



NSW GOVERNMENT
Department of Planning

***PROPOSED MODIFICATION:
Mandalong Coal Mine -
Increased Production Rate and
Infrastructure Upgrade (DA 97/800 MOD 4)***



Environmental Assessment Report
Section 75W of the
Environmental Planning and Assessment Act 1979

July 2009

Cover photograph: Mandalong Mine, proposed Ballast Borehole Area

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EXECUTIVE SUMMARY

Centennial Coal Company Limited (Centennial) is seeking to modify its current consent for the Mandalong Coal Mine. The modification application is to increase the rate of coal production from 4 to 6 million tonnes per annum, construct methane-fuelled gas engines generating up to 12 megawatts of electricity, relocate an already approved ballast borehole and streamline and modernise consent conditions relating to subsidence management.

The increased rate of production would result in the additional employment of up to 75 full-time equivalent employees, but over a shorter mine life. The increased rate of production would increase minewater discharge to local waterways. The minewater would be discharged in accordance with the conditions of the mine's existing Environmental Protection Licence.

The operation of the methane-fuelled gas engines would increase NO₂ and SO₂ concentrations in the vicinity. However all modelled emissions would be below DECC's guideline criteria. Centennial has committed to a final engine configuration that would be less polluting than the configuration assessed in the EA. The gas engines would reduce Scope 1 greenhouse gas emissions from the mine by 160.5 kilotonnes of CO₂-equivalent per year by burning methane that would otherwise be released into the atmosphere and by 112.4 kilotonnes of CO₂-equivalent per year by replacing electricity otherwise generated within a coal-burning power station.

The construction of the ballast borehole and gas engines would result in a total of 5 hectares of modified grassland being cleared, with associated minor soil, air and water impacts. The relocation of the ballast borehole would allow for more efficient delivery of ballast to underground mining operations, reducing costs associated with the use of ballast material.

Increased annual coal production would shorten the timeframe over which subsidence impacts would occur throughout the mining area. This, together with other subsidence impacts, would be managed through streamlined and effective revised consent conditions, which would bring the management of subsidence at Mandalong into line with current standards at other underground coal mines in the State. The proposed conditions of consent would remove duplicated reporting and notification requirements as well as updating conditions reliant on now-repealed legislation. Overall, the changes to conditions relating to subsidence management, reporting and notification improve the clarity and intent of the consent, without reducing the rigour or effectiveness of these conditions in protecting residential amenity and safety and the local environment.

The Department has assessed the key potential impacts of the proposed modification and has recommended conditions it believes would, in conjunction with the reasonable and feasible mitigation measures Centennial has committed to, adequately mitigate or minimise all environmental impacts. The Department is satisfied that the other impacts of the proposal would remain much the same as for Centennial's existing operations, and are unlikely to be significant.

The Department is satisfied that the proposal is in the public interest and should be approved subject to conditions. Centennial has reviewed and accepts the recommended conditions. Centennial has provided a Statement of Commitments as part of the EA, and has undertaken to implement these 33 operational controls in addition to the revised conditions of consent.

1. BACKGROUND

Centennial Mandalong Pty Ltd, a subsidiary of Centennial Coal Company Limited (Centennial) operates the Mandalong Coal Mine, located west of the township of Morisset in the Lake Macquarie local government area (see Figure 1).

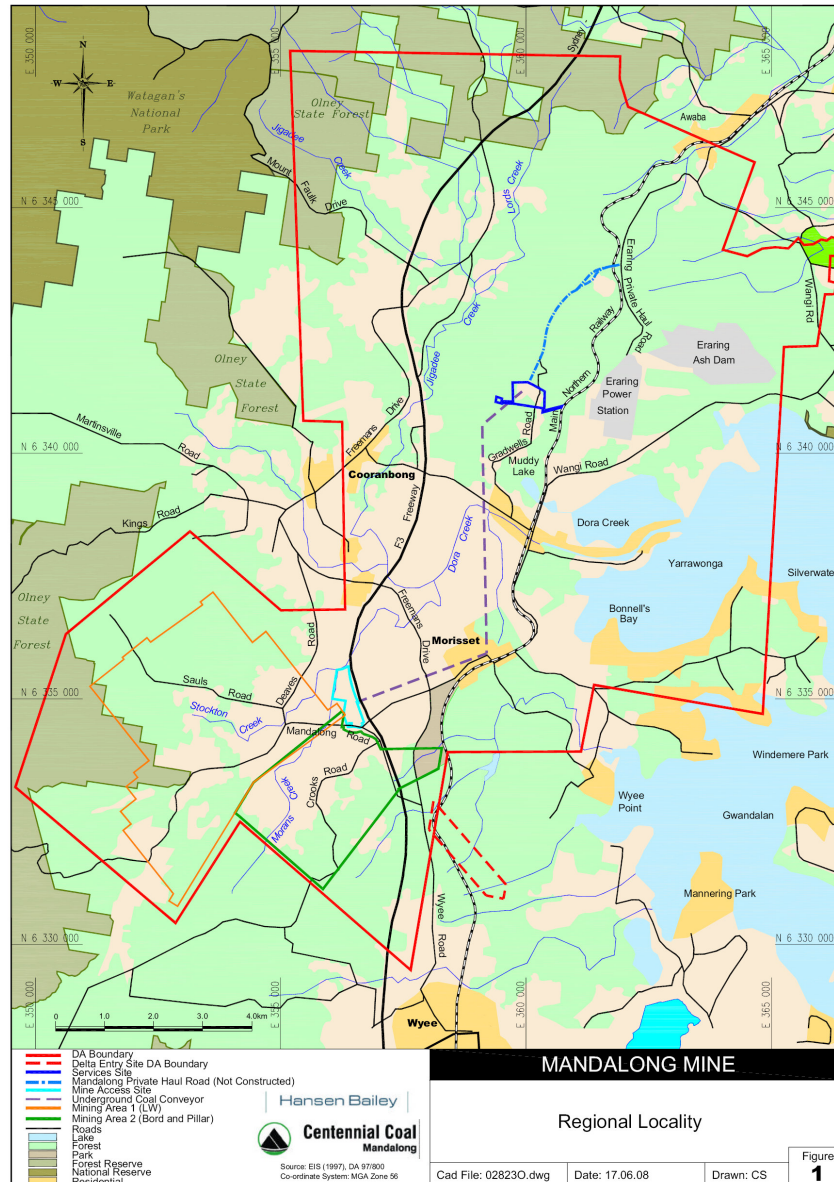


Figure 1: Mandalong Coal Mine Location

Mandalong Mine operates under two Ministerial consents: DA 97/800 and DA-35-2-2004. Consent DA 97/800 was approved by the then Minister on 14 October 1998, and has had 3 subsequent modifications. Under this consent Mandalong Mine has approval to:

- undertake longwall and bord and pillar mining to extract up to 4 million tonnes per annum (Mtpa) of run of mine (ROM) coal until 2024;
- construct a 40 hectare (ha) Mine Access site west of the Morisset F3 interchange, consisting of amenities, workshop, carpark and mining infrastructure;
- operate two 100,000 (t) stockpiles and a Coal Handling Plant at the Mine Services site (now named the Mandalong Services site), located at the former Cooranbong Colliery site;
- transport up to 2 Mtpa of product coal from the Mandalong Services site to Eraring Power Station via an overland conveyor;

- operate a methane gas drainage plant;
- operate six enclosed methane gas flare units to burn gas generated by the methane drainage plant;
- construct a private haul road (not yet constructed) to facilitate transport of up to 2 Mtpa of product coal from the Mandalong Services site to Newstan Rail Loading Facility for export; and
- operate 24 hours / 7 days a week.

