



NSW GOVERNMENT
Department of Planning

MAJOR PROJECT ASSESSMENT: Abel Coal Project



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

June 2007

Cover Photo: Abel Underground Mining Area, Looking south from Donaldson Open Cut Mine

© Crown copyright 2007
Published June 2007
NSW Department of Planning
www.planning.nsw.gov.au

Disclaimer:
While every reasonable effort has been made to ensure that this document is correct at the time of publication, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of this document

EXECUTIVE SUMMARY

Donaldson Coal Pty Limited (the Proponent) proposes to establish a new underground coal mine and associated surface facilities in the Black Hill area, 23 kilometres northwest of Newcastle (see Figure 1). The project would be located primarily within the Cessnock local government area (LGA), but small components would be located in the adjacent Maitland and Newcastle LGAs.

The proposal, known as the Abel Coal Project, involves (see Figure 2):

- extracting up to 4.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal for a period of 21 years, using continuous miners in bord and pillar systems with associated pillar extraction;
- transporting ROM coal from the mine surface facilities to the existing Bloomfield Coal Handling and Preparation Plant (CHPP), initially by truck on internal private haul roads but potentially by a new overland conveyor;
- upgrading and using the Bloomfield CHPP to produce up to 5 Mtpa of product coal;
- transporting product coal from the CHPP to market via the existing Bloomfield rail loading facilities; and
- rehabilitating the mine site.

The new surface facilities would be constructed within the existing open cut of the neighbouring Donaldson Coal Mine and entry to the new underground mine would be through a portal to be constructed in the Donaldson high wall.

The Department publicly exhibited the environmental assessment (EA) of the proposal from 6 October until 9 November 2006, and received 284 submissions including 9 submissions from government authorities and 275 submissions from the general public and special interest groups (230 of which were form letters). All but 6 of the public submissions objected to the Project, with the key grounds for objection relating to:

- subsidence and related impacts on surface water, groundwater, flora and fauna (including rainforests and conservation reserves);
- greenhouse gas emissions from product coal;
- noise and dust impacts from coal handling and transport; and
- limited community consultation by the Proponent.

The Department has assessed the project application, EA, submissions on the Project, and the Proponent's Response to Submissions, and is satisfied that there is sufficient information available to determine the application.

The Abel Coal Project would significantly benefit the regional and State economies. It involves an initial capital investment of \$83.5 million; it would generate extensive export revenue and provide direct employment for around 375 employees for up to 20 years; and it would provide royalties and tax income to Government.

The Project would have a number of environmental impacts, most notably subsidence associated with underground coal mining. However, the Project is based on partial extraction below and adjacent to sensitive surface features, leading to reduced (and controlled) subsidence outcomes.

These low subsidence protocols or commitments are as follows:

- *zero mining impact* – Pambalong Nature Reserve and the F3 Freeway;
- *negligible subsidence impact (by undertaking "first workings" only)* – all "principal residences", Black Hill Public School, the proposed Catholic High School site, Black Hill Church and cemetery, the Boral Hotmix Plant, all Schedule 2 creeks, rainforest areas and the Blue Gum Creek alluvium; and
- *reduced subsidence impact (by limiting coal extraction to 40-60%)* – identified cliff areas.

These low subsidence protocols are significantly in advance of those adopted by many other underground coal mining operations in the State. All other environmental impacts of the Project are limited, largely due to the Proponent's proposals to:

- locate the surface facilities for the Abel coal mine within an existing final void of the nearby Donaldson open cut coal mine;

- wash its coal at the nearby Bloomfield Coal Handling and Preparation Plant (CHPP); and
- dispose of coarse reject and tailings from the Bloomfield CHPP in available underground and open cut voids on the Bloomfield Mine.

Other local environmental impacts of the Project would be limited, and include potential impacts on groundwater, surface streams, overlying farm dams and noise. The Department acknowledges these impacts but is satisfied that they can be adequately mitigated, managed, offset and/or compensated for. It has recommended a range of environmental conditions to ensure this occurs.

The Project would also lead to “downstream” environmental impacts associated with the use of the product coal (ie greenhouse gas emissions associated with burning product coal in other countries). However, the Department considers that the NSW approvals process is not the most effective or appropriate means of reducing global carbon dioxide emissions. To limit approvals of coal mine development in NSW is unlikely to lead to any measurable reduction in global CO₂ emissions.

Finally, the Proponent proposes to integrate the environmental monitoring and management of the Project with the monitoring and management of the adjacent Donaldson, Tasman and Bloomfield Mines. This is considered to be best practice in the mining industry.

The Department has considered the proposal with reference to the objects of the *Environmental Planning & Assessment Act 1979*, including the object to encourage Ecologically Sustainable Development. The Department believes that the Project would lead to significant socio-economic benefits, and that the environmental impacts of the Project would be acceptable and could be successfully managed through conditions and the Proponent’s Statement of Commitments.

The Department therefore considers the Project to be in the public interest, and recommends that it be approved subject to strict conditions of approval.

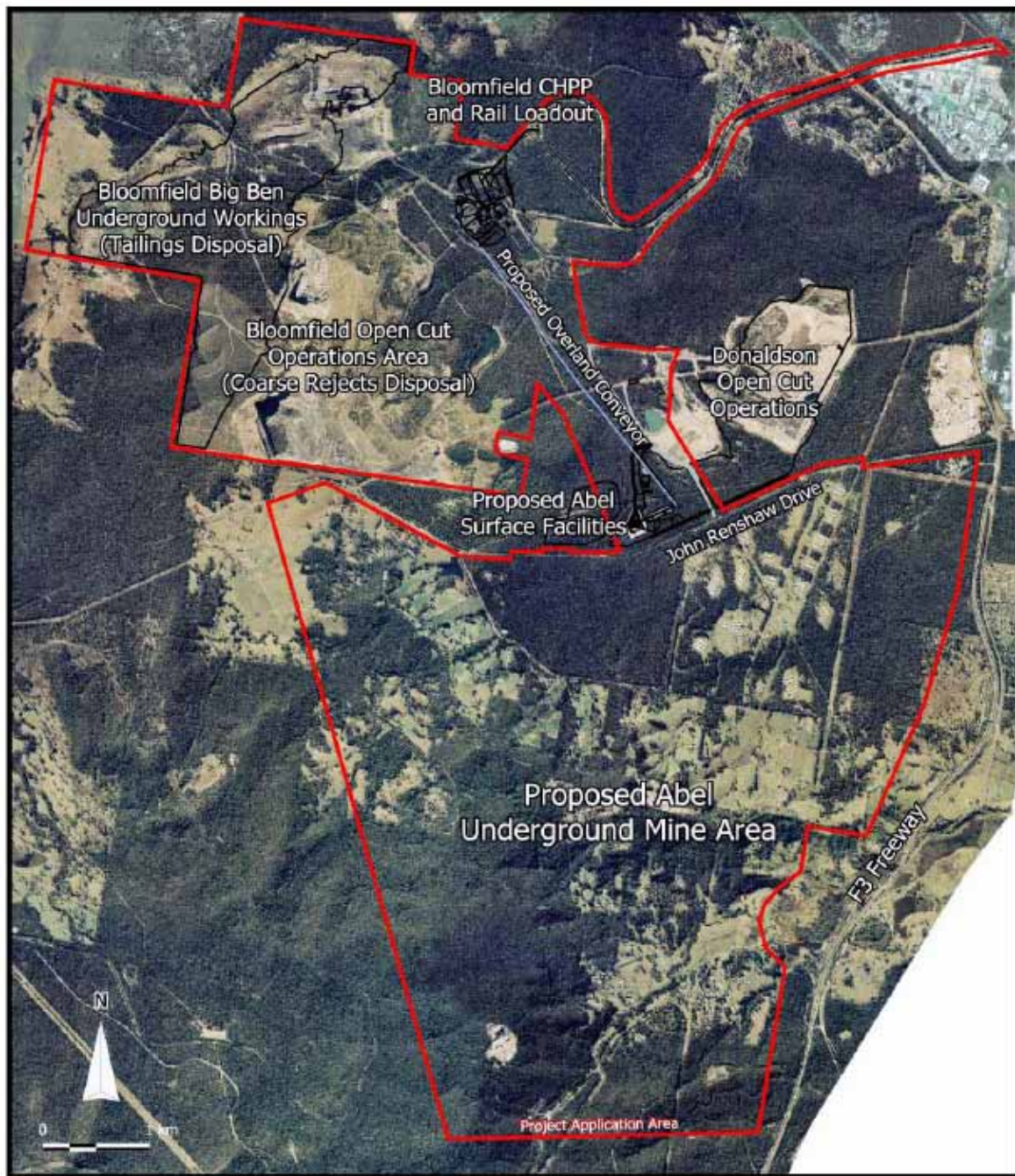
1. PROPOSED PROJECT

1.1 Project Description

Donaldson Coal Pty Ltd (the Proponent) proposes to establish a new underground coal mine, known as the Abel Coal Project, near Maitland in the Newcastle Coalfield. The major components of the Project are summarised in Table 1 and depicted in Figure 2.

<i>Aspect</i>	<i>Description</i>
Project Summary	Construction and operation of an underground coal mine, extracting up to 4.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal for processing and supply to export markets. Construction and operation of mine surface facilities within the existing open cut of the Donaldson Coal Mine.
<i>Mining and Reserves</i>	Extraction from three adjacent groups of mining panels in the Upper Donaldson and Lower Donaldson Seams, using continuous miners in flexible bord and pillar systems with associated pillar extraction. Mineable reserve of 45-55 Mt and an underground mining area of around 2750 hectares.
<i>Project Life</i>	An expected project life of 21 years (from the date of grant of a mining lease), including 20 years of mining.
<i>Coal Production</i>	Abel would produce up to 4.5 Mtpa of ROM coal, which, following washing, would provide up to 3.6 Mtpa of product coal.
<i>Coal Washing</i>	At the existing Bloomfield CHPP, proposed to be modified to allow total processing of up to 6.5 Mtpa. Total product coal from the CHPP would then be up to 5 Mtpa of product coal, a 43% increase on the currently approved limit of 3.5 Mtpa. The project application includes continued use of the CHPP.
<i>Construction</i>	<p>Construction of the Abel mine surface facilities area would be undertaken in 3 stages. The first involves excavation of a box cut for the mine entries, three underground mine access roadways and a ventilation shaft, together with temporary surface facilities and a stack-out conveyor. The second involves construction of permanent surface facilities after blasting has ceased in the Donaldson open cut. The third involves construction of a ROM coal reclaim system and the potential construction of an overland conveyor from the ROM stockpile to the Bloomfield CHPP.</p> <p>Construction of modifications to the Bloomfield CHPP would take place over a period of 12 months, with the start date determined by demand (ie increasing ROM coal output from Abel and the remainder of the Donaldson/Bloomfield mining complex).</p>
<i>Water Demand and Supply</i>	Annual water demand under the “target production” scenario would vary between 2,170 and 3,160 megalitres (ML), or 6 – 8.7 ML per day, mainly for coal processing and dust suppression, for the entire Donaldson/Bloomfield mining complex. The CHPP’s current water demand is around 2,000 MLpa. Water would continue to be sourced primarily from former Bloomfield underground workings and from surface run-off feeding five existing surface storages. Adequate water is available to meet all projected water requirements.
<i>Coarse Rejects and Tailings Management</i>	Coarse rejects from Bloomfield CHPP would continue to be mixed with overburden and placed into mined-out voids. Since 2003, fine tailings have been pumped into the former Bloomfield underground workings. This process would continue. Tailings would also be placed within available mined-out open cut voids at Bloomfield.
<i>Employment</i>	Peak construction workforce of about 70 and peak operational workforce of 375 employees.
<i>Hours of Operation</i>	Operations would take place 24 hours a day, 7 days a week, up to 50 weeks per year.
<i>Construction Hours</i>	Underground construction of the Abel mine would take place 24 hours a day, 7 days a week. Construction of the surface facilities would be undertaken Monday to Friday 7.00 am to 5.00 pm and Saturday 7.00 am to 1.00 pm, and exclude public holidays.
<i>ROM Coal Transport</i>	ROM coal would be transported to Bloomfield CHPP, initially by truck on internal private haul roads but later by a planned new overland conveyor.
<i>Product Coal Transport</i>	Product coal would be loaded onto trains (average of 3 – 6 trains per day) and transported to the Port of Newcastle via the Bloomfield rail loop connected to the Main Northern Railway, operated by Australian Rail Track Corporation.
<i>Mine Access</i>	Access to mine surface facilities via the existing Donaldson mine access road to John Renshaw Drive.

Table 1: Major components of the Abel Coal Project



DONALDSON COAL



**Abel Underground Mine Project
Aerial Site Plan**

Figure 1.2 26/07/2006

Figure 2: Project Layout

1.2 Project Setting

The Project would be located principally within the Cessnock local government area, but small components would be located in the adjacent Maitland Newcastle LGAs.

A key feature of the proposal is that it involves both current and proposed development owned and operated by separate and unrelated companies (Donaldson Coal Pty Ltd and Bloomfield Collieries Pty Ltd). Only one of these companies is shown on the project application as the Proponent (ie Donaldson Coal). However, the two companies are working co-operatively and the project application includes landowner's consent for lodgement from Bloomfield Collieries and related companies. Bloomfield Collieries has also written to the Department indicating its "endorsement and acceptance of all matters discussed in, reported by and proposed under the EA and supporting documents."

While the Abel Coal Project is a new mine proposal, it is associated with two nearby coal mines also operated by the Proponent. The open cut Donaldson Coal Mine has consent to operate until 2012. The underground Tasman Coal Mine was approved in 2004 and has consent to operate until 2025.

The nearby Bloomfield Colliery is owned by Bloomfield Collieries and has been operating since 1937, previously by underground methods but currently by open cut. Coal from Donaldson and Tasman is washed at Bloomfield's Coal Handling and Preparation Plant (Bloomfield CHPP) under a commercial arrangement between Donaldson and Bloomfield Collieries.

In summary, the project application involves:

- a new underground coal mine proposal (the proposed Abel Coal Mine, to be owned and operated by Donaldson Coal);
- continued operation, expansion and modification of existing development (the Bloomfield CHPP, owned and operated by Bloomfield Collieries); and
- linkages between the existing operations of the Donaldson Coal Mine, Tasman Coal Mine, the Bloomfield Coal Mine, the Bloomfield CHPP and the proposed Abel Coal Mine (in particular regarding an integrated monitoring system, integrated water management and tailings disposal).

The Donaldson and Bloomfield operations are increasingly being managed in an integrated fashion and are collectively called the "Donaldson/Bloomfield mining complex" in this report. The Abel Coal Project application area, including the proposed Abel underground coal mine, the Donaldson and Bloomfield Coal Mines and the Bloomfield CHPP, is shown on Figure 1. The Tasman Coal Mine is located off George Booth Drive, southwest of the area shown in Figure 1.

The proposed Abel Coal Mine is located south of John Renshaw Drive in a 2700 ha area of undulating forested hills and valleys, about 30% of which comprises patches of cleared land. The ridgeline associated with Black Hill runs east-west through the proposed underground mine area, with tributaries of Buttai Creek, Viney Creek/Weakleys Flat Creek and Four Mile Creek draining northwards. Long Gully/Blue Gum Creek drains the southern side of the ridgeline eastwards towards Pambalong Nature Reserve. Some limited clifflines and steeper gullies are located along sections of the ridge. Existing surface items in the proposed mine area are shown on Figure 5 and include 110 principal residences, Black Hill Public School, Black Hill Church, a 330 kV transmission line and other lower voltage transmission lines, water pipelines and roads including John Renshaw Drive, Black Hill Road, Dog Hole Road and smaller roads.

The project area north of John Renshaw Drive is within or above the existing Donaldson and Bloomfield mining leases which have, to a significant degree, been already disturbed by mining operations. The nearest significant residential areas are: Ashtonfield (approx. 2.5 km northeast of the Bloomfield CHPP and 1.1 km north of the Bloomfield rail loop), Thornton (approx 5 km northeast of the Bloomfield CHPP) and Beresfield (approx 5 km northeast of the proposed Abel surface facilities).

The Lower Hunter Regional Strategy identifies the project area as forming part of the Watagan to Stockton Green corridor, which are linked areas of high conservation value proposed to establish and maintain key regional wildlife corridors. However, the Strategy also identifies the site as "coal resources" land, in which access to mineral resources should be maintained in order to facilitate their development. The Strategy also states that sustainable use of the Lower Hunter's resources is critical to achieving its objectives. The draft Lower Hunter Regional Conservation Plan is associated with the Strategy. This plan is mainly focused on the interactions between urban development and

conservation, and does not address the potential impacts of coal mines or other major projects. The project proposal is therefore generally consistent with the objectives of the Strategy.

