MAJOR PROJECT ASSESSMENT: Wallarah 2 Coal Project (MP 07_0160)

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

March 2011

Cover photograph: view looking south across the Tooheys Road site, the proposed site of the mine's coal processing infrastructure

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EXECUTIVE SUMMARY

The Wyong Areas Coal Joint Venture proposes to develop the Wallarah 2 Coal Project, a new underground coal mine approximately 100 kilometres north of Sydney on the Central Coast. The project involves the extraction of up to five million tonnes of coal per annum over a 28-year life using longwall mining methods. Coal would be processed on-site before being transport to the Port of Newcastle by rail for export. The project is estimated to involve capital investment of approximately $750 million, and would employ 270 people during construction and 300 during operation.

The project is subject to assessment under Part 3A of the *Environmental Planning and Assessment Act 1979* because it meets the requirements of *State Environmental Planning Policy (Major Development) 2005*. The Minister for Planning is therefore the approval authority for the project. In addition to approval under NSW legislation, the project is also a Control Action requiring assessment and approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. The NSW assessment process has been accredited for the purpose of complying with the assessment requirements of Commonwealth legislation.

The Environmental Assessment for the project was publicly exhibited for an extended, two-month period and the Department accepted late submissions on the project following conclusion of the exhibition period. The Department has received 249 submissions on the project, including 11 from pubic authorities, nine from special interest groups and the remaining 229 from the general public. Of the submissions received from special interest groups and the general public, all but nine objected to the project. Key grounds of opposition to the project included impacts on the Central Coast water supply, human health impacts (dust), impacts on groundwater and surface water, air quality, noise, general amenity issues, subsidence, ecology and traffic impacts.

In July 2010, the Minister directed that the Planning Assessment Commission consider and report on the project, including conducting a public hearing (which occurred in October 2010). The PAC supports approval of the project in its report, but *express*[es] *its disappointment at the level of information provided in the* [Environmental Assessment]. The PAC indicates that if more information had been provided in the Environmental Assessment, it would not have had to recommend as many conditions be imposed on the project.

Recommended conditions presented in the PAC's report rely heavily on an adaptive management approach to impacts from the project, and the development and implementation of a significant list of environmental management plans. The PAC has adopted this approach to deal with uncertainties around subsidence predictions, particularly in the west of the project site, concerns of the site water balance, lack of assessment of impacts associated with the discharge of site process waters (including treated mine water and sewage effluent), and lack of ecological and heritage survey effort in the west of the project site. Many of these issues have also been raised in public authority submissions, which have suggested an inability to conclusively determine the environmental impacts of the project based on the information provided in the Environmental Assessment.

The Department accepts that there will always be a level of uncertainty associated with predictive modelling and assessment of large-scale development proposals, and that the adaptive management approach is an effective tool that is used to refine, mitigate and manage the long term impacts of mining in NSW. However, the Department stresses that a reasonable level of confidence around the type and magnitude of likely environmental impacts must be achieved before adaptive management and management plans can be applied.

In the case of the subject project application, the Department considers, based on the outcomes of the PAC assessment, issues raised by public authorities and the community in submissions, and its own assessment of the proposal that a number of areas of uncertainty and high residual environmental risk remain. These areas include:

1. uncertainty around the subsidence predictions for the project, particularly in the western portion of the site under Jilliby Conservation Area and the Wyong State Forest;
2. inconsistencies and discrepancies with the project water balance;
3. the project does not adequately address potential surface water quality impacts associated with the discharge of treated mine water, the underground disposal of brine or the irrigation/ discharge of treated sewage, and no demonstration of availability of alternative reuse options to avoid environmental discharge of these streams

4. uncertainty around the ecological impacts of the project, particularly in the western portion of the site, as a result of a lack of ecological survey effort combined with unresolved uncertainties with subsidence predictions in this area;
5. uncertainty around the heritage impacts of the project, particularly in the western portion of the site, as a result of a lack of heritage survey effort combined with unresolved uncertainties with subsidence predictions in this area; and
6. inconsistencies between the modelling scenarios for air quality and noise impacts.

The Department does not consider that the Proponent has sufficiently demonstrated that the application of adaptive management or management plans is an appropriate response to these uncertainties, and therefore the Department does not consider the application of such an approach for the project to be an appropriate regulatory response to these uncertainties at this point in time.

To apply such an approach in this instance would, in effect, be deferring assessment of key impacts associated with the project to some point in time after approval of the project. Given the extent of these issues, there is no certainty that these unresolved issues and uncertainties could be adequately addressed and resolved post-approval in manner that is protective of the environment and consistent with acceptable environmental limits. The Department considers that approval of the project without a reasonable level of confidence around these key issues at this point in time poses a significant and unacceptable environmental risk.

For these reasons, whilst the Department considers that coal mining could potentially be carried out, the Department is unable to support approval of the project at this time. The Department therefore recommends refusal of the project application.

1. PROPOSED PROJECT

1.1 Project Description

The Wyong Areas Coal Joint Venture (WACJV), a joint venture whose majority shareholder is Kores Australia, proposes to develop a new underground coal mine near Wyong, approximately 100 kilometres (km) north of Sydney on the New South Wales Central Coast (see **Figure 1**).

The proposal, which is known as the Wallarah 2 Coal Project (W2CP), is depicted in **Figures 2-4** and summarised in **Table 1**. The project is described in detail in the Environmental Assessment (EA) for the project, which is attached as **Appendix A**.

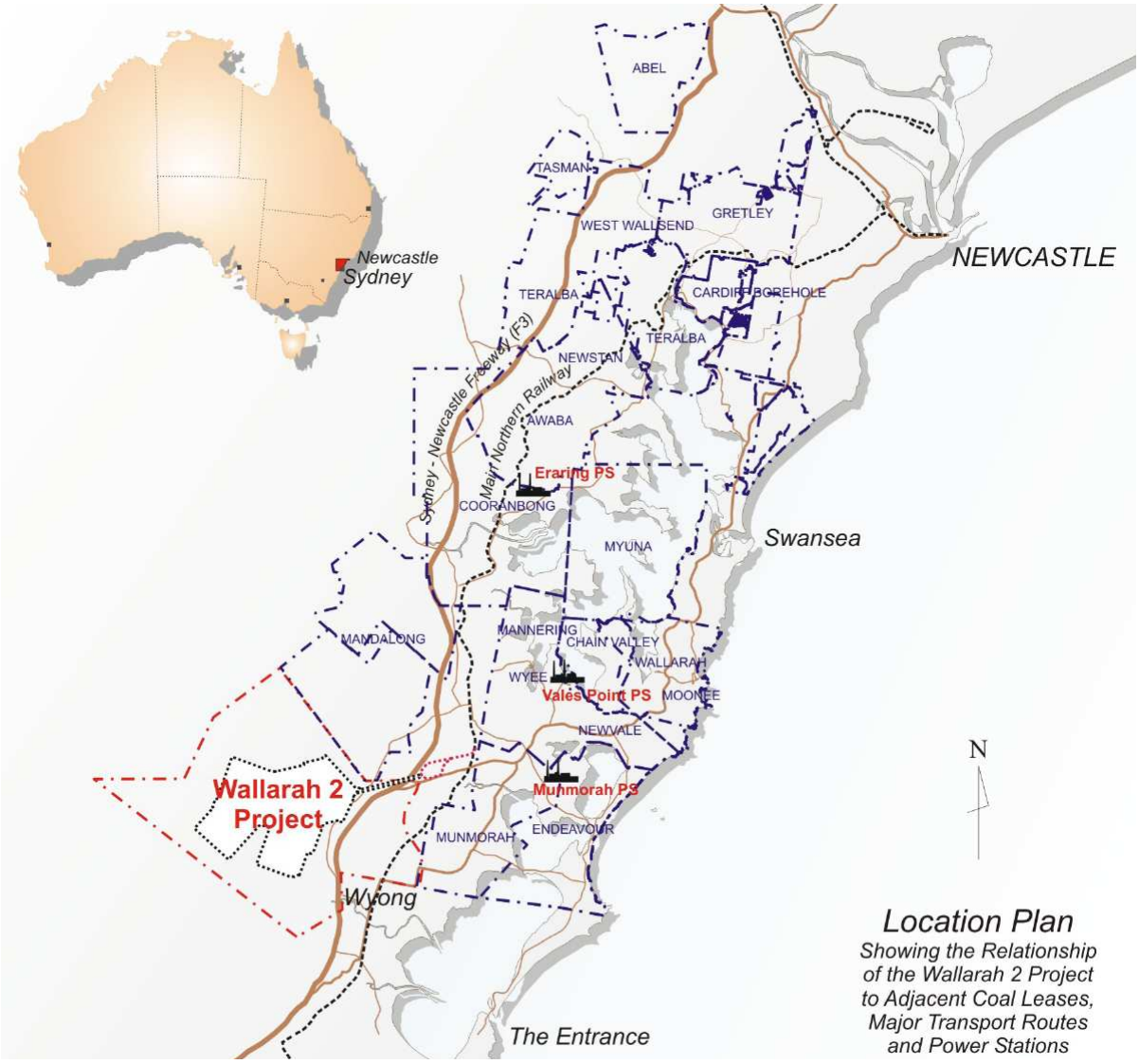

Figure 1: *Project Location*

1.2 Project Background

In 1995, the NSW Government invited tenders for the Wyong Coal Development Areas, in the NSW Central Coast. WACJV was the successful tenderer, which, at the time, was majority owned by Coal Operatons Australia Limited (COAL), with Kores representing a minority interest. BHP Billiton (BHPB) became the majority shareholder when it acquired COAL. In 2005 BHPB sold its majority share to the minor shareholders, and Kores acquired an 82% stake in the joint venture.

Exploration, mine planning and environmental studies defined significant coal resources in the Wyong Shire, to the west of the F3 Freeway (known as the western resource). A potentially viable coal resource of 375 million tonnes (Mt) has been identified within the western resource.