Consent DA-35-2-2004 was approved by the then Minister in 2004 and allows up to 4 Mtpa of ROM coal to be transported via underground conveyor to the Delta Entry site. From that site, a separate council consent (DA 2501/2004) permits the transport of sized coal by overland conveyor to the Vales Point Power Station.

Under these various consents, Centennial has approval to transport up to 4 Mtpa of ROM coal to each of the Mine Services and Delta Entry sites for sizing or processing and dispatch (at the Mandalong Services site) or sizing and dispatch (at the Delta Entry site). As such, the mine has approval to transport and process up to 8 Mtpa of ROM coal. Consequently, the impacts associated with transporting and processing 4 Mtpa at each of the Mandalong Services site and the Delta Entry site have previously been assessed. Nonetheless, the mine only has current approval to extract up to 4 Mtpa.

The layout of the mine is shown in Figure 1 and includes:

- the Mine Access site, west of the F3 interchange (outlined in blue-green in Figure 1, and shown in detail in Figure 2 with carpark, amenity, gas drainage plant and administration buildings visible);
- longwall mining west of the Mine Access site (outlined in orange in Figure 1);
- bord and pillar mining south of the Mine Access site (outlined in green in Figure 1);
- the Mandalong Services site (outlined in dark blue in Figure 1); and
- an underground conveyor connecting the Mandalong Services site and the Mine Access site (shown as purple dashes).

The region is dominated by Lake Macquarie and surrounding residential and rural properties, with the F3 Freeway running north to south. Other features of the area include:

- the town of Morisset east of the Mine Access site and the F3 Freeway;
- Eraring Power Station to the east of the Mandalong Services site;
- the Northern Railway running north to south through the towns of Awaba, Morisset and Wyee; and
- the Olney State Forest west of the longwall mining area.

2. PROPOSED MODIFICATION

On 28 August 2008, Centennial lodged a modification application with the Department under section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act). In summary, the application (DA 97/800 Mod 4) seeks to:

- increase the rate of ROM coal extraction from 4 to 6 Mtpa;
- construct and operate gas engines, generating up to 12 megawatts (MW) of electricity, fuelled by methane from the existing mine methane gas drainage plant;
- increase employment from 230 to 305 full-time equivalent employees;
- relocate an approved, but not yet constructed, ballast borehole; and
- revise the subsidence conditions of the existing consent to ensure consistency with the Department of Primary Industries' (DPI's) Subsidence Management Plan (SMP) process.

The proposed modifications are outlined below.

Increased Coal Extraction Rate and Associated Employee Increase

Improved operational efficiency and an increased geological knowledge of the mining area underpins the proposed 2 Mtpa increase in coal extraction rate. This increased rate would not increase the overall area proposed to be mined. Consequently, Centennial would complete mining at Mandalong earlier than previously predicted. Figure 3 shows the indicative mine plan schedule that would result from the increased extraction rate. The increased production rate would require 75 additional full-time equivalent staff, but over a shorter mine life.

Construction and Operation of Gas Engines

The gas engines would be located at the Mandalong Mine Access site, adjacent to the existing methane drainage plant, which would supply fuel to the engines. The installation of the engines would require an extension of an existing cleared area by 1 ha. Design and configuration of the gas engines has not been

finalised, but gas engines are typically configured to the size of a shipping container. Establishment of the gas engines would occur in a staged fashion, dependent on the delivery of methane from the drainage plant. The gas engines, gas drainage plant and gas flares would run 24 hours per day, 7 days a week.

Relocation of Ballast Borehole

An existing approved location for a ballast delivery borehole is located within the Mandalong Mine Access site. However, this borehole, which is required to deliver gravel for use in maintaining underground roadways, needs a more efficient and practical location (see Figure 2). The required borehole is a 350 mm diameter steel-cased borehole fitted with a small hopper to carry the gravel/ballast. A small communications borehole would be installed adjacently. Associated infrastructure would include an access road from Mandalong Road, a gravel pad to accommodate safe manoeuvring of a 10 t truck, 300 t ballast stockpile and landscaping of vegetated earthen bunds. A total of 4 ha of modified grassland would be cleared to allow for this infrastructure (see cover photograph). Construction would take two months and ongoing operation would be from 7:00 am to 6:00 pm, 7 days a week.

Update Consent Conditions

Centennial seeks to modify specific conditions of its consent DA 97/800 relating to subsidence management and related stakeholder notifications. The current consent was created before the introduction of DPI's SMP process in 2004. Since that date, all underground coal mining leases in NSW have contained a condition requiring the preparation and approval of an SMP in accordance with published guidelines. The modification seeks to update the consent to adopt DPI's SMP process as the primary management and mitigation tool for subsidence impacts to property, infrastructure and the environment.

3. STATUTORY CONTEXT

3.1 Assessment Process

Mandalong Mine has development consent under Part 4 of the EP&A Act. Centennial has sought to modify this consent under section 75W of Part 3A of the Act. Under clause 8J(8)(b) of the *Environmental Planning and Assessment Regulation 2000*, a development consent in force immediately before the commencement of Part 3A may be modified under section 75W as if the consent were an approval under Part 3A, but only if:

- a) *the consent was granted with respect to development that would be a project to which Part 3A of the Act applies but for the operation of clause 6(2)(a) of State Environmental Planning Policy (Major Projects) 2005, and*
- b) *the Minister approves of the development consent being treated as an approval for the purposes of section 75W of the Act.*

Development consent DA 97/800 was granted for development that would be a project to which Part 3A of the Act applies except for the exemption provided by clause 6(2)(a) of the Major Projects SEPP. The then Minister gave approval to the consent being treated as an approval for the purposes of section 75W on 14 June 2007. While the modification process has taken place under Part 3A, the modified consent would remain a consent under Part 4 of the Act.

On 4 March 2009, the Minister delegated her powers and functions as an approval authority to modify certain development consents under section 75W of Part 3A of the EP&A Act, to the Deputy Director-General, Development Assessment. This modification application meets the terms of this delegation, and consequently the Deputy Director-General may determine the application under delegated authority.



