



**Planning &
Infrastructure**

***Abel Coal Project
Longwall Mining Modification
(05_0136 MOD 3)***



Environmental Assessment Report
Section 75W
Environmental Planning and Assessment Act 1979
December 2013

Cover Photo: The pit-top at the Abel Underground Coal Mine
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NSW Department of Planning and Infrastructure
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EXECUTIVE SUMMARY

The Abel Underground Coal Mine is located approximately 23 kilometres northwest of Newcastle within the Cessnock City, Maitland City and Newcastle City local government areas. The mine is owned and operated by Donaldson Coal Pty Limited (Donaldson), which is a wholly owned subsidiary of Yancoal Australia Limited.

The mine operates under a 2007 Ministerial project approval that allows Donaldson to extract up to 4.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal using underground bord and pillar mining methods until 2028, and to operate the nearby Bloomfield Coal Handling and Preparation Plant (CHPP). The Bloomfield CHPP processes coal from Abel, as well as coal from the nearby Donaldson Open Cut Mine, the Tasman Underground Coal Mine and the Bloomfield Colliery. The approval also allows Donaldson to transport all product coal from the CHPP to the Port of Newcastle by rail.

Donaldson proposes to change its underground mine plan to extract a further 10 million tonnes of coal, and introduce more-intensive mining methods in discrete areas of the Abel mine. It plans to extract five longwall panels from part of the Lower Donaldson Seam and to extract five shortwall panels in a separate part of the same seam. It also proposes to undertake bord and pillar mining and pillar extraction in the Upper Donaldson Seam in the southern half of the underground mining area, and undertake total pillar extraction from four thin seam panels in the Upper Donaldson Seam, directly above the proposed longwall panels. The proposed changes to the mine plan would not preclude the ability to instead undertake bord and pillar mining in place of longwall and shortwall mining. The proposed changes would extend the life of the mine by up to two years.

The proposed changes would allow Donaldson to increase the rate of ROM coal production at Abel to 6.1 Mtpa. The Bloomfield CHPP would also be upgraded, to process the increased ROM coal from Abel and also increased ROM coal from the recently-approved Tasman Extension Project. The number of product coal train movements would consequently increase. Minor infrastructure works, including a new ventilation shaft and a new alignment for the approved pit-top coal conveyor are also proposed. All other operating functions of the mine would remain as currently approved.

The Department received 16 submissions on the proposed modification: 12 from public authorities, 2 from special interest groups, and 2 from local residents. None of the government authorities objected to the proposal, and only 1 submission objected. The key concerns raised in submissions related to subsidence impacts, including impacts to natural features such as cliffs and watercourses, impacts to built features including residences and dams, and impacts to biodiversity and Aboriginal heritage.

The proposed modification application must be considered under the now-repealed section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act), as the project is classified as a 'transitional Part 3A project' under Schedule 6A of the EP&A Act. The Department has carried out a detailed merit assessment of the merits of the proposed modification in accordance with the relevant requirements of the EP&A Act.

Potential subsidence impacts were the key issue for the assessment, particularly as there are a range of sensitive natural and built features located within the proposed longwall and shortwall mining areas, which include cliff lines, steep slopes, a number of houses, transmission lines and other public infrastructure. To protect these features from significant impacts, Donaldson would apply subsidence control zones to restrict the intensity of underlying or adjacent mining. With the application of these subsidence control zones, the Department is satisfied that any subsidence impacts would be minor, and if unforeseen impacts occur, then they can be readily remediated.

Because the proposed longwall and shortwall mining would generally take place beneath previous workings in a separate coal seam, there is a risk of reactivation of subsidence in the overlying workings causing pillar failure. This risk has been mitigated through requiring that Extraction Plans include a detailed investigation of the overlying workings.

The proposed realignment of an approved (but unconstructed) coal conveyor would lead to a small reduction in the amount of *Lower Hunter Spotted Gum Ironbark Forest EEC* to be cleared. Impacts from this clearing would be adequately offset under an existing Biodiversity Offset Strategy, which includes the long-term conservation of land with similar biodiversity values.

The Department has assessed the other potential impacts of the proposed modification, including noise, Aboriginal heritage, surface water, groundwater and air quality. The Department is satisfied that any impacts relating to these matters would not be significant.

Overall, the Department is satisfied that the proposed modification would not result in significant additional environmental impacts when compared to current approved operations at the mine. Any residual impacts can be managed, mitigated or offset through appropriate conditions of approval.

The proposed modification would also result in a range of ongoing social and economic benefits including:

- employment of an additional 48 employees;
- additional capital investment of \$65 million; and
- provision of \$75 million of royalties to the NSW Government.

The Department is satisfied that these benefits can be realised without any significant adverse environmental impacts, and that the proposed modification is in the public interest, and should be approved subject to strict conditions. Particular regard has been given to protecting natural and built features from potential subsidence impacts, strict management and monitoring of noise impacts, and effective management of surface water. The Department also has reviewed the mine's current project approval, and has updated all conditions to be consistent with other recently approved underground coal mining operations in NSW.

1. BACKGROUND

1.1 Introduction

The Abel Underground Coal Mine (Abel) is located in the Newcastle Coalfield, approximately 23 kilometres (km) northwest of Newcastle, in the local government areas (LGAs) of Cessnock, Maitland and Newcastle (see Figure 1). The mine is owned and operated by Donaldson Coal Pty Limited (Donaldson) - a wholly owned subsidiary of Yancoal Australia Limited.



Figure 1: Mine location

Abel comprises an underground mining area and a pit-top infrastructure area, which includes a box-cut and drift to the mining area and coal stockpiling facilities. Donaldson also operates the Bloomfield Colliery Coal Handling and Preparation Plant (Bloomfield CHPP) and its associated rail loading infrastructure. The approved underground mining footprint and the associated surface facilities are shown in Figure 2.

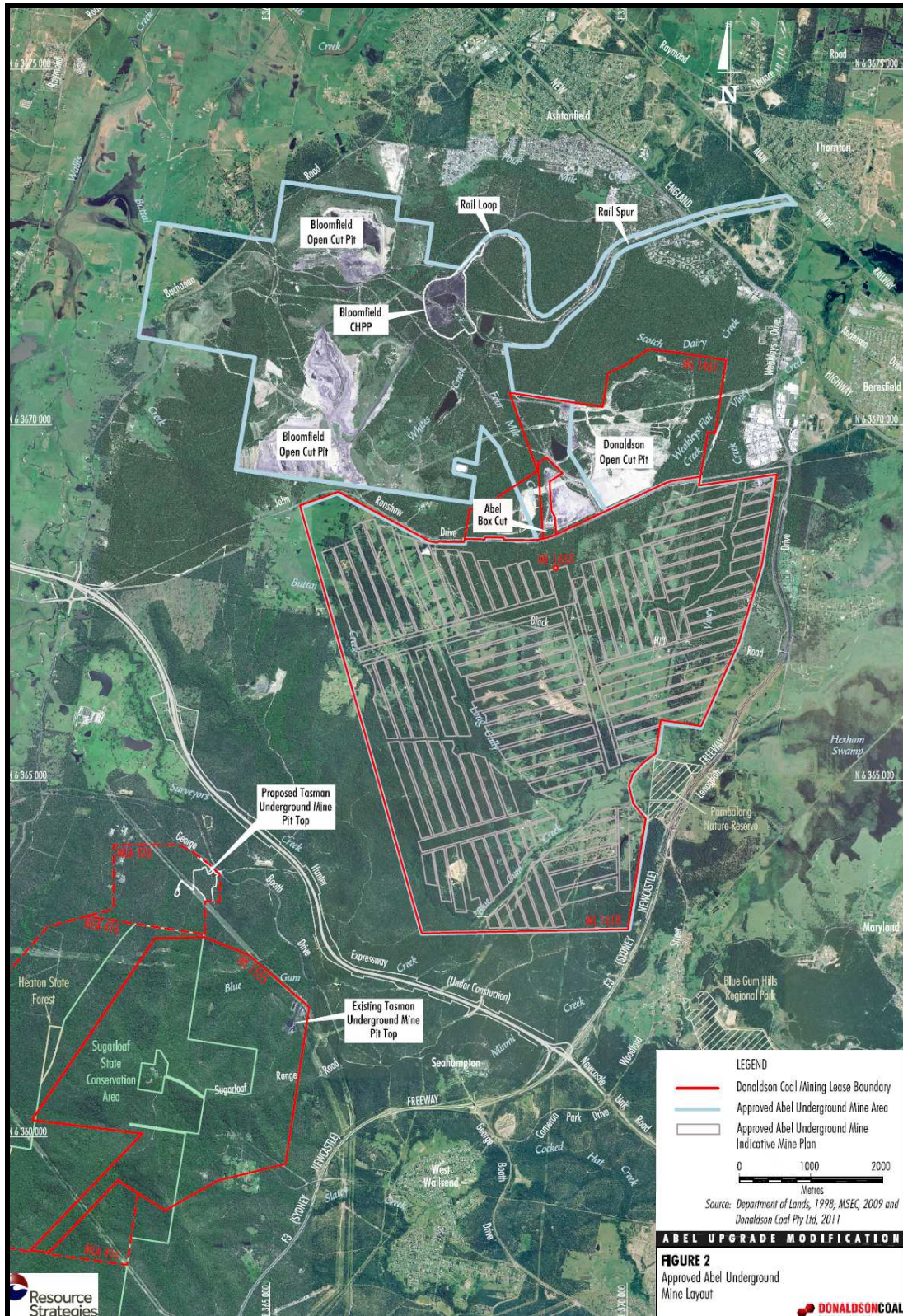


Figure 2: General layout of Abel and its associated surface facilities

The dominant land-uses above the mining area are agricultural, rural residential and a State forest (see Figure 2). Two hard rock quarries, the Black Hill Quarry and the Stockrington Quarry, are also located within the mining footprint.

The F3 Sydney-Newcastle freeway is located around 1 km east of the underground mining area. The Hunter Expressway (due to open late 2013) is located about 1 km southwest of the mining area. The closest urban areas are Beresfield and Thornton, about 2 - 3 km north of the mine (see Figure 2).

1.2 Approved Operations

The existing Abel Coal Project was approved by the then Minister for Planning in June 2007, and mining operations commenced in May 2008. The project approval (05_0136) permits:

- extraction of up to 4.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal, using bord and pillar underground mining methods, until 2028;
- ROM coal to be stockpiled at the Abel pit-top;
- ROM coal transportation from the Abel pit-top to the Bloomfield CHPP, via a 4 km private haul road, or by overland coal conveyor¹;
- the processing at the Bloomfield CHPP of all ROM coal from Abel, the Tasman Underground Coal Mine, the Donaldson Open Cut Coal Mine and the Bloomfield Colliery; and
- the transport of all product coal from the Bloomfield CHPP to the Port of Newcastle via a private rail loop and spur, and the Main Northern Railway.

The Abel project approval has been modified twice, in June 2010 and in May 2011. Both modifications involved the construction of mine ventilation infrastructure.

The mine targets the extraction of coal from the Upper Donaldson Seam and the Lower Donaldson Seam (see Figure 3).

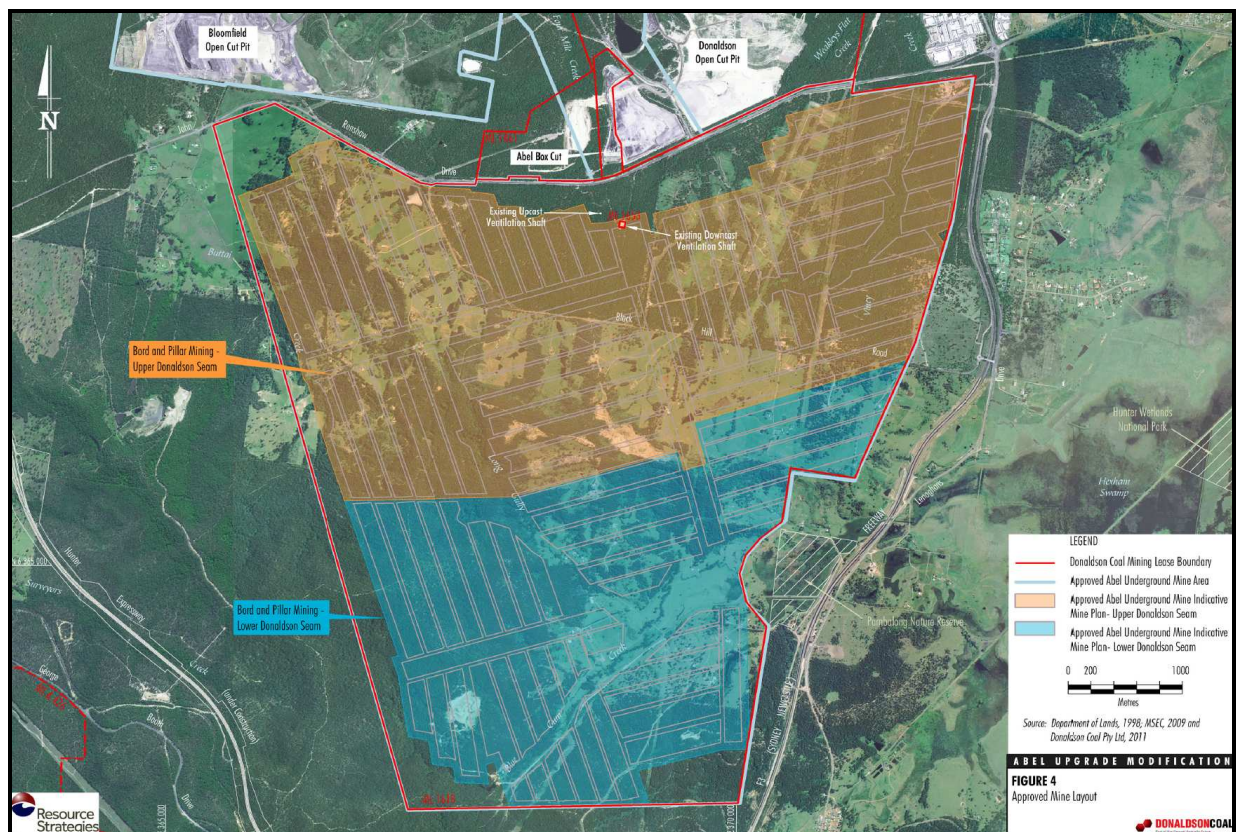


Figure 3: Target seams and approved indicative mine layout

¹ The approved overland coal conveyor is yet to be constructed.
NSW Government
Department of Planning and Infrastructure

2. PROPOSED MODIFICATION

2.1 The Proposal

Donaldson has lodged a modification application (05_0136 MOD 3) under section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

In the period since Abel received project approval, Donaldson has further investigated the potential coal resources at the mine. This investigation has found that a greater and more efficient resource yield can be achieved by introducing longwall mining, 'shortwall' mining and pillar extraction in certain areas of the mine.

Donaldson proposes to extract five longwall mining panels from the Lower Donaldson Seam and five shortwall panels in a separate area of the same seam. It also proposes to introduce first workings bord and pillar mining in the Upper Donaldson Seam in the southern portion of the mine, and undertake total pillar extraction from four 'thin seam' panels in the Upper Donaldson Seam, above the proposed longwall panels. Donaldson would continue its approved bord and pillar and pillar extraction mining in both target seams in other areas of the mine. Donaldson has also proposed that it have the option of conducting longwall and shortwall mining, ie that it could continue to conduct bord and pillar and pillar extraction mining in these areas (as currently approved) if it so chooses.

