notified the consent authority in writing of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development will comply with paragraph (a) (i) and (ii) and that development consent is not otherwise required by this plan, and

(c) the proposed work or development is described in a conservation management plan which has been endorsed by the Council (in the case of items classified in Part 2 of Schedule 1 as being of regional heritage significance) or the Heritage Council (in the case of items classified in Part 2 of Schedule 1 as being of State heritage significance).

(3) Development consent is not required by this clause for the following development in a cemetery or burial ground if there will be no disturbance to human remains, to relics in the form of grave goods or to a place of Aboriginal heritage significance:

(a) the creation of a new grave or monument,

(b) an excavation or disturbance of land for the purpose of carrying out conservation or repair of monuments or grave markers.

(4) What must be included in assessing a development application?

Before granting a consent required by this clause, the consent authority must assess the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.

(5) What extra documentation is needed?

The assessment must include consideration of a heritage impact statement that addresses at least the issues described in subclause (6) (but is not to be limited to assessment of those issues, if the heritage significance concerned involves other issues). The consent authority may also decline to grant such a consent until it has considered a conservation management plan, if it considers the development proposed should be assessed with regard to such a plan.

(6) The minimum number of issues that must be addressed by the heritage impact statement are:

(a) for development that would affect a heritage item:

(i) the heritage significance of the item as part of the environmental heritage of the City of Wollongong, and

(ii) the impact that the proposed development will have on the heritage significance of the item and its setting, including any landscape or horticultural features, and

(iii) the measures proposed to conserve the heritage significance of the item and its setting, and

(iv) whether any archaeological site or potential archaeological site would be adversely affected by the proposed development, and

(v) the extent to which the carrying out of the proposed development would affect the form of any historic subdivision, and

(b) for development that would be carried out in a heritage conservation area:

(i) the heritage significance of the heritage conservation area and the contribution that any building, work, relic, tree or place affected by the proposed development makes to this heritage significance, and

(ii) the impact that the proposed development would have on the heritage significance of the heritage conservation area, and

(iii) the compatibility of any proposed development with nearby original buildings and the character of the heritage conservation area, taking into account the size, form, scale, orientation, setbacks, materials and detailing of the proposed development, and

(iv) the measures proposed to conserve the significance of the heritage conservation area and its setting, and

(v) whether any landscape or horticultural features would be affected by the proposed development, and

(vi) whether any archaeological site or potential archaeological site would be affected by the proposed development, and

(vii) the extent to which the carrying out of the proposed development in accordance with the consent would affect any historic subdivision pattern, and

(viii) the issues raised by any submission received in relation to the proposed development in response to the notification or advertising of the application.

- ***Clause 29A***

29A Development affecting places or sites of known or potential Aboriginal heritage significance

Before granting consent for development that is likely to have an impact on a place of Aboriginal heritage significance or a potential place of Aboriginal heritage significance, or that will be carried out on an archaeological site of a relic that has Aboriginal heritage significance, the consent authority must:

(a) consider a heritage impact statement explaining how the proposed development would affect the conservation of the place or site and any relic known or reasonably likely to be located at the place or site, and

(b) except where the proposed development is integrated development, notify the local Aboriginal communities (in such way as it thinks appropriate) and the Director-General of the Department of Environment and Conservation of its intention to do so and take into consideration any comments received in response within 28 days after the relevant notice is sent.

- ***Clause 29C***

29C Development in vicinity of a heritage item

(1) Before granting consent to development in the vicinity of a heritage item, the consent authority must assess the impact of the proposed development on the heritage significance of the heritage item and of any heritage conservation area within which it is situated.

(2) This clause extends to development:

(a) that may have an impact on the setting of a heritage item, for example, by affecting a significant view to or from the item or by overshadowing, or

(b) that may undermine or otherwise cause physical damage to a heritage item, or

(c) that will otherwise have any adverse impact on the heritage significance of a heritage item or of any heritage conservation area within which it is situated.

(3) The consent authority may refuse to grant any such consent unless it has considered a heritage impact statement that will help it assess the impact of the proposed development on the heritage significance, visual curtilage and setting of the heritage item.

(4) The heritage impact statement should include details of the size, shape and scale of, setbacks for, and the materials to be used in, any proposed buildings or works and details of any modification that would reduce the impact of the proposed development on the heritage significance of the heritage item.

Clauses 27, 29A and 29C set out above are potentially applicable to the Project with respect to the upgrade of existing facilities (e.g. the CHPP) at the heritage listed Metropolitan Colliery, potential subsidence impacts on heritage listed sites/areas (e.g. the Garawarra Hospital Heritage Conservation Area) and on Aboriginal heritage sites located above the Project Underground Mining Area, or potentially affected by Project surface activities.

Aboriginal and Non-Aboriginal Heritage Assessments have been completed for the Project and are provided in Appendices H and I. A summary of how the above issues have been addressed is provided in Sections 4.8 and 4.9. Accordingly the Minister can be satisfied as to these matters.

- ***Clause 30***

30 Services

The Council shall not consent to the carrying out of development on any land unless:

(a) a water supply and facilities for the removal or disposal of sewage and facilities for drainage are available to that land, or

(b) arrangements satisfactory to the Council have been made for the provision of that supply and those facilities.

The Project general raw water supply would continue to be largely sourced from storages, licensed extractions and recycling through the water treatment plant and metered supply from Sydney Water (Section 2.9.3). As part of the Water Savings Action Plan developed for Metropolitan Colliery (DoC, 2007) , the use of potable water from Sydney Water as a source of raw water is undertaken only when all other readily available sources of raw water have been exhausted (Section 2.9.3). The existing sewage disposal arrangements would continue to be used for the Project (Section 2.10.6).

Accordingly, the Minister can be satisfied as to these matters.

- ***Clause 32***

32 Consideration of certain applications

(1) The Council shall, in respect of an application to carry out development on land within view of any waterway or adjacent to any main road, railway, public reserve or land zoned as open space, take into consideration the probable aesthetic appearance of the proposed building or work on that land when used for the proposed purpose and viewed from that waterway, main road, railway, public reserve or land zoned for open space.

(2) The Council shall, in respect of an application to carry out development likely to cause increased vehicular traffic on any road in the vicinity of that development, take into consideration:

(a) whether adequate vehicular exits from and entrances to the sites have been provided so that vehicles using those exits and entrances will not endanger persons using those roads,

(b) provision of space on the site or on land adjoining the site, other than a public road, for the parking or standing of such number of vehicles as the Council may determine, and

(c) *(Repealed)*

(d) *whether adequate space has been provided within the site of the building or development for the loading, unloading and fuelling of vehicles and for the picking up and setting down of passengers.*

The existing Metropolitan Colliery Major Surface Facilities Area is adjacent to the Illawarra Railway (Figure 1-3) and is located proximal to both the Garawarra State Conservation Area and parcels of land in Helensburgh that have been reserved for public recreation. The potential aesthetic appearance of the proposed Project upgrade works is considered in Section 4.16. The Project would not result in significant changes to the appearance of the existing Metropolitan Colliery Major Surface Facilities Area. Issues associated with Project road traffic, parking and setdown areas are considered in Appendix L and Section 4.12.

The majority of the Project Underground Mining Area is located to the west of the F6 Southern Freeway and the Princes Highway in the Woronora Special Area, which is not accessible by the public (Figure 2-1). The Project would not result in any significant changes to the appearance of the lands overlying the Project Underground Mining Area. Ventilation Shaft No. 4 and the methane flare unit (if constructed) at Ventilation Shaft No. 3 may be visible from the F6 Southern Freeway, however minor visual impacts associated with these facilities, and other minor surface works could be readily managed (Section 4.16).

Accordingly, the Minister can be satisfied as to these matters.

3.2.5 State Environmental Planning Policies

The following SEPPs are relevant to the Project:

State Environmental Planning Policy (Major Projects) 2005

Clause 2 of the Major Projects SEPP outlines a number of aims of the SEPP, the following being relevant to the Project:

(a) *to identify development to which the development assessment and approval process under Part 3A of the Act applies,*

…

On 8 October 2007, the Director-General of the DoP, under delegation from the Minister, formed the opinion that the Project is of a kind that meets the description in Schedule 1 to the Major Projects SEPP, and pursuant to clause 6(1) of the Major Projects SEPP, declared the Project to be a project to which Part 3A of the EP&A Act applies.

State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)

SEPP 33 applies to the entire State.

Clause 2 sets out the aims of SEPP 33, the following being relevant to the Project:

(a) *to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and*

…

(d) *to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and*

(e) *to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and*

…

For development for the purposes of a potentially hazardous industry or a potentially offensive industry, clause 12 of SEPP 33 requires a preliminary hazard analysis (PHA) to be prepared in accordance with the current circulars or guidelines published by the Department of Planning. Clause 13 of SEPP 33 requires the approval authority, in considering an application to carry out development for the purposes of a potentially hazardous or a potentially offensive industry, to consider:

(a) *current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, and*

(b) *whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply, and*

(c) *in the case of development for the purpose of a potentially hazardous industry – a preliminary hazard analysis prepared by or on behalf of the applicant, and*

(d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application), and*

(e) *any likely future use of the land surrounding the development.*

As part of the preparation of this EA, a PHA has been conducted in accordance with SEPP 33 (Appendix N). The PHA has been prepared in accordance with the general principles of risk evaluation and assessment outlined in the NSW Department of Urban Affairs and Planning (DUAP) *Multi-Level Risk Assessment Guidelines* (1999). In addition, the PHA considers the qualitative criteria provided in *Risk Criteria for Land Use Planning: Hazardous Industry Planning Advisory Paper No. 4* (DUAP, 1992a) and is documented in general accordance with *Guidelines for Hazard Analysis: Hazardous Industry Planning Advisory Paper No. 4* (DUAP, 1992b).

Extensive consultation has been undertaken with public authorities during the preparation of this EA as described in Section 3.5.

Project alternatives (including the Project location) are discussed in Section 3.9.2.

The land surrounding the Project site comprises a range of zonings under the Wollongong LEP as discussed in Section 3.2.4. Land surrounding the Project Underground Mining Area is primarily zoned 7a (Special Environmental Protection), 5c (Special Uses - Main Roads), 7d (Hacking River Environmental Protection) and 8a (National Parks, State Conservation Areas and Nature Reserves), and the Project is generally consistent with this use. Consideration of the potential for the Project to adversely affect Sydney's water supply is discussed in Section 4.4. Consideration of the potential for the Project to adversely affect lands zoned 8a (National Parks, State Conservation Areas and Nature Reserves) is discussed in Appendix A and Sections 4.2, 4.5, 4.6, 4.7 and 4.9.

Management of mine subsidence to minimise potential impacts on the F6 Southern Freeway is provided in Appendix A and Section 4.2.

State Environmental Planning Policy No. 44 - Koala Habitat Protection

State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) requires the council in certain LGAs (including Wollongong LGA) to consider whether the land which is to be the subject of the development consent is "potential koala habitat" or "core koala habitat". SEPP 44 refers to "council" throughout. Since the Project is a project to which Part 3A applies, the Minister is the approval authority. Accordingly, references to "council" (when referring to giving consent) for the purposes of SEPP 44 would therefore be interpreted as references to the Minister for the Project.

An assessment of Koala habitat is provided in Appendix G. This assessment concluded that the lands in the Project area contain potential Koala habitat, however, do not fall within the definition of "core koala habitat" for the purposes of SEPP 44 (i.e. there was no evidence of a resident population of Koalas). Based on this conclusion, the provisions of SEPP 44 are not applicable to the Project.

State Environmental Planning Policy No. 55 (Remediation of Land)

State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) applies to the whole of NSW and is concerned with the remediation of contaminated land. It sets out matters relating to contaminated land that a consent authority must consider in determining an application for development consent.

"Contaminated land" in SEPP 55 has the same meaning as in Part 7A of the EP&A Act as follows:

> ***contaminated land*** *means land in, on or under which any substance is present at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.*

Clause 7(1) of SEPP 55 provides that a consent authority must not consent to the carrying out of any development on land unless:

(a) *it has considered whether the land is contaminated, and*

(b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*

> *(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, clause 7(2) of SEPP 55 provides:

> *(2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines* [*Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land]* [DUAP and NSW Environment Protection Authority [EPA], 1998].
>
> *(3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.*
>
> *(4) The land concerned is:*
>
> *(a) land that is within an investigation area,*
>
> *(b) land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,*
>
> *(c) to the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital—land:*
>
> *(i) in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and*
>
> *(ii) on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).*

Clause 7(2) provides that before a consent authority determines an application for development consent, a "preliminary investigation" is required where:

- the application for consent is to carry out development that would involve a "change of use"; and
- that "change of use" is to certain land specified in clause 7(4).

For the purposes of the Project, the certain land specified in clause 7(4) on which the "change of use" must relate is either:

- land that is an "investigation area" – defined in SEPP 55 as land declared to be an investigation area by a declaration in force under Division 2 of Part 3 of the *Contaminated Land Management Act, 1997* (CLM Act); or
- land on which development for a purpose referred to in Table 1 to the contaminated planning guidelines (being *Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land* [DUAP and EPA, 1998]) is being, or is known to have been, carried out.

On the combined operation of clauses 7(2) and 7(4) of SEPP 55, a preliminary investigation of the Project land would not be required because:

- the Project does not involve a change of use of certain land within the Project land – that is, the components of the Project that involve an extension of or upgrade to existing uses of land within the Project land; and
- although the Project involves a change of use of certain land within the Project land, this change of use does not relate to land that is:
  - an investigation area; or
  - land on which development for a purpose referred to in Table 1 to the contaminated planning guidelines is being, or is known to have been, carried out.

Part of the Project does not involve a "change of use" because the project would involve the continued development of underground mining and associated surface activities within the existing CCLs held by HCPL, including CCL 703 and subleased portions of CCL 724 (Figure 1-2). The CCLs held by HCPL and BHP Billiton Endeavour Coal amalgamated a number of historical mining tenements. The Project involves continued underground mining within the existing mining tenements as well as upgrade and augmentation of existing surface facilities at the Metropolitan Colliery (Section 2.4).

Where these activities are to be undertaken within the existing CCLs, these Project activities would not result in any change in use of the land, as mining related activities are already occurring within these existing mining tenements. Accordingly, on this land within the Project land, a preliminary investigation under SEPP 55 is not required.

The remainder of the Project will involve a change of use, being that part of the Project described in Section 1.1.3 as the extension of underground mining activities into MLA 1 and MLA 2 located to the west of the CCL 703 boundary (Figure 1-2). However, this change of use is not in respect of land specified in clause 7(4) of the SEPP because they are areas that are located within the boundaries of the Woronora Special Area and hence historical landuse in these areas has been restricted (i.e. reserved for water supply catchment). Due to their long-term restriction from public access, industrial development and agricultural development, these areas have been isolated from significant potential sources of land contamination (e.g. pesticides, hydrocarbons and industrial chemicals). During the conduct of the Non-Aboriginal Heritage Assessment, a review of the historical landuses of the Project area was conducted and no significant historical developments or settlements were identified in MLA 1 or MLA 2. On this basis, and noting that these areas do not include land that is an investigation area or on which development for a purpose referred to in Table 1 of the contaminated planning guidelines is being, or is known to have been, carried out, land within this part of the Project land also does not require a preliminary investigation under SEPP 55.

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

- ***Clause 2***

Clause 2 sets out the aims of the Mining SEPP as follows:

> *(a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
>
> *(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
>
> *(c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*

- ***Clause 7***

Clause 7 (1) of the Mining SEPP states that development for any of the following purposes may be carried out only with development consent:

> *(a) underground mining carried out on any land,*
>
> *…*

The Project comprises underground mining (Section 2.5).

- ***Clause 12***

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

> *(a) consider:*
>
> *(i) the existing uses and approved uses of land in the vicinity of the development, and*
>
> *(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
>
> *(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*
>
> *(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
>
> *(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*

The existing Metropolitan Colliery Major Surface Facilities Area is located in close proximity to the suburban areas of Helensburgh and the Current Underground Mining Area and Project Underground Mining Area are located to the west of Helensburgh in the Woronora Special Area, where landuse is restricted to water supply catchment and nature conservation (Section 4.1). The close proximity of the town of Helensburgh to the existing Metropolitan Colliery Major Surface Facilities Area has resulted from the historical development of the town to accommodate the mine workforce (Section 4.10.1 and Appendix I).

Noise, air and transport impact assessments have been conducted for the Project (refer Appendices J, K, L) and these assessments indicate that the Project would not result in significant additional impacts on adjoining landuses in Helensburgh near the existing Metropolitan Colliery Major Surface Facilities Area (Sections 4.10, 4.11 and 4.12).

The Project would not have a significant impact on the use of the Woronora Special Area for water catchment, or nature conservation, and is not incompatible with these existing landuses within the Woronora Dam catchment (Sections 4.3 to 4.9). Similarly, the Project would not have a significant impact on the Garawarra State Conservation Area or Heathcote National Park which are located adjacent to the Project Underground Mining Area (Figure 2-1) (Sections 4.3 to 4.9 and Appendix A).

The development of the Project would result in significant socio-economic benefits to the Illawarra economy and the State of NSW (Sections 4.13 and 4.14).

HCPL would, where practicable, implement a range of measures to avoid or minimise incompatibility of the Project with existing and future landuses in Helensburgh and in the Woronora Special Area (Sections 4 and 5).

- ***Clause 14***

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

> *(a) that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
>
> *(b) that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
>
> *(c) that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.

The potential impacts of the Project on surface water and groundwater resources are discussed in Sections 4.3 and 4.4, including measures to minimise potential impacts which are described in Sections 4.3.3 and 4.4.3. The potential impacts of the Project on threatened species and biodiversity are described in Sections 4.5 to 4.7, including measures to minimise potential impacts which are described in Sections 4.5.3, 4.6.3 and 4.7.3.

The Project greenhouse gas emissions assessment is provided in Section 3.8. Greenhouse gas abatement measures are described in Section 3.8 and Appendix K. These sections of the EA address the Director-General's EARs for the quantitative assessment of potential scope 1, 2 and 3 greenhouse gas emissions of the Project, and the qualitative assessment of the potential impacts of these emissions on the environment.

- ***Clause 15***

Clause 15 of the Mining SEPP requires that:

> *(1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*
>
> *(2) Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*

> *(3) The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

The proposed longwalls include extraction of the full seam thickness (pillars of coal would remain for safety and management of surface features [e.g. Woronora Reservoir] where necessary) (Section 2.5.2). In addition, the Project would include upgrades to the CHPP which would provide for on-going efficient recovery of saleable coal in the CHPP (Section 2.6.2). As described in Section 3.5.3, HCPL has progressively presented Project description information, mine layout plans and other information to the DPI-MR during the development of this EA. It is in HCPL's financial interest to maximise the efficiency of coal recovery and minimise the generation of coal reject which requires off-site or on-site underground disposal.

- ***Clause 16***

Clause 16(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining or extractive industry that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any one or more of the following:

> *(a) require that some or all of the transport of materials in connection with the development is not to be by public road,*
>
> *(b) limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,*
>
> *(c) require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.*

The primary public road network transport routes to and from the Metropolitan Colliery includes routes that are adjacent to commercial areas, residential areas and schools (Section 4.12).

During construction, the Project would involve a minor increase in truck and light vehicle movements associated with construction activities intermittently over a period of up to five years, while Project upgrades are being undertaken. During the operation of the Project there would also potentially be some minor increases in the frequencies of deliveries at the Metropolitan Colliery, due to increased ROM coal and saleable coal production. Section 4.12 provides a review of potential transport impacts associated with these movements.

The majority of the saleable coal produced by the Project would be transported off-site by train, which is consistent with clause 16(1)(a) of the Mining SEPP. The Project would also involve the continuation of the existing road transport of coking coal to the coking plants at Coalcliff and Corrimal and the continued transport of coal reject from the Metropolitan Colliery to Glenlee Washery for off-site disposal. These transport movements would be capped at the existing annual maximum levels. Alternative transport modes for the transport of coking coal to the Corrimal and Coalcliff Coke Works and alternative coal reject disposal options that were considered for the Project are described in Section 3.9.2.

The existing transport of coal reject on the public road network would be reduced over time, as on-site underground disposal by goaf cavity injection is developed (Sections 2.8.2 and 2.8.4).

Clause 16(2) of the Mining SEPP requires that, if the consent authority considers that the development involves the transport of materials on a public road, the consent authority must, within seven days after receiving the development application, provide a copy of the application to each roads authority for the road, and the NSW Roads and Transport Authority (RTA) (if the RTA is not a roads authority for the road).

In addition, Clause 16(3) of the Mining SEPP requires that the consent authority:

> *(a) must not determine the application until it has taken into consideration any submissions that it receives in response from any roads authority or the Roads and Traffic Authority within 21 days after they were provided with a copy of the application,*
>
> *…*

HCPL has consulted with the RTA, Campbelltown City Council, Wollondilly City Council and WCC during the development of the EA and these authorities are aware of the proposed continuation of the existing Metropolitan Colliery road transport of materials on the public road network, as a component of the Project (Sections 3.5.3 and 3.5.4).

- ***Clause 17***

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. In particular, the consent authority must consider whether conditions of the consent should:

(a) require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or

(b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or

(c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or

(d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.

At the cessation of the Project, a comprehensive programme would be implemented for the rehabilitation of the Metropolitan Colliery Major Surface Facilities Area and any ancillary surface developments (e.g. ventilation shaft installations), including the remediation of any contaminated soil, if applicable (Section 5). The proposed management of Project coal reject material is discussed in Section 2.8 and the management of other wastes is described in Section 2.11. One of the key objectives of the rehabilitation plan (Section 5) would be the development of landforms which are stable in the long-term, and therefore do not jeopardise public safety.

3.2.6 Section 94 Contribution Plan

The Project is situated wholly within the combined city wide area in the *Wollongong City Council Section 94A Development Contributions Plan* (Wollongong Contributions Plan). The Wollongong Contributions Plan came into force in June 2007 and applies to all applications for development consent and complying development certificates required to be made by or under Part 4 of the EP&A Act.

As described above, the Project will be assessed under Part 3A of the EP&A Act. However, under the combined operation of section 75R(4) and section 94B(2) of the EP&A Act, the Minister must consider the Wollongong Contributions Plan but may impose a condition under section 94 or 94A of the EP&A Act even though it is not authorised by, or is not determined in accordance with, the Wollongong Contributions Plan.

The Project is situated wholly within the combined city wide area in the *Wollongong City Council Section 94A Development Contributions Plan* (Wollongong Contributions Plan). The Wollongong Contributions Plan came into force in June 2007 and applies to all applications for development consent and complying development certificates required to be made by or under Part 4 of the EP&A Act.