Figure 2: Mandalong Mine Access site and the sites of proposed surface modifications

3.3 Environmental Planning Instruments

The following environmental planning instruments are relevant to the proposal:

- Lake Macquarie Local Environment Plan 2004;
- Hunter Regional Environmental Plan 1989;
- SEPP (Mining, Petroleum Production and Extractive Industries) 2007;
- SEPP 33 – Hazardous and Offensive Development; and
- SEPP 55 – Remediation of Land.

The Department has assessed the proposal against the relevant provisions in these instruments and is satisfied that the proposal complies with and is otherwise consistent with the aims, objectives and provisions of the instruments (see Appendix B).

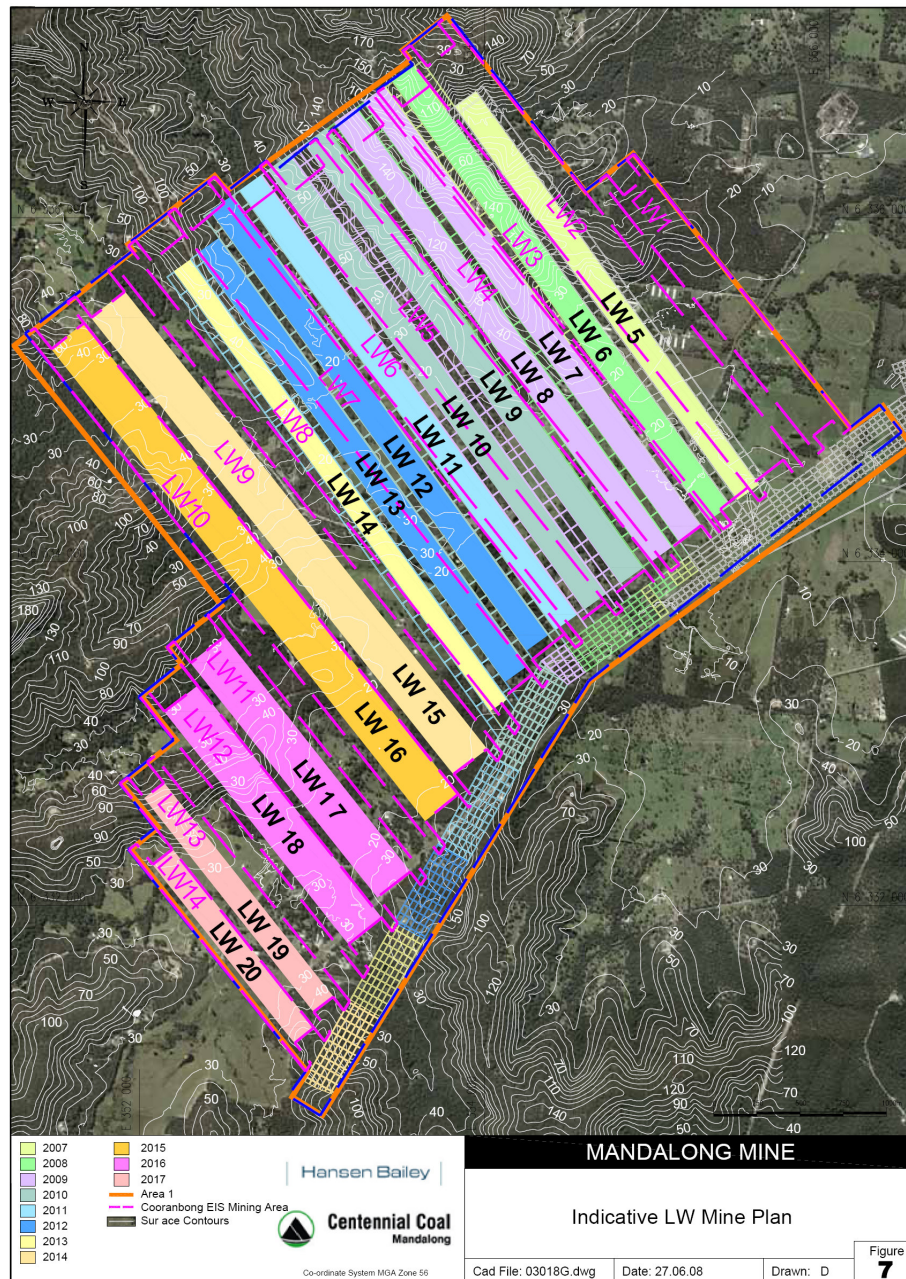


Figure 3: Mandalong Mine – Current Indicative Longwall Mine Plan

4. CONSULTATION

After accepting the modification application, the Department:

- placed the Environmental Assessment (EA) on public exhibition from 13 to 29 October 2008 at:
 - the Department's Information Centre;
 - Lake Macquarie City Council's offices;
 - Mandalong Mine's offices;
 - Nature Conservation Council's offices; and on
 - the Department's website;
- notified relevant State government authorities and Lake Macquarie City Council by letter; and
- advertised the exhibition in the Newcastle Herald on 10 October 2008.

This satisfies the requirements for public participation in the EP&A Act and the EP&A Regulation.

During the exhibition period, the Department received 5 submissions on the proposal (see Appendix D), including:

- 4 from public authorities:
 - Department of Environment and Climate Change (DECC);
 - Department of Primary Industries (DPI);
 - Department of Water and Energy (DWE); and
 - Lake Macquarie City Council (Council); and
- 1 from a special interest group:
 - United Mineworkers Federation of Australia (Union).

No submissions were received from the general public.

None of the public authorities objected to the proposal, but many had concerns regarding subsidence impacts / management, increased mine water discharge, flooding and rehabilitation.

Council objected to the proposed introduction of a 6 month timeframe during which landowners would have to apply for assistance if subsidence-related damage occurred to their property. Council raised other key issues, including:

- mine subsidence – increased impact to land owners and the environment due to the increased rate at which subsidence will occur;
- flora and fauna – management of remnant endangered ecological communities, land clearing and protecting wetland areas;
- flooding – impact from flooding to the ballast borehole or impact on local flooding regimes;
- acid sulphate soils management;
- future land use – nearby property is zoned for Urban / Conservation and may be rezoned to residential in the near future;
- greenhouse gas emissions – methodology used to calculate greenhouse emissions and the lack of offset measures; and
- lighting and construction impacts.

DECC raised concerns regarding the water, air and noise assessments. DECC was concerned that potential impacts from increased mine water discharges had not been assessed, and stated that it is not sufficient to rely on proposed daily water discharges complying with the mine's existing Environmental Protection Licence. DECC is also concerned that the noise assessment did not establish rating background noise levels or assess the occurrence of temperature inversions according to DECC guidelines. It also noted that the air quality assessment used incorrect units in reporting air-borne contaminants and that the combined impact of the gas engines and local freeway emissions could exceed relevant DECC criteria.

DWE raised concerns regarding the assessment of proposed groundwater extraction and subsidence impacts on waterways and shallow groundwaters.

DPI raised concerns regarding rehabilitation and the final landform and land use of the areas containing the ballast borehole and gas engines and indicated that it would require a conceptual final landform plan for the mine.