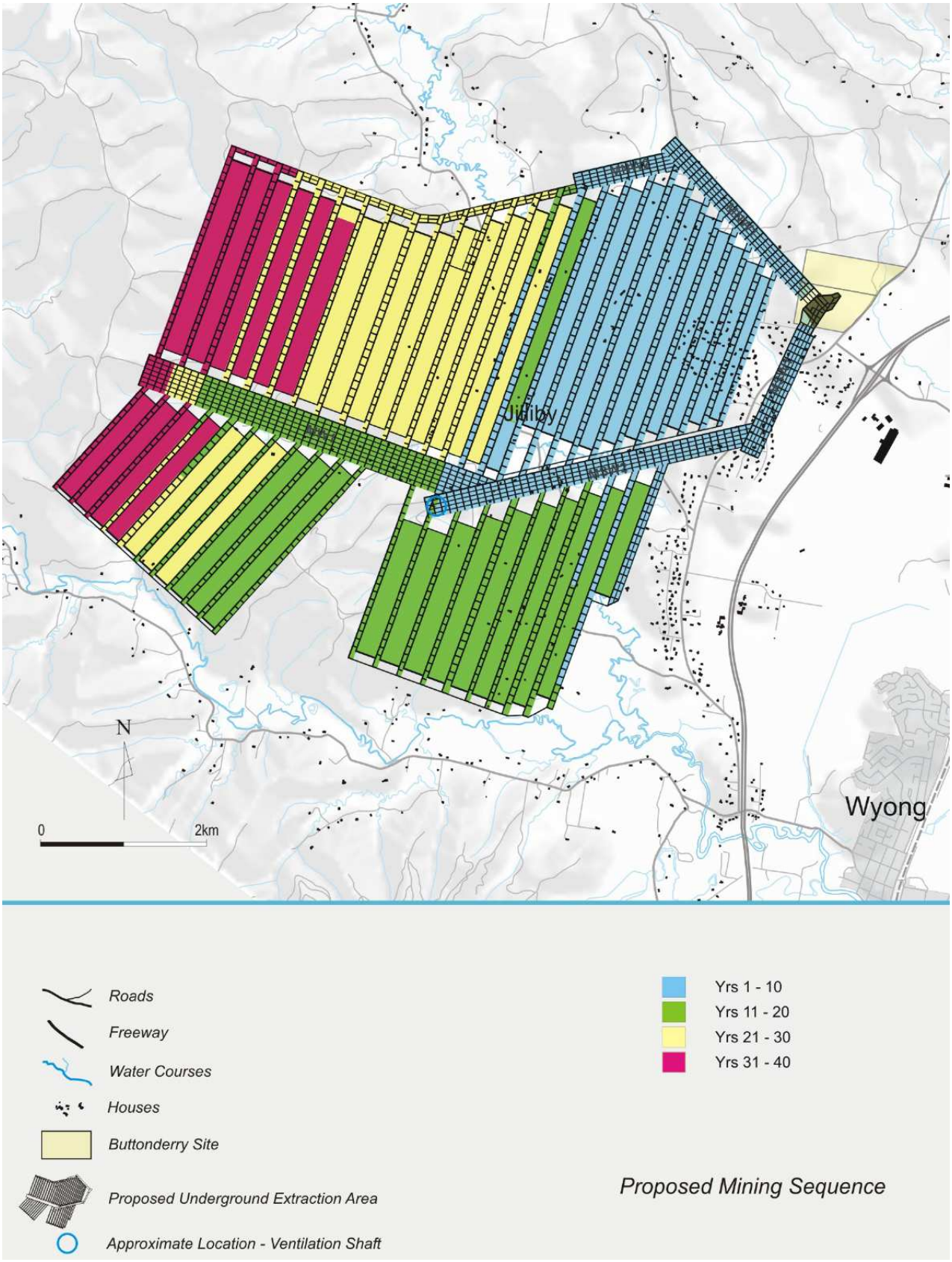

Figure 2: *Conceptual Mine Plan*

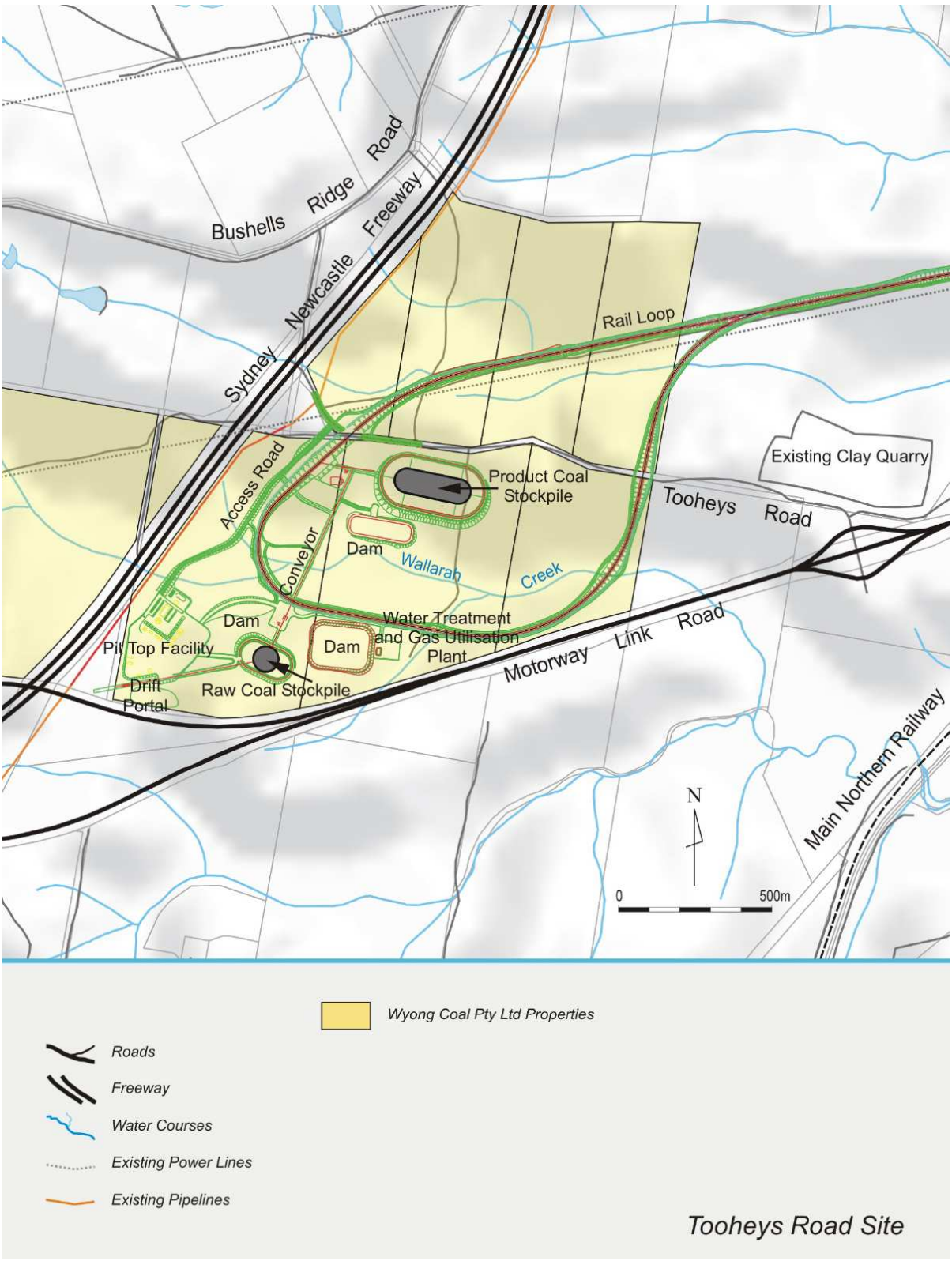

Figure 3: *Proposed Coal Processing Site at Tooheys Road*

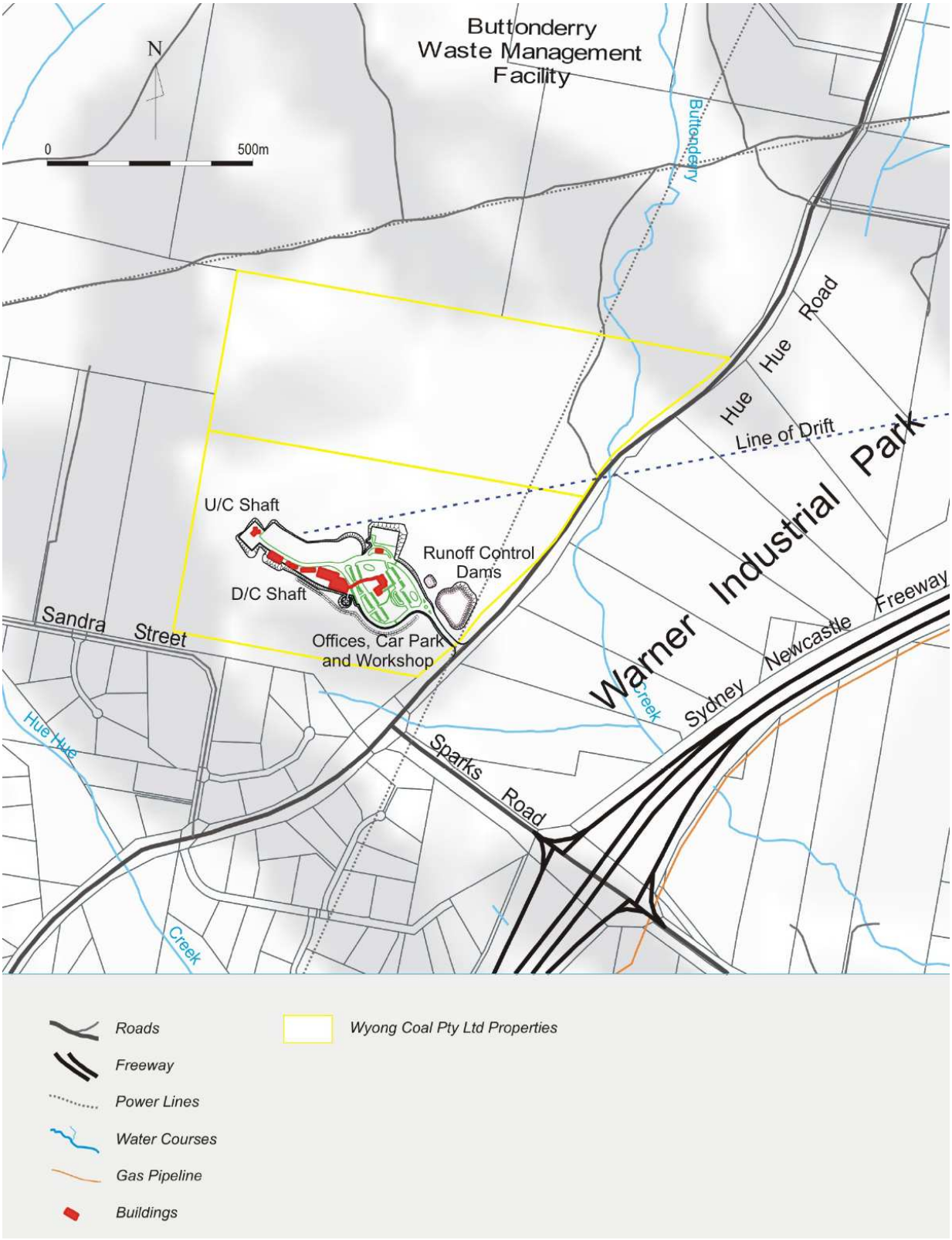

Figure 4: *Proposed Administrative Facilities and Drift Site at Buttonderry*

***Table 1**: Major Components of the Project*

Aspect	***Description***
Project Summary	• **Development of a new underground coal mine;** • **Extraction of up to five million tonnes per annum (Mtpa) of thermal coal for 28 years using longwall mining methods;** • **Development of surface infrastructure at three sites, including:** *Tooheys Road Site* - rail loop and spur; - raw coal and product coal stockpiles; - workshop; - decline tunnel; and - water management system, including the mine's water supply dam and reverse-osmosis treatment plant. *Buttonderry Site* - administrative offices, training rooms and bath house; - new intersection with Hue Hue Road, access road and car park; - upcast ventilation shaft and mine fan; - downcast ventilation shaft and man winder; - effluent treatment facility; and - surface run-off sediment dam. *West Shaft Site* - downcast ventilation shaft (construction expected around year 10 of the project). • **Transferring all coal extracted from the mine to the Tooheys Road infrastructure site for processing, and railing to domestic and export markets; and** • **Rehabilitating the site.**
Mining and Reserves	Extraction from a total coal resource of 375 Mt from the Wallarah-Great Northern Seam. Longwall panel widths would predominantly be 250 m, with exceptions being below the Hue Hue Mine Subsidence District (120 m and 150 m wide panels), and below the 1:100 year flood zone (150 m, 170 m or 200 m panels, depending on the depth of cover).
Coal processing & Reject Management	Coal would undergo minimal processing. The coal would not require washing, but would be sized and screened, and processing would not produce tailings. A minor amount of waste rock may be produced during processing, which would be trucked offsite to a licensed emplacement facility.
Water Demand and Supply	Underground dewatering would result in a peak water surplus of approximately 2.5ML per day after 20 years of operations. The water management system would involve: • a 120 ML operational water dam, a 3 ML portal dam, stormwater management system and potable water storage tanks at the Tooheys Road site; • a 10 ML operational water dam, stormwater management system and potable water storage tanks at the Buttonderry site
Project Life	28 years
Employment	Construction workforce of 270 and an operational workforce of 300.
Capital Value	$750 million.
Support Facilities and Utilities	Support facilities and utilities would include: • administration, store, workshop and staff facilities (bathhouse, lamp room, etc); • ventilation systems and service/distribution boreholes; • water bores and surface water management infrastructure; • power supply and communications infrastructure; • bulk storage facilities; • underground mine access; • rail provisioning facility; and • internal site roads.
Hours of Operation	Operations would take place 24 hours a day, seven days a week.
Product Coal Transportation	All product coal would be transported via rail to the Port of Newcastle for export, using the project rail loop and spur. An average of approximately seven trains would be loaded per day, with a peak of 10 trains per day.
Mine Access	Access to the Tooheys Road infrastructure site would be via the Motorway Link Road. Access to the Buttonderry pit top site would be via Hue Hue Road.
Clearing, Rehabilitation and Offsets	The project would result in the loss of 32.73 ha of native vegetation and indirect impacts as a result of subsidence effects. The rehabilitation and offset strategy proposed to compensate for this loss involves rehabilitation of the Tooheys Road, Buttonderry and West Shaft sites and conservation of 159 ha of land at Hue Hue Road (Hue Hue Road Conservation Area), which includes 50 ha of native vegetation.

2. STATUTORY CONTEXT

2.1 Permissibility

The project is permissible with development consent under clause 7 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

2.2 Major Project

The proposal is declared to be a project under Part 3A of the *Environmental Planning and Assessment Act 1979* because it meets the requirements of *State Environmental Planning Policy (Major Development) 2005*. In particular, the proposal exceeds the thresholds specified under clause 5 of Schedule 1 of that Policy, being development for the purpose of coal mining. The Minister for Planning is therefore the approval authority for the project.

2.3 Other Approvals

Under section 75U of the EP&A Act, a number of other approvals have been integrated into the Part 3A approval process and are not required to be separately obtained for the project. These include:

- heritage-related approvals under the *Heritage Act 1977* and *National Parks and Wildlife Act 1974*; and
- particular water-related approvals under the *Water Management Act 2000*.

Under section 75V of the EP&A Act, a number of further approvals are required to be obtained, but must be approved in a manner that is consistent with any Part 3A approval for the project. These include:

- a mining lease under the *Mining Act 1992*;
- an environment protection licence under the *Protection of the Environment Operations Act 1997*; and
- a consent under the *Roads Act 1993*.

The Department has consulted with the relevant public authorities responsible for these other approvals (see Section 4) and has considered the issues relating to these approvals in its assessment of the project (see Section 5). None of the relevant authorities object to the project on grounds related to these other approvals.

2.4 Commonwealth Assessment and Approval Requirements

The project has been declared a Controlled Action under the *Environment Protection and Biodiversity Conservation Act 1999* as it may impact on nationally-listed threatened species. The State environmental assessment process has been accredited for the purpose of assessment under Commonwealth legislation.

2.4 Exhibition and Notification

Under section 75H(3) of the EP&A Act, the Director-General is required to make the Environmental Assessment for the project publicly available for at least 30 days. However, the former Minister for Planning made a commitment to extend the usual exhibition period to 60 days. Therefore, after accepting the Environmental Assessment for the project, the Department has satisfied or exceeded the requirements of section 75H(3) of the EP&A Act by:

- making the Environmental Assessment publicly available from 31 March 2010 until 2 June 2010:
  - on the Department's website; and
  - at the Department's Information Centre, Wyong Council's Offices in Wyong, and at the office of the Nature Conservation Council of NSW;
- notifying community groups and individuals who made a submission to the *Independent Inquiry into the Impacts of Potential Coal mining in the Wyong Local Government Area* about the exhibition by letter;
- notifying relevant State Government authorities and Council about the exhibition by letter; and
- advertising the exhibition in the *Sydney Morning Herald*, *The Australian* on 30 March 2010 and the *Central Coast Express Advocate* on 24 March and 22 April 2010

During the assessment process, the Department also made a number of documents available on its website, including the:

- project application;
- Director-General's environmental assessment requirements;
- the Environmental Assessment;
- the Proponent's Response to Submissions;
- Wyong Water Study and International Peer Review; and
- Peer Review of Groundwater Modelling.

2.5 Environmental Planning Instruments

There are no environmental planning instruments that substantially govern the carrying out of the project, as required to be considered under section 75I of the *Environmental Planning and Assessment Act 1979*.

2.6 Objectives of the EP&A Act

The Minister is required to consider the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the Minister's decision on whether or not to approve the project are found in section 5(a)(i),(ii),(vi)&(vii) of the Act. They are:

(a) to encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development"

The Department is satisfied that the project encourages the proper use of resources (Object 5(a)(i)) and the promotion of orderly and economic use of land (Object 5(a)(ii)).

The encouragement of environmental protection (Object 5(a)(vi) is considered in Section 4 of this report. Following this consideration, the Department is satisfied that the potential impacts of the project can be suitably mitigated, managed and/or offset to ensure an acceptable level of environmental performance.

The Department has considered the encouragement of ecologically sustainable development (ESD) (Object 5(a)(vii)) in its assessment of the project application. This assessment has sought to integrate all significant economic and environmental considerations, and to avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences.