1.3 Project Need and Justification

From the Proponent's perspective, the Project is justified by a combination of coal resource availability and market opportunity over the proposed 21 year life of the mine, coupled with projected costs of extraction which would permit a sufficient profit to be made. From the State's perspective, key benefits from the Project are long-term valuable permanent employment opportunities for approximately 375 people, an initial capital investment of \$83.5 million, flow-on regional economic benefits, and significant royalty and tax income for the Government.

The ultimate need for the Project is driven by international coal demand. World coal demand is projected to increase from around 5,000 Mtpa in 2005 to over 7,000 Mtpa in 2025 (an increase of 41%). The expected output from the Abel coal mine is predicted to be around 0.5% of annual world coal demand in 2025.

2. STATUTORY CONTEXT

2.1 Major Project

The proposal is classified as a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), because it is development for the purpose of coal mining and consequently meets the criteria in clause 5 of schedule 1 of *State Environmental Planning Policy (Major Projects) 2005*.

The Minister for Planning is therefore the approval authority for the Project.

2.2 Permissibility

Under Section 75J of the EP&A Act, the Minister cannot approve the carrying out of a project that would be wholly prohibited under an environmental planning instrument.

The majority of the proposed underground mine and surface infrastructure area is within Cessnock LGA and is zoned 1(a) Rural A under the *Cessnock Local Environment Plan 1989*, which permits underground mining and associated surface activities with consent.

Within Maitland LGA, the rail loop and the northern section of Bloomfield Colliery where tailings may be disposed of is zoned 1(b) Secondary Rural land under the *Maitland Local Environment Plan 1993*, which permits coal freight and mining activities with consent.

The small eastern section of the underground mining area within Newcastle LGA is zoned 7(c) Environmental Investigation under the *Newcastle Local Environment Plan 2003*, which permits underground mining activities with consent. The Newcastle City Council has indicated that it considers the proposal to be consistent with the zone objectives, and therefore to be permissible with consent.

Consequently, the Department is satisfied that the proposal as presented is permissible with consent.

2.3 Exhibition

Under Section 75H(3) of the EP&A Act, the Director-General is required to make the environmental assessment of a project publicly available for at least 30 days.

After accepting the EA for the proposal, the Department:

- made the EA publicly available from 6 October 2006 until 9 November 2006:
 - on the Department's website, and
 - at the Department's Information Centre and the offices of Cessnock City Council, Newcastle City Council, Maitland City Council and the Nature Conservation Council;
- notified relevant State and local government authorities by letter; and
- advertised the public exhibition in the Newcastle Herald and Cessnock Advertiser.

This satisfies the requirements in Section 75H(3) of the EP&A Act.

2.4 Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The Minister's consideration and determination of the project application must be consistent with the relevant provisions of the EP&A Act, including the objects of the Act. The objects of most relevance to the Minister's decision on whether or not to approve the Project are found in Section 5(a)(i),(ii),(vi)&(vii). They are:

"The objects of this Act are:

- (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,*
 - (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"*

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD "requires the effective integration of economic and environmental considerations in decision-making processes" and that ESD "can be achieved through" the implementation of the principles and programs including the precautionary principle, the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity, and the principle of improved valuation, pricing and incentive mechanisms. In applying the precautionary principle, public decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and an assessment of the risk-weighted consequences of various options.

The Department has fully considered the objects of the EP&A Act, including the encouragement of ESD, in its assessment of the project application. The assessment integrates all significant economic and environmental considerations and seeks to avoid any potential serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences. The Proponent has also considered a number of alternatives to the proposed development, including the alternative of not proceeding, and considered the proposal in the light of the ESD principles.

2.5 Environmental Planning Instruments

Under Section 75I of the EP&A Act, the Director-General's report is required to include a copy of or reference to the provisions of any State Environmental Planning Policy (SEPP) that substantially governs the carrying out of the Project.

The Department has considered the proposal against the relevant provisions of SEPPs 11, 33, 44 and 55 and is satisfied that none of these SEPPs substantially govern the carrying out of this project (see Appendix C). The Mining, Petroleum Production and Extractive Industries SEPP 2007 does not apply to the project since the project application was lodged prior to the SEPP's commencement.

2.6 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the environmental assessment requirements with respect to the Project. The Department is satisfied that the environmental assessment requirements have been complied with.

3. ISSUES RAISED IN SUBMISSIONS

During and following the exhibition period, the Department received a total of 284 submissions on the proposal:

- 9 from public authorities;
- 10 from special interest groups;
- 265 from the general public, including 230 form letters.

A summary of the issues raised in submissions is provided below. The views expressed in submissions (both those of public authorities and also key issues raised by the community and special interest groups) are addressed in more detail under section 4 below.

Public Authorities

Section 75I(2)(b) of the EP&A Act requires that the Director-General's assessment report include advice provided by public authorities on the Project. The advice received from public authorities is attached in full in Appendix F, and the key issues they raise are summarised below.

The **Department of Primary Industries** (DPI) does not object to the proposal and made the following key comments:

- there are likely to be uncertainties in predicting and managing subsidence impacts, due to shallow cover depths (in places), interactions between the proposed workings and existing overlying workings (in places) and a wide range of surface stakeholder needs;
- DPI supports the Proponent's pillar extraction mining method, but flexibility in mine planning and layout is considered to be a key risk control measure, necessary to provide appropriate levels of protection to key surface and subsurface features; and
- the Proponent should identify domains and locations where management strategies or flexible mine design may be required for subsidence impact control, and demonstrate strategies to ensure this flexibility.

The former **Department of Environment and Conservation** (now the Department of Environment and Climate Change, DECC) does not object to the proposal and provided a set of recommended conditions of approval for consideration in the assessment. It also provided the following key comments:

- Noise and vibration impacts – DECC concurs with the findings of the Proponent's noise impact assessment. It noted two anticipated exceedances at Location K but considered that these were unlikely to result in a significant impact for a number of reasons;
- Air quality impacts – the EA indicates that predicted PM₁₀ concentrations, TSP concentrations and dust deposition levels are all below the relevant assessment criteria;
- Surface Water Management – the EA predicts that the proposal's water management systems would operate within the discharge and water quality levels specified in the existing environment protection licence (EPL) for Bloomfield Coal Mine. DECC recommends conditions of approval which reflect the current discharge arrangements for Bloomfield and require that details of the proposed sewage treatment system be provided with the EPL application for the Abel project, if approved;
- Threatened species and Endangered Ecological Communities – DECC accepts that it is impossible to quantify the likelihood of subsidence impacts on such features and therefore recommends conditions of approval which require rigorous monitoring and remedial action. DECC does not agree with the EA's findings that there would be no impact on threatened species, since the proposal involves clearing approximately 12.3 ha of native vegetation. DECC recommends further fauna surveys in this area and proposed a vegetation offset of 20 ha. This matter has been addressed in conditions of approval;
- Aboriginal cultural heritage – DECC considers the assessment undertaken to date to be preliminary, and recommends more comprehensive consultation with Aboriginal knowledge holders and a comprehensive archaeological survey. These matters have been addressed in conditions of approval; and
- Integrated environmental monitoring systems – DECC welcomed the Proponent's proposal for the air quality, noise, surface water and groundwater monitoring systems for the existing Donaldson, Bloomfield and Tasman Coal Mines and the Abel proposal to be fully integrated.

The former **Department of Natural Resources** (DNR) did not object to the proposal and indicated that the assessment of anticipated subsidence impacts on surface water bodies was acceptable. DNR requested that conditions of approval for the Abel project address a number of matters, including:

- requirements for licensing of all groundwater works (including those for the three existing mines and the Bloomfield CHPP);
- ongoing review of the integrated water management system for the three existing mines and the Abel proposal;
- development of a groundwater management plan, to be endorsed by DNR, and further development of the groundwater model;
- monitoring of identified high priority ecosystems; such as the Pambalong Nature Reserve, the downstream Hexham Swamps, and rainforests above the mining area; and contingency plans on detection of any unacceptable impacts on these features.

The **Mine Subsidence Board** (MSB) does not object to the proposal and reports that the underground mining area is *not* within a mine subsidence district. The MSB indicates that subsidence impacts on surface structures can be successfully managed and that subsidence damage is automatically covered under the *Mine Subsidence Compensation Act 1961*, providing that surface structures are approved constructions. Detailed assessment of subsidence effects on surface structures must be undertaken by the Proponent during preparation of a Subsidence Management Plan, should the Project be approved.

The **Roads and Traffic Authority** and **Hunter Regional Development Committee** do not object to the proposal. Each proposes that the Proponent be required to upgrade the intersection between John Renshaw Drive and Blackhill Rd and prepare a Construction Traffic Management Plan.

Cessnock City Council does not object to the proposal. However, the Council raised a number of concerns regarding:

- the need for detailed consideration of potential amenity impacts associated with the upgrade and expansion of the Bloomfield CHPP;
- potential subsidence impacts on surface water resources and the Pambalong Nature Reserve and the need for close monitoring of actual impacts;
- potential subsidence impacts on residences and associated structures;
- interrelationships between the development and strategic planning instruments, such as the Lower Hunter Regional Strategy and the Integrated Catchment Management Plan for the Hunter Catchment;
- community consultation; and
- potential traffic impacts.

Maitland City Council does not object to the proposal. The Council raised a number of issues, including the need for:

- the Minister to fully take greenhouse gas implications into account;
- detailed plans of the proposed works at the Bloomfield CHPP;
- further information about construction noise at the Bloomfield CHPP;
- additional noise monitoring for the Bloomfield CHPP and rail load out facility;
- air and water quality monitoring; and
- consideration of the recent Memorandum of Understanding between the State Government and Coal & Allied Industries regarding the conservation values of land overlying part of the underground mining area.

Newcastle City Council does not object to the proposal, which only extends marginally into its LGA. However, the Council draws attention to:

- strategic planning instruments, considering that the proposal is “consistent with” both the Lower Hunter Regional Strategy and the draft Lower Hunter Regional Conservation Plan;
- support for the Proponent’s proposed additional baseline data and monitoring in the Blue Gum Creek Catchment and Pambalong Nature Reserve;
- general acceptance and support of the Proponent’s assessment and proposals regarding air quality, noise impacts, water protection and management, subsidence, integrated monitoring and traffic, with the exception of cumulative noise impacts at Location K; and
- community consultation.

Community and Interest Groups

Of the 275 submissions from the community and special interest groups, 269 (98%) objected to the proposal, 4 (1%) did not object but raised concerns, and 2 (<1%) supported the proposal. 230 (84%) submissions from the community were one or another of two separate form letters, many of which contained additional comments.

Form Letter A (101 submissions) primarily drew attention to the following issues:

- lack of consultation with the East Maitland/Ashtonfield and Thornton communities (generally north of the proposal, but affected by the Bloomfield CHPP);
- potential impacts on these communities (noise, dust, residential amenity and general wellbeing); and
- potential water impacts, particularly associated with expansion of the Bloomfield CHPP and continued disposal of tailings within the former Bloomfield underground workings.

Form Letter B (129 submissions) primarily drew attention to the following issues:

- unsatisfactory community consultation, both in the communities mentioned above and with landholders in the Black Hill, Buttai and Stockrington areas affected by the proposed undermining;
- threats to the overall wellbeing of the community (including semi-rural lifestyles and community identity) and the environment (including the unique features of the Sugarloaf Range and wetlands), as recognised in the Lower Hunter Regional Strategy;
- perceived inadequacies in the EA's assessment of subsidence impacts (on property, dams and other surface water resources, and flora and fauna) and dust and noise pollution; and
- perceived lack of scientific rigour and commitment in the EA, as shown by a subjective risk assessment, inadequate greenhouse gas impact assessment and inadequate response to community concerns.

The main grounds for objection from both individuals and community interest groups were (in decreasing order of mention and including form letters):

- surface water impacts;
- subsidence impacts;
- groundwater impacts;
- air quality and dust impacts;
- lack of community consultation;
- noise impacts;
- greenhouse impacts;
- flora and fauna impacts;
- traffic impacts; and
- cumulative impacts.

The other key issue raised in individual submissions was the relationship with key landholders and land users affected by the proposed undermining (ie Coal & Allied Operations, the Catholic Diocese of Maitland-Newcastle, Boral Asphalt Pty Ltd, Black Hill Quarry and the Black Hill Public School).

4. ASSESSMENT

4.1 Subsidence

The Project would cause subsidence of the subsurface and surface overlying and adjacent to the mining area. This is its most important potential environmental impact, since it could significantly impact on overlying structures (such as the Boral asphalt batching plant, residences and associated structures, farm dams, roads and other infrastructure) and sensitive environments (such as Schedule 2 creeks¹, rainforests and the Pambalong Nature Reserve).

Proposed Mining Method and Mine Layout

The Proponent has sought to significantly limit subsidence impacts through choice of both its preferred mining method and mine layout.

The mining method proposed is a bord and pillar system with varying amounts of secondary (pillar) extraction, using continuous miners. Extraction panels would be approximately 150 metres (m) in width, and of varying length. The solid, barrier panels separating the extraction panels would be 25 m in width. The proposed mining method is referred to as the 'Huff Creek' layout, based on a similar operation in the United States (see the EA's Figures 2.9 and 2.10 for a pictorial representation). This method allows for subsidence impacts to be varied by increasing or reducing the amount of coal extracted in particular areas. The Proponent indicates that this would protect identified surface features from subsidence impacts, or reduce it to specified, manageable levels.

In terms of mine layout, the Proponent has placed priority not on a final, detailed mine plan but on identifying surface features that require protection and the appropriate subsidence outcomes for these features. The EA therefore only contains an indicative mine plan (see Figure 3). The EA indicates that the mine plan is required to be flexible to cater for changing surface and mining conditions. The mine plan provided is sufficient to support a project approval, subject to appropriate conditions.

Extraction is proposed from three adjacent areas of mining panels. Two of these, in the north and central parts of the proposed mining area, are in the Upper Donaldson Seam. The third, to the south, is in the Lower Donaldson Seam. Extraction from both seams is not proposed in any part of the mining area, largely because extraction from the Upper Donaldson Seam is uneconomic in the south due to the seam splitting (and thereby thinning). The proposed mining height would range from 1.8 m to 3.6 m in the Upper Donaldson Seam, and from 1.8 to 3.2 m in the Lower Donaldson Seam. Cover depth for extraction panels varies from as little as 30 – 40 m to as much as 310 m in the Upper Donaldson Seam, and between 180 – 340 m in the Lower Donaldson Seam. The cover depth generally increases towards the southern part of the mine.

Low Subsidence Protocols

The Proponent has also sought to significantly limit subsidence impacts by identifying four different subsidence outcomes. It proposes to tailor the degree of extraction to ensure that these outcomes are achieved. The four outcomes have been applied in the EA to various areas and items within the mining area that require subsidence protection, as identified by the Proponent's impact assessment (see Figure 3).

The four subsidence management outcomes are:

¹ Under the draft guideline *Management of Stream/Aquifer Systems in Coal Mining Developments – Hunter Region* (DIPNR, 2005), Schedule 1 streams are 1st and 2nd order and are usually intermittent, Schedule 2 streams are primarily 3rd and higher order and Schedule 3 streams are major rivers and connected alluvial aquifers.

- **zero mining impact** – achieved by there being *no* underground mining in the area and ensuring appropriate buffers so that nearby mining has no impact on the area or item;
- **negligible subsidence impact** – being 20 mm or less of subsidence (which is considered in the EA to have negligible impact)², achieved by limiting workings to “first workings”³ designed so as to provide no more than 20 mm of subsidence on the surface (generally allowing 20-35% extraction of the seam);
- **reduced subsidence impact** to a set limit – as determined by surface features, achieved by leaving long term pillars and varying the amount of coal extracted by “second workings” to achieve the required surface subsidence (generally allowing 40-60% extraction of the seam); and
- **maximum subsidence** – as provided by total (ie maximum) pillar extraction in a certain area (allowing 70-85% extraction of the seam).

The EA proposes particular circumstances in which the three reduced subsidence outcomes would be applied. These low subsidence protocols or commitments are as follows:

- **zero mining impact** – Pambalong Nature Reserve and the F3 Freeway;
- **negligible subsidence impact** – all “principal residences”, Black Hill Public School, Black Hill Church and cemetery, the Boral Hotmix Plant, all Schedule 2 creeks, rainforest areas and the Blue Gum Creek alluvium; and
- **reduced subsidence impact** – identified cliff areas.

However, the Proponent has indicated in the EA that Schedule 2 creeks, rainforest areas and the Blue Gum Creek alluvium may be moved from “negligible subsidence impact” to “reduced subsidence impact”, should further studies indicate that additional extraction can take place without compromising specified environmental objectives.

The EA concludes that “safe and serviceable” subsidence tolerance limits would be met for all man made surface features by applying these reduced subsidence outcomes as proposed. Each outcome also has additional detailed commitments regarding consultation, preparation of plans and studies, ongoing monitoring and rehabilitation.