The **Union** was generally supportive of the proposed modification.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

5.1 Subsidence

Subsidence Impacts

The proposed modification would affect subsidence impacts in two ways. Firstly, the rate at which mining progresses and therefore the date at which subsidence impacts would be first experienced at a particular location would be shortened and, secondly, the way subsidence impacts are managed under the consent would be streamlined.

The timing of the onset of subsidence at any particular location is dependent on the rate of progress in mining in the mine below. The modification seeks to increase the extraction rate by 50% from 4 to 6 Mtpa. Consequently, the rate at which individual longwall panels would be mined would increase, meaning subsidence impacts to residential properties, local infrastructure and environmental features would occur up to 50% sooner than previously predicted (see Figure 3). Longwall mining is now anticipated to be completed by 2017, which is about 5 years earlier than indicated in the EIS for the mine.

The company has achieved, or anticipates achieving, increased rates of coal production by the introduction of improved mining equipment and more efficient work practices. In addition, the company plans to mine larger longwall panels (both increased length and width) than has been the case up until the present, which would also increase the efficiency of mining operations.

The proposed increase in production rate would not change the quanta of predicted subsidence effects, subsidence impacts or environmental consequences, as the thickness of coal seam that would be mined (which is a key determinant of vertical subsidence) would remain unchanged. Mining would also not be undertaken in any area that has not been previously assessed as part of the development application for the mine. Longwall panel widths are likely to increase from those of the first 10 longwall panels (which have been or are being mined at either 125 m or 160 m) but would not exceed the 250 m panel width assessed in the original EIS. Therefore, subsidence effects, subsidence impacts and environmental consequences would be no greater than previously assessed. All that would change is that these effects, impacts and environmental consequences would be experienced at some particular locations up to 5 years earlier than expected at the current production rate of 4 Mtpa.

The Department believes that, provided landowners are notified well in advance of the likely occurrence of mining and related subsidence impacts and consequences for their property, the increased rate of mining would not lead to any effective change in the management of subsidence on private property. Under conditions as proposed, landowners would still have a substantial amount of time to consider the implications of mining beneath their property.

The EIS predicted that vertical subsidence would vary from 1.5 m (125 m width longwall panel) to 2.91 m (250 m width longwall panel). Longwall panels 1 and 2 were extracted with panel width of 125 m, resulting in vertical subsidence of 0.87 m and 1.36 m respectively. After data were available on the relationships between local geology and measured vertical subsidence, an increased longwall width (160 m) was introduced for longwalls 3 to 5. Subsidence predictions approved under the SMP approval process for longwalls 3 to 5 indicated that impacts would be managed within the approved consent conditions. For longwall panels 6 to 10 (which are being managed under the mine's 3rd SMP), predictions have been amended (1.2 to 1.6 m) to reflect vertical subsidence monitored to date (see Table 1).

Table 1: Subsidence data for Longwalls 1-10

Longwall No	EIS Predicted Subsidence ¹	SMP Predicted Subsidence ²	Measured Subsidence
1	1.5	0.24	0.87
2	1.5	0.24	1.36
3	1.5	0.54	1.22
4	1.5	0.54	0.67
5	2.91	0.54	1.02
6	2.91	1.2	0.64
7	2.91	1.6	-
8	2.91	1.4	-
9	2.91	1.2	-
10	2.91	1.2	-

Notes: 1. Longwalls 1 - 4 were assessed in the EIS at 125 m panel width, Longwalls 5 - 10 at 250 m panel width.
 2. Longwalls 1 - 2 were assessed and mined under the SMP at 125 m panel width, Longwalls 3 - 10 were assessed and are being mined at 160 m panel width.

The observed impacts of subsidence on residential properties, local infrastructure and environmental features have been significantly less than predicted in the original impact assessment and are either less than, or within, the predicted range of impacts outlined in the three SMPs prepared by Centennial and approved by DPI to date.

To date, Centennial has used the subsidence monitoring information from each longwall panel to better understand, and therefore more accurately predict, subsidence impacts for each successive longwall panel. Overall, subsidence impacts to structures such as residences have been slight and able to be repaired without residents needing to leave while the repairs were effected. Other impacts that have required remedial measures include a small area of land subject to ponding, a horse training track and a subsidence compression hump to Mandalong Road. In addition, Centennial has purchased many of the properties that overlie the mine's mining areas which means that any subsidence impacts to these properties can be addressed without inconvenience to the general public or local landowners.

Centennial has been required to monitor the condition of local waterways and, to date, subsidence impacts to these waterways have not been of a sufficient magnitude to require remedial action. The company is also required to undertake modelling of any changes that may be caused by subsidence to flooding behaviour. Since longwall mining began in January 2005, there has not been a significant flood to test the flood modelling predictions. Nevertheless, the flood modelling undertaken is robust and Centennial does not expect significant changes in flood behaviour as a result of its mining operations.

The Department has recommended revised conditions of consent that would require Centennial to continue its comprehensive subsidence prediction, monitoring and reporting measures (see below). The Department considers that a rigorous subsidence monitoring and management regime needs to be maintained for the mine so that the accuracy of subsidence predictions is continuously improved. This, in turn, would allow landowners to be better informed of likely impacts and allow for the best possible management of subsidence impacts for individual landowners.

Subsidence Conditions

The existing consent contains a substantial number of conditions relating to subsidence management, monitoring and notification of landowners and agencies. These conditions represented the Department's best practice at the time they were first applied (October 1998). Since that time, both the Department and DPI have sought to continually improve the management of subsidence impacts and environmental consequences by improved conditions of consent, as well as by providing for rigorous subsidence monitoring, auditing and reporting mechanisms.

In particular, in 2004 DPI introduced the SMP approval process that has since applied to all underground coal mines in the State. The SMP process is a comprehensive environmental impact assessment process that addresses the risk, management and mitigation of subsidence impacts and allows for substantial community consultation and input. It leads to the approval by DPI of a comprehensive management plan to

control, monitor and report subsidence impacts. The process requires an interagency panel to assess the application and draft SMP before final approval is given by the Director-General of DPI.

The DPI's SMP process applies to Mandalong Mine as a condition of its mining lease. This means that Centennial is currently required to implement all of the subsidence management, reporting and notification requirements of its 1998 consent as well as all the requirements of DPI's SMP process. The result is that Centennial is required to report the same data, and many aspects of subsidence management, more than once and under differing timeframes, to affected government agencies and other stakeholders.

Centennial has therefore sought to amend the existing consent conditions to ensure consistency with the DPI's SMP process and to remove regulatory duplication. The Department is strongly supportive of the principle of reducing bureaucratic duplication, and would much prefer that the company's efforts are directed to production of high quality and timely subsidence information, rather than compliance with outdated, duplicate and confusing reporting requirements.