2.7 Statement of Compliance

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

3. CONSULTATION

The Department exhibited the Environmental Assessment from 10 March 2010 until 2 June 2010, and made a public commitment to accept late submissions. As at 31 January 2011, the Department had received a total of 249 submissions on the project, including:

- 11 from public authorities;
- nine from special interest groups (Australian Coal Alliance, Newcastle Greens, Rivers SOS, Total Environment Centre, Climate Action Group Central Coast, Wyong Chamber of Commerce, Stop Korean Coal Mining Inc., United Mineworkers Association and the Jilliby Stage 2 Landowners Action Group); and
- 229 from the general public, including 54 form letters.

The Proponent subsequently provided a formal response to the issues raised in these submissions (see **Appendix B**).

A summary of the issues raised during the consultation process is provided below.

3.1 Public Authorities

Department of Environment, Climate Change and Water

The Department of Environment, Climate Change and Water (DECCW) indicated that it required further information and clarification before it could consider supporting the project. It raised the following matters:

Water

- DECCW required further assessment of potential impacts to shallow aquifers;
- the potential for faulting of the bedrock under Jilliby Jilliby Creek would increase the risk of adverse subsidence impacts and sub-surface diversion of flows from the creek;
- the EA did not include aquatic flora and fauna survey data for Little Jilliby Jilliby Creek;
- DECCW required further detail on impacts at local watercourses, including Little Jilliby Jilliby Creek, Hue Hue Creek, Myrtle Creek and Armstrong Creek;
- the EA did not discuss the potential impact to perched aquifers;
- the project should have a strong emphasis on the protection of surface and groundwater resources from salinity impacts and options for the disposal of brine should be addressed;
- the Water Management Plan proposed by WACJV would need to address how water would be supplied to the mine in dry years and the likely discharge requirements during wet years; and
- the flood models for the Yarramalong and Dooralong Valleys were not suitably calibrated or were not adequate to confidently predict flood impacts, and flood profiles should have been included for pre and post-mining scenarios. Additional sensitivity assessment should have been undertaken to assess the impact of higher flood flow rates and greater subsidence than predicted;
- post-mining cross sections for Yarramalong and Dooralong Valleys and Hue Hue catchment used to model subsidence impacts were not included in the EA.

Flora and Fauna

- the EA did not provide a clear indication of the survey effort. A description of the vegetation types that are proposed to be cleared and their locations should have been provided;
- current DECCW guidelines should have been used for the flora and fauna surveys than 5 years old;
- survey methodology for both flora and fauna surveys requires clarification, including survey timing, targeted surveys;
- the proposed offset areas were unable to be clearly determined, was inadequate compensation for the loss of 33 ha of native vegetation, and the "ecological offset areas" shown in the EA may be unsuitable as offsets as some vegetation communities in these areas are in a regrowth state and/or highly degraded;
- the potential subsidence footprint and associated impacts on vegetation and hydrology were unable to be determined. Subsidence may lead to increased flood impacts, including impacts to threatened species habitat; and

- DECCW would require a plan to manage the offset areas and areas of retained habitat prior to determination of the project.

Noise

- a construction noise management plan is required to manage construction noise impacts to nearby residential areas; and
- noise from the rail spur line was not modelled in the noise impact assessment.

Air

- DECCW supported the project's air quality assessment and proposed monitoring program;
- world's best practice measures should be applied to coal stockpiling on site, to minimise dust emissions; and
- DECCW recommended that if the project is approved, the approval conditions should include the requirement to prepare a study on options for coal seam methane capture.

NSW Office of Water

The NSW Office of Water (NOW) raised concerns over the veracity of the assessment presented by the Proponent, particularly in relation to surface and groundwater impacts, and in particular, highlighted the following issues:

- the Wyong River and Jilliby Jilliby Creek are both governed by Water Sharing Plans. As surface flows are dependent on shallow alluvial groundwater, predicted subsidence levels should not interrupt surface flows to these sources or affect available water determinations. NOW suggested that a precautionary approach to mining would be warranted, given the current level of commitment to available waters in Wyong Jilliby Catchments;
- the groundwater model developed for the proposal was deficient in predicting groundwater interactions in post-subsidence conditions. NOW requested a review of the model against subsidence predictions;
- a precautionary exclusion zone should be established around the river systems until avoidance of impacts is certain; and
- conditions of approval should contain an adaptive management framework, where approval is given for each longwall panel in proximity to any connected alluvium only where minimal impact can be verified.

Industry and Investment NSW

Industry & Investment NSW (I&I NSW) supports the project and included the following comments:

- the Proponent's rehabilitation strategy is satisfactory to achieve a safe, stable and non-polluting final landform;
- the process used to develop subsidence predictions for the project is current best practice in NSW;
- an adaptive management approach should be applied to the project, to respond to any exceedences in predictions;
- I&I NSW Fisheries raised concerns in relation to potential erosive impacts at Jilliby Jilliby Creek and effects on fish habitat; and
- the Proponent should consult with Forests NSW with regard to the use of the Wyong State Forest for the West Shaft site.

Hunter-Central Rivers Catchment Management Authority

The Hunter-Central Rivers Catchment Management Authority (CMA) offered the following comments:

- the proposed offset of approximately 50 ha of vegetation for a loss of 33 ha is less than a ratio of 1.6:1, and is inadequate to improve or maintain environmental values. Biodiversity offsets are best determined by using methodology such as the Environmental Outcomes Assessment Methodology or the BioBanking calculator;
- subsidence would deepen Jilliby Jilliby Creek and increase its flow. However, the Proponent's proposed rehabilitation measures only included bank stabilisation. Streambed lowering would have a high risk of causing head cuts and ongoing bed erosion;
- the CMA did not support the potential for a reduction in the shallow groundwater aquifer. The Environmental Assessment did not state if the groundwater resources in the shallow aquifers would ever return to current levels - the inference being that the shallow groundwater resources would decrease by 25%. The CMA considered this to be a significant reduction and that it could result in increased impacts to groundwater-dependent ecosystems.

Transport NSW

Transport NSW raised the following matters:

- that further analysis of rail transport should be undertaken, with a focus on corridor capacity, which takes into account the proposed development, future passenger rail growth, additional freight services from local users and freight services traversing the north-south interstate freight corridor; and
- the Proponent should prepare a workplace travel plan, considering alternative forms of transport for its workers other than the private car.

Roads and Traffic Authority

The Roads and Traffic Authority (RTA) commented on the following issues:

- the Proponent incorrectly modelled Sparks Road interchange as one interchange when it is two separate interchanges; and
- traffic signals would be required at the Sparks Road eastern intersection by 2012 when project traffic is added to background traffic growth. The Proponent should be required to partially fund the installation of the traffic signals.

NSW Department of Health

The NSW Department of Health objected to the project, based on its potential health impacts, and highlighted the following:

- increases in particulate pollution caused by the project would be associated with increased adverse health outcomes, including increased respiratory symptoms and morbidity; and
- increased rail noise may cause adverse health effects.

Railcorp

Railcorp did not object to the project and offered the following comments:

- requires a commitment from the Proponent that it would fund the installation and maintenance of the proposed new rail connections to the Newcastle line;
- domestic transport of coal would require further assessment; and
- the Proponent should undertake a rail corridor capacity review or fund Transport NSW to undertake the review. The Proponent should fund an appropriate share of the rail infrastructure enhancements recommended by the review, to support its rail requirements.

Wyong Shire Council

Wyong Shire Council objected to the project, highlighting the following concerns:

- groundwater modelling in the Environmental Assessment used understated permeability values and impacts to the Yarramalong and Dooralong Valleys were inaccurately identified;
- the predicted surface water flow impacts did not correlate with impacts in other mining regions in the Sydney basin and losses of surface water flow would be likely. The Proponent did not adequately assess surface water quality impacts;
- the ecological assessment was undertaken with inadequate surveys, and no aquatic fauna survey was undertaken;
- acid mine drainage was not assessed;
- an environmental management and monitoring program should have been included in the Environmental Assessment.
- the Environmental Assessment did not include detailed consideration of rehabilitation and mine closure strategies;
- the Environmental Assessment did not fully address the recommendations of the Wyong Coal Inquiry and the Southern Coalfields Inquiry; and
- Council recommended that a supplementary Environmental Assessment should be prepared, to include further groundwater assessment, ecological surveys, water quality, acid mine drainage, waste management, mine closure plan, rehabilitation plan, subsidence management plan, revised risk assessment. Council also recommended an independent peer review of the supplementary Environmental Assessment.

Lake Macquarie City Council

Lake Macquarie City Council stated that approval conditions should include measures to manage and maintain the acoustic and air quality amenity of its residents, from both the operation of the mine and the transport of coal, via the rail network, to the Port of Newcastle.

Gosford-Wyong Councils' Water Authority

Gosford-Wyong Councils' Water Authority (GWCWA) did not object to the project, however it raised the following concerns:

- water resources on the Central Coast are extremely limited and as the area is growing at a rapid rate, It is essential that these limited resources are protected;
- the Councils are currently constructing a transfer pipeline from Mardi Dam to Mangrove Creek Dam. This pipeline would enable the transfer of water from Wyong River and Ourimbah Creek to Mangrove Creek Dam to provide critical drought security for the Central Coast;
- the Central Coast water supply would continue to be highly dependent on the stream flows and water quality in the Wyong River and Jilliby Jilliby Creek; and
- GWCWA agreed with the findings of Wyong Council's review of the Environmental Assessment, that the groundwater study was flawed, and proposed water monitoring is inadequate.

3.2 Special Interest Groups and General Public

Of the 238 submissions from the special interest groups and the general public, all but nine objected to the project. The key issues raised in these submissions are summarised in **Figure 5** below.

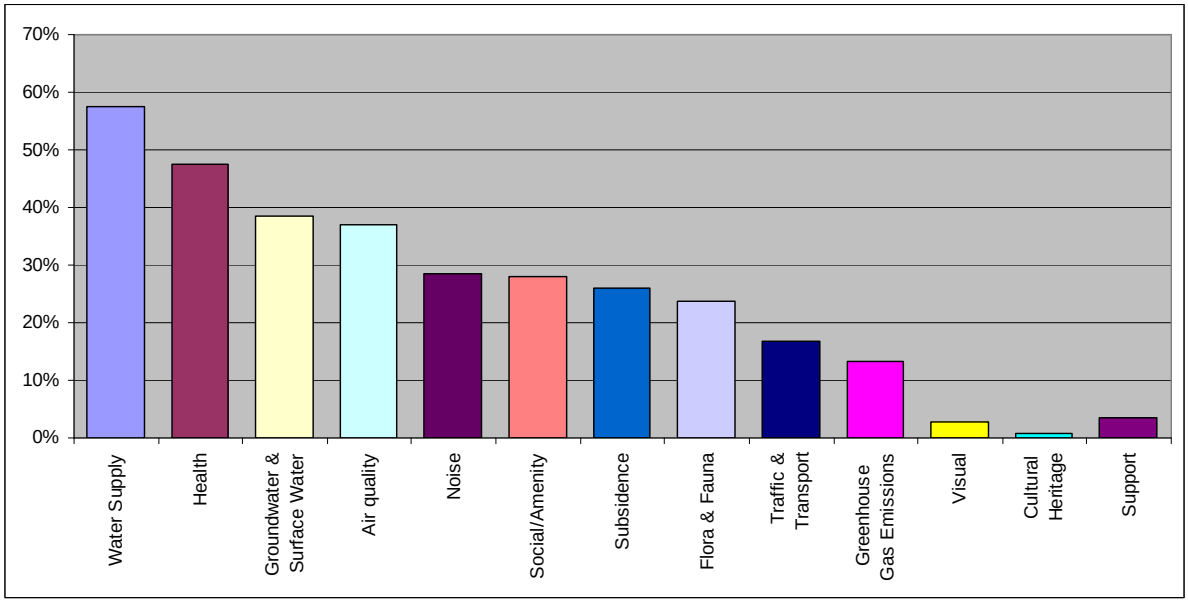

Figure 5: *Key Issues Raised by Special Interest Groups and the General Public*

3.3 Wyong Water Study

The former Minister for Planning gave a public commitment to undertake an independent review of the adequacy of the surface and groundwater data in the sub-catchments affected by the proposal. In May 2010, the Department engaged an independent consultancy (SKM), to conduct the study. The study was completed in August 2010 and placed on the Department's website. T he study's main findings were that:

- the current status of groundwater and surface water information for the western part of the Wyong LGA area (the study area) is sufficient for the identification of baseline conditions within the context of the range of general development assessment and land use decisions required by Government;
- the amount and quality of data is equal to or greater than for similar areas of agricultural, natural or water supply catchments, albeit that individual data sets vary in their density according to the reason or reasons for which they have been gathered (eg water supply activities, which are unevenly distributed across the study area in respect of both groundwater and surface water sources); and
    - the baseline information in the study area is sufficient for the purposes of undertaking an assessment of the potential impacts of the Wallarah 2 Coal Project. This would not relate to a more detailed analysis and management of ongoing project-related impacts, which would be more properly assessed on an expanded baseline data set developed specifically for the purposes of project management.

The study also included general recommendations and recommendations specific to the Wallarah 2 Coal Project. These included:

General Recommendations

- all high yielding groundwater extraction bores in the study area should be metered and reported to a central agency or group; and
- an annual assessment of groundwater use from stock and domestic extraction bores should also be undertaken, funded by the relevant water regulator.

Wallarah 2 Coal Project Recommendations:

- regular water level monitoring should be re-instituted for an agreed observation bore network across the study area. This should ideally operate for two years (including previous monitoring) prior to any in-seam mine development;
- all bores in the observation network should be surveyed to provide elevation data that can be used to construct accurate watertable and piezometric contour maps;
- bores monitoring the coal seams should be included;
- sampling for water quality should be undertaken on a periodic basis across the life of the mine;
- additional active surface water monitoring site should be installed on Jilliby Jilliby Creek upstream of the Project area boundary and monitored to improve the ability to model potential changes to streamflow.

The Wyong Water Study is attached at **Appendix C**.