The proposed modification would allow extraction of an additional 10 million tonnes (Mt) of ROM coal. Because of the greater coal production rates resulting from longwall and shortwall extraction, Donaldson proposes to increase the annual ROM coal production rate from 4.5 Mtpa to 6.1 Mtpa.

The proposed modification would also allow the approved coal processing rate at the Bloomfield CHPP to be increased from 6.5 Mtpa to 8.9 Mtpa. This increase takes into consideration the increase in ROM coal from Abel mine and the increase in ROM coal expected to be received from the recently-approved nearby Tasman Extension Project. The CHPP would need upgrading, including installing a second CHPP module and associated feed and conveyor systems, to handle the proposed additional throughput of ROM coal. Coal reject and fines from the CHPP would be managed by emplacement in the Square Pit at the Donaldson Open Cut mine, and in the Bloomfield Colliery pits.

The proposed modification also seeks to increase the number of ROM coal truck movements on Abel's private haul road, and increased product coal rail movements to the Port of Newcastle via the existing Bloomfield rail loop and rail spur. Donaldson also proposes to change the alignment of the approved coal conveyor from the Abel pit-top to the Bloomfield CHPP. Other minor infrastructure is also proposed, including an additional downcast ventilation shaft, in-seam gas drainage infrastructure, and a reverse-osmosis water treatment facility.

The proposed modification would extend the life of the mine by two years. It would also create additional jobs both at the mine and at the CHPP.

The key components of the proposed modification are compared to current operations in Table 1, and the proposed modification is shown in Figures 4 and 5. The proposed modification is also fully described in Donaldson's Environmental Assessment (EA, see Appendix E).

Table 1: Summary of approved operations and the proposed modification

Aspect	Approved Operations	Proposed Modification
<i>Project Life</i>	Approved to operate until 2028.	Extension to 2030.
<i>Approved ROM Coal Production Rate</i>	Up to 4.5 Mtpa.	Increase to up to 6.1 Mtpa.
<i>Abel ROM Coal Production</i>	Approximately 55 Mt over the life of the mine.	Increase to approximately 65 Mt.
<i>Mining Area and Method</i>	Mining by bord and pillar methods within an approved underground mining area.	- No change to the underground mining footprint. - Optional introduction of longwall mining in five panels in the Lower Donaldson Seam.

	• Optional introduction of shortwall mining in five panels in the Lower Donaldson Seam. • Pillar extraction from four panels in the Upper Donaldson Seam above the longwall panels. • New bord and pillar extraction in other parts of the Upper Donaldson Seam. • Continued bord and pillar extraction in other areas of the mine.
<i>Coal Processing</i>	• ROM coal from the Abel Mine, Tasman Underground Mine, Donaldson Open Cut Mine and Bloomfield Colliery processed at the Bloomfield CHPP. • Maximum processing rate of 6.5 Mtpa. • No change to the sources of ROM coal received. • Increase in the ROM coal processing rate to 8.9 Mtpa.
<i>Coal Transport</i>	• All ROM coal produced at the Abel Mine is currently transported by private haul roads to the CHPP. However, Donaldson has approval to construct and operate a coal conveyor from the Abel pit-top to the CHPP. • All product coal is transported via rail to the Port of Newcastle, at an average of 3 - 6 train movements per day. • No change to coal receipt and despatch methods. • The approved alignment of the coal conveyor would be revised. • A peak number of train movements of 12 per day.
<i>Minewater Management</i>	• Water management is undertaken in accordance with the Integrated Water Management System for Abel, Donaldson Open Cut Mine and Bloomfield Colliery and the conditions of Donaldson's Environment Protection Licence. • No change to water management processes. • Augmentation of water storages if required, including use of the Donaldson Square Pit. • Discharge of excess water to Four Mile Creek, following treatment by reverse osmosis.
<i>Waste</i>	• CHPP tailings are pumped to the Bloomfield U-Cut North pit. • Coarse reject is emplaced in-pit at Bloomfield Colliery. • Tailings would be stored in the U-cut North Pit, the Donaldson Square Pit, the Bloomfield S-cut North and S-cut South pits. • No change to coarse reject management.
<i>Surface Infrastructure</i>	• The Abel mine pit-top area, which includes a box cut, ROM coal stockpiles, workers' amenities, workshops, offices, car-park, ventilation systems and pollution control facilities. • Operation of the Bloomfield CHPP. • Approval to construct a coal conveyor from the Abel pit-top to the CHPP. • No change to the Abel pit-top area. • Additional downcast ventilation shaft in the mining area. • The installation of a second CHPP module, feeder and conveyor systems at the Bloomfield CHPP. • Revised alignment of the approved coal conveyor. • Reverse osmosis water treatment facility.
<i>Hours of Operation</i>	• Mining, processing and transportation all occur 24 hours per day, 7 days per week. • No change to approved hours of operation.
<i>Employment</i>	• 375 full-time employees at the mine. • 28 full-time employees at the Bloomfield CHPP. • Increase to 400 full-time employees. • Increase to 51 full-time employees at the CHPP. • 25 temporary construction workers to upgrade the CHPP.
<i>Capital Investment</i>	• \$83.5 million • Additional \$65 million

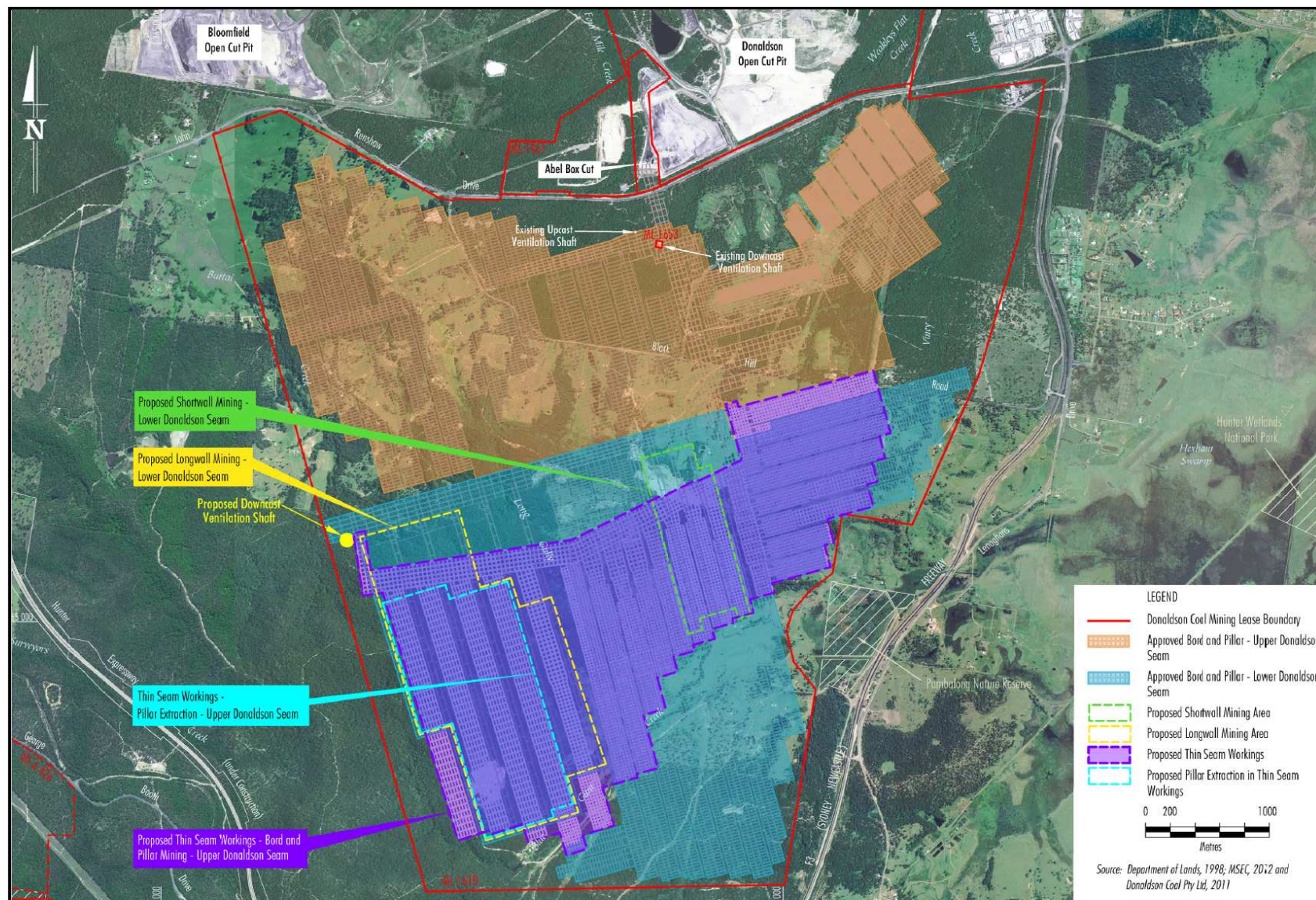


Figure 4: Proposed modified mine plan, including the additional ventilation shaft

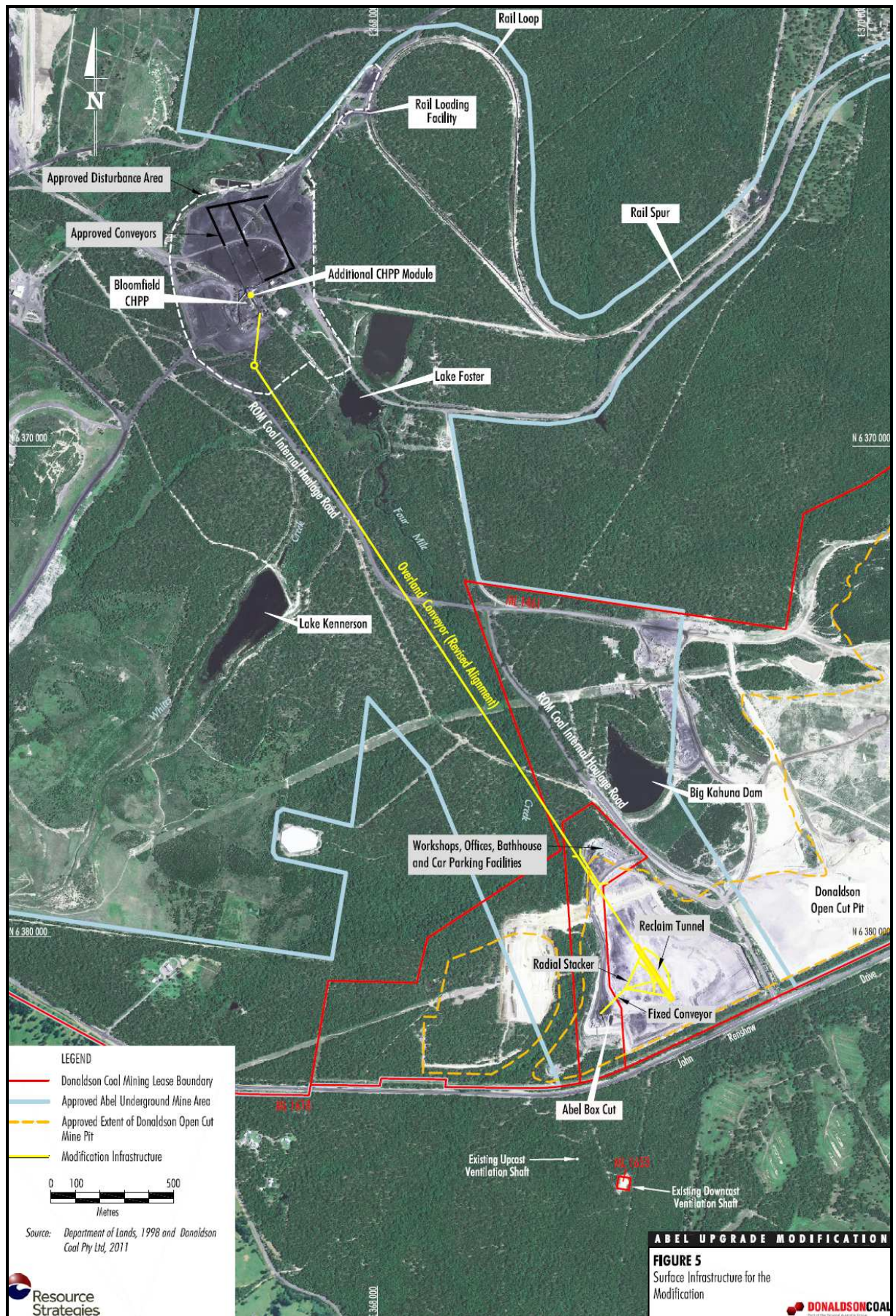


Figure 5: Proposed modified surface infrastructure

2.2 Changes to the Exhibited Modification Application

During the Department's assessment of the modification application, Donaldson made two key changes to its proposal, in correspondence to the Department dated 31 May 2013 and 25 July 2013. The Department has considered these changes in its assessment of the environmental impacts of proposed modification (see Section 5).

Upper Donaldson Seam shortwall mining

The modification application initially also sought to mine five shortwall mining panels in an area of the Upper Donaldson Seam. However, to ensure that mining in this area could continue as approved in the event that either the modification application was refused, or its determination was delayed, Donaldson decided instead to lodge a Subsidence Management Plan (SMP) application to continue bord and pillar mining in that area. Donaldson subsequently advised the Department that it no longer sought to undertake the proposed shortwall mining in the Upper Donaldson Seam.

Tailings emplacement

Donaldson currently emplaces tailings from the Bloomfield CHPP at the U-Cut North pit at Bloomfield Colliery. Donaldson's tailings disposal strategy included tailings emplacement in the former U-Cut South pit when the U-Cut North reaches its capacity. The Square Pit at the Donaldson Open Cut Mine is now available to handle tailings, 18 months ahead of its previously expected availability. Donaldson would therefore not require the use of the U-Cut South pit to store tailings. This change removes the need to clear up to 11.1 hectares (ha) of *Hunter Valley Moist Forest* and *Coastal Plains Smooth-barked Apple Woodland* vegetation communities.

3. STATUTORY CONTEXT

3.1 Section 75W Modification

The original Abel Coal Project was approved under the now repealed Part 3A of the EP&A Act. Notwithstanding the repeal of Part 3A, the project remains a 'transitional Part 3A project' under Schedule 6A of the EP&A Act.

The Department has considered the nature of the application, and is satisfied that it can be characterised as a modification to the original project. In this respect, the Department notes that there would be no change to the footprint of the approved underground mining and pit-top areas, no change to the approved processing or transportation systems. While more intensive production is proposed, the resulting environmental impacts would be substantially the same as those already approved. Consequently, the Department has satisfied itself that the application can be assessed under Section 75W of the EP&A Act.

3.2 Approval Authority

Under Part 3A of the EP&A Act, the Minister for Planning and Infrastructure is the approval authority for the proposed modification. However, under the Minister's delegation to the Department dated 27 February 2013, the Executive Director, Development Assessment Systems and Approvals can determine the modification application, as:

- none of the relevant Councils objected to the proposed modification;
- Donaldson has not made reportable political donations in the previous two years; and
- less than 25 public submissions objecting to the proposed modification were received.