As described above, the Project will be assessed under Part 3A of the EP&A Act. However, due to the operation of section 75R(4) of the EP&A Act, the Minister may grant approval to the Project subject to a condition requiring contributions under section 94 and/or section 94A of the EP&A Act. In each case, the development contribution must be of a kind allowed in accordance with a contributions plan (in this case, the Wollongong Contributions Plan). Further, section 94B(2) provides that where the consent authority is not a council (i.e. in this case, is the Minister), the Minister may still impose a condition under sections 94 or 94A that is not authorised by or determined in accordance with the Wollongong Contributions Plan, as long as the Minister has regard to the Wollongong Contributions Plan.

Contributions under section 94 can only be required in circumstances where the development will or is likely to require the provision of or increase the demand for public amenities or services.

3.3 OTHER APPLICABLE STATUTORY APPROVALS

The following Acts may be applicable to the Project:

- *Contaminated Land Management Act, 1997*;
- *Dangerous Goods Act, 1975*;
- *Mining Act, 1992*;
- *Noxious Weeds Act, 1993*;
- *Rail Safety Act, 2002*;
- *Road and Rail Transport (Dangerous Goods) Act, 1997*;
- *Roads Act, 1993*;
- *Protection of the Environment Operations Act, 1997* (POEO Act);
- *Threatened Species Conservation Act, 1995* (TSC Act);
- *Sydney Water Catchment Management Act, 1998*;
- *Coal Mine Health and Safety Act, 2002*;
- *Crown Lands Act, 1989*;
- *Dams Safety Act, 1978*;
- *Energy and Utilities Administration Act, 1987*;
- *Fisheries Management Act, 1994*;
- *Water Act, 1912*; and
- *Water Management Act, 2000*.

Relevant licences or approvals required under these Acts would be obtained as required.

For example, the Project would require additional mining leases under the *Mining Act, 1992*, a revision of EPL No. 767 under the POEO Act and water licences under the *Water Act, 1912* and *Water Management Act, 2000* for groundwater and surface water extraction, where applicable.

Section 47 of the *Sydney Water Catchment Management Act, 1998* requires the determining authority to give notice of the Project Application to the SCA and provides the SCA with an opportunity to make representations regarding the application. The DoP must also give the SCA 28 days notice if it intends to determine the application of application otherwise than in accordance with SCA's representations.

Additional detail on the likely requirements under the *Mining Act, 1992* and *Dams Safety Act, 1978* are provided in the subsections below.

The Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) may be applicable to the Project (Section 3.4).

The Commonwealth *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) and any associated emissions trading act that may be enacted in the future by the Commonwealth Government may also be applicable to the Project and/or Peabody Pacific's operations in Australia. The relevance of these acts is discussed in Section 3.8.

3.3.1 Mining Act, 1992

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions included in all mining leases, including requirements for the submission of a Mining Operations Plan (MOP) prior to the commencement of operation, and subsequent Annual Environmental Management Reports (AEMR).

Collectively, the MOP and AEMR constitute the *Guidelines to the Mining, Rehabilitation and Environmental Management Process* (MREMP Guidelines) (DPI-MR, 2006b) which has been developed by DPI-MR.

The MREMP is a framework that aims to facilitate the development of mining in NSW in a safe manner such that operations are safe, the environment is protected, the resources are efficiently extracted and rehabilitation achieves a stable, satisfactory outcome (DPI-MR, 2006b). The structure and content of the Project MOP and AEMR would be developed in accordance with the MREMP Guidelines (DPI-MR, 2006b) and through consultation with various regulatory and advisory agencies including DPI-MR, DECC, DoP, SCA and WCC.

As Project rehabilitation and remediation activities would be undertaken progressively, the MREMP would be used throughout the Project life to both plan and track the performance of these activities as they are carried out.

Mining Operations Plan (MOP)

The MOP would provide information in regard to the mining, processing and rehabilitation operations, relevant lease and development conditions, licences and other approvals.

The MOP would also describe:

- area(s) to be disturbed;
- mining, rehabilitation and remediation method(s) to be used and their sequence;
- existing surface infrastructure;
- progressive rehabilitation schedules;
- areas of particular environmental sensitivity;
- land and water management systems; and
- resource recovery.

The MOP would be revised periodically as well as prior to any significant alteration to Project operations.

Annual Environment Management Report (AEMR)

An AEMR would be prepared to address the reporting of the status of approvals, leases, licences and environmental risk management and environmental control strategies.

For the preceding 12 month period, the AEMR would provide a summary of community relations and liaison, mine development and rehabilitation in relation to the MOP. Project environmental performance in relation to the collective conditions of approvals, leases and licences for the previous 12 month period would also be reported.

The AEMR would also include a review and any proposed improvements in relation to environmental monitoring and management systems and environmental performance and would specify environmental and rehabilitation targets to be achieved during the ensuing 12 month period.

Subsidence Management Plans (SMPs)

In accordance with the requirements of CCL 703 (and other applicable mining leases), HCPL would progressively prepare SMPs and obtain DPI-MR approval for the Project underground mining activities prior to mining being undertaken.

These applications would be prepared in accordance with the *Guideline for Applications for Subsidence Management Approvals* (DMR, 2003a) and *New Approval Process for the Management of Coal Mining Subsidence – Policy* (DMR, 2003b). These documents are collectively referred to as the SMP Guideline.

In accordance with the SMP Guideline, a number of SMPs would be required over the life of the Project, as SMP applications are limited to a mining area extending over a maximum of seven years.

The main areas to be addressed by an SMP application include (DMR, 2003a):

1. *The proposed mining system(s) and resource recovery;*
2. *Community consultation;*
3. *Statutory requirements that apply to the Application Area;*
4. *Expected subsidence and its potential impacts on public safety, the environment, community, land use, surface improvements and infrastructure; and*
5. *The proposed Subsidence Management Plan for the expected subsidence impacts.*

Where applicable, the SMP process provides the appropriate venue for the resolution of particular management issues pertaining to individual longwall panels or mining domains. For example, management of potential subsidence effects would be required at a number of structures on the F6 Southern Freeway (refer Section 4.2). When the SMPs that apply to these structures are prepared, consultation with the RTA and the formulation of site specific management measures to suitably manage potential subsidence effects on these structures to maintain public safety on the F6 Southern Freeway would be undertaken as a component of the SMP process.

SMPs are reviewed through a whole-of-government approach by the Subsidence Management Plan Interagency Committee. The Committee includes representatives from each of the following agencies:

- DoP;
- DWE;
- DECC;
- DPI;
- DSC;
- SCA; and
- Mine Subsidence Board (MSB).

As discussed in Section 3.5.3, a Project presentation has been made to the Subsidence Management Plan Interagency Committee.

New Mining Tenements

HCPL would apply to the DPI-MR for two new mining leases to the west of the CCL 703 boundary (MLA 1 and MLA 2) and would also, where required, apply for specific surface access leases within CCL 703 for the installation of surface facilities as required (e.g. for Ventilation Shaft No. 4), where the existing CCL does not currently include surface access rights for the construction and operation of these facilities.

3.3.2 Dams Safety Act, 1978

In accordance with clause 14 of the *Dams Safety Act, 1978*, the DSC has the following functions:

(a) to maintain a surveillance of prescribed dams, the environs under, over and surrounding prescribed dams and the waters or other materials impounded by prescribed dams to ensure the safety of prescribed dams,

(b) to examine and investigate the location, design, construction, reconstruction, extension, modification, operation and maintenance of prescribed dams, the environs under, over and surrounding prescribed dams and the waters or other materials impounded by prescribed dams,

(c) to obtain information and keep records on matters relating to the safety of dams,

(d) to formulate measures to ensure the safety of dams,

(e) to make such reports or recommendations to the Minister or any other person in relation to the safety of prescribed dams as the Committee considers necessary or appropriate,

(f) to make reports and recommendations with respect to the prescription of dams for the purposes of this Act,

(g) to exercise such other functions as are conferred or imposed on the Committee by or under this or any other Act or the regulations, and

(h) to do such supplemental, incidental and consequential acts as may be necessary or expedient for the exercise of its functions.

A portion of the Project Underground Mining Area would be located within the Woronora Notification Area (Section 2.5.2). The Woronora Dam is a prescribed dam as listed in Schedule 1 of the *Dams Safety Act, 1978*.

Prior to the commencement of mining within a Notification Area, mining companies must receive the consent of the Minister administering the *Mining Act, 1992*. The DSC advises the Minister administering the *Mining Act, 1992* on the extent and type of mining to be permitted, and on any special conditions which should apply.

HCPL has consulted with the DSC during the preparation of this EA (Section 3.5.3). Within the Woronora Notification Area, the mine layout has been varied to conform with the guideline provided by the DSC, *Mining in Notification Areas of Prescribed Dams* (DSC, 1998) (Section 2.5.2).

Prior to mining within the Woronora Dam Notification Area, HCPL would obtain all necessary approvals from the Minister administering the *Mining Act, 1992* in accordance with the requirements of the *Dams Safety Act, 1978* and the DSC.

3.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT, 1999

The EPBC Act commenced operation on 16 July 2000. The EPBC Act defines proposals that are likely to have an impact on a matter of environmental significance as a “controlled action”. Proposals that are, or may be, a controlled action are required to be referred to the Commonwealth Minister for the Environment, Heritage and the Arts for a determination as to whether or not the action is a controlled action.

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 EPBC Act. The Bilateral Agreement applies to actions that the Commonwealth Minister for the Environment, Heritage and the Arts 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 an assessment of whether or not it is a controlled action under the EPBC Act.

Consultation with the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) has been undertaken as part of the preparation of this EA and is summarised in Section 3.5.5. Notwithstanding, consideration of the potential impacts of the Project on matters of national environmental significance is provided below.

3.4.1 Matters of National Environmental Significance

Baseline aquatic ecology and terrestrial flora and fauna surveys have been conducted for the Project and have included assessment of matters of national environmental significance (Sections 4.5, 4.6 and 4.7).

A description of the existing environment, potential impacts of the Project, mitigation measures, management and monitoring in relation to matters of national environmental significance is provided below along with compensatory measures and ecological initiatives.

Existing Environment

World Heritage Properties

A declared World Heritage property is an area that has been included in the World Heritage List or declared by the Minister to be a World Heritage property under the EPBC Act (Department of the Environment and Heritage [DEH], 2006a). World Heritage properties are places with natural or cultural heritage values which are recognised to have outstanding universal value (DEH, 2006a).

No World Heritage properties are situated in the Project area or surrounds. The closest World Heritage property to the Project is The Greater Blue Mountains Area, situated approximately 40 km to the north-west of the Project. The Greater Blue Mountains Area is particularly noted for providing outstanding examples representing on-going ecological and biological processes significant in the evolution of Australia's highly diverse ecosystems and communities of plants and animals, particularly eucalypt-dominated ecosystems.

The Greater Blue Mountains Area includes significant habitats for *in situ* conservation of biological diversity, including the eucalypts and eucalypt-dominated communities, taxa with Gondwanan affinities, and taxa of conservation significance (DEWHA, 2008a).

National Heritage Places

The National Heritage List comprises a list of places with outstanding natural, Indigenous or historic heritage value to the nation. To be included on the National Heritage List, a place must meet one or more of nine National Heritage List criteria.

The Royal National Park and Garawarra State Conservation Area were both listed as a place on the National Heritage List in 2006 in accordance with criteria (a) *the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.*

The official values of the Royal National Park and Garawarra State Conservation Area National Heritage Place are outlined in Table 3-1 (DEWHA, 2008b).

The Garawarra State Conservation Area is located within CCL 703, immediately east of the F6 Southern Freeway (Figures 1-1 and 1-2). Longwalls 20 to 44 are situated immediately to the west of the F6 Freeway and Project longwall mining would not occur beneath the Garawarra State Conservation Area.

Further, the surface lands of the Garawarra State Conservation Area are not included in the Project Application Area and accordingly, surface activities and works would not occur within the Garawarra State Conservation Area.

The Royal National Park abuts the north-eastern and eastern boundaries of Garawarra State Conservation Area and a portion of Royal National Park is located within CCL 703. Longwalls 20 to 44 are situated immediately to the west of the F6 Freeway and Garawarra State Conservation Area. Hence the boundaries of the Project Underground Mining Area are well outside of the adjacent Royal National Park. Further, the surface lands of the Royal National Park are not included in the Project Application Area and accordingly, surface activities and works would not occur within the Royal National Park.

Table 3-1
Values of the Royal National Park and Garawarra State Conservation Area National Heritage Place

Criteria	Values
A Events, Processes	*Royal National Park and Garawarra State Conservation Area constitute a major centre of plant species richness, having one of the richest concentrations of plant species in temperate Australia with more than 1000 species. The place is important for its richness in a wide array of species including heaths (Epacridaceae), peas and wattles (Mimosaceae and Fabaceae), orchids (Orchidaceae), grevilleas and banksias (Proteaceae) and members of the eucalypt family (Myrtaceae). The place is also extremely important as a centre of temperate animal species richness for a range of groups including perching birds (Passeriformes) especially honeyeaters (Meliphagidae), tree-frogs (Hylidae), reptiles (Reptilia) and butterflies (Lepidoptera). The place can be regarded as exemplifying the biodiverse Hawkesbury Sandstone environment (Braby, 2000; DEH, 2004; DEH, 2006; NPWS, 2000).*
A Events, Processes	*Royal National Park was the first National Park to be established in Australia in 1879 and this event is seen as the beginning of the Australian conservation movement (Heathcote 1988). The permanent reservation of a large natural area for the purposes of public recreation marked the start of the development of Australia's National Park system of protected areas (Worboys et al., 2005).*

Source: DEWHA (2008b)

Wetlands of International Significance

The closest Ramsar wetland is the Towra Point Nature Reserve, which is situated approximately 25 km north of the Project on the northern side of Kurnell Peninsula which forms the southern shore of Botany Bay. The Towra Point Nature Reserve contains approximately half the mangrove communities remaining in the Sydney region (DEWHA, 2008c). These wetland communities are considered important as they provide habitat for over thirty species of migratory birds listed on the Japan-Australia Migratory Bird Agreement (*ibid*.). They are also significant for wading and wetland birds in the Sydney region (*ibid*.). The Project is situated within the same catchment as the Towra Point Nature Reserve.

Threatened Flora Species

A number of threatened flora species listed under the EPBC Act are known to occur or could possibly occur in the Project area or surrounds. Four vulnerable species, Bynoe's Wattle (*Acacia bynoeana*), Thick-leaf Star-hair (*Astrotricha crassifolia*), Deane's Paperbark (*Melaleuca deanei*) and Prickly Bush-pea (*Pultenaea aristata*) were recorded by the baseline flora surveys conducted in the Project area and surrounds (Appendix E). Non-flowering plants tentatively identified as the vulnerable species Woronora Beard-heath (*Leucopogon exolasius*) were also found, but the lack of flowers prevented positive identification.

Threatened Fauna Species

A number of threatened fauna species listed under the EPBC Act are known to occur or could possibly occur in the Project area or surrounds. Three vulnerable species, the Giant Burrowing Frog (*Heleioporus australiacus*), Broad-headed Snake (*Hoplocephalus bungaroides*) and the Grey-headed Flying Fox (*Pteropus poliocephalus*) were recorded by the baseline fauna surveys in the Project area or surrounds (Appendix F).

In addition, diggings that could potentially belong to the Southern Brown Bandicoot (*Isoodon obselus obselus*), listed as endangered, Long-nosed Potoroo, listed as vulnerable, or the Long-nosed Bandicoot, not listed, under the EPBC Act were recorded during the baseline surveys.

Threatened Aquatic Biota

Review of relevant literature and databases prior to the baseline aquatic ecology surveys identified two threatened aquatic species or their habitats listed under the EPBC Act that have the potential to occur in the study area, *viz.* the Macquarie Perch (*Macquaria australasica*) listed as endangered and the Australian Grayling (*Prototroctes maraena*) listed as vulnerable (Appendix D).

Macquarie Perch (*Macquaria australasica*) are generally found in the Murray-Darling Basin and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments (DPI, 2005). Its abundance is thought to have declined because of over-fishing, loss of habitat, river regulation and competition with introduced species.

The Woronora River system was sampled at 20 sites in 2001 by NSW Fisheries to determine whether the Macquarie Perch existed within the catchment. The survey found no Macquarie Perch upstream or downstream of Woronora Dam (Bruce *et al.*, 2001). Bruce *et al.* (2001) indicates that while some uncertainty due to the extent of sampling remains, when the results are combined with other fish surveys done in the Woronora catchment (since 1994 and historical information), there remains no evidence that Macquarie Perch ever existed in the Woronora River system.

The Australian Grayling (*Prototroctes maraena*) is a species that inhabits clear, flowing waters in southern NSW coastal rivers (DPI, 2006). It is reportedly sensitive to changes in the environment and because it is a migratory species it has disappeared from many rivers where water regulation has resulted in physical and chemical barriers to fish passage. It has been recorded in the Sydney basin but not within the Woronora area.

No threatened aquatic biota listed under the EPBC Act are known to occur in streams within the Project Underground Mining Area or in the Woronora Reservoir (Appendix D).

Threatened Ecological Communities

No ecological communities listed under the EPBC Act are known to occur in the Project area or surrounds (Appendix E).

A search of the EPBC Act database using the Protected Matters Search Tool for the Project area and surrounds indicates that the Turpentine-Ironbark Forest in the Sydney Basin Bioregion critically endangered ecological community (EEC) may possibly occur within the area. The Turpentine-Ironbark Forest occurs mainly on the Cumberland Plain of the Sydney region, with patches extending onto the adjoining plateaux (DEH, 2005a).

It is known from the LGAs of Auburn, Bankstown, Baulkham Hills, Blue Mountains, Campbelltown, Canterbury, Concord, Hawkesbury, Hornsby, Kogarah, Ku-ring-gai, Lane Cove, Liverpool, Parramatta, Penrith, Ryde, Sutherland, Wingecarribee, Wollongong and Wollondilly (DEH, 2005a). This community is recognised as two separate EECs under the TSC Act, namely, the Sydney Turpentine-Ironbark Forest EEC and the Blue Mountains Shale Cap Forest EEC (*ibid*.).

An indicative map showing the possible distribution of the Turpentine-Ironbark Forest critically endangered ecological community in the Sydney Basin Bioregion (DEH, 2005b) indicates that a patch of this community may occur to the south of the Project Underground Mining Area in the Longwalls 18 to 19A area. However, detailed baseline flora surveys (Bangalay Botanical Surveys, 2007) indicate that the O'Hares Creek Shale Forest vegetation community (listed as an EEC under the TSC Act) occurs in this particular location (Appendix E).

The DECC (2007a) in its submission to the NSW Southern Coalfield Inquiry (SCI) (Section 3.5.2), stated that *Upland swamps of the Woronora Plateau also appear to be encompassed by the definition of 'Temperate Highland Peat Swamps on sandstone' (DEH, 2005), an ecological community listed as endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (Keith et al., 2006)*. However, based on comparison of the topographical and geographic distribution, none of the vegetation occurring within upland swamps within the study area accord with this EEC (Appendix E).

Migratory Species

Migratory species are those animals that migrate to Australia and its external territories, or pass though or over Australian waters during their annual migrations (DEWHA, 2008d).

Appendix F provides a list of migratory species listed under the EPBC Act that have been recorded in the vicinity of the Project or in the wider surrounds by various sources including the Project surveys (Appendix F), Atlas of NSW Wildlife (DECC, 2007b), Australian Museum (2007), Birds Australia (2007) and fauna species recorded in the Woronora Special Area (DECC, 2007c).

One migratory bird species, the Rufous Fantail, was recorded in the Woronora Special Area by the DECC (2007c) and during the Project surveys (Appendix F).

A large number of the migratory bird species recorded in the wider surrounds (DECC, 2007b; Australian Museum, 2007; Birds Australia, 2007; in Appendix F) are associated with coastal habitats and would not normally be expected to utilise the Project area. This includes species from the Families:

- Diomedeidae (Albatrosses);
- Procellariidae and Hydrobatidae (Petrels, Shearwaters and Storm-Petrels);
- Phaethontidae, Fregatidae and Sulidae (White-tailed Tropicbird, Lesser Frigatebird and Brown Booby);
- Laridae (Terns); and
- Stercorariidae (Skuas).

A number of other migratory bird species could potentially occur in the Project area or surrounds. These migratory species have been categorised into five groups according to the availability of potential habitat within the Project area and surrounds (Table 3-2).

Commonwealth Marine Areas

The Commonwealth marine area is any part of the sea, including the waters, seabed, and airspace, within Australia's exclusive economic zone and/or over the continental shelf of Australia, that is not State or Northern Territory waters (DEWHA, 2008e). The Commonwealth marine area stretches from three to 200 nautical miles from the coast. Further, a number of marine protected species are listed under the EPBC Act.

The Project does not lie within a Commonwealth marine area. The Project area is situated approximately 6 to 8 km west of the eastern seaboard.

Appendix F provides a list of marine protected species listed under the EPBC Act that have been recorded in the vicinity of the Project or in the wider surrounds by various sources including the Project surveys (Appendix F), Atlas of NSW Wildlife (DECC, 2007b), Australian Museum (2007), Birds Australia (2007) and fauna species recorded in the Woronora Special Area (DECC, 2007c).

Thirteen marine protected bird species were recorded during the Project surveys, *viz*. the Nankeen Night Heron, Australian Kestrel, Brown Goshawk, Pallid Cuckoo, Fan-tailed Cuckoo, Channel-billed Cuckoo, Southern Boobook, White-throated Nightjar, Sacred Kingfisher, Rufous Fantail, Black-faced Cuckoo-Shrike, Welcome Swallow and Silvereye (Appendix F). DECC (2007c) has also recorded the Whistling Kite and White-bellied Cuckoo-shrike in the Woronora Special Area.

A larger number of marine protected bird species have been recorded in the wider surrounds (DECC, 2007b, Australian Museum, 2007 and Birds Australia, 2007; in Appendix F). Similar to the migratory bird species, a number of the marine protected bird species recorded in the wider surrounds are associated with coastal habitats and would not be expected to utilise the Project area.

Table 3-2
Potential Migratory Species

Group	Migratory Species Category	Species
1	Unlikely to be present within the Project area due to lack of suitable habitat.	Black-winged Stilt, Grey Plover, Lesser Golden Plover, Australian Painted Snipe, Lathams Snipe, Ruddy Turnstone, Great Knot, Red Knot, Sanderling, Broad-billed Sandpiper, Oriental Cuckoo and Rainbow Bee-eater.
2	Located within the Project area during Project surveys.	Rufous Fantail.
3	Potential residents associated with limited habitats of the Woronora Reservoir and Waratah Rivulet.	Cattle Egret, Great Egret, Osprey and White-bellied Sea Eagle.
4	Predominantly coastal species that could be occasionally associated with limited habitats of the Woronora Reservoir and Waratah Rivulet.	Black-tailed Godwit, Bar-tailed Godwit, Marsh Sandpiper, Common Greenshank, Terek Sandpiper, Red-necked Stint, Sharp-tailed Sandpiper and Curlew Sandpiper.
5	Other migratory species.	White-throated Needletail, Fork-tailed Swift, Black-faced Monarch and Satin Flycatcher.