3.4 International Peer Review of the Wyong Water Study

The former Minister also committed to having the Wyong Water Study peer reviewed by an international expert. The Department engaged Aqualinc Pty Limited, an expert consultancy from New Zealand to undertake the peer review. The review found:

- most of the conclusions and recommendations reached by SKM are reasonable, however Aqualinc disagreed with SKM's assessment that baseline data is sufficient for "general development assessment" in the Wyong area, stating instead that the baseline data would be considered sufficient for the purpose of assessing the Wallarah 2 Coal Project;
- agreement with SKM's recommendations for additional monitoring and the installation of new monitoring bores;
- additional recommendations, including
  - all sites that are used to determine baseline conditions should have at least two years of relevant data prior to the commencement of mining activity that is likely to affect surface water or groundwater flows or quality;
  - re-establishing three of the five inactive surface flow monitoring networks
  - quantifying the accuracy of all gauging stations in accordance with the relevant standard;
  - installing groundwater monitoring bores (additional to those recommended by SKM) located approximately mid-way across the upper boundary of the proposed mining
  - assessing the existing groundwater monitoring network with respect to depth coverage and install additional bores if required;
  - monitoring groundwater levels monthly and chemistry three-monthly;
  - reviewing data, or further monitoring, to determine if the coastal lakes and extraction bores down-gradient and adjacent to the proposed mining area would be affected by mining;
  - completing aquifer testing to assist groundwater modelling studies; and
  - reviewing the suitability of the project's flood routing models and groundwater model (once the independent review is complete) for predicting the potential impacts from proposed mining.

The International Peer Review of the Wyong Water Study is attached at **Appendix D**.

3.5 Planning Assessment Commission

The former Minister for Planning gave a public commitment that the project would be assessed by a Planning Assessment Commission (PAC), which would also hold public hearings. On 5 July 2010, the current Minister directed the PAC to:

- *review the environmental assessment (EA) for the Wallarah 2 Coal Project, taking into consideration any issues raised in submissions, the findings of the strategic review into the*

Impacts of Potential Underground Coal Mining in the Wyong LGA, the Wyong Water Study and the international peer review of the Wyong Water Study;
- *hold public hearings during this review;*
- *assess the potential subsidence-related impacts of the project, paying particular attention to its ability to adversely affect the Central Coast's drinking water supply; and any other potentially significant impacts;*
- *recommend appropriate measures to avoid, minimise or offset these impacts; and*
- *provide advice on the merits of the project as a whole.*

The Minister appointed permanent PAC members Ms Gabrielle Kibble and Mr John Court to undertake the PAC's review. The Minister also appointed three experts as casual PAC members to assist with the review:
- Emeritus Professor Jim Galvin – subsidence expert;
- Dr Steve Perrens – surface water expert; and
- Dr Lloyd Townley – groundwater expert.

The PAC held a public hearing at Wyong Council on 28 October 2010. Twenty-eight people made oral submissions to the PAC at the hearing. After detailed consideration, the PAC concluded that the application may be approved subject to the imposition of a substantial number of conditions to avoid, manage and/or mitigate the following:
- subsidence impacts, effects and environmental consequences;
- surface water impacts;
- groundwater impacts;
- flooding impacts;
- flora and fauna impacts (including aquatic communities);
- air quality impacts;
- noise impacts;
- traffic impacts;
- visual and lighting impacts;
- landscape management and rehabilitation; and
- development of a Community enhancement fund and the formation of a Community Consultative Committee.

The PAC's report is attached at **Appendix E**.

4. ASSESSMENT

The Department considers the follow to be key issues associated with the project:

- subsidence impacts;
- groundwater and surface water impacts;
- ecological impacts;
- heritage impacts;
- noise impacts; and
- traffic impacts.

All other issues are considered to have been adequately addressed by the Proponent in its Environmental Assessment (refer to Appendix A), Response to Submissions (refer to Appendix B), and the Planning Assessment Commission's report (refer to Appendix E) and have therefore not been considered in detail as part of this report.

4.1 Subsidence Impacts

The two key issues associated with the assessment of subsidence impacts from the project relate to:

1. the subsidence assessment methodology utilised by the Proponent, including assumptions and calibration of the subsidence model; and
2. the predicted subsidence impacts of the project.

Subsidence Assessment Methodology

The Proponent assessed the subsidence impacts of the project principally using the Incremental Profile Method (IPM), an empirical subsidence prediction technique that draws upon large databases of actual subsidence data. As the geology in and surrounding the project site differs from other NSW mining districts for which empirical data is available, the Proponent applied a numerical model developed by Strata Control Technologies (SCT) to calibrate the empirical IPM model.

The accuracy of the SCT numerical model is demonstrated in the Environmental Assessment through application to actual mining operations in the Greta Seam and the Bulli Seam. Compared with recorded subsidence data from mining activities in these seams, the SCT model generates subsidence predictions that reasonably reflect observed subsidence effects. To calibrate the IPM model, two scenarios were developed using the SCT model (the Hue Hue Case and the Valley Case) with the results of both models compared. Based on this comparison, the Proponent identified that a geological factor of 1.5 should be applied to the third and subsequent longwall within a series to align the results of the IPM model with those of the SCT model (and thereby calibrate the IPM to produce accurate subsidence predictions).

The Department is generally satisfied that the Proponent has applied an appropriate subsidence prediction and assessment methodology, noting the challenges of extrapolating empirical data from the Southern and Newcastle coalfields for application to the project site. Industry and Investment NSW, in its submission on the project, suggested that it considers the modelling methodology applied by the Proponent to be current best practice in New South Wales. Although not explicitly stated, the PAC similarly seems to accept the broad approach applied by the Proponent.

The Department of Environment, Climate Change and Water highlighted the inherent uncertainties associated with extrapolating from existing mine subsidence data to the somewhat unique situation presented by the current project. In addition to a different geological profile, DECCW suggests that a relatively weaker roof-pillar-floor system (compared with the Southern coalfields) and a greater seem thickness means that the subsidence assessment presented by the Proponent is extrapolating outside the bounds of previous mining experience in the area. As a result, DECCW cautions that subsidence levels associated with the project may in fact be greater that would otherwise be predicted using the IPM empirical approach. The Department does not consider the modelling uncertainties identified by DECCW to be sufficient to reject the subsidence predictions presented in the Environmental Assessment. All modelling carries with it an inherent level of uncertainty which must be recognised when interpreting modelling results and accommodated when relying on those results. In this particular case, the uncertainties associated with extrapolating beyond the existing subsidence dataset highlighted by DECCW contribute to a greater level of uncertainty around the results of the modelling

than may typically be experienced (when modelling subsidence effects within the subsidence dataset). Should the Minister determine to approve the subject project, the Department recommends that this increased level of uncertainty be recognised and reflected in the mine plan for the site, with appropriate monitoring and verification undertaken during mining operations to refine subsidence predictions as mining progresses.

While the general modelling approach is, in broad terms, accepted, significant concerns have been raised in submissions and noted by the PAC in relation to the calibration of the IPM model. The Proponent's calibration approach rests on the development of representative geological cases (the Hue Hue Case and the Valley Case), based on actual geological data from the site and comparing IPM model outputs for these cases with the SCT numerical model. For both cases, 'geological factors' were derived and subsequently applied to the IPM model to align its results with those from the SCT model. Both DECCW and the PAC have noted that the Hue Hue Case and the Valley Case encompass the geological conditions within the Hue Hue Mine Subsidence District (to the north east of the project site) and the alluvial valleys located across the site, but not the vegetated hilly areas characteristic of the west of the project site. The absence of a geological case representative of this part of the site, and calibration of the IPM model with such a case, represents a significant additional area of uncertainty with the modelling approach and results. If a geological factor derived for this area of the site were to vary substantially from the factor of 1.5 established for the Hue Hue Case and Valley Case, then the subsidence predictions for a large area of the site could be significantly over- or underestimated. The PAC has noted that mining is unlikely to reach this area of the site for 12-15 years after commencement of the project, and there is therefore sufficient time for the Proponent to undertake further assessment of the likely subsidence effects in this area, and to modify the project if necessary. The PAC also highlights that this adaptive management approach would enable subsidence data from the first 12-15 years of mining to be used to inform a more accurate subsidence model for the project as a whole.

While the Department generally supports adaptive management as an effective and pragmatic approach to dealing with uncertainties inherent in subsidence assessments, the Department is concerned that the Proponent has not sufficiently demonstrated that its application to the western, hilly area of the site is appropriate given the elevated level of uncertainty around subsidence effects in this area. The Department considers that there is sufficient residual risk, based on uncertainties with subsidence predictions in this area, to caution against the application of an adaptive management approach in the absence of further subsidence modelling. The PAC itself suggests that the assessment of subsidence effects in this area is 'minimal', and recommends that no secondary extraction be permitted beneath the Jilliby Conservation Area and the Wyong State Forest (ie the hilly areas in the western part of the project site) until a 'comprehensive assessment of surface features and potential subsidence effects and impacts within these areas' has been undertaken. The Department suggests that given the uncertainties at this point in time around subsidence predictions in this part of the site, deferring a 'comprehensive assessment' of impacts to a future date is not advisable, and instead should be provided upfront before any planning approval is granted that foreshadows mining in these areas.

While more comprehensive assessment of subsidence impacts in the west of the site, as recommended by the PAC, may demonstrate that the project would generate an acceptable subsidence outcome, it may also demonstrate the converse. Should the more comprehensive assessment in fact demonstrate an unacceptable subsidence outcome, or require a significant reconfiguration of the longwalls in this part of the site, it may be problematic to achieve such a reconfiguration if the mine plan had already been established and first workings already conducted. In this light, the Department recommends strengthening the PAC's recommendation of no secondary extraction beneath the Jilliby Conservation Area and the Wyong State Forest to exclude all mining in this area until a more comprehensive subsidence assessment has been completed. Ideally this would be given effect through exclusion of this area from any approval that may be granted for the balance of the project, or alternatively, but less preferably, through conditions of approval that require such an assessment to be submitted to the Director-General for approval prior to commencing mining under these areas. Based on the mine plan presented by the Proponent in the Environmental Assessment, these areas are generally west of longwalls 14N and 6S. A 26.5^{o} angle of draw should be applied eastward of these boundaries to minimise the potential for subsidence effects in the hilly western areas of the site until a more comprehensive assessment is completed. In effect, the life of the project would be reduced from the proposed 28-year timeframe to approximately 12-15 years.

The submission made by DECCW and the PAC's report also highlight that the IPM model was calibrated using 125-metre, 155-metre and 175-metre longwalls. While longwall widths of this magnitude are proposed under the eastern, Hue Hue part of the site, the mine plan presented in the Environmental Assessment proposes significantly wider long walls (205 to 255 metres) as mining progresses westward. This variation in longwall width represents an additional uncertainty with the accuracy of subsidence predictions, particularly in the west of the site, and the PAC has specifically recommended that the Proponent not be permitted to relax longwall dimensions from those employed for longwalls 1N to 5N (the first five, smaller-dimension longwalls) until the Proponent has demonstrated a 'reliable subsidence prediction methodology'. The Department supports this recommendation, and notes that it presents a further argument to exercise caution with respect to predicted subsidence impacts in the western, hilly part of the site.

Subsidence Impacts

Predicted total subsidence, tilt and progressive strain predictions from the subsidence modelling presented in the Environmental Assessment are reproduced as Figure 6, Figure 7 and Figure 8. From these figures, and noting the limitations and uncertainties highlighted in the preceding section of this report, total subsidence across the project is predicted to be up to 2.50 metres, total tilt up to seven millimetres per metre and compressive strain no greater than minus two millimetres per metre. The figures highlight that the most marked subsidence effects are expected to occur under the hilly areas in the western part of the site, with reduced effects in the east.

The PAC has accepted the predictions of conventional subsidence presented in the Environmental Assessment as being adequate for assessment, but reiterated concerns about the limited consideration given to the hilly landform areas. In particular, the PAC raises concerns about the subsidence modelling for this part of the site, as well as the characterisation of the areas to be impacted – in terms of watercourse characterisation, ecological surveys and Aboriginal heritage surveys. On this basis, the PAC has recommended (as noted above) that mining not be permitted to occur under these hilly landform areas in the west of the site until a more comprehensive assessment has been completed.

The Department considers that modelling uncertainties, combined with limitations on associated assessments of surface water, ecology and heritage impacts reinforces the particular importance of exercising caution with respect to the assessment and determination of the current project application as it relates to the western, hilly part of the site. While one could argue, as the PAC has, that an adaptive management approach may be acceptable for accommodating and managing the risks associated with the uncertainties in the subsidence modelling, the additional uncertainties with flow-on surface water, ecological and heritage impacts, for example, translate into adaptive management in this case being a relatively high risk approach.

In addition to these systematic subsidence effects (referred to by the PAC as conventional subsidence), the project has the potential to generate non-systematic, far-field effects (referred to by the PAC as non-conventional subsidence) such as valley closure and uplift/ upsidence. Non-systematic subsidence effects are significantly more difficult to accurately predict than systematic subsidence (ie sag, tilt and strain). Notwithstanding, the PAC notes that the Proponent has provided little consideration of potential upsidence and closure impacts on valley floors within the hilly areas of the site (where such effects are more likely to occur than in the east of the project site). The Department concurs with the PAC's observation in this regard, and notes that the Environmental Assessment provides limited assessment of these subsidence effects beyond a broad and general description of the effects in the Southern coalfields. Until a reasonable assessment of these subsidence effects is conducted, the Department considers there to be a significant level of uncertainty around the likely non-systematic subsidence effects of the project in the western, hilly area of the project site.

Conclusions

The Department generally accepts that the Proponent has applied an appropriate subsidence assessment methodology to the project, and notes that the methodology has been characterised by Industry and Investment NSW as current best practice in New South Wales. The model has been appropriately calibrated and applied to the eastern part of the site, and the Department considers that predicted subsidence impacts in this area (up to longwalls 14N and 6S) generally carry an acceptable level of uncertainty. This residual uncertainty, inherent in any modelling approach, can be appropriately accommodated in a robust adaptive management approach applied to the eastern part of the project site. This is consistent with recommendations made by the PAC.

