



**Planning &
Infrastructure**

***PRELIMINARY ASSESSMENT
Stratford Extension Project
(SSD 4966)***



Environmental Assessment Report
Section 89E of the
Environmental Planning and Assessment Act 1979
November 2013

Cover Photo: The view to the northeast along Glen Road. The southern edge of the proposed Stratford East open cut would come to within 300 metres of the road. Its eastern margin would include a portion of the vegetated ridge in the background of this view.

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NSW Department of Planning and Infrastructure
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EXECUTIVE SUMMARY

The Stratford Mining Complex (Stratford) is located approximately 10 kilometres (km) south of Gloucester within the Gloucester local government area. The mine is owned and operated by Stratford Coal Pty Ltd - a wholly owned subsidiary of Yancoal Australia Limited (Yancoal).

Mining at Stratford takes place under two Ministerial consents which together allow up to 3.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal to be mined. Currently, Stratford is producing about 1.2 Mtpa using conventional drill-and-blast, truck-and-shovel, open cut mining methods. Although mining operations have previously been conducted on a 24-hour basis, current operations are limited to between 7 am and 10 pm. Stratford has a coal handling and processing plant (CHPP) which operates 24-hours a day. The CHPP also processes up to 3.0 Mtpa of ROM coal railed from Yancoal's Duralie mine, 19 km to the south.

Yancoal is now proposing to extend open cut mining operations into three new mining areas (Roseville West Pit Extension, Avon North and Stratford East Open Cuts) to produce up to 2.6 Mtpa of ROM coal and a total of 21.5 Mt of ROM coal over the next 11 years, until 2025. The proposed development (known as the Stratford Extension Project) would largely utilise existing facilities and infrastructure, although some infrastructure upgrades are proposed.

The Department received 295 submissions on the project: 214 supported the proposal; 65 were by way of objection and 16 provided comments. The two main reasons advanced in support were employment opportunities (82% of submissions) and socio-economic benefits (25%).

The three key issues of concern for people living near the Stratford mine are noise (particularly in light of the planned reinstitution of 24-hour mining operations), air quality impacts and loss of property value. The broader community, including Gloucester Shire Council and resident groups, also raised concerns over potential impacts on groundwater and on the social, cultural and environmental values of the Gloucester Valley, including cumulative impacts associated with other coal mines and coal seam gas developments.

No Government authorities objected to the proposal. However, most raised concerns over potential impacts of the project and proposed recommended conditions should it be approved.

The proposal is 'State significant development' under Section 89C of the *Environmental Planning & Assessment Act 1979* (EP&A Act), and the Department has carried out a detailed assessment of the merits of the proposed development in accordance with the requirements of Section 79C of the EP&A Act.

Mine noise, particularly during night hours, can be a very sensitive issue for nearby residents. After consideration of the various alternatives regarding the project's hours of operation, the Department has recommended that operations in the Avon North and Stratford East open cut pits should be approved on a 24-hour basis. A key reason for this is that the Department is satisfied that eliminating night-time mining would not significantly reduce night-time noise levels for residents – a potential reduction of only about 1 dB(A) for residents of Stratford village. This level of noise reduction is not normally considered to be perceptible to most human ears.

The Department is also satisfied that, due to the physical constraints of the narrow open cut pits, eliminating night-time mining at either one or both pits would extend the length of mining operations by between 1 and 6 years, Net Production Benefit to Australia would fall by \$21 M to \$58 M, and more extensive waste emplacements would be required. The costs to Yancoal would not substantively improve night-time residential amenity, and would come at the cost of increased amenity and other impacts on the community, given the substantially longer period of mining operations.

The Department has recommended conditions of consent that require Yancoal to use real-time noise monitors at Stratford and Craven villages as components of its noise mitigation, monitoring and management measures. Should noise impacts be other than expected, Yancoal would be required to reduce or cease its operations to achieve compliance.

The Department is satisfied that air quality in the vicinity of Stratford is generally quite good and would remain so during the operation of the development.

The proposed development would result in the removal of 105 hectares (ha) of native vegetation, including 13.5 ha of an Endangered Ecological Community (EEC). Clearing of this EEC would *not* result in a significant impact as it is well-represented in the region. Yancoal is proposing a 935 ha biodiversity offset strategy (BOS) to compensate for the impacts of the development, including 495 ha of good quality native woodland in four parcels close to the mine and with good linkages to other vegetated areas. In addition, Yancoal is proposing to revegetate existing cleared areas and establish a 240 ha Biodiversity Enhancement Area as part of its mine closure strategy for Stratford. The BOS areas contain each of the broad fauna habitat types that are located in the project area. A number of threatened species are known to inhabit the BOS areas; including six birds, six non-flying mammals and five bat species.

With the implementation of the proposed biodiversity offset measures, the Department believes that the project has the potential to enhance regional biodiversity values in the medium to long-term and provide enhanced habitat for threatened fauna known to reside in the area.

The Department has assessed the potential impacts of the proposed development on other matters, including, surface water, groundwater, aquatic ecology, Aboriginal and non-indigenous heritage, blasting impacts, roads and traffic, agricultural production and visual amenity. The Department is satisfied that residual impacts relating to these matters would not be significant.

Overall, the Department is satisfied that the proposed development would not result in any significant additional environmental impacts when compared to current operations, and that its impacts can be managed, mitigated or offset through appropriate conditions of consent.

To this end, the Department has reviewed the current development consent for Stratford, and proposes its replacement with a strengthened and updated set of conditions which are consistent with other recently approved coal mining operations in NSW. Particular regard has been given to the protection of residential amenity, strict management and monitoring of noise and air quality impacts, offsetting of biodiversity impacts, and an appropriate level of contribution by Yancoal for road maintenance and community infrastructure.

The project would result in a number of important social and economic benefits including:

- increasing employment at Stratford from the current 71 personnel to up to 250 personnel;
- on-going economic and employment benefits for 11 years;
- additional capital investment of \$75 million; and
- provision of \$84 million of royalties to the NSW Government.

The Stratford Extension Project would mine a 21.5 Mt coal resource and produce about 15 Mt of soft coking and thermal product coal with an export value of at least \$1,200 million, even at the low 'spot' prices for coal that currently prevail. The project is considered to be a relatively significant coal resource, given its size, quality and availability and that it forms an extension of the existing Stratford operations and would utilise the site's existing infrastructure. The economic importance of the project must be considered during assessment and determination of the project.

The Department is satisfied that, with the implementation of appropriate management measures, noise mitigation and monitoring programs, these benefits can be realised without any significant adverse environmental impacts, and hence the proposed development is in the public interest, and should be approved, subject to the recommended conditions of consent.

1. STRATEGIC CONTEXT

The Stratford Mining Complex (Stratford)¹ is an open cut coal mining operation located in the Gloucester Valley about 100 kilometres (km) north of Newcastle (see **Figure 1**). It has been operating since 1995. It is owned and operated by Stratford Coal Pty Limited, which is a wholly-owned subsidiary of Yancoal Australia Limited (Yancoal). Yancoal is seeking approval to extend Stratford and continue operations until 2025.

Stratford is one of two coal mines owned and operated by Yancoal in the Gloucester Valley. It is located on about 1500 hectares (ha) of former farming land 10 km to the south of the township of Gloucester. The second mine, Duralie Coal Mine, is located a further 20 km to the south of Stratford (see **Figure 1**).

Apart from the two coal mines, the Gloucester Valley is a predominantly rural area, characterised by cattle grazing on gently undulating, cleared valley floors at about 140 m Australian Height Datum (AHD). The northern half of the Valley is located in the Gloucester local government area (LGA) and the southern half in the Great Lakes LGA. The Valley is flanked by the slopes and hilltops of the Mograni ranges to the east (at an elevation of about 450 m AHD) and the distinctive Gloucester Bucketts to the west of Gloucester. The vegetated slopes and hilltops surrounding the Valley contribute to its significant scenic value.

The main road through the Gloucester Valley is The Bucketts Way, which branches from the Pacific Highway about 12 km north of Raymond Terrace. This road winds northwards for approximately 80 km through rural land and a number of small villages (including Stroud, Stroud Road, Craven and Stratford villages) to Gloucester. The North Coast rail line, which links Sydney and Brisbane, also runs through the Gloucester Valley, running parallel with The Bucketts Way from the village of Stroud Road to Gloucester.

Stratford is located to the east of The Bucketts Way, close to the villages of Stratford and Craven. Stratford village contains 54 houses and a range of community facilities including a two-room primary school with 15 students, a church, service station/shop, recreation reserve and cemetery. Craven consists of 16 houses and a vacant church, with several rural small-holdings in close proximity to the village.

Gloucester, with a population of approximately 2,500, is the major commercial and administration centre of the area. It contains the Gloucester Shire Council (GSC) offices, the Gloucester Hospital, schools and the main shopping area.