Source: Appendix G

This includes species from the Families:

- Spheniscidae (Little Penguin);
- Diomedeidae (Albatrosses);
- Procellariidae and Hydrobatidae (Petrels, Shearwaters and Storm-Petrels);
- Phaethontidae, Fregatidae, Pelecanidae and Sulidae (Tropicbirds, Frigatebirds, Pelicans, Gannets and Boobies);
- Burhinidae (Beach-stone Curlew);
- Laridae (Gulls and Terns); and
- Stercorariidae (Skuas).

A number of other marine protected bird species could potentially occur in the Project area or surrounds. These marine protected species have been categorised into five groups according to the availability of potential habitat within the Project area and surrounds (Table 3-3).

Potential Impacts

Evaluations have been conducted to assess potential impacts of the Project, including those associated with mine subsidence effects and other direct, indirect and cumulative potential impacts on matters of national environmental significance. The evaluations are based on the *Significant Impact Guidelines – Matters of National Environmental Significance* (DEH, 2006b). These evaluations are provided in Appendix G and the outcomes are summarised below.

World Heritage Properties

The Greater Blue Mountains Area is situated approximately 40 km north-west of the Project and a considerable distance from the area of any potential direct or indirect effect of the Project. Any secondary effects associated with the Project such as global warming would be negligible when compared to the effect of national and global emissions.

Table 3-3
Potential Marine Protected Species

Group	Marine Protected Species Category	Species
1	Unlikely to be present within the Project area due to lack of suitable habitat.	Black-winged Stilt, Grey Plover, Lesser Golden Plover, Australian Painted Snipe, Latham's Snipe, Ruddy Turnstone, Great Knot, Red Knot, Sanderling, Broad-billed Sandpiper, Oriental Cuckoo, Rainbow Bee-eater, Stubble Quail, Cape Baron Goose, Red-capped Plover, Double-banded Plover, Hooded Plover, Eastern Curlew, Grey-tailed Tattler, Wandering Tattler, Pectoral Sandpiper and Superb Fruit-Dove.
2	Located within the Project area during Project surveys (Western Research Institute and Biosphere Environmental Consultants, 2008) or in the Woronora Special Area (DECC, 2007c).	Rufous Fantail, Nankeen Night Heron, Australian Kestrel, Brown Goshawk, Pallid Cuckoo, Fan-tailed Cuckoo, Channel-billed Cuckoo, Southern Boobook, White-throated Nightjar, Sacred Kingfisher, Black-faced Cuckoo-Shrike, Welcome Swallow, Silvereye, Whistling Kite and White-bellied Cuckoo-shrike.
3	Potential residents associated with limited habitats of the Woronora Reservoir and Waratah Rivulet.	Cattle Egret, Great Egret, Osprey and White-bellied Sea Eagle, Australian White Ibis, Straw-necked Ibis, Intermediate Egret and Little Egret.
4	Predominantly coastal species that could be occasionally associated with limited habitats of the Woronora Reservoir and Waratah Rivulet.	Black-tailed Godwit, Bar-tailed Godwit, Marsh Sandpiper, Common Greenshank, Terek Sandpiper, Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper, Musk Duck, Eastern Reef Egret, Spotless Crake, Purple Swamphen and Red-necked Avocet.
5	Other marine protected species.	White-throated Needletail, Fork-tailed Swift, Black-faced Monarch and Satin Flycatcher, Brahminy Kite, Swamp Harrier, Swift Parrot, Horsefield's Bronze-Cuckoo, Shining Bronze-Cuckoo, Dollarbird, Forest Kingfisher, Pink Robin, Flame Robin, Spangled Drongo, Cicadabird and Tree Martin.

Source: Appendix G

The Project would not have a significant impact on the World Heritage values of the Greater Blue Mountains Area given the Project would not cause one or more of the World Heritage values to be lost, one or more of the World Heritage values to be degraded or damaged, or one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

National Heritage Places

The proposed underground mining would not occur beneath the Royal National Park or the Garawarra State Conservation Area. Further the Project would not include surface activities or works in the Royal National Park or Garawarra State Conservation Area. The potential direct (e.g. subsidence) and indirect (e.g. introduction or spread of weeds) impacts associated with the Project are very unlikely to impact on flora or fauna species diversity in the Royal National Park or Garawarra State Conservation Area given the National Heritage Place is located well away from the surface activities, the nature and extent of the potential impacts, and the proposed implementation of management measures described in Section 4 and below.

Any secondary effects associated with the Project such as global warming would be negligible when compared to the effect of national and global emissions. In addition, the historical values of the National Heritage Place would not be impacted by the Project (Appendix I).

The Project is unlikely to cause one or more of the National Heritage values to be lost, one or more of the National Heritage values to be degraded or damaged, or one or more of the National Heritage values to be notably altered, modified, obscured or diminished. Accordingly, the Project will not have, or is not likely to have, a significant impact on the National Heritage values on the Royal National Park or Garawarra State Conservation Area.

Wetlands of International Significance

The Towra Point Nature Reserve is situated approximately 25 km north of the Project and a considerable distance from the area of any potential direct (e.g. mine subsidence and vegetation clearance) or indirect (e.g. potential downstream effects on water quality) effect of the Project. Any secondary effects associated with the Project such as global warming would be negligible when compared to the effect of national and global emissions.

The Project would not have a significant impact on the ecological character of the Towra Point Nature Reserve Ramsar wetland as it would:

- not result in areas of the wetland being destroyed or substantially modified;
- not result in a substantial and measurable change in the hydrological regime of the wetland;
- not result in the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected;
- not result in a substantial and measurable change in the water quality of the wetland; and
- not result in an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

Threatened Flora Species

Potential impacts of the Project on terrestrial flora and their habitats have been assessed and include those associated with mine subsidence effects (e.g. surface cracking, buckling and/or dilating and changes to surface or groundwater hydrology), other direct and indirect potential impacts (e.g. vegetation clearance, fire, weeds, the plant pathogen, *Phytophthora cinnamomi*, dust and greenhouse gas emissions/climate change effects) and cumulative impacts. These potential impacts are described in Section 4.6.2.

Evaluations were conducted for threatened flora species that could possibly occur in the Project area or surrounds. Evaluations were conducted for the following threatened flora species listed as vulnerable under the EPBC Act: Bynoe's Wattle (*Acacia bynoeana*), Thick-leaf Star-hair (*Astrotricha crassifolia*), *Darwinia biflora*, Camfield's Stringybark (*Eucalyptus camfieldii*), Woronora Beard-heath (*Leucopogon exolasius*), Deane's Paperbark (*Melaleuca deanei*) and Prickly Bush-pea (*Pultenaea aristata*). An evaluation was also conducted for *Persoonia hirsuta* subsp. *hirsuta*, listed as endangered under the EPBC Act. These evaluations are provided in Appendix G.

On the basis of these assessments, it is considered that the Project would be unlikely to have a significant impact on threatened flora of national environmental significance as it is unlikely that the Project would:

- lead to a long-term decrease in the size of a population of a species;
- reduce the area of occupancy of a population;
- fragment an existing population into two or more populations of a species;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population of a species;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that a species is likely to decline;
- result in invasive species that are harmful to a species becoming established in a species' habitat;
- introduce disease that may cause a species to decline; or
- interfere with the recovery of a species.

Threatened Fauna Species

Potential impacts of the Project on terrestrial fauna species and their habitats have been assessed and include those associated with mine subsidence effects (e.g. surface cracking, buckling and/or dilating and changes to surface or groundwater hydrology), other direct and indirect potential impacts (e.g. habitat disturbance, fire, exotic pests, amphibian Chytrid fungus, noise, fauna traps, road traffic, artificial lighting and greenhouse gas emissions/climate change effects) and cumulative impacts. These potential impacts are described in Section 4.7.2.

Evaluations were conducted for the following threatened fauna species listed as vulnerable under the EPBC Act: Giant Burrowing Frog (*Heleioporus australiacus*), Stuttering Frog (*Mixophyes balbus*), Littlejohn's Tree Frog (*Litoria littlejohni*), Green and Golden Bell Frog (*Litoria aurea*), Broad-headed Snake (*Hoplocephalus bungaroides*), Superb Parrot (*Polytelis swainsonii*), Long-nosed Potoroo (*Potorous tridactylus*), Grey-headed Flying Fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinobus dwyeri*).

Evaluations were also conducted for the Swift Parrot (*Lathamus discolor*), Regent Honeyeater (*Xanthomyza phrygia)*, Eastern Bristlebird (*Dasyorrnis brachypterus*), Southern Brown Bandicoot (*Isoodon obselus obselus*) and Spotted-tailed Quoll (*Dasyurus maculatus*) listed as endangered under the EPBC Act. These evaluations are provided in Appendix G.

On the basis of these assessments, it is considered that the Project would be unlikely to have a significant impact on threatened fauna of national environmental significance as it is unlikely that the Project would:

- lead to a long-term decrease in the size of a population of a species;
- reduce the area of occupancy of a population;
- fragment an existing population into two or more populations of a species;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population of a species;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that a species is likely to decline;
- result in invasive species that are harmful to a species becoming established in a species' habitat;
- introduce disease that may cause a species to decline; or
- interfere with the recovery of a species.

Threatened Aquatic Biota

No threatened aquatic biota listed under the EPBC Act are known to occur in streams within the proposed mining area or in the Woronora Reservoir. It is unlikely that any threatened aquatic biota would occur given the location of the Woronora Dam which is a barrier to fish migration upstream, the habitat requirements of the species and the absence of any records to date (Appendix D).

Threatened Ecological Communities

No ecological communities currently listed under the EPBC Act occur in the Project area or surrounds (Appendix E).

Migratory Species

Evaluations were conducted for the migratory species listed in Table 3-2 in accordance with the *Significant Impact Guidelines - Matters of National Environmental Significance* (DEH, 2006b) and are provided in Appendix G. On the basis of these assessments, it is considered that the Project would be unlikely to have a significant impact on migratory species as it is unlikely that the Project would:

- substantially modify, destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.

Commonwealth Marine Areas

The closest Commonwealth marine area is situated approximately 6 to 8 km east of the Project and a considerable distance from the area of any potential direct (e.g. mine subsidence and vegetation clearance) or indirect (e.g. potential downstream water quality changes) effect of the Project. The degree of separation between the Project potential effects and the closest Commonwealth marine area is further broadened by the presence of Woronora Dam and reservoir immediately downstream of the Project mining area. This structure creates a significant barrier and regulation of flow conditions along the Woronora River. The Project is unlikely to have a significant impact on the environment in a Commonwealth marine area as it is unlikely to:

- result in a known or potential pest species becoming established in a Commonwealth marine area;
- modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area results;
- result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity; social amenity or human health;
- result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected; or
- have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck.

Evaluations were conducted for the marine protected species listed in Table 3-3 in accordance with the *Significant Impact Guidelines - Matters of National Environmental Significance* (DEH, 2006b) and are provided in Appendix G. On the basis of these assessments, it is considered that the Project would be unlikely to have a substantial adverse effect on a population of a marine species or cetacean including its lifecycle (e.g. breeding, feeding, migration behaviour, life expectancy) and spatial distribution.

Mitigation Measures, Management and Monitoring

The mitigation measures, management and monitoring described in Sections 4.5.3, 4.6.3 and 4.7.3 are applicable to matters of national environmental significance, particularly threatened, migratory and marine protected species.

Compensatory Measures and Ecological Initiatives

The compensatory measures and ecological initiatives described in Section 3.9.3 are applicable to matters of national environmental significance, particularly threatened, migratory and marine protected species.

3.5 ENVIRONMENTAL ASSESSMENT CONSULTATION

3.5.1 Objectives of the Project Consultation Programme

HCPL is committed to an open and constructive consultation programme, which aims to:

- identify interested parties and stakeholders;
- inform government and other stakeholders of the nature and status of the Project by presenting information in a number of formats and venues, to facilitate a clear understanding of the Project;
- identify issues of concern to stakeholders for consideration in the Project planning and design process and in this EA; and
- establish dialogue between HCPL and government and community stakeholders that would be on-going, should the Project be approved.

The level of consultation undertaken during the preparation of this EA is considered to be in accordance with the EARs and is adequate and appropriate for a Major Project under Part 3A of the EP&A Act. The consultation programme has provided an effective avenue to identify issues of concern or interest to stakeholders and to address these issues in this EA document, where applicable.

The consultation undertaken to date is summarised in the following sub-sections and includes a synopsis of the relevant issues raised. It is anticipated that consultation would continue to be undertaken with government and non-government stakeholders during the assessment of this EA, and construction and operation of the Project, should it be approved.

Where key concerns or issues raised during Project consultation are described in the following sub-sections, a reference to the relevant section of this EA where the concern is addressed is provided.

3.5.2 Southern Coalfield Inquiry

The NSW Government announced a strategic inquiry into underground mining in the Southern Coalfield (herein described as the SCI) on 6 December 2006. An Independent Expert Panel was appointed to conduct the inquiry. The Terms of Reference for the Inquiry were:

1. *Undertake a strategic review of the impacts of underground mining in the Southern Coalfield on significant natural features (i.e. rivers and significant streams, swamps and cliff lines), with particular emphasis on risks to water flows, water quality and aquatic ecosystems; and*
2. *Provide advice on best practice in regard to:*
   - a) *assessment of subsidence impacts;*
   - b) *avoiding and/or minimising adverse impacts on significant natural features; and*
   - c) *management, monitoring and remediation of subsidence and subsidence-related impacts; and*
3. *Report on the social and economic significance to the region and the State of the coal resources in the Southern Coalfield.*

HCPL, along with a number of other mining companies, made a submission to the SCI in July 2007, which included the following statement:

> *HCPL, like many other mining companies in the Southern Coalfield, is required to obtain Project Approval for the Metropolitan Colliery coal mining operations by August 2010 in accordance with Part 3A of the Environmental Planning and Assessment Act, 1979 and the State Environmental Planning Policy (Major Projects), 2005.*
>
> *HCPL will soon be submitting a Project Application to the Department of Planning under Part 3A of the Environmental Planning and Assessment Act, 1979 in relation to proposed future mining at the Metropolitan Colliery. An Environmental Assessment will be prepared and will consider the potential environmental impacts of new mining areas at the Metropolitan Colliery.*

HCPL also facilitated an inspection of Waratah Rivulet by the SCI expert panel members, plus key representatives of DPI-MR, DECC, DoP, SCA and a number of other interested parties on 14 August, 2007. This inspection included sections of Waratah Rivulet that had experienced subsidence effects from Longwalls 14 to 17.

The SCI convened public hearings in Camden in September 2007. A total of 28 oral presentations were made to the panel (DoP, 2008). The General Manager of the Metropolitan Colliery made a presentation at the SCI public panel hearings.

Approximately 56 written submissions were made to the SCI by a range of public, non-government and government agencies and interest groups. These submissions were also placed on the DoP website in October 2007 at:

http://www.planning.nsw.gov.au/planningsystem/panel_southerncoalfield.asp

The SCI therefore provided an opportunity for a range of stakeholders with an interest in mining in the Illawarra Region to express their views and raise issues with underground mining in the region. Issues specifically relating to the Metropolitan Colliery operations were raised in these submissions.

The SCI Independent Expert Panel reported in July 2008 (Section 3.7). Key issues and concerns raised by a range of submissions to the SCI with respect to potential environmental effects of underground longwall mining included, but were not limited to, those listed below. The section reference where each of these issues has been considered in this EA is also provided.

- concerns regarding aesthetic impacts on streams, such as discolouration of streambeds due to iron deposition and increased cracking of rock bars in stream beds (Sections 4.4 and 4.16);
- concerns regarding potential impacts on groundwater quality and quantity (including altered interaction of surface water and groundwater) (Sections 4.3 and 4.4);
- concerns regarding potential impacts on surface water quality and quantity reporting to the Woronora Reservoir, and greater Sydney's water supply (Section 4.4);
- concerns regarding the potential for the surface release of gas, due to cracking of near-surface strata (Section 4.4);
- concern regarding the potential for adverse effects on upland swamps (e.g. cracking, draining and degradation of vegetation) (Sections 4.3, 4.4.and 4.6);
- concerns regarding reduction in surface flows and draining of pools in sections of streams as a result of subsidence effects, and associated impacts on aquatic flora and fauna (Sections 4.4 and 4.5);
- concerns that mining could have adverse effects on threatened or iconic flora and fauna species (Sections 3.4 and 4.5 to 4.7);
- concerns regarding the effectiveness of the mining industry's efforts in the restoration of subsidence effects post-mining, and the damage that may be caused by such works (Sections 4.4, 4.16 and 5);
- concerns regarding the length of time that may be required for restoration of adverse subsidence effects following mining (Sections 4.4 and 5);
- concerns regarding the medium and long-term compatibility of underground mining with water catchment areas and the conservation role of some of these areas (Section 4);
- concerns that mine subsidence effects may potentially be more than predicted, or opinions that mine subsidence is a poorly understood phenomenon (Sections 3.7.2 and 4.2);
- opinions that potential impacts on streams, swamps and Aboriginal heritage sites should be avoided rather than impacts minimised or impacts remediated (Section 3.9.2);
- concerns that potential environmental impacts should be economically valued (Sections 4.13 and 3.9);
- concerns regarding the length of baseline monitoring data that was available, and the potential for long-term data trends to be unobserved to date (Section 4 and Appendices A to O – each technical appendix to this EA explains the data upon which it relies);
- suggestions that alternative mining methods should be implemented, rather than longwall mining (Section 3.9.2); and

- concerns regarding obtaining suitable scientific certainty in assessing the potential impacts of underground mining (Sections 3.7 and 4 and Appendices A to O – each technical appendix to this EA explains the data upon which it relies and where relevant, the limitations of the work conducted).

The key issues raised in the SCI and the findings and recommendations of the Independent Expert Panel as described in the SCPR (DoP, 2008) have been addressed in this EA. Section 3.7 provides consideration of each of the recommendations of the SCPR with respect to the Project.

3.5.3 State Government Agencies

The Project Application was lodged with the DoP in September, 2007 and the Project was declared a Major Project by the Director-General of the DoP in October 2007 (Section 3.1).

Consultation with key NSW State Government agencies commenced well in advance of the submission of the Project Application. The early consultation was in the form of preliminary briefings for the purpose of commencing the approval process. Initial Project briefings were provided to the DoP, DPI-MR, SCA and WCC in the second half of 2006.

In order to facilitate information exchange between key State Government agencies and HCPL and Project environmental specialists, working groups were established at both the technical and executive levels. Information exchange and the progressive presentation and discussion of baseline data and assessment findings from the key environmental studies occurred during the preparation of this EA and supporting appendices. The majority of these meetings were held with key agencies prior to the issue of the EARs by the DoP on 30 July 2008 (Section 1.2).

The following outlines the key participants in the Technical Working Group (TWG) and Executive Working Group (EWG) for the Project. Key consultation subjects and outcomes from these meetings are also presented where relevant.

Technical Working Group (TWG)

A TWG was initiated for the Metropolitan Colliery in May 2007 to facilitate discussions regarding Waratah Rivulet remediation and other existing mine-related activities. Subsequently the scope of the TWG was expanded to include consultation regarding the Project and provide a forum for the exchange of technical and monitoring data during the preparation of the EA.

The TWG generally met monthly between May 2007 and the finalisation of the EA. The TWG continues to meet and comprises representatives from the SCA, DPI-MR and HCPL.

The TWG comprised individuals from each organisation as the core members, with other technical representatives attending depending on the agenda for each meeting. Presentations to the TWG were made by HCPL's technical specialists at various stages in the EA preparation.

Key findings of Project baseline studies and impact assessments tabled and/or presented to the TWG included:

- potential groundwater and surface water impacts and assessment (Sections 4.3 and 4.4);
- potential impacts on flora and fauna and assessment (Sections 4.5 to 4.7);
- potential socio-economic impacts and assessment (Sections 4.13 and 4.14);
- rock bar restoration, methods and environmental controls (Sections 4.4 and 5);
- environmental controls associated with surface works;
- monitoring data and monitoring systems;
- on-going management of the Metropolitan Colliery surface activities in the Woronora Special Area; and
- environmental offsets (Section 6).

Project Executive Working Group (EWG)

The Project EWG was formulated by the DoP to provide a venue for executive level consultation with key State Government agencies. Presentations were made by HCPL at approximately monthly intervals from February 2008 to familiarise the relevant managers from the key agencies with the Project and to inform the Project planning, design and environmental assessment process.

The Project EWG continues to meet and comprises the following representatives:

- DoP – David Kitto (*Director – Major Development Assessment*) (chair);
- SCA – George Dodds (*General Manager of Catchment Operations & Major Projects*);
- DPI-MR – Garth Holmes (*Director, Development Coordination*);
- DPI-MR – Elise Newberry (*Director, Mineral Resources Division, Environmental Sustainability*);
- DECC – William Dove (*Acting Manager Metropolitan*);
- HCPL – Neville McAlary (*General Manager Metropolitan Colliery*); and
- Peabody Pacific – Peter Doyle (*General Manager Corporate Operations and Support*).

Other representative of these agencies attended particular meetings as required. Presentations to the EWG were made by HCPL's specialists at various stages in the EA preparation.

Discussions in the EWG meetings ranged across a broad range of environmental issues, including, but not limited to the following:

- approach to key environmental assessments (Section 4);
- mine planning and design process (Section 3.9);
- groundwater investigations and potential impacts (Section 4.3);
- surface water investigations and potential impacts (Section 4.4);
- ecological investigations and impact assessment (Sections 4.5 to 4.7);
- potential impacts on heritage values (Sections 4.8 and 4.9);
- subsidence effects on Waratah Rivulet (Sections 3.9, 4.2, 4.3, 4.4 and 4.16);
- consideration of avoidance and minimisation of subsidence effects to Waratah Rivulet (Section 3.9.2);
- adaptive management concepts (Section 5);
- Project economics and trade-off analysis (Section 3.9);
- rock bar restoration progress (Sections 4.4. and 5); and
- scientific certainty (Sections 3 and 4).

In addition to the regular Project TWG and EWG meetings between HCPL, DoP, DPI-MR, DECC and SCA, a range of State Government agencies were consulted with respect to the assessment of the Project. Presented below is a summary of other consultation with State Government agencies.

Subsidence Management Plan Interagency Committee

SMPs are reviewed through a whole-of-government approach by the Subsidence Management Plan Interagency Committee (Section 3.3.1). The committee includes representatives from each of the following agencies:

- DoP;
- DWE;
- DECC;
- DPI;
- DSC;
- SCA; and
- MSB.