3.3 Environmental Planning Instruments

Donaldson has undertaken a full review of the relevant provisions of various Environmental Planning Instruments (EPIs), including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs), that may apply to the proposed modification (see Section 5 of the EA), including:

- *Cessnock LEP, Maitland LEP and Newcastle LEP*;
- *SEPP (State and Regional Development) 2011*;
- *SEPP No.33 – Hazardous and Offensive Development*;
- *SEPP No.44 – Koala Habitat Protection*;
- *SEPP No.55 – Remediation of Land*;
- *SEPP (Infrastructure) 2007 (the Infrastructure SEPP)*; and

- *SEPP (Mining, Petroleum and Extractive Industries) 2007* (the Mining SEPP).

The Department has considered Donaldson's review of these EPIs, and has undertaken its own assessment of these matters (see Section 5 and Appendix B). The Department considers that the project as proposed to be modified can be undertaken in a manner that is generally consistent with the aims, objectives and provisions of these instruments, subject to a range of mitigation, monitoring and management measures that have been incorporated in the recommended Notice of Modification (see Appendix A).

4. CONSULTATION

4.1 Public Exhibition

The Department:

- publicly exhibited the EA from 26 February 2013 to 19 March 2013;
- advertised the exhibition in the Newcastle Herald and the Cessnock Advertiser newspapers;
- notified relevant State government authorities and affected Councils;
- notified relevant electricity supply and transmission authorities, in accordance with the Infrastructure SEPP;
- notified relevant road authorities, in accordance with the Mining SEPP; and
- notified registered Aboriginal stakeholder groups.

4.2 Submissions

The Department received 16 submissions during the exhibition period, comprising:

- 12 submissions from public authorities;
- 2 from special interest groups; and
- 2 submissions from local community members.

None of the Government authorities objected to the proposal, however all raised matters that required further assessment. Agencies recommended a number of additional or modified conditions to provide an effective regulatory framework for the mine.

The **Division of Resources and Energy** (DRE) of the Department of Trade and Investment, Regional Infrastructure and Services did not raise any objection to the proposed modification. It raised concerns over the potential for the reactivation of subsidence and consequent pillar run in existing workings in the West Borehole Seam, above the proposed longwall and shortwall mining domains. DRE requested that a full investigation of the extent and stability of the previous workings is undertaken as part of the assessment process.

The **Environment Protection Authority** (EPA) did not object to the proposed modification, and provided revised recommended operational noise limits for inclusion as conditions of approval. EPA considered that air quality emissions would increase in line with increased coal processing. However, the increased emissions would not exceed relevant criteria, and consequently no additional conditions of approval are considered necessary to regulate this impact.

The **NSW Office of Water** (NOW), part of the Department of Primary Industries, did not object to the proposed modification. However, it raised concerns over the potential for hydraulic connectivity between the mine and the nearby Hexham Swamp. NOW also highlighted the potential groundwater drawdown impacts, particularly the additional residual drawdown that would occur from longwall and multi-seam mining. NOW recommended conditions of approval including a review of multi-seam subsidence predictions, subsidence impact performance measures for water resources and preparation of a comprehensive water management plan, including surface water and groundwater monitoring programs and reporting requirements.

The **Office of Environment and Heritage** (OEH) noted the significance of the wider Black Hill area to the Aboriginal community. OEH supports Donaldson preparing a new Aboriginal Cultural Heritage Management Plan for the project, including consultation with the local Aboriginal community. It recommended that the plan include effective community consultation initiatives. OEH also commented that biodiversity impacts should be adequately offset by the long-term conservation of land, commensurate with the existing conditions of approval.

The **Mine Subsidence Board** did not object to the proposal and requested that Donaldson consult with it prior to undermining built infrastructure.

NSW Health commented that the proposal may represent an increase in coal dust impacts for residents on the rail corridor.

Department of Primary Industries (DPI) (Agriculture) commented that some land in the mining area is highly productive agricultural land, and that consideration should be given to reducing the impact of mining on this productivity.

The **Rural Fire Service, DPI (Fisheries), DPI (Crown Lands), Transport for NSW and Roads and Maritime Services** did not object to the proposal.

The **Construction Forestry Mining and Energy Union** supported the proposed modification. The **Australian Rail Track Corporation** did not raise any objections to the proposal.

Of the two community submissions, one provided support based on the resulting economic benefits, while the other contained objections regarding the potential additional noise impacts.

A summary of key issues raised in submissions appears below. The submissions are provided in full in Appendix C.

4.3 Key Issues

The key issues raised in submissions related to the increased levels of subsidence and resulting potential additional subsidence impacts and environmental consequences. Potential impacts on key natural and built features (including Aboriginal cultural heritage sites) required close consideration.

Concerns were also raised regarding increased noise impacts, particularly as the throughput of coal at the CHPP and the number of coal train despatches would both increase.

Other key issues related to the management of increased groundwater inflows to the underground mining area, the effect of the modified mine plan on the baseflow of nearby watercourses and potential groundwater drawdown from Hexham Swamp, and the provision of offsets for biodiversity impacts.

4.4 Response to Submissions

Donaldson provided a detailed response to submissions (RTS, see Appendix D). The Department has considered the RTS in its assessment of the proposal (see Section 5 below).

5. ASSESSMENT

5.1 Subsidence Effects and Management

The EA included a detailed subsidence impact assessment (SIA) undertaken by Mine Subsidence Engineering Consultants (MSEC). The SIA predicted the subsidence effects, subsidence impacts and environmental consequences for the proposed modification, and compared these effects, impacts and consequences with those already approved for the original project.

Mine plan

The major changes to the mine plan under the proposed modification include (see Figure 4):

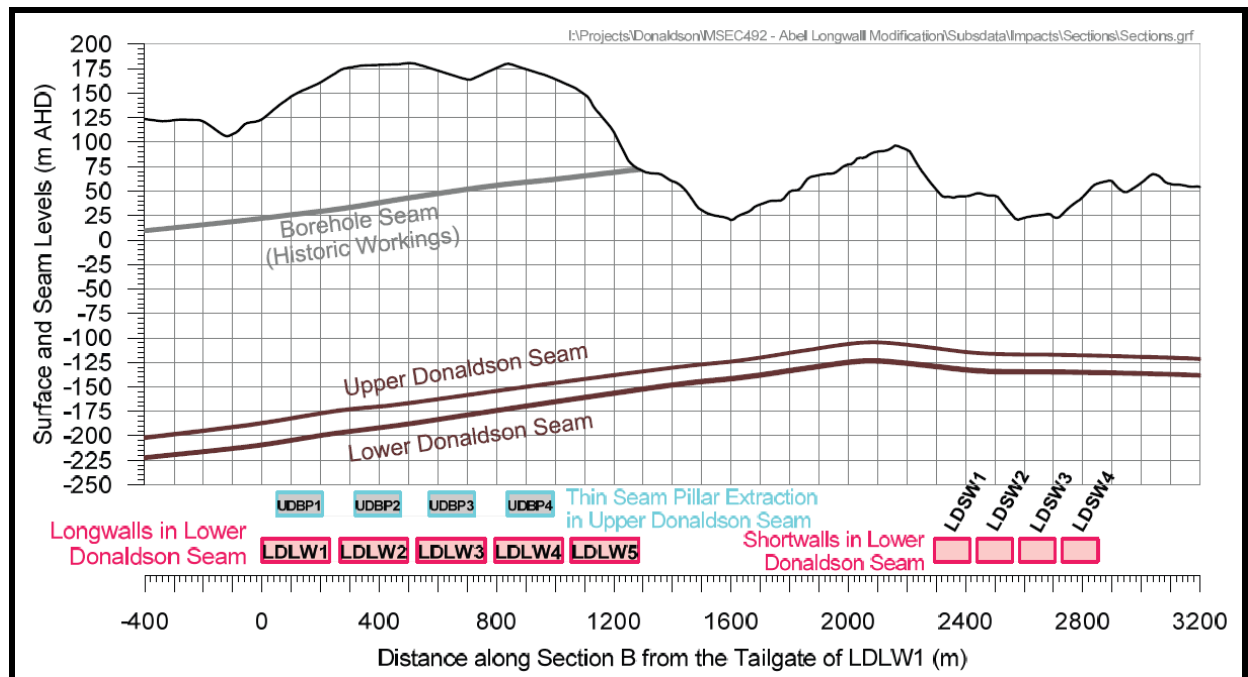
- development of five longwall panels (LDLW 1-5) in the Lower Donaldson Seam;
- development of five shortwall mining panels (LDSW 1-5) in the Lower Donaldson Seam, with first workings extraction in the Upper Donaldson Seam above these panels; and
- total pillar extraction from four 'thin seam' panels in the Upper Donaldson Seam (UDBP 1-4) directly above LDLW 1-5.

The assessment concentrated on the impacts of these changed conditions. Bord and pillar mining would continue as originally approved in the other areas of the mine, and the approved impacts in those areas would not change under the proposed modification.

The proposed panel dimensions and depths of cover are shown in Table 2 and Figure 6.

Table 2: Longwall, shortwall and pillar extraction panel dimensions

Panel	Panel length (m)	Panel width (m)	Depth of cover (m)
LDLW 1-5	1420 – 2470	230	170 – 350
LDSW 1-5	1170 – 1360	120	150 – 300
UDBP 1-4	1050 – 1950	155	170 – 350

**Figure 6:** Depths of cover to the target seams

Subsidence effects

The SIA states that subsidence effects (ie the deformation of the ground mass due to mining) would vary across the longwall and shortwall mining areas. Various factors would act to control overall subsidence and the resulting effects and impacts, including variations in the mining methods employed, cover depths, interburden thickness between the two seams and between the seams and previous workings in the West Borehole Seam, and specific geological conditions. Conventional subsidence predictions for the modified project compared with those made for the original project are shown in Table 3.

For the *shortwall* mining area, maximum subsidence would be greater than predicted for bord and pillar mining under the original project, but tilts and strains are likely to be lower. Maximum vertical subsidence of 1700 millimetres (mm) is only likely to develop in a small area at the northern end of SW2, where the West Borehole Seam workings overlap the shortwall panels (see Figure 7, and discussion on previous workings below).

Table 3: Comparison of subsidence predictions

Area	Comparison with approved project	Maximum Predictions				
		Subsidence (mm)	Tilt (mm/m)	Tensile Strain (mm/m)	Hogging curvature (km ⁻¹)	Sagging curvature (km ⁻¹)
LDSW1-5	Approved bord and pillar mining	1480	41	15.4	1.54	1.95
	Proposed modification	1700	25	10	1	1.5
LDLW1-5 and UDBP1-4	Approved bord and pillar mining	990	17	8.1	0.81	1.02
	Proposed modification	3100	30	10	1	1

Note: 'Curvature' relates to the rate of change of tilt. 'Hogging' curvature is convex over the goaf edges and 'sagging' curvature is concave toward the bottom of the subsidence trough (MSEC).

The Department notes that the shortwall mining would occur at around 300 m depth of cover (see Figure 6). Subsidence in the remainder of the shortwall domain is likely to be much less than the maximum prediction (see Figure 7), and the predictions are substantially the same as those already approved for the project. There are a limited number of significant overlying surface features (principally a 132 kV transmission line). The Department considers that the resulting environmental consequences of the changed mining conditions in the shortwall domain are unlikely to be significantly different to those already assessed and approved.

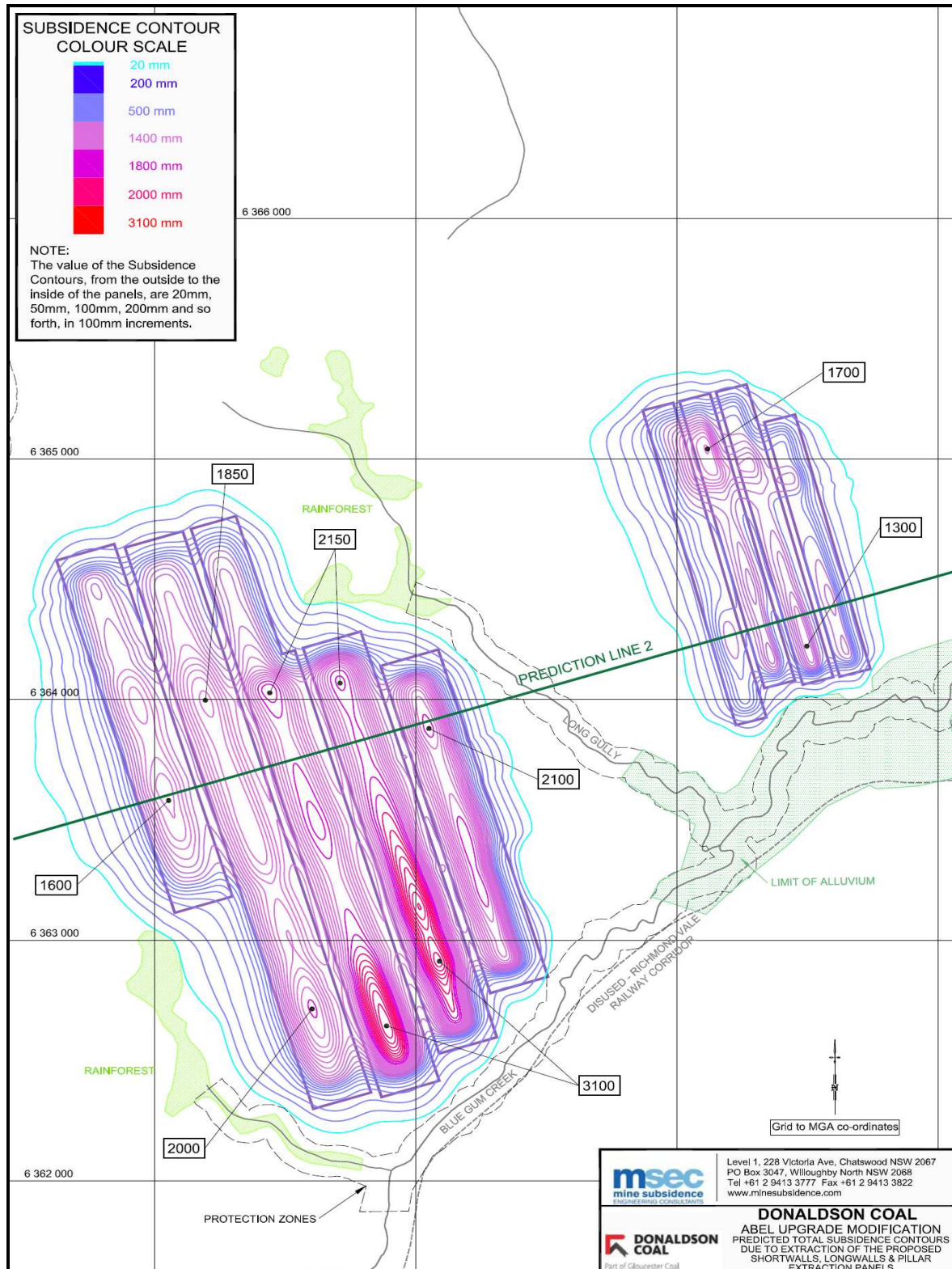


Figure 7: Predicted total vertical subsidence contours

For the *longwall* mining domain, subsidence, tilts and tensile strains are all predicted to be significantly greater than predicted for the original project (see Table 3). This is due to the effect of the proposed second workings in both the Upper and Lower Donaldson Seams, and the location of this domain in relation to the overlying previous workings. The Department also notes that:

- Donaldson's subsidence predictions are conservative, and represent the maximum subsidence for the longwall panels and overlying pillar extraction panels under single seam extraction conditions across the entire longwall domain;
- maximum predicted subsidence is only likely to occur in localised areas above two panels in the south of this domain (see Figure 7);
- second workings would occur at significant depths (around 350 m). Based on empirical evidence in the Newcastle Coalfield, the SIA states that overlying fracture zone would be unlikely to result in connective cracking to either the surface or the overlying previous workings;
- the barrier pillars between the pillar extraction panels in the Upper Donaldson Seam are of significant size (ie between 95 - 110 m);
- no significant natural features such as cliffs, rainforest EEC or alluvial lands would be undermined by these second workings; and
- no important built infrastructure is located above this mining domain.