The Gloucester LGA has a population of 4,877 (2011 census data). Of the 1,962 people in the workforce, 16% are employed in agriculture, forestry or fishing and 6.5% are employed in the mining industry. There are a number of nature reserves in and within the vicinity of the Gloucester Valley including the Glen Nature Reserve, Berrico Nature Reserve and the Chichester and Avon River State Forests (see **Figure 1**). The World Heritage listed Barrington Tops National Park is located about 40 km to the northwest. Gloucester is marketed as the 'gateway' to this national park.

A catchment divide separates both the surface catchments and groundwater systems in the Gloucester Valley at Craven, just to the south of Stratford. Surface water and groundwater to the north of the catchment divide flows to the Manning River and to the south flows to the Karuah River. Within the project area, the main drainage systems are Avondale and Dog Trap Creeks and their tributaries. These creeks flow into the Avon River which feeds the Gloucester River and ultimately the Manning River.

The Gloucester Valley was extensively cleared of timber in the early 20th century. Initially, the cleared land was used for dairying. However, (particularly since the deregulation of the dairy industry in 2000), many former dairy farms are now used for the production of beef cattle.

¹ In this report, the term 'Stratford' always applies to the Stratford Mining Complex. The village of Stratford is differentiated by the use of the term 'Stratford village'.

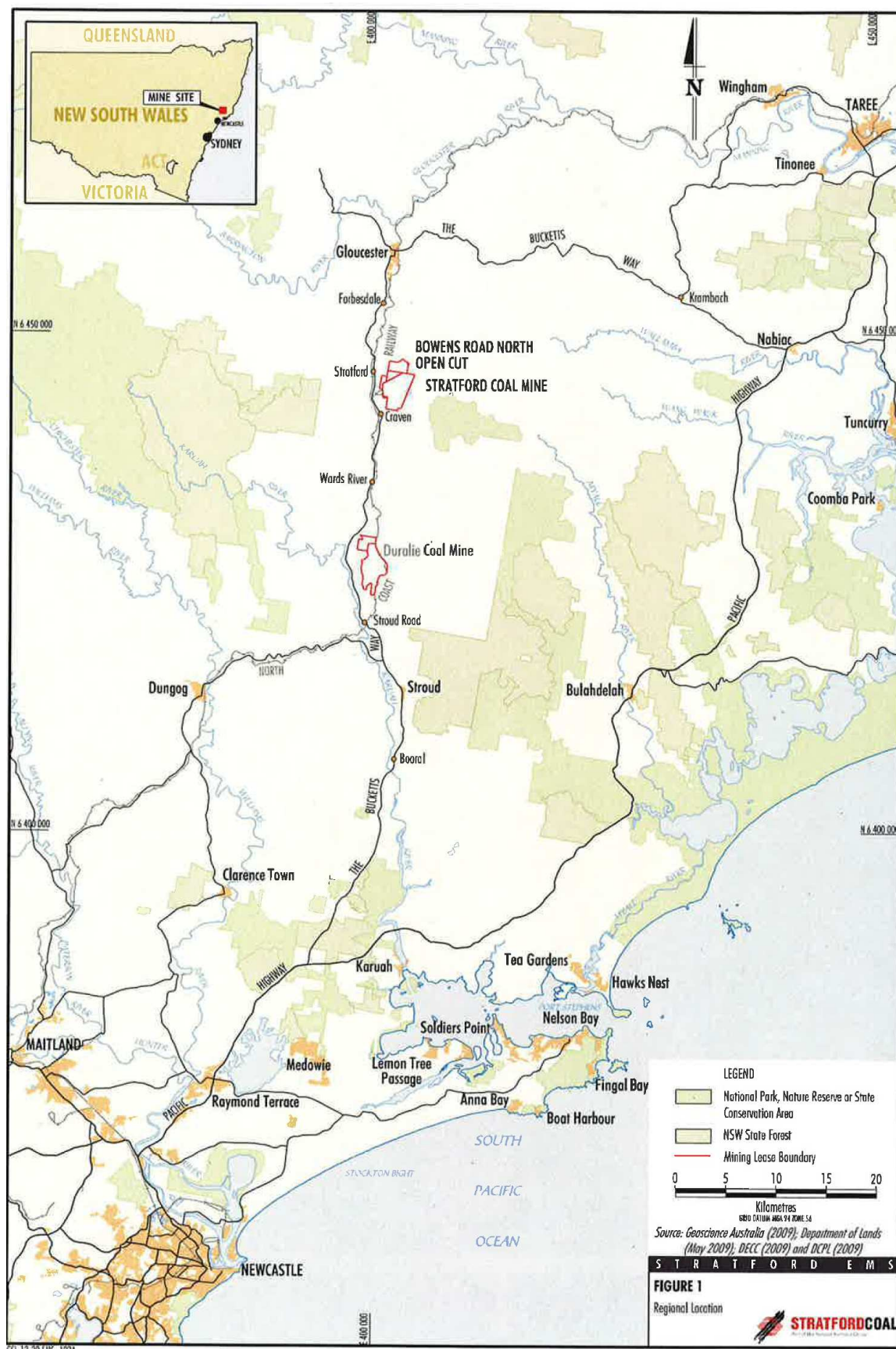


Figure 1: Location of the Stratford Mining Complex and the Duralie Coal Mine

Another relatively recent change has been people moving to the area for a 'tree-change'; typically to rural-lifestyle lots in the more forested areas of the Valley or to large-lot residential estates to the south of Gloucester including the Forbesdale, Thunderbolt and the Avon River estates.

The third recent change has been the commencement of coal mining in the Gloucester Basin, a north-south trending geological synclinal structure measuring approximately 40 km long and 13 km wide, stretching south from the township of Gloucester. Although these coal resources had been known for over 100 years, it was not until 1995 that mechanised mining commenced, firstly at Stratford in 1995 and then at Duralie in 2003.

A third open cut coal mining project, known as Rocky Hill Coal Project, is proposed by Gloucester Resources Limited (GRL) and is located about 5 km to the north of Stratford and to the south of Gloucester.

As well, Stage 1 of the Gloucester Gas Project was approved in 2011. This project involves the construction and operation of up to 110 coal seam gas extraction wells over a 50 km² area to the south of Gloucester and overlaps the Stratford site.

2. EXISTING AND PROPOSED DEVELOPMENT

2.1 Existing Operations at Stratford

Mining at Stratford takes place under two Ministerial development consents which together allow up to 3.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal to be mined. Currently, Stratford is producing about 1.2 Mtpa.

The extent of the existing development at Stratford is shown on **Figure 2**. There are two pits available for coal extraction - the Roseville West Pit and the Bowens Road North Open Cut (BRNOC). However, in October 2013 mining operations in the Roseville West Pit were suspended and employee numbers were reduced from around 125 to 71. Since 1995, mining has been completed in the Stratford Main, Roseville, Roseville Extended and Parkers/Bowens Road West Pits which have either been filled and rehabilitated or are being used for waste rock and water storage as part of Stratford's ongoing mining operations.