Subsidence Management Plans

The EA also reports that a more detailed Subsidence Management Plan (SMP) would be prepared by the Proponent prior to the commencement of mining. This is a requirement of all coal mining leases. The SMP becomes part of the Mining Operations Plan required under the lease. Under DPI’s guidelines, an SMP can be prepared for up to seven years of mining. Consequently, a series of SMPs would be required during the life of the mine.

Each SMP would detail specific subsidence assessment and mitigation measures for individual land parcels to be affected by subsidence during the life of the SMP. It would address all structures on these parcels, such as houses, sheds, dams, fencing, pools, orchards, pipes, electricity lines and roads. The Proponent would develop these specific measures as individual property subsidence management plans, in consultation with the individual landowners, agencies responsible for the management of individual areas and items, and DPI. The Department considers it appropriate that detailed assessment and management of the impacts of subsidence on surface features takes place under DPI’s SMP approval process. That agency has extensive experience and expertise in subsidence assessment and management. The role of the project approval, and therefore the Department’s own assessment, is to set a broad, overall framework for potential subsidence impacts, rather than to manage or condition all potential impacts at the detailed level.

² 20 mm of vertical subsidence is generally considered by subsidence experts to be the lower limit of subsidence usually measurable, due to other causes of surface deformation, such as soil swelling or contraction. Further, 20 mm of vertical subsidence usually results in negligible subsidence impact. The subsidence parameters which are more likely to result in structural damage are tilt and strain.

³ In the context of the Abel Project, “first workings” means bord and pillar extraction and “second workings” means partial or complete extraction of the remaining pillars. See the EA’s Figures 2.9 and 2.10 for a pictorial representation of each. Such first workings generally produce no more than 20 mm of vertical subsidence.

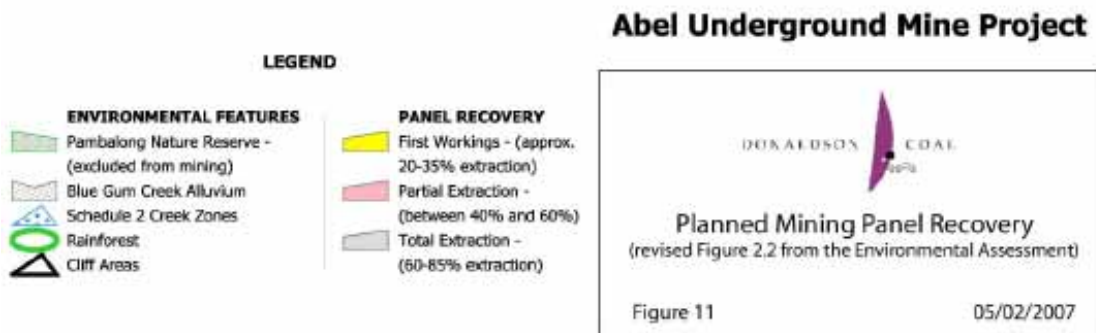
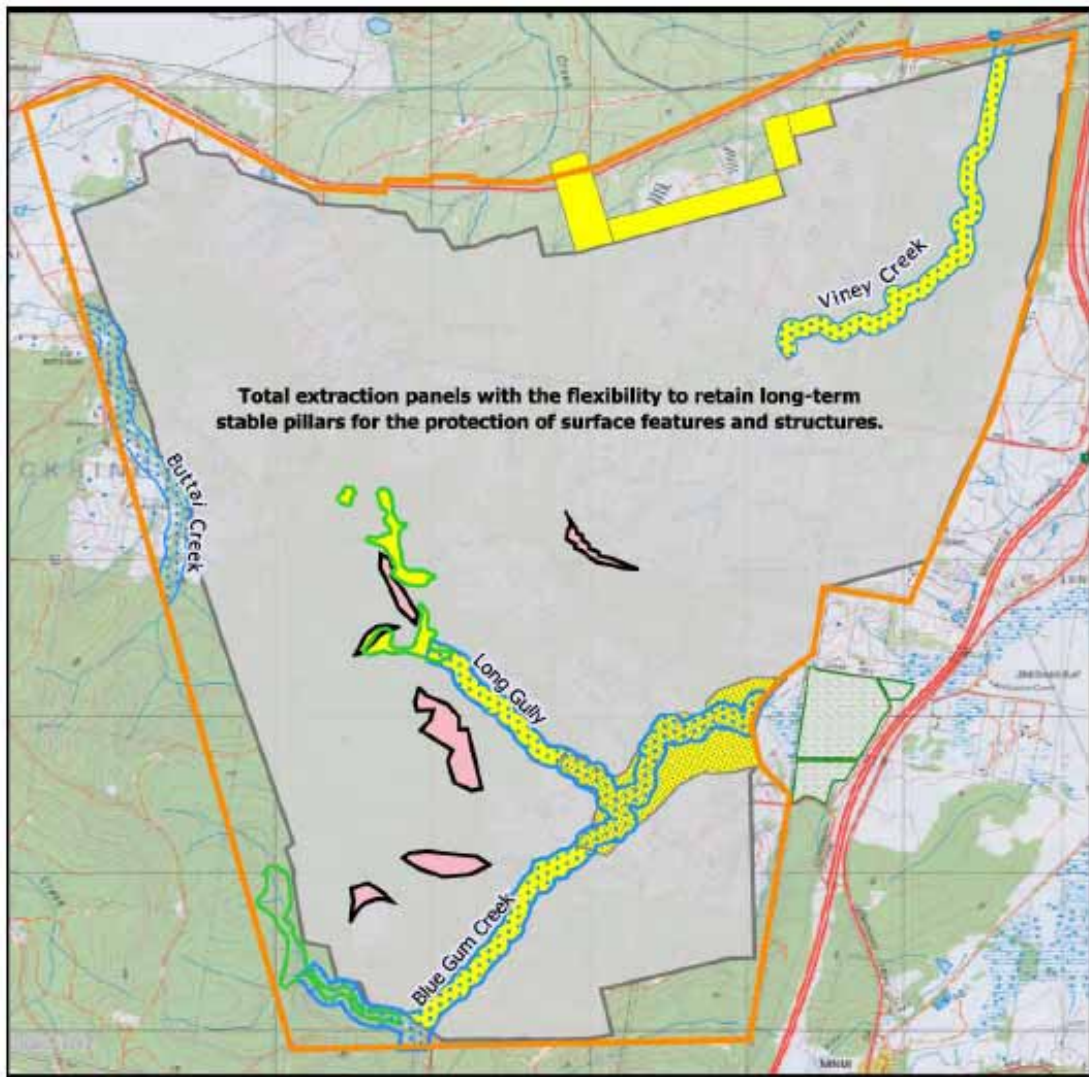


Figure 3: Subsidence Management Outcomes

Subsidence Impact Assessment

The EA contains a Subsidence Impact Assessment (SIA) prepared by Strata Engineering Australia Associates (Appendix E of the EA), which was independently reviewed. Initial subsidence modelling assumed that no surface protection pillars would be left in place throughout the underground mine, in order to determine maximum subsidence scenarios and whether additional subsidence impact controls were required. These maximum subsidence scenarios are shown in Figure 4.

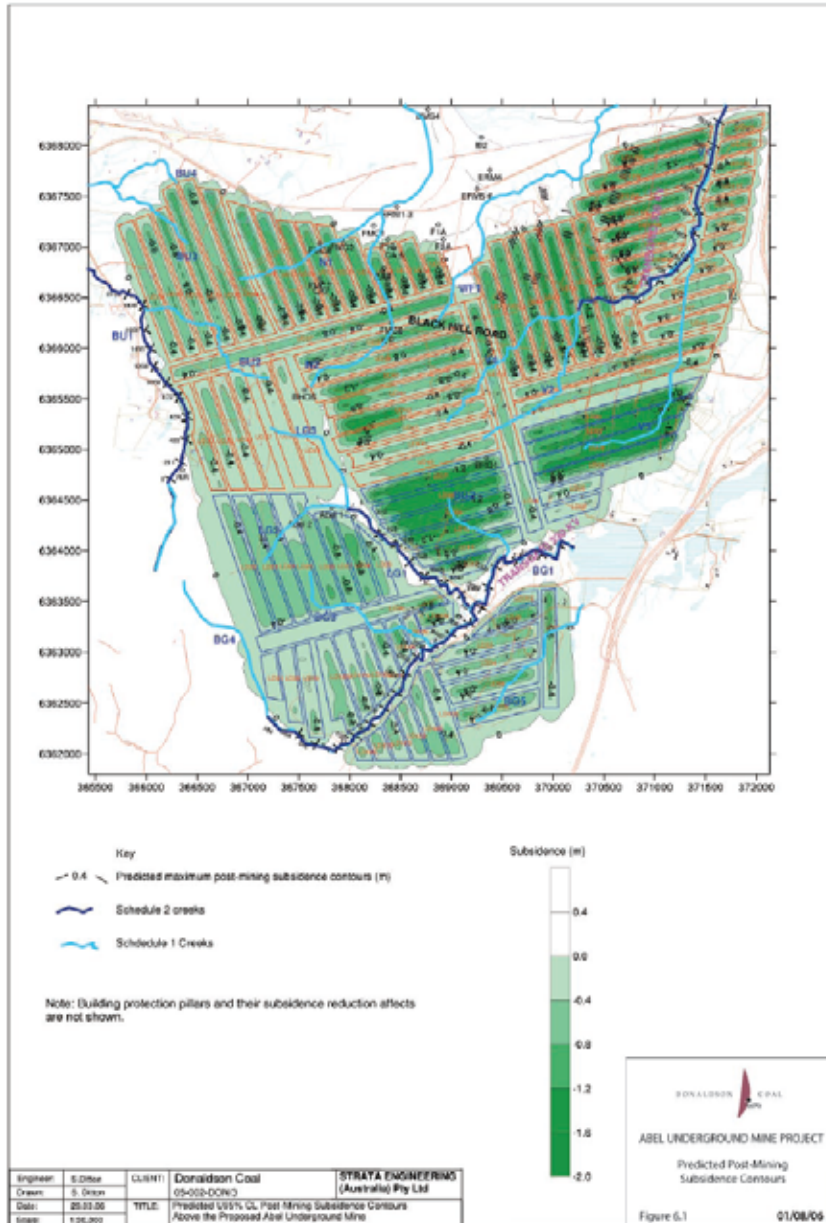


Figure 4: Predicted Maximum Subsidence Contours (with no Protection)

It should be noted that this scenario does not address subsidence associated with first workings proposed beneath the Schedule 2 creeks and the Blue Gum Creek alluvium. It is based on a scenario of total extraction within the indicative panel layout shown on the figure. Maximum final subsidence under this scenario is predicted to vary between 0.5 – 1.8 m above extraction panels of 150 m width, and between 0.09 – 1.02 m across barrier panels of 25 m width. This broad subsidence envelope would then be locally reduced by the leaving of barrier pillars beneath significant surface features.

This broad subsidence envelope could also be locally increased by a variety of geological, geotechnical or mining features. Such geological features include faults, dykes and surface slopes or cliffs. However, the most important and widespread of these features is the existing underground workings on the site (in particular the abandoned Stockrington Colliery workings in the West Borehole Seam in the west and southwest of the site). In this area, increased subsidence due to pillar collapse of standing pillars in the existing workings or re-activation or consolidation of old goafed (collapsed) areas could occur. The EA suggests that additional subsidence could be up to 0.6 m, assuming a mining height of 3 m. Because of this additional (and non-systematic) subsidence, this area would require particular consideration within DPI's Subsidence Management Plan process to predict and control the impacts of subsidence.

A number of impacts on the landscape are predicted in the SIA as potentially occurring in areas of total extraction, with the likelihood of these impacts increasing significantly in areas of low cover depth. Potential landscape impacts are:

- subsurface cracking;
- upsidence and valley bending effects;
- surface cracking;
- ponding;
- scarp development; and
- slope instability and erosion.

The EA indicates that both vertical and horizontal subsurface fracturing would occur above the total extraction panels. Vertical fractures may reach the surface in areas of shallow cover depth (less than 100 m). These fractures may then provide a direct flow-path or hydraulic connection, from either surface waters or subsurface aquifers, to the mine workings.

The protection offered by the Proponent for all Schedule 2 creeks should avoid them being subject to cracking impacts leading to water loss, either to the mine or the subsurface. For areas with Schedule 1 creeks where depth is less than 200 m, the EA predicts that discontinuous subsurface fractures could interact with cracking or existing open joints on the surface. Surface waters in these areas could therefore drain into deeper cracks resulting in a drop in an initial drop in the water table. Over time, the water table would be expected to recover either partially or fully as the new voids became saturated or surface cracks are in-filled with sediment. The presence of coal seams or subsurface aquifers above the workings and within the fracture zone could also lead to de-watering of that aquifer and increased water make in the mine.

Upsidence⁴ and buckling of valley floor strata following total extraction mining is considered by the EA to be a possibility along several creeks and tributaries. Schedule 2 creeks are not expected to be impacted due to the protection proposed. However, Schedule 1 creeks could be impacted by buckling or uplift.

The EA indicates that surface cracking may occur where there is significant bending of stiff surface rocks as the subsidence trough develops. Maximum surface cracking widths of 25 - 280 mm could occur, with the larger cracks in the shallow northern areas. Ponding may occur where low lying areas and watercourses are subject to significant differential subsidence above a total extraction panel, leading to the development of closed form depressions. Post mining subsidence contours indicate that the north-east, north-west and south-east areas of the site are unlikely to be impacted by ponding, except for some limited sections of some Schedule 1 creeks.

⁴ Upsidence is upward, buckling-type movement along stream beds that have been subsided. It is associated with "valley closure", where subsurface mining induces the rapid release of existing high horizontal stresses in the floor of the valley. It can cause significant cracking and heaving of strata in the stream bed, particularly if the bed is composed of medium to thinly bedded sandstone, and consequent loss of surface waters to the underlying strata.

Small surface scarps could potentially develop due to sub-vertical shear failure above the edge of a total extraction panel, if cover depths are less than 80 metres. The EA proposes that in such areas scarp development could be managed by leaving partial extraction zones around the edges of total extraction panels or else repaired by filling cracks with self cementing materials and replacing topsoil.

Localised slope instability and erosion could occur where ground slopes greater than 15° exist, if the slopes are also affected by mining-induced cracking and increased erosion rates.

As indicated above, most of these impacts are much more likely where proposed total extraction coincides with areas of low cover depth. This is particularly the case in the northern part of the proposal, where cover depths are commonly as low as 60 - 80 m, and in places only 30 - 40 m. Around one-sixth of the proposed Abel underground mine area has a cover depth of <100 m. This area is generally confined to the Upper Donaldson Seam workings adjacent to and east of the main headings, close to John Renshaw Drive. The Department considers that the Proponent should pay particular attention to limiting potential surface impacts in parts of the mining area with <100 m cover depth within DPI's Subsidence Management Plan approval process and has proposed a condition to this effect.

Subsidence Impacts on Key Surface Features

Key surface features are shown in Figure 5. Subsidence impacts on these features are dealt with below, with the following exceptions which are dealt with later in this report:

- surface watercourses (ie Schedule 1 and Schedule 2 streams), water supply dams, flooding and groundwater;
- sensitive ecosystems (ie rainforests); and
- Aboriginal heritage sites.

➤ Principal Residences and Associated Buildings

As earlier indicated, the Proponent has committed that each of the 110 Principal Residences (ie an existing building or buildings on a property capable of and being used as a domicile) within the proposed mining area would be protected by establishing "tolerable limits" of subsidence for each residence, in individual subsidence plans of management and monitoring plans. The "tolerable limit" is that level of subsidence which would not lead to any damage to the residence (ie no requirement for any mitigation or repair works).

Principal residences would be protected by leaving barriers or long-term stable pillars beneath the structures with an appropriate angle of draw. Abel's Subsidence Management Plan (see below) would be designed so as to ensure that impacts only occur at these levels. However, the Proponent has also indicated that it would further undermine residences if agreement can be reached with the owner regarding a higher level of impact. The Department considers that this approach is fair to all residents, and the commitment by the Proponent goes beyond existing statutory requirements.

Other structures, such as equipment sheds, driveways, swimming pools, on-site effluent disposal systems, fences and in ground services, would experience impacts from subsidence. However, limiting subsidence below residences such that no mitigation or repair would be necessary would also lessen or avoid subsidence impacts on these structures, if they are close to residences. The Proponent proposes that any such damage which does occur would be compensated through the existing processes of the *Mine Subsidence Compensation Act 1961* (MSCA). As indicated by the Proponent, the MSB has a long history of managing such impacts through various mitigation and remediation measures that ensure that structures either remain safe and serviceable or else are repaired or rebuilt where necessary. Where damage is not compensable under the MSCA (eg in the case of damage to the surface of land, crops, orchard or other trees, pasture, stock, etc), then the "compensable loss" provisions of the *Mining Act 1992* require that the Proponent fully compensate the landowner.