Given these factors, the Department is satisfied that the impacts of second workings in both seams in the longwall mining domain can be managed to not eventuate in significant environmental consequences, and that any unforeseen surface impacts would be able to effectively remediated.

Proposed Subsidence Control Zones

As under the existing approved project, Donaldson would protect the most significant natural and built features in the proposed second workings areas by using 'subsidence control zones' (SCZs). The SCZs would ensure a lateral distance separating the secondary extraction panels from the relevant surface feature that equates to a minimum 'angle of draw' (AOD) of 26.5°, which equates to the usual limit of measurable surface subsidence. The proposed SCZs and associated performance measures are shown in Table 4.

Table 4: Proposed SCZs for significant surface features

Significant Surface Feature	Performance Measures
<i>Principal Residences</i>	• First workings only beneath • 20 mm maximum subsidence • 26.5°AOD to secondary extraction areas
<i>Cliffs, greater than 10 m height and 20 m length</i>	• First workings only beneath • 20 mm maximum subsidence • 26.5°AOD to secondary extraction areas
<i>3rd order streams or above and associated alluvium</i>	• First workings only beneath • 40 m setback from the centre of stream • 40 m setback between 20 mm subsidence limit and extent of alluvium • 26.5°AOD to secondary extraction areas
<i>Lowland Rainforest EEC</i>	• First workings only beneath • 20 mm maximum subsidence • 26.5°AOD to secondary extraction areas
<i>Groundwater Dependent Ecosystems (GDEs)</i>	• First workings only within 40 m of the Blue Gum Creek and Long Gully alluvium, which feed the GDE.

Previous workings

The overlying West Borehole Seam was mined between the 1940s - 1970s at depths ranging between 35 - 112 m (see Figure 6). The proposed longwall mining domain is located wholly beneath these previous workings, and the shortwall mining domain is also partially located beneath these workings (see Figure 8).

Some uncertainty exists with regard to the location, size and stability of remnant pillars in areas of the workings in the West Borehole Seam. DRE raised concerns in its submission that the cumulative subsidence from the proposed multi-seam mining conditions could result in subsidence levels exceeding Donaldson's predictions. DRE also considered that reactivation of subsidence in the previous workings could result in some of the remnant pillars in those workings failing, leading to a potential risk of pillar run.

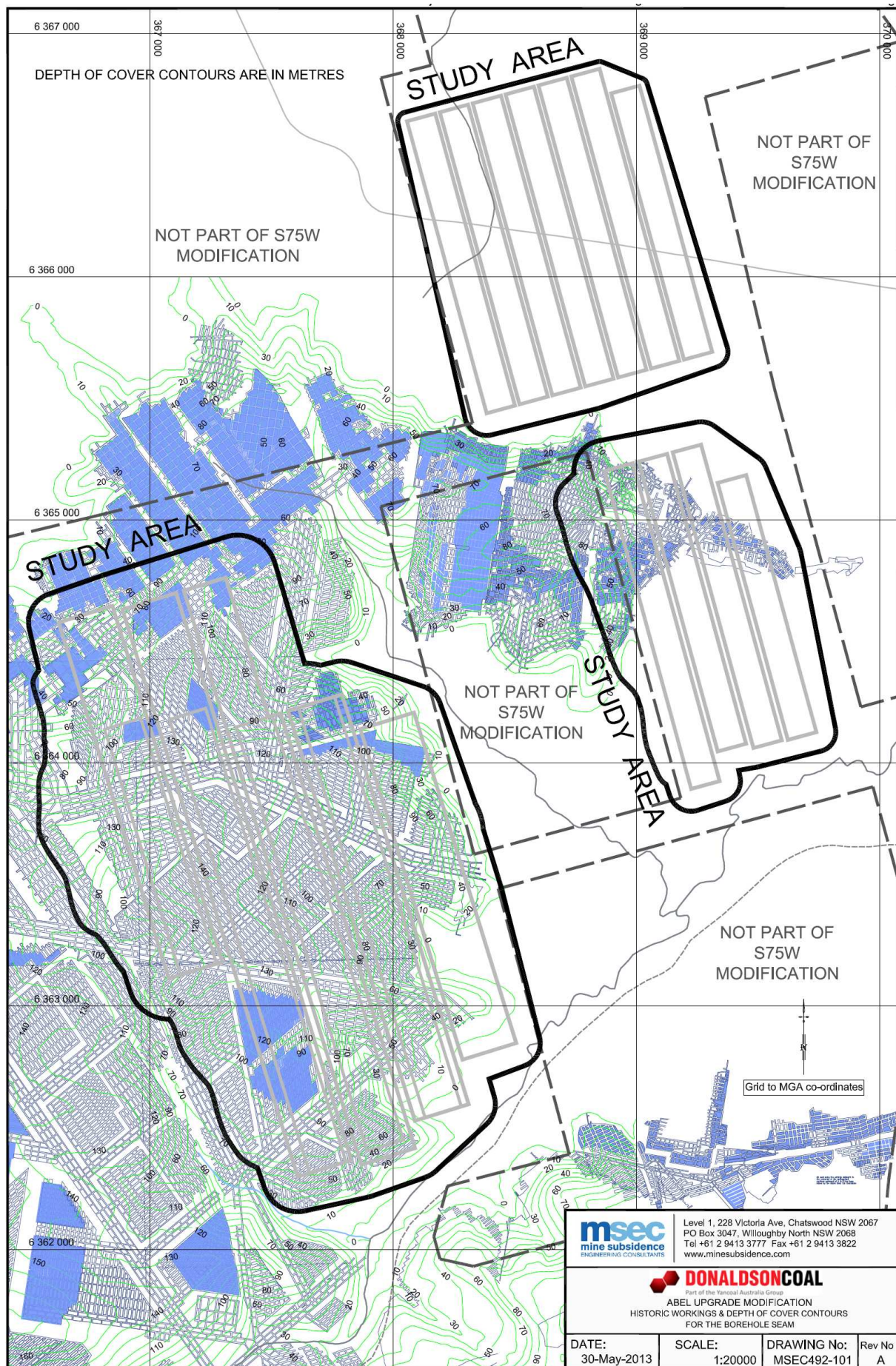


Figure 8: Longwall and Shortwall Footprints and West Borehole Seam Workings

The SIA factored in 700 mm of subsidence to its total vertical subsidence predictions, to account for the potential reactivation of subsidence in the West Borehole Seam. It also assessed an upperbound limit of 1300 mm of reactivation. These figures were based on estimated void size, the typical remnant pillar size and the maximum limit of subsidence in the Newcastle Coalfield for single-seam, critical width conditions. The Department agrees that second workings in the Upper and Lower Donaldson Seams would cause some subsidence reactivation in the previous workings. It also notes the substantial interburden thickness between the West Borehole and the Donaldson Seams (200 – 225 m, see Figure 6), which would reduce the likelihood of approaching the predicted upperbound limit.

The SIA also stated that the extent and discontinuities of the workings are such that the risk of pillar run would be minimal. It also considered that the risk is limited by other factors (in some directions, at least) in that the previous workings do not generally extend to the end and south of the proposed longwalls, overlay a limited amount of the proposed shortwall layout, and total pillar extraction has generally occurred to the north of the proposed longwalls (see Figure 8). Further, the key built surface features (ie the transmission towers) are not located in the directions of remaining risk of pillar run.

Notwithstanding this limited risk profile, the Department considers that a thorough investigation of the previous workings would further inform how best to manage the residual risks. DRE's original submission stated its preference for this investigation to be undertaken prior to the Department's determination. The Department notes that Donaldson has since committed to undertake this investigation for the approved project under DRE's required SMP process, and has made the same commitment for the proposed modification, in respect of an Extraction Plan for all second workings.

The Department considers that a requirement under a modified project approval for an Extraction Plan, which would require close consultation with DRE, is the most appropriate mechanism under which Donaldson should undertake these investigations. The Department has accordingly recommended that the stability and extent of the previous workings in the West Borehole Seam overlying the second workings areas must be fully investigated, in consultation with DRE, as part of the proposed Extraction Plan for second workings. DRE has since endorsed this approach.

The Department's recommendations also require Donaldson to implement adaptive management measures if its refined predictions show there is any significant risk of remnant pillar failure and/or pillar run in the previous workings. Donaldson's RTS indicates that these measures could include increasing the size of remnant pillars and/or backfilling the voids in the Lower Donaldson Seam, or grouting the previous workings in the West Borehole Seam.

Subsidence management & monitoring

Donaldson's current subsidence monitoring program for its bord and pillar mining operations would be expanded for the modified project. This would involve regular inspections during and after mining.

Conclusion

The Department is satisfied that the SIA has used conservative assumptions, and that the resulting subsidence predictions provide a sound basis to assess the potential subsidence impacts and environmental consequences of the proposed modification. The SIA uses empirical data from the current mining operations, where the application of SCZs has proven successful in managing the risk of significant impacts, and from the Newcastle Coalfield more generally. The SIA's predictions are based on worst-case scenarios. Consequently, the Department is confident that the proposed SCZs are appropriate, and that these measures would provide adequate impact protection to all significant surface features.

The Department has recommended that a comprehensive Extraction Plan is prepared following consultation with relevant agencies and be approved prior to the commencement of second workings. The Extraction Plan would detail the proposed subsidence impact assessment, monitoring and reporting frameworks for all built and natural features in the second workings areas. The Extraction Plan would include:

- protection measures for all key surface features, including SCZs;
- component management plans for managing impacts on water resources, biodiversity, heritage, land and specific built features;
- specific trigger action response plans (TARPs);
- adaptive management and remediation measures; and
- stakeholder consultation protocols.

Because the proposed longwall and shortwall mining would generally take place beneath previous workings in the West Borehole Seam (multi-seam mining), there is a risk of reactivation of subsidence in the overlying workings causing pillar failure, and potential 'pillar run'. This risk has been mitigated through requiring that Extraction Plans for longwall and shortwall mining include a detailed investigation of the overlying workings, undertaken in consultation with DRE, which:

- assesses the stability of remnant coal pillars in the former workings;
- includes revised multi-seam subsidence predictions for the second workings areas;
- gives particular consideration to the risks of irregular subsidence and for pillar run leading to subsidence outside of the predicted angle of draw; and
- recommends final design of the second workings panels and any necessary adaptive management measures.

To ensure that unforeseen impacts do not result in significant environmental consequences, the Department has recommended that conditions of approval also include:

- strict subsidence performance measures which act to protect all natural and built features in the underground mining area and allow the identification and repair/remediation of any subsidence impacts (eg significant surface cracking); and
- the provision of offsets if unforeseen impacts occur which cannot be successfully remediated.

The potential environmental consequences to cliffs and rock features, built infrastructure, water resources, Aboriginal heritage, and flora and fauna are addressed in detail in sections 5.2 to 5.7.

5.2 Cliffs, Rock Face Features and Steep Slopes

Cliffs

Existing conditions restrict pillar extraction beneath 'cliff areas' to not more than 60% of the total seam. The Department notes that this restriction currently applies to five rock formations, only two of which would be defined as 'cliffs' under the criteria listed in Table 4 (ie the Department's standard definition). As such, these two cliffs would not be undermined by secondary extraction methods.

These two significant cliff lines are located in the upper reaches of Long Gully and Blue Gum Creek (see Figure 8). These areas also contain vegetation representing an un-specified Lowland Rainforest EEC, and the proposed SCZs for these areas would act to protect both the EEC and the cliff lines.

The description of 'cliff areas' in the 2006 EA also includes three other rock formations located above the proposed longwall panels but which are smaller and do not fit the Department's standard definition of a cliff. Donaldson argued that these three formations should be redefined as 'rock outcrops', since these features have discontinuous rock faces less than 10 m in height or slopes less than 2 to 1.

As the proposed longwall mining would allow up to 87% of the available coal resource to be extracted from the Lower Donaldson Seam, Donaldson argued that the current 60% coal recovery restriction would prevent it from developing the longwall mining domain as proposed, which would have significant economic disbenefits. It also argued that longwall mining was unlikely to cause subsidence impacts on >5% of the total extent of rock face features impacted by the proposed mining and noted that longwall mining has been undertaken or is approved to be undertaken at other NSW mines beneath similar rock features without the restriction imposed under its current conditions.

The Department supports Donaldson's proposed definitions for cliffs and rock face features, noting that equivalent definitions have been applied to other recently-approved underground mining operations in the Newcastle Coalfield. The Department considers that it is possible to allow coal recovery at Abel to be increased through limited introduction of longwall mining, while appropriately protecting the two significant cliff features. To this end, the Department has proposed a performance measure that limits impacts on the two cliffs to minor environmental consequences affecting not more than 3% of the total face area of the cliffs within the mining area, as with other recent approvals.

Rock face features and steep slopes

Donaldson has not proposed any SCZs to apply to rock face features and steep slopes located above the longwall and shortwall mining domains. However, Donaldson's SIA predicted that <5% of the extents of any of these features would be likely to be subject to subsidence impacts, due to the discontinuous nature and generally low elevations of these features (see Figure 9).