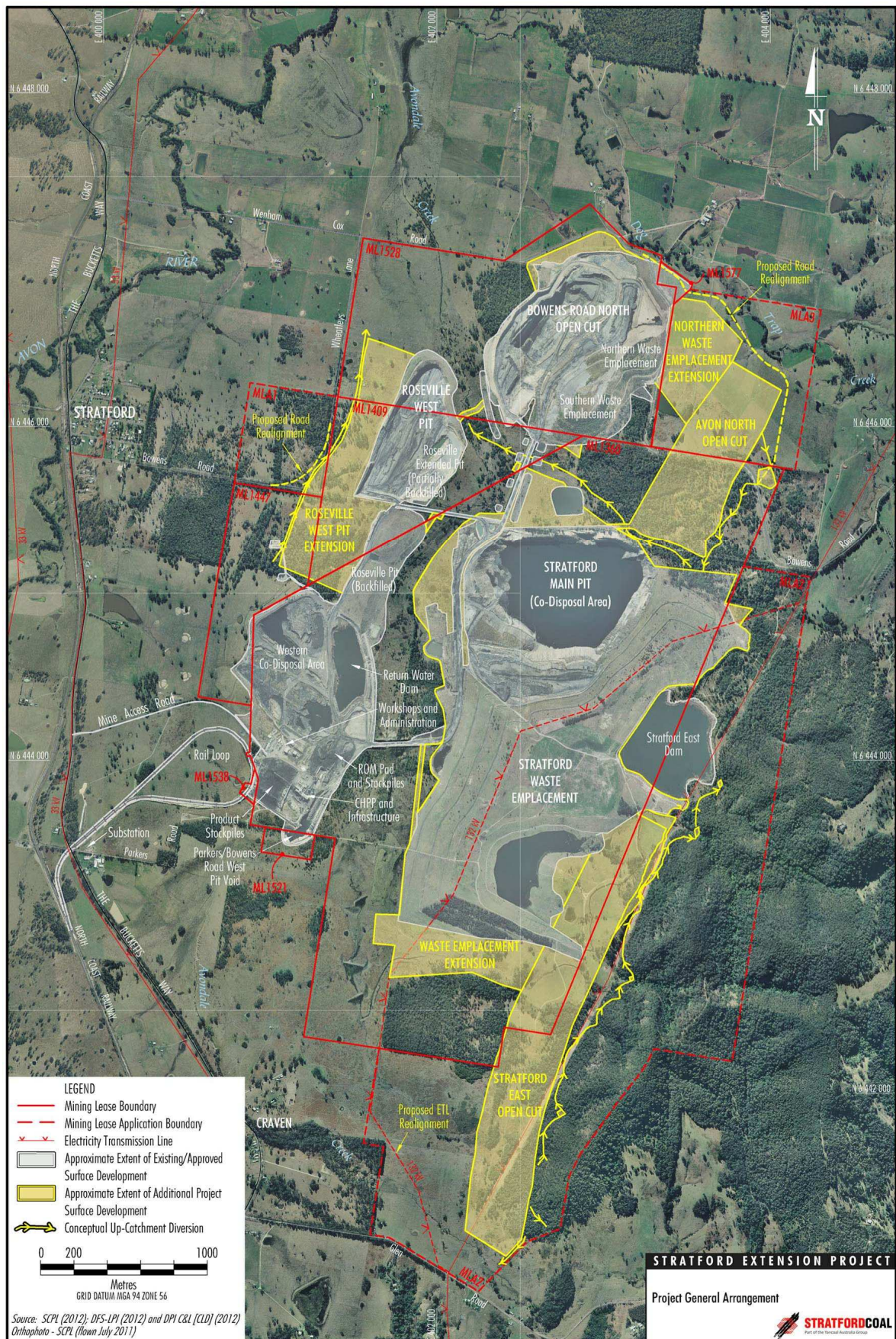
Coal at Stratford is mined using conventional drill-and-blast, truck-and-shovel, open cut mining methods. Coal is delivered from the pits to the ROM coal pad by haul trucks prior to its transfer to the Coal Handling and Preparation Plant (CHPP) for processing. ROM coal from the Duralie Coal Mine is also railed to the CHPP for processing. This train makes a regular 19 km shuttle journey between the mines along the North Coast rail line.

The CHPP is approved to operate 24 hours a day, seven days a week and process up to 4.6 Mtpa of ROM coal. Recent processing rates are lower, at about 2.9 Mtpa. Washed and blended product coal from the CHPP is conveyed to stockpiles before being loaded onto trains for transport to the Port of Newcastle for export. Loading and dispatch of export trains at Stratford is undertaken 24 hours a day; however the Duralie shuttle train is not allowed to operate between the hours of 1 am and 6 am.

2.2 Proposed Development

Yancoal is seeking approval to extend operations at Stratford to extract up to 21.5 Mt of ROM coal over 11 years at a rate of up to 2.6 Mtpa. The proposal involves three new mining areas - the Avon North Open Cut, the Stratford East Open Cut and an extension of the Roseville West Pit (see **Figure 2**).

The Avon North Open Cut is proposed to be developed northeast of the Stratford Main Pit and would yield about 4.3 Mt of ROM coal. Following completion of mining, the void would be used for water storage and then for the co-disposal of fine and coarse CHPP rejects.



The Stratford East Open Cut is proposed to be developed south of the Stratford Main Pit and would yield about 9.6 Mt of ROM coal.

The Roseville West Pit Extension involves the continuation of open cut mining west and south of the existing Roseville West Pit and would yield about 7.3 Mt of ROM coal. It would also involve the further excavation of the previously mined and backfilled Roseville Pit to allow access to the deeper Roseville Seam.

Yancoal is also seeking approval to extend mining operations to 24 hours a day in the Avon North and the Stratford East Open Cuts and to realign three local roads and a 132 kV electricity line.

The proposed rehabilitation of the overall Stratford Mining Complex at the end of mining, including the location of three final voids and proposed Biodiversity Offset Areas, is shown on **Figure 3**. **Table 1** provides a comparison of the existing and proposed operations at Stratford.

Table 1: Comparison of existing/proposed operations at Stratford

Aspect	Existing	Proposed
<i>Rate of Production</i>	Up to 2.1 Mtpa (Stratford pits). Up to 1 Mtpa (BRNOC).	Up to 2.6 Mtpa.
<i>Mine Life</i>	Mining operations to end in 2013. Processing and export to end in 2019.	Mining operations to end in 2025. Processing and export to end in 2025.
<i>Hours of Operation</i>	Seven days a week: 7 am to 7 pm (BRNOC); 7 am to 10 pm (Roseville Pit); - CHPP operation approved 24 hours per day; - loading and despatch of product by rail approved 24 hours per day; - unloading of ROM coal from the Duralie shuttle train approved between 7 am and approx. 12 midnight.	Seven days per week: 7 am to 7 pm (BRNOC); 7 am to 6 pm (Roseville West Pit Extension); 7 am to 6 pm (recovery of CHPP rejects for re-processing); 24 hours (Avon North Open Cut); 24 hours (Stratford East Open Cut); - no change to CHPP hours of operation; and - no change to hours of rail operation.
<i>Operational Workforce</i>	Approximately 125 people (including Yancoal staff and on-site contractors) have been employed at Stratford. In October 2013, employee numbers were reduced from around 125 to 71.	- At full development, the project operational workforce would be in the order of 250 on-site personnel. - Construction/development activities would require up to 30 people for short periods.
<i>Waste Rock Emplacement (including backfill)</i>	Combination of in-pit and out-of-pit waste rock emplacement.	Continued placement of mine waste rock to in-pit and out-of-pit emplacements including: - extension of the Stratford Waste Emplacement and increase in its height to approximately 196 m AHD; and - extension of the Northern Waste Emplacement and increase in its height to approximately 165 m AHD.
<i>General Infrastructure</i>	Access roads, electricity supply and distribution, rail loop, CHPP, train loading and unloading infrastructure, coal stockpiles, coal handling equipment, diesel storage, administration, workshop, stores and ablution buildings, heavy vehicle servicing, parking and washdown facilities.	- Continued use of existing approved infrastructure, subject to minor modifications. - Realignment of a 132 kilovolt (kV) power line. - Realignment of Wheatleys Lane and Bowens Road, and Wenham Cox Road.

<i>Coal Trains</i>	Average of 2.5 product coal trains per day with a peak of 5 product coal trains per day.	Average of 2.5 product coal trains per day with a peak of 6 product coal trains per day.
<i>Water Supply</i>	Mine water supply obtained from runoff recovered from mine operational areas, waste rock emplacements, CHPP rejects co-disposal areas (ie Stratford Main Pit) and open pit dewatering.	No change to key sources of water supply.
<i>Water Management</i>	On-site water management system comprising water management dams and collection drains, runoff diversions, sediment control, and irrigation of water from the Stratford East Dam on rehabilitated waste rock emplacements that drain directly to mine water storages.	• Progressive augmentation of the existing water management system, which would be designed and managed so no stored water would overflow. • Development of up-catchment diversion systems in advance of open cut operations.
<i>Final Voids</i>	Two final voids: • BRNOC final void; and • Stratford Main Pit final void	Three final voids: • Avon North Open Cut final void; • Roseville West Pit Extension final void; and • Stratford East Open Cut final void.

3. STATUTORY CONTEXT

3.1 State Significant Development

The project is development for the purposes of coal mining as defined in Schedule 1 of the *State and Regional Development State Environmental Planning Policy 2011* and is therefore State significant development under Section 89C of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Minister for Planning and Infrastructure is the approval authority for the project, under section 89D of the EP&A Act. However, as more than 25 public submissions objected to the project, the application falls within the terms of the Minister's delegation of 14 September 2011. Consequently, the Planning Assessment Commission (PAC) will determine the application.

3.2 Permissibility

The project is located in the Gloucester LGA. Under the *Gloucester Local Environmental Plan 2010* (Gloucester LEP) the land on which the project is located is predominantly zoned RU1 (Primary Production zone) (see **Figure 4**). Some of the land within the project area is zoned E3 (Environmental Management zone) and IN3 (Heavy Industrial zone). Under the Gloucester LEP mining is permissible with consent in the RU1 zone, but prohibited in the E3 and IN3 zones.

However, clause 7(1)(a) of *State Environmental Planning Policy (Mining Petroleum and Extractive Industries) 2007* (Mining SEPP) makes mining permissible with consent on land where development for the purposes of agriculture or industry is permissible. As extensive agriculture is a permitted land use in the E3 zone and industry is a permitted land use in the IN3 zone, the proposed development is permissible with consent.

3.3 Other Approvals

Under Section 89J(1) of the EP&A Act, a number of other approvals are not required to be separately obtained for the project. These include certain approvals, permits and concurrences under the *Heritage Act 1977*, the *National Parks and Wildlife Act 1974* and the *Water Management Act 2000*.