Since Centennial prepared its modification application, the report of the *Strategic Review of Impacts of Underground Mining on Natural Features in the Southern Coalfield* has been released by the Department. While not all matters reported upon in this strategic review are directly relevant to underground coal mining in the Lake Macquarie area, or to the Mandalong Mine in particular, almost all of the recommendations of the report concerning principles for assessing, monitoring, notifying and reporting subsidence-related effects, impacts and environmental consequences are quite relevant.

Rather than simply applying DPI's existing SMP process as a corresponding condition of consent, the Department believes that the best interests of the community, regulators and Centennial would be served by applying the Southern Coalfield Inquiry's recommendations in rationalising the mine's subsidence-related conditions of consent.

In addition, a number of the Applicant's requirements under the existing consent's subsidence conditions are tied to statutory provisions under the *Coal Mines Regulation Act 1982*, which predates DPI's SMP process and which has since been repealed. This has rendered a significant proportion of the existing subsidence conditions of consent difficult to interpret and enforce.

The Department has therefore recommended conditions of consent that provide for a future SMP approval process at Mandalong that is based on:

- a minimum of 2 years of baseline data for significant natural features, collected at appropriate frequency and scale;
- identification and assessment of significance for all natural features located within 600 m of the edge of secondary extraction;
- a clear description of subsidence effects, subsidence impacts and environmental consequences;
- increased transparency, quantification and focus in describing anticipated subsidence impacts and consequences;
- acceptability of impacts under the SMP process being determined within a framework of risk-based decision-making;
- ensuring that the mining company consults with key agencies as early as possible in the mine planning process and consults with the community in accordance with applicable current industry and Government guidelines;
- providing for management, monitoring and contingency plans for all significant man-made and natural features which may experience subsidence effects, subsidence impacts or environmental consequences, including dwellings and buildings; roads, electrical, communications and other infrastructure; landscape; groundwater; terrestrial flora and fauna and ecology (including any threatened species and their habitats); and Aboriginal and other cultural heritage;
- preparation in accordance with any guidelines for SMPs developed by the Department and/or DPI;
- approval prior to the carrying out of any underground mining operations that could cause subsidence in the relevant area (including related gateroads, but not main headings); and
- implementation to the satisfaction of the Director-General of DPI.

Landowner's Rights

The local community of the Mandalong Mine has a strong interest in how subsidence-related impacts are managed, monitored and reported. Although no submissions were received from the public about the proposed modification, Centennial has communicated its desire to remove duplication of subsidence-related

conditions from its consent to the Mandalong Community Consultative Committee and via newsletters distributed to potentially-affected landowners.

The existing consent requires, among many other notification requirements, that residents are notified at least 2 years prior to longwall mining occurring under their land. It also requires that individual Property Subsidence Management Plans (PSMPs) be prepared for each landowner whose land is likely to be affected by subsidence. Each PSMP is required, based on best available data, to set out likely subsidence impacts to the land, structures upon the land, drainage and any other consequences for agricultural production or the conduct of a business on that land. Notification to the landowner of their rights and PSMP consultation arrangements must be at least 2 years prior to the commencement of longwall mining. Each PSMP is also required to be provided to the landowner "prior to a section 138 application of secondary extraction approval under the *Coal Mines Regulation Act 1982*". As indicated above, this statutory provision has been repealed. However, DPI requires that the corresponding SMP applications are submitted at least 6 months prior to the commencement of longwall mining.

The Department has recommended revised conditions to consent that are integrated with DPI's SMP process. These have the effect that landowners would be advised by newspaper advertisement of the company's intention to prepare a SMP for a particular longwall (or more usually a group of longwalls) about 18 months before the planned commencement of any mining of the longwall(s) or associated gateroads. Following this notification, the company would also need to consult with individual landowners in the preparation of PSMPs in order to have them ready to provide to landowners prior to the company's submission of its SMP.

Under the SMP process, the company is also required to advertise the submission of its SMP application to DPI. As noted above, this usually takes place at least 6 months prior to the commencement of longwall mining. The recommended conditions require that the company provide its completed PSMPs (and a written notification of landowner rights and offers to consult in person and to fund independent advice on the PSMP) to individual landowners at least 7 days before its SMP submission advertisement.

As the development of gateroads for longwall blocks at Mandalong Mine would take 6-12 months, this means that, under the revised conditions, landowners would receive their completed PSMP and notification of rights 12-18 months prior to the commencement of longwall mining. The Department believes that the revised approach would provide a superior outcome for landowners as the detailed subsidence information for their property contained in the PSMP would be provided to them much earlier than under existing conditions of consent. The Department also believes that the most appropriate time to provide landowners with written information on their rights is at the time they are given their PSMP.

The existing conditions of consent also provide that each landowner is notified at least 2 weeks prior to the development of main headings under their property. As these roadways are needed to provide access for workers and supplies to mining areas and contain conveyors to transport mined coal, they are designed to be long-term stable and do not lead to measurable subsidence effects on surface lands. Consequently, the Department does not believe that this notification requirement serves a beneficial purpose and has recommended that it is removed from the consent.

The Department is satisfied that the recommended conditions of consent provide an effective consultation mechanism and relevant, up-to-date subsidence information for each individual landowner. This information must be delivered in a timely manner and with an offer by the company to provide, if requested, funds for the landowner to obtain assistance in the interpretation of their individual PSMP.

Conclusion

The Department proposes amendments to the consent conditions to avoid duplication and inconsistencies in regards to subsidence management. It is confident that the revised subsidence management process would satisfactorily manage subsidence impacts and environmental consequences, including the accelerated timeframes for the onset of subsidence impacts at any particular location.

5.2 Noise

Centennial undertook a noise impact assessment (NIA) to assess the noise levels that would be generated by the modification and to predict impacts on nearby receivers at both the Mine Access and Mandalong Services sites. The NIA referenced DECC's *Industrial Noise Policy* and used four receiver locations representative of neighbouring properties to establish background noise levels to thereby determine the appropriate noise impact assessment criteria for the modification. The NIA calculated the likely noise levels

that nearby residents would receive and determined that these levels would be below the noise impact assessment criteria during day, evening and night periods for both construction and operational activities. The predicted night-time noise levels in the vicinity of the Mine Access and Mine Services are shown in Figures 4 and 5.

However, DECC raised concerns with some aspects of the methodology used to calculate the noise impact assessment criteria. Of particular concern was the methodology used to calculate the occurrence of temperature inversions at the Mine Access site.

The NIA relied on analysis of wind direction and temperature to predict the occurrence of temperature inversions. The wind analysis predicted that temperature inversions would occur 23% of the time during winter months. This is below the 30% threshold required by DECC's INP. Analysis of night-time temperatures during winter months indicates a reduction of 2°C occurs between 11 pm and 5 am, which is minor in comparison to other locations, eg in the Hunter Valley. The minor night-time temperature change indicates Lake Macquarie (approximately 5 km to the east) has a stabilising effect on night-time air temperatures in winter months. Analysis of drainage flow patterns associated with temperature inversions indicates receiver locations are either upwind or uphill from the Mine Access site. Consequently, the Department considers that noise-enhancing winds are not expected to be significant for any residence near the Mine Access site. While the NIA did not determine occurrence of temperature inversions strictly in accordance with DECC guidelines, the Department is satisfied that temperature inversions in winter months are not a significant feature of the local area.