A Project presentation to the Subsidence Management Plan Interagency Committee was made in November 2007 which comprised a briefing on: the Part 3A assessment process (Section 3.1); mine planning (Section 3.9.2); and Waratah Rivulet stream restoration works (Sections 4.4 and 5).

Consultation was also undertaken with the Subsidence Management Plan Interagency Committee during the development of the EA with respect to the Longwall 18-19A SMP approval.

Department of Environment and Climate Change (DECC)

Prior to the commencement of the regular EWG meetings a separate meeting was held with DECC representatives in November 2007. At the meeting, HCPL made a Project presentation including providing explanation of the Project description; key assessment issues and specialist involvement; environmental assessment; mine design; subsidence assessment; Waratah Rivulet remediation progress; stakeholder consultation; and the EA provisional timeline.

Key issues specifically raised by DECC at this meeting included, but were not limited to:

- consideration of impact avoidance and impact minimisation scenarios for the Waratah Rivulet in mine planning (Section 3.9.2);
- consideration of the economic assessment of environmental externalities (impacts) (Section 4.13);
- re-iteration of its position from the SCI submission that remediation should be a last resort (Sections 4.4 and 5);
- ability to demonstrate successful remediation (Sections 4.4 and 5);
- concern over the reliability of subsidence predictions (Sections 3.7 and 4.2); and
- interest in seeing an adaptive management approach being adopted by HCPL (Sections 4.4 and 5).

Department of Primary Industries – Mineral Resources (DPI-MR)

As described above, the DPI-MR participated in the Project TWG and EWG meetings. In addition, the DPI-MR was consulted with respect to a range of on-going Metropolitan Colliery approvals (e.g. Longwall 18-19A SMP approval) and the Project during the development of the EA. Additional Project meetings were held with the DPI-MR including a technical presentation and initial Project briefing meeting in December 2006, and three subsequent meetings with respect to interaction of existing operations with the Part 3A approval timeline, mine layout presentation and a Project presentation to the DPI-MR Principal Subsidence Engineer.

Key issues discussed with the DPI-MR during this consultation included, but were not limited to:

- potential subsidence impacts (Section 4.2);
- Project road transport (Section 4.12);
- management of potential subsidence impacts on the F6 Southern Freeway (Section 4.2);
- noise and air quality (Metropolitan Colliery surface facilities area) (Sections 4.10 and 4.11);
- surface water and groundwater effects (Sections 4.3 and 4.4);
- ecological effects (Sections 4.5 to 4.7);
- Aboriginal and non-Aboriginal heritage (Sections 4.8 and 4.9);
- socio-economics (Sections 4.13 and 4.14);
- fugitive gas management and greenhouse gas emissions (Sections 3.8 and 4.11);
- mine planning and consideration of alternative mine layouts (Section 3.9.2); and
- demonstration of successful stream restoration at the Waratah Rivulet (Sections 4.4 and 5).

Sydney Catchment Authority (SCA)

In addition to the TWG and EWG meetings described above, HCPL met with the SCA on several occasions during the development of the EA.

Key issues discussed with the SCA during this consultation included, but were not limited to:

- the Part 3A assessment process and its relationship to the preparation of SMPs (Sections 3.1 to 3.4);
- avoidance, minimisation and management of potential environmental impacts in the Woronora Special Area (Sections 3.9.2 and Section 4);
- management of surface activities and exploration works (Section 4);
- baseline monitoring, data collection and sharing (Section 4);
- management of existing SCA and third party surface infrastructure in the Woronora Special Area (Section 4.2); and
- environmental offsets (Section 6).

Mine Subsidence Board (MSB)

HCPL initially contacted the MSB to discuss the Project in September 2006. Aspects discussed included the role of the MSB, the scope of MSB compensation payments and consultation with infrastructure owners in this regard.

HCPL contacted the MSB again in June 2008 to inform the MSB of the Project progress with the EA and to ascertain if the MSB had any other issues or concerns. No particular issues were raised by the MSB.

Roads and Traffic Authority (RTA)

HCPL consulted with the RTA during the preparation of the EA, including contact in 2007 with the Sydney and Southern Region offices regarding the Traffic Assessment (Appendix L).

In addition, a meeting was held with the RTA in January 2008 to discuss the Project and potential subsidence effects on the F6 Southern Freeway and RTA's associated requirements for management of potential subsidence effects.

Following the meeting, HCPL commissioned a supplementary assessment *Bridges near Proposed Longwalls 18 to 44 at Metropolitan Colliery* (Cardno, 2008) for three key structures on the F6 Southern Freeway Princes Highway (*viz*. Underpass No. 1; Princes Highway Underpass No. 2 and the Cawley Road Overbridge). A joint inspection of these structures was undertaken by HCPL, RTA, MSEC and Cardno in May 2008.

Following the provision of the Cardno (2008) advice, HCPL met with the RTA in July 2008 to discuss the report findings and Project subsidence management measures for the key structures on the F6 Southern Freeway.

RTA feedback indicated that the Project subsidence effects on the bridge structures would be manageable, subject to further development of detailed engineering management measures and a risk assessment during the SMP process.

Department of Water and Energy (DWE)

In addition to the DWE's role on the Subsidence Management Plan Interagency Committee described above, a presentation was made to the DWE on 13 June 2008. This included a Project description briefing along with the findings of the Surface Water and Groundwater Assessments (presented by Dr Noel Merrick and Gilbert & Associates) and the status and timing of the Project approval process. Subsequently, in June 2008 HCPL forwarded the DWE an overview of the Project and invited the DWE to provide any supplementary queries or concerns or visit the Metropolitan Colliery site for an inspection.

During consultation, the DWE indicated it would assess the Project against the relevant objects of the *Water Management Act, 2000* and consider the requirements for licensing of Project water extractions, once the finalised EA was received.

The DWE subsequently wrote to HCPL, explaining its statutory authority in regard to the regulation of NSW water resources and requiring HCPL to provide more information in regard to its current licensing arrangements. HCPL provided the DWE supplementary information on the estimated water make of the existing Metropolitan Colliery underground mining operation and water balance in July 2008.

South Eastern Sydney Illawarra Area Health Service

The South Eastern Sydney Illawarra Area Health Service are the operators of the Garrawarra Centre, an aged care facility located in the north of the Project area (Figure 2-1).

HCPL initially contacted the South Eastern Sydney Illawarra Area Health Service in June 2007 to arrange site access to the Garrawarra Centre for the Non-Aboriginal Heritage Assessment.

HCPL then met with the South Eastern Sydney Illawarra Area Health Service in March 2008 to provide an overview of the Project and associated subsidence assessment. At this meeting, the results of the preliminary subsidence assessment were discussed along with the proposed subsidence management measures that HCPL has adopted for the Project to minimise potential impacts on key structures at the Garrawarra Centre (Section 4.9).

Key concerns raised by the South Eastern Sydney Illawarra Area Health Service were potential impacts of mine subsidence effects on buildings and services and subsequent potential effects on the provision of patient care at the Garrawarra Centre.

HCPL formally advised the Director-General of the Health and Administration Corporation in March 2008 that the Project EA was being prepared and that HCPL would be seeking access to the site at a later date for a detailed inspection of buildings and structures.

HCPL has committed to design the mine layout so as to ensure that any subsidence effects to the Garrawarra Centre are negligible (Appendix A).

NSW Dams Safety Committee (DSC)

In December 2006, the DSC made a presentation to HCPL regarding the DSC's statutory authority, DSC application format and content, and communication protocols. In December 2006, HCPL formally notified the DSC of its intention to seek the DSC approval to mine within the Woronora Dam Notification Area (Section 3.3.2).

In January 2008, HCPL met with the DSC to provide a presentation on the Project and obtain preliminary DSC feedback on the proposed mine layout under the Woronora Reservoir, future information requirements and DSC application requirements.

At this meeting, the DSC provided feedback on subsidence assessment requirements and advised it would reserve assessment of the Project proposal to undermine the Woronora Reservoir until HCPL submits the finalised DSC application (required 12 months prior to mining in the Woronora Notification Area).

HCPL met with the DSC in June 2008 and presented findings of preliminary work to develop a regional groundwater model and outlined geological investigations that would support the HCPL application. The DSC advised that it was satisfied that there was no impediment to HCPL seeking approval for the Project under Part 3A of the EP&A Act. It was also agreed that prior to mining occurring within the Woronora Dam Notification Area, HCPL would provide additional technical data in its DSC application and obtain all necessary approvals from the Minister administering the *Mining Act, 1992* in accordance with the requirements of the *Dams Safety Act, 1978*.

Dr Noel Merrick and Gilbert & Associates presented the key findings of the Groundwater and Surface Water Assessments (Appendices B and C) to the DSC in July 2008. The DSC indicated that these studies were comprehensive in nature.

Heritage Branch (DoP)

In March 2006, the Heritage Office was integrated as a division of the DoP. A standalone unit also specifically services the on-going role of the Heritage Council, including overseeing proposed State Heritage listings.

In 2008 HCPL consulted with the Heritage Branch representatives within the DoP, with respect to the requirements for management of non-Aboriginal heritage at the Project. No State Heritage Register sites would be impacted by the Project (Appendix I) and the Heritage Council advised the DoP that they did not need to be consulted regarding the Project.

The Heritage Branch advised that the assessment of heritage management issues at the Wollongong LEP listed Metropolitan Colliery (some items also listed under the Illawarra REP – Section 3.2.1) and Garrawarra Centre and completion of a statement of heritage impact (Appendix I) was appropriate for the Project, and they supported the proposed development of a Conservation Management Plan (CMP) for the Metropolitan Colliery Major Surface Facilities Area. The Heritage Branch is expected to provide additional formal feedback on the Non-Aboriginal Heritage Assessment (Appendix I) following public exhibition of the EA. No requests for additional information were provided by the Heritage Branch.

Department of Lands

The Department of Lands was contacted a number of times during the development of the EA with respect to crown land searches in the Helensburgh area and provision of baseline information. In addition, consultation with the Department of Lands in June 2008 involved phone discussions regarding the Project and Department of Lands administrative role. An overview of the Project was provided to the Department of Lands on 22 June 2008 for their records. No issue of concern or requests for additional information were provided by the Department of Lands.

Sydney Metropolitan Catchment Management Authority (SMCMA)

The SMCMA is a NSW State Government agency with a role in improved uses of natural resources. HCPL met with the SMCMA in April 2008 to discuss the Project. Issues discussed included current and future mining at the Metropolitan Colliery, the management of coal reject, subsidence effects that have been observed in the Woronora Special Area, the role of the SMCMA in community consultation, and the future exchange of data. No particular concerns were raised with respect to the Project.

3.5.4 Local Government Agencies

Wollongong City Council (WCC)

As the Project surface facilities and Project Underground Mining Area are located in the Wollongong LGA, consultation with the WCC was undertaken during the preparation of the Project EA, including:

- an initial Project briefing presentation to the WCC on 20 November 2006 (attended by the Lord Mayor, Deputy Mayor, General Manager and seven Councillors);
- correspondence in January, March and April of 2007, regarding the conduct of transport, non-Aboriginal heritage, and Aboriginal heritage studies for the Project;
- consultation in July 2007 with the Manager - Planning and Policy, regarding proposed revisions to the Wollongong LEP, with respect to zonings in the vicinity of the Metropolitan Colliery Major Surface Facilities Area;
- a meeting in February 2008 to discuss WCC assets in the Project area and potential impacts associated with mine subsidence (attended by WCC Asset Manager and Area Manager-North);
- a meeting with the WCC General Manager and Metropolitan Colliery General Manager to discuss the Project in May 2008; and
- HCPL provided supplementary Project information, including a letter report summarising potential subsidence effects on the Princes Highway to the WCC in June 2008.

Key issues discussed in consultation with WCC include, but were not limited to:

- continuation of the Metropolitan Colliery road transport of product coal and coal reject materials and key haulage routes (Section 4.12);
- mechanisms for Project consultation with the public (Section 3.5.8);
- Project mine layout alternatives and potential impacts of mining within the Woronora Special Area (Sections 3.9.2 and 4);
- management of coal rejects, surface emplacement and underground disposal options (Sections 3.9.2 and 2.8);
- the management of potential subsidence effects on the Princes Highway (Section 4.2); and
- the development of specific management measures and detailed mine design via the SMP process (Section 3.3.1), post-Project Approval determination.

Wollondilly City Council

HCPL made a presentation to representatives of the Wollondilly City Council in June 2008. At the meeting, HCPL provided an overview of the Project, the environmental assessment process and the key components of the consultation programme with State Government agencies to date.

Key issues that were discussed at the meeting included potential impacts on the Woronora Reservoir, and the future handling of coal reject at the Metropolitan Colliery, including trucking of coal reject to Glenlee Washery and future on-site disposal of coal reject underground as a component of the Project (Section 2.4.5).

HCPL provided Wollondilly City Council with a written overview of the Project, the environmental approval process and stakeholder engagement programme in July 2008. No requests for further information have been received from Wollondilly City Council at this stage.

Campbelltown City Council

HCPL made a Project presentation to key staff at the Campbelltown City Council in June 2008. At the meeting, HCPL provided an overview of the Project, the environmental assessment process and the key components of the consultation programme with State Government agencies to date.

Key issues that were discussed at the meeting included potential impacts on the Waratah Rivulet and Woronora Reservoir, and the future handling of coal reject at the Metropolitan Colliery, including trucking of coal reject to Glenlee Washery and future on-site disposal of coal reject underground as a component of the Project (Section 2.4.5).

HCPL provided Campbelltown City Council with a written overview of the Project, the environmental approval process and the stakeholder engagement programme in July 2008. No requests for further information have been received from Campbelltown City Council.

3.5.5 Federal Government Agencies

In July 2008, HCPL contacted the DEWHA to initiate consultation regarding the referral of the Project to the Minister for determination under the EPBC Act (Section 3.4) and preliminary briefing material on the Project was provided. A meeting was then held in August 2008 with the DEWHA Environmental Assessment Branch (Mining Section) representatives. At the meeting, HCPL provided a briefing on the Project including an explanation of the Project description, the assessment of terrestrial and aquatic ecology, potential impacts on ecology and matters of national environmental significance. HCPL will make a referral to the DEWHA under the EPBC Act separately to this EA.

3.5.6 Infrastructure Owners

There are a range of infrastructure items in the Project area that could potentially be affected by mine subsidence (Appendix A). HCPL consulted with the following agencies with an interest in infrastructure in the Project area during the preparation of the Subsidence Assessment (Appendix A) and/or as a component of the wider consultation programme:

- Telstra (e.g. optical fibre cables);
- Optus (e.g. optical fibre cables);
- Integral Energy (e.g. 132 kV electrical transmission line);
- Nextgen (e.g. optical fibre cables);
- Transgrid (e.g. 330 kV electrical transmission line);
- Sydney Water (e.g. water pipelines);
- Railcorp (i.e. Illawarra Railway);
- the RTA (e.g. F6 Southern Freeway) (Section 3.5.3);
- the WCC (e.g. Princes Highway) (Section 3.5.4);
- the South Eastern Sydney Illawarra Area Health Service (Garrawarra Centre) (Section 3.5.3);
- Macedonian Church; and
- Sutherland Shire Sport Flying Association.

This consultation included the provision of draft subsidence predictions for key infrastructure for consideration by infrastructure owners, where relevant.

3.5.7 Non-Government Organisations

The SCI provided an opportunity for a range of organisations to present their views on mining in the Southern Coalfield (Section 3.5.2). The SCI particularly provided a forum for the expression of concerns from a wide range of environmental non-government organisations (NGOs). A number of these NGOs specifically included comments and concerns in their submissions to the SCI regarding the current (and future) operations of the Metropolitan Colliery in the Woronora Special Area. These submissions were considered during the preparation of this EA where relevant.

In June 2006, HCPL provided the Total Environment Centre and the Colong Foundation with a Project briefing presentation. Both of these NGOs expressed their concerns.

3.5.8 Public Consultation

HCPL formed a Community Reference Group (CRG) for the Metropolitan Colliery in May 2008. Expressions of interest to participate in the CRG were submitted by members of the community following HCPL: placing an advertisement in the *Helensburgh and District News*; posting a CRG advertisement to all mail recipients in the Helensburgh postcode; and forwarding expression of interest forms to a number of local schools and businesses.

The Metropolitan Colliery CRG comprises thirteen members from the local community.

The CRG met on four occasions prior to completion of this EA (28 May 2008, 25 June 2008, 30 July 2008, 27 August 2008) and provided a mechanism to discuss the existing Metropolitan Colliery, the Project environmental assessment process and key findings of the air, noise, surface water, groundwater, Aboriginal heritage, non-Aboriginal heritage, rock bar restoration and transport assessments. The CRG has also acted as a forum for issues of interest to the CRG participants and/or the wider community to be raised.

The CRG will continue to meet throughout the DoP assessment of the Project Application and EA. Issues raised during the CRG were wide ranging and included (but were not limited to):

- the Project EA approval process and the roles of government and public stakeholders in the assessment process (Sections 1 and 3);

- potential noise impacts from the Metropolitan Colliery and the Project and noise monitoring and management measures (Section 4.10 and Appendix J);
- concerns about potential air quality impacts, dust mitigation measures and air quality monitoring (Section 4.11 and Appendix K);
- the management of existing heavy vehicle and rail movements associated with the Metropolitan Colliery, including train whistles (Sections 4.10, 4.11 and 4.12 and Appendices J, K and L);
- water use and water management (Section 4.4 and Appendix C);
- potential impacts of the Project on Aboriginal and non-Aboriginal heritage (Sections 4.8 and 4.9 and Appendices H and I);
- potential impacts of subsidence and restoration technologies (Appendices A, B and C, and Section 5);
- management and monitoring of the Project during construction and operation (Sections 4 and 6); and
- technical questions regarding the timing, nature and operation of the Project (Section 2).

At the CRG meetings, participants were also given copies of Project Information Leaflets. These are available on Peabody's website at:

http://www.peabodyenergy.com.au/nsw/metropolitan-mine.html

Private Landholders

While the vast majority of the Project Underground Mining Area and surrounds is located on lands held by SCA in the Woronora Special Area, portions are also owned by the Health and Administration Corporation (Garrawarra Centre), and some private landholdings are located adjacent to the Princes Highway and in the corridor between the Princes Highway and F6 Southern Highway (Figures 1-4a and 1-4b). Where these landholdings are held by private parties, HCPL made efforts to contact the landholders and discuss the Project.

In cases where houses or buildings were identified in the Subsidence Assessment (Appendix A) and may potentially be subject to mine subsidence, HCPL contacted the private landholders to discuss the Project and provide subsidence predictions to the landholders, prior to the lodgement of the EA.

Aboriginal Community

Project consultation with Aboriginal stakeholders was extensive during the development of the Project EA and has been undertaken in general accordance with the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (NSW Department of Environment and Conservation [DEC], 2005a) and *National Parks and Wildlife Act 1974: Part 6 Approvals Interim Community Consultation Requirements for Applicants* (DEC, 2004a).

In accordance with these guidelines identification of indigenous stakeholders was undertaken via:

- public advertisement;
- correspondence with the WCC, the DECC, the NSW Department of Aboriginal Affairs and the NSW Native Title Services; and
- correspondence with indigenous stakeholders previously identified by earlier studies at the Metropolitan Colliery.

Subsequent consultation with registered indigenous stakeholders during the preparation of the EA included:

- provision of draft Aboriginal heritage assessment methodology to stakeholders and consideration of comments received prior to fieldwork;
- Aboriginal heritage assessment fieldwork with representation from each of the registered indigenous stakeholders;
- discussions with registered indigenous stakeholders regarding the cultural significance of individual Aboriginal heritage sites and the Project area;
- provision of a copy of the draft Aboriginal heritage assessment report to each of the registered indigenous stakeholders for review and comment;
- meetings with registered indigenous stakeholders to discuss the draft Aboriginal heritage assessment report; and
- finalisation of the Aboriginal heritage assessment report including consideration of the comments received from registered indigenous stakeholders.

3.6 ENVIRONMENTAL RISK ANALYSIS

In accordance with the Project EARs (Section 1.2), an Environmental Risk Analysis (ERA) was undertaken to identify the potential environmental impacts of the Project and identify key issues for further assessment in the EA. The ERA was conducted on 9 May 2008 and was facilitated by an independent specialist (SP Solutions). The risk analysis team consisted of representatives from:

- HCPL;
- Peabody Pacific;
- MSEC;
- Gilbert and Associates;
- Heritage Computing;
- Western Research Institute;
- FloraSearch;
- Bio-Analysis;
- Heggies;
- Holmes Air Sciences; and
- Resource Strategies.

The key environmental issues that were identified by the risk analysis team and the sections of this EA that address these issues are presented in Table 3-4.

Risk ranking was also undertaken on key potential loss scenarios based on the key potential issues described in Table 3-4. The risk rankings from the workshop indicated that the key potential environmental issues ranked were all within the "Medium-ALARP" or the "Low" range (Appendix O). The ERA is documented in full as Appendix O.

3.7 EA CONSIDERATION OF THE RECOMMENDATIONS OF THE SOUTHERN COALFIELD PANEL REPORT

The Project Application was made in September 2007 and the development of the Project EA has been progressively conducted since that time, including progressive consultation with and presentations to key regulatory agencies (Section 3.5).

The SCPR was released by the DoP on 10 July 2008 and hence the EA was substantially complete prior to its release. Notwithstanding, the SCPR recommendations have been considered in the preparation of this EA. Presented in the following sections is a summary discussion of how the recommendations have been considered.