➤ Other Buildings to be Treated as Principal Residences

The Proponent has committed that the Black Hill Public School (and grounds), Black Hill Church (and adjacent cemetery), the disused Anglican cemetery off Lings Road, and the Boral Hotmix Plant would be treated as "Principal Residences".

➤ Catholic Diocese Lands

The Catholic Diocese of Maitland-Newcastle is a substantial owner of lands in the northern part of the proposed underground mine area. The church proposes to develop a school for 800-1000 pupils on part of this 300 ha parcel of land, with the remainder to be developed as “employment lands”, in accordance with the Lower Hunter Regional Strategy. Both the Proponent and the Diocese have committed to work collaboratively. A key element of this collaboration is that the area proposed for the school would be identified in early 2007 and any mining would be planned to facilitate the construction and protect the building, either by excluding the nominated site from undermining or by priority access and vacation of the nominated site, allowing for construction of the school to be undertaken in 2009-10. The Diocese has requested that this agreement be reflected in approval conditions.

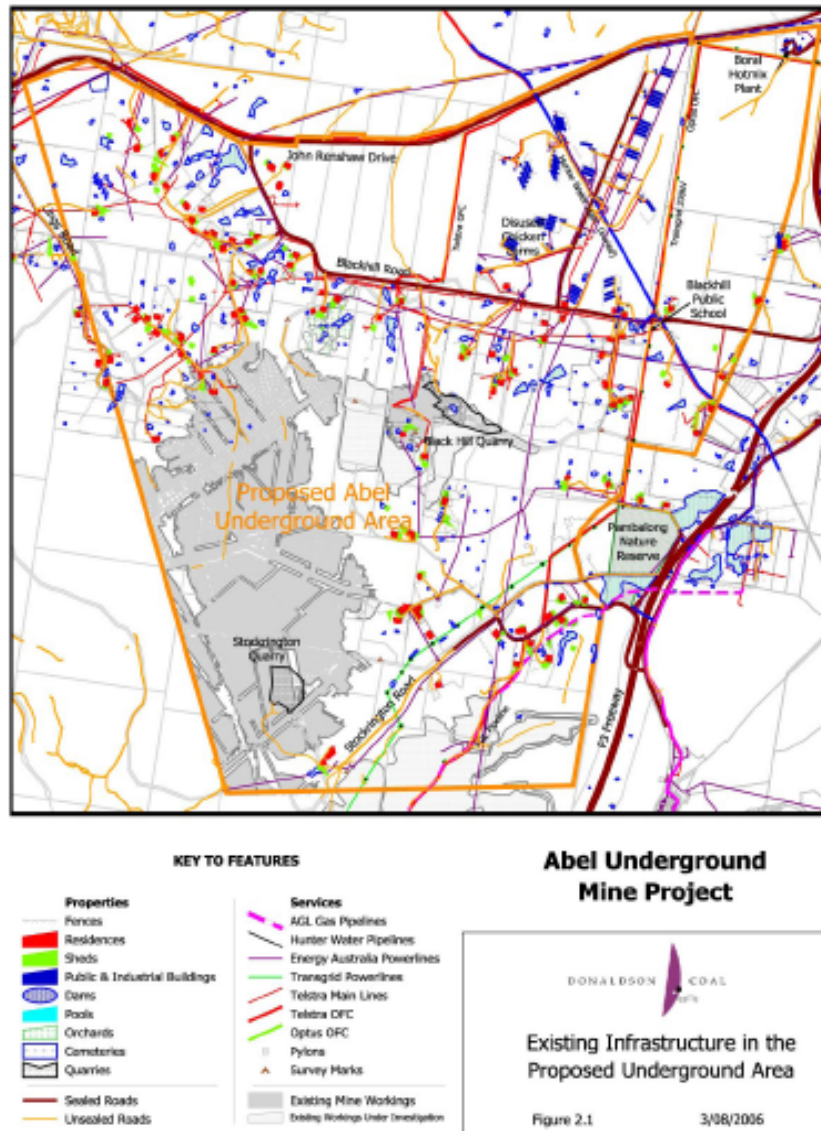


Figure 5: Key Surface Features

➤ Coal & Allied Lands

Coal & Allied Operations Pty Limited (and related entities) is also a major landholder in both the northern (Black Hill) and southern (Stockrington) parts of the proposal. These two parcels total nearly 1,000 ha. Coal & Allied has recently entered into a Memorandum of Understanding with the State Government whereby 80% of these lands will be transferred to the Government for conservation corridor purposes. The remaining 20% (the 183 ha Black Hill parcel, which is adjacent to the Catholic Diocese’s lands) will be developed as employment lands, consistent with the Lower Hunter Regional Strategy. The Proponent has consulted closely with Coal & Allied and has reached agreement with it that any coal extraction which is approved within these lands and resulting subsidence should be

completed within 6 years following approval. Coal & Allied has requested that this agreement be reflected in approval conditions.

➤ Powerlines, Transmission Towers, Water Pipelines & Communications Cables

The proponent's SIA has considered potential impacts on all significant infrastructure features which traverse the Abel underground mining area (see Figure 5); as follows:

- Transgrid 330 kV transmission lines and towers;
- Energy Australia powerlines (132 kV, 66 kV and domestic supply);
- Hunter Water pipelines;
- Agility natural gas pipeline;
- Telstra and Optus optic fibre cables; and
- Telstra standard (ie copper wire) communications lines.

Cover depth beneath the 330 kV transmission towers ranges from 60 – 220 m. The SIA has concluded that the majority of these towers would be subject to tilts and strains in excess of their tolerable limits, and would therefore need protection measures such as installation of cruciform footings to the towers and roller sheaves on their conductor supports. The EA reports that Trigger Action Response Plans (TARPs) would be developed by the Proponent to ensure that the transmission lines and towers remain safe and serviceable. Transgrid would advise the Proponent of its requirements to control the longterm stability of the towers and the Proponent would institute a monitoring program.

The SIA has determined that protection, mitigation or repair measures may also be needed for each of the other key infrastructure assets, particularly in areas of low cover depth, total extraction, or maximum subsidence. It is noted that TARPs would be developed by the proponent for each class of asset and that extensive consultation would take place with each asset owner. However, it is more appropriate that detailed assessment and management of the impacts of subsidence on key infrastructure assets takes place under DPI's SMP approval process, as outlined above.

➤ Cliff Lines

Cliff lines (defined as rocky outcrops 5 – 20 m high) of up to 100 m in length have been identified along Long Gully, two of its tributaries, west of Blue Gum Creek and within Black Hill Quarry. The Proponent has committed that only partial extraction of coal (40-65%) would take place beneath identified cliff line zones (see Figure 3), and therefore they should not be subject to significant subsidence impacts. Nonetheless, rock fall management plans would be prepared for all cliff lines. Appropriate rock fall hazard controls may include such items as rock fall catch ditches, barrier fencing, earth mounds and warning signs installed at appropriate locations to promote awareness that a rock fall hazards may exist. Cliff lines would be subject to more detailed management through DPI's SMP approval process.

Some of the cliff lines are associated with the rainforest gullies in Long Gully. Potential impacts on these cliffs would be reduced by the Proponent's commitment to ensure negligible subsidence impact on the rainforest areas. The Department considers that a "negligible subsidence impact" outcome for the rainforests must preclude any impact through rock falls from the cliffs within the rainforest gullies.

➤ Roads and Drainage

Proposed total extraction mining on Black Hill Road, Brown's Road, Taylor's Road and minor access roads could lead to cracking and buckling or shear failures. Damage to kerb and guttering and drainage structures beneath and adjacent to the road may also occur. Similar impacts are assessed for parts of Dog Hole and Stockrington Roads in the south east of the mining area.

The roads in the underground mining area are flexible, granular pavements, which are amenable to repair if damaged by subsidence. The Proponent reports that it would develop TARPs (based on consultation with Cessnock and/or Newcastle Councils and the DPI) to ensure that roads and associated infrastructure remain in a safe and serviceable condition. A monitoring program would also be developed to measure subsidence and strains along affected sections of road, and road repair crews would be placed on 24-hour stand by when the section has been undermined and subsidence development or visual inspection responses have been triggered.

John Renshaw Drive is considered in the SIA to be outside of the limits of subsidence. However, the Proponent would monitor the road for vertical and far-field horizontal displacements. Black Hill Road is located 70 -190 m and Dog Hole and Stockrington Roads in the south-east are located 180 - 200 m above proposed panels.

➤ Quarries

The Blackhill and Stockrington Quarries overlie the proposed underground workings. The SIA has determined that the Blackhill Quarry may be impacted by highwall or batter slope instabilities and surface cracking. Repairs may range from simple earthworks to batter slope stabilisation through rock bolts and meshing of the faces. The likely areas of subsidence impact would be on the batter slopes, haulage roads and quarry buildings. Similar impacts are expected at the Stockrington Quarry.

The Proponent states that more complete subsidence impact and hazard assessment would be undertaken before underground mining occurs in these areas. TARPs would be developed in consultation with the owners and DPI to ensure the quarries and associated infrastructure remain in a safe and serviceable condition, to ensure operating safety. A monitoring program for the quarry site to measure subsidence and strains along crests of batter slopes and repairs made to cracking would also be implemented.

Since exhibition of the EA, Hunter Inert Waste Pty Limited has indicated to the Department that it is considering further developing the existing Blackhill Quarry as a landfill operation. The proposal involves continued extraction of gravel, clays and shale; potential open cut extraction of remnant coal pillars from the underlying West Borehole Seam; followed by potential forming and filling of cells with inert construction waste; and progressive rehabilitation. This proposal (including the proposal to extract underlying coal) would be a complicating factor for subsidence management for the Project. It is not currently possible or appropriate to develop conditions to manage this interaction in detail, most particularly since a project application by Hunter Inert Waste has not yet been submitted. However, the issues are addressed in part by the Proponent's existing commitments regarding subsidence impacts on other structures and TARPs and cliff line management for the quarry. These matters would also have to be taken into account during DPI's SMP process for the Abel Coal Mine and in any future project application process for Hunter Inert Waste's proposed project. A condition requiring that potential impacts on the Blackhill Quarry receive particular consideration during the preparation of the SMP application has been included in the proposed conditions of approval.

Subsidence Monitoring

The Proponent has outlined a proposed ongoing surface subsidence and strain monitoring program and a proposed initial subsurface continuous and discontinuous fracture monitoring program. It proposes that the fracture monitoring program take place above the sections of panels that are located less than a multiple of 3 X the cover depth away from Schedule 2 Creeks and where the cover depth ranges between 60 and 100 m. The purpose of this program would be to allow a comparison/validation of measured values with model predictions for surface and groundwater level impacts.

The Proponent has suggested that this proposed monitoring and testing program would probably only be required for the first few panels, should measurements confirm the predicted values. The Department believes that this monitoring program should be continued until advice is received by the Proponent from DPI that it is no longer necessary, and a condition to this effect has been proposed.

Conclusion

The Department considers that the SIA is generally acceptable and has appropriately assessed and reported the potential subsidence impacts of the Project. The Proponent has made commitments to a substantial range of management protocols to minimise and manage these impacts. Most significantly, these include the low subsidence protocols:

- **zero mining impact** (ie no mining or subsidence) – Pambalong Nature Reserve and the F3 Freeway;
- **negligible subsidence impact** (ie first workings only) – all “principal residences”, Black Hill Public School, Black Hill Church and cemetery, the Boral Hotmix Plant, all Schedule 2 creeks, rainforest areas and the Blue Gum Creek alluvium; and
- **reduced subsidence impact** (ie partial extraction only) – identified cliff areas.

Other important management protocols proposed by the Proponent include the development of TARPs (in consultation with asset owners or managers and/or DPI) and/or management plans to manage subsidence impacts on key infrastructure assets, quarries and cliff lines.

The SIA and the Proponent's management protocols and other commitments demonstrate that the subsidence impacts of the project are limited and are manageable. The Department considers that these impacts are acceptable. The Department is also confident that more-detailed assessment and management of subsidence impacts on surface features would take place under DPI's SMP approval process. As indicated above, the role of any project approval in respect of subsidence is to set a broad, overall framework for potential subsidence impacts, rather than to manage or condition all potential impacts in detail. Appropriate framework conditions to manage the impacts of subsidence have been recommended by the Department.

4.2 Surface Water and Groundwater

Streams in the Underground Mining Area

The project area is located within the lower section of the Hunter River catchment and consists of low undulating forested hills with patches of cleared land for rural/residential properties. A ridgeline associated with Black Hill runs east-west through the proposed underground mine area, with tributaries of Buttai Creek, Viney Creek, Weakleys Flat Creek and Four Mile Creek draining northwards from this ridgeline. Long Gully & Blue Gum Creek drain the southern side of the ridgeline eastwards towards Pambalong Nature Reserve. Water quality is generally good and reflects the relatively undisturbed catchments.

➤ Schedule 2 Streams

There are four Schedule 2 streams within the underground mining area (Blue Gum, Long Gully, Viney and Buttai Creeks). As noted above, the Proponent proposes that all Schedule 2 streams would be largely protected from subsidence impacts by ensuring that only first workings take place beneath them, with a minimum barrier of 40 m between the 20 mm line of subsidence and the bank of any Schedule 2 stream. This is a substantial commitment not commonly proposed by underground mines. Notwithstanding this commitment, the EA, SIA and other associated specialist reports have all been based on a mine plan which results in a predicted 45 mm of maximum subsidence at the centre of affected Schedule 2 Streams (see eg Figure 4). In essence, the current "indicative" location of extraction panels is too close (in some cases) to Schedule 2 streams to achieve the Proponent's commitment. Thus the current mine plan would require revision to achieve those commitments.

The Proponent has also indicated that it may seek a future approval to undertake further extraction within these barriers (ie beneath Schedule 2 streams), should further studies indicate that such extraction can take place without compromising specified environmental objectives, the principal of which is that "*geomorphic integrity of the stream will be maintained, the ecosystem habitat values of the stream will be protected and no significant alteration of the water quality will occur in the stream.*"⁵ The Proponent has specified further environmental objectives of its own for Schedule 2 streams on p 6-35 of the EA. The Department also notes the Proponent's intention to develop a Watercourse Subsidence Management Plan, as part of its overall SMP.

The Department supports the Proponent's commitment to protect Schedule 2 streams and accepts that the 40 m barrier from stream banks to the 20 mm vertical subsidence contour is an appropriate means of achieving this. It accepts that mining (additional to first workings) may be able to be undertaken beneath parts of particular Schedule 2 creeks without compromising the environmental objectives, noting that it is unlikely that Viney Creek would fall into this category, given the very low cover depths. The Department considers that such mining (ie additional to first workings) should be subject to a further approval by the Minister and conditions which result in this requirement have been proposed.

⁵ *Management of Stream/Aquifer Systems in Coal Mining Developments – Hunter Region*; draft guideline (DIPNR, 2005).

➤ Schedule 1 Streams

The EA predicts that Schedule 1 creeks⁶ above total extraction panels would be subsided between 0.4 - 1.6 m, depending on cover depth and mining height, leading to gradient changes along the creek beds of 1 - 2%. Potential ponding depths of 0.1 - 0.5 m are predicted for sections of creeks above panel centres. However, ponding depths up to 1.0 m have been assessed for one tributary of Viney Creek in the north of the underground mining area, where cover depths are very low.

It is also predicted that surface crack widths of 25 - 240 mm (depending on the cover depth) could develop above peak tensile and compressive strain zones. However, cracks are only likely to impact on flows in Schedule 1 drainage gullies or creek beds where sandstone outcrops (as against shale or alluvium). The EA considers that such impacts may be self-healing as sediment accumulates over time in the cracks but also suggests that it may be necessary to mitigate impacts with cement or other grouting.

Management of Schedule 1 streams would be included within the Proponent's Watercourse Subsidence Management Plan. The Proponent has made commitments that impacts on Schedule 1 streams would be subject to mitigation or remediation works where needed to ensure that:

- stream stability is maintained where subsidence occurs;
- stream fractures are minimised; and
- stream channels are maintained with minimal incision from bed grade change stream bed grade change minimised to provide stable stream length.

The Department considers that impacts on Schedule 1 streams have been appropriately assessed and reported in the EA and are generally manageable. Nonetheless, it considers that there is a potential for loss of surface waters to the underground workings where cover depths are less than 100 m. A similar potential may exist where the presence of the overlying Stockrington Colliery workings results in non-systematic subsidence of up to an additional 0.6 m. While the Department finds these potential impacts to be acceptable, it is recommending that mining beneath Schedule 1 streams in these two areas (ie where cover depths are < 100m and above the old Stockrington Colliery workings) be subject to additional consideration by the Proponent and more detailed assessment through DPI's SMP approval process, so as to ensure that appropriate management measures are in place.