The existing consent conditions do not provide noise impact criteria established in accordance with the INP. Consequently, the Department has recommended a condition of approval that provides noise impact assessment criteria for residences in proximity to both the Mine Access and Mandalong Services sites that are both in accordance with INP processes and the predictions provided by Centennial.

5.3 Air Quality

Centennial prepared an Air Quality Assessment (AQA) for the modification in accordance with DECC's *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*.

The air quality impacts associated with the processing and transport of coal have been previously assessed, as the mine already has approval to transport 4 Mtpa of ROM coal to both the Mine Services and Delta Entry sites, allowing a total of 8 Mtpa to be processed (or sized, in the case of the Delta Entry site) for transport to power stations and other markets (see Background, above).

The air quality impacts of the modification are therefore limited to the construction of the ballast borehole and construction and operation of the gas engines. The dust generated by construction would be minimal as the areas to be disturbed are small and the nature of the construction involves little soil disturbance. Dust-generating activities would be mitigated by dust suppression techniques such as keeping drilling equipment damp and watering dirt roads and exposed surfaces.

In respect of operation of the gas engines, the AQA contains predictions of emission levels for carbon monoxide (CO), nitrogen dioxide (NO₂) and sulphur dioxide (SO₂), using local meteorological data and known emission characteristics for gas engines. The predicted contaminant concentrations are all below the maximum and cumulative 15 minute, 1 hour and 24 hour criteria for CO, NO₂ and SO₂, as established by DECC and the relevant NEPM. However, the predicted cumulative average 1 hour NO₂ concentration for properties near the site and 50 m from the F3 Freeway was only one µg/m³ below the relevant criterion of 246 µg/m³. The Department notes that a very substantial proportion of this cumulative impact (nearly 80%) derives from traffic on the freeway, or from other background. In addition, the engine configuration of 6 x 2 MW engines used to model predicted impacts was the most polluting of the possible configurations which could provide a total of 12 MW of generating capacity. That is, if 2 engines each of 6 MW were used instead, then the resultant NO₂ levels would be lower than as modelled. Accordingly, the model's predictions are conservative.

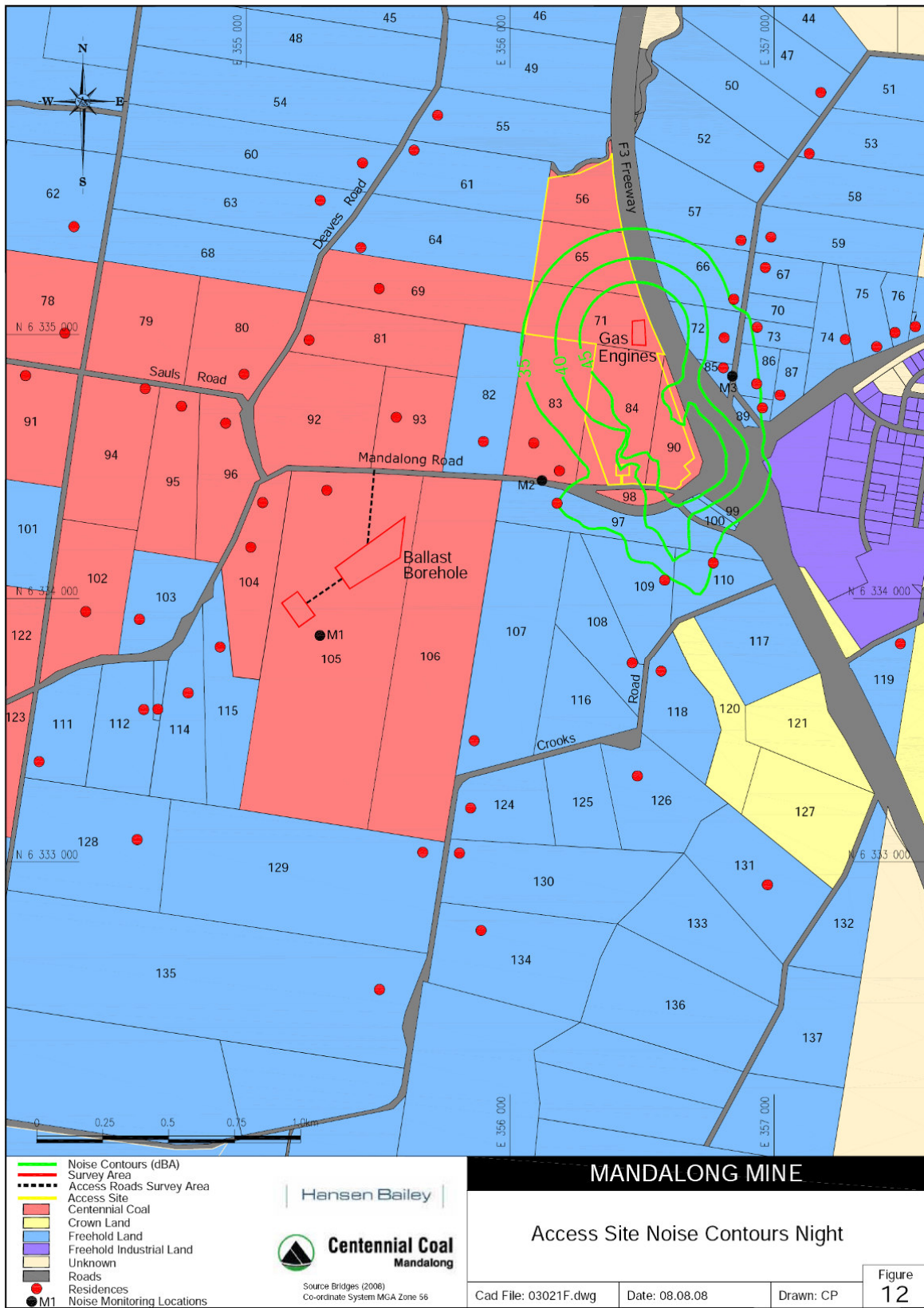


Figure 4: Noise levels for Mine Access site with gas engines operational (night-time)