Under Section 89K of the EP&A Act, a number of further approvals are required, but these cannot be refused if they are necessary for the carrying out of an approved State significant development. These include:

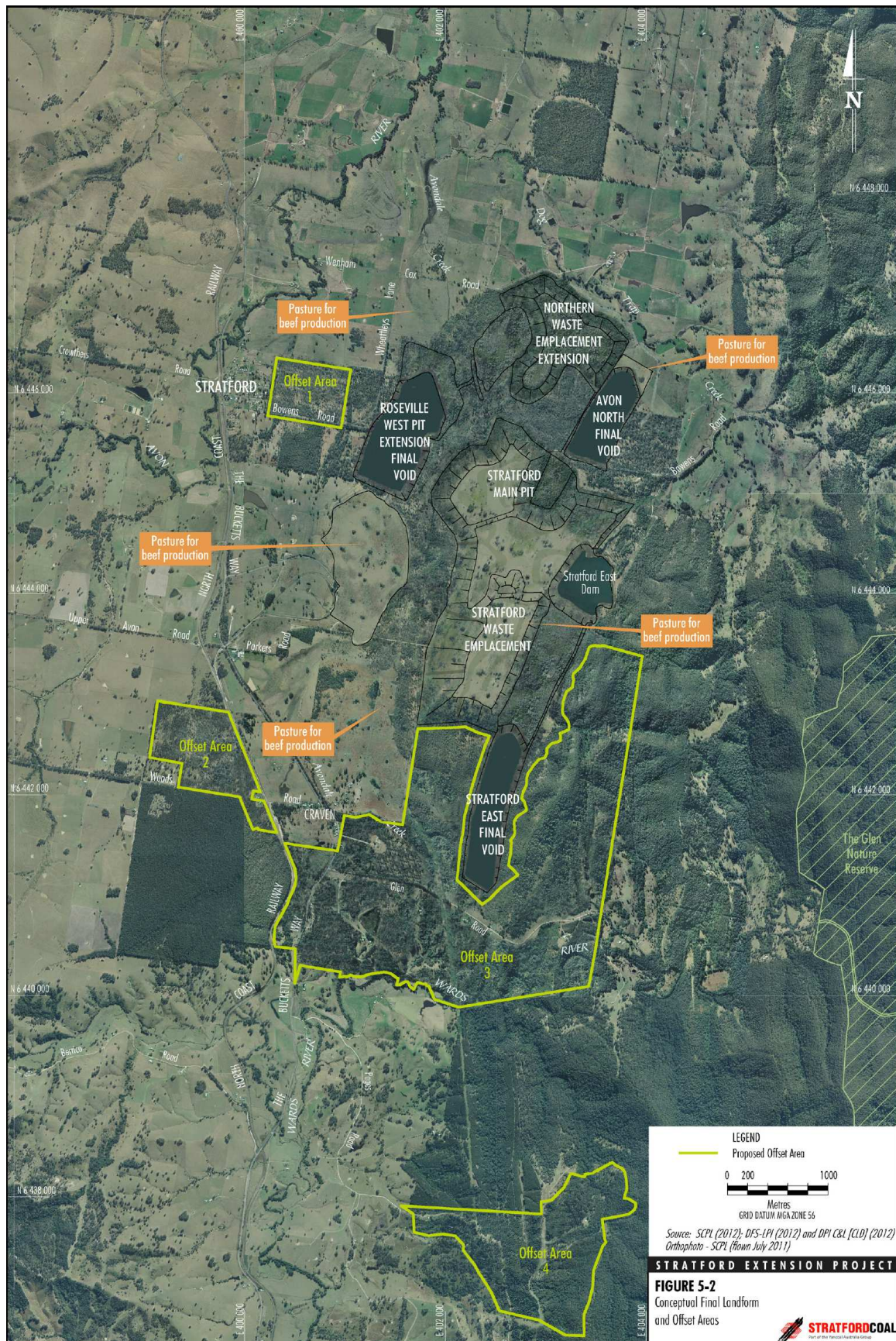


Figure 3: Proposed final landform

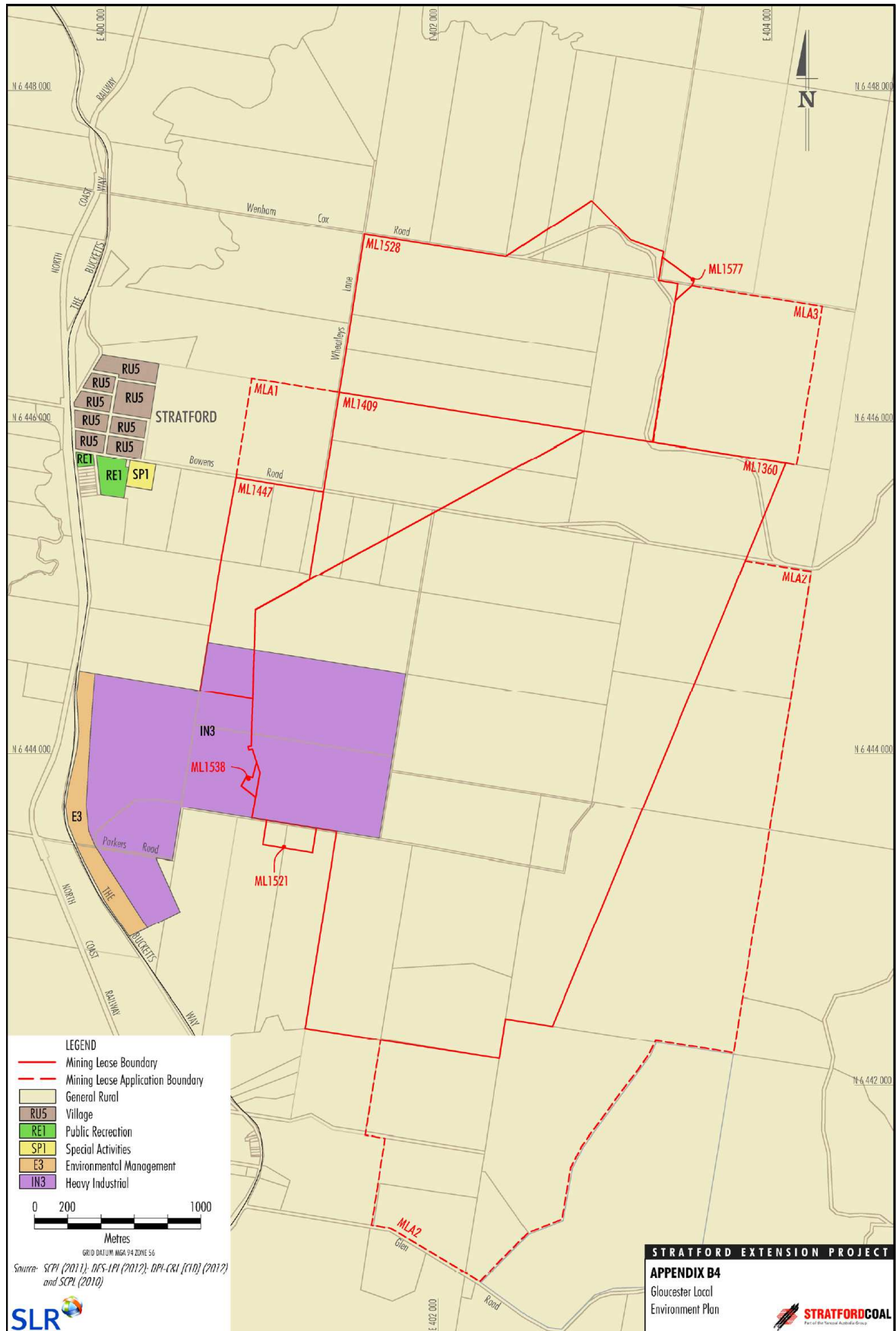


Figure 4: Land use zoning of the site and surrounds

- variations to the existing mining lease under the *Mining Act 1992*;
- variations to the existing environment protection licence (EPL) under the *Protection of the Environment Operations Act 1997*;
- a permit under Section 144 of the *Fisheries Management Act 1994*; and
- an approval for road construction under Section 138 of the *Roads Act 1993*.

3.4 Commonwealth Approval

The Commonwealth Minister for the Environment has declared the project to be a 'controlled action' for the purposes of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to its potential impacts on listed Matters of National Environmental Significance (MNES), including water impacts, threatened species, ecological communities and migratory species.

The Commonwealth has accredited the State's environmental assessment process for this project on a one-off basis. This means that the potential impacts on MNES will be assessed under Part 4 of the EP&A Act; however, the Commonwealth Minister will make a separate decision on the project following the PAC's determination of the project application. The Department of the Environment (DoE) referred the project to the Commonwealth's Independent Expert Scientific Committee on Coal Seam Gas and Large Mining Development (IESC) for advice on surface and ground water issues. This advice is considered in Section 5.