Water Supply Dams

There are 175 water supply (or farm) dams above the underground mining area, with cover depths varying between 80 - 210 m. Farm dams are susceptible to surface cracking and tilting from mine subsidence. This could result in loss of storage capacity through drainage into the surface cracks or breaching of the dam wall. Tilting of dams may also effectively reduce storage by lowering of the dam wall crests relative to the storage area. Some of the dams with significant storages (>10 ML), close to Black Hill Road and other public access roads could also present a potential flooding hazard. Based on predicted ranges of subsidence, the EA considers it "likely" that a high proportion of dams would be subject to cracking of walls and storage areas that could lead to water loss. Maximum crack widths are estimated to range from 60 - 100 mm and extend to depths of 5 - 7 m.

It would also be possible to identify which dams are likely to be impacted based on their location above the mine panels and predicted subsidence profile during the preparation of the SMP.

The Proponent is proposing that a Dam Monitoring and Management Strategy would be formulated for all dams prior to any impact. This Strategy would provide for individual pre-mining inspections by a qualified engineer, pre-mining photography, dam water level monitoring, management of potential dam wall failure and associated flooding risk, provision of alternate water supplies and remediation of damage in conjunction with the MSB.

Similar dams are regularly undermined and damaged by coal mining elsewhere in NSW. The dams have been reinstated by the MSB and an alternative supply of water has been provided by the mine during the repair period.

⁶ See footnote 1.

The Department considers the proposed management strategy to be appropriate for the circumstances of most dam owners in the underground mining area. However, one landowner, a commercial orchard on properties 52 and 53 close to Blackhill Road, is in a unique position. This orchard has five water supply dams set on relatively steep terrain. The EA predicts that this orchard may be impacted with cracks between 50 - 180 mm in width, indicating a relatively high risk of dam wall breach. Because most of these dams are large (several megalitres), there is an associated flooding risk. However, the greatest risk is the potential inability of the Proponent to supply sufficient water to maintain the productivity of the orchard if one or more of these dams are emptied and rendered unusable for a period of time. Consequently, the Department is proposing conditions whereby the four largest dams on these properties must be treated by the Proponent in the same manner as a "Principal Residence".

Flooding

Subsidence is not predicted to affect flooding of Schedule 2 creeks or the Blue Gum Creek alluvium, given the protection zones currently proposed.

Groundwater

A groundwater assessment was undertaken for the Proponent by Peter Dundon and Associates (Appendix G of the EA). Groundwater modelling for this assessment was undertaken by Aquaterra Simulations. The groundwater modelling was subject to peer review by Dr Noel Merrick.

As part of the groundwater assessment, a series of piezometers were installed across the proposed underground mine area to enable separate sampling, testing and monitoring of the principal coal seams and the overburden and interburden sediments, both within the shallow northern part of the deposit, and at the southern end. Some bores were also installed along the strike to the east. A number of shallow piezometers were also installed around the Pambalong Nature Reserve.

The study found that the coal measures were only poorly permeable. The interbedded sandstones and siltstones are of lower permeability again, and offer very limited porosity and permeability. A much more important groundwater system is that within the alluvial overburden, which comprises mainly swamp, floodplain and estuarine sediments (principally the Blue Gum Creek alluvium). The study considered that there was limited hydraulic connectivity between the alluvium and the coal measures (ie the alluvium is a "perched", surficial groundwater system). Recharge to this system is controlled by stream flows and runoff. These alluvial aquifers are likely to be in hydraulic connection with Hexham Swamp to the east.

Groundwater quality is highly variable, with high salinities found at the base of the alluvial column, where it is in contact with weathering Permian bedrock. The EA predicts that the quality of groundwater inflows to the proposed mine would initially be similar to the current groundwater inflow to the Donaldson Open Cut Mine, with total dissolved solids (TDS) around 1500-2000 mg/L and pH around 7. Over time, a gradual increase in salinity may occur, to an eventual salinity of around 3000-4000 mg/L TDS.

Groundwater modelling indicated that groundwater inflows (of up to 3 ML/day) to the proposed mine were unlikely to impact on surface flows or surficial groundwater. No adverse impacts are predicted on existing groundwater supplies, groundwater dependent ecosystems, or existing surface water quality. However, the SIA indicated that continuous cracking is likely to result in hydraulic connection for 29 - 66 m above the mined seams. In the area of shallow cover depth in the northern part of the area, this direct hydraulic connection may extend to the surface. This area of potential direct hydraulic connection includes Viney Creek, but no regionally significant alluvium.

Owing to the proposed mining exclusion zone beneath the Pambalong Nature Reserve, and the proposed restriction of mining to "first workings only" beneath the Blue Gum Creek alluvium, the EA does not anticipate that subsurface cracking would allow direct hydraulic interconnection between the workings and the surface or surficial groundwater in the vicinity of Pambalong Nature Reserve. The Department agrees with this conclusion.

The Proponent is proposing that its current groundwater monitoring program at Donaldson Mine would be continued and expanded to include the proposed Abel Underground Mine and existing Tasman Underground Mine and Bloomfield CHPP areas, as an integrated monitoring system covering all four

sites and enabling the development of a regional groundwater model. This would also be integrated with the surface water monitoring program as an Integrated Monitoring System.

Reflecting some concerns expressed by sectors of the community, the Department commissioned an independent review of the groundwater assessment and groundwater modelling completed for the Project. The review was undertaken by Kalf and Associates (see Appendix D). This review was provided to the Proponent, which provided comments in reply as part of its Response to Submissions. The Department notes that the issues raised in the independent review were relatively few and minor in nature, and accepts the comments in reply provided by the Proponent.

The Department therefore considers that the groundwater assessment is generally robust and accepts its conclusions. The Department strongly supports the proposed integrated monitoring system to cover all four sites in the Donaldson/Bloomfield mining complex, and considers that it offers substantial opportunities to improve both groundwater and surface water management in the complex. The Department supports the proposal by the Proponent, endorsed by DNR, that the Proponent should develop an integrated groundwater management plan and that there should be further development of the groundwater model.

Integrated Minesite Water Management

The Proponent proposes to integrate minesite water management for the proposed Abel mine with the existing water management facilities for the Donaldson and Bloomfield Mines and the Bloomfield CHPP and rail loading facility. To a lesser degree, linkages are also proposed with Tasman Mine. This is an innovative approach, and would lead to improved water management outcomes for all sites.

All permanent Abel mine surface facilities would be located within the final void created by the Donaldson Mine. All runoff from external catchments would drain away from the void and there would be no requirement for separate facilities for diversion of “clean” runoff away from the surface facilities. The base of the open cut would be graded to enable water to drain adequately. A sump with simple sedimentation and oil separation systems would be established. Water collected in this sump would be pumped to Donaldson’s ‘Big Kahuna’ Dam, where it would be used for dust suppression on stockpiles, haul roads and general disturbed surface areas. Excess water removed from the Abel Underground Mine would also be pumped into the Big Kahuna Dam, making it the focal point for dirty water management for both Donaldson and Abel.

It is planned to operate Big Kahuna as a ‘zero discharge’ dam by upgrading an existing pipeline between it and the Bloomfield CHPP to enable water to be transferred to the CHPP, so as to ensure that no overflow occurs from the dam. If necessary, the pipeline could be used to transfer water from the CHPP back to the dam.

There are four other mine water storage areas currently located on Bloomfield Mine - Possums Puddle, Lake Foster, Lake Kennerson and the Stockpile Dam. Existing stormwater pollution control facilities around Bloomfield CHPP comprise a series of drains that direct runoff to a number of small sediment traps which overflow to the Stockpile Dam. To cater for the proposed expansion of stockpile areas at the CHPP, alterations to Bloomfield’s water management regime are proposed, including modifications to existing dams and pipes, to ensure rainfall events are managed and dirty and clean water remain separated. Minor earthworks would ensure that all runoff from the enlarged stockpile area adjacent to the Bloomfield CHPP can be directed to existing dams. The bypass channel around Lake Foster would also be upgraded. This would ensure that flows in excess of 40ML/day can be released from Lake Kennerson without the risk of overflow into Lake Foster.

The objectives of the revised integrated minesite water management system are to:

- maintain water supply for the CHPP and dust suppression at all times;
- achieve zero discharge to the environment from the Big Kahuna Dam;
- minimise discharge from the Stockpile Dam; and
- minimise discharge from Lake Foster and Lake Kennerson (with preference given to controlled discharge from Lake Kennerson).

The EA proposes that Tasman Mine (which is much more distant) is connected into this integrated water management system only through the trucking of water to and from that mine in times of dire need.

Mine Water Balance

The EA includes a water balance for the proposed integrated minesite water management system (see Appendix F to the EA). The model includes water use for the Donaldson, Bloomfield and Tasman Mines and the Abel proposal. Climate data, catchment runoff and groundwater inflows to the proposed Abel underground workings, and Donaldson and Bloomfield Mines were calculated to determine water make. Groundwater pumping that currently occurs at Bloomfield was also taken into consideration.

Water requirements for each of mine forming part of the model were then calculated based on two Abel production scenarios, being 'target' production (Abel proposal operating at full capacity) and 'provisional' production (reflecting a lower, more likely, extraction rate from the Abel proposal). The total amount of water required annually for all mines using the integrated water usage system under these two scenarios ranges from 2,270 ML to 3,160 ML (target production) or 210 ML to 2,680 ML (provisional production) over the life of the proposed Abel operation. The water balance model indicates that:

- there would be adequate water available to meet all requirements for dust suppression and operation of the CHPP. Water derived from the proposed Abel mine would contribute to the available supply;
- assuming tailings deposition to underground workings continues, groundwater extraction from the Bloomfield underground workings would not exceed historic levels and would progressively decline as water from this source is substituted by groundwater inflow transferred from the proposed Abel Mine;
- if tailings were deposited in open cut voids, excess water discharged from Lake Kennerson would be comparable to 2000 and 2001 rates. Under these conditions approximately 80% of the water discharged with the fine tailings would be returned for use in the CHPP;
- for all scenarios, controlled volume and frequency of discharge from Lake Kennerson would be reduced significantly in the early years of the Abel project;
- the proposed operating levels for Lake Foster would ensure that any discharge at the EPA licence discharge point would primarily occur as controlled discharge from Lake Kennerson rather than overflow from Lake Foster;
- proposed minor modifications to the Stockpile Dam together with an automatic pump to transfer water to Lake Foster would allow the performance of this dam to significantly exceed the requirements set out in *Managing Urban Stormwater: Soils and Construction*. There would only be a small risk of overflow in extreme wet weather conditions. Any pollution risk would be further reduced by configuring the dam as a "first flush" capture dam; and
- zero discharge to the environment from Big Kahuna Dam can be achieved for all mine and climate scenarios.

However, in the later stages of mining there would be an excess of water generated from the proposed Abel Underground Mine that could not be utilised for mine purposes or the CHPP. Under the 'provisional production' scenario this would occur from 2025 onwards and by the end of the mine life a total of up to 2,500ML of excess water could accumulate. This excess water could be discharged to the environment via Lake Kennerson or could be retained within the proposed Abel underground workings. The Abel mine plan indicates that up until 2015 a total of about 1,600 ML would be available for water storage in worked out areas of the mine. Additional water storage capacity would become available as mining progresses after 2015. Bloomfield Colliery currently has a licensed discharge point downstream of Lake Kennerson, with a volume limit of 40 ML/day.

The Department accepts the conclusions of the water balance assessment. It also strongly supports the proposals for an integrated water management system over the Donaldson and Bloomfield Mines, the Abel mine proposal and the Bloomfield CHPP and associated facilities. It sees significant advantages in the model proposed. Even the potential for excess water to accumulate after 2025 is markedly less than would occur if Abel water management was not integrated with the Bloomfield CHPP.

The integrated water management model proposed is sound, and produces synergistic benefits for all 3 mine sites and the CHPP. In particular, it would lead to improved site water management at the Bloomfield CHPP and generally reduced discharges to the environment.

4.3 Flora and Fauna

The potential flora and fauna impacts of the Project are limited, due to a number of factors. Principally, these are that:

- underground coal mining does not involve major land clearing;
- the Project's surface facilities would be located generally within disturbed areas; and
- the Proponent's low subsidence protocols for the Pambalong Nature Reserve, subtropical rainforests and cliff lines would limit potential impacts.

Surface Facility Areas

The mine's surface facilities would be located within the existing Donaldson open cut and essentially would have no impact on flora and fauna. In addition, the Proponent has decided to relocate the ventilation shaft site from forested land south of John Renshaw Drive to within the Donaldson open cut, reducing this impact further.

ROM coal would be washed at the existing Bloomfield CHPP; however, the Project entails a substantial expansion of this facility. In addition, the Proponent's midterm plan under the project application (post 2012) is to construct a 4 km conveyor to carry ROM coal from the Abel surface facilities to the CHPP. The CHPP sits amongst remnant native vegetation, principally Lower Hunter Spotted Gum - Ironbark Forest, which has been declared as an endangered ecological community (EEC) under the *Threatened Species Conservation Act 1995*.

There has been some confusion as to the extent that the proposed CHPP expansion and conveyor construction would impact on the native vegetation which surrounds the CHPP. The Proponent advised on 5 February 2007 that the required clearing would be:

- | | |
|---|-------------------|
| • Lower Hunter Spotted Gum - Ironbark Forest (for CHPP modifications) | - 7.2 ha |
| • Lower Hunter Spotted Gum - Ironbark Forest (along the conveyor route) | - 2 ha |
| • Coastal Plains Smooth-barked Apple Woodland | - 3 ha |
| • Tall Moist Forest (4 Mile Ck crossing) | - <u>0.13 ha</u> |
| • Total area of vegetation to be cleared | - <u>12.33 ha</u> |

An ecological assessment was undertaken for the Proponent by Eco Biological. As part of this assessment, a 184 ha area surrounding the CHPP and the proposed conveyor route was investigated. Of this area, 138 ha was mapped as Lower Hunter Spotted Gum - Ironbark Forest and 28 ha as Coastal Plains Smooth-barked Apple Woodland. The areas around the existing CHPP designated by the Proponent for stockpile expansion consist of forested patches segmented by a number of roads and tracks.

At the request of the Department, the Proponent has examined options to reduce the clearing footprint. It has advised that various conveyor routes were considered when preparing the EA and presented to Eco Biological. These routes were then examined to determine vegetation communities and potential fauna habitats. The proposed route was selected based on the recommendation of the flora and fauna specialist, together with practical considerations for conveyor design and efficiency. For example, construction of the conveyor adjacent to the road haul route would not be possible whilst the Donaldson Open Cut Mine was operational and would also require additional transfer points. Additional transfer points would increase dust, noise, maintenance requirements and construction and operational costs, and lead to a decrease in the energy efficiency of product transfer to the CHPP. The Department accepts the Proponent's view that the conveyor route as proposed is the most practical and results in limited clearing of the endangered ecological community.

DECC has recommended that further fauna surveys are undertaken in the areas to be cleared and proposed an offset of 20 ha of similar native vegetation to compensate for the 12.3 ha to be cleared. The Department considers that this 20 ha should include at least 10 ha of Lower Hunter Spotted Gum Ironbark Forest. This offset should be contiguous with existing native vegetation and be capable of enhancing local and regional wildlife corridors. The Proponent has significant forested landholdings in the area and has agreed to the proposed offset, and the Department has proposed conditions to this effect.

Underground Mine Area

The land above the proposed mine contains about 1900 ha of relatively undisturbed vegetation and 900 ha of fragmented vegetation in a farmland mosaic. Of this total, approximately 640 ha is Lower Hunter Spotted Gum - Ironbark Forest, 6 ha is Hunter Lowlands Redgum Forest (also a listed EEC). However, the most significant vegetation community present is 27 ha of Sub-tropical Rainforest, which is subject to a preliminary listing as an EEC.

➤ Sub Tropical Rainforests

The 27 ha of rainforest is principally located in Long Gully and one of its tributaries, and also a tributary of Blue Gum Creek in the far south of the proposed underground mining area (see the EA's Figure 6.7). The EA reports that, even during a long dry period a base flow of water was present along the rainforest gullies and it is evident that the rainforest is dependant on both the base flow and the surrounding topography to create a suitable habitat and microclimate.

Subsidence impacts that could be detrimental to the rainforest gullies include cracking of the bedrock structures in the gully floors, resulting in downward diversion of the ground water, and collapse and sliding of rock structures at the edges of the gullies resulting in physical damage to the forest and potential weed invasion.

As noted above, the Proponent is proposing that the rainforests are subject to a low subsidence protocol. Only first workings are proposed beneath rainforest areas (see Figure 3) and subsidence would be limited to 20 mm at the edge of these areas.

The Department supports the Proponent's commitment to protect the rainforest areas and accepts that a 20 mm vertical subsidence limit across these areas (as would be expected with first workings) is an appropriate means of achieving this. It notes the Proponent's view that "*further studies [may be able to] demonstrate that there will be no significant impact on the rainforest communities within the buffer zone with greater subsidence impacts.*" However, it considers that such mining (ie additional to first workings) should be subject to a further approval by the Minister and conditions to this effect have been proposed.