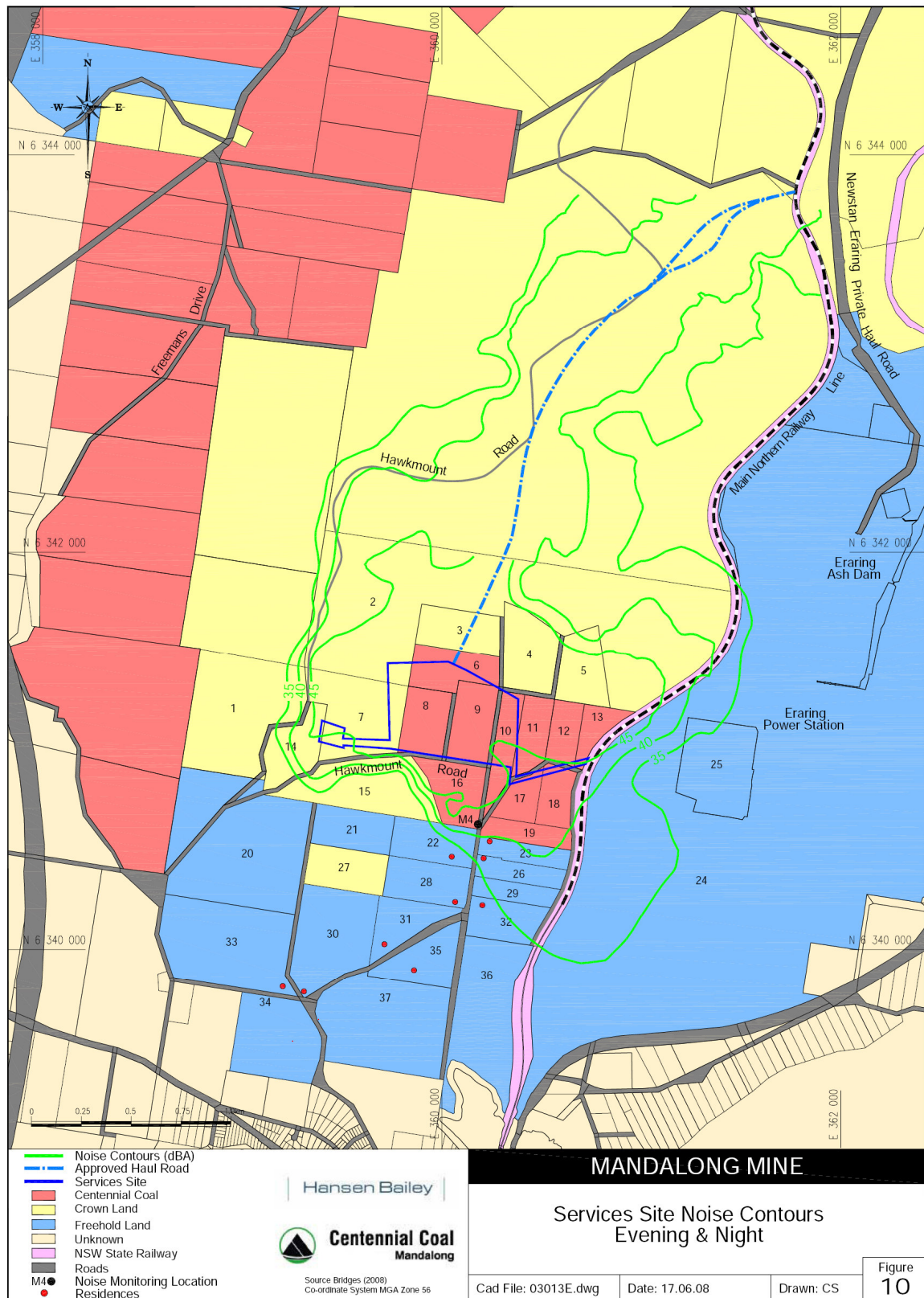


Figure 5: Noise Levels for the operation of the Mandalong Services site

Centennial would be required to obtain a variation to its Environmental Protection Licence (EPL) prior to installing the gas engines. Centennial suggested that the EPL would be best sought once the actual engine type and configuration is decided and that emission levels should be set in the EPL, rather than the modified consent. DECC and the Department agree with this approach, as it enables the best engine design for the project to be chosen and the most appropriate emission levels to be set. The performance of the selected engines must then be in accordance with specific emission levels set by conditions of the EPL.

On this basis, the Department is satisfied that air quality impacts related to the ballast borehole would be minimal and that the final configuration and output of the gas engines would comply with air quality criteria.

5.4 Other Issues

ISSUE	CONSIDERATION	IMPACT
<i>Greenhouse Gases</i>	Use of the proposed gas engines would reduce methane emissions from the mine, but not by as much as might be anticipated. The Department has clarified particular calculations in the EA. Perhaps 40% of the total methane drained from the mine by the existing gas drainage plant would be combusted in the engines as proposed. In turn, this represents slightly less than 10% of the total methane expected to be liberated by the mine if operating at 6 Mtpa. Use of the gas engines would reduce the mine's Scope 1 greenhouse gas emissions (GHGEs) by 160.5 ktpa. This equates to an approximate 8% reduction in the predicted annual total Scope 1 emissions of the mine. Use of the gas engines would also potentially reduce external Scope 3 GHGEs by 112 ktpa, through displacing electricity generated in a coal-fired power plant. Thus the total potential reduction in emissions resulting from installing and operating the gas engines is around 273 ktpa. This is equivalent to 13% of the mine's total Scope 1 and Scope 2 emissions. While this would be a substantial reduction in direct emissions, it would lead to no effective change in indirect emissions (ie Scope 3 emissions), which are dominated by the downstream burning of product coal (estimated in the AQA at 12.88 Mtpa, for 6 Mtpa of ROM coal production). Nonetheless, the proposed modification would not increase the total amount of coal to be extracted from the mine. Accordingly, the total GHGEs resulting from mining and burning this coal has not changed over the life of the mine. However, the extra 2 Mtpa of coal mined per year would result in a corresponding 50% increase in annual GHGEs, albeit over a lesser period. The Department considers that the overall impacts from GHGEs would remain similar over the life of the mine, with a minor reduction in Scope 1 GHGEs resulting from the gas engines. Nonetheless, the installation of gas engines to burn methane which is otherwise directly vented to the atmosphere is a positive step forward for underground coal mines in NSW, and is to be encouraged.	Small beneficial impact, in reducing Scope 1 emissions.
<i>Surface Water</i>	The increased rate of mining would increase water consumption at the mine, particularly within the underground operations. The site water balance for the mine is in surplus, and the increased demand for water is easily met by existing water inflows. The amount of water discharged at the mine's Licensed Discharge Point is predicted to increase from 481 to 618 ML a year. This equates to an increase in the daily discharge volume from 1.3 to 1.7 ML a day. The mine is permitted to discharge up to 5 ML a day. As noted in Section 4, DECC objected to the increase in mine water discharge, as the impact to the receiving waterways had not been assessed. The Department believes that issues associated with the proposed increase in discharge of water, which would remain well within limits in the mine's existing EPL, are best considered directly by DECC. Construction activities would require areas to be cleared, which could cause sediment run-off and siltation of local waterways. Risk of run-off would be mitigated by the implementation (and revision, if required) of the mine's Erosion and Sediment Control Management Plan. Material extracted from the drilling of the ballast borehole would be used in the creation of the visual and acoustic bund at the borehole site. The Department is satisfied that surface water impacts are unlikely to be significant. The Department accepts the proposed increase in discharge would be within Centennial's existing EPL limits and considers that DECC should review discharge conditions in the mine's EPL if required.	Minor