4. CONSULTATION

The Department made the development application and accompanying Environmental Impact Statement (EIS) publicly available for six weeks from 7 November to 19 December 2012:

- on the Department's website;
- at the Department's Information Centre in Bridge St, Sydney;
- at GSC's offices in Gloucester;
- at Great Lakes Council's offices in Stroud and Forster; and
- at the Nature Conservation Council's office in Newtown.

Following requests from GSC and the community, the Department extended the exhibition period to 25 January 2013.

The Department also distributed copies of the EIS to relevant State and local government authorities and advertised the exhibition in the *Gloucester Advocate*. Additional hard copies and CDs of the EIS were mailed to agencies and some members of the community.

The documents made publicly available on the Department's website included:

- the development application and EIS;
- the Director-General's environmental assessment requirements;
- the submissions received from the public and from agencies; and
- Yancoal's response to the issues raised in the submissions.

A number of officers from the Department, including the Deputy Director-General and Director, Mining and Industry Projects, have travelled to Gloucester during the past 12 months to attend meetings with representatives of community groups and GSC or to inspect the project site and its surrounds.

Departmental officers also attended a meeting of the Stratford Community Consultative Committee, inspected existing Stratford mining operations during the Planning Focus Meeting held on site, undertook site visits on two other occasions, and travelled extensively on surrounding rural roads and within the villages of Stratford and Craven to observe the locations of privately-owned residences, the type and quality of native vegetation and watercourses, and the potential for local topography to provide screening effects in terms of visual and noise impacts. The state of local infrastructure (primarily roads) and local land use were also observed as well as distances to existing conservation areas such as the Glen Nature Reserve.

The Department received 295 submissions in response to the exhibition. Of these:

- 214 supported the project;
- 65 objected to the project; and
- 16 provided comments on the project.

Of the **214 submissions in support of the project**, 210 were of a generally common format but with several lines available for the submitter to set out his or her reasons for supporting the proposal, and 4 were individual letters. The two main reasons given for supporting the project were employment opportunities (mentioned in 82% of the submissions) and socio-economic benefits (25% of the submissions).

About half of the supporting submissions were from residents in the 2422 postcode area of Gloucester and surrounds, with 5 submissions received from the Stratford / Craven area which is adjacent to the proposed mine extension. Many of the proposal's supporters stated that they depend on the mine for employment, either directly or as suppliers of goods and services.

The **Construction, Forestry, Mining and Energy Union** (CFMEU) provided a detailed submission in support which concluded that the project is '*anticipated to pose negligible additional environmental impacts*' and '*would have significant economic and social benefits*'.

Of the **65 submissions objecting to the project**, 8 were from local special interest groups and 42 were from individuals living near Stratford, with most residing in Stratford village and the Gloucester area. The issues raised were broad-ranging and included noise, air quality and health impacts, loss of property values, potential impacts on water resources and biodiversity and impacts on the social structure of the community in the Gloucester Valley.

Review of these submissions indicates that the three key issues for people living near Stratford are noise impacts (particularly from proposed 24-hour mining operations), air quality impacts and loss of property value.

Submissions from the broader community, including GSC and the resident groups, also indicated that potential noise and air quality impacts are of major concern. Other particular concerns were potential impacts on groundwater and the social, cultural and environmental values of the Gloucester Valley, including cumulative impacts associated with other approved and proposed coal mines and coal seam gas developments.

4.1 Public Authority Submissions

Sixteen public authorities commented on the proposal. None of the State or local government authorities objected to the proposal. Most raised concerns about the potential impacts of the project and recommended conditions of consent, should the project be approved.

Environment Protection Authority (EPA) noted the project is reliant on a range of noise mitigation measures, and that if these measures were not implemented properly then there could be exceedances of the Project Specific Noise Levels (PSNLs) in the Stratford village.

The EPA provided recommended conditions relating to noise and blasting. The EPA also noted that there would be an increase in the number of properties where the rail noise criteria are predicted to be exceeded and provided a proposed condition to mitigate this noise.

The EPA also asked that consideration be given to the impact of the proposed mining on Dog Trap Creek and Avondale Creek and the risk of these creeks being polluted by seepage or overflows from the proposed mining voids.

Office of Environment and Heritage (OEH) raised a number of relatively minor concerns regarding Yancoal's flora and fauna surveys and the identification of some threatened species. It considered that the proposed biodiversity offset strategy represents a suitable compensatory package for the vegetation that would be lost as a result of the project. OEH provided conditions to address the management of Aboriginal cultural heritage.

OEH was concerned that no flood impact assessment had been undertaken, nor had there been any assessment of potential flooding impacts in the open cut pits. Yancoal provided additional information which addressed these matters by demonstrating that the project would not impinge on any flood plains.

NSW Office of Water (NOW), part of the **Department of Primary Industries (DPI)**, provided recommended conditions related to water licensing, proposed activities on riparian land such as proposed haul road crossings of Avondale Creek, and surface and ground water monitoring programs. NOW also requested that it be consulted during the revision of the mine's Site Water Management Plan and Rehabilitation Management Plan.

At the Department's request following issues raised by the EPA, NOW provided additional consideration of the potential impacts to Dog Trap Creek and Avondale Creeks. NOW was generally satisfied with the measures proposed by Yancoal to protect these two creeks. NOW also recommended installing additional groundwater monitoring bores to track the accuracy of Yancoal's predicted rate of the post-mining recovery in groundwater levels. Any deviations from predictions could be identified at an early stage which would facilitate corrective actions.

Fisheries NSW, also part of DPI, noted that the values of the aquatic ecosystems within the survey area are moderate to good and recommended conditions relating to zero discharge of mine water and the design of stream crossings.

The **Office of Agricultural Sustainability and Food Security**, also part of DPI, agreed that the project is not located on highly valuable agricultural land and that its footprint is relatively small. It raised some issues relating to the assessment of the impact of the project on the value of adjoining rural land, agricultural support industries and agri-tourism.

Division of Resources and Energy (DRE), part of the **Department of Trade & Investment, Regional Infrastructure & Services**, recommended a plan of management and cooperation to manage the interaction between the project and AGL's Gloucester Gas Project. DRE considered that Stratford's Western Co-Disposal area should be progressively rehabilitated throughout the project. DRE also requested more details on the proposed final landform and provided recommended conditions.

In its submission, **Gloucester Shire Council (GSC)** recognised the valuable economic contribution of the Stratford mine to the local economy and NSW, but emphasised that the major impacts of the project would be experienced locally, particularly by the residents of Stratford village and rural properties closest to the Stratford mine.

GSC was particularly concerned about the:

- Roseville West Pit Extension (GSC considers this mining is not appropriate given its proximity to Stratford village);
- proposal for 24-hour mining (GSC considers mining should be limited to 7 am to 10 pm);
- lack of an appropriately restored landscape at the end of the project, particularly the proposal for three large final mining voids;
- noise, blasting and air quality impacts;
- impacts of the incremental expansion of the Stratford mine;
- social impacts of the project;
- impacts of the project on the heritage landscape and tourism in the Gloucester Valley;
- need for appropriate independent monitoring of the existing and potential conditions of consent; and
- long-term management of the site at the end of the project.

GSC considered that Yancoal should financially contribute to the upgrade of essential local infrastructure, including upgrade of The Bucketts Way, and to significant community enhancement, particularly for the benefit of residents of Stratford village.

Great Lakes Council (GLC) provided detailed comments on the broad ecological context of the project and noted the opportunity for the proposed Biodiversity Offset Areas and rehabilitated mining areas to contribute to regional ecological connectivity and improved

conservation outcomes. GLC also considered that the proposed Biodiversity Offset Areas were inadequate in terms of size, location and long-term security. Other concerns raised by GLC included:

- noise impacts associated with the proposed 24-hour operations;
- noise and coal dust impacts from the transportation of coal on the North Coast railway, particularly through the Wards River area;
- lack of consideration of the cumulative impacts of coal and coal seam gas development on groundwater in Gloucester Valley;
- long-term environmental impacts of the proposed three final mining voids; and
- the need for Yancoal to provide funds to assist in the upgrade of The Bucketts Way.

Greater Taree City Council's principal concern was water quality within the Manning River catchment. It supported the containment of all mine water on the project site, improved assessment of the cumulative impacts of mining and monitoring of post-mining water quality.

Midcoast Water (MCW) also supported the 'zero discharge' principle for the project's water management and raised issues relating to on-going monitoring of water quality in the Avon River and the long-term management of water which would accumulate in the mining voids.

NSW Health raised a number of issues including inadequate consultation with the community in the noise management zone, particularly with regard to the potential for sleep disturbance; the need for appropriate management of lighting impacts; the project's impacts on air quality and related health issues; and the need for a better management system for receiving complaints and rectifying issues relating to the quality of water in water tanks.

NSW Roads and Maritime Services (RMS) had no objection to the proposal, provided that the intersections of The Bucketts Way with the mine access road and Wenham Cox Road are upgraded to Austroad standards. As well, it suggested that the cumulative impacts of mining-related projects on the safety and efficiency of the wider road and rail networks should be considered by the Department.