➤ Other Potential Flora and Fauna Impacts

The Department notes that no assessment has been undertaken of the potential presence of threatened species (such as the Green and Gold Bell Frog) in the 175 farm dams which may be impacted by subsidence. It is possible that the damage to dams which is predicted in the EA as "likely" could impact on such species. The Department therefore believes that the Proponent should assess the potential flora and fauna impacts (with particular reference to threatened species) of damage to dams and amend its Dam Monitoring and Management Strategy to include measures to minimise impacts on threatened species.

The Department accepts the Proponent's views that:

- the proposed mining exclusion zone and limiting operations beneath the Blue Gum Creek alluvium to first workings would avoid any significant impacts on the flora and fauna of the Pambalong Nature Reserve;
- vegetation in the areas of dry forest on ridges and slopes would not be impacted by surface subsidence; and
- based on assessments to date, the Project is unlikely to have a significant impact on any threatened species of fauna or flora.

The Department considers that the ecological assessment is generally adequate and accepts its conclusions. It believes that the protection proposed by the Proponent for rainforest gullies, Schedule 2 streams, the Blue Gum Creek alluvium and cliff lines would offer substantial ecological benefits. These measures are directed towards the conservation of biological diversity. With the addition of a flora and fauna assessment of farm dams and appropriate consequential mitigation measures, and a 20 ha contiguous vegetation offset to compensate for the additional clearing in association with the Bloomfield CHPP and proposed coal conveyor, the Department considers that the flora and fauna impacts of the proposal would be minor.

4.4 Noise

A noise impact assessment (NIA) was undertaken for the Proponent by Heggies Pty Ltd, assessing the proposed Abel Underground Mine, associated surface facilities and continued use of the Bloomfield CHPP. The assessment was prepared with reference to *AS 1055:1997 Description and Measurement of Environmental Noise Parts 1, 2 and 3* and in accordance with DECC's *NSW Industrial Noise Policy (INP)*. Where noise issues are not covered by the INP (eg sleep disturbance, rail traffic noise and construction noise goals) then the *NSW Environmental Noise Control Manual (ENCM)* was used instead. The impact of noise from the CHPP, train movements, internal haulage, surface facilities, ventilation fan and cumulative impacts were all assessed.

Noise emissions (and therefore environmental risk) for the Project are greatly reduced by the nature of underground mining, where there is no noise associated with removal of overburden by blasting and equipment. Noise would also be significantly reduced by the Proponent's proposal to place surface facilities in the final void of the Donaldson open cut. The Proponent is also proposing a number of new noise control features at the Bloomfield CHPP, which involve partial enclosure and noise screening of drives and conveyors so as to screen residences to the north of the site (ie the suburb of Ashtonfield). The NIA predicts that this would lead to a 10dBA reduction from existing noise emissions from the CHPP.

The Proponent has also reported that the operator of the Bloomfield CHPP would:

- investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;
- implement all reasonable and feasible best practice noise mitigation measures on the site; and
- report on these investigations and implement any new noise mitigation measures on site as required under any approval.

The Proponent has since stated that, in response to concerns raised, it would relocate its proposed ventilation shaft and fan from south of John Renshaw Drive to within the void of the Donaldson open cut, close to the other proposed surface facilities. The Proponent's noise consultant notes that "*the revised ventilation fan location has advantages in terms of noise emission as additional noise attenuation is provided by the mine pit surrounding the portal. The additional topographic screening will result in a reduction on noise levels at receivers surrounding the site. The relocation...will result in a decrease of noise from the ventilation fan at noise sensitive receivers.*"

The NIA included a computer model to predict noise emissions, using a 3-D digital terrain map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. The model was based on conservative assumptions (eg all acoustically significant plant and equipment is in simultaneous operation and the Abel Project, Bloomfield CHPP and Bloomfield Rail Loop would all operate 24 hours per day, 7 days a week). The modelling also assumed that the Proponent's proposed noise control measures and the Bloomfield CHPP modifications have been implemented.

Operational Noise

The NIA reports that project specific noise criteria for the Project were established for 12 surrounding locations with reference to the INP and adjustments to account for existing industrial noise contributions. The acoustical environment typifies that of urban, suburban and commercial environments.

The EA predicts that operational noise levels from the Project would easily meet the project specific noise criteria at all receiver locations under prevailing weather conditions, with the exception of Location K where a level of 37 dBA during night-time (an exceedance of 1 dBA) is predicted under a prevailing northwest wind.

Sleep disturbance criteria are also expected to be met comfortably at all locations, again with the sole exception of Location K at night with a northwest wind, where a level of 52 dBA is predicted (an exceedance of 6 dBA). Location K is a residence on land owned by the Catholic Diocese of Newcastle and Maitland, and subject to an existing agreement between the owner and the Proponent. Further, since the modelled operational scenario is based on very conservative assumptions, actual operational noise levels from the Project are likely to be less than predicted.

The NIA examined potential cumulative operational noise impacts from the existing Bloomfield and Donaldson Coal Mines, Bloomfield CHPP and the Abel Project. Tasman Mine was excluded because of its distance from the remaining sites. The NIA reports that cumulative impacts, including the addition of trains on the Main Northern Railway Line, would comply with the relevant amenity criteria set in accordance with the INP for both calm and adverse weather.

Rail Noise

The Bloomfield CHPP and rail loading facility utilise the Main Northern Railway Line. The Australian Rail Track Corporation (ARTC) operates the Hunter Valley Coal Rail Network, including this line. Noise emissions from the network are regulated by a DECC Environment Protection Licence (EPL 3142). The EPL does not nominate specific noise limits but has objectives to progressively reduce noise levels to appropriate goals. These goals are 65 dBA $L_{Aeq(15hour)}$ during daytime, 60 dBA $L_{Aeq(9hour)}$ during night-time and a maximum of 85 dBA L_{Amax} . Existing rail noise on the Main Northern Rail Line is modelled in the NIA to be in excess of these goals.

Currently, there are some 232 daily rail movements on the Main Northern Rail Line. The daily number of movements (dispatches x 2) on the Bloomfield rail loop averaged 2.4 in 2006. An average of 3 - 6 train movements per day are planned to occur on the Bloomfield rail loop between 2008 and 2013 (relating to product coal from all mines in the Donaldson/Bloomfield mining complex, including the Abel proposal).

The increase in rail traffic which would arise from approval of the Abel project is predicted in the NIA to only increase the existing daytime $L_{Aeq(15hour)}$ rail noise level by approximately 0.2 dBA and the existing night-time $L_{Aeq(9hour)}$ rail noise level by approximately 0.1 dBA. It would not increase L_{Amax} . These increases are negligible and would not be discernible by receivers.

Construction Noise

Construction of surface works would generally take place between 7.00 am and 5.00 pm Monday to Friday, and 7.00 am to 1.00 pm on Saturday and exclude public holidays. The NIA predicted that the Project would comfortably comply with a daytime construction noise criterion of 41 dBA L_{A10} at all surrounding receivers.

The Proponent has since advised that construction of the proposed modifications to the Bloomfield CHPP would "include working 24 hours per day, 7 days a week where appropriate" (*Additional Information on the CHPP, 5/2/07*). Modification of existing plant does not fall within the definition of construction noise and is therefore to be assessed as operational noise. The noise consultant has further considered these proposed modifications and has advised that resulting noise would be "similar in character" to existing operational noise from the CHPP, as similar equipment would be in use. The total existing sound power level of the CHPP is approximately 121 dBA (to be reduced by proposed noise shielding as part of the modification). The consultant has advised that re-construction noise would be of such a low level that it would not be discernable amongst or add to existing operational noise emissions from the CHPP.

Underground construction work would also proceed on a 24/7 basis, but this is immaterial with respect to noise emissions.

The Department concludes that the Project would meet all operational and construction project specific and cumulative noise criteria, with the exception of predicted minor exceedances at Location K for project specific operational noise during night-time adverse weather conditions. This location is subject to an existing noise impact agreement with the Proponent. The Department concludes that the Project would not add significantly to existing rail noise levels on the Main Northern Rail Line or the Bloomfield rail loop.

Noise Management and Monitoring

The EA indicates that existing noise management procedures at the Donaldson Open Cut Mine would be extended to apply to the Abel surface facilities and the Bloomfield CHPP. The Proponent has since indicated that a Noise Management Plan would be prepared before operations commence at Abel. This management plan would include a noise monitoring program, which would be used to verify

predicted noise levels contained in the NIA and would include measurements of noise impacts from the CHPP.

An 11 station monitoring program was previously established to monitor noise emissions from the Donaldson Open Cut Mine. Noise monitoring would be expanded to include the Abel project, Bloomfield CHPP and the Tasman Mine. A total of 12 stations are proposed for Donaldson, Abel and Bloomfield CHPP and a further two for Tasman. The Proponent has proposed that noise monitoring would consist of operator-attended and unattended noise measurements, together with a log of operational activities to identify any significant generated noise sources.

The Department considers that the NIA, together with the additional material since provided by the Proponent, satisfactorily assesses noise impacts associated with the Project and, generally speaking, adequately provides for their monitoring and management. However, the Department considers that two additional noise monitoring stations, in the Ashtonfield and East Maitland areas, are warranted. The Department has proposed conditions of approval designed to facilitate integrated monitoring and management of noise emissions across the Donaldson/Bloomfield mining complex and continued improvement of noise mitigation.

4.5 Air Quality

An air quality assessment (AQA) was undertaken for the Proponent by Holmes Air Sciences, assessing the proposed Abel Underground Mine, associated surface facilities and continued use of the Bloomfield CHPP. The assessment was prepared in accordance with DECC's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. The assessment was based on the use of an air dispersion model, which used estimated emissions and local meteorological data to predict resultant dust concentration and deposition levels.

The AQA indicated that the risk of air quality impacts was greatly reduced because of the proposed underground mining methods. There would also be very limited clearing associated with the development of the Abel surface facilities. Air pollution emissions would be minor when compared with an open cut of similar production level. Emissions would occur primarily as fugitive dust from the surface facilities and the mine ventilation air. There would also be minor emissions from vehicles and underground equipment, including carbon monoxide (CO), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) which, due to their low level, were not considered in detail by the AQA.

Monitoring programs to characterise existing meteorological conditions and air quality have been in place since late 1999 for the adjacent Donaldson Open Cut Mine. This existing monitoring program includes 11 dust deposition gauges, one total suspended solids (TSP) monitor and one PM₁₀ monitor. There is also a regional DECC PM₁₀ monitor located nearby at Beresfield.

Maximum annual dust emissions associated with the Abel project are estimated in the AQA as 409.7 tpa, whilever coal is trucked from the mine's surface facilities to the CHPP, and 264.3 tpa, once the proposed conveyor to the CHPP is constructed. Major modelled sources of emissions are wind erosion from stockpiles at the CHPP (172.7 tpa), trucking coal to the CHPP (148.0 tpa), mine ventilation air (47.3 tpa) and the CHPP itself (19.5 tpa). These figures reflect the expanded capacity of the Bloomfield CHPP (6.5 Mtpa of ROM coal), including the proposed expansion in stockpile areas. They also include existing emissions from the CHPP associated with processing coal from Bloomfield, Donaldson and Tasman Coal Mines. The EA states that the internal haul road would be sealed, which would significantly reduce potential dust emissions. This was also factored into the AQA.

The EA reports that the most affected residence is located about 1 km southeast of the proposed surface facilities. The AQA modelled worst case scenario impacts on this residence as⁷:

- 24-hour average PM₁₀ concentrations - increase of approximately 30 µg/m³, which is less than DECC's 50 µg/m³ assessment criterion. 24-hour average PM₁₀ concentrations could still exceed the assessment criterion on days when the background-level of PM₁₀ is above 20 µg/m³ (eg when bushfire smoke is present), if emissions from Abel are also at their maximum.

⁷ It should be noted that significantly lower figures are reported in the EA. It has been confirmed that these figures reflect modelled impacts only after the proposed overland coal conveyor to the Bloomfield CHPP has been constructed. The figures in the AQA are the true worst case figures, since they are based on coal haulage by truck to the CHPP, which the Proponent proposes to use until at least 2012.

- annual average PM concentrations – increase of approximately $7 \mu\text{g}/\text{m}^3$, which is less than DECC's $30 \mu\text{g}/\text{m}^3$ annual average assessment criterion. Annual average PM_{10} concentrations at Blackhill have averaged $19.2 \mu\text{g}/\text{m}^3$ and have not exceeded $25 \mu\text{g}/\text{m}^3$ since monitoring commenced in May 2000.
- annual average TSP concentrations – increase of approximately $9 \mu\text{g}/\text{m}^3$, which is less than the DECC's $90 \mu\text{g}/\text{m}^3$ annual average assessment criterion. The annual average TSP concentration at Blackhill has not exceeded $50 \mu\text{g}/\text{m}^3$ since May 2000.
- annual average dust (insoluble solids) deposition level – increase of approximately $1.0 \text{ g}/\text{m}^2/\text{month}$, which is less than DECC's acceptable annual average increment of $2 \text{ g}/\text{m}^2/\text{month}$.

The AQA concluded that no residence was likely to experience any exceedances of the DECC's long-term assessment criteria for particulate matter (PM_{10}), total suspended solids (TSP) or dust (insoluble solids) deposition. The only potential exceedances would be for 24-hour average PM_{10} concentrations at the nearest residence, and only if there were high prevailing PM_{10} levels, such as might be experienced with significant bushfire activity.

Since this assessment, the Proponent has decided to move the mine's ventilation shaft to within the existing Donaldson open cut, some 300 – 400 m further away from the closest residence. The air quality consultant indicates that this would reduce concentrations of dust from the Project at that residence.

Air Quality Management and Monitoring

The EA indicates that during operation of the Project:

- water sprays would be used on open stockpile areas (including the main ROM and product coal stockpiles), regular visual inspection would be undertaken and water sprays activated as required;
- there would be regular watering of all roads;
- stockpiles at the mine portal would be below ground level;
- conveyors would be enclosed on three sides;
- all mobile equipment would be maintained in good working order to limit exhaust fumes;
- vegetation would be maintained around the mine surface facilities to mitigate visual impacts and reduce off-site transport of dust;
- regular inspections for excessive visible dust generation would be undertaken and appropriate controls would be implemented when such events occur, including ceasing operations during high wind conditions if necessary to ensure effective dust control;
- dust control on site is to be aimed at prevention of air pollution and prevention of the degradation of local amenity; and
- dust emissions would not exceed any statutory limits, relevant DECC guidelines and any applicable EPL.

It is to be noted that these commitments are in respect of both the proposed Abel Coal Mine and also the continued use of the Bloomfield CHPP.

Further, an Air Quality Monitoring Program, covering both the Abel Mine and the Bloomfield CHPP would be prepared. This program would be integrated with the existing monitoring programs for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated air quality monitoring program for all four mines and the CHPP. The EA commits that regular analysis and reporting of the monitoring results would be undertaken to identify any problems should they arise.

The Department concludes that the Project would meet all operational and construction project specific and cumulative air quality criteria, with the exception of possible exceedances of cumulative 24-hour average PM_{10} concentrations at the nearest residence in adverse weather conditions (particularly bushfire conditions). It is not expected that such conditions would arise regularly. However, it is noted that the nearest existing dust monitoring station to this residence, while subject to the same wind patterns, is roughly twice away as far from the proposed surface facilities (2 km, rather than 1 km). Further, it is noted that the existing air quality monitoring program only includes two high volume air samplers, both of which are well to the southeast of Donaldson open cut, and neither of which are close to the Bloomfield CHPP or the populated areas of Ashtonfield and East Maitland.

The Department considers that the AQA satisfactorily assesses air quality impacts associated with the Project and, generally speaking, adequately provides for their monitoring and management. However,

the Department considers that a number of additional dust monitoring stations are warranted. These include:

- additional dust deposition gauges close to the nearest affected residence and in East Maitland; and
- high volume air samplers in Ashtonfield and East Maitland.

The Department has proposed conditions of approval designed to facilitate integrated monitoring and management of air quality emissions across the Donaldson/Bloomfield mining complex and continued improvement of air quality mitigation.

4.6 Greenhouse Gas Emissions

The Proponent provided estimates in the EA of greenhouse gases (GHG) which would be emitted by the Project during mining. These estimates were as little as 5,800 tpa CO₂-equivalent in Year 1 of the mine's life to 710,000 tpa CO₂-equivalent in Year 25. The increase is principally due to the increase in the underground mining area over that time. A substantial fraction of these emissions result from methane in the mine ventilation air, despite the fact that the Abel project is not considered to be a "gassy" mine.

As part of its Response to Submissions, the Proponent provided further estimates of GHG emissions associated with transport of product coal for export 30 km from Bloomfield CHPP to the Port of Newcastle, and thence the burning of that coal in other countries for energy purposes. All estimates were prepared by Holmes Air Sciences.