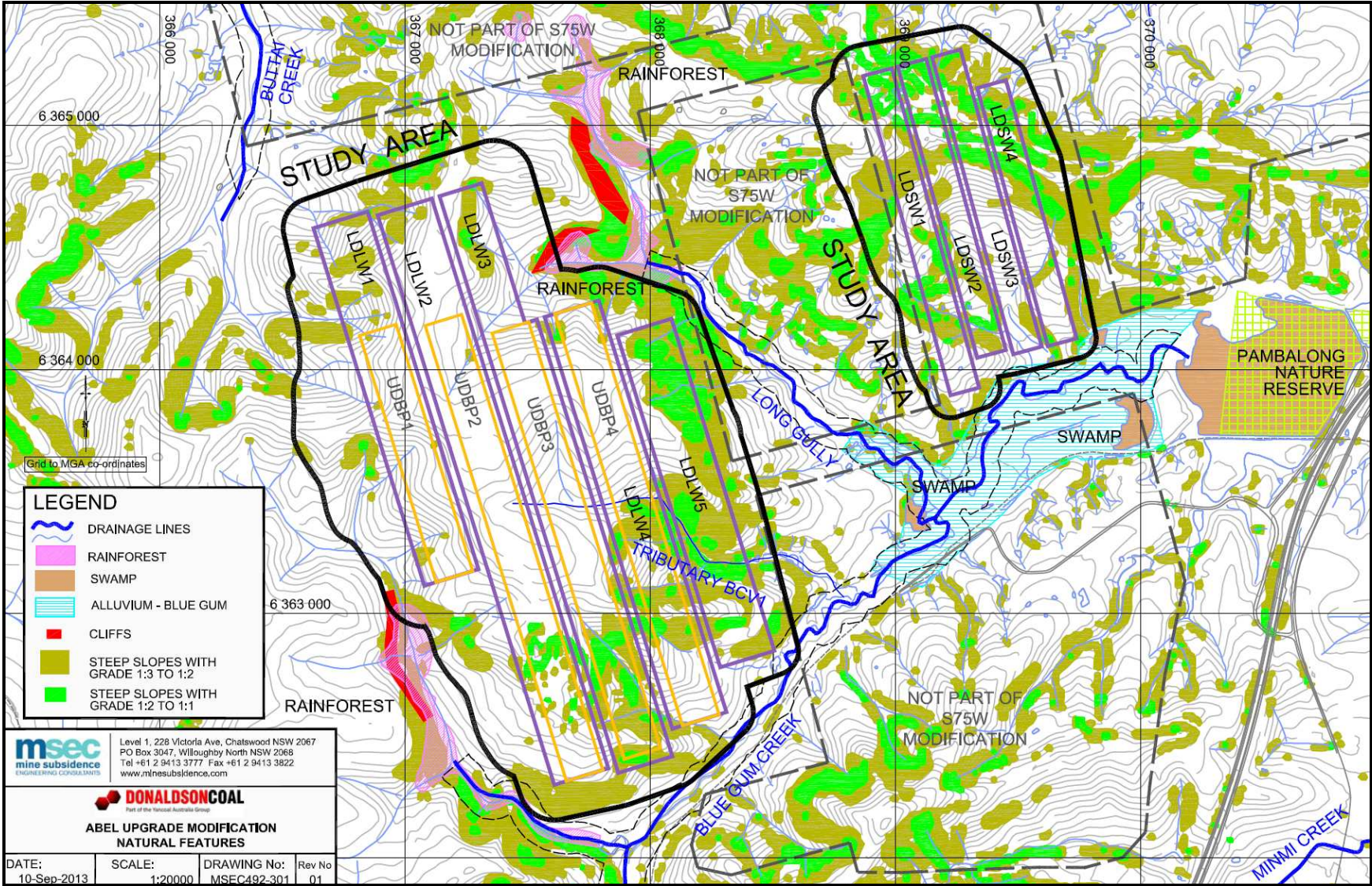


Figure 9: Natural features

The SIA acknowledges that minor impacts, such as fracturing causing occasional rock falls, displacement or dislodgement of boulders or slabs may occur to rock features and steep slopes. These impacts can sometimes be difficult to distinguish from impacts caused by natural processes, which can result in around 5% of the rock face feature or the steep slope exhibiting signs of instability.

The Department has proposed performance measures that limits impacts on rock face features and steep slopes to minor environmental consequences affecting not more than 5% of the total face area of the rock face features within the mining area, as with other recent approvals. Donaldson would undertake monitoring at all rock face features and steep slopes both during and following mining, and would prepare a Public Safety Management Plan as part of its Extraction Plan. The plan would include a TARP, which would be applied if the steep slopes become unstable, including remediation measures such as infilling of surface cracks, removal of unstable boulders, erosion and sediment controls, and public safety protection protocols.

Conclusion

The Department has recommended that strict subsidence performance measures apply to the modified project, to replace the existing restriction on pillar extraction beneath 'cliff areas'. These performance measures include:

- not greater than 'minor environmental consequences' affecting cliffs, which do not impact more than 3% of the total face area of the cliffs; and
- not greater more than 'minor environmental consequences' result at rock face features and steep slopes, which do not impact more than 5% of such features.

These contemporary standards reflect the intent of Donaldson's proposed SCZs for cliffs, and correspond with the standards which apply for similar features in recent approvals for other similar underground coal mining operations in the Newcastle Coalfield, ie the Tasman Extension Project and West Wallsend Colliery. With the implementation of the Department's recommended subsidence performance measures the Department is satisfied that the cliffs, rock face features and steep slopes in the underground mining area would be adequately conserved and protected.

The Department has also recommended that Donaldson prepares a Land Management Plan and Public Safety Management Plan as part of the necessary Extraction Plan. This plan would detail the subsidence management regime (including remediation) for potential impacts and environmental consequences at all cliffs, rock face features and steep slopes.

5.3 Built Features

A number of built features are located above either the longwall or shortwall mining domains, or in their vicinity (see Figure 10), including:

- 330 kV transmission line, 132 kV powerline transmission and suspension towers and;
- fibre-optic and copper telecommunications cables;
- privately-owned residences;
- farm buildings and a farm dam;
- sealed public roads and private unsealed access tracks; and
- Black Hill Quarry and Stockrington Quarry;

Residences and farm buildings

The longwall and shortwall mining domains have both been designed to avoid second workings beneath any privately-owned residences. Donaldson's SCZs would restrict mining operations to non-subsiding first workings only within a 26.5° angle of draw of the residence. Subsidence predictions for the proposed modification at the residences are similar to those approved for the original project. Mining is not expected to affect the serviceability of the residences.

Similarly, no farm buildings would be undermined by second workings. The subsidence predictions for these buildings are similar to those approved for the original project, and any impacts would be unlikely to affect structural serviceability.

Farm dams

Most farm dams would be undermined by bord and pillar methods. The predicted tilts and strains at all farm dams are unlikely to result in significant impacts including loss of serviceability. Donaldson currently monitors its impacts at farm dams, and has developed remedial strategies in the event that serviceability impacts occur.

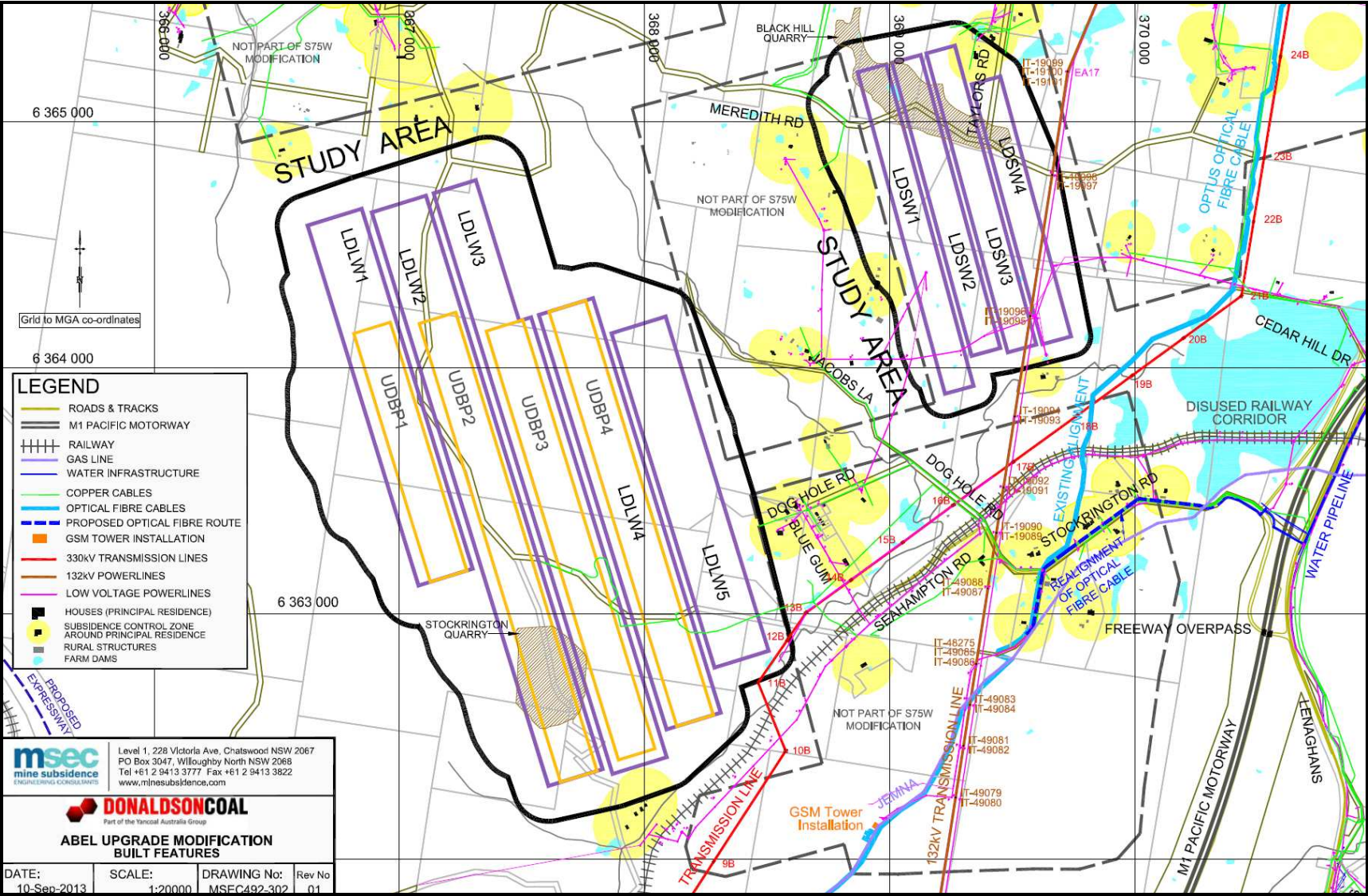


Figure 10: Built features

The Department considers that significant impacts at any farm dams are unlikely, and its recommended performance measures would ensure serviceability of the dams is maintained wherever practicable, or remediated if unforeseen impacts occur. The Department has also recommended that only first workings are permitted beneath the four largest dams on the commercial orchard in the northwest of the mining area, to protect their serviceability. Impact management strategies for the farm dams would also be detailed in Built Features Management Plans, which the Department has recommended as components of the Extraction Plan.

Quarries

Stockrington Quarry is located in the south of the longwall domain, close to the area where subsidence is predicted to be greatest (see Figures 4 and 7). DRE's record tracings show that total pillar extraction has already occurred in the West Borehole Seam beneath the quarry and potential pillar run in this area is therefore unlikely. Also, quarrying operations are likely to have been completed prior to the commencement of longwall mining beneath the quarry.

Nonetheless, Donaldson would consult with the quarry operator to ensure that the Stockrington Quarry remains safe while site rehabilitation occurs. Impact management strategies for this quarry would be detailed in a Built Features Management Plan, as part of the Extraction Plan.

Black Hill Quarry is located towards the northern end of the shortwall panels. The SIA predicted that tilts and strains in this location would be less than previously assessed and approved. This quarry has extracted down to the level of the previous workings in the West Borehole Seam, and minor preventative measures may be required to maintain a safe working environment in the quarry. Again, these measures would be detailed in a Built Features Management Plan.

The Department has also recommended subsidence performance measures for the two quarries which require maintenance of serviceability where practicable, and for any damage to be remediated.

Transmission and telecommunications infrastructure

The 330 kV transmission line and associated transmission towers lie outside the footprint of both the longwall and shortwall mining domains, but would be subject to multi-seam mining conditions. In particular, a number of angle towers are located on the mining area, with three 330 kV towers located immediately south of the longwall panels and one 132 kV tower located over proposed single seam Upper Donaldson Seam bord and pillar workings (see Figure 10).

The Department notes that the two angle towers closest to the longwall panels are located within the SCZ for Blue Gum Creek and its alluvium, where only non-subsiding first workings are proposed. Notwithstanding, the Department notes that angle towers have particular sensitivity to conventional subsidence, tilts and strains, and considers that any potential impacts to the angle towers require careful management. The Department has therefore recommended that appropriate impact management and remediation strategies for the transmission towers (particularly the angle towers) are given particular focus in the required Extraction Plans.

Even so, the predicted total vertical subsidence, tilts and strains for the 132 kV powerline are significantly less than those approved for the existing project, and any impacts to the powerline are not expected to cause loss of serviceability.

Sections of fibre-optic cable located near the shortwall mining domain would be re-routed to remove the risk of impact and loss of service. Copper telecommunications cables service the residential properties in the underground mining area. Subsidence predictions for these cables are similar to those already approved, and any impacts would be expected to be minor at worst and easily remediated if required.

Built features impact management

The Department has recommended performance measures for all built features in the underground mining area that are generally consistent with Donaldson's proposed SCZs. The Department has also recommended that Donaldson prepares and implements specific Built Features Management Plans, in consultation with the owners of these features, as part of its Extraction Plans. The plans would detail how Donaldson would achieve the relevant performance measures, and outline how any unforeseen impacts would be identified, repaired, replaced or compensated.

With the implementation of the SCZs and the Department's recommended conditions, the Department is satisfied that the proposed modification would be unlikely to result in any significant impacts on built features, and that any unforeseen impacts would be appropriately managed and remediated.

5.4 Surface Water

Subsidence impacts

The EA includes an assessment of the potential impacts of the proposed modification on surface water resources and surface water management systems. The underground mining area underlies:

- the headwaters of Four Mile Creek and Viney Creek, which drain north to the Hunter River floodplain;
- Blue Gum Creek (and its tributary Long Gully) which drains to the Hexham Swamp via the Pambalong Nature Reserve; and
- Buttai Creek which drains northwest to Wallis Creek and the Hunter River near Maitland.

The surface water assessment considered whether the changed mining methods would increase the approved subsidence impacts and environmental consequences at these watercourses, including:

- cracking of stream beds and banks;
- connective cracking resulting in surface flow losses; and
- changes in stream geomorphology resulting in ponding.

Donaldson would apply SCZs at 3rd order streams² and above and their associated alluvia to limit subsidence impacts. Long Gully, Viney and Buttai Creeks are all 3rd order streams. Blue Gum Creek is partly a 3rd and partly a 4th order stream. Second workings would not occur beneath either Long Gully or Blue Gum Creek, with first workings only allowed within a 26.5° of the stream bank, and within a 26.5° angle of draw of the extent of the alluvium. The SCZs would act to limit subsidence of the creeks and their alluvium to no more than 20 mm, and therefore significant impacts would not be expected.

Minor increased ponding could occur in a 1st order tributary of Blue Gum Creek above the longwall domain. First workings pillar extraction is already approved to occur beneath this stream, and it is unlikely that the resulting environmental consequences would be significantly different to those already assessed and approved.

However, minor surface cracking of stream beds is possible, even with the application of the SCZs. This could result in localised stream flow reduction, loss of water held in pools, and water quality impacts. These potential impacts were all considered in the assessment for the original project, which found that that even if upperbound subsidence predictions were to eventuate and impacts exceed predictions, any impacts could be effectively remediated. The current assessment reiterates this position, and the Department considers that any unforeseen impacts from the modified project would not be significant and would be able to be effectively remediated.

Donaldson would implement an adaptive management process to address any potential impacts to watercourses. This process would include identifying subsidence impacts at streams, assessing whether these impacts would result in significant consequences, and implementing appropriate control or remediation techniques (eg allowing cracks to seal naturally or remediating using artificial methods). The adaptive management process would be comprehensively detailed in a Water Management Plan, which the Department has recommended is included as part of each Extraction Plan.