Transport NSW supported the recommendations contained in the RMS submission.

The **Heritage Council of NSW** considered that the nearest heritage sites are too far away to be impacted by the project. It recommended conditions of consent to ensure that the re-alignment of the electricity transmission line and roads do not impact on the historic Stratford and Glen logging railways and that work would be required to cease in the vicinity of any newly-discovered items or sites of historic heritage.

The **NSW Rural Fire Service** had no objection to the development, subject to the preparation of a Bushfire Management Plan.

The **Department of Education and Communities** was concerned about the proximity of proposed mining operations to the Stratford Public School and requested that an appropriate setback be provided to ensure a safe environment for the students and staff at the school.

4.2 Other submissions

AGL Energy Ltd (AGL) holds project approval for Stage 1 of its Gloucester Gas Project. AGL does not object to the project but raised issues relating to the groundwater modelling, the co-existence of its proposed gas wells with mining activities and offset areas, and amenity impacts for tenants on a particular AGL property (resident 13(1) in the EIS). Following further discussions, both Yancoal and AGL have agreed to enter into a co-operative agreement to facilitate the implementation of both projects and manage any cumulative impacts.

The Commonwealth **Department of the Environment** (DoE) provided a copy of advice it had requested from the Commonwealth's **Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development** (IESC) about the likely impacts of the proposal on surface and groundwater resources and the conclusions contained in the EIS relating to the water balance and water management for the project. This advice is considered in Section 5.4.

4.3 Yancoal's Response to Submissions

Yancoal provided a response to the issues raised in submissions (see **Appendix D**). The Department was not satisfied with some of the responses contained in that document and required Yancoal to provide additional information, including:

- justification for the proposed 24-hour operations;
- assessment of noise impacts for three additional operational scenarios that considered eliminating night-time mining operations from the Avon North Open Cut, the Stratford East Open Cut, and both these open cut pits;
- justification for the air quality model applying a 90% control factor for dust emissions from unsealed haul roads, and re-modelling (as a means of sensitivity analysis) the Air Quality Impact Assessment (AQIA) using haul road emission control factors of 65% and 80%;
- details of the proposed interactions between Yancoal's and AGL's operations;
- consideration of proposals to progressively rehabilitate the Western Co-disposal Area;
- cross-sections of the proposed final landform; and
- justification of the need for, and extent of, the proposed three final voids.

Yancoal's response to these requests for further information is attached (see **Appendix E**). This included a commitment to progressively rehabilitate the Western Co-disposal Area and confirmation that Yancoal's preferred hours of operation, mining sequence and mine configuration are as proposed in the EIS. In July 2013, the Department met with Yancoal's representatives to explore any further feasible reductions in the proposal's impacts.

The Department also sought confirmation that the elimination of night-time mining operations from the Avon North Open Cut, the Stratford East Open Cut, and from both pits would result in a reduction in the project's Net Production Benefit to Australia of \$27 M, \$21 M and \$58 M, respectively. Yancoal provided detailed information to support these figures on a commercial-in-confidence basis (see **Appendix E**). This information also demonstrated that elimination of night-time operations would extend mining operations by up to 6 years and result in a larger disturbance footprint for the project. This outcome is due to restrictions on in-pit waste rock emplacement caused by the need to accommodate additional trucks and shovels within the working section of the pit to maximise production during the restricted hours of operation. Yancoal's information, supported its contention that 24-hour operations would be needed to efficiently and profitably operate the proposed extension, based on its mine planning and operational considerations and overall and economic outcomes.

5. ASSESSMENT

The Department's assessment of the project was undertaken in accordance with the EP&A Act. Under Section 79C of the EP&A Act, the relevant matters for consideration in determining the project are the:

- provisions of any relevant environmental planning instrument;
- likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality;
- suitability of the site for the development;
- any submissions made in accordance with this Act or the regulations; and
- public interest, including whether the project is consistent with the objects of the EP&A Act.

The principal relevant environmental planning instruments (EPIs) applicable to the project are *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP) and the Gloucester LEP.

Under the Mining SEPP, the consent authority is required to consider:

- the significance of the resource and the economic impact of the development;
- the existing uses and approved uses of land in the vicinity of the development;
- whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development; and

- any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses.

The consent authority is also required to consider the aims of the Gloucester LEP and other relevant provisions of the plan.

The subject land is zoned RU1 (Primary Production); IN3 (Heavy Industrial) and E3 (Environmental Management). The Gloucester LEP provides objectives for each of these zones and controls the type of land uses that are permitted in them. A consideration of the project against the provisions of the Mining SEPP, the Gloucester LEP and other relevant EPIs is attached at **Appendix B**.

The key issues identified by the Department for assessment (and the sections in which they are considered) are:

- noise and blasting (5.1);
- air quality (5.2);
- surface water (5.3);
- groundwater (5.4);
- biodiversity (5.5);
- roads and traffic (5.6);
- Aboriginal heritage (5.7); and
- social and economic impacts (5.8)

In preparing this assessment, the Department has considered the EIS; the submissions made by government agencies, community groups and individuals in response to the public exhibition of the EIS; and Yancoal's response to these submissions. As well, the Department has considered Stratford's current operations and additional information provided by Government authorities and Yancoal throughout the assessment process. In addition, the Department engaged Mr Peter Dundon to conduct a peer review of the groundwater assessment and to consider whether likely cumulative groundwater impacts had been appropriately assessed.

5.1 Noise and Blasting

Noise from the project is a critical issue for people living nearby. Almost all of the 65 submissions objecting to the project raised concerns about potential noise impacts on the local community, particularly in relation to proposed 24-hour operations in the Stratford East and Avon North pits and the proximity of the Roseville West Pit Extension to Stratford village. GSC noted that noise disturbance from the current operations is a significant issue for neighbouring residents and advised that it is strongly opposed to 24-hour mining operations.

The EIS included a noise and blasting assessment for the project undertaken in accordance with applicable guidelines, including the *NSW Industrial Noise Policy* (INP), the *NSW Road Noise Policy* (RNP), the *Interim Construction Noise Guideline* (ICNG), and the *Environment Assessment Requirements for Rail Traffic Generating Developments*. In addition to considering the impacts from the project, the assessment also considered cumulative impacts from concurrent operation of the project with the Rocky Hill Coal Project (proposed) and AGL's Gloucester Gas Project (approved).

The noise and blasting assessment considered the five potential noise impacts of the project, namely: operational noise; construction noise associated with the proposed road re-alignments; off-site road traffic noise; off-site rail noise; and blasting impacts.

Current Noise and Blasting Levels

Noise from Stratford is monitored at eight quarterly attended noise monitoring sites and one real-time monitoring site (located to the east of Craven). Over the period 2008 to 2012, Stratford was compliant with all relevant noise criteria, with two exceptions at properties which have since been either acquired by Yancoal or whose owner has entered into a private landholder agreement in respect of these impacts.

Nonetheless, the number of noise complaints has steadily increased over the past five years, from around 10 per year for 2006/2008, to 20 per year for 2009/2010 and to about 40 per year

for the last 3 years. These complaints relate to night-time noise from train loading/unloading, and associated dozer operations on the product coal stockpile. Analysis of complaint records shows that these complaints tend to emanate from a small number of properties near the mine, rather than the wider area.

Background Noise Levels

To undertake a noise assessment, the INP requires the establishment of background noise levels, without the proposed development in operation. This level is known as the Rating Background Level (RBL) and utilises a minimum setting of 30 dB(A), should measured background levels be below this value. The application of the INP provides the following RBLs:

- Stratford and Craven villages - 32 dB(A) (daytime), 31 dB(A) (evening) and 30 dB(A) (night); and
- all other locations - 30 dB(A) for all periods.

Assessment Criteria

The INP requires the consideration of two components of noise criteria:

- a project-specific intrusiveness criterion which requires that the continuous noise level (LAeq, 15 minute) not exceed the RBL by more than 5 decibels; and
- an amenity criterion which aims to maintain amenity across an area, given the proposed and existing land uses.

The areas surrounding Stratford are classified as 'rural' under the INP and the intrusive criteria and the relevant rural amenity criteria are set out in **Table 2**. The intrusive criteria are significantly lower than the rural amenity criteria and become the assessment criteria against which the project is assessed (also known as the Project Specific Noise Levels or PSNLs).