Even at maximum production (3.6 Mtpa of product coal), transport to Newcastle is expected to result in only some 1,330 tpa of CO₂-equivalent. However, as might be expected, emissions associated with burning the coal would be much larger than those associated with mining or transport. The Proponent estimates that approximately 7.155 Mtpa CO₂-equivalent of greenhouse gas emissions would result from burning 3.6 Mtpa of its product coal, assuming that 55% is used for coking purposes and the remainder for thermal purposes. Combining these figures (for mining, rail transport and burning) leads to a maximum total annual emission of 7.833 Mt for coal produced by the Project, which is reported on behalf of the Proponent to be equivalent to 0.034% of current annual global GHG emissions.

It should be noted that these figures provided by the Proponent are theoretical maxima, rather than anticipated annual averages. The figures are based on the Abel mine proposal's maximum design capacity (which is 4.5 Mtpa), rather than its "target production" scenario (which averages 3.85 Mtpa over 20 years), or its more likely "provisional production" scenario (which averages 2.63 Mtpa).

Further, global GHG emissions are currently rising and are projected to continue to do so over the life of the Project and maximum annual emissions would not occur until well into the Project life (either 2013 or 2015 depending on which of the above scenarios is adopted). Given this, it is certain that average annual total emissions from coal produced at Abel would be a substantially lower percentage of annual global emissions than has been predicted on behalf of the Proponent. For example, should global emissions rise merely 2% pa throughout the projected 20 year mine life, then, under the "target production" scenario, average annual global emissions from coal produced at Abel would be 0.0234% of average annual global emissions over that time. Under the same assumptions, then under the mine's anticipated "provisional production" scenario, average annual global emissions from Abel coal would be just 0.0160% of average annual global emissions. Given that global temperatures are estimated to be currently rising by roughly 0.1°C per decade, then it is apparent that GHG emissions from the Abel Project may lead to a global rise in temperature of roughly 0.000002°C over a decade. Clearly, these figures are very small.

Further, it must be noted that, if the Project was not approved, the resultant gap in coal supply would almost certainly be filled by coal supplied from an existing mine in NSW, or a new or existing mine elsewhere in Australia or overseas. In other words, removing the GHG emissions from the Abel Coal Project is unlikely to result in *any* decrease in global CO₂ emissions. This point illustrates the reality that key responses to the issue of global warming/climate change need to be made at a policy or strategic planning level, outside and above the NSW project assessment process.

The Proponent also points out that the adopted convention in greenhouse gas accounting and inventories is that these "downstream" emissions are attributed to the user of the coal rather than the producer, so as to avoid double counting. Leaving the accounting of emissions from the use of coal to

the end user is also desirable as these emissions depend on the method by which the coal is used to produce energy and any control measures that might be in place.

Nonetheless, the Department recognises that global warming and climate change pose a significant threat to society and the environment and that decision-making under the EP&A Act must have regard to the object (*inter alia*) of “encouraging” ESD. The *Protection of the Environment Administration Act 1991* indicates that ESD can be achieved through the implementation of (*inter alia*) the precautionary principle and the principle of intergenerational equity. The precautionary principle only applies where there are threats of “serious or irreversible environmental damage”. The principle of inter-generational equity requires the present generation to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The Department considers that the determination of the project application with regard to anticipated GHG impacts and the achievement of ESD should take into account:

- the very small scale of the Project’s overall contribution to GHG emissions and therefore to global warming and climate change;
- whether refusing the project application would actually reduce global GHG emissions;
- the need for the project;
- the benefits of the project, including job creation and its contribution to the NSW economy;
- the objects of the EP&A Act, including the encouragement of ESD; and
- available GHG impact mitigation measures.

Further, significant responses to the issues of global, national and sector GHG emissions and global warming and climate change are most appropriately made at the international, national and State level, through strategic policy instruments applying either to the whole economy or to industry sectors, rather than to individual mine or other proposals during the environmental assessment process under the EP&A Act. The Department concludes that there is no significant reason relating to GHG emissions (either relating to the mining process or the burning of product coal) to withhold approval for the Project.

4.7 Tailings and Coarse Reject Disposal

The Bloomfield CHPP is expected to continue to receive ROM coal from Bloomfield and Donaldson Mines until 2010, from the Tasman Mine until 2017, and is proposed to receive ROM coal from the Abel mine until 2027. A proportion of the ROM coal is unfit for sale and the principal purpose of the CHPP is to separate this proportion as either coarse rejects or fine tailings. Based on experience at Bloomfield CHPP and other mines, the estimated average proportions of coarse rejects and fine tailings are:

- open cut ROM coal 21% coarse rejects, 14% fine tailings; and
- underground coal 12% coarse rejects, 8% fine tailings.

Currently, Bloomfield CHPP coarse reject is mixed with overburden material and placed back into Bloomfield’s open cut pits. The EA proposes that this process be continued, which would assist in filling voids in preparation for surface rehabilitation.

Since 2003, fine tailings have been pumped into the former Big Ben seam underground workings at Bloomfield Colliery. Water is then recovered from the underground workings and recirculated to the CHPP. To June 2006 an estimated 1.2 Mt of fine tailings was disposed of in this way, occupying perhaps 1 million m³ of the estimated 4.8 million m³ of the available void space. The EA assumes that tailings could be injected into only 50% of the available 4.8 million cubic metres of underground void space. On this basis, there is an estimated 1.4 million m³ capacity remaining in the underground workings.

However, there is also an estimated 16.8 million m³ volume remaining in Bloomfield’s open cuts. There is therefore an estimated total capacity for coarse rejects and tailings of 18.2 million m³ within the existing Bloomfield operations.

Potential coarse reject and tailings volumes have been calculated as part of Appendix F to the EA. Volumes were calculated for both target and provisional production scenarios. Calculations showed that for each production scenario, there is sufficient capacity to accept all reject and tailings material over the anticipated life of all mines proposed to supply the Bloomfield CHPP.

The Department considers that the proposed coarse reject and tailings disposal strategy is sound, and utilises available opportunities at Bloomfield Mine while improving rehabilitation and environmental management outcomes for each mine which provides ROM coal to the CHPP. The Department supports the proposed strategy.

4.8 Rehabilitation

Rehabilitation of subsided areas would take place in accordance with the Subsidence Management Plan to be developed, including particular Trigger Action Response Plans (TARPs).

The EA states that decommissioning of the Abel underground mine at the end of mining would involve sealing the underground access portals and removing surface infrastructure, including offices, bath house, ROM coal stockpile infrastructure, workshop, conveyors and operational water management structures.

The remaining Donaldson void around the Abel portal would be reshaped. The eastern, western and southern sides of the final void would be blasted and pushed to a maximum slope of 18 degrees. The northern side would be blasted and regraded to a maximum of 10 degrees, with a permanent vehicle access ramp. Water management structures such as contour banks, drains and drop structures would be established to divert most of the surrounding catchment away from the void to limit water accumulating in the pit. However, the Proponent expects that some water would accumulate in the pit (to a maximum depth of 24 m, below 40 metres RL.) Due to the expected standing water at the bottom of the void, a safety berm and security fence would be provided around the void to prevent unauthorised access.

The Abel Mining Operations Plan would include a Mine Closure Plan. A detailed rehabilitation plan would be developed as part of the Mine Closure Plan prior to 5 years before closure.

The Department considers that the rehabilitation proposals are generally appropriate, and would minimise both the eventual scale and impact of the Donaldson final void proposed to be used for the Abel surface facilities. The Department has proposed conditions of approval for the Project to require a Landscape Management Plan, Rehabilitation Management Plan, Mine Closure Plan and Final Void Management Plan.

4.9 Traffic

The Abel Underground Mine would have minimal impact on the local road network as no coal would be hauled on public roads. Coal would be conveyed to the CHPP via existing private haul roads on the Donaldson and Bloomfield mines and a conveyor constructed when economically viable. The existing rail loading facility would be used and so no trucks would haul coal to the Port of Newcastle.

A Traffic and Transport Assessment was undertaken as part of the EA to determine employee and general delivery numbers, access requirements, impacts on the local road network, road safety and efficiency/performance of affected intersections. Operation of the Abel Mine is expected to generate a maximum of 560 vehicular trips per day on the existing road network. Access to the mine's surface facilities would be via the existing Donaldson access intersection on John Renshaw Drive, approximately 2 km west of the F3 Freeway - Weakleys Drive roundabout. This recently constructed intersection is a high standard channelised T-intersection with long deceleration and acceleration facilities for traffic entering and leaving the Donaldson Mine access.

The impact of the 560 additional trips on key roads in the Beresfield - Thornton area was assessed as negligible, with increases below 1% on most roads, whereas natural growth rates are around 6%. The exception to this is John Renshaw Drive east of the Donaldson access where a 6.9% increase in traffic would be expected. However, this increase is unlikely to have any noticeable impact on the road's capacity or safety.

The Roads and Traffic Authority (RTA) and the associated Hunter Regional Development Committee have both proposed that the Proponent upgrade the intersection between John Renshaw Drive and Blackhill Rd "if access is required to the [underground mining area] on the southern side of John Renshaw Drive". The Proponent has indicated in its Response to Submissions that the only mine-related traffic to use this intersection would be a small number of personnel visiting the underground mining area to monitor subsidence or other environmental parameters, visit residents or undertake subsidence management works. The additional amount of Abel traffic predicted to use John Renshaw

Drive west of the Donaldson intersection (where the Black Hill Road intersection is located) was assessed as 56 vehicles per day, or 0.8%, which is negligible. The RTA has also admitted in its submission that it is “difficult to draw a nexus between the proposed development and any upgrade works required at [this] intersection”.

The Department considers that there is no case for the Proponent to contribute in any substantial way to the upgrade of the intersection. However, the RTA indicates that the Proponent has offered to undertake “minor works to improve the operation and safety of the intersection”. The Department supports this proposal.

The Department concludes that traffic impacts of the Project would be minor, and are well-managed by the Proponent’s primary proposal to use the existing Donaldson access road to access the Abel surface facilities.

4.10 Aboriginal Heritage

The EA contains an assessment of Aboriginal heritage by South East Archaeology. The heritage assessment involved:

- searches of the DECC Aboriginal Heritage Information Management System (AHIMS), other relevant heritage registers and environmental planning instruments;
- development of a predictive model of Aboriginal site location for the site area;
- field survey of areas to be disturbed by surface infrastructure;
- reconnaissance inspection of the underground lease area; and
- limited consultation with the local Aboriginal community.

The assessment focused on about 1.5 km² of the Donaldson and Bloomfield mines adjacent to the footprint where surface infrastructure is proposed to be further developed (see Fig 1 in Appendix K to the EA) and only involved limited field surveys in the underground mining area. The survey discovered 15 small sites additional to the 23 already known. 33 of the known 38 sites are artifact scatters or single artifacts. Most newly found sites were associated with the proposed footprint for surface infrastructure. Only 4 additional sites were discovered south of John Renshaw Drive, including two sets of grinding grooves (Abel 1 and Abel 2).

Most known sites in the Project area north of John Renshaw Drive were either discovered during environmental impact assessment for the Donaldson mine or during this present survey. There has never been a comprehensive Aboriginal heritage survey across the greater part of the Bloomfield mine.

The Proponent has proposed that an Aboriginal Heritage Management Plan would be developed and implemented for the Project area, in consultation with relevant Aboriginal stakeholders, to specify the policies and actions required to mitigate and manage potential impacts on Aboriginal heritage. The plan would include procedures for ongoing Aboriginal consultation and involvement, maintenance of an Aboriginal site database, management of recorded sites, further archaeological investigation prior to undermining, identification and management of previously unrecorded sites and a program of monitoring. The plan would be regularly verified to establish that it is functioning to the standard required.

The Proponent has also committed to staged, systematic archaeological surveys of each section of the underground mining area, with the participation of the Aboriginal stakeholders, prior to underground mining in that section. Where sites susceptible to subsidence impacts (eg grinding grooves and rock shelters) are identified, an expert assessment of the potential impacts of subsidence would be undertaken. Where it is determined that subsidence may impact such sites, mitigation measures would be implemented. A regional monitoring network for Aboriginal heritage across the Abel, Tasman, Donaldson and Bloomfield sites would also be established.

DECC considers the Aboriginal heritage assessment undertaken to date for the Project to be “preliminary”, a view which was not rebutted in the Proponent’s Response to Submissions and with which the Department concurs. DECC recommended that conditions of approval require that a comprehensive archaeological survey be undertaken and more comprehensive consultation with Aboriginal knowledge holders. The Department agrees with this position, and has developed conditions to that effect. The Department accepts the Proponent’s proposal that the comprehensive surveys be staged across the mining area, but considers that all areas within the project application

area north of John Renshaw Drive, including the entirety of the land above the Bloomfield mining lease, should be subject to a further comprehensive Aboriginal heritage survey prior to any impact by the Project.

4.11 Cumulative Issues

As previously discussed, the proposed Abel underground mine would interact with the nearby Tasman underground mine, Donaldson open cut mine, Bloomfield open cut mine and Bloomfield's CHPP and rail loading facility. There are no other coal mining activities in the nearby area.

The potential for significant cumulative impacts is very much reduced by the Proponent's innovative proposals to integrate its operations with these neighbouring mines and associated operations, including those separately owned by Bloomfield Colliery. For example, the Abel proposal would utilise existing areas of disturbance within the Donaldson open cut to house its surface infrastructure, thereby minimising surface disturbance. Existing haul roads from Donaldson would be used and the existing intersection north of John Renshaw Drive would be used by both Abel's and Donaldson's mine employees, as well as Tasman's haul trucks.

Donaldson's consent expires in 2012 and therefore potential noise and dust impacts are associated with the simultaneous operation of Abel and Donaldson mines until that date. Potential cumulative impacts were examined in detail by the relevant specialist studies supporting the EA. These studies found that no criteria would be exceeded even when both mines are operating, except for the 1 dBA noise exceedance predicted to occur at night-time during a prevailing northwest wind at location K.

Tasman and Abel Underground Mines would both utilise the Bloomfield CHPP and rail loading facility. Impacts associated with the combined use of this facility by these and any other mines were assessed in the EA.

Integrated Monitoring Network

The proposed Project includes the development of an Integrated Monitoring Network to monitor, review and report environmental data across the Donaldson/Bloomfield mining complex (see Figure 6, ie the Donaldson and Tasman Mines and the proposed Abel Mine (all owned by the Proponent) and Bloomfield Mine, Bloomfield CHPP and the associated Rail Loading Facility (all owned by Bloomfield Collieries).

The EA states that Integrated Monitoring Network would assist the development of a sub-regional model of environmental data from Mount Sugarloaf to Ashtonfield, rather than focusing on individual mine site issues. It would reduce duplication of monitoring on individual sites and identify sensitive areas that may be between mine sites that require additional monitoring. Data would be shared across the sites and reported in one Integrated Monitoring Network document. Individual site reporting would still be provided as required by DECC's Environmental Protection Licences.

Monitoring to be included in the Integrated Monitoring Network includes:

- noise;
- air quality;
- surface water;
- groundwater; and
- Aboriginal heritage.

Figure 6 shows the Integrated Monitoring Network, as set out in the EA. It includes the existing Tasman, Donaldson, Bloomfield and Abel piezometers and the Donaldson and Bloomfield noise, dust and blast monitoring networks.

The EA also indicates an intention to partially integrate management plans across the Donaldson/Bloomfield mining complex. In large measure, the proposal is to amend and extend the existing suite of Donaldson Environmental Management Plans (EMPs) to apply to operations covered by the project application for the proposed Abel mine and also (although less clearly) to the Bloomfield CHPP and Rail Loading Facility. There would also be 6 new stand-alone EMPs prepared for the Abel underground mine (covering Construction, Subsidence, Groundwater, Watercourse Subsidence, Dam Subsidence and Repair, and Gas). This overall suite of EMPs would in turn relate to the existing EMPs for Tasman.

However, the EA also intimates that the Bloomfield Mine and CHPP do not currently have either an environmental management system (EMS) or a full suite of EMPs. No particular commitment is made in the EA to remedy this state of affairs, although it is proposed that a single EMP would be prepared to cover the operation of the CHPP and the Rail Loading Facility. It is also stated that the Donaldson Erosion and Sediment Control Plan would be extended to cover the Bloomfield CHPP and that the proposed Construction and Surface Water Management Plans would also cover the Bloomfield part of the Project site. However, it is quite unclear as to the extent that the overall suite of Donaldson EMPs would apply to the Bloomfield CHPP and Rail Loading Facility, and it is implied that they would not cover Bloomfield Mine at all.

The Department considers it appropriate that the Bloomfield operations, which are, in a sense, an integrated whole, should be subject to its own separate EMS and a stand alone, integrated set of EMPs to improve its environmental management and reduce its environmental footprint. This suite of stand alone EMPs should cover the whole of the Bloomfield operations, including the Bloomfield Mine, which is entirely within the project application area. The Department has recommended conditions to this effect.