Table 3-4
Key Potential Environmental Issues Identified in the Environmental Risk Analysis

Issue/Loss Scenario	Environmental Assessment Section
Swamp deterioration (vegetation composition and health, hydrology, fire susceptibility and erosion)	Sections 4.2 to 4.6
Surface water quality - local and reservoir (including electrical conductivity impacts)	Section 4.4
Water loss from reservoir	Sections 4.3 and 4.4
Cracking of Waratah Rivulet	Sections 4.2 to 4.4
Diversion of surface flow	Sections 4.2 to 4.4
Impacts on aquatic biota - invertebrates, fish, etc.	Section 4.5
Loss or modification of aquatic habitat	Section 4.5
Waratah Rivulet remediation	Sections 4.4 and 5
Loss of stream connectivity	Sections 4.4 and 4.5
Noise - amenity and fauna	Sections 4.7 and 4.10
Dust - amenity and health	Section 4.11
Reduction of groundwater resource	Sections 4.3 and 4.4

Source: After Appendix O

3.7.1 Assessment and Regulatory Processes

1. *Risk Management Zones (RMZs) should be identified in order to focus assessment and management of potential impacts on significant natural features. RMZs are appropriate to manage all subsidence effects on significant natural features, but are particularly appropriate for nonconventional subsidence effects (especially valley closure and upsidence). Consequently, RMZs should be identified for all significant environmental features which are sensitive to valley closure and upsidence, including rivers, significant streams, significant cliff lines and valley infill swamps.*

2. *RMZs should be defined from the outside extremity of the surface feature, either by a 40° angle from the vertical down to the coal seam which is proposed to be extracted, or by a surface lateral distance of 400 m, whichever is the greater. RMZs should include the footprint of the feature itself and the area within the 40° angle (or the 400 m lateral distance) on each side of the feature.*

HCPL has undertaken a systematic approach to the identification of key environmental features of relevance to the EA. Steps in this process have included:

- The Project Subsidence Assessment (Appendix A) has identified all features that may potentially be adversely affected by subsidence effects from first principles (e.g. infrastructure, buildings, topographic and hydrological features, ecological features and heritage sites) paying particular attention to significant features of the natural and built environment, as required by the EARs.
- Consultation was undertaken with the EWG (Section 3.5.3) to identify the key features that regulatory agencies considered should be the focus of the EA.
- The EWG indicated that the key feature that required consideration of avoidance and minimisation measures in preparation of the EA was the Waratah Rivulet (upstream of the inundation limit of the Woronora Reservoir). Appendices A and C and Section 4.4 include detailed assessments of potential impacts to Waratah Rivulet. Consideration of avoidance and minimisation of potential impacts to the Waratah Rivulet is presented in Section 3.9.
- In completing the Subsidence Assessment, MSEC specifically analysed potential subsidence effects and associated environmental consequences for the Waratah Rivulet.
- HCPL has proposed an adaptive management approach in regard to potential subsidence effects to four key rock bars on Waratah Rivulet (Section 5.2). This approach includes the utilisation of 400 m RMZs to determine monitoring frequency, reporting requirements, and the need for response measures.
- Any significant features within 400 m of the location of the Project longwall extraction were identified and considered in the relevant technical appendix.

It is considered that the approach taken is generally consistent with the intent of SCPR recommendations 1 and 2.

3. *RMZs for watercourses should be applied to all streams of 3rd order or above, in the Strahler stream classification. RMZs should also be developed for valley infill swamps not on a 3rd or higher order stream and for other areas of irregular or severe topography, such as major cliff lines and overhangs not directly associated with watercourses.*

See the response to recommendations 1 and 2 above. In addition:

- No infill swamps are located in the Project Underground Mining Area. One valley infill swamp is located in the Completed Underground Mining Area and is considered in this EA (Section 4).
- Streams of all orders within 400 m of the location of the Project longwall extraction were identified and considered in the relevant assessments (Appendices A and C).
- The EWG (Section 3.5.3) indicated that the key feature that required focussed consideration in the preparation of the EA was the Waratah Rivulet (upstream of the inundation area of the Woronora Reservoir). Appendices A and C and Section 4.4 include detailed assessments of potential impacts to Waratah Rivulet. Consideration of avoidance and minimisation of potential impacts to the Waratah Rivulet is presented in Section 3.9.
- The Subsidence Assessment (Appendix A) considered potential subsidence effects on cliff lines and overhangs via examination of topographic data sets and site validation. This is consistent with the concept of RMZs as stated in recommendation 3.

4. *Environmental assessments for project applications lodged under Part 3A should be subject to the following improvements in the way in which they address subsidence effects, impacts and consequences:*

   - *a minimum of 2 years of baseline data, collected at an appropriate frequency and scale, should be provided for significant natural features, whether located within an RMZ or not;*
   - *identification and assessment of significance for all natural features located within 600 m of the edge of secondary extraction;*
   - *better distinction between subsidence effects, subsidence impacts and environmental consequences;*
   - *increased transparency, quantification and focus in describing anticipated subsidence impacts and consequences;*
   - *increased communication between subsidence engineers and specialists in ecology, hydrology, geomorphology, etc;*
   - *key aspects of the subsidence assessment (particularly in respect of predicted impacts on significant natural features and their consequences) should be subject to independent scientific peer review and/or use of expert opinion in the assessment process; and*
   - *increased use of net benefit reviews by both mining proponents and regulatory agencies in assessing applications.*

As described above, the SCPR was released in July 2008 immediately prior to the finalisation of this EA. Notwithstanding, in regard to the above recommendations, the following have been undertaken:

- HCPL has gathered comprehensive data sets for the key studies as described in the relevant appendices and Section 4. In addition, through a data exchange agreement with SCA, HCPL obtained valuable additional data of relevance to the Project Underground Mining Area (e.g. long-term monitoring records for the Woronora Reservoir).
- For certain key Project assessment issues (i.e. Surface Water Assessment [Appendix C], Aquatic Ecology Assessment [Appendix D], flora components of the Flora and Fauna Impact Assessment [Appendix G], and Aboriginal Cultural Heritage Assessment [Appendix H]), peer review by recognised experts (Dr Walter Boughton [Appendix C], Dr David Goldney [Appendices D and G], and Mr Robert Gunn [Appendix H]) was undertaken including review of the suitability of the data sets available. These reviews included consideration of whether adequate data sets were available for the purpose of assessment. The outcomes of these reviews are presented in Attachment 3 of this EA. In addition, the Groundwater Assessment (Appendix B) was prepared by Dr Noel Merrick, who is a recognised expert who has previously been commissioned by the DoP for independent expert panels.
- Upon release of the SCPR, supplementary reviews of the 600 m area around secondary extraction (i.e. longwall panel) areas were conducted for the Project. These included consideration of aspects of aquatic ecology, flora, fauna and Aboriginal heritage as described in Section 4. The Subsidence Assessment (Appendix A) had already documented all features that were considered to have the potential to be adversely affected by the Project.
- Where practicable in the EA the distinction between subsidence effects, subsidence impacts and environmental consequences is articulated and the Project Subsidence Assessment (Appendix A) has formed the basis for the other environmental studies where relevant.
- The EA has been drafted in consideration of the wholly integrated nature of various environmental consequences of subsidence effects. Various specialists were brought together on a regular basis and to cross-review each others work. This process is evidenced by the high degree of cross-referencing and integration of key findings between key specialist studies.
- Consideration of the potential socio-economic costs and benefits of the Project have been considered (Appendix M).

It is considered that the approach taken in the EA is generally consistent with the intent of SCPR recommendation 4.

> 5. *Due to the extent of current knowledge gaps, a precautionary approach should be applied to the approval of mining which might unacceptably impact highly-significant natural features. The approvals process should require a 'reverse onus of proof' from the mining company before any mining is permitted which might unacceptably impact highly-significant natural features.*
>
> *Appropriate evidence should include a sensitivity analysis based on mining additional increments of 50 m towards the feature. If such mining is permitted because the risks are deemed acceptable, it should be subject to preparation and approval of a contingency plan to deal with the chance that predicted impacts are exceeded.*

The SCPR does not clearly define *highly-significant natural features* or *unacceptable impacts*. Notwithstanding, recommendation 5 is considered below:

- MSEC has considered the reliability and confidence of subsidence predictions:
  - *…it has been concluded that the vertical subsidence predictions for single seam extractions, obtained using the Incremental Profile Method, should generally be conservative where the geology is consistent and the model has been calibrated to local data. Where subsidence is predicted at points beyond the goaf edge, which are likely to experience low values of subsidence, the predictions should generally be accurate to within 50 mm of subsidence. In this case, the model has been calibrated to local data and, therefore, there is greater confidence in the subsidence predictions made using the Incremental Profile Method.*
  - *The Incremental Profile Method should, therefore, provide realistic, and possibly conservative predictions of subsidence, tilt, curvature and strain over the proposed longwalls. The predicted profiles obtained using this method also reflect the way in which each parameter varies over the mined area and indicate the movements that are likely to occur at any point on the surface.*
  - *Predicted upsidence and closure values were determined for several monitoring lines that cross the Waratah Rivulet. The predicted values of upsidence and closure were plotted against observed values of upsidence and closure along with observations from several other collieries …. The results show that observed upsidence and closure movements are less than predicted values of upsidence and closure.*
- Sensitivity analysis and multiple data sources have been built into a number of the EA key studies, including:
  - the Subsidence Assessment (Appendix A), where a sensitivity analysis for greater subsidence effects are considered and reported;
  - the Groundwater Assessment (Appendix B) included assessment of the effects of subsidence by direct measurement of groundwater effects and via development of a groundwater model;
  - the Surface Water Assessment (Appendix C) examined the issue of water quantity reporting to the Woronora Reservoir via three assessment mechanisms, comprising examination of reservoir yield over time, by comparing Waratah Rivulet and a control (unmined) stream flows, and via modelled versus measured stream flows downstream of the mining area;
  - the findings of the Groundwater and Surface Water Assessment reports are consistent and independently reinforce each other; and
  - the Socio-Economic Assessment (Appendix M) has included sensitivity testing of a range of key economic factors, including the costs and benefits of environmental impacts.
- The adaptive management approach to be adopted by HCPL (Section 5) further enhances HCPL's level of confidence that the mine can be managed so as not to exceed the predicted subsidence effects and consequent potential environmental impacts.
- Contingency plans for the Project mining in the vicinity of the Waratah Rivulet have been included in the EA (Section 5).
- MSEC has analysed the potential subsidence effects of mining in proximity to the Waratah Rivulet in 50 m increments (Appendix A).

It is considered that the approach taken in the EA is generally consistent with the intent of SCPR recommendation 5.

> 6. *Approved mining within identified RMZs (and particularly in proximity to highly-significant natural features) should be subject to increased monitoring and assessment requirements which address subsidence effects, subsidence impacts and environmental consequences. The requirements should also address reporting procedures for back analysis and comparison of actual versus predicted effects and impacts, in order to review the accuracy and confidence levels of the prediction techniques used.*

This recommendation appears to be more applicable to the setting of approval conditions by Government, rather than the preparation of EAs. Notwithstanding, applicability to the Project includes:

- As a component of the Project Subsidence Assessment (Appendix A), MSEC has conducted a back analysis of measured subsidence effects and recorded consequences at the Metropolitan Colliery.
- A SMP would be prepared for the Project that would set out detailed subsidence monitoring requirements in accordance with any Project Approval conditions set by the DoP (Section 3.3.1).
- The adaptive management approach to be adopted by HCPL (Section 5) further enhances HCPL's level of confidence that the mine can be managed so as not to exceed the predicted effects and consequent potential environmental impacts.

> 7. *Part 3A of the Environmental Planning and Assessment Act 1979 should be the primary approvals process used to set the envelope of acceptable subsidence impacts for underground coal mining projects. This envelope of acceptability should be expressed in clear conditions of approval which establish measurable performance standards against which environmental outcomes can be quantified. Once a project has approval under Part 3A, the Subsidence Management Plan approval should be restricted to detailed management which ensures that the risk of impacts remains within the envelope assessed and approved under Part 3A. In cases where a mining project approval under Part 3A of the EP&A Act does not yet exist, the SMP process should take a greater role in assessing and determining the acceptability of impacts.*

It is considered that this recommendation applies to the NSW Government.

> 8. *The acceptability of impacts under Part 3A (and, in the interim, the SMP process) should be determined within a framework of risk-based decision-making, using a combination of environmental, economic and social values, risk assessment of potential environmental impacts, consultation with relevant stakeholders and consideration of sustainability issues.*

The EA has been prepared utilising a risk based framework for the evaluation of potential impact pathways, their potential consequences and suitable management measures. This has included:

- the completion of an ERA (Section 3.6 and Appendix O);
- consultation with the EWG to obtain feedback on key issues for assessment (Section 3.5.3) and overall consultation with relevant stakeholders (Section 3.5);
- integrated assessment of environmental and socio-economic issues (Section 3.9 and Appendix M); and
- consideration of the principles of ecologically sustainable development (ESD) for the Project (Section 3.9.3).

> 9. *Mining which might unacceptably impact highly-significant natural features should be subject to an increased security deposit sufficient to cover both anticipated rehabilitation costs (as at present), and potential rehabilitation costs in the event of non-approved impacts to the highly significant feature. The higher deposit should be commensurate with the nature and scale of the potential impact and should be attached to the mining lease by DPI under powers available to its Minister under the Mining Act 1992. If non-approved impacts occur and the feature is not able to be remediated by the mining company, then the deposit should be able to be forfeited as compensation for the loss of environmental amenity.*

The SCPR does not clearly define *highly-significant natural features* or *unacceptable impacts*. Notwithstanding, HCPL anticipates that the DPI may require some form of security deposit for the Project.

10. *Consideration should be given to the increased use within Part 3A project approvals of conditions requiring environmental offsets to compensate for either predicted or non-predicted impacts on significant natural features, where such impacts are non-remediable.*

While the restoration of key in-stream features has been demonstrated by HCPL to be successful at the Waratah Rivulet (Section 5), HCPL has committed to contribute an environmental offset (compensatory measures and ecological initiatives) for the effects that would occur during mining (Section 5).

11. *Mining companies should ensure that they consult with key affected agencies as early as possible in the mine planning process, and consult with the community in accordance with applicable current industry and Government guidelines (eg NSW Minerals Council's Community Engagement Handbook and DoP's Guidelines for Major Project Community Consultation). For key agencies (eg DECC and SCA), this engagement should begin prior to the planning focus stage of a project application.*

A comprehensive consultation programme has been undertaken for the EA (Section 3.5). This involved early consultation with the key regulatory agencies and systematic on-going feedback and updates via the TWG and EWG meetings. Direct consultation was also undertaken with a range of other stakeholders.

12. *Government should provide improved guidance to both the mining industry and the community on significance and value for natural and other environmental features to inform company risk management processes, community expectations and Government approvals. This guidance should reflect the recognition that approved mining would be expected to have environmental impacts.*

The consultation process has informed the EA preparation (Section 3.5). The EWG has communicated to HCPL that the key feature that should be considered for the Project is the Waratah Rivulet (upstream of the inundation limit of the Woronora Reservoir). Appendices A and C and Section 4.4 include detailed assessments of potential impacts to Waratah Rivulet. Consideration of avoidance and minimisation of potential impacts to the Waratah Rivulet is presented in Section 3.9.

3.7.2 Subsidence Impact Management

13. *The coal mining industry and Government should undertake additional research into the impacts of subsidence on both valley infill and headwater swamps. This research should focus on the resilience of swamps as functioning ecosystems, and the relative importance of mining induced, climatic and other factors which may lead to swamp instability.*

The swamps within the Project Underground Mining Area are classified as headwater upland swamps (Section 4.4). One in-valley upland swamp is located in the Completed Underground Mining Area and has previously experienced subsidence effects. HCPL proposes to extensively monitor the headwater swamps in the Project Underground Mining Area (Sections 4 and 6) and intends to share this information with Government. HCPL would co-operate with the Government in relation to research into the impacts of subsidence on both valley infill and headwater swamps.

14. *The coal mining industry should undertake additional research into means of remediating stream bed cracking, including:*
    - *crack network identification and monitoring techniques;*
    - *all technical aspects of remediation, such as matters relating to environmental impacts of grouting operations and grout injection products, life spans of grouts, grouting beneath surfaces which cannot be accessed or disturbed, techniques for the remote placement of grout, achievement of a leak-proof seal and cosmetic treatments of surface expressions of cracks and grouting boreholes; and*
    - *administrative aspects of remediation, in particular, procedures for ensuring the maintenance and security of grout seals in the long term.*

HCPL has conducted industry leading research into remediation techniques, including the investigation and identification of crack networks and successful implementation of remediation of subsidence cracking at a rock bar on Waratah Rivulet using polyurethane (PUR) grouting products (Section 5). This significant effort in obtaining approval and demonstrating the successful use of these products in the Woronora Special Area by HCPL has provided potential benefits to the coal mining industry in the Southern Coalfield. HCPL plans further research in this regard as part of Project compensatory measures and ecological initiatives (Sections 3.9.3 and 5).

15. *Coal mining companies should develop and implement:*
    - *approved contingency plans to manage unpredicted impacts on significant natural features; and*
    - *approved adaptive management strategies where geological disturbances or dissimilarities are recognised after approval but prior to extraction.*
16. *Government should review current control measures and procedures for approval and management of non-mining related impacts on Southern Coalfield natural features. These include various forms of discharge into rivers and streams, as well as water flow control practices. The impacts of such non-mining factors must be recognized when assessing the value of significant natural features in the region, and the assessment of appropriate control strategies.*

HCPL has undertaken a number of geological and structural investigations for the Project to date (Section 2.2). Geological investigations would be undertaken progressively during the life of the Project. Key components of the Project geological investigations would include:

- long (up to 1,600 m) in-seam exploration boreholes to identify any geological anomalies in advance of longwall mining;
- surface mapping (ground-truthing) of geological characteristics; and
- further analysis of geomorphic expressions.

The above activities would focus on the identification of potential conduits (e.g. faults, dykes, joint seams) and include extrapolation from areas external to the Project Underground Mining Area.

An adaptive management approach, incorporating contingency plans, would be implemented for the Project should it be approved (Section 5). The detailed design and implementation of this approach in regard to specific individual features would be described in the Waratah Rivulet Management Plan (WRMP) and refined throughout the Project life.

3.7.3 Prediction of Subsidence Effects and Impacts

17. *The coal mining industry should escalate research into the prediction of non-conventional subsidence effects in the Southern Coalfield and their impacts and consequences for significant natural features, particularly in respect of valley closure, upsidence and other topographic features.*

To date, HCPL has contributed, and will continue to contribute, towards Southern Coalfield industry subsidence research. HCPL continues to investigate, research and improve knowledge of subsidence effects at the Metropolitan Colliery and how these effects translate into environmental consequences. HCPL plans further research in this regard as part of Project compensatory measures and ecological initiatives (Sections 3.9.3 and 5).

18. *Coal mining companies should place more emphasis on identifying local major geological disturbances or discontinuities (especially faults and dykes) which may lead to non-conventional subsidence effects, and on accurately predicting the resultant so-called 'anomalous' subsidence impacts.*

Geological and structural investigations would be undertaken progressively during the life of the Project (Section 3.7.2). These geological investigations would also inform the research aspects described for the Project compensatory measures and ecological initiatives (Sections 3.9.3 and 5).

19. *In understanding and predicting impacts on valleys and their rivers and significant streams, coal mining companies should focus on the prediction of valley closure in addition to local upsidence. Until prediction methodologies for non-conventional subsidence are more precise and reliable, companies should continue to use an upper-bound, or conservative, approach in predicting valley closure.*

20. *Mining companies should incorporate a more extensive component of subsidence impact prediction with respect to natural features, in any future planning submissions. Such predictions should be accompanied by validation of the prediction methodology by use of back-analysis from previous predictions and monitoring data.*

The Subsidence Assessment (Appendix A) employed the upper bound prediction method to estimate valley closure and upsidence magnitudes as a result of the Project. Back analysis of Metropolitan Colliery subsidence survey data from previously completed longwalls was undertaken (Appendix A). HCPL continues to investigate, research and improve knowledge of subsidence effects at the Metropolitan Colliery and how these effects translate into environmental consequences.

3.7.4 Environmental Baseline Data

21. *Regulatory agencies should consider, together with the mining industry and other knowledge holders, opportunities to develop improved regional and cumulative data sets for the natural features of the Southern Coalfield, in particular, for aquatic communities, aquifers and groundwater resources.*

HCPL supports improvement of knowledge with respect to the natural features of the Southern Coalfield. Project aquatic, flora, fauna and groundwater monitoring proposals are detailed in the Statement of Commitments (Section 6) and Section 4.

22. *Coal mining companies should provide a minimum of two years of baseline environmental data, collected at appropriate frequency and scale, to support any application under either Part 3A of the Environmental Planning and Assessment Act 1979 or for approval of a Subsidence Management Plan.*

As described above:

- HCPL has gathered comprehensive data sets for the key studies as described in the relevant appendices and Section 4. In addition, through a data exchange agreement with SCA, HCPL obtained valuable additional data of relevance to the Project Underground Mining Area (e.g. long-term monitoring records for the Woronora Reservoir).
- For the key Project assessment issues (i.e. Surface Water Assessment [Appendix C], Aquatic Ecology Assessment [Appendix D], flora components of the Flora and Fauna Impact Assessment [Appendix G], and Aboriginal Cultural Heritage Assessment [Appendix H]), peer review by recognised experts (Dr Walter Boughton [Appendix C], Dr David Goldney [Appendices D and G], and Mr Robert Gunn [Appendix H]) was undertaken including review of the suitability of the data sets available. These reviews included consideration of whether adequate data sets were available for the purpose of assessment. The outcomes of these reviews are presented in Attachment 3 of this EA. In addition, the Groundwater Assessment (Appendix B) was prepared by Dr Noel Merrick, who is a recognised expert who has previously been commissioned by the DoP for independent expert panels.

3.8 PROJECT GREENHOUSE GAS CONSIDERATIONS

3.8.1 International Framework

United Nations Framework Convention on Climate Change

The *United Nations Framework Convention on Climate Change* (UNFCCC) sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change (United Nations, 2008). The UNFCCC was adopted in May 1992 and came into force in March 1994. Australia ratified the Convention in December 1992. Parties to the Convention have agreed to work towards achieving the Convention's ultimate aim of stabilising *greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system* (Department of Climate Change, 2008a).

Under the UNFCCC, governments (United Nations, 2008):

- gather and share information on greenhouse gas emissions, national policies and best practices;
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and
- co-operate in preparing for adaptation to the impacts of climate change.

The obligations contained in the UNFCCC are overarching framework principles and objectives. Detailed commitments regarding greenhouse gas emissions reduction are contained in the Kyoto Protocol as described below.

Kyoto Protocol

The Kyoto Protocol came into force in February 2005.

The Kyoto Protocol builds upon the UNFCCC by committing Annex I Parties to individual, legally-binding targets to limit or reduce their greenhouse gas emissions for the following greenhouse gases (United Nations, 2008):

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulphur hexafluoride (SF_6).

The emission reduction targets are calculated based on a Party's domestic emissions (such as land use change and forestry clearing, transportation, stationary energy, etc.).

To achieve their targets, Annex I Parties must put in place domestic policies and measures. The Kyoto Protocol provides an indicative list of policies and measures that might help mitigate climate change and promote sustainable development.

Australia signed the instrument of ratification of the Kyoto Protocol in December 2007 (Department of Climate Change, 2008b). Australia is committed to ensuring its greenhouse gas emissions over 2008 to 2012 are no more than 8% above 1990 levels (*ibid*.).

Greenhouse Gas Protocol

The Greenhouse Gas Protocol (GHG Protocol) contains methodologies for assessing and calculating greenhouse gas emissions (World Business Council for Sustainable Development [WBCSD] and World Resources Institute [WRI], 2004). The GHG Protocol provides standards and guidance for companies and other types of organisations preparing a greenhouse gas emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol.

Under the GHG Protocol the establishment of operational boundaries involves identifying emissions associated with an entity's operations, categorising them as direct or indirect emissions, and identifying the scope of accounting and reporting for indirect emissions.