ISSUE	CONSIDERATION	IMPACT
<i>Flora & Fauna</i>	A total of 5 ha of modified grassland would be cleared - 4 ha at the Ballast Borehole site (see cover photograph) and 1 ha at the Gas Engines site. No threatened flora species, endangered ecological communities or critical habitat were identified at these sites by the flora survey. The fauna survey identified a bird species of conservation significance (Cattle Egret) foraging within a pond at the Ballast Borehole site. No other fauna species of conservation significance was identified. Management and mitigation measures would be implemented to protect the pond and wetland area from siltation, and an appropriate buffer area would be provided. The Department is satisfied the impact to flora and fauna would be minor.	Minor
<i>Traffic</i>	The modification would increase employee traffic entering the mine site from Mandalong Road, as a result of up to 75 additional workers. Centennial's traffic assessment determined that the increase in traffic would not result in disruption to traffic on Mandalong Road and that the existing Mine Access site intersection has adequate capacity. The construction of the ballast borehole would result in a minor temporary increase in traffic on Mandalong Road, which is predicted to not disrupt existing traffic. The intersection upgrade at the ballast borehole access road would allow for safe entry. The Department is therefore satisfied that there would be no significant traffic impacts arising from the proposed modification.	Minor
<i>Ground-Water</i>	The increased mining rate would increase the amount of incidental groundwater that seeps into mine workings. As this water is unsuitable for re-use it is pumped to the Mandalong Services site where suspended solids are allowed to settle out before it is discharged via the mine's Licensed Discharge Point (see Surface Water, above). Centennial has also demonstrated that the extraction of additional incidental groundwater is within the volume limits of its existing water licence from DWE.	Minor
<i>Aboriginal Heritage and Non Aboriginal-Heritage</i>	A desktop study, field survey and review of the existing literature did not locate any sites, artefacts or potential archaeological deposits of Aboriginal or non-Aboriginal heritage within the ballast borehole or gas engine sites. The local Aboriginal community was consulted in accordance with DECC guidelines and was present during the field survey. Consequently, the Department considers the potential impacts to Aboriginal heritage and non-Aboriginal heritage from the proposal are negligible.	Negligible
<i>Visual</i>	The gas engines and the ballast borehole infrastructure would be visible to some residents. Visual impacts would be mitigated by the provision of a bund at the ballast borehole site, vegetative screening and the use of directional lighting. Additionally, residents would be consulted with regards to any visual screening requirements. The Department therefore considers residual visual impacts to be negligible.	Negligible
<i>Lighting</i>	The construction of the gas engines and the ballast borehole would not occur at night. Any lighting in the vicinity of the gas engines would be in an area close to the F3 Freeway and the existing Mine access site. The Department believes that changes to lighting impacts would be negligible.	Negligible.
<i>Acid Sulphate Soils</i>	Council identified that both sites for surface disturbance are located within an identified Acid Sulphate Soil Zone, and that an acid sulphate soils management plan should therefore be prepared. Centennial responded that no excavation of soil is proposed for the gas engine site and the ballast borehole would be fully lined with steel. In addition, the mine has previously prepared an Acid Sulphate Soils Investigation and Management Plan, in accordance with existing conditions of consent. This Plan was approved by the Department in April 2007. It is accepted that any Potential Acid Sulphate Soils encountered would be managed in accordance with this Plan.	Negligible.
<i>Flooding</i>	The earthworks associated with the construction of the gas engines and ballast borehole sites are extremely minor when compared to the extent of the Mandalong floodplain. The proposed modification would not have any measurable impact on flood levels or water velocities.	Effectively nil.
<i>Potential future land use conflicts</i>	The development is located within one kilometre of land that Council is investigating to be rezoned for future residential purposes. Council was concerned that the development may impact on this potential future land use. The Department believes that the mine as proposed to be modified would not have any different impact on these potential future land uses then the current mining operation approved in 1998.	Nil.
<i>Hazards</i>	A Preliminary Hazard Assessment (PHA) was undertaken to determine if the proposed gas engines would be hazardous or offensive development. The PHA assessed risks against proposed controls and risk mitigation and determined that residual risks to surrounding land users would be appropriately managed and the proposed gas engines are not hazardous or offensive development.	N/A

6. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of consent for the proposed modification (see Appendix A). These conditions are required to:

- prevent and/or minimise adverse impacts of the proposed modification;
- set standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting;
- provide for the ongoing environmental management of the development; and
- remove duplicated and conflicting subsidence management requirements.

Centennial has reviewed and accepts the recommended conditions. Centennial has provided a Statement of Commitments as part of the EA, and has undertaken to implement these 33 operational controls in addition to the revised conditions of consent.

7. CONCLUSION

Centennial is seeking to modify its current consent to increase the rate of coal production from 4 to 6 Mtpa, construct methane-fuelled gas engines with a combined generating capacity of 12 MW, relocate an already approved ballast borehole and revise consent conditions to avoid duplication and inconsistency in regards to subsidence management. The modification would result in the additional employment of up to 75 full-time equivalent employees, but over a shorter mine life.

The Department has assessed the modification application, EA, submissions and Centennial's response to submissions, and is satisfied that there is sufficient information available to determine the application. This assessment has found that the proposed modification would have only limited environmental impacts, most notably increased air emissions from the proposed gas engines and an increase in the volume of minewater discharged from the mine, which would be in accordance with its existing EPL.

Increased annual coal production would shorten the timeframe over which subsidence impacts would occur throughout the mining area. This, together with other subsidence impacts, would be managed through streamlined and effective revised consent conditions, which would bring the management of subsidence at Mandalong into line with current standards at other underground coal mines in the State. The proposed conditions of consent would remove duplicated reporting and notification requirements as well as updating conditions reliant on now-repealed legislation. Overall, the changes to conditions relating to subsidence management, reporting and notification improve the clarity and intent of the consent, without reducing the rigour or effectiveness of these conditions in protecting residential amenity and safety and the local environment.

The Department has assessed the predicted impacts of the proposed modification and has recommended conditions it believes would, in conjunction with the reasonable and feasible mitigation measures Centennial has committed to, adequately mitigate or minimise these impacts. The Department is satisfied that other impacts of the proposal would remain much the same as for the mine's existing operations, and are unlikely to be significant.

In assessing the proposed development, the Department has taken into account the objects of the EP&A Act, in particular the need to encourage ESD, and matters required to be considered under section 79C of the Act.

Based on this consideration, the Department is satisfied that the proposal is generally in the public interest, and should be approved subject to conditions.

8. RECOMMENDATION

It is RECOMMENDED that the Deputy Director-General, as delegate of the Minister:

- consider the findings and recommendations of this report;
- determine that the proposed modification is not a “radical transformation” of the development consent;
- approve the application to modify development consent, subject to conditions, under section 75W of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached instrument of modification to the development consent (Tagged A).



21/7/09

David Kitto
A/Executive Director



Richard Pearson
Deputy Director-General

21/7/09