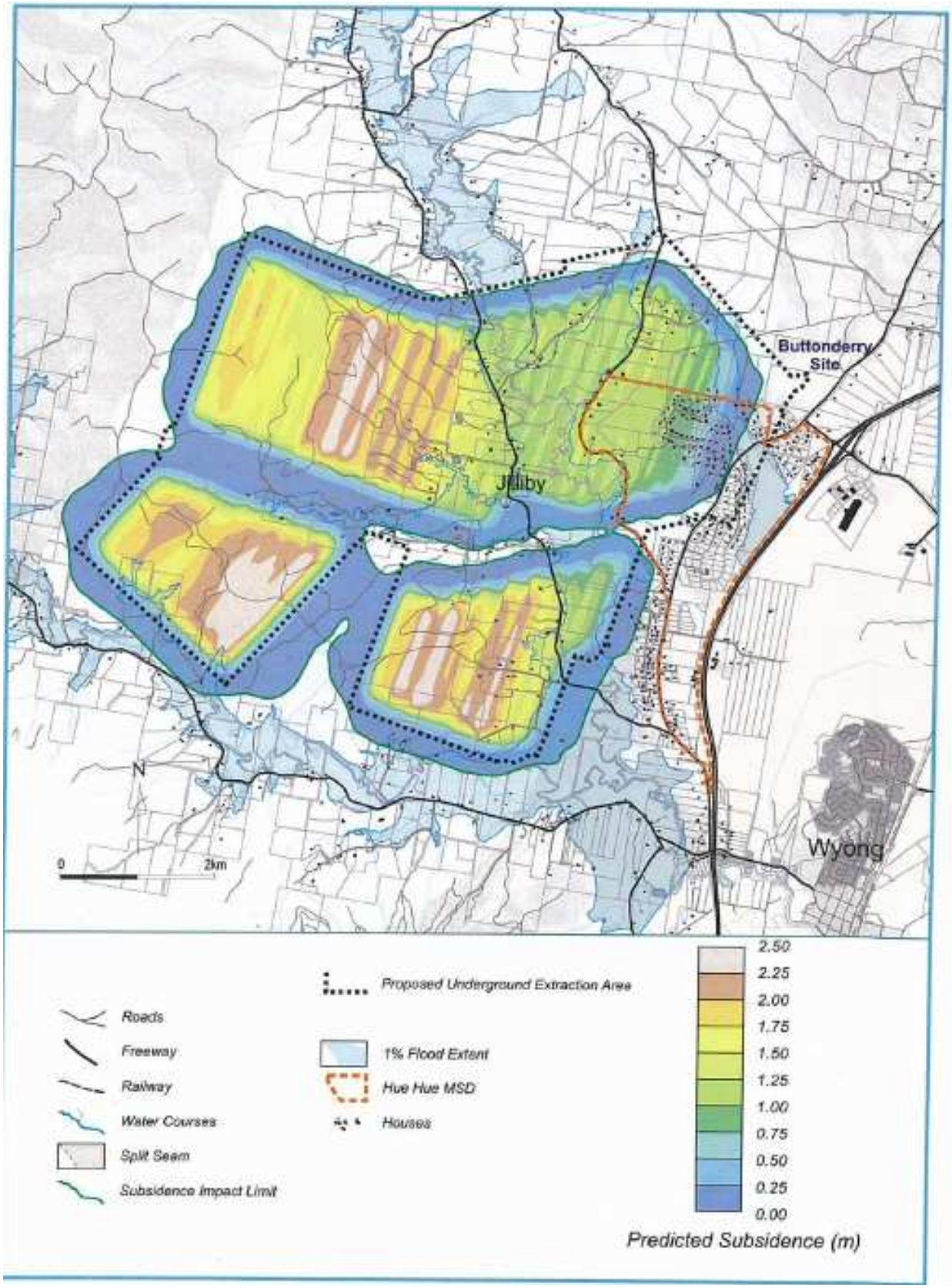

Figure 6: *Predicted Total Subsidence*

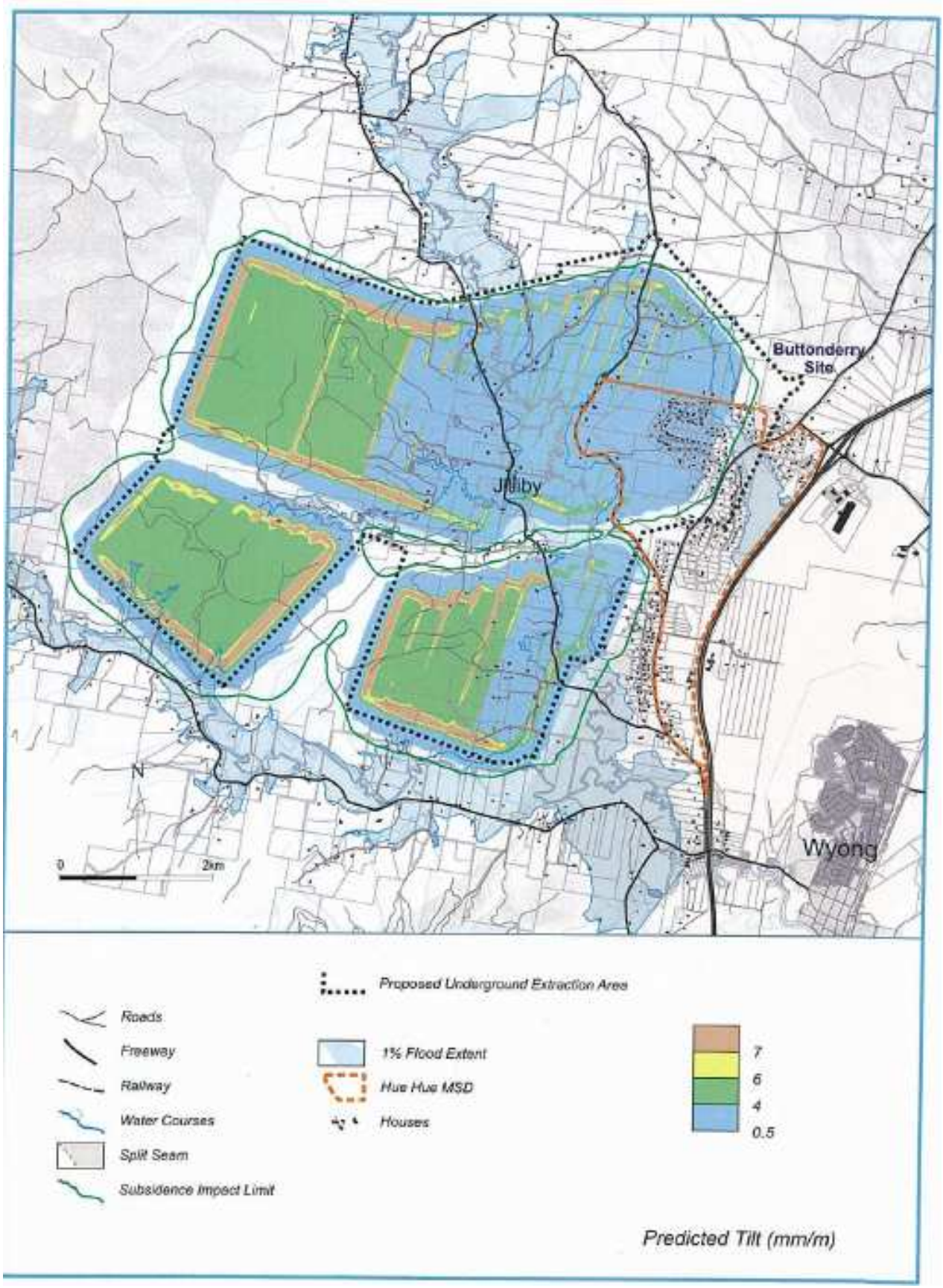

Figure 7: *Predicted Total Tilt*

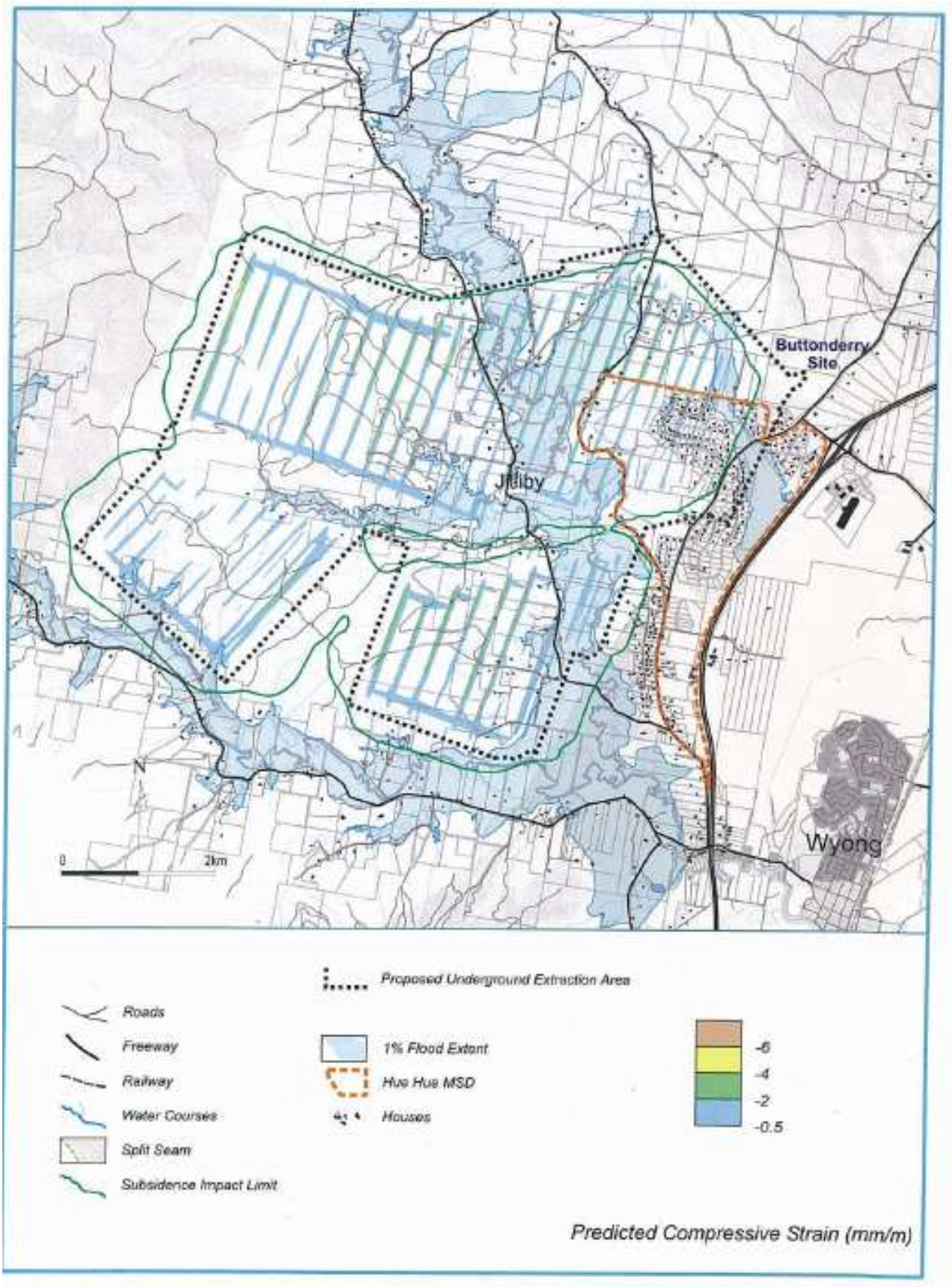

Figure 8: *Predicted Total Compressive Strain*

The model has not, however, been appropriately calibrated and applied to the western, hilly area of the site, and as a consequence, the Department considers there to be considerable uncertainty around the subsidence predictions made for these areas. Similar concerns have been identified by the PAC and in the detailed submission made by the Department of Environment, Climate Change and Water. The PAC has recommended that this residual uncertainty be accommodated through adaptive management, and that the Proponent not be permitted to conduct second workings under the Jilliby Conservation Area and the Wyong State Forest until a comprehensive subsidence assessment has been conducted to the satisfaction of the Director-General. While the Department is usually supportive of adaptive management, it is not convinced in this instance that it represents an appropriate environmental risk management approach for the western, hilly area of the site based on the level of uncertainty around subsidence predictions in this area, the limited assessment of associated impacts (surface water, ecology and heritage), the absence of a robust consideration of non-systematic subsidence effects and the potential difficulties with altering longwall configurations if a future assessment identifies an unacceptable subsidence outcome. The Department considers that approval of these areas of the project should not be considered until these issues are fully resolved within a reasonable level of confidence.

It is recognised that exclusion of the western areas of the site from any approval that may be granted for the project may trigger the need for the Proponent to revisit the configuration of the mine in the eastern part of the site (if the Proponent chooses to proceed with the project ahead of resolving outstanding issues in the western part of the site). Further, restricting the project generally to the first 12-15 years of proposed operations (covering only the eastern part of the site), may mean that the project is impractical or not commercially viable to implement without resolution of the western component of the project.

4.2 Groundwater and Surface Water Impacts

The five key issues associated with the assessment of groundwater and surface water impacts from the project relate to:

1. changes to hydrogeology, surface connectivity and aquifer impacts;
2. site water balance and wastewater treatment;
3. impacts on the Central Coast water supply;
4. subsidence-induced changes to flooding characteristics; and
5. changes in watercourse geomorphology.

Groundwater Impacts, Surface Connectivity and Aquifer Drainage

The Environmental Assessment presents a detailed assessment of potential impacts on groundwater, including infiltration into the mine void, based on a conceptual model of the hydrogeological environment in which the project is proposed to be located. The model and assessment have been independently peer reviewed, as well as further assessed by the PAC. The independent peer reviewer, in particular, presents a comprehensive response to issues and concerns raised in submissions in relation to the model and hydrological assessment (including submissions made by DECCW, the NSW Office of Water and Wyong Shire Council). The Department is satisfied that the independent peer reviewer has appropriately addressed and resolved the key concerns raised in relation to the modelling approach applied to the project. Further, the Department notes that both the independent peer review and the PAC are satisfied that the hydrogeological modelling undertaken for the project is appropriate, and concurs with their views in this regard.