Three “Scopes” of emissions (Scope 1, Scope 2, and Scope 3) are defined for GHG accounting and reporting purposes. Scopes 1 and 2 have been carefully defined to ensure that two or more entities will not account for emissions in the same Scope.

Scope 1: Direct GHG Emissions

Direct GHG emissions are defined as those emissions that occur from sources that are owned or controlled by the entity (WBCSD and WRI, 2004). Direct GHG emissions are those emissions that are principally the result of the following types of activities undertaken by an entity:

- generation of electricity, heat, or steam. These emissions result from combustion of fuels in stationary sources (e.g. boilers, furnaces, turbines);
- physical or chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials (e.g. the manufacture of cement, aluminium, adipic acid and ammonia, or waste processing);
- transportation of materials, products, waste, and employees. These emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources, (e.g. trucks, trains, ships, aeroplanes, buses and cars); and
- fugitive emissions. These emissions result from intentional or unintentional releases (e.g. equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting, HFC emissions during the use of refrigeration and air conditioning equipment, and methane leakages from gas transport) (WBCSD and WRI, 2004).

Scope 2: Electricity Indirect GHG Emissions

Scope 2 emissions are a category of indirect emissions that accounts for GHG emissions from the generation of purchased electricity consumed by the entity.

Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the entity (WBCSD and WRI, 2004). Scope 2 emissions physically occur at the facility where electricity is generated (WBCSD and WRI, 2004). Entities report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as Scope 2.

Scope 3: Other Indirect GHG Emissions

Under the GHG Protocol, Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions.

Scope 3 emissions are defined as those emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity. Some examples of Scope 3 activities provided in the GHG Protocol are extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services (WBCSD and WRI, 2004).

The GHG Protocol provides that reporting Scope 3 emissions is optional (WBCSD and WRI, 2004). If an organisation believes that Scope 3 emissions are a significant component of the total emissions inventory, these can be reported along with Scope 1 and 2. However, the GHG Protocol notes that reporting Scope 3 emissions can result in double counting of emissions and can also make comparisons between organisations and/or projects difficult because reporting is voluntary. Double counting needs to be avoided when compiling national (country) inventories under the Kyoto Protocol. The GHG Protocol also recognises that compliance regimes are more likely to focus on the "point of release" of emissions (i.e. direct emissions) and/or indirect emissions from the use of electricity.

Relevant Scope 1, 2 and 3 greenhouse gas emissions have been estimated for the Project (Section 3.8.3).

3.8.2 Commonwealth and NSW Framework

Key elements of the Commonwealth Government's plan of action to reduce our national emissions include (Department of Climate Change, 2008a):

- A commitment to reduce Australia's greenhouse gas emissions by 60% on 2000 levels by 2050.
- Implementing a comprehensive emissions trading scheme by 2010 to deliver these targets.
- Setting a 20% target for renewable energy by 2020 to dramatically expand the use of renewable energy.
- Investing in research and development on low emissions technologies.
- Helping households and businesses to use energy more wisely.
- Managing our land to reduce emissions.

Garnaut Climate Change Review

The Garnaut Climate Change Review is an independent study by Dr Ross Garnaut, which was commissioned by Australia's Commonwealth, State and Territory governments to examine the impacts of climate change on the Australian economy, and recommend medium to long-term policies and policy frameworks to improve the prospects for sustainable prosperity. A Draft Report was released on 4 July 2008 (Commonwealth of Australia, 2008a) and a Supplementary Draft Report is expected to be released in September 2008.

The Garnaut Climate Change Review reports on:

1. The likely effect of human induced climate change on Australia's economy, environment, and water resources in the absence of effective national and international efforts to substantially cut greenhouse gas emissions.
2. The possible ameliorating effects of international policy reform on climate change, and the costs and benefits of various international and Australian policy interventions on Australian economic activity.
3. The role that Australia can play in the development and implementation of effective international policies on climate change.
4. In light of 1 to 3, recommends medium to long-term policy options for Australia, and the time path for their implementation which, taking the costs and benefits of domestic and international policies on climate change into account, will produce the best possible outcomes for Australia.

Carbon Pollution Reduction Scheme

The Commonwealth Government's Carbon Pollution Reduction Scheme aims to reduce carbon pollution while minimising the impact on business and households (Commonwealth Government, 2008b). The scheme will place a limit or cap on the amount of carbon pollution industry can emit and will require affected businesses and industry to buy a 'pollution permit' for each tonne of carbon they contribute to the atmosphere. The scheme targets companies that produce more than 25,000 t of carbon pollution each year.

The Government plans to commence the scheme in 2010. The *Carbon Pollution Reduction Scheme Green Paper* (Commonwealth Government, 2008b) encourages stakeholder feedback in order to inform the Government's final decisions on scheme design. The Commonwealth Government intends to reflect its final decisions in a white paper, accompanied by exposure draft legislation, to be released in December 2008 (*ibid*.).

National Greenhouse Accounts Factors

The *National Greenhouse Accounts Factors* (NGA Factors) (Department of Climate Change, 2008c) contains methodologies for assessing and calculating greenhouse gas emissions. The NGA Factors largely adopt the methodology set out in the GHG Protocol described in Section 3.8.1 and replaces the *AGO Factors and Methods Workbook* (AGO, 2004).

National Greenhouse and Energy Reporting Act

The *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) establishes a national framework for corporations to report greenhouse gas emissions and energy consumption and production from 1 July 2008 (Department of Climate Change, 2008a). The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

Section 1 of the NGER Act defines the object of the Act:

> *The object of this Act is to introduce a single national reporting framework for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy consumption and energy production of corporations to:*
>
> - *underpin the introduction of an emissions trading scheme in the future; and*
> - *inform government policy formulation and the Australian public; and*
> - *meet Australia's international reporting obligations; and*
> - *assist Commonwealth, State and Territory government programs and activities; and*
> - *avoid the duplication of similar reporting requirements in the States and Territories.*

The NGER Act requires those emitters who meet specific emission criteria to start reporting their emissions from 1 July 2008. Peabody Pacific, as the parent company of HCPL, would report emissions from its facilities, including the Metropolitan Colliery, as required.

NSW Greenhouse Plan and NSW Climate Action Plan

The *NSW Greenhouse Plan* was released in November 2005 (NSW Greenhouse Office, 2005) and provides a strategic approach to combating climate change in NSW from 2005 to 2008. Key principles and goals of the Plan are to (DECC, 2008b):

- raise awareness of climate issues within the broader community;
- promote understanding of the likely impacts on NSW, and identify adaptation strategies;
- raise awareness of climate issues within the broader community;
- limit the growth of greenhouse gas emissions and reduce these emissions in NSW;
- promote climate change partnerships by Government, individuals, industry, business and community groups;
- reduce business uncertainties by establishing carbon constraints in order to promote new investment and innovation; and
- identify strategic areas for cooperative work with other Australian jurisdictions including a national emissions trading scheme.

The NSW Government is currently in the process of developing a NSW Climate Action Plan that is intended to be finalised by mid 2009. The NSW Climate Action Plan will replace the existing NSW Greenhouse Plan.

3.8.3 Project Greenhouse Gas Assessment

The EARs (Section 1.2) for the Project require this EA to include an assessment of greenhouse gas including:

- *a quantitative assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project, and qualitative assessment of the potential impacts of these emissions on the environment; and*
- *a detailed description of the measures that would be implemented on site to ensure that the project is energy efficient.*

These requirements are addressed below.

Quantitative Assessment of Potential Scope 1, 2 and 3 Greenhouse Gas Emissions

A quantitative assessment of Project greenhouse gas emissions is provided in Appendix K. The outcomes of this quantitative assessment are summarised below.

Project greenhouse gas emissions were calculated using empirical emission factors provided by the NGA Factors (Department of Climate Change, 2008c). The major source of greenhouse gas emissions from the Project would be generated by the use of diesel to power on-site equipment, gas flaring and ventilation (i.e. venting/flaring of methane and venting of CO_2 from the underground mine) (Appendix K). Emissions would also arise from the export and end-use of coal by third parties.

The total direct (i.e. Scope 1) emissions over the life of the Project is estimated to be approximately 6,310,336 t carbon dioxide equivalent (CO_2-e), which is an average of approximately 262,931 t CO_2-e per year over the life of the Project (Appendix K). This equates to average Scope 1 emissions over the life of the Project of 0.1 t CO_2-e /t ROM coal.

The total indirect emissions (i.e. Scope 2 and 3) associated with the on-site use of fuel and electricity over the life of the Project are estimated to be 3,546,039 t CO_2-e, which is an average of approximately 147,752 t CO_2-e per year, or 0.056 t CO_2-e/t ROM coal (Appendix K).

The greenhouse gas emission estimates can be compared with the following 2005 estimates provided in the latest *National Greenhouse Gas Inventory* report (AGO, 2007) and *State and Territory Greenhouse Gas Inventories 2005* (AGO, 2005).

- current estimate of Australia's 2005 net emissions, 559.1 Mt CO_2-e;
- current estimate of NSW's net 2005 emissions, 158.2 Mt CO_2-e;
- current estimate of Australia's 2005 net emissions for the energy sector, the major contributor to carbon dioxide emissions, 391 Mt CO_2-e; and
- current estimate of Australia's 2005 net emissions for the industrial sector, 29.5 Mt CO_2-e.

On the basis of the above estimates, the Project average combined (Scope 1, 2 and 3) CO_2-e emissions (0.41 Mt) would be around 0.073% of the total annual 2005 Australian emissions. The Intergovernmental Panel on Climate Change (IPCC) (2007) identifies that estimated anthropogenic global emissions in 2004 were approximately 49 Giga tonnes (Gt) of CO_2-e (i.e. 49,000 Mt). Comparison of the Project combined (Scope 1, 2 and 3) emissions of 0.41 Mt per annum with the 2004 global estimate indicates the Project would on average contribute approximately 0.0008% of global emissions.

Total indirect emissions (i.e. Scope 3) from the export and end use of the Project coal by other parties are estimated to be 185,838,567 t CO_2-e, which is an average of 8,079,938 t CO_2-e per year (Appendix K). Greenhouse gas emissions resulting from the annual average export and end use of Project coal by other parties would be around 0.016% of the total annual global (2004) emissions (calculation assuming no clean emissions technology or abatement measures by end user).

There would also be benefits to the community from the Project (Sections 3.9.5, 4.13 and 4.14) and to the global community through the provision of energy and coking coal for use in steelmaking to meet the global demand for commodities.

While future projections of global CO_2-e emissions vary, there is agreement and much evidence that with current climate change mitigation policies and related sustainable development practices, global greenhouse gas emissions will continue to grow over the next few decades (IPCC, 2007).

Qualitative Assessment of Potential Impacts of Greenhouse Gas Emissions on the Environment

Potential environmental impacts associated with climate change are discussed below.

Climate change involves complex interactions between climatic, biophysical, social, economic, institutional and technological processes. The weight of scientific opinion supports the proposition that the world is warming due to the release of emissions of carbon dioxide and other greenhouse gases from human activities including industrial processes, fossil fuel combustion, and changes in land use, such as deforestation (Pew Centre on Global Climate Change, undated).

Although understanding of climate change has improved markedly over the past several decades, climate change projections are still subject to uncertainties such as (Commonwealth Scientific Industrial Research Organisation [CSIRO], 2007):

- *Socio-economic uncertainties associated with the current and future activities of humans, which affect the development of greenhouse gas and aerosol emission scenarios.*
- *Uncertainties associated with our understanding of how the Earth's major biophysical systems behave and how they are represented in climate models.*
- *Uncertainties regarding the assignment of probability distributions to regional climate change projections.*
- *Uncertainties associated with projecting climate change at small spatial scales, particularly for coastal and mountainous areas.*

Climate Change Projections for Australia

In Australia, the climate is projected to become warmer and drier. By 2030, warming (for mid-range emissions) is projected to be about 1 degree Celsius (°C) over most of Australia, with slightly less warming in some coastal areas, and slightly more warming inland (CSIRO, 2007). By 2070, annual average temperatures are projected to increase by 1.8° to 3.4°C with spatial variations similar to those for 2030 (*ibid.*) depending on the emission scenarios examined. Substantial increases in the frequency of days over 35^{o}C and fewer frosts are likely (*ibid.*).

Sea level is projected to rise by 18 to 59 cm by 2100, or 2.0 to 7.0 cm per decade, as a result of global warming (CSIRO, 2007). Sea-level rise will have impacts on soft sediment shorelines and intertidal ecosystems, which will be especially vulnerable to change with additional impacts from extreme events. The interaction of severe weather events, such as tropical cyclones, with the coastal ocean has the potential to generate severe waves and storm surge, which in turn can have significant impacts on the coast. Warmer ocean waters and sediment transport following heavy rainfall will affect fisheries and coastal ecosystems (CSIRO, 2007).

Climate change may result in changes to rainfall patterns, run-off patterns and river flow. High emission scenario projections for annual average rainfall in Australia for around 2050 and 2070, relative to 1990 include (CSIRO, 2007):

- in southern areas (-20% to +0% by 2050 and -30% to +5% by 2070);
- in central, eastern and northern areas (-20% to +10% by 2050 and -30% to +20% by 2070);
- decreases are most pronounced in winter and spring;
- some inland and eastern coastal areas may become wetter in summer, and some inland areas may become wetter in autumn; and
- where average rainfall increases, there are predicted to be more extremely wet years and where average rainfall decreases there would be more dry spells.

Higher temperatures are likely to increase evaporation (CSIRO, 2007). When this is combined with the projected changes in rainfall, there would be a decrease in available moisture (*ibid*.).

A 2°C rise in temperature in Australia would be likely to have a number of negative environmental impacts such as the regular bleaching of near-shore coral reefs and a reduction in the total area in which some plants and animals naturally occur, particularly in the Southern Alps (NSW Greenhouse Office, 2005).

Climate change has been identified as one of numerous pressures on the world's wildlife. Research shows that it has led to approximately 25% of the world's mammals and 12% of birds being at significant risk of extinction (AGO, 2005). Some species have migrated both pole-wards and to high elevations to escape warmer conditions. A study of the likely impact of climate change on flora and fauna concluded that minimal climate-warming scenarios for 2050 could lead to extinction of approximately 18% of species (*ibid*.). Mid-range and maximum warming could lead to extinction of 24% and 35% of species respectively by 2050 (*ibid*.). Australian research has predicted that the bio-climates of some species of plants and vertebrates will disappear with a warming of just 0.5 to 1.0°C (AGO, 2005).

Climate Change Projections for NSW

From 1950 to 2003, the NSW annual mean maximum temperature rose 0.15°C/decade and the NSW annual mean minimum temperature rose 0.19°C/decade. There has been an increase in hot days (35°C or more) of 0.10 days per year, an increase in hot nights (20°C or more) of 0.26 nights per year, a decrease in cold days (15°C or less) of 0.22 days per year and a decrease in cold nights (5°C or less) of 0.29 nights per year (Hennessey *et al*., 2004).

Projections of climate change in NSW were undertaken for the NSW Government by the CSIRO and Bureau of Meteorology, and are reported in the NSW Greenhouse Plan. It was concluded that without action to limit global greenhouse gas emissions, NSW can expect:

- a warming of between 0.2 to 2.1°C over the next 3 decades (with the greatest rise in spring and summer) and a warming of 0.7 to 6.4°C by 2070; and
- a general tendency for decreasing annual average rainfall, particularly in spring and particularly in south western NSW (Hennessey *et al*., 2004).

In parts of NSW, some agricultural and forestry activities may benefit from small temperature and carbon dioxide increases, because of the improvements in plant growth that may result. However, most changes in average and extreme climate are expected to have negative impacts on natural ecosystems, water resources, primary industries, human health and settlements (Hennessey *et al*., 2004).

Hotter, dry conditions are likely to put crops under greater heat and water stress. Rivers are likely to decline, making irrigation less reliable and shrinking natural wetlands. Rising temperatures will reduce the available habitat for alpine species such as the Mountain Pygmy Possum (Hennessey *et al*., 2004).

Major storms may become more common over much of NSW which may lead to an increased risk of damage to buildings, bridges and power lines. In the coastal zone, these storms may combine with the rise in the sea level to worsen coastal erosion, damaging beaches and improvements. Bushfires are likely to become more frequent and intense. Human health also faces risks, with warmer temperatures increasing the risk of infectious diseases, food poisoning and mosquito-borne diseases (Hennessey *et al*., 2004).

Potential Impacts of Project Greenhouse Gas Emissions on the Environment

As described above, increased greenhouse gas levels have the potential to alter the interaction amongst climate variables such as cloud cover, rainfall, wind patterns, ocean currents, sea levels and the distribution of plant and animal species.

The Project greenhouse gas emissions would make some contribution to global emissions as described above. Measures to minimise greenhouse gas emissions from the Project are described below.

The potential effects of climate change on the nature and extent of the Project potential impacts has also been considered including those relating to groundwater (Appendix B), surface water (Appendix C), aquatic ecology (Appendix D) and terrestrial flora and fauna (Appendix G), as described below.

The Groundwater Assessment (Appendix B) indicates the Project is likely to have a negligible incremental effect on baseflow and that the anticipated climate change effects on baseflow in the Woronora Special Area are far greater than any changes in baseflow induced by mining (i.e. by more than two orders of magnitude). The Surface Water Assessment (Appendix C) indicates that climate change would produce more pronounced seasonal patterns of runoff in the region with increasing amounts of runoff occurring in the summer and less in the autumn, winter and spring. Relative to the current streamflows, which are more winter dominated, this might lead to a more uniform pattern of flows through the year (*ibid*.).

Overall there would also be a tendency for reduced overall streamflow but with an increase in larger flow events in summer. These effects would occur irrespective of any effects of longwall mining in the catchment (Appendix C).

Longwall mining is predicted to have localised effects on pools and the frequency of interconnected flows between pools. A climate change induced decrease in annual average rainfall and rainfall frequency has the potential to result in a reduction in low flow persistence, an increase in the frequency of low pool water levels and a reduction in inter-pool connection (*ibid*.). The predicted small increase in summer rain and rainfall intensity might increase low flow persistence in summer which is likely to be the currently dominant time for low pool water levels and loss of inter-pool connection (Appendix C).

Climate change induced reductions in winter and spring rainfall would be expected to result in a significant change to the flow regime irrespective of any mining impacts (*ibid*.). As a result, the potential direct effects of the Project on riparian vegetation, which are expected to be minor and limited in extent, are unlikely to significantly exacerbate the expected effects of climate change (Appendix G).

The distribution of most species, populations and communities is influenced by climate (NSW Scientific Committee, 2000a). Human-caused Climate Change is listed as a key threatening process under the TSC Act and *Loss of Climatic Habitat Caused by Anthropogenic Emissions of Greenhouse Gases* is listed as a key threatening process under the EPBC Act. Many species would be adversely affected unless populations were able to move across the landscape (DECC, 2008c).

Species with long generations, poor mobility, narrow ranges, specific host relationships, isolate and specialised species and those with large home ranges are considered to be particularly at risk (Hughes and Westoby, 1994). All vertebrate species operate within given tolerances being physiologically adapted to for example a particular temperature range (Appendix G). If tolerances are exceeded then fauna will seek to re-locate, possibly cease reproduction, and in some cases likely respond adversely with a resulting increase in mortality in various age groups. More vagile species may be able to move to more suitable locations and others could respond by changing their behaviour, for example spending longer periods sheltering in shady habitats that also help to minimise moisture loss (Appendix G).

The likely impacts of climate change on vertebrate species are difficult to predict. However, it is likely that a significant number of species could be physiologically stressed with variable adverse outcomes that are likely to be highly species specific and likely to be much greater than the predicted impacts of the Project (Appendix G).

Project Measures for Energy Efficiency

HCPL would assess and implement, where practicable, energy and greenhouse management initiatives during the various phases of the Project. Some of the opportunities available to HCPL for improving energy efficiency and reducing greenhouse emissions from the Project are:

- regular on-site energy audits to optimise energy efficiency and minimise energy consumption;
- consideration of energy efficiency in plant and equipment selection/purchase (e.g. fuel efficient vehicles and air-conditioning/ refrigeration unit energy ratings);
- avoiding unnecessary usage of high energy consuming plant and equipment items;
- minimising operation interruptions (i.e. start-up/shutdown);
- consideration of energy efficient lighting (e.g. automatic luminosity control and avoiding use of non-essential lighting);
- regular maintenance of plant and equipment to minimise fuel consumption and associated emissions; and
- installation of solar-powered monitoring equipment and other instrumentation where practicable.

An Energy Savings Action Plan (Energetics, 2007) has been prepared for the Metropolitan Colliery, which identifies opportunities to reduce energy use and greenhouse intensities on-site. As a result, HCPL are currently implementing measures to address energy use at the Metropolitan Colliery including:

- the introduction of energy savings targets;
- the implementation of operating procedures for energy intensive processes/equipment;
- documenting energy use;
- maintaining a register of energy savings opportunities;

- incorporating regular reviews of the energy cost-saving programme; and
- increasing staff awareness of site energy issues.

HCPL would prepare and implement an Energy Plan as a component of the Energy Savings Action Plan to further improve energy performance and management systems for the Project having regard to the *Guidelines for Energy Savings Action Plans* (NSW Department of Energy, Utilities and Sustainability [DEUS], 2005) (Section 6).

Considerations of potential ESD implications of climate change are included where relevant in Section 3.9.3.

3.9 PROJECT JUSTIFICATION

3.9.1 Scale and Development Profile of the Project

Mine planning is a structured process designed to take into account aspects and issues that may influence a potential mining operation. Aspects vary from safety, resource recovery, potential environmental impacts, potential hazards to the mining operation, methods of mining, mining rates, equipment requirements and the economics of the mining operation (MineCraft Consulting, 2008).

The extent of the Project is determined by the location of the resource with constraints then imposed by the presence of surface features, and engineering, safety and geological considerations.

Analysis undertaken by HCPL to determine the optimum production level for the Project indicated that ROM coal production rates above 4 Mtpa were not considered feasible, primarily due to observed spatial limitations at the highly constrained Metropolitan Colliery Major Surface Facilities Area, as well as other mining, supporting services and economic limitations.

The Project optimum ROM coal production rate is estimated to be approximately 3 Mtpa, with a 24 hours per day, 7 days per week operation. The provisional mine schedule is presented in Section 2.5.1.

3.9.2 Consideration of Project Alternatives

Project Location

The location of the Project is primarily defined by the existing Metropolitan Colliery and the remaining Bulli Seam coal reserves in CCL 703 and adjacent lands (i.e. CCL 724, MLA 1 and MLA 2). Given these constraints, the location of the Project is not considered to be an alternative that requires further consideration. Alternative mine designs (i.e. layout within the Project Underground Mining Area) are discussed below.