Surface water management

An integrated water management system operates between Abel, Donaldson Open Cut and Bloomfield Colliery, which allows water to be transferred between the three mines and the Bloomfield CHPP (see Figure 11). It allows Donaldson to:

- store its groundwater inflows and run-off in the Big Kahuna Dam,
- recycle CHPP water and store it in Lake Foster, which is a closed storage designed for nil discharge to the environment;
- dispose of CHPP tailings in the U-Cut North tailings dam at Bloomfield Colliery;
- return decant water and seepage from the tailings dam to Lake Foster for CHPP re-use; and
- transfer water from Lake Kennerson to Lake Foster and discharge from Big Kahuna to Four Mile Creek under licence.

² This report adopts the Strahler stream classification for the watercourses in the mining area
NSW Government
Department of Planning and Infrastructure

When longwall mining commences in 2016, groundwater inflows would provide all water required for underground operations. Excess inflows would be transferred to the Square Pit at the Donaldson Open Cut, and treated using reverse osmosis (RO) to ensure it is of a sufficient quality to be pumped to the Big Kahuna Dam for re-use in the CHPP.

Donaldson's indicative water balance shows that, if peak predicted groundwater inflows coincide with a wet year for rainfall and no discharge to Four Mile Creek (ie worst case conditions), then the mine would need to manage an excess of up to 1,804 megalitres (ML) of water. Therefore the availability of adequate storage capacity is key to the management of these potential excesses of water.

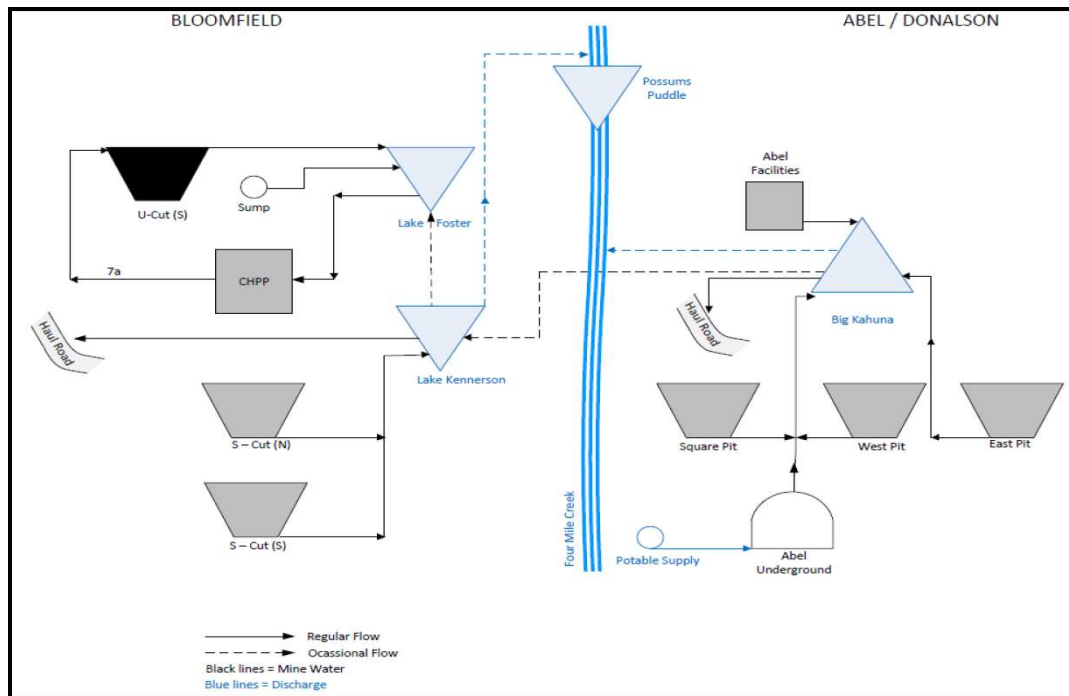


Figure 11: Schematic of the Integrated Water Management System

Until mid-2015, inflows would continue to be transferred directly to the Big Kahuna Dam for use in the CHPP. Until 2018, tailings would be directed to the U-Cut North pit at Bloomfield, and to the Square Pit at Donaldson Open Cut. Decant water would also be treated by RO to a quality consistent with its existing Environmental Protection Licence (EPL) discharge limits, and transferred to Big Kahuna Dam. If required, Donaldson would discharge this water to Four Mile Creek under the conditions of the EPL.

From 2018 until the end of the project, Donaldson would store tailings in the Bloomfield S-Cut North and Bloomfield S-Cut South voids. Part of the S-Cut South void would become available in 2018 when Bloomfield completes mining in that pit. The S-Cut North void would become available in 2022. These voids could also be used to store excess water and ultimately remove the need in the longer term for the operation of the RO facility and discharge to Four Mile Creek.

Under worst-case conditions, the S-Cut South void would reach capacity in 2023, which would allow sufficient time for the S-Cut North void to be commissioned. At the completion of mining in 2030, it is estimated that the S-Cut-North void would be 50% filled with tailings. The Department is therefore satisfied that Donaldson has demonstrated that there is sufficient capacity for the storage of both water and tailings, under worst case conditions, throughout the life of the modified project.

Conclusion

The Department is satisfied that application of Donaldson's proposed SCZs would avoid significant impacts to significant surface water resources (ie 3rd and 4th order streams). Donaldson's adaptive approach to impact management would also ensure that any unforeseen impacts would be likely to be temporary and limited in their nature and extent.

To ensure significant surface water impacts do not eventuate throughout the modified project, the Department has recommended conditions requiring Donaldson to prepare comprehensive Water Management Plans, covering both its surface facilities and as part of Extraction Plans, to include:

- subsidence performance measures for surface water features;
- surface water assessment criteria and trigger levels;
- a surface water monitoring program;
- regular review of the mine's site water balance;
- an erosion and sediment control plan; and
- a contingency plan that provides for adaptive impact management if predictions are exceeded.

5.5 Groundwater

Donaldson provided an updated assessment of its predicted groundwater impacts as part of its EA. Donaldson has developed a regional groundwater model under the existing conditions of approval, which it has used to inform the groundwater predictions for the modified project. Compared to the 2006 model used to predict the original project's groundwater impacts, the regional groundwater model used for the modification has incorporated deeper layers and a larger regional extent, and therefore provides a greater understanding of the groundwater environment in and near the mine.

The groundwater environment in and around the mine is characterised by two distinct aquifer systems: shallow alluvial aquifers and deeper coal measure aquifers. The alluvial aquifers have direct hydraulic connection with surface water drainages, including the Pambalong Nature Reserve and Hexham Swamp. Conversely, there is minimal interaction between the surface water drainages and their alluvial aquifers and the deeper coal measures.

Groundwater inflows

The modified mining proposal is predicted to be likely to result in peak groundwater inflows to the underground mining area of up to 6.3 ML/day in 2016. This peak figure is 0.7 ML/day less than the predictions originally made for the approved project, and is still likely to be overestimated, as it includes an additional allowance for inflows from second workings in the Upper Donaldson Seam, which Donaldson has since removed from its modified mine plan. The improved predictions result from additional monitoring results and the consequential amendments to the previous groundwater model.

From 2017-2020, the inflow rate drops to around 4.8 ML/day, which corresponds with pillar extraction in the deepest section of the Upper Donaldson Seam and the commencement of longwall mining. This inflow rate exceeds levels predicted for this period for the original project, and can be attributed to potential strata fracturing resulting in increased permeability. In 2021, the predicted inflow rate falls to 2 ML/day and, despite a spike between 2024 and 2026, remains less than previously-predicted for the current mine plan for the rest of the project life.

Drawdown impacts

Donaldson's improved regional groundwater model has provided a better understanding of the mine's potential groundwater drawdowns and impacts. Monitoring results from existing mining, and the influence of the neighbouring Donaldson Open-cut Mine, the Bloomfield Colliery and the Tasman Underground mine have been included in the model.

Modelling now predicts that the extent of drawdown within coal seam aquifers will be substantially less than predicted in 2006 across the majority of the mining area, particularly in the northeast and southeast mine areas where drawdown levels are up to 60 m less than previously predicted.

Increased drawdown in the coal seam aquifers is likely to be confined only to the areas where multi-seam mining is proposed, with the greatest increase in drawdown likely in the Lower Donaldson Seam where the more intensive mining (ie longwall and shortwall) is proposed. However, any additional drawdown of groundwater in the coal measures would be unlikely to lead to increased impacts, as there are no bores which draw water from the coal measures or nearby Groundwater Dependent Ecosystems (GDEs) dependent on outflows to the surface.

Increased drawdown would mostly affect the coal seam aquifers and not the shallower geological layers, where very limited (ie up to 1 m) additional drawdown is predicted to result from the modification. The SCZs to be applied to protect alluvium and rainforest EEC are unchanged from the 2006 mine plan, and drawdown of alluvial aquifers in these areas is similar to previous predictions.

Any increase in drawdown would also be unlikely to affect GDEs in the Pambalong Nature Reserve and Hexham Swamp. This is due to the influence of a geological fault structure, located between the mining area and these GDEs, which provides a regional barrier to the movement of groundwater, and limits groundwater depressurisation and the migration of drawdown impacts to the east of the mine.

The Department also notes that Donaldson has committed to implement a groundwater response plan, in the event of significant unforeseen increased inflow rates and/or groundwater drawdown impacts. The response plan would include details of how unforeseen drawdown impacts would be further assessed and managed. The Department has recommended that Donaldson prepares and implements a Water Management Plan as part of its Extraction Plan for second workings, which includes monitoring and reporting on groundwater inflows to the mining area.

Baseflow impacts

The majority of streams in the mining area are ephemeral, with minor groundwater contributions to baseflows. Viney Creek and Buttai Creek are modelled to receive reduced baseflows, but only during the post-mining recovery period and at a very low rate (up to 11.4 ML/year). These losses are similar to those predicted for the approved mine plan. For Blue Gum Creek, the groundwater contribution to baseflow would not change from that previously predicted and approved. Further, the eventual recovery of water levels in the nearby Tasman Coal Mine would lead to long-term significant increases (ie more than double) in the baseflow contribution to Blue Gum Creek.

Groundwater users

Non-alluvial (ie fractured rock) groundwater resources are relatively deep, and there are no useable fractured rock aquifers in the vicinity of the mining area. There are 34 registered bores within 5 km of the site, with 28 of these classified as monitoring or test bores. The remaining 6 are not located in aquifers connected hydraulically to those that may be affected by the proposed modification. Consequently, the proposal is unlikely to adversely affect any groundwater users in the locality.

Groundwater Dependent Ecosystems

Hexham Swamp, Pambalong Nature Reserve and the Lowland Rainforest EEC in Long Gully are all considered to be GDEs. Hexham Swamp and Pambalong Nature Reserve are located well outside of the mining footprint, and would be unlikely to be subject to any subsidence impacts or environmental consequences. The Long Gully Lowland Rainforest EEC would be protected by an SCZ, with Long Gully only undermined by first workings, such that no more than 20 mm of subsidence would occur within 40 m of the boundary of the alluvium.

The Department notes that each of these GDEs is reliant on surface water flows and alluvial aquifers, and not the deeper coal measure aquifer. The EA indicates that connective cracking between the mine workings and the alluvium is unlikely, given the application of the proposed SCZs. Any reactivation of subsidence in the previous West Borehole Seam workings would also be unlikely to have any effect on these GDEs. To confirm this prediction, Donaldson would investigate the stability of the previous workings as part of its Extraction Plan, and would accordingly review its subsidence predictions for the GDEs following this investigation.

The Department has recommended that strict subsidence performance measures are applied in order to ensure that each of these significant GDEs is protected from impacts.

Water approvals

Donaldson has sought a variation from NOW to its existing groundwater access licence to allow for inflows into the underground workings of up to 6.3 ML/day (2,300 ML/year). Currently, it holds a licence entitlement of 550 ML per year. It is also in the process of obtaining a water access licence under the *Water Management Act 2000* for the predicted 11.4 ML/year take from connected surface water sources due to baseflow losses to streams in the underground mining area.

Donaldson would not require an aquifer interference approval under the *Water Management Act 2000* as the *NSW Aquifer Interference Policy* has not yet commenced. Nonetheless, the EA considered the proposed modification against the requirements of the draft policy and the Department and NOW are satisfied that the modified project would have minimal effect on local and regional groundwater resources.

Impact management

Donaldson would continue to monitor groundwater levels and report its groundwater inflows. The integrated surface water management system has the capacity to handle all predicted groundwater inflows over the life of the project, and to treat inflows by RO and discharge them if necessary.

To ensure monitoring, management and mitigation of impacts on groundwater resources, the Department has recommended a number of conditions, including strict subsidence impact performance measures to prevent connective cracking between the underground workings and 3rd and 4th order streams), and the preparation and implementation of a detailed Water Management Plan as part of its Extraction Plan for second workings in consultation with NOW, that includes:

- groundwater impact assessment criteria;
- a groundwater monitoring program to monitor water inflows to the mine, and water levels in bores near the mine; and
- a TARP to manage any unforeseen groundwater impacts.

5.6 Aboriginal Cultural Heritage

The EA contains an Aboriginal cultural heritage assessment (ACHA) which focused on the longwall and shortwall mining areas, as an extensive survey of the overall mining area had previously been conducted for the original project. The previous survey identified 21 sites in the underground mining area, and found that bord and pillar mining would not be expected to significantly affect any Aboriginal cultural heritage sites. Donaldson would manage any unpredicted impacts through its approved Aboriginal Cultural Heritage Management Plan.

The ACHA recorded a further 11 sites in the proposed longwall and shortwall mining areas not previously recorded. The ACHA also recognised that the Aboriginal community places high cultural significance on the Black Hill locality, highlighting that the Black Hill spur was previously used as a pathway between Hexham Swamp and Mount Sugarloaf, and that a ceremonial area, known as the 'Doghole' is located near Long Gully. The sites identified in the ACHA comprised:

- 7 grinding groove sites;
- an artefact scatter;
- 2 possible scarred trees; and
- a rock shelter and associated potential archaeological deposit (PAD).

Each of these sites was identified as being of either low or low-moderate archaeological significance. The assessment found that the proposed changed mining conditions would be unlikely to result in significant impacts at the majority of these sites, as:

- subsidence at the open artefact scatter would be confined to minor impacts to the ground surface, rather than any direct damage to the artefacts;
- the 2 possible scarred trees are located on flat terrain, where minimal subsidence is likely;
- 4 of the grinding groove sites are located outside of the extent of mining, and predicted strains are unlikely to exceed the levels already approved at these sites;
- surface cracking would be unlikely, given the significant depths of cover above the mining areas; and
- the rock shelter is located within a small freestanding isolated boulder, which would be much less susceptible to impacts than a similar site within a continuous rock face.

Of the remaining 3 grinding groove sites, 2 are located above the longwall mining domain, and one is located above the shortwall mining domain. Predicted tilts and strains could affect the bedrock on which these sites are located. Donaldson stated that it could implement impact prevention measures at these sites (eg slotting of bedrock near the site), however considered that this type of impact management carries a risk of actually increasing impacts. Donaldson instead proposes to use a risk-based approach to managing impacts at these grinding groove sites, including regular monitoring during and after mining, and appropriate impact mitigation strategies.