Table 2: Project Specific Intrusive and Amenity Assessment Criteria

Locality	Land Use	Intrusive L _{Aeq} (15minute)			Amenity L _{Aeq} (period)		
		Day	Evening	Night	Day	Evening	Night
Stratford/Craven	Residential	37	36	35	50	45	40
	Vacant Land						
Other Rural	Rural Residential	35	35	35	50	45	40
	Rural Vacant Land						
Parkers Road	Industrial	Intrusive noise criteria not applicable			70	70	70
Any	School	Intrusive noise criteria not applicable			External 45 when in use		
Any	Church, Cemetery	Intrusive noise criteria not applicable			External 50 when in use		
Any	Active Recreation	Intrusive noise criteria not applicable			External 55 when in use		

Operational Noise

Stratford has implemented, or proposes to implement, a range of measures to minimise the operational noise impacts of the project. These measures include:

- buying extensive landholdings around the mine to create a 'buffer' between the mine and other private landholdings;
- entering into noise agreements with several private landowners who have agreed to accept elevated noise impacts from the project in return for compensation;
- progressively introducing 'extra quiet' mobile equipment onto the site;
- installing bunds along the pits, haul roads and rail loop;
- no night-time mining operations in the Roseville West pit, which is reasonably close to Stratford village; and
- implementing a range of standard management measures, such as:
 - using a real-time noise management system to guide the day-to-day management of noise on the site to ensure compliance with noise limits, and minimise noise impacts during adverse weather conditions;
 - limiting the use of dozers at certain locations and times; and
 - using quieter plant at night-time and during adverse weather conditions.

The Department considers the implementation of these measures to be consistent with best management practice.

Operational noise impacts were assessed under the three 'worst-case' scenarios:

- Year 2 – represents the northern-most operations;
- Year 7 – represents mining of the Roseville West Pit Extension in combination with the operation of the Stratford East Open Cut when the latter is operating 24-hours a day; and
- Year 10 – represents the southern-most operations.

Figures 5 and 6 show the project's predicted noise contours based on the noise-enhancing effects of temperature inversions during the most sensitive period (night-time). As such, they are a reasonable representation of the project's 'worst-case' noise impacts. These figures illustrate the northern-most extent of these impacts (**Figure 5**) and southern-most (**Figure 6**). It should be noted that, in producing a 'line of best fit' for noise contours on such plans, minor variations to calculated values for individual receivers can occur (in the order of 1 to 2 dB(A)). Accordingly, the Department relies on calculated values for specific receivers in its assessment of noise impacts.

These predictions suggest the project would comply with the PSNLs at most properties around the mine (excluding those properties where there is a noise agreement in place to accept higher levels), and comply with the night-time noise criterion of 35 dB(A) $L_{Aeq(15min)}$ in Stratford village, which is the lowest criterion possible under the (INP).

Nevertheless, there would be exceedances of the relevant criteria at 4 private properties at some stage of the project with:

- one of these being significant (>5 dB(A)), at property Cr 7 in Craven village;
- two being moderate (4 dB(A)), at properties 44 and 60 to the south of the project; and
- one being minor (2 dB(A)), at property 23 to the east of the project.

However, it is important to note that the relative change in noise impacts from the impacts of existing mining operations would be relatively minor, to the point of being almost indiscernible; and the absolute noise levels would still be below the recommended noise amenity levels for rural areas under the INP. In other words, while the noise levels at these properties would be slightly elevated from those currently existing, they would still be well-within acceptable levels for a rural area in NSW.

Notwithstanding these conclusions, and given the extensive community concern about the re-introduction of 24-hour mining operations on site, the Department asked Yancoal to provide further justification for night-time mining operations, and to clearly identify the consequences of not being able to carry out night-time mining operations. This included:

- noise modelling of 3 alternative scenarios:
 - no night-time operations in the Avon North pit;
 - no night-time operations in the Stratford East pit; and
 - no night-time operations in either the Avon North or Stratford East pits; and
- detailed analysis of the economic consequences of such restrictions.

The results of these investigations are summarised in **Table 3**. The Department has analysed these investigations carefully, and is satisfied that there is no justification for restricting night-time operations in either the Stratford East or Avon North pits. To do so would only marginally reduce the noise impacts of the project (in the situation where these impacts are generally considered to be acceptable) but substantially extend the duration of the project and reduce its economic benefit.

However, to further reduce the impacts of the project on private landholders, the Department believes that Yancoal should be required to:

- provide additional noise mitigation at the residences on the 4 properties where exceedances of the PSNLs are predicted (23, 44, 60 Cr 7); and
- acquire property Cr 7 upon request.

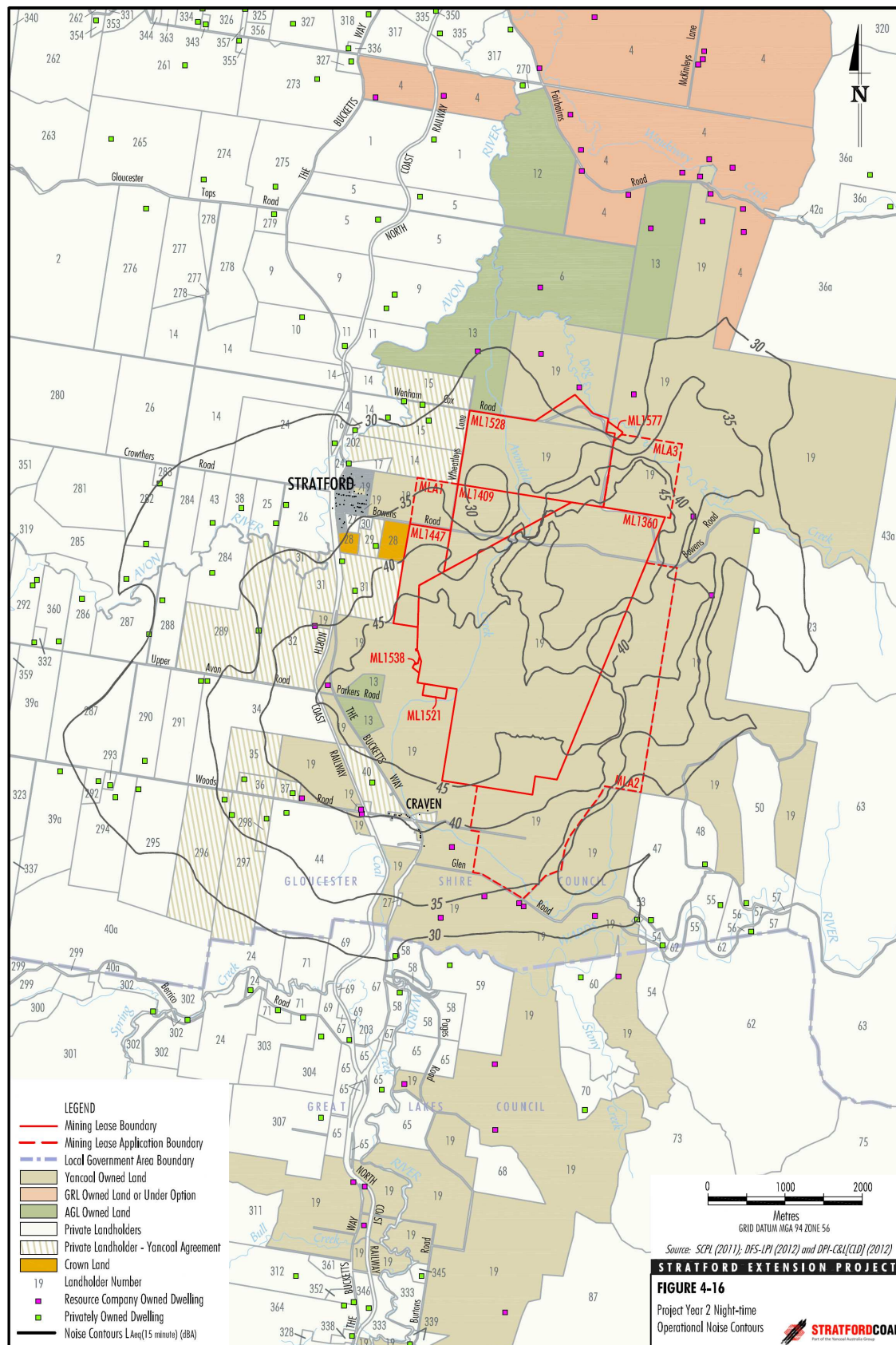


Figure 5: Predicted noise impacts – Year 2 at night (adverse meteorological conditions)