Mining Method

The Metropolitan Colliery currently employs conventional longwall underground mining methods to extract coal from the Bulli Seam (Section 2.1). The Bulli Seam at the Metropolitan Colliery could not be mined by open cut mining methods given the depth of the seam and would not be compatible with the primary existing landuse in the Project Underground Mining Area, which is water supply catchment and conservation. Open cut mining was therefore not considered to be an option for the Project.

While bord and pillar mining is an underground mining technique that can be viable for some shallow coal seams, it is now uneconomic in Australia to use bord and pillar mining as the primary production method at depths from the surface that are greater than about 200 m (DoP, 2008). Longwall mining is recognised as a safer mining method compared with bord and pillar. As stated above, the depth of the Bulli Seam in the Project area is generally more than 400 m from the surface.

In addition, the SCPR (DoP, 2008) stated:

> *Safety, productivity and cost considerations dictate that longwall mining is now the only major, viable, high production mining method in the majority of Australian underground coal mines that operate at a depth of greater than about 300 m and in virtually all new coal mines (irrespective of depth).*

This is also considered to be the case at the Metropolitan Colliery.

HCPL has examined the current longwall mining production rates and capacities and identified that improvements to underground production rates can be made with upgrades and replacement of components of the mining and materials handling chain. These upgrades are described in Section 2.4.

The current longwall panel void width at the Metropolitan Colliery is 163 m (including adjoining gateroads), and this is considered to be one of the narrowest panel widths in the Australian underground coal mining industry (MineCraft Consulting, 2008). New longwalls are commonly being specified for 300 m wide panels and up to 400 m wide (*ibid.*).

Increasing the longwall panel width was considered as a component of the Project, however, this was discounted on the basis of managing potential subsidence effects (*ibid*.) and DSC constraints within the Woronora Notification Area. Consequently, the predicted potential subsidence effects are generally expected to be less than impacts that would occur if much wider longwall widths, typical of current practice, had been adopted (Appendix A).

Proposed Mine Plan and Orientation

As part of the typical mine plan development, the following process of analysis is generally adopted (HCPL, 2008a):

- conceptual mine planning study;
- pre-feasibility study;
- feasibility study;
- final feasibility study;
- commitment to proceed;
- construct; and
- commission.

This process is being implemented by HCPL for the Project.

At the conceptual mine planning study stage, engineering decisions are broad (i.e. open cut versus underground mine), as too are associated risk assessments. At the pre-feasibility planning stage, numerous mine plans are considered including different mining extraction methods (e.g. longwall versus bord and pillar extraction) and mine layouts. At this planning stage, “fatal flaw” risk assessments are undertaken in parallel with mine design studies (HCPL, 2008a).

As part of the mine design studies for the Project, mining engineering considerations include the following (HCPL, 2008a):

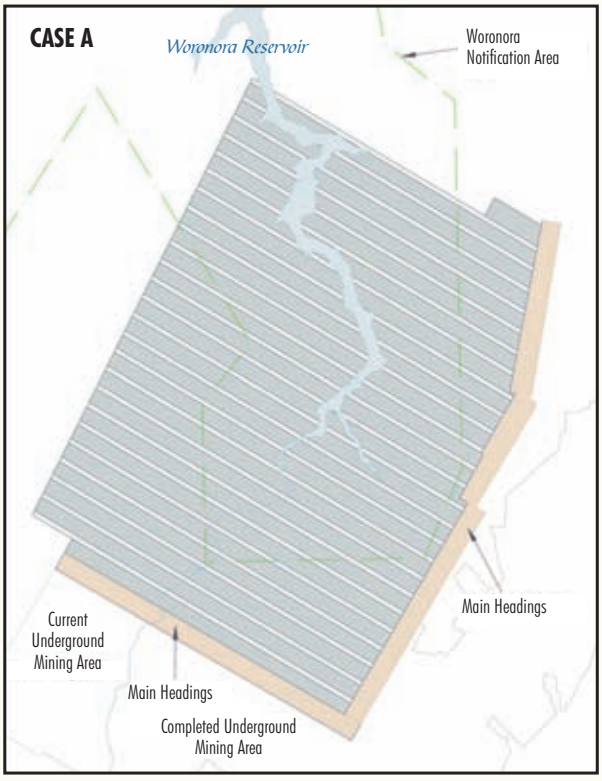
- men and materials management (i.e. ingress and egress from the underground mining areas);
- ventilation (i.e. management of various gas levels underground);
- ground control (i.e. geotechnical stability and characteristics of the underground mining area); and
- coal haulage (including optimisation of roadway development to extraction ratio).

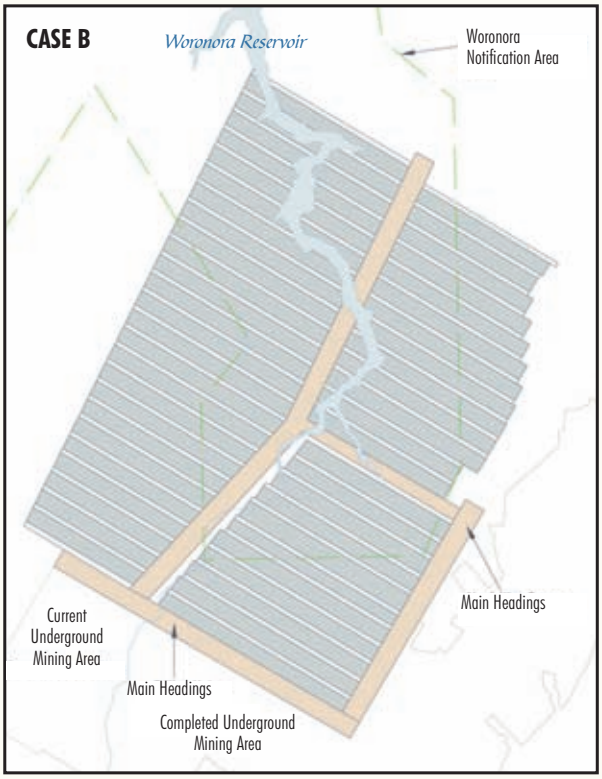
Potential mining hazards are identified as part of the risk assessments during the pre-feasibility planning stage (e.g. seam gas, outbursts, inrushes, spontaneous combustion). Comparisons of mine layout options designed to meet the requirements of the relevant mine design guidelines (e.g. DSC Guidelines – Sections 2.5.2 and 3.3.2) are then undertaken.

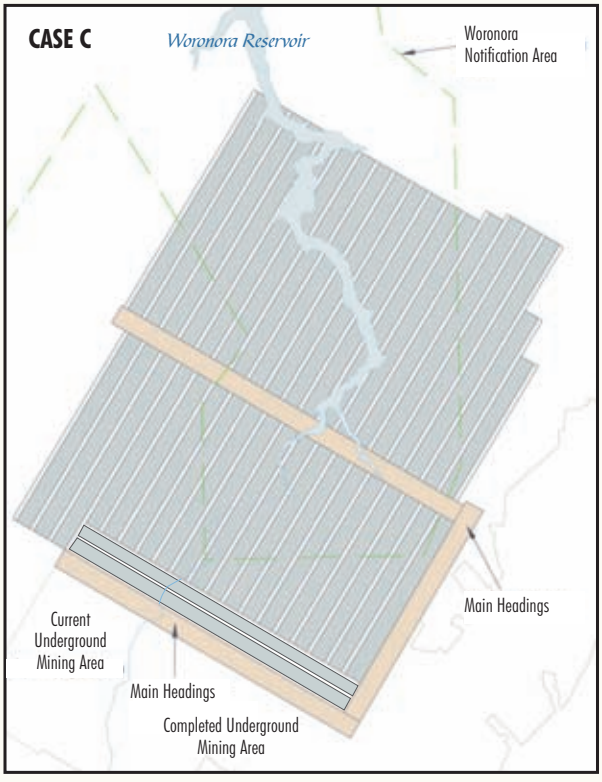
In addition to the above mining engineering considerations as part of the pre-feasibility and feasibility level studies, the application of environmental constraints to minimise or avoid potential impacts is also considered. An iterative approach is required in this regard as the environmental assessment process and ultimately any conditions of Project Approval inform the extent of environmental constraints.

The above process resulted in the voluntary exclusion of a large area located to the east of the F6 Southern Freeway and beneath the Garawarra State Conservation Area. This decision resulted in the voluntary exclusion of approximately 3.4 Mt of ROM coal from the Project Underground Mining Area.

In late 2007, HCPL conducted a detailed consideration of a selection of mine layout options for the Project. Based on the underground mining experience gained from over 100 years of mining, management of gas/ventilation and hauling of coal at the Metropolitan Colliery, three alternative mine orientation layout cases (A, B and C), were selected. Each layout case had several options of longwall panel arrangements. These options are listed in Table 3-5 and shown on Figure 3-2 (HCPL, 2008a).







METROPOLITAN COAL PROJECT

FIGURE 3-2
Mine Plan Orientation
Alternative Layouts

ResourceStrategies

HELENSBURGH COAL PTY LTD

Table 3-5
Alternative Mine Orientation Layout Options

Case	Option	Description
A – East-West Orientation (Mains in East)	1	Full Extraction (as shown on Figure 2-1)
	2	475 m stand-off each side of Waratah Rivulet
	3	100 m void/100 m chains full length of longwall panels
	4	90 m void/110 m chains within 700 m of Waratah Rivulet
B – East-West Orientation (Mains under Waratah Rivulet)	1	Full Extraction
	2	475 m stand-off each side of Waratah Rivulet
	3	100 m void/100 m chains full length of longwall panels
	4	90 m void/110 m chains within 700 m of Waratah Rivulet
C – North-South Orientation (Mains in Central Area)	1	Full Extraction
	2	475 m stand-off each side of Waratah Rivulet
	3	475 m stand-off (some panels East-West)
	4	100 m void/100 m chains full length of longwall panels

Source: HCPL (2008a)

In each case Option 1 was full extraction and Options 2 to 4 were alternative minimisation scenarios for the Waratah Rivulet that had approximately the same environmental outcome (i.e. potential upsidence and closure magnitudes at Waratah Rivulet) (Table 3-5). This allowed options to be analysed and ranked based on mine engineering, economics and safety performance. The analysis eliminated those options not within the practical constraints of mine engineering considerations and ranked the remaining options based on the relative economic benefits.

Ranking of each of these options by HCPL and a review conducted by MineCraft Consulting (2008) used both reserve extraction and development ratio as key indicators. Reserve extraction reflects the effective utilisation of the resource (a benefit to the State of NSW) while development ratio can be considered as an indicator of the cost of mining (MineCraft, 2008). In both comparisons, the East-West Orientation was considered to be superior (*ibid.*).

HCPL's comparative analysis of the East-West orientation options resulted in the selection of the Case A (East-West Orientation) as suitable for further consideration in this EA.

The comparative analysis was presented to the EWG (Section 3.5.3) for the Project and it was agreed that:

- the Case A (East-West Orientation) was appropriate for the purposes of undertaking environmental assessment particularly as it provided greater flexibility for "adaptive management"; and
- the DoP advised the EA should focus on the assessment of environmental impacts of the Case A (East-West Orientation) mine plan.

The Case A (East-West Orientation) is considered the preferred mine layout option for the Project due to its ability to both accommodate and adapt to various environmental drivers, and still maintain favourable reserve recovery and development ratios (MineCraft, 2008).

Subsequent to the selection of the Case A (East-West Orientation), HCPL identified that control measures were required for the management of potential subsidence effects on longer building structures at the Garrawarra Centre (Section 4.9 and Appendix A). HCPL has committed to suitable performance criteria for these buildings in the Project Statement of Commitments (Section 6). Detailed mine design in the vicinity of the Garrawarra Centre would be constrained by these criteria. It is estimated that this would result in the sterilisation of a significant quantity of coal.

In addition to the above, consideration of alternative mine designs to avoid or minimise potential impacts on Waratah Rivulet, Aboriginal heritage sites, upland swamps, EECs, cliff lines and steep slopes was undertaken. Further detail is provided in Appendix A (Subsidence Assessment) and below.

Avoidance and Minimisation Options Considered for the East-West Mine Plan Orientation

As stated in the SCPR, the high capital cost of a longwall face installation and an almost total dependency for production at any one time on a single longwall panel, make the viability of longwall mining very sensitive to interruptions in production (DoP, 2008). In order to ensure production continuity, the driveage of each set of gateroads needs to commence at least 12 to 18 months ahead of when extraction of the associated longwall panel is scheduled to begin. If the sequence of longwall panels is interrupted, then two new sets of gateroads have to be developed in order to re-establish the longwall operations, which in itself can take many months (*ibid*.).

A complete change in longwall layout typically requires a lead time of at least 3 years if continuity of longwall productivity is to be maintained (DoP, 2008). Given the large capital costs involved and contract sales commitments associated with a longwall operation, lack of longwall continuity can quickly result in the operation becoming economically unviable (*ibid*).

Given the above, it is essential that the potential need for changes in longwall layout to avoid or minimise subsidence effects on surface features is considered as part of the initial mine plan development. This allows for informed changes to the mine plan from the outset and/or for adaptive management planning to be put into place well in advance so as to minimise interruptions to production.

MSEC (2008) considered the potential for the Project to avoid subsidence effects on a range of surface features (Appendix A). For the purpose of this consideration, avoidance is defined as management measures that are assessed as providing certainty that no environmental impact would occur.

The evaluation of environmental impact avoidance scenarios indicated that in order to avoid potential impacts to Waratah Rivulet; steep slopes and cliff lines; upland swamps; EECs; and/or Aboriginal heritage sites, no economic mine plan would be available to HCPL in the Project Underground Mining Area (Appendix A).

This is effectively the “do nothing” scenario. Under this scenario the potential environmental effects assessed in this EA would not occur and the economic and social benefits (Sections 3.9.5 and 4.13) would not be realised.

Hence, the following discussion focuses on the consideration of impact minimisation options. For the purpose of this consideration, minimisation is defined as management measures that are assessed to very significantly reduce the risk of damage to a particular natural or man-made feature.

In order to consider the coal sterilised with various impact minimisation scenarios for key surface features, MSEC evaluated mine layout alternatives to the A1 mine plan option described above (Table 3-5 and Figure 3-2). Features for which this was considered in the vicinity of the Project Underground Mining Area included (Appendix A):

- Waratah Rivulet;
- steep slopes and cliff lines;
- upland swamps;
- EECs; and
- known Aboriginal heritage sites.

As described above, the Garrawarra Complex performance criteria were also developed by MSEC for the Project and have been adopted by HCPL (Sections 4.9 and 6).

The EWG (Section 3.5.3) advised HCPL that consideration of avoidance and minimisation measures for the Project should focus on the Waratah Rivulet.

Valley closure (herein referred to as “closure”) is defined as the reduction in the horizontal distance between the valley sides, and is expressed in units of millimetres (MSEC, 2008). Closure predominantly results from the re-distribution of and increase in the horizontal stresses around the collapsed zones above extracted longwalls coupled with failure of the rocks in the base of the valley (MSEC, 2008).

Closure predictions provide a measure of the potential subsidence effects on watercourse incised valleys (e.g. Waratah Rivulet).

The potential to minimise impacts to Waratah Rivulet was considered by an iterative process of applying incremental setbacks and then calculating the potential maximum closure. A series of 50 m increments from the Waratah Rivulet were applied to determine the setback required to achieve a 200 mm upper bound closure target (Table 3-6). A target of 200 mm was selected on the basis of previous analysis undertaken by subsidence specialists MSEC which indicated that a total closure of 200 mm or less would minimise the potential for draining of pools due to cracking of rock bars. Under this scenario, some cracking would still occur but MSEC consider that the likelihood of such pools draining would be low.

Table 3-6
Summary of Predicted Maximum Upsidence and Closure*

Offset Distance from Waratah Rivulet	Maximum Cumulative Upsidence (mm)	Maximum Cumulative Closure[1] (mm)	Maximum Total Closure[2] (mm)
0 m	495	519	589
50 m	435	458	533
100 m	374	407	482
150 m	316	365	450
200 m	265	326	448
250 m	221	292	446
300 m	182	261	444
350 m	156	233	442
400 m	139	209	441
450 m	124	188	440
500 m	110	171	439

After: Appendix A

[1] Maximum cumulative closure due to the extraction of Longwalls 20 to 44 only.

[2] Maximum total closure due to the extraction of Longwalls 20 to 44 plus Longwalls 1 to 19A.

On the basis of this analysis, MSEC concluded that a longwall setback of greater than 500 m would be required to reduce the maximum total closure to 200 mm within the subject reach of Waratah Rivulet (Appendix A). However, the subsidence effects of previously extracted Longwalls 1 to 19A result in an exceedance of the 200 mm total closure along Waratah Rivulet even with a constant 500 m offset across Longwalls 20 to 30 (Table 3-6). To account for the above, a variable analysis was then undertaken with larger longwall setback distances (i.e. approximately 800 to 1,000 m) for Longwalls 20 and 21 and smaller setbacks for the remaining Longwalls 22 to 30. The results of this scenario estimated an *in-situ* tonnage of sterilised coal along the Waratah Rivulet similar to the above analysis (Appendix A).

In addition to the above analyses, MSEC has also considered options whereby longwall setbacks are designed to reduce the predicted maximum total closure to 200 mm at rock bars WRS5, 6, 7 and 8 only. This analysis is presented in Appendix A. This scenario was considered on the basis that rock bars WRS5, 6, 7 and 8 are the larger of those present in the subject reach of Waratah Rivulet (Figure 5-1).

The adoption of a 500 m setback would have a number of potential environmental benefits. These include reduced potential for:

- cracking in the bed of Waratah Rivulet resulting in increased diversion of surface flow as underflow;
- short-term and localised effects on water quality where such underflow returns to the stream downstream of mining;
- localised impacts on surface stream flow persistence and affects on pool levels associated with subsidence induced rock bar leakage; and
- localised impacts on aquatic ecology associated with the above described impacts on streams and aquatic habitats.

Notwithstanding the above, a 500 m setback would still result in some subsidence effects to Waratah Rivulet. Subsidence effects to the remainder of the Project Underground Mining Area (i.e. outside of the 500 m setback area) would generally be similar to that which would occur without a setback.

The adoption of such a 500 m setback to reduce valley closure effects on the Waratah Rivulet would also have significant economic costs. In order to evaluate the potential economic benefits and costs of adopting the 500 m setback, Gillespie Economics (Appendix M) conducted a marginal trade off analysis.

This analysis indicates that level of setback would have a number of economic costs and benefits relative to the full extraction scenario. Economic benefits of not mining this portion of the mine reserve would include (Appendix M):

- operational cost savings;
- reduced sustaining capital costs associated with a reduction in the mine life;
- reduced costs associated with stream remediation works;
- reduced greenhouse gas emissions (i.e. less drainage of coal seam gases); and
- slightly earlier realisation of any benefits associated with the sale of HCPL land holdings.

Economic costs of not mining this portion of the mining reserve would include:

- additional capital costs;
- additional labour costs (more staff required to implement intra-panel longwall changes);
- additional costs of relocating longwalls around the area of coal not mined under the Waratah Rivulet; and
- lost revenue to HCPL.

The estimated net quantified cost of a 500 m setback is $114 million (M) (Appendix M). This can be considered a threshold value and the opportunity cost to society of adopting such a 500 m setback (Appendix M). Interpreted another way, the environmental benefits of a 500 m setback would need to be valued at greater than $114M to make such a setback desirable from an economic efficiency perspective (Appendix M).

To put this into a regional context, this is equivalent to each household in the Illawarra region having a willingness to pay over $720 to avoid the predicted impacts on the Waratah Rivulet.

HCPL is seeking Project Approval for full extraction, as described in Section 2.

Coal Reject Management Strategy

All coal rejects produced by the Metropolitan Colliery CHPP are currently transported by road from the Metropolitan Colliery to the Glenlee Washery for disposal (Section 2.1.6). This involves the movement of haulage trucks via the public road network to Glenlee Washery (Figure 1-1). This route includes the town of Helensburgh.

As a component of the Project, annual coal reject production would increase proportionally as the ROM coal production rate increases (Table 2-5). The total amount of coal reject produced over the life of the Project would exceed the current approved capacity of the Glenlee Washery (Section 2.8).

Over a period of approximately 18 months, HCPL investigated an extensive range of coal reject management options including:

- increased road transport of coal reject to the Glenlee Washery (i.e. to exhaust the available capacity more quickly);
- development of alternative off-site coal reject disposal facilities, with associated road or rail haulage;
- development of various on-site (surface) coal reject emplacements, including construction of the full capacity of the approved Camp Gully coal reject emplacement;
- transport of coal reject off-site by road or rail for use as a ceramics industry feedstock;
- a range of on-site underground reject disposal methods, including:
  - filling abandoned underground workings by injection of a reject slurry from a network of surface boreholes;
  - production and disposal of a reject paste in obsolete workings or headings via a system of retreating pipelines;
  - development of specific fit-for-purpose voids underground for the disposal of coal reject as a paste, slurry or solid;
  - transport underground by vertical shaft and mechanical placement in obsolete headings or workings;
  - production and injection of a reject paste into the goaf behind the longwall machine as a component of the on-going mining operation together with injection of reject paste into obsolete workings;
- reject beneficiation to recover saleable thermal coal product from coal reject and hence reduce the amount of coal reject requiring on-site or off-site disposal; and
- continued road transport of coal reject to the Glenlee Washery, capped at the existing maximum annual rate.

Increased road haulage to the Glenlee Washery was considered feasible, however the approved capacity at the Glenlee Washery would not accommodate all of the Project coal rejects. HCPL discounted this option as it considered the associated increase in truck movements through Helensburgh to be unacceptable.

A number of the above options were sub-optimal with respect to confidence in their on-going feasibility (e.g. filling abandoned underground workings by injection of coal reject slurry from a network of surface boreholes).

Some of the above options were sub-optimal with respect to the level of surface disturbance required or access to available land was limited (e.g. surface injection of coal reject slurry or extensive new surface coal reject emplacements).

The development of specific fit-for-purpose voids underground for the disposal of coal reject as a paste, slurry or solid was discounted by HCPL as it would result in coal sterilisation and would have very high development costs.

Disposal of coal rejects via vertical shaft to the underground for disposal in obsolete headings or workings is considered feasible, but only as a supplementary strategy due to the relatively small potential coal reject storage capacity.

The above coal reject management options were considered with respect to comparative cost, coal resource sterilisation potential, engineering feasibility, and development timing (AWA, 2007).

As a result of this analysis, HCPL adopted a combined coal reject management approach that incorporated a number of elements for the Project, comprising:

- continued road transport and emplacement at Glenlee Washery (annual road movements capped at the existing maximum rate);
- installation of a beneficiation circuit at the CHPP to reduce coal reject production;
- underground coal reject goaf injection on-site;
- utilisation of a small area adjacent to the proposed Coal Reject Paste Plant within the Major Surface Facilities Area for a short-term coal reject stockpile while the underground injection systems are being developed; and
- disposal of coal rejects via vertical shaft to the underground workings for disposal in obsolete workings.