The Department is satisfied that a risk-based impact management approach is acceptable at these sites, recognising that they are not identified as highly significant in archaeological terms, and that a risk-based approach is regularly applied across the Newcastle Coalfield and elsewhere. Nonetheless, subsidence impact performance measures should also be applied to limit the chance of any unforeseen impacts. The Department has therefore recommended that subsidence impacts at all Aboriginal cultural heritage sites are no greater than that predicted in the EA for the original project and the EA for the proposed modification.

Donaldson would detail its impact management strategies in a revised Aboriginal Cultural Heritage Management Plan (ACHMP). Donaldson has already re-drafted its existing ACHMP in consultation with the Aboriginal community, to address the proposed modification. OEH recommended that the draft ACHMP is further developed, to include protocols for reporting and managing new sites, and impact monitoring and reporting. The Department has accordingly recommended that an ACHMP is prepared, in consultation with OEH and the Aboriginal community, as part of the Extraction Plan for second workings, and that a standalone ACHMP is prepared for all other project areas (including surface sites) which are not subject to second workings.

The Department also notes that the subsidence predictions for the longwall and shortwall mining domains would be refined following further investigation of the previous West Borehole Seam workings. These revised predictions would further inform appropriate management of impacts to individual sites. The Department is satisfied that, subject to the implementation of the recommended management plans, impacts to Aboriginal cultural heritage sites would be appropriately limited and managed.

5.7 Biodiversity

The EA included an assessment of potential biodiversity impacts, which also reviewed the biodiversity assessment for the original project. The proposed modification would require a total of 2.36 hectares (ha) of vegetation to be cleared, comprising 0.16 ha for the downcast ventilation shaft and 2.20 ha for the revised alignment for the proposed overland coal conveyor.

The clearing required for the revised alignment of the approved coal conveyor is slightly more than for the originally approved alignment (2.13 ha). However, there would be reduced impact on the *Lower Hunter Spotted Gum-Ironbark Forest EEC*. Only 1.62 ha, rather than the previously approved 2.0 ha, would now be cleared.

No threatened species were found within the proposed downcast ventilation shaft site, and both OEH and the Department consider that any biodiversity impacts from this clearing would be negligible.

The proposed SCZs would limit environmental consequences to vegetation resulting from subsidence impacts, including drawdown of groundwater aquifers, reduced stream flows, ponding, surface water draining to underground workings and slope destabilisation. The Department is satisfied that any environmental consequences to vegetation not classified as EEC resulting from subsidence impacts would be minor at worst, and has recommended performance measures for the EEC vegetation in the underground mining area to ensure that subsidence causes not greater than negligible environmental consequences. Notwithstanding, the Department has recommended that, if any unforeseen biodiversity impacts occur, then appropriate biodiversity offsets are provided as compensation.

Fauna

The revised conveyor alignment would also reduce the previously approved impact to threatened fauna, particularly those that might utilise the EEC. All threatened fauna species identified are avifauna, and the extensive amount of similar habitat in the vicinity of the conveyor alignment would provide suitable alternative habitat to that proposed to be cleared. The Department is satisfied that the proposed modification would not result in significant fauna impacts.

Aquatic ecology

No significant changes to aquatic habitat or water quality in local streams are expected. To manage any unforeseen impacts to aquatic habitats while undertaking second workings, the Department has recommended that the Water Management Plan prepared as part of any Extraction Plan include:

- monitoring of stream flow characteristics and water quality; and
- trigger levels for investigation of impacts to aquatic ecosystems.

Biodiversity offsets

The Department notes that the existing approval requires an offset of 20 ha, which includes a minimum of 10 ha of *Lower Hunter Spotted Gum-Ironbark Forest EEC*, to compensate for the 12.3 ha of clearing associated with the approved project. While no clearing has yet taken place, Donaldson has retained its commitment to provide a 20 ha offset, and OEH and the Department are satisfied that this would continue to adequately compensate for the reduced overall biodiversity impacts of the modified project.

The Department has therefore recommended that a Biodiversity Offset Strategy is prepared for the modified project in consultation with OEH, which includes securing and conserving land with at least 10 ha of *Lower Hunter Spotted Gum-Ironbark Forest EEC*. The Department notes that the conveyor would only be constructed when economic circumstances permit, and has therefore recommended that the preparation and implementation of the Strategy is deferred until such time as the conveyor is constructed and/or the other approved clearing is undertaken.

Rehabilitation

The broad rehabilitation objectives in Donaldson's approved Landscape Management Plan would continue to apply to the modified project. The primary rehabilitation objective would be to create stable final landforms with acceptable post-mining land uses and capabilities, which are consistent with surrounding land uses.

Rehabilitation of disturbed areas is being undertaken on a progressive basis, and would be undertaken as soon as practicable to minimise the amount of disturbed land throughout the life of the mine. The focus of rehabilitation activities would be to regenerate self-sustaining vegetated areas using species endemic to the local area.

The Abel Box Cut low wall would be stabilised and appropriate drainage structures installed to direct run-off away from the box-cut void. Other surface facilities areas would be revegetated to either pasture or native woodland where practicable, and retained vegetation would be fenced for further protection. The Department supports the revegetation of disturbed areas to native woodland, as this would be consistent with the character of the surrounding land uses. The Department is generally satisfied that Donaldson's broad rehabilitation goals remain appropriate for the modified project.

The Department has recommended that Donaldson meets specific rehabilitation objectives for the mine site as a whole, and for the affected surface facilities sites. The recommended rehabilitation objectives also provide for the future protection of natural features such as watercourses and cliffs, and require other areas of the site to be restored to self-sustaining ecosystems.

The Department has also recommended that Donaldson prepares a comprehensive Rehabilitation Management Plan, which would replace the existing Landscape Management Plan, in consultation with relevant stakeholders. The Rehabilitation Management Plan would:

- detail the rehabilitation objectives for the site;
- describe how rehabilitation performance would be monitored and assessed against rehabilitation objectives;
- allow for the identification and implementation of additional measures to ensure these objectives continue to be achieved; and
- provide for detailed mine closure planning.

Conclusion

The Department is satisfied that the limited clearing required for the proposed modification would result in less biodiversity impact than is already approved. To ensure any flora and fauna impacts are minimised, managed, monitored, and the long term beneficial biodiversity outcomes are realised, the Department has recommended that Donaldson:

- prepares and implements detailed Biodiversity Management Plans, as part of Extraction Plans;
- offsets the clearing of EEC and other native vegetation through the long-term security and conservation of 20 ha of land with similar biodiversity values;
- controls subsidence such that not greater than negligible environmental consequences result for EECs in the underground mining area; and
- rehabilitates disturbed areas under a comprehensive Rehabilitation Management Plan.

5.8 Noise

A detailed noise impact assessment (NIA) was undertaken for the proposed modification in accordance with the *NSW Industrial Noise Policy* and other relevant guidelines. The assessment considered the existing project noise environment, and the additional impacts from the following:

- increasing coal production at Abel from 4.5 Mtpa to 6.5 Mtpa;
- increasing coal processing at Bloomfield CHPP from 6.5 Mtpa to 8.1 Mtpa;

- increasing truck movements on the project's internal haul roads in line with the ROM coal production increases at Abel and at the Tasman Extension Project;
- constructing the downcast ventilation shaft and the overland conveyor, and modifying the CHPP;
- emplacing tailings and overburden at Bloomfield Colliery; and
- vibration impacts caused by underground mining activities.

Operational noise

Abel's existing operational noise criteria are quite high. They vary, at 12 surrounding locations, from 41 – 50 dB(A) $L_{Aeq}(15 \text{ min})$ during the day time to 36 - 41 dB(A) $L_{Aeq}(15 \text{ min})$ during the night time. These high limits largely reflect the significant background noise level from the F3 Freeway, the New England Highway and John Renshaw Drive, rather than particularly noisy mining operations.

In addition, Donaldson has reduced noise emissions below those predicted in its 2006 EA via a number of operational changes implemented since the project was approved. These changes include installation of noise screens at the CHPP and rail loader, construction of an upcast ventilation shaft and a restriction on night-time coal deliveries from the Tasman Coal Mine.

Donaldson's quarterly noise monitoring has shown the success of these measures, with the Abel project consistently complying with its approved noise limits. Noise monitoring has also demonstrated that the mine is typically inaudible at all monitoring locations (partly due to high background noise from major nearby roads). Donaldson also reports that to date it has not received any complaints regarding its noise emissions.

The NIA considered two operational noise scenarios. The first assessed total noise emissions from all operations, including all ROM coal haulage from Abel and Tasman mines on internal haul roads to the CHPP. The second scenario assessed total noise emissions from all operations, with ROM coal transported to the CHPP from Abel by conveyor and from Tasman by truck.

Predictions for both scenarios were made at a number of locations (see Figure 12) for calm and adverse weather conditions, and for night-time temperature inversions, which the INP requires to be separately assessed if these are a feature of the area. The results concluded that for both operational scenarios, even under worst-case conditions, that the modified project would easily comply with its current limits at *all* receivers during *all* assessment periods. The primary noise sources are the Bloomfield CHPP, the rail loading facility, and train movements on the rail spur.

The Department considers that significant operational noise impacts are unlikely to eventuate over the life of the project. The Department also considers that, based on the results of the NIA, the approved noise limits can be substantially reduced. The Department notes the EPA's recommended noise limits for the modified project (see Table 5), and considers these revised limits are appropriate for the modified project. The Department has accordingly recommended that the noise limits in Table 5 replace the existing approved limits.

Table 5: EPA's recommended noise limits (dB(A))

Location	Day	Evening	Night	
	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{A1} (1 \text{ min})$
Location I - Lord Howe Drive, Ashtonfield	36	36	36	45
Location K - Catholic Diocese Land	37	37	37	45
Location L - Kilshanny Avenue, Ashtonfield	40	40	40	47
All other privately-owned residences	35	35	35	45

Construction noise

The conveyor and CHPP modifications would be constructed during standard day-time construction hours only, and these activities would not be able to be distinguished from overall operational noise. Exceedances of day-time assessment criteria at any privately-owned residence would be unlikely.

However, construction of the downcast ventilation shaft must be undertaken on a 24-hour basis, and day-time operational noise criteria would be exceeded at the two closest residences.

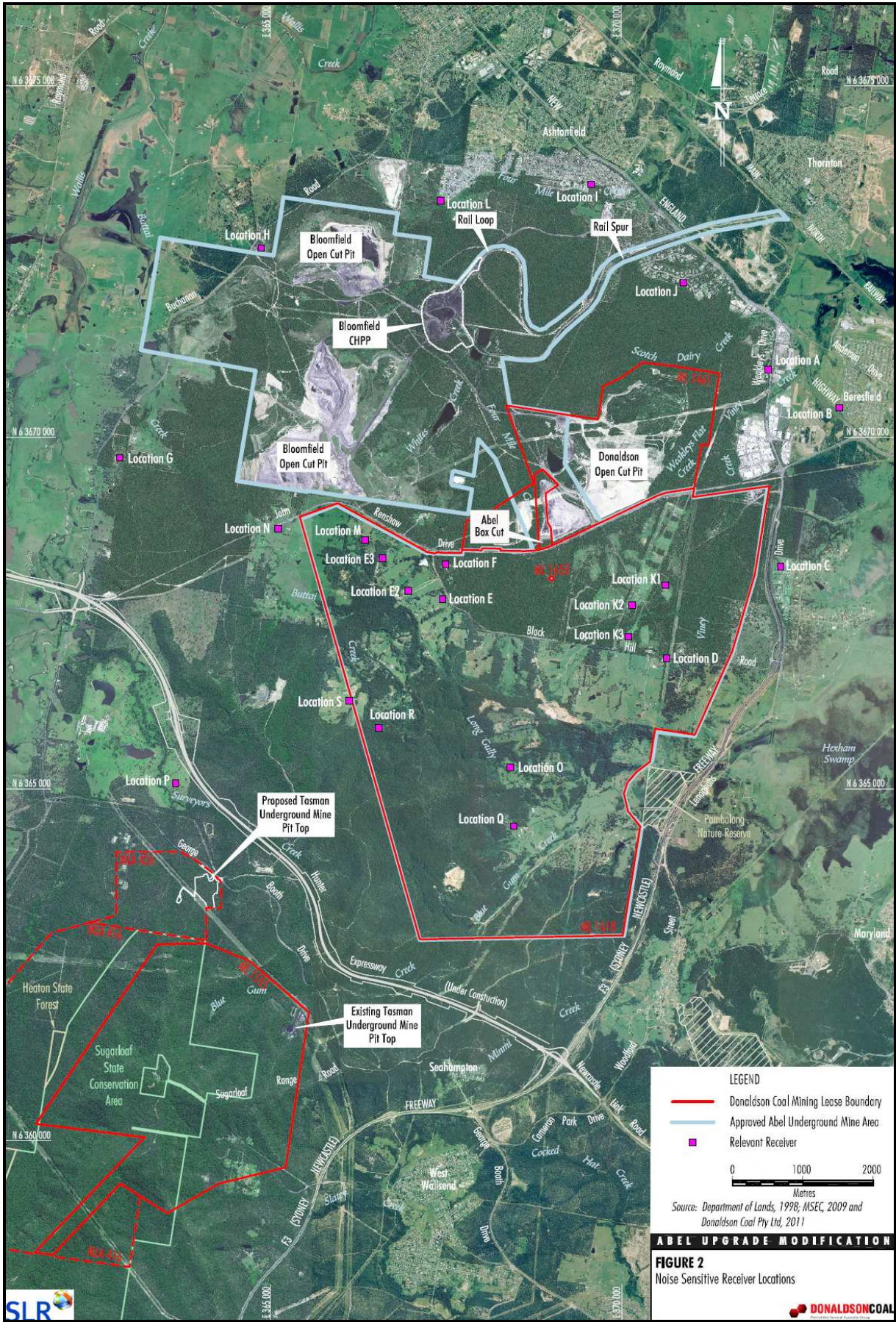


Figure 12: Noise receiver locations

The Department notes the short timeframe attached to these activities (maximum 12 weeks), and considers that with careful management and consultation with the property owners, resulting impacts would be limited. Donaldson would implement a Construction Noise Management Plan for construction activities. The Department has adopted the EPA's recommendation to limit day-time construction noise at the two closest residences to the levels shown in Table 6, for operational noise limits to apply to standard day-time construction activities at all other residences, and for a 35 dB(A) limit to apply at all residences for shaft construction activities outside of standard construction hours.

Table 6: Recommended construction noise limits

Location	Day (L_{Aeq} (15 min))
Location R – 281 Lings Road Buttai	50
Location S – 189 Lings Road Buttai	43

Road noise

Transport of coal from the Abel pit-top to the Bloomfield CHPP would only use private haul roads and not public roads. Transport of Tasman coal on public roads is regulated under the development consent for the Tasman Extension Project and does not form part of the proposed modification.

Road noise could however be affected by an increase in light vehicles as a result of the proposed increase in the mine's workforce. This increase would however only result in an at-worst 0.5% increase to the current traffic level on George Booth Drive, and a 0.2% increase to the traffic on John Renshaw Drive. These increases would be unlikely to translate into discernible increased traffic noise levels at any privately-owned residence, and the Department considers no additional conditions of approval are warranted to limit road traffic noise impacts.

Rail noise

Product coal is loaded onto trains on the private Bloomfield Rail Loop. These trains then travel on the Bloomfield Rail Spur to the Main Northern Rail Line.