Assessment of groundwater seepage into the mine void suggests that total inflow over the life of the project would be approximately 26.5 gigalitres, with peak inflows expected to occur around year 20 (at an expected maximum of 2.5 megalitres per day). The PAC cautions that due to the Proponent's reliance on hydraulic conductivity and compressibility data obtained through lab-core measurements, there is uncertainty around the estimate of mine water generation. Notwithstanding, the PAC suggests that the 26.5 gigalitre figure, while it may be an over- or underestimate, is of the right order of magnitude and is a reasonable estimate for the purpose of assessment. The Department supports this view and notes that while there is some uncertainty inherent in the model used to generate this estimate, and consequently in the estimate itself, there is likely to be limited risk to the project as a result. Peak mine water generation is not expected until the 20th year of mining, and there is sufficient time for the predicted maximum mine water generation rate to be verified through actual water generation figures during the initial years of mining. The key risk associated with over- or underestimating maximum mine water generation volumes is that water management infrastructure

proposed for the project may have excess or insufficient capacity to accommodate the predicted maximum volumes. The Department is satisfied, however, that this risk is effectively mitigated through typical engineering design practice of applying "margins of safety" and through the staging of infrastructure provision over time (with additional capacity able to be implemented earlier than expected if actual mine water monitoring data indicates that predicted generation rates in the Environmental Assessment would be exceeded).

The project is unlikely to interact directly with surface water overlying mining areas, unless unexpected geological discontinuities are encountered during mining that open up any major hydraulic connectivity with the surface. The PAC considers there to be a minimal likelihood of encountering an unexpected geological discontinuity such that the mining operations and surface water become connected, given the several iterations and updates made to the current mine plan over time. The Department supports the PAC's view that this residual risk of encountering a discontinuity is minimal and would be effectively mitigated through early identification as mining operations proceed.

The NSW Office of Water has confirmed that it considers there to be a minimal likelihood of direct connectivity between subsurface mining activities and tension on the land surface, a conclusion also drawn by the PAC and the independent expert reviewer. With respect to potential tensile cracking as a result of subsidence effects from the project, the PAC considers that any cracks within alluvial valleys are likely to be small (based on peak strains in the Dooralong Valley of 2 mm/m tensile and 2.5mm/m compressive, and along Jilliby Jilliby Creek of 2.3mm/m tensile and 3mm/m compressive) and readily filled with alluvial silt. As a result, any loss of water into tensile cracks on the land surface is expected to be minimal. The Department concurs with this conclusion.

Groundwater modelling indicates that groundwater levels are predicted to initially fall by approximately 1.3 metres, although between 55% and 75% recovery is expected within six months. The Proponent argues that the 12 bores located within the subsidence zone for the project are unlikely to be affected in a measurable way by this short term lowering. The PAC forms a similar view, stating that shallow bores into alluvium would not be affected, while bores in to hardrock aquifers in the Dooralong Valley would only be affected slightly and very slowly.

Wastewater Treatment and Site Water Balance

The Proponent proposes to establish wastewater treatment infrastructure to manage mine water, as well as domestic wastewater generated at the Buttonderry and Tooheys Road sites. The Environmental Assessment indicates that mine water is likely to be treated through a reverse osmosis process, with concentrated brine disposed of underground and treated water potentially supplied to mine operations, surrounding industrial users or otherwise discharged to local watercourses. Domestic wastewater would be treated through on-site sewage treatment plants at the Buttonderry and Tooehys Roads sites, with treated effluent discharged to transpiration ponds and potentially irrigated.

The submission made by DECCW has raised concerns with respect to both of these wastewater treatment proposals. In relation to mine water management, DECCW has highlighted that no assessment of the potential impacts on groundwater quality as a result of brine disposal has been undertaken, nor is there any assessment of surface water quality impacts if treated water is discharged to the environment. While DECCW is satisfied with the Proponent's commitment to undertake sewage treatment in accordance with relevant guidelines, it is concerned that no assessment of impacts that may result from irrigation of treated effluent has been presented. The Department echoes DECCW's concerns in this regard, and notes that DECCW has indicated that in the absence of these assessment details it would not be in a position to adequately consider the water quality impacts of the project – and presumably not be in a position to license any water discharge.

The PAC raises similar, but more detailed concerns with respect to the absence of appropriate assessment of surface water quality impacts, and suggests that there is 'an increased risk of discharge water of unacceptable quality'. The PAC also questions the preliminary design and capacity of proposed wastewater treatment systems, as well as the ability of the proposes systems to achieve acceptable water quality outcomes. A Surface Water Facilities Management Plan is proposed by the PAC as a mechanism to address and resolve these questions and outstanding water quality impact assessment issues.

The Department is particularly concerned that a management plan approach, as proposed by the PAC, represents a significant environmental risk in light of there being no general confidence provided

by the Environmental Assessment that acceptable water quality outcomes could be achieved. Not only has the Proponent not adequately demonstrated that proposed water treatment systems are capable, in principle, of appropriately treating wastewaters to an acceptable standard, it has not considered the impacts of treated water if discharged to the environment (or wastes from the treatment process in the case of brine disposal). Even if the Proponent is able to undertake the project without environmental discharges, it has provided no assurance or justification that there is sufficient local or regional demand for the treated water likely to be produced by the project.

In addition, the PAC has pointed out that the water balance developed for the project is questionable based on a series of disputable assumptions and discrepancies. On this basis, it is not possible to conclusively determine the water requirements/ surpluses for the project, the likely volumes and qualities of water to be disposed/ reused, or the likely impacts of project water management on the environment. The Department cannot support approval of the proposed water management systems for the project in the absence of an adequate assessment of the impacts of those systems.

Impacts on the Central Coast Water Supply

Significant concern was raised in submissions made by the Gosford-Wyong Councils' Water Authority and others about the potential impacts of the project on Wyong River and Jilliby Jilliby Creek, given that the Jilliby Jilliby Water Source contributes to the Central Coast water supply.

The PAC suggests that the contribution of Jilliby Jilliby Creek flow to the Central Coast water supply is generally between 11% and 13%. If the Water Authority extracted the maximum allowable water volume from the combined Wyong River and Jilliby Jilliby Creek flow, this source would provide up to 27% of supply.

The PAC argues that the Water Authority has considerable flexibility to extract water from a number of sources, and even in the unlikely event of an unforseen geological feature that leads to a loss of surface water, sufficient alternatives are available to mitigate the low residual risk to the Central Coast water supply.

The Department acknowledges and understands the significant community concern which has been expressed in relation to this issue. However based on the independent Wyong Water Study, the international peer review and the PAC's independent review, the Department considers the risk to the Central Coast's water supply as a result of the project to be minimal and manageable.

The Department considers that the project is unlikely to interact directly with surface water overlying mining areas, unless unexpected geological discontinuities are encountered during mining, and that such event would be effectively mitigated through early identification as mining operations proceeds. Furthermore, in any unforeseeable event that this does occur, any resulting loss would not significantly impact on water supply to the Central Coast given the relatively small contribution from this particular catchment to overall water supply for the area and the alternatives available to the Authority.

While there is uncertainty regarding subsidence impacts in the western part of the project area, the Department does not consider that these are likely to have a significant impact on the streams which flow into the Central Coast's water supply.

Flooding Impacts

The Proponent has assessed potential increases in flooding contours in and around the project as a consequence of project-related subsidence. Figure 9 presents predicted areas of increased flooding risk (shaded in red). The PAC considers that this increase in flooding risk is acceptable. The Department generally supports this conclusion, but notes that given uncertainties around the subsidence modelling undertaken for the project, increased flooding risk may be greater than predicted by the Proponent, particularly in the transitional zone between alluvial valley areas and the western, hilly parts of the site. Notwithstanding, given existing topography and flooding contours, the Department expects that any additional flooding impacts that may be identified as a result of improved subsidence modelling and assessment are likely to be a minimal increase above current predictions.

The PAC has highlighted that there are a number of options for dealing with increased flooding risk, including raising structures and infrastructure, construction of levees, voluntary acquisition of properties and improvements to flood drainage infrastructure. The Department supports these measures and considers them appropriate for the mitigation and management of subsidence-induced flooding impacts.

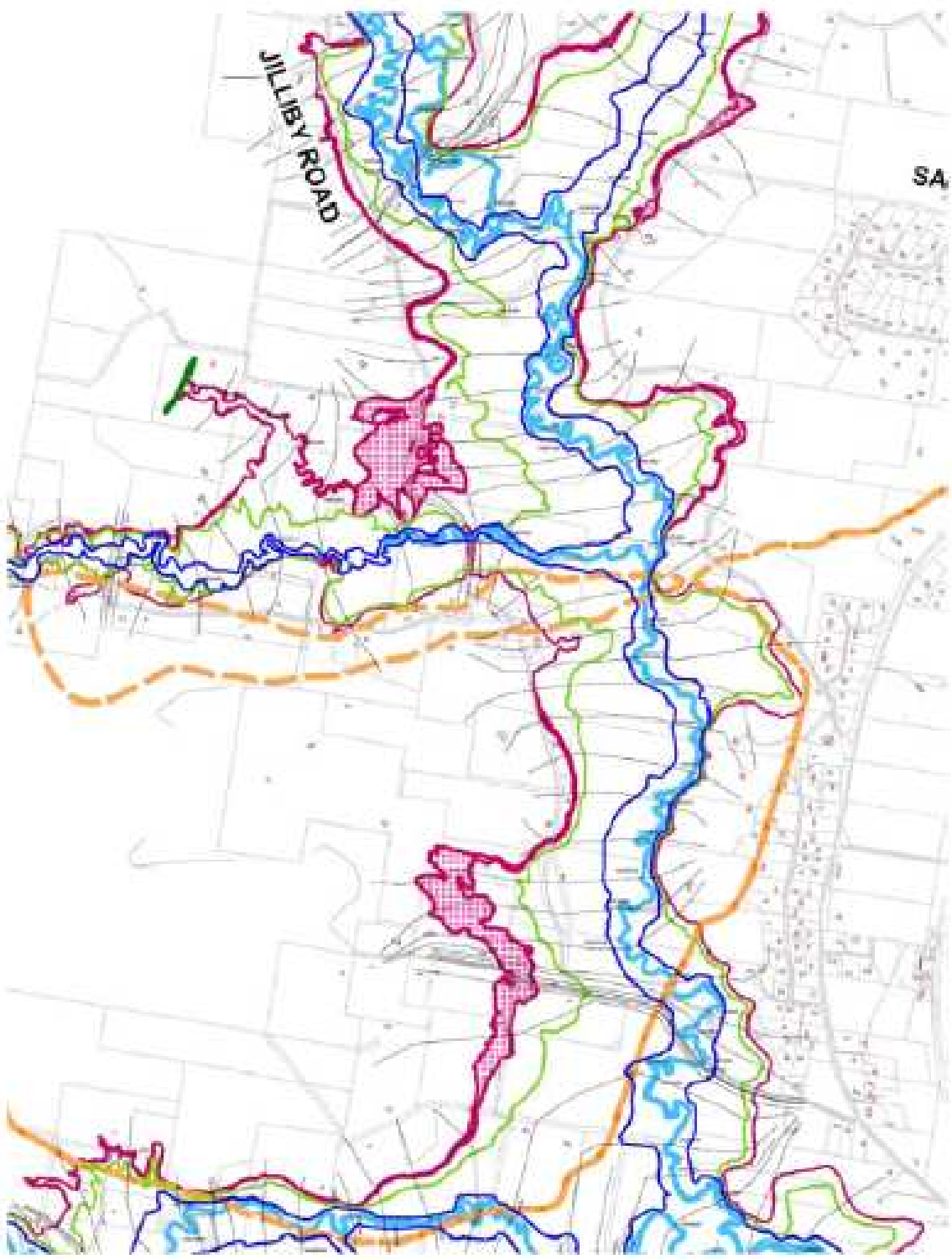

Figure 9: *Predicted Increases in Flood Extent*

Changes to Geomorphology

Subsidence associated with the project has the potential to affect the geomorphology of watercourses, leading to bank erosion, changes in aquatic and riparian ecology, ponding and drainage changes. The PAC considers that site-specific impacts cannot be ruled out, but suggests that these are likely to be sparsely distributed and of a very localised nature.

The Department accepts this position, but notes that there remains a reasonable level of uncertainty around potential geomorphological changes in the western, hilly areas of the site as a result of similar uncertainties in subsidence predictions. While the Proponent has committed to monitoring a rehabilitation works, it is not clear whether such works would be practical or effective given the outstanding uncertainties around the likely impacts of the project on geomorphology in hilly areas of the site.

4.3 Ecological Impacts

The Proponent's assessment of potential ecological impacts associated with the project is presented in three parts:

1. direct impacts associated with the establishment of surface facilities;
2. indirect impacts as a result of project-related subsidence; and
3. assessment of ecological values of unaffected project lands for the purpose of formulating biodiversity offsets.

Direct Ecological Impacts and Offset Areas

The project is expected to require the removal of approximately 32.73 hectares of native vegetation, including 4.54 hectares at the Buttonderry site, 17.27 hectares at the Tooheys Road site, 0.92 hectares within the Wyong State Forest and 10 hectares for the construction of the proposed rail loop. Vegetation clearing would include removal of areas of *Angophora inopina* and *Tetratheca juncea* at the Toohey's Road site, both of which are listed as vulnerable under State and Commonwealth threatened species legislation. Squirrel Gliders, Wallum Froglets and a likely Powerful Owl nesting site have also been identified on the site.

The Proponent proposes to offset vegetation loss and biodiversity impacts through the dedication of 50 hectares of land in the vicinity of Hue Hue Road, six hectares of *Angophora inopina* revegetation at the Tooheys Road site, and 12 hectares of vegetation enhancement along Wallarah Creek at the Tooheys Road site. The PAC also notes that the Proponent owns approximately 115 hectares of forested land that would not be disturbed between Tooheys Road and Buttonderry, and a further 318 hectares of forested land within development areas that would not be disturbed by the project.

Through detailed ecological surveys of surface facility sites, the Proponent has identified three Endangered Ecological Communities at the Tooheys Road site, and one at the Hue Hue Road offset site. Ten threatened flora species and ten threatened fauna species have been identified in the area, and assessments of significance for these species undertaken by the Proponent have concluded that the project is unlikely to significantly affect the species, populations, or their habitats.