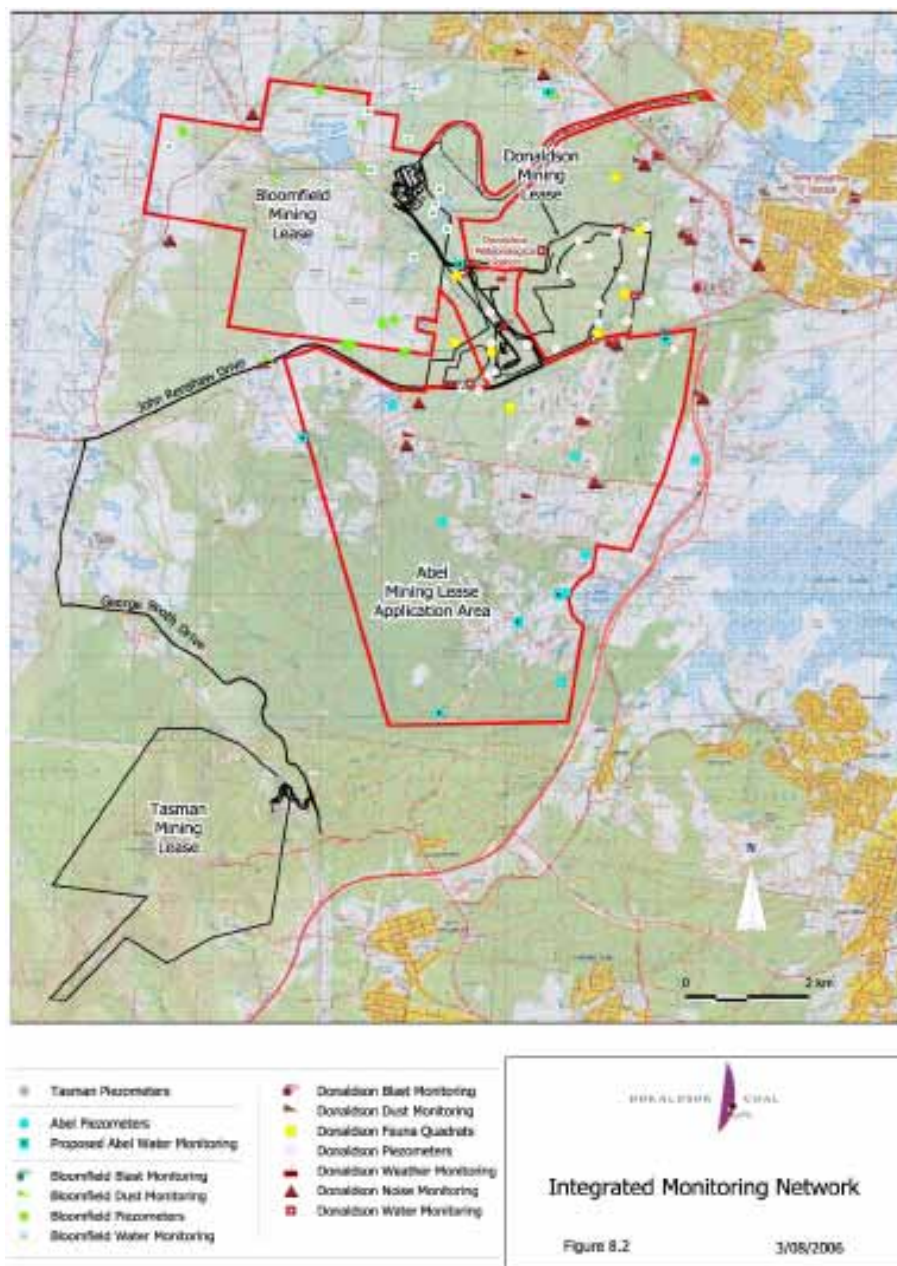


Figure 6: Integrated Monitoring Network

4.12 Community Contributions

Donaldson Coal Pty Limited already makes significant contributions to the local community in association with its existing Donaldson mining operation. In particular, it has established the Donaldson Job Creation Trust, a charitable trust set up to distribute \$1,000,000 over ten years in the Lower Hunter in the areas of job training, job creation and Youth at Risk programs. While half of this money has been expended, a further \$500,000 remains to be spent. The company proposes that this expenditure becomes part of its Statement of Commitments for the Abel Coal Project.

Donaldson has also proposed additional community enhancement contributions as set out in Table 2:

<i>Community or Environmental Sector</i>	<i>Contribution</i>
<p>Conservation</p> <p>\$1,000,000 to be distributed over ten years by a community trust to be established for the purpose.</p> <p>These monies will be able to be expended by the trust on environmental education or research or environmental management works or activities in State Conservation Area lands or other environmentally valuable lands within or above Donaldson's mining leases, exploration licences or other land owned by the company.</p>	\$1,000,000
<p>Community Welfare</p> <p>\$250,000 over 5 years to be spent as decided by a community trust on educational needs, community works or other works or activities of benefit to the community within the Abel underground mine area.</p>	\$250,000
<p>Road Safety</p> <p>\$250,000 towards the cost of upgrading the intersection of Black Hill Rd and John Renshaw Drive, provided that construction is initiated by June 2009.</p>	\$250,000

Table 2: Proponent's Company Contribution Initiatives

When taken together with the money yet to be expended on job training, job creation and Youth at Risk programs, this is a significant contribution to local community welfare and environmental improvement. The Department is satisfied with the Proponent's community contributions, and recognises that they are set out in full within its final Statement of Commitments.

4.13 Other Issues

Other environmental impacts of the Project are minor and readily managed. A summary of these impacts and the Proponent's proposed management measures are set out in Table 3.

<i>Issue</i>	<i>Potential Impacts</i>	<i>Mitigating Factors</i>
Waste Management	<ul style="list-style-type: none"> Inadequate management of industrial wastes may lead to aesthetic, surface water, groundwater and bushfire risks. 	<ul style="list-style-type: none"> Waste management will be as per the existing Donaldson Mine and Bloomfield CHPP Waste Management Plans, which manage general refuse, waste oils and greases, used tyres and equipment, scrap metal and drums.
Fuel and Chemical Storage	<ul style="list-style-type: none"> A permanent bulk fuel farm facility on the Donaldson Mine stores up to 100,000 litres of diesel fuel and is contained by an earthen bund. Oil and grease is delivered to site in drums. A bunded storage pad is used to store full drums. All waste oil collected during servicing is stored in a 5000 litre tank and sent for recycling. Inadequate management of fuels and chemicals may lead to air pollution, surface and groundwater pollution and bushfire risks. 	<ul style="list-style-type: none"> All fuels and chemicals would be stored in accordance with the existing Donaldson Fuel and Chemical Storage Controls and Bloomfield CHPP procedures. All fuels and chemicals are to be stored within bunded compounds in the proposed Abel surface facilities area or within the Bloomfield CHPP. No fuels or chemicals will be stored south of John Renshaw Drive.

Issue	Potential Impacts	Mitigating Factors
Erosion and Sediment Control	<ul style="list-style-type: none"> There are minimal activities associated with the Project that will require erosion and sediment control works. 	<ul style="list-style-type: none"> All works for the Abel box cut and subsequent construction of surface facilities will be undertaken within the boundaries of the existing Donaldson Mine. The majority of works in the vicinity of the stockpile area for the Bloomfield CHPP will be undertaken within an area that reports to the existing Stockpile Dam and Dam F. Standard erosion control practices such as silt fences will be used for other earthworks. If a conveyor is constructed between the Abel box cut and the Bloomfield CHPP, a separate Erosion and Sediment Control Plan will be prepared that takes account of the conveyor, particularly the crossing of Four Mile Creek.
Construction Management	<ul style="list-style-type: none"> Improperly managed construction operations have the potential to cause dust emissions and sediment and erosion problems. 	<ul style="list-style-type: none"> A Construction Management Plan will be prepared that details environmental protection, management and monitoring requirements for the construction phase of the Project. This Plan will be formed in association with Bloomfield Collieries so that construction areas, such as access roads and pipelines that are located in both lease areas apply the same management procedures.
Gas Management	<ul style="list-style-type: none"> Methane testing undertaken as part of the most recent exploration program indicates that the seams generate very low levels of methane. Therefore, it is unlikely that methane extraction equipment will be required. 	<ul style="list-style-type: none"> However, if the mine experiences methane generation from strata above or below the target seam that impedes production or overloads the ventilation system, goaf drainage plants may need to be installed.
Visual Amenity	<ul style="list-style-type: none"> The EA's visual impact assessment notes that a significant portion of the required surface infrastructure is already present on the Donaldson Mine, and any additional infrastructure and works can easily be accommodated on already disturbed. Additional infrastructure is to be situated such that it would either not be visible from surrounding areas at all, or would only be perceptible as a modification to existing mining infrastructure. The mitigation measures proposed would lead to an improvement in existing visual impacts from the Bloomfield CHPP. 	<ul style="list-style-type: none"> The access portals for the Abel Mine will be located in the high wall of the existing Donaldson Open Cut Pit. If the overland conveyor to the Bloomfield CHPP to the Abel Underground Mine portal is constructed, its maximum height will not exceed 15 m so to ensure that it is concealed from view by surrounding trees. Where possible the route will follow existing haul roads and tree clearing will be minimised to further reduce visual impacts. New buildings and structures, as well as existing buildings and structures at the Bloomfield CHPP, visible from surrounding areas will be painted a dark charcoal colour. All reasonable measures will be taken to design the stockpiles at Bloomfield CHPP so as to minimise their visual impact on the East Maitland and Ashtonfield areas.
Lighting	<ul style="list-style-type: none"> Inappropriately designed and directed lighting has the potential to impact on residential amenity in the area. 	<ul style="list-style-type: none"> Existing lighting will be redesigned and new lighting will be designed, so as to minimise, via the use of directional lighting, light spill affecting residents in the East Mainland, Ashtonfield Areas and Black Hill areas.
Non-Aboriginal Heritage	<ul style="list-style-type: none"> Subsidence may affect the elevated railway corridor of the former Richmond Vale Railway. 	<ul style="list-style-type: none"> Potential damage is considered to be "negligible" in the SIA, partly because most of the corridor is located above the proposed surface protection barrier for Blue Gum Creek.

Table 3: Minor Potential Impacts of the Abel Coal Project

5. RECOMMENDED CONDITIONS

The recommended conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the Project;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting in accordance with current best practice; and
- provide for the ongoing environmental management of the Project; and
- ensure that long term rehabilitation and final land use objectives for the mine are satisfactorily achieved.

The recommended conditions address management of mining induced subsidence (including limits on subsidence on sensitive features), surface water and groundwater impacts, noise and air quality impacts, Aboriginal heritage impacts, greenhouse gas emissions, landscape and rehabilitation management and environmental management systems, on-going environmental monitoring, community consultation and complaints management and performance audits.

A summary of the recommended conditions of approval is provided in Appendix A and a full set appears in Appendix B. The Proponent has reviewed these conditions and accepted them. The Department believes these conditions reflect current best practice for the regulation of coal mines in NSW.

6. CONCLUSION

The Department has assessed the project application, EA, submissions from agencies and the community and the Proponent's response to submissions and is satisfied that there is sufficient information available to determine the application. The key issues identified in the Department's assessment or that arose in submissions concern subsidence impacts on sensitive natural and built surface features. However, the Project is based on partial extraction below and adjacent to sensitive surface features, leading to reduced (and controlled) subsidence outcomes.

The Proponent has proposed low subsidence protocols which are significantly in advance of those adopted by many other underground coal mining operations. All other environmental impacts of the Project are limited, largely due to the Proponent's proposals to:

- locate the surface facilities for the Abel coal mine within an existing final void of the nearby Donaldson open cut coal mine;
- wash its coal at the nearby Bloomfield Coal Handling and Preparation Plant (CHPP); and
- dispose of coarse reject and tailings from the Bloomfield CHPP in available underground and open cut voids on the Bloomfield Mine.

Other environmental impacts of the Project include potential impacts on groundwater, surface streams, overlying farm dams, and noise.

However, the Project would have a total capital investment value of \$83.5 million and employ around 375 people during 20 years of extraction. The Department is satisfied that the residual environmental and socio-economic impacts of the Project can be adequately mitigated, managed, offset and/or compensated for and that the Project's benefits significantly outweigh its costs. The Department recommends approval of the Project, subject to conditions which cover all current and proposed operations.

7. RECOMMENDATION

It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (Tagged B).

David Kitto
Director
Major Development Assessment

Chris Wilson
Executive Director
Major Project Assessment

Sam Haddad
Director-General

APPENDIX A. CONDITIONS OF APPROVAL SUMMARY

The Department has recommended a number of conditions of approval, including requirements to:

- limit mining operations under the approval to 21 years and production of ROM coal from the proposed Abel Mine to 4.5 Mtpa;
- limit preparation of coal at the Bloomfield CHPP to 6.5 Mtpa, to produce no more than 5 Mtpa of product coal;
- limit subsidence impacts on sensitive natural and built surface features, as follows:
 - **zero subsidence impact** on the Pambalong Nature Reserve and the F3 Freeway;
 - **negligible subsidence impact** on:
 - all primary residences;
 - Black Hill Public School and the proposed Catholic High School site;
 - Black Hill Church and cemetery;
 - the Boral Hotmix Plant and associated buildings and structures;
 - the four largest dams serving the commercial orchard situated on Properties 52 and 53; and
 - all Schedule 2 creeks, rainforest areas and the Blue Gum Creek alluvium; and
 - **reduced subsidence impact** on identified cliff areas.
- prepare and implement a comprehensive Site Water Management Plans for the Project to monitor and manage surface and groundwater impacts. The components of the Plans include a:
 - Site Water Balance;
 - Erosion and Sediment Control Plan;
 - Surface Water Management Plan; and
 - Groundwater Monitoring Program and Management Plan.
- offset the proposed clearing and disturbance of 12.3 ha of native vegetation by conserving 20 ha (including 10 ha of Lower Hunter Spotted Gum Ironbark Forest), contiguous with existing native vegetation and capable of enhancing local and regional wildlife corridors;
- prepare and implement detailed Landscape Management Plans. The components of the Plan include :
 - Rehabilitation Management Plan;
 - Final Void Management Plan; and
 - Mine Closure Plan.
- comply with strict criteria and develop monitoring programs for noise emissions and air quality; and
- prepare and implement Aboriginal Heritage Management Plans.

APPENDIX B. RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX C. CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

State Environmental Planning Policy (Major Projects)

See discussion in Section 3.1.

State Environmental Planning Policy (SEPP) No. 11 – Traffic Generating Development

The proposal is affected by the provisions of SEPP 11, as an 'extractive industry or mining' (Schedule 1 paragraph 'm'). As such, the application was referred to the RTA, who subsequently confirmed that it had no objection to the proposal. See section 4.9.

SEPP No. 33 – Hazardous and Offensive Development

SEPP 33 requires consideration of whether an industrial proposal is a potentially hazardous or offensive industry. This is defined as a development that *'would pose a significant risk in relation the locality: to human health, life or property; or to the biophysical environment, and includes a hazardous industry and a hazardous storage establishment'*.

The EA details management considerations for various aspects such as waste management, fuel storage and emergency response. All hazardous materials would be managed in accordance with Donaldson's existing management procedures that have successfully operated for the Donaldson Open Cut Mine. An Environment Protection Licence (EPL) would be obtained for the proposed development. As such, the Department is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No. 44 – Koala Habitat Protection

The Environmental Assessment identified that the project site does not contain 'core' or 'potential' Koala habitat and does not have a resident population of Koalas. As such, the Department is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 44.

SEPP No. 55 – Remediation of Land

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. In particular, this policy requires consideration of whether a development requires a consent for remediation works or not and requires that remediation works meet certain standards and notification requirements. It also requires a consent authority to consider whether, if land is contaminated, it is suitable in this state for the proposed development.

The Department is satisfied that the proposal is generally consistent with the aims, objectives and requirements of SEPP 55.

APPENDIX D. REVIEW OF GROUNDWATER IMPACTS – ABEL UNDERGROUND MINE (KALF & ASSOCIATES)

See attached CD-ROM containing a file entitled *Review of Groundwater Impacts – Abel Underground Mine (Kalf & Associates)*, dated 21 December 2006.

APPENDIX E. PROPONENT'S RESPONSE TO THE SUBMISSIONS

See attached CD-ROM containing a file entitled *Abel Underground Mine Part 3A Environmental Assessment, Response to Submissions*, dated 19 January 2007.

APPENDIX F. SUBMISSIONS

See the attached CD-ROM containing a folder entitled *Submissions*.

APPENDIX G. ENVIRONMENTAL ASSESSMENT REPORT

See the attached CD-ROM entitled *Abel Underground Mine Part 3A Environmental Assessment*, dated 22 September 2006.