Noise from project-related trains travelling on the Main Northern Rail Line would only increase the resulting rail noise level by 0.1 dB(A) over the levels predicted for the original project, and would not exceed the relevant rail noise limits set in the ARTC's EPL for the rail line at any privately-owned residence.

The Bloomfield Rail Loop and Rail Spur are privately-owned infrastructure. Therefore the resulting noise levels are measured as operational noise under the INP. The NIA considered a peak of 12 *train movements* in any 24 hour period, which reflects the conservative assessment previously undertaken for the approved project, which considered the likely range of laden train dispatches to be between 3 - 6 in any 24 hour period. Thus, peak movements would not increase under the proposed modification, although higher average train movements are required to dispatch the additional product coal.

The Department notes that the resulting predictions did not fully consider the current noise impacts of trains moving on the rail spur, instead referring to measurements of train noise used for the original project application. Donaldson stated that such emissions would continue to meet the existing approved $L_{Aeq(15 \text{ min})}$ project specific noise levels at the closest residences (see Figure 12). The Department raised concerns that this approach could have underestimated operational noise impacts.

The EPA recently released its *Rail Infrastructure Noise Guideline* (RING), which the Department considers to be the most appropriate tool to assess impacts from the Bloomfield Rail Spur. The RING recommends noise limits of 55 dB(A) during the day, 45 dB(A) during the evening and 40 dB(A) during the night. Donaldson accordingly re-assessed this aspect of its noise impacts based on the following:

- 5 rail movements during a 9-hour night-time assessment period (based on the peak of 12 rail movements over a 24-hour period);
- train pass-by speed of 20 km/hour; and
- 6 minutes per train pass-by (ie 30 minutes of pass-by in a night).

Its results showed that, under worst-case conditions, the night-time ($L_{Aeq(9 \text{ hour})}$) noise level would only be 29 dB(A) at the nearest residence to the spur. Therefore Abel's rail movements would comfortably comply with RING criteria. The Department also notes that the noise environment at the closest residential receivers to the rail spur is dominated by noise from the New England Highway, and that

rail noise on the spur is unlikely to create a significant additional impact. The Department has accordingly recommended that RING limits apply to noise on the rail spur.

The Department notes that operational noise is monitored at a residential location (location J – see Figure 12) near the rail spur. Donaldson has committed to reviewing this monitoring location, to also take into consideration monitoring of rail noise impacts. Its rail noise monitoring locations would be detailed in a Noise Management Plan for the modified project, which the Department has recommended as a condition of approval.

Sleep disturbance

Donaldson's assessment of sleep disturbance impacts showed that the L_{Amax} night-time noise limits would be well below the INP's recommended sleep disturbance criteria, and would be unlikely to result in sleep disturbance impacts for nearby residents. The Department has recommended that the INP's $L_{A1(1min)}$ sleep disturbance criteria continue to apply to the modified project.

Blasting and vibration

Some underground blasting may be required during mining operations if geological structures such as dykes are encountered. The blasting and vibration assessment considered blasting in locations known to have geological structures.

The assessment indicates that surface vibration levels would be well below the relevant ANZECC guidelines for human comfort and potential vibration damage to structures. Donaldson's proposed SCZs, which adopt minimum setback distances from privately-owned residences, would ensure relevant criteria are not exceeded. The Department is satisfied that the proposed modification would not result in any noticeable blasting or vibration impacts at any residence or other built infrastructure.

Conclusion

The NIA has found that any increase in the noise environment would be unlikely to translate into increased impacts at any residences surrounding the mine, the CHPP or the Rail Loop and Spur.

Donaldson would continue to implement all reasonable and feasible measures to minimise noise from the modified project. The Department has recommended that reduced operational noise limits apply to the modified project, and is satisfied that no additional noise mitigation measures are warranted to further reduce received noise levels at any privately-owned residences.

To effectively manage and monitor the residual noise impacts of the modified project, the Department has recommended that:

- revised noise criteria, based on the new noise predictions, apply to the modified project;
- a contemporary Noise Management Plan is prepared and implemented for the modified project, including a Construction Noise Management Plan; and
- Donaldson's noise monitoring results are published on its website.

5.9 Other Environmental Impacts

The Department's has assessed a number of other potential environmental impacts associated with the proposed modification. A summary of this assessment is provided in Table 7.

Table 7: Assessment of other environmental impacts

Issue	Assessment	Conclusion & Recommendations
<i>Socio-Economic</i>	• The modified project would accrue a number of economic benefits, including: – The creation of 48 new jobs; – \$65 million of additional capital investment; and – \$75 million in royalty contributions to the State.	• The Department is satisfied that the proposed modification would provide a net community benefit.
<i>Air Quality</i>	• Background concentrations of dust are relatively low, and impacts would remain well below relevant project-specific and cumulative air quality criteria at all residential receivers during both construction and operation of the modified project.	• The Department is satisfied that dust generated by the modified project would comfortably comply with all relevant criteria, and would not significantly affect the amenity of local residents.

	- A range of mitigation measures would continue to be implemented to minimise dust generation, including watering of internal haul roads. - The existing air quality monitoring network would continue to be used to monitor mine impacts.	The Department recommends that an Air Quality Management Plan is prepared for the modified project.
<i>Greenhouse Gas Emissions</i>	- Scope 1, 2 and 3 greenhouse gas emissions (GHGEs) from the mine have been estimated in accordance with the National Greenhouse Accounts Factors (July 2011). - Scope 1 and 2 GHGEs from the modified project represent 0.02 % of Australia's annual emissions. - The total GHGEs from the project (ie Scope 1, 2 and 3) over the life of the modified mine would be 120 Mt CO₂-e. - A range of minimisation and reduction measures are already applied at the mine, including energy efficiencies, regular maintenance of equipment, and timely rehabilitation of disturbed areas. - Scope 1 and 2 GHGEs may exceed the Commonwealth's Carbon Pricing Mechanism threshold of 25,000 tonnes CO₂-e per annum. Donaldson may be required to contribute towards the revenue generated through this mechanism which is used for initiatives designed to reduce Australia's domestic GHGEs.	- The Department recognises that the modified project would generate a large volume of GHGEs, especially when Scope 3 emissions (ie downstream emissions from transport and burning of coal) are considered. - The Department considers that Scope 3 emissions are largely unavoidable, and that it is generally in Donaldson's economic interest to minimise its Scope 1 and Scope 2 GHGEs. - In the context of national GHGEs, the impacts of the modified project are not significant. - Nonetheless, the Department has recommended conditions requiring Donaldson to prepare an updated Air Quality Management Plan that reflects the GHGE minimisation strategies to be employed by the modified project.
<i>Visual Impacts</i>	- The Abel pit-top and the Bloomfield CHPP are shielded from public view by dense vegetation. - The pit-top and CHPP sites would eventually be rehabilitated to native woodland, preventing significant long-term visual impacts. - The proposed modification is unlikely to increase the approved visual impact of the project.	The Department has recommended conditions requiring Donaldson to implement all reasonable and feasible measures to minimise visual and off-site lighting impacts of the modified project.
<i>Historic Heritage</i>	The disused Richmond Vale Railway corridor, which is locally listed as a heritage item, is located immediately south of the second workings domains. Significant subsidence impacts are unlikely at the surface in this area, and hence no specific mitigation, monitoring or management measures are proposed.	A Heritage Management Plan would be prepared as part of the Extraction Plan for second workings.

6. RECOMMENDED CONDITIONS

The Department has prepared a Notice of Modification containing its recommendations for the proposed modification (see Appendix A). The Department has undertaken a thorough review of the existing conditions, and considers, in accordance with its current practice for the regulation of coal mining projects, that the conditions should be updated to a contemporary standard.

Therefore, the Department has recommended that the current conditions of approval are wholly replaced by contemporary conditions, which allow the mine to increase its production and processing limits, recognise the existing bord and pillar mining conditions and permit longwall and shortwall mining as proposed, and require the mine to operate under strict performance measures and detailed Extraction Plans. These updated conditions are required to:

- prevent, minimise, and/or offset the increased impacts of the modified project;

- ensure best practice standards and performance measures for acceptable environmental performance continue to be met;
- ensure that regular monitoring and reporting is undertaken; and
- provide for the ongoing environmental management of the modified project.

The recommended conditions reflect current best practice for the regulation of underground coal mines in NSW. Donaldson has reviewed and accepted the recommended conditions.

7. CONCLUSION

Donaldson has made an application under Section 75W of the EP&A Act to modify its approval for the Abel Underground Coal Mine. Donaldson plans to increase the efficiency of its resource recovery in sections of its underground mining area by introducing more intensive mining methods, including longwall and shortwall mining in the Lower Donaldson Seam, and pillar extraction in the Upper Donaldson Seam.

It also seeks to upgrade the Bloomfield CHPP, to allow the proposed increase in ROM coal to be extracted to be processed and transported to the Port of Newcastle for export. This upgrade would also allow increased coal production from the nearby Tasman Underground Mine to be processed at the CHPP.

The Department has thoroughly assessed the proposed modification in accordance with Section 75W and the objects of the EP&A Act, including:

- the environmental, social and economic impacts of the proposed modification;
- relevant environmental planning instruments;
- submissions on the proposed modification; and
- the public interest.

The Department considers that the proposed modification would not significantly increase the overall approved environmental impacts of the mine, and that any increase in impacts would be adequately managed using a range of appropriate measures. The Department considers that Donaldson's proposed subsidence control zones would provide adequate protection to all significant natural and built features in the mining domains subject to the more intensive mining proposed. Predicted subsidence impacts that may occur would be minor. They would also be identified by subsidence monitoring, and could be appropriately repaired or restored using standard remediation techniques.

Because the proposed longwall and shortwall mining would generally take place beneath previous workings in the West Borehole Seam, there is a risk of reactivation of subsidence in the overlying workings causing pillar failure, and potential 'pillar run'. This risk has been mitigated through the requirement for Extraction Plans to include a detailed investigation of the overlying workings, undertaken in consultation with DRE, which:

- assesses the stability of remnant coal pillars in the former workings;
- includes revised multi-seam subsidence predictions for the second workings areas;
- gives particular consideration to the risks of irregular subsidence and for pillar run leading to subsidence outside of the predicted angle of draw; and
- recommends final design of the second workings panels and any necessary adaptive management measures.

The proposed modification would decrease some of the approved environmental impacts of the existing approved operations, particularly impacts on EECs and threatened fauna species if the coal conveyor is constructed on the proposed revised alignment.

Finally, the proposed modification would result in a range of significant beneficial social and economic impacts, including the creation of 48 new jobs, \$65 million of additional capital investment, and \$75 million in royalty contributions to the State.

On balance, the Department believes that the proposed modification represents a more efficient use of a readily available coal resource and the existing processing and transportation infrastructure. The Department considers that the benefits of the proposed modification significantly outweigh any

potential environmental costs. Consequently, the Department believes that the proposed modification is consistent with the objects of the EP&A Act, is in the public interest, and should be approved subject to conditions.

8. RECOMMENDATION

It is RECOMMENDED that the Executive Director, Development Assessment Systems and Approvals, as delegate of the Minister for Planning and Infrastructure:

- **considers** the findings and recommendations of this report;
- **approves** the modification application 05_0136 MOD 3, subject to conditions; and
- **signs** the attached Notice of Modification (Appendix A).


Manager
Mining Projects 22-11-13

 4.12.13

Executive Director
Development Assessment Systems and Approvals

 22/11/13

Director
Mining & Industry Projects

APPENDIX A: RECOMMENDED NOTICE OF MODIFICATION

APPENDIX B: CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Clause 7(1)(a) of the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007* (Mining SEPP) makes development for the purposes of underground mining permissible with development consent on any land. Consequently, the proposed modification is permissible with development consent (or project approval, as this application is made under Part 3A of the EP&A Act), and application may be granted.

Under Part 3 of the Mining SEPP, there are a number of matters that must be considered by a consent authority prior to granting development consent. These matters are:

- a. compatibility of the proposal with other land uses;
- b. natural resource management and environmental management;
- c. resource recovery;
- d. transport; and
- e. rehabilitation.

These matters do not require to be taken into consideration for modifications of existing project approvals under section 75W. Nevertheless, the Department has considered these matters in its merit assessment, and taken them into account in its recommended conditions of approval.

SEPP (State and Regional Development) 2011

Both the Abel coal mine and the proposed modification meet the definition of 'development for the purposes of coal mining' under Schedule 1 of the *SEPP (State and Regional Development) 2011*. However, no separate development application is required for the proposal, since it meets the requirements of a modification to the existing project approval under Section 75W.

SEPP No.33 – Hazardous and Offensive Development

Donaldson undertook a preliminary hazard analysis in accordance with *SEPP No.33 – Hazardous and Offensive Development* for the approved project, which found that the project does not meet the definition of a hazardous or offensive industry. The assessment applies equally to the proposed modification. Consequently, the Department is satisfied that the modified project would not pose a credible risk to surrounding land uses, and is therefore consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No.44 – Koala Habitat Protection

SEPP 44 requires a consent authority to consider the presence of any core or potential koala habitat. The EA for the approved project and the EA for the proposed modification included fauna assessments which did not identify koalas within the approved or proposed mining area. There is therefore no evidence of 'core koala habitat' in this area. However, there is potential Koala habitat within the project area due to the presence of feed tree species. SEPP 44 does not prevent grant of consent to development located where potential koala habitat exists. The Department considers that the proposed modification would not result in any significant impacts on potential koala habitat, and consequently the proposal is consistent with the aims, objectives, and requirements of SEPP 44.

SEPP (Infrastructure) 2007

SEPP (Infrastructure) 2007 requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. The Department has notified Roads and Maritime Services (RMS), relevant electricity authorities (TransGrid and Ausgrid), and the Office of Environment and Heritage (OEH) regarding the proposed modification. None of these authorities objected to the proposed modification, and their recommendations have been considered by the Department and incorporated into the proposed Notice of Modification as appropriate. This satisfies the requirements of *SEPP (Infrastructure) 2007*.

Hunter Regional Environmental Plan 1989 (Heritage)

This REP requires consideration of the potential impacts of proposed developments on various heritage items and values in the Hunter Region. However, there are no items identified by the REP in the vicinity of the project, and the assessment did not identify any items of significant heritage value that would require further investigation within the proposed modification area. Consequently, the Department is satisfied that the proposed modification is consistent with the aims, objectives and provisions of this REP.

Cessnock Local Environmental Plan 2011, Cessnock Local Environmental Plan 1989, Maitland Local Environmental Plan 2011 and Newcastle Local Environmental Plan 2012

The Department has considered Donaldson's detailed review of the relevant provisions of the *Cessnock Local Environmental Plan 2011, Cessnock Local Environmental Plan 1989, Maitland Local Environmental Plan 2011 and the Newcastle Local Environmental Plan 2012*. This review included discussion that the underground mining area includes land where mining or development ancillary to mining is not a permissible land-use.

Clause 5(3) of the Mining SEPP states that the Mining SEPP prevails over any inconsistency with a local environmental plan. Consequently, the proposed modification is wholly permissible and may be carried out with development consent.

APPENDIX C: SUBMISSIONS

(see attached CD)

APPENDIX D: RESPONSE TO SUBMISSIONS

(see attached CD)

APPENDIX E: ENVIRONMENTAL ASSESSMENT

(see attached CD)