The PAC is satisfied that the Proponent has undertaken an adequate level of ecological assessment for surface facility sites associated with the project, and that impacts could be constrained within acceptable limits subject to the provision of biodiversity offsets and development of a formal Ecological Management Plan. The PAC suggests, however, that further assessment of offset lands needs to be undertaken to demonstrate the acceptability of the proposed offsets. The Department generally concurs with the PAC's conclusions in this regard, but notes that the Environmental Assessment does not clearly demonstrate that the Proponent has actively sought to avoid or minimise ecological impacts though careful design of surface facilities. While this point is not fundamental to determining the acceptability of direct ecological impacts from the project, the Department highlights that a more rigorous site configuration development process could have avoided ecological impacts and the need for or magnitude of biodiversity offsets.

Indirect Impacts

The Proponent's assessment of indirect ecological impacts associated with the project, principally driven by subsidence effects, is heavily qualified as a result of limited survey work undertaken across potentially affected areas. The Proponent has argued that in many cases, survey work has not been possible due to limitations on access to private lands.

In the absence of more comprehensive survey data, the Proponent has argued that the ecology of the alluvial valleys within the project would be driven by two key factors – that the semi-aquatic nature of the valley floor would govern the types of flora and fauna likely to be present, and that the predicted levels of subsidence in these areas of the project site are unlikely to result in a significant change to the semi-aquatic nature of the valley floor. The Proponent has argued that any localised changes in ecology associated with subsidence would be mitigated by the ability of amphibians and other aquatic species to adapt to those changes. While the PAC agrees that changes to the valley floor are likely to be low, it does not accept the Proponent's assertions with respect to the adaptability of species given the lack of investigation of this issue. The PAC suggests that an adaptive management approach to the issue of ecological impacts on the valley floor would not be appropriate in this case, unless and until additional work is undertaken to characterise the capacity of species to adapt to expected localised changes as a result of subsidence effects on the valley floor. The Department supports the PAC's position in this regard.

In contrast to the valley floor situation, the PAC highlights that cracking of creek beds and geomorphological change is more likely in the western, hilly areas of the site. It considers that considerable further ecological survey work is required in these areas of the site to define the existing ecology and to fully and appropriately assess the likely impacts of subsidence/ upsidence on ecology in this part of the site. Further, the PAC reiterates concerns over the certainty of subsidence predictions in the western, hilly parts of the site. The Department concurs with the PAC's observations about the lack of ecological assessment for the western, hilly areas of the site and the considerable uncertainty around ecological impacts generated by unresolved ecological survey issues and debatable subsidence predictions for these areas. While the PAC has suggested that these issues could be subject to further investigation following approval of the project, and before mining operations reach these areas, the Department considers that the level of uncertainty and environmental risk associated is not appropriate for the application of an adaptive management approach. Until greater certainty and clarity is achieved for subsidence predictions and consequent ecological impacts in the western, hilly areas of the project site, the Department is not in a position to support mining activities in or close to these areas at this point in time.

4.4 Heritage Impacts

The assessment of direct and indirect impacts (i.e subsidence) on Aboriginal and non-indigenous heritage was undertaken by OzArk Environmental and Heritage Management Pty Ltd. The assessment was further supplemented by a report on the results of test excavation for Aboriginal heritage at the Tooheys Road site.

Aboriginal Heritage

For direct impacts (being the Tooheys Road Site, the Buttonderry Site and the West Ventililation Shaft), only the Tooheys Road site was considered to have areas containing potential Aboriginal sites/items and therefore was subject to a more detailed assessment (including test excavations). The assessment found 14 artefacts (tool, flakes, etc) and concluded that there is very low archeological potential within the area that may be directly impacted by the project. Measures were recommended to manage construction activity (such as stop work practices) and to limit the extent of disturbance in areas that could potentially contain items of Aboriginal heritage. The Department concurs with the findings of the assessment, and considers the management of this impact could be suitably conditioned, should the Minister determine to approve the project.

For indirect impacts, the assessment was limited to the use of a predictive model, supported by an on-site survey (including Aboriginal community representatives) in accessible areas. This did not include site excavations. As the survey team was unable to access private property, the on-site survey was limited to Wyong Forest Study Area and the Honeysuckle Park Study Area to verify the predictive model. There were also access limitations in these areas, for example, due to difficult terrain.

A desktop analysis was conducted for the remaining areas that could not be accessed but impacted indirectly. These areas were mostly private land along the valley floor which has been subject to substantial disturbance.

As noted by the PAC, the predictive model concluded that:

- further Aboriginal sites are expected in the Wyong Forest Study Area, but no intact Aboriginal sites are to be expected in the valley floor;
- axe-grinding would form the majority of sites that remain to be recorded in the Wyong Forest Study Area. The assessment concludes that these are a common feature, and that the scientific and public significance is rated as Low-Moderate, and cultural significance as High.

The Proponent commits to undertake further archaeological work in the Wyong State Forest, to inform the future Subsidence Management Plan.

It is important to note that the assessment relies on the conclusions of the subsidence assessment for the project, and concludes that the recorded axe-grinding sites are likely to be at a low level of risk of damage.

The PAC expressed reservations on the accuracy of these predictions, given its reliance on the subsidence assessment. The PAC also recommends that mining should not be permitted in any area until an assessment in that area has been undertaken in accordance with an Aboriginal Cultural Heritage Management Plan to ensure sites of 'special significance' are afforded appropriate protection. This is contrary to DECCW's submission, which indicated that such assessments should be conducted before any approval is given.

The Department echoes the PAC's reservations, and considers that the current uncertainties in the subsidence predictions within the western hill areas (which is essentially the Wyong Forest Study Area) creates doubt about conclusions that could be made for impacts on Aboriginal heritage. Furthermore, the reliance on predictive modelling as opposed to a full cultural assessment (supported by test excavations) makes it difficult to conclude that no items of special significance are located in the area indirectly impacted within the western hill area, and whether or not changes may need to be made in the mine plan to suitably avoid or mitigate such impacts.

This applies to a lesser extent to the valley floor area, given the risk of subsidence (and the uncertainties in the assessment) is generally lower in these areas, and the test excavations at the Tooheys Road site supports the low level of risk of any significant sites being uncovered. Nonetheless, the absence of any detailed test excavations places a reasonable level of doubt on the general conclusions of this assessment.

Non-indigenous Heritage

Within the area to be indirectly impacted, there are two items listed within the Wyong Local Environmental Plan and 10 items identified in previous studies (but not listed). Similar to the limitations on the Aboriginal cultural assessment, the assessment for non-indigenous heritage was limited to areas where access was permitted, and therefore the significance of the items recorded in previous studies was unable to be assessed but considered likely to be of local significance.

The assessment concluded that these items would be impacted by subsidence and that these impacts can be suitably mitigated through measures contained in the future Subsidence Management Plan. Again, the assessment acknowledges that the limitations in the survey should be addressed through further study (after approval) to conclusively determine the heritage significance of these items and to identify appropriate mitigation measures.

The Department's concerns with the subsidence impacts are limited in the 'valley floor' area, where these items are mostly concentrated. The Department also acknowledges that this assessment was incomplete due to access difficulties. As such, the Department considers this matter to be a low risk and considers the potential impacts could be conditioned to ensure appropriate mitigation measures are implemented

4.5 Air Quality Impacts

An air quality impact assessment (AQIA) and a Health Risk Assessment (HRA) were undertaken by PAEHolmes for the Environmental Assessment. The AQIA includes an assessment of particulate matter (total suspended particulates and particulates less than 10 µm (PM_{10})), dust deposition and odour at 15 sensitive receivers. The HRA provides an assessment associated with particulate matter less than 2.5 µm ($PM_{2.5}$).

The assessment has considered impacts arising from construction activities, the mine operations at the Tooheys site and the ventilation shaft emissions at the Buttonderry site. The closest residential receiver is located approximately 2.5 km to the east of the Tooheys Road site, and to the south and south west of the Buttonderry site.

The model used for the AQIA was based on the scenario of a 'busy day' and an 'average day' of mine operations at the Tooheys Road site, with the 'busy day' assuming 65,000 tonnes of raw material

would be processed and 40,000 tonnes of product coal loaded and the 'average day' assuming 14,000t product coal would be loaded. Operational scenarios assumed no control of dust emissions and the construction scenario only assumes the watering of haul roads.

Based on these scenarios, the AQIA predicts that the construction and operational phases of the project would satisfy air quality criteria for PM_{10} (annual average), total suspended particulates (annual average) and dust deposition at all sensitive receivers when considered in isolation and when combined with background air quality levels. As stated within the PAC report, additional modelling for the cumulative 24-hour PM_{10} criteria (during peak activity) indicated two values above the criterion at one sensitive receiver (the Department has not been presented with this additional modelling). However, the PAC also notes that the NEPM criterion does allow for five maximum exceedances per year and that the Proponent's assessment has not factored in any mitigation measures. It therefore concludes that these two predicted exceedences are acceptable.

The assessment of $PM_{2.5}$ during mine operations demonstrates compliance at all sensitive receivers for the 24-hour average and annual average $PM_{2.5}$ goals (in isolation).

To manage emissions from the site, the Proponent has proposed a number of measures including:

- operational air quality controls, including water sprays at coal handling transfer points and stockpile areas, wind activated water cannons at the product stockpile, enclosure of conveyors on three sides, fully enclosing the crusher and screens at the Tooheys Road site and inclusion of dust suppression measures at the train loading facility during design and operation;
- an operational air quality monitoring program, including real-time dust monitoring for pro-active dust control;
- land acquisition upon request where air quality criteria are exceeded and where satisfactory mitigation measures cannot be negotiated; and
- dust control measures during construction (eg water carts, vegetative matting and constraints during unfavourable weather conditions) and installation of first flush systems on rural residential rain water tanks for residences within 500 metres of areas disturbed during construction (upon request of the landowner).

The modelling of odour emissions from the upcast ventilation shaft indicates a low potential for nuisance at sensitive receivers with all below the criterion of 2OU (the maximum odour level at a sensitive receiver is predicted to be 1.4OU). Additional measures are available to increase the degree of dispersion in the event that odour becomes a problem.

The PAC concluded that the modelling of the air quality impacts were in accordance with DECCW and NEPM criteria and that relevant air quality criteria for TSP, PM_{10} and dust deposition would be comfortably met. The PAC did, however, highlight that there are some uncertainties in the predictions, specifically the ability to predict emission rates (as with any other air quality modelling exercise), however, was satisfied that this uncertainty would only reduce the margin of comfort in the predictions, rather than lead to an exceedance of the applicable air quality criteria. The PAC is confident that practical engineering solutions are available should any non-compliance occur against particulate (PM_{10}/TSP), dust deposition and odour criteria contained in any approval that may be granted by the Minister. The PAC also recommends that $PM_{2.5}$ goals be imposed on the development, when NSW goals are established, but that these particulates should be monitored in the interim as part of the future air quality monitoring network for the project.

The PAC is critical of the Proponent's intended application of an adaptive management system based on real-time monitoring as a dust management tool. It considers that the Proponent should work with DECCW and the Bureau of Meteorology to create a predictive management system to manage emissions during high wind events as part of the Air Quality Management Plan (AQMP).

The Department is generally satisfied that the Proponent has assessed the potential air quality impacts of the project in accordance with the relevant DECCW guidelines, and the Department considers that the proposal can operate and comply with set air quality criteria during construction and operation.

Although the NEPM criterion for PM_{10} does provide for this criterion to be exceeded up to five times in any one year, the Department considers that the Proponent should implement all reasonable and feasible measures to effectively manage emissions to minimise the likelihood of this scenario arising and to undertake air quality monitoring to ensure compliance with this goal. Furthermore, these

exceedances should be considered within the context that no air quality controls were assumed in the air modelling exercise. With the application of all reasonable and feasible dust mitigation measures, the Proponent should be in a position to proactively and reactively manage dust generation on the site to ensure that no exceedances occur.

The Department concurs with the majority of the PAC recommendations relevant to any project approval that may be granted by the Minister. In particular, the recommendation for the Proponent to establish a predictive management system is supported and it is expected that any future AQMP would contain both pro-active (utilising metrological predictions) and reactive approaches (using real-time monitoring) to ensure emissions are suitably controlled and managed throughout the life of the mine.

The Department does not recommend that a $PM_{2.5}$ criterion be set within the approval (as no such criterion has been adopted for application in New South Wales at this time), however, the Department supports the inclusion of $PM_{2.5}$ monitoring within the AQMP for the project.

The Department also recommends the following conditions should be imposed in the event that the Minister determines to approve the project:

- comply with applicable air quality criteria and to ensure no offensive odours are emitted from the site;
- prohibit the transport of coal by road, other than in the case of an emergency;
- implement all reasonable and feasible air quality control measures throughout the life of the mine;
- establish a detailed air quality monitoring program to support the future AQMP, which includes real-time air quality monitoring at nearby sensitive receivers;
- regularly and communicate with surrounding landowners in respect of mine operations, and respond to enquiries and complaints; and
- criteria and procedures to address dust complaints and to acquire properties (if requested).

The Department also highlights a discrepancy between the noise and air quality assessments (with the noise assessment assuming a fully automated system for the ROM stockpile and one dozer on the coal product stockpile). This may mean that the air quality outcomes may be inaccurate, and may result in increases or decreases in emissions compared with those presented and assessed in the Environmental Assessment. Given the expected contributions to air quality by the mine operations, it is possible that the use of the automated system and reduction in dozer activity may not significantly alter the assessed outcome at sensitive receivers. However, this is an unresolved matter that ideally should be addressed prior to commencement of operations, should approval be granted to the project.

4.6 Noise Impacts

The Environmental Assessment includes a noise impact assessment (NIA) undertaken by acoustic consultants Atkins Acoustics and Associates Pty Ltd in accordance with the NSW Industrial Noise Policy (INP). It considers noise generated during construction, operations (including sleep disturbance, rail noise and traffic noise). Currently, the acoustic environment is influenced by road traffic noise, natural sources and localised domestic activities.

Construction Noise

Construction activities would be undertaken across three locations and are expected to last for varying periods of time –

- the Tooheys Road site, including the construction of the rail spur and loop, would be constructed over a period of 12-16 months;
- the Buttonderry site would be constructed over a period of approximately 24 months; and
- the West Ventilation Shaft site, accessed off Little Jilliby Road, would be constructed over a period of 15 months (noting that this won't be constructed until approximately the tenth year of operations).

Blasting activity may be required to remove rock outcrops. The NIA indicates that, under the worst case scenario (being all earthwork activity occurring at once), proposed construction activity would not comply with the noise criteria (being background +5dB(A)) at some locations. Vibration (for structural damage and human disturbance) and air-blast overpressure criteria would be met.