Further description of the coal reject management and disposal measures that have been adopted for the Project is provided in Section 2.8.

Road Transport of Coking Coal to Corrimal and Coalcliff Coke Works

A small proportion of the product coal (i.e. less than 10%) produced by the Metropolitan Colliery is trucked via the public road system to the coke works located at Corrimal and Coalcliff (Figure 1-1 and Section 2.1.5). The majority of product coal is transported by rail to Port Kembla.

Consideration was given to whether alternative transport modes to these coke works were available, including utilisation of the rail network. This included consideration of the building of additional rail infrastructure and a combination of railing the product coal to Port Kembla, unloading and trucking the coal north to the Corrimal Coke Works. Initial feasibility evaluation undertaken by HCPL indicated that these options would not be economically viable.

Given that road transport was considered to be the most feasible method for continuation of coal transport to the Corrimal and Coalcliff coke works, consideration was given to whether the current transport routes to these coke works were using the most environmentally acceptable route. Masson Wilson Twiney concluded that the existing routes to the Coalcliff and Corrimal coke works were more acceptable with regard to environmental impacts than the alternative routes that were identified (Appendix L).

Importantly, the Project does not involve any change to the current maximum annual truck movements associated with the transport of product coal to the Corrimal and Coalcliff coke works (Section 2.7.1).

Electricity Supply

While the potential electricity requirements of the Project have been estimated (Section 2.4.4), the final electricity demand would be determined as a component of the Project final detailed design.

When electricity upgrade requirements (i.e. additional surface and underground electricity demands) have been defined, HCPL would consult with electricity suppliers with respect to supply options and how these requirements may be incorporated with any general electricity supply upgrades that may be required in the Helensburgh area.

Any additional electricity transmission lines (overhead or buried) and electrical switchyards that may be required in support of the Project (or more general supply upgrades in the region) and are located outside of the Metropolitan Colliery Major Surface Facilities Area and Project surface ventilation installations, are not included as part of the Project or assessed in this EA.

3.9.3 Ecologically Sustainable Development Considerations

Background

The concept of sustainable development came to prominence at the World Commission on Environment and Development (1987), in the report titled *Our Common Future*, which defined sustainable development as:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

In recognition of the importance of sustainable development, the Commonwealth Government developed a National Strategy for Ecologically Sustainable Development (NSESD) (Commonwealth of Australia, 1992) that defines ecologically sustainable development (ESD) as:

> *using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.*

The NSESD was developed with the following core objectives:

- enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- provide for equity within and between generations; and
- protect biological diversity and maintain essential processes and life support systems.

In addition, the NSESD contains the following goal:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

In accordance with the core objectives and a view to the achieving this goal, the NSESD presents private enterprise in Australia with the following role:

> *Private enterprise in Australia has a critical role to play in supporting the concept of ESD while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy.*

Australia's commitment to the principles of ESD is considered in the EPBC Act, which defines principles of ESD:

> *(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
>
> *(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
>
> *(c) the principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
>
> *(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
>
> *(e) improved valuation, pricing and incentive mechanisms should be promoted.*

For the purposes of this EA, the relevant definition of ESD is that in section 6(2) of the *Protection of the Environment Administration Act, 1991*, which is the definition adopted by the EP&A Act. This definition provides as follows:

> *Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:*
>
> *(a) the precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.In the application of the precautionary principle, public and private decisions should be guided by:*
>
> *(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
>
> *(ii) an assessment of the risk-weighted consequences of various options.*
>
> *(b) inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*

(c) *conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*

(d) *improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:*

(i) *polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*

(ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*

(iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Ecologically Sustainable Development Assessment

Project design, planning and assessment have been carried out applying the principles of ESD, through:

- incorporation of risk assessment and analysis at various stages in the Project design and environmental assessment and within decision-making processes;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders; and
- optimisation of the economic benefits to the community arising from the development of the Project.

Assessment of potential medium and long-term impacts of the Project was carried out during the preparation of this EA on aspects of surface water and groundwater, transport movements, air quality emissions (including greenhouse emissions), noise emissions, aquatic and terrestrial ecology, coal reject management, heritage and socio-economics.

The Project design takes into account biophysical considerations, including the principles of ESD as defined in section 6(2) of the *Protection of the Environment Administration Act, 1991*.

In addition, it can be demonstrated that the Project can be operated in accordance with ESD principles through the application of mitigation and management measures to minimise environmental impacts of the Project.

The following subsections describe the consideration and application of the principles of ESD to the Project.

Precautionary Principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account, especially in relation to threats of irreversible environmental damage.

A PHA (Appendix N) and ERA (Appendix O) were conducted to identify risks and develop appropriate mitigation measures and strategies. The PHA considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events).

The ERA addressed potential environmental impacts associated with the Project, including long-term effects. In addition, long-term risks are considered by the specialist studies conducted in support of this EA (Section 1.3). For example, in the Socio-Economic Assessment (Appendix M), risk and uncertainty have been taken into account through sensitivity testing. Findings of these specialist assessments are presented in Section 4 and relevant appendices. Measures designed to mitigate potential environmental impacts arising from the Project are also described in Section 4.

The specialist assessments, PHA and ERA, have evaluated the potential for harm to the environment associated with development of the Project. A range of mitigation measures have been adopted as components of the Project design to minimise the potential for serious and/or irreversible damage to the environment, including the development of environmental management and monitoring programmes, compensatory measures and ecological initiatives (Sections 4 and 5). Where residual risks are identified, contingency controls have been considered (Sections 4 and 5).

In addition, for the key Project environmental assessment studies (i.e. Surface Water Assessment [Appendix C], Aquatic Ecology Assessment [Appendix D], flora components of the Flora and Fauna Impact Assessment [Appendix G], and Aboriginal Cultural Heritage Assessment [Appendix H]), peer review by recognised experts (Dr Walter Boughton [Appendix C], Dr David Goldney [Appendices D and G], and Mr Robert Gunn [Appendix H]) was undertaken. In addition, the Groundwater Assessment (Appendix B) was prepared by Dr Noel Merrick, who is a recognised expert who has previously been commissioned by the DoP for independent expert panels.

As described in Section 3.7.2, HCPL would continue to undertake geological investigations such as long in seam drilling to identify geological features that may be of relevance to Project subsidence predictions and potential environmental impacts as a component of the on-going mining operation. These investigations would help to manage the risk of unexpected outcomes in regard to surface water and/or groundwater potential impacts and therefore increase the level of certainty that predictions of environmental impacts would not be exceeded.

The adaptive management approach with respect to the management of subsidence effects on the Waratah Rivulet, which provides for the implementation of additional response and contingency measures (e.g. altering the mine layout in the vicinity of Waratah Rivulet) in the event that the impacts being observed are trending towards exceeding those predicted (Section 5), also provides increased certainty that the environmental outcomes predicted in this EA would be achieved.

Social Equity

Social equity is defined by inter-generational and intra-generational equity. Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations, while intra-generational equity is applied within the same generation.

The principles of social equity are addressed through:

- assessment of the socio-economic impacts of the proposal, including the distribution of impacts between stakeholders and consideration of the potential socio-economic costs of climate change (Appendix M);
- management measures to be implemented in relation to the potential impacts of the Project on water resources, land resources, noise, air quality, ecology, transport, hazards and risks, greenhouse gas emissions and socio-economics (Section 4);
- implementation of environmental management and monitoring programmes (Section 4) to minimise potential environmental impacts (which include environmental management and monitoring programmes covering the Project life); and
- implementation of compensatory measures and ecological initiatives during the life of the Project to compensate for potential localised impacts that have been identified for the development (Sections 4 and 5).

In particular, the Project would benefit current and future generations through the maintenance of employment (continued direct employment of 320 staff and on-site contractors at the Metropolitan Colliery for approximately 23 years and up to an additional 50 people during Project construction over a period of five years). Continued flow-on employment effects in the Illawarra Region would also continue to be significant (Appendix M).

Consideration of the economic benefits potentially forgone if the Project does not proceed amounts a net production benefit of approximately $592M, and a net benefit of approximately $436M (Appendix M).

The Project incorporates a range of environmental management and mitigation measures to minimise potential impacts on the environment and the costs of these measures would be met by HCPL. These costs have been included in the economic assessment, the potential benefits to current and future generations have therefore been calculated in the context of the mitigated Project.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or ‘biodiversity’ is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species as well as diversity of ecosystems (Lindenmayer and Burgman, 2005). For the purposes of this EA, ecological integrity has been considered in terms of ecological health and ecological values.

The Project site has recognised ecological values, which include the presence of threatened flora and fauna species as well as Endangered Ecological Communities (EECs) (Sections 4.6 and 4.7). The environmental assessments in Sections 4.5 to 4.7 (and Appendices D and G) describe the potential impacts of the Project on the biological and ecological environment.

Greenhouse Gas Emissions and Biological Diversity and Ecological Integrity

The effects of global warming are tangible in Australia as well as internationally, as described in Section 3.8. Natural ecosystems are considered to be vulnerable to climate change. Patterns of temperature and precipitation are key factors affecting the distribution and abundance of species (Preston and Jones, 2005). Projected changes in climate will have diverse ecological implications. Habitat for some species will expand, contract and/or shift with the changing climate, resulting in habitat losses or gains, which could prove challenging, particularly for species that are threatened.

Human-caused Climate Change is listed as a key threatening process under the TSC Act and Loss of Climatic Habitat Caused by Anthropogenic Emissions of Greenhouse Gases is listed as a key threatening process under the EPBC Act.

In making its final determination to list anthropogenic climate change as a key threatening process, the NSW Scientific Committee (2000a) found that:

1. The distribution of most species, populations and communities is determined, at least at some spatial scale, by climate.
2. Climate change has occurred throughout geological history and has been a major driving force for evolution.
3. There is evidence that modification of the environment by humans may result in future climate change. Such anthropogenic change to climate may occur at a faster rate than has previously occurred naturally. Climate change may involve both changes in average conditions and changes to the frequency of occurrence of extreme events.
4. Response of organisms to future climate change (however caused) is likely to differ from that in the past because it will occur in a highly modified landscape in which the distribution of natural communities is highly modified. This may limit the ability of organisms to survive climate change through dispersal (Brasher and Pittock, 1998; AGO, 1998). Species at risk include those with long generations, poor mobility, narrow ranges, specific host relationships, isolate and specialised species and those with large home ranges (Hughes and Westoby, 1994). Pest species may also be advantaged by climate change.

Measures to Maintain or Improve the Biodiversity Values of the Surrounding Region

A range of mitigation, management and monitoring measures would be implemented for the Project to maintain or improve the biodiversity values of the surrounding region in the medium to long-term, as described below.

Weeds and pests can impact on biodiversity in the Project area and in the surrounding region. Weed and pest management measures would be implemented to minimise the potential introduction or spread of weeds and pests and are described in Sections 4.6.3 and 4.7.3. In addition, financial contributions would also be made to weed control programmes for weeds such as Pampas Grass, African Love Grass, Lantana, African Boxthorn, Bridal Veil Creeper, Prickly Pear, Onion Grass and Blackberry within the Woronora catchment and/or other SCA controlled catchments.

Financial contributions would also be made by HCPL to pest control programmes for pests such as the Red Fox, European Rabbit, Feral Deer, Feral Pig and Feral Cat within the Woronora catchment and/or other SCA controlled catchments. The weed and pest control measures described above would maintain or improve biodiversity in the surrounding region.

Plant and animal pathogens can also impact on biodiversity. Infection of native plants by *Phytophthora cinnamomi* and infection of frogs by amphibian chytrid causing the disease Chytridiomycosis are listed as key threatening processes under the TSC Act and EPBC Act.

Management measures would be implemented to minimise the risk of the introduction or spread of *P. cinnamomi* and the chytrid fungus, and in doing so would minimise the introduction or spread of these diseases in the surrounding region. These management measures are presented in Sections 4.6.3 and 4.7.3, respectively.

High frequency fire has the potential to impact on biodiversity by reducing vegetation structure and resulting in a corresponding loss of animal species. High frequency fire is listed as a key threatening process under the TSC Act. A range of management measures would be implemented for the Project to minimise the risk of bushfire and in doing so, would maintain or improve the biodiversity values of the surrounding region. These measures are described in Sections 4.1 and 4.15.

A range of vegetation management measures would be implemented for the Project to minimise impacts on flora, fauna, and their habitats. For example, consistent with HCPL's existing approach, surface works would, where practicable, be sited to minimise the amount of vegetation clearance required. Project rehabilitation works would include activities that are to be undertaken progressively (e.g. rehabilitation of minor disturbance areas associated with exploration activities) and that would be undertaken at the cessation of the Project (e.g. the rehabilitation of the Major Surface Facilities Area). Section 5 presents HCPL's rehabilitation plan for the Project. Implementation of measures to minimise impacts on flora, fauna and their habitats would assist in maintaining or improving the biodiversity values of the surrounding region.

The Garawarra State Conservation Area is located within the CCL 703 and immediately east of the F6 Southern Freeway (Figures 1-1 and 1-2). Longwalls 20 to 44 are situated immediately to the west of the F6 Freeway and longwall mining would not occur beneath the Garawarra State Conservation Area. Surface activities and works would not occur within the Garawarra State Conservation Area. Further, the boundaries of the proposed underground mining areas and surface works are well outside of the adjacent Royal National Park. The potential direct (e.g. subsidence) and indirect (e.g. introduction or spread of weeds) impacts associated with the Project are very unlikely to impact on flora or fauna species diversity in the Royal National Park or Garawarra State Conservation Area.

Section 5 presents HCPL's restoration trials and proposed approach to stream restoration of subsidence effects on key stream features in the Project area. The Project would not result in a measurable change in downstream water quality in the Woronora Reservoir or Hacking River catchments (Gilbert and Associates, 2008). HCPL would operate at the Metropolitan Colliery Major Surface Facilities Area in accordance with the requirements of EPL No. 767 which regulates the controlled discharge of treated water to Camp Gully. It is also anticipated that augmentation of the Major Surface Facilities Area for the Project would improve water management at the site. As a result, the habitat or lifecycle of native species and the biodiversity values associated with downstream waterways would be maintained.

Other measures would be implemented to maintain the biodiversity values of the surrounding region. For example, dust controls would be employed at the Major Surface Facilities Area to minimise potential impacts on surrounding vegetation.

A financial contribution would be made by HCPL towards rehabilitation works within the Woronora catchment and/or other SCA-controlled catchments to maintain or improve the biodiversity values of the surrounding region.

A financial contribution to research programmes designed to improve the knowledge and understanding of impacts of underground mining and the rehabilitation of natural features, that have the potential to assist mining projects in the surrounding region:

- A financial contribution to research of techniques for remediating stream bed cracking, including crack network identification and monitoring techniques. This may include research on various technical aspects of remediation, as well as research comparing the outcomes of interventionist remediation with natural processes of remediation.
- A financial contribution to research of the prediction of non-conventional subsidence effects in the Southern Coalfield and their impacts and consequences for significant natural features, particularly in respect of valley closure, upsidence and other topographic features.

These compensatory measures and ecological initiatives are summarised in Table 3-7 below.

Table 3-7
Metropolitan Coal Project Compensatory Measures and Ecological Initiatives

Compensatory Measure or Ecological Initiative	Comment	Financial Contribution
Research Programmes		$250,000
• Research into subsidence effects on streams.	Consistent with SCPR.	
• Research on techniques for remediating stream bed cracking, including:	Consistent with SCPR Recommendation 14.	
- Crack network identification and monitoring techniques.		
- Technical aspects of remediation, such as matters relating to environmental impacts of grouting operations and grout injection products, life spans of grouts, grouting beneath surfaces which cannot be accessed or disturbed, techniques for the remote placement of grout, cosmetic treatments of surface expressions of cracks and grouting boreholes.		
• Research comparing the outcomes of interventionist remediation with natural processes of remediation.	Consistent with SCPR.	
• Research into the refinement of the prediction of non-conventional subsidence effects in the Southern Coalfield and the link to environmental effect. This would focus on valley closure and upsidence mechanisms.	Consistent with SCPR Recommendation 17.	
	Sub-total Contribution	**$250,000**
Catchment Condition Work		$50,000/year for life of Project
• Financial contribution towards rehabilitation and revegetation works within the Woronora catchment and/or other SCA controlled catchments. This would include Project management services as required.	Catchment residual impact offset.	
• Pest Control	Biodiversity initiative.	
- Financial contribution to pest control programmes for pests such as the Red Fox, European Rabbit, Feral Deer, Feral Pig and Feral Cat within the Woronora catchment and/or other SCA controlled catchment.		
• Weed Control	Biodiversity initiative.	
- Financial contribution to weed control programmes for weeds such as Pampas Grass, African Love Grass, Lantana, African Boxthorn, Bridal Veil Creeper, Prickly Pear, Onion Grass and Blackberry within the Woronora catchment and/or other SCA controlled catchment.		
	Subtotal Contribution	**$1,150,000**
Total HCPL Contribution		**$1,400,000**

Valuation

One of the common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations.

In the past, some natural resources have been misconstrued as being free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of the environment, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environment considerations in decision making, as required by ESD.

While historically, environmental costs have been considered to be external to project development costs, improved valuation and pricing methods attempt to internalise environmental costs and include them within project costing.

The Socio-Economic Assessment (Appendix M) undertakes an analysis of the Project and attempts to incorporate environmental values via direct valuation where practicable (e.g. greenhouse gas emissions of the Project) or indirectly via the threshold value method, where the trade-off between net production benefits and environmental impacts is considered. Furthermore, wherever possible, direct environmental effects of the Project are internalised through the adoption and funding of mitigation measures by HCPL to mitigate potential environmental impacts (e.g. stream restoration costs).

Greenhouse gases directly generated at the Project (i.e. Scope 1 emissions) on average are estimated at 262,931 t CO_{2-e} per year (Appendix K). Indirect emissions associated with the on-site use of fuel and electricity (i.e. Scope 2 and Scope 3 emissions) are estimated on average to be 147,752 t CO_{2-e} per year (Appendix K). The EA also contains an assessment of the greenhouse gas emissions which may be emitted by other parties from off-site transport of coal reject, transport and use of the product coal that is produced by the Project in accordance with the requirements of the EARs. The average lifetime indirect (i.e. Scope 3) emissions from these activities are estimated to be 8,079,938 t CO_{2-e} per year (Appendix K).

The benefit cost analysis in Appendix M indicates a net production benefit of approximately $592M, and a net benefit of approximately $436M would be forgone if the Project is not implemented. Any residual environmental impacts of the Project after mitigation would need to be valued higher than $436M, to make the Project undesirable from an economic efficiency perspective (Appendix M).

3.9.4 Consideration of the Consistency of the Project with the Objects of the EP&A Act

The EARs (Section 1.2) require consideration of the consistency of the Project with the objects of the EP&A Act. Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development, and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The Project is considered to be generally consistent with the objects of the EP&A Act, because it is a Project which:

- incorporates:
  - measures for the management and conservation of resources including water and natural areas (Sections 4.3 to 4.7);
  - development of the State's mineral resources (i.e. coal resources);
  - measures to minimise potential amenity impacts associated with the Major Surface Facilities Area in the township of Helensburgh (Sections 4.10 to 4.12);
  - significant continued employment and other socio-economic benefits to the community (Sections 4.13 and 4.14);
- includes the economic use and development of land, while maintaining key existing landuses including water catchment and nature conservation at the Project Underground Mining Area and would maintain the operation of the existing Metropolitan Colliery;
- incorporates measures to manage and protect the existing communication and utility services in the region that may potentially be subject to Project mine subsidence effects;
- includes measures to minimise potential amenity impacts (e.g. air and noise emissions) on public land in the vicinity of the Major Surface Facilities Area;

- would support the on-going provision of community services and facilities through significant contributions to State royalties, State taxes, Commonwealth tax revenue and any applicable Section 94 contributions (Sections 4.13, 4.14 and 3.2.6);
- incorporates a range of measures for the protection of the environment, including the protection of native plants and animals, threatened species, and their habitats (Sections 4.5 to 4.7);
- incorporates relevant ESD considerations (Section 3.9.3);
- is a Major Project that would be determined by the Minister (Section 3.1), however feedback and consultation with Local Government agencies and Federal Government agencies has been undertaken where relevant (Section 3.5); and
- involves public involvement and participation though both the SCI and the Project EA consultation programme (Section 3.5), which would be on-going following the public exhibition of the EA document and DoP assessment of the Project in accordance with the requirements of the EP&A Act.

3.9.5 Summary Conclusion of the Potential Impacts and Benefits of the Proposal

The EARs for the Project (Section 1.2) require a conclusion, justifying the Project on economic, social and environmental grounds. An assessment of the potential impacts and benefits of the proposal has been conducted in this EA and associated supporting studies. The following subsection provides a brief overview of the findings of this EA.

Consideration of Potential Environmental Impacts, Mitigation Measures and Environmental Management

The EARs for the Project outline key environmental issues which the Director-General of the DoP has specified must be addressed by this EA. Table 1-2 provides a summary of the EARs and a reference to the relevant section of this EA where the issues are addressed.

In accordance with the requirements of the EARs, an ERA has been conducted for the Project (Section 3.6 and Appendix O). The key potential environmental issues identified by the ERA and the section of this EA where the issues are addressed are provided in Table 3-4.

A summary of environmental issues raised during consultation with government and non-government stakeholders and the sections of this EA where they are addressed is provided in Section 3.5.

As described in Section 3.9.3, the Project would be developed and operated in accordance with ESD principles.

Section 4 of this EA provides comprehensive consideration of the potential environmental impacts and environmental mitigation and management measures for the potential impacts of the Project. Section 5 (Rehabilitation) provides a description of the rehabilitation and stream restoration measures that would be employed. A summary of the mitigation measures, environmental management and monitoring programmes is provided in Section 6 (Statement of Commitments).

Consideration of Potential Socio-Economic Benefits

The Project would provide up to 50 direct construction jobs and would continue to provide employment for 320 existing Metropolitan Colliery staff and on-site contractors for the life of the Project.

Employment and expenditure associated with the Project is also predicted to have significant flow-on effects in the regional and NSW economy (Section 4.13). The Socio-Economic Assessment (Appendix M) indicates that the Project is predicted to generate up to 700 direct and indirect jobs in the Illawarra economy and up to 1,951 direct and indirect jobs in the wider NSW economy.

The Socio-Economic Assessment (Appendix M) has indicated the development of the Project would provide a net production benefit of approximately $592M, and a net benefit of approximately $436M would be forgone if the Project is not implemented. These significant economic benefits to Australia (and the State of NSW) would be foregone if the Project does not proceed.