The PAC noted the prediction that the proposal would be unable to comply at some sensitive receivers and recommended that a Noise Management Plan be implemented to implement all reasonable and feasible measures. The Department largely concurs with this recommendation. The prolonged period of construction at the Buttonderry site and the expected noise impacts on neighbouring residences requires particular attention within the future Noise Management Plan to ensure all reasonable and feasible measures are implemented. Noise monitoring should also be conducted during these activities, supported by procedures to record and respond to noise complaints. It is also recommended that conditions relating to vibration and blasting activities would also be imposed, should the Minister determine to approve the application.

Operational Noise

Operational noise impacts were assessed separately at the Buttonderry Site and Tooheys Road site. Road traffic noise and rail noise impacts were considered separately. The West Ventilation Shaft facility would not have any fixed plant and therefore no assessment was conducted for this site.

The noise impact assessment is based on the use of an automated ROM stockpile management system and the use of one dozer on the product stockpile. Other alternatives were considered but were excluded based on feasibility, cost and attenuation gained. The assessment also considered the worst case scenario at the Tooheys Road site, being fixed and mobile plant operating simultaneously together with train loading.

The assessment demonstrates that the proposed mine operations at Tooheys Road site and the Buttonderry Road site can satisfy noise criteria at all sensitive receivers (day, evening, and night), with noise levels at some receivers in proximity of the Tooheys Road site predicted to be close to or equaul to the project specific criteria during adverse weather conditions during day and evening periods. No assessment appears to have been completed against the sleep disturbance project specific criteria.

The PAC concludes that noise impacts can be adequately managed, subject to conditions, and that noise monitoring should be conducted to ensure compliance. The PAC's primary area of concern regarding site operations related to the noise from dozers, and considers that other noise mitigation measures could be employed in the event that noise criteria are not met.

The Department concurs with PAC that noise impact assessment for day/evening/night periods demonstrates that noise can be adequately managed, subject to the implementation of all reasonable and feasible measures. However, the Department notes that there are some resolved matters relating to the noise impact assessment at the Tooheys Road site and/or Buttonderry site. Specifically,

- the apparent absence of any assessment against sleep disturbance criteria, or justification why the NIA only reports against day/evening/night criteria;
- DECCW's query on the exclusion of rail operations from the assessment (before trains join the Main North Railway line) and its potential impact on Blue Haven residents does not appear to have been addressed by the Proponent (within the Response to Submissions); and
- the PAC's observation that there are inconsistencies between the assumptions contained within the noise assessment and air quality assessment remains unresolved (with the air quality assessment assuming the use of three dozers on the ROM stockpile and coal product stockpile).

There is no explanation as to why the results of the sleep disturbance assessment have not been presented in the Environmental Assessment or specialist report. The Proponent is intending to undertake 24 hour operations, including train loading activities. As such, this matter should ideally be resolved prior to determination of the project application. Alternatively, conditions can be imposed on the project, however, this does run the risk that the Proponent may be unable to reasonably and feasibly comply with noise criteria (sleep disturbance) for the project.

In terms of the exclusion of rail operations from the assessment, this may be the result of the noise impact assessment considering the worst case scenario (being full operations and train loading activities) – therefore rail movement along this corridor would not be generated and would not be considered as noise source. Alternatively, the rail spur may have been considered by the Proponent as an external noise source from the Tooheys Road site, as it has been by the PAC – however, as the Proponent is proposing (as part of the project application) to subdivide and lease this land (from the LALC and the Crown), this should have been considered as a source of noise during site operations. Ideally, this matter should also be resolved prior to determination of the project application. Alternatively, conditions of approval requiring confirmation of noise predictions before construction

activities commence should be imposed, supported by conditions to limit the use of the rail spur by specific locomotives to limit noise contributions from this source (as recommended by DECCW).

The PAC's note on the discrepancies between the noise and air quality assessments is considered in the Department's assessment of air quality impacts given that the Environmental Assessment states that the fully automated system has been incorporated into the proposal.

Road Traffic Noise

Traffic generated by the development during operations would be limited to employees and service deliveries to/from the Buttonderry site and Tooheys Road site. The majority of the movements would be generated by employees and associated with movements to/from the Buttonderry site (220 vehicles in the morning peak) compared to Tooheys Road site (39 vehicles in the morning peak). Construction traffic is comparable to the operational phase of the project for the Buttonderry site (but with a greater percentage of heavy vehicles), however a greater number of movements would occur to/from the Tooheys Road site during construction (93 movements).

The road traffic noise assessment assumes a 50% split in traffic from the Buttonderry site and assumes 200 vehicle movements in the morning peak (operation) and 176 vehicles during construction. The assessment concludes that $LA_{eq(1\text{-}hour)}$ traffic noises levels at Hue Hue Road and Bushells Ridge Road would be satisfied during construction and operation at 30 metres from the road. Residential dwellings located along these roads are set back more than 30 metres from the centre road alignment.

The PAC concludes that there would be minor impacts on residential receiversrs on Bushells Ridge Road and Hue Hue Road during construction as a result of increased traffic movements. No specific conclusion or recommendation was made with respect to operational road traffic noise.

The Department largely concurs with the PAC but notes that DECCW queried the assumptions in the operational noise assessment, being a 50% split from the Buttonderry site and 200 vehicles. In comparison, the traffic assessment assumes 220 in the morning peak and the majority of traffic travelling to/from this site originating from the south via Hue Hue Road/Sparks Road/Sydney-Newcastle Freeway (totalling 90%). This discrepancy has not been resolved in the Response to Submissions, and ideally should be resolved prior to determination of the project application. However, this uncertainty represents a low risk given the current predicted noise levels are below the ECRTN criteria.

Rail Noise

The noise impact assessment considered the impacts on residences along the Main North Railway Line resulting from the additional trains servicing the development during operations (predicted to be five to six trains per day). Based on the peak annual production output of 5,000,000 tonnes per year, the additional rail traffic generated by the site would marginally increase the existing $LA_{eq(24\text{-}hour)}$ rail traffic noise by 1-2dB(A) and would not change the LA_{max} noise levels along this line (which are currently above DECCW criteria for residences up to 100 metres from the railway line). It is noted that the existing and projected noise levels are satisfied at 60 metres from the railway line, however, the typical setback of residences from the railway line varies from 50-60 metres (at Wyee) to 10-15 metres (Broadmeadow).

The PAC notes that it would be difficult to comply with the DECCW criteria (60 $LA_{eq(24\ hour)}$ and 85 LA_{max}) given the narrowing of the corridor closer to the port. The Department agrees with this conclusion, and concurs with the Proponent that the reduction of overall train noise along this section of the track would be achieved through Noise Abatement Programs. It is also noted that the Proponent is considering the purchase of two train sets for its operations, which would provide greater opportunity to control rolling stock standards. If this eventuates, this may assist in minimising the contributions of the operations to overall train noise and to address the PAC's concerns relating to 'wheel squeal'.

The Department notes that vibrations from rail operations were not assessed as part of the application. Given the relatively minor contributions to rail traffic noise, the project is unlikely to significantly alter the current levels. Further, the constraints to the railway corridor and limited responsibility of the Proponent for this issue (as opposed to the licensed rail operator), the Department does not consider this to be a key issue for this project.

The noise impact assessment considered the impacts on residences along the Main North Railway Line resulting from the additional trains servicing the development during operations. Based on the peak annual production output of 5,000,000 t per year, the additional rail traffic generated by the site would marginally increase the existing LAeq, 24 hour rail traffic noise by 1-2dB(A) and would not change the LAmax noise levels along this line (which are above DECCW criteria for residences up to 100 metres from the railway line). It is noted that the existing and projected LAeq, 24 hour noise levels are satisfied at 60 metres from the railway line, however, the typical setback of residences from the railway line varies from 50-60 metres (at Wyee) to 10-15 metres (Broadmeadow).

The PAC notes that it would be difficult to comply with the DECCW criteria (60 LAeq, 24 hour and 85 LAmax) given the narrowing of the corridor closer to the port. The Department agrees with this conclusion, and concurs with the Proponent that the reduction of overall train noise along this section of the track would be achieved through Noise Abatement Programs. It is also noted that the Proponent is considering the purchase two train sets for its operations, which would provide greater opportunities to control rolling stock standards. If this eventuates, this may assist in minimising the contributions of the operations to overall train noise and addresses the PAC's concerns relating to 'wheel squeal'.

The Department notes that vibrations from rail operations were not assessed as part of the application. Given the relatively minor contributions to rail traffic noise, the project is unlikely to significantly alter the current levels. Further, the constraints to the railway corridor and limited responsibility of the Proponent for this issue (as opposed to the licensed rail operator), the Department does not consider this to be a relevant issue for this project.

4.7 Traffic Impacts

The Proponent proposes to transport all coal via rail, and as such, traffic contributions from the development are limited to employees and service vehicles. At peak operations, this would result in:

- 220 vehicle movements during morning/evening peak for the Buttonderry Site, with the majority of traffic accessing the site via the Sydney Newcastle Freeway, Sparks Road and Hue Hue Road; and
- a maximum of 40 movements during morning and evening peak at the Tooheys Road site, with the majority of traffic accessing the site via Motorway Link/Sydney Newcastle Freeway/Tooheys Road.

Construction traffic was also considered, including cumulative impacts associated with mine operations and construction activities associated with the construction of the West Ventilation Shaft in year 10. Vehicle trips were predicted to be 145 per day for the Buttonderry Site, 250 per day for the Toohey Road site, and 45 per day for the West Ventilation Shaft.

The Proponent's assessment (updated in September 2010) concludes that only four intersections (of the nine intersections assessed) are forecast to operate unsatisfactorily by 2024, but only the Sydney Newcastle Freeway/Sparks Road interchange (eastern side) would be affected by the proposal. The Proponent considers the deterioration of the remaining three intersections to be due to background traffic growth, for example, traffic resulting from growth within the Wyong Employment Zone.

Possible treatments for these intersections are outlined by the Proponent but not proposed to be carried out as part of the project. These include:

- construction of a two-lane roundabout at the Sydney Newcastle Freeway/Sparks Road interchange (western side) (RTA controlled);
- construction of single land roundabout at the Hue Hue Road/Wyee Road intersection (Council controlled); and
- construction of single land roundabout at the Hue Hue Road/Jilliby Road intersection (Council controlled).

A number of road safety issues were also identified along the proposed routes, and the Proponent's assessment acknowledged that although not caused by the project, its traffic contributions would increase the level of safety risk at these intersections. Mitigation measures are outlined in the specialist traffic assessment report to address the identified safety risks.

There are no clear commitments from the Proponent on what road upgrades would be undertaken by the Proponent, other than site access points, and the realignment of Tooheys Road (including construction of rail bridges). Details of these road works appear to be very limited within the Environmental Assessment. This issue is also noted by the PAC in its report.

The RTA, in its submission on the exhibited Environmental Assessment, recommended that traffic lights at the eastern intersection of the Sparks Road/Pacific Highway would need to be installed and be provided in 2012 as a result of the project (currently scheduled for 2015). The RTA required no contributions towards the western intersection. The RTA recommended a contribution of $143,000 towards the signals be provided upon the RTA commencing works. The PAC supported this contribution, and recommended that the Proponent should be required to provide evidence of an agreement with the RTA on the contribution prior to the commencement of construction.

The Department also agrees with this contribution towards the installation of the traffic signals (should the project be approved). The Department also considers that no other contributions towards intersection upgrades are considered necessary (should the Minister determine to approve the application). The Department is satisfied that the Proponent's traffic movements represent a small percentage of total traffic movements and background growth would already require these intersections to be upgraded with or without the project. The Department notes that the Proponent is contributing a reasonable percentage of traffic movements to the Hue Hue Road/Sparks Road intersection. However, this intersection is already scheduled to be upgraded in 2015.

With respect to the intended road works along Tooheys Road, this information should ideally be provided before the application is determined. In particular, the extent of disturbance is unknown and therefore the environmental impacts are similarly unknown. Should the Minister determine to approve the application, conditions of approval could be imposed to require this information be provided before construction works commence. However, this does pose a risk to the determination given the uncertainty of any resulting impacts (albeit low).

Overall, there are minor risks associated with approving the project in the absence of this information. However, if the project were to be approved, the Department supports the imposition of the PAC recommendations (in addition to the above), being:

- prohibition of coal being transported by road, with all coal to be transported by rail (unless if it is required for an emergency);
- dilapidation reports for local and State roads during construction and operation, with requirements to repair any damage attributed to the project; and
- preparation of a Traffic Management Plan for construction activities, including detailing of any road closures (partial or full).

5. CONCLUSION

The Department has assessment the project application, Environmental Assessment, Response to Submissions and submissions on the project. It has also considered the detailed and comprehensive report prepared by the Planning Assessment Commission.

While the Department recognises that the PAC, in formulating recommended conditions of approval, has endeavoured to address and resolve the uncertainties and information gaps in the Environmental Assessment process in a pragmatic and flexible manner, it considers the uncertainties around key environmental impacts too great to support an adaptive management approach to the project. The Proponent has failed to demonstrate that an adaptive management approach is acceptable in these areas, and therefore the Department cannot support deferral of key assessment issues, including those around subsidence predictions, surface water impacts, ecological impacts, heritage, noise and air quality until after determination of the project application. To do so would be to agree to an unacceptable environmental risk, and permit the implementation of project for which there was no reasonable certainty that environmental standards could be achieved.

Given the number and significance of unresolved issues associated with the project, the Department cannot support approval of the project application for the Wallarah 2 Coal Project at this time. As such, the Department recommends that the Minister refuse the application.

6. RECOMMENDATION

It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- consider the findings and recommendations of the Planning Assessment Commission's report (Appendix E);
- refuse the project application under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached instrument of refusal (see Appendix E).

Richard Pearson
Deputy Director-General

Sam Haddad
Director-General

APPENDIX A – ENVIRONMENTAL ASSESSMENT

APPENDIX B – RESPONSE TO SUBMISSIONS

APPENDIX C – WYONG WATER STUDY

APPENDIX D – WATER STUDY PEER REVIEW

APPENDIX E – PLANNING ASSESSMENT COMMISSION REPORT

APPENDIX E – INSTRUMENT OF REFUSAL