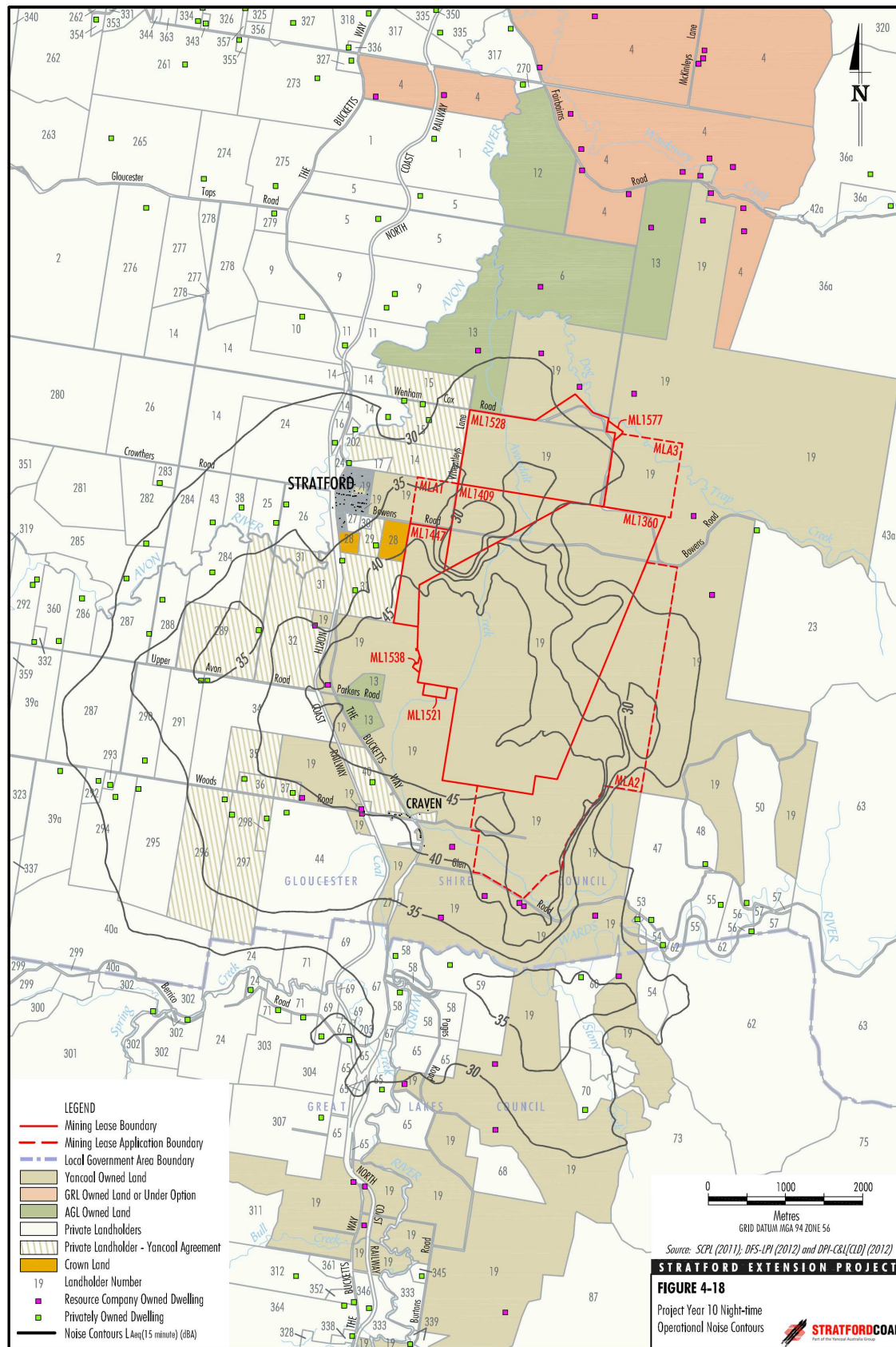


Figure 6: Predicted noise impacts – Year 10 at night (adverse meteorological conditions)

Table 3: Comparison of effects of restricting night-time mining operation

Scenario	Time Needed to Complete Mining (Years)	Reduction in Net Production Benefit to Australia (\$M)	Acoustic Benefit
As proposed in EIS	11	-	-
No night operations at Avon North pit	12	-27	Maximum noise levels at Receiver 23 predicted to reduce from 37 to 26 dB(A). About 1 dB(A) reduction for Stratford village.
No night operation at Stratford East pit	15	-21	Maximum noise levels at Receiver 60 predicted to reduce from about 38 to 28 dB(A) and at Cr7 from 43 to 40 dB(A). About 1 dB(A) reduction for Stratford village
No night mining operations at all	17	-58	Similar reductions in noise impacts for Receivers 23, 60 and Cr7 as shown above. About 1 dB(A) reduction for Stratford village.

With these measures in place the Department believes the noise impacts of the project would be acceptable. To ensure that this is the case, the Department has recommended that an extensive noise monitoring program is implemented, which includes increased attended monitoring compared to existing operations. It has also recommended that Yancoal is required to calibrate and validate its real-time monitoring results with the attended monitoring results over time, so that the real-time noise monitoring can be used as a better indicator of compliance with the consent's noise limits, and as a trigger for further attended monitoring.

Cumulative noise impacts

Cumulative noise impacts resulting from the project operating concurrently with the Gloucester Gas Project, the proposed Rocky Hill Coal Project and the Duralie Coal Mine were assessed in the EIS against the INP's recommended amenity criteria.

This assessment found that there would be no exceedances of the night-time criterion at property Cr 7. The Department has recommended that the owner of this property be given acquisition rights due to the predicted operational impacts of the project (see above).

Sleep disturbance

This assessment found that the only exceedance of the sleep disturbance investigation criterion of 45 dB(A) at privately-owned residences (without noise agreements) would only occur at Cr 7, which has been recommended for acquisition upon request on the basis of the project's operational (intrusive) noise impacts.

Construction noise impacts

The project requires realignment of both Wenham Cox Road around the northeastern edge of the proposed Avon North open cut pit and the intersection of Bowens Road and Wheatleys Lane (see **Figure 2**). It is expected that these road realignments would take approximately 12 weeks. The noise assessment demonstrates that these works would comply with the appropriate criteria in the ICNG.

Road traffic noise

The increase in road noise on The Bucketts Way attributable to increased traffic movements associated with the project would be less than 2 dB(A). Under the RNP, an increase of < 2 dB(A) is considered to be imperceptible, and therefore acceptable. The Department considers that the road traffic noise associated the project would have a minimal impact on residential amenity.

Rail noise

The project would have only a marginal effect on rail noise impacts for residents living near the North Coast rail line as:

- LA_{max} pass-by noise levels would not change (ie individual trains would be no noisier);
- the daily average of 2.5 laden product coal trains would not change;
- the daily maximum number laden coal trains would increase, but only from 5 to 6.

However, due to current train scheduling constraints on the North Coast rail line, the additional 2 trains (one laden, one empty) generated by the project during peak periods (which would be infrequently) would generally use the line during the night-time period (10 pm – 7 am).

Predictions in the EIS suggest these additional movements would increase cumulative night-time rail noise levels by 1.2 dB(A)_(9 hour), and contribute to exceedances of the relevant night-time rail noise criteria in the EPA Rail Infrastructure Noise Guideline (RING) at all residences within 66 m of the railway line. At present, all but 5 of these residences are entitled to additional noise mitigation under the Duralie Extension project approval.

To mitigate the predicted impacts, the EPA has recommended that Yancoal be required to:

- only use best available locomotives and rolling stock; and
- provide ameliorative treatment to the 5 residences where exceedances of the relevant criteria are predicted.

The Department has included a condition that requires Yancoal to only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in the Australian Rail Track Corporation's (ARTC's) environment protection licence (EPL) that covers operations on the North Coast rail line. This is now a standard condition for most mine approvals, and is designed to prohibit the use of old locomotives or rolling stock which otherwise have an existing use right to operate on the rail network.

While the Department believes that Yancoal should contribute towards the abatement or mitigation of rail noise at the residences along the railway line where there would be exceedances of the relevant rail noise criteria, it does not believe Yancoal should be solely liable for implementing these abatement or mitigation measures. This is because the impact on these residences is essentially a cumulative impact, and Yancoal's Stratford operations would be only one of a number of operations responsible for the impact.

The Department considers the most equitable way to deal with these impacts would be to make the ARTC liable for providing any mitigation measures at these residences via a pollution reduction program under the existing EPL for operations on the railway line, and then for the ARTC to pass any costs associated with implementing these measures onto the various users of the railway, and ensure that the cost for each user is proportionate with their contribution to the impact on these residences. This is a far more robust mechanism for dealing with noise abatement on railway lines, and would ensure that new users on the railway line (such as Rocky Hill, if approved) would pay their share of any mitigation costs for reducing rail noise impacts at residences along the railway line.

In summary, the Department believes the rail noise impacts of the project would be consistent with those of the existing operations. While there would be a marginal increase in night-time noise levels along the railway line during peak periods, these periods are not expected to occur on a regular basis given the proposed restriction in the recommended conditions that Yancoal not be allowed to dispatch more than 2.5 laden trains from the site each day in any calendar year (compared to the 5 or 6 laden trains that would be dispatched from the site during peak periods). The Department is satisfied that these impacts can be kept to a minimum by requiring Yancoal to use the best available locomotives and rolling stock, and through the implementation of noise abatement plans on the railway network under the ARTC's EPL.

Blasting impacts

The EPA adopts ANZECC's 1990 *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*. Under this guideline, to control human discomfort, the:

- recommended maximum level for airblasts is 115 dBL;
- level of 115 dBL may be exceeded for 5% of the blasts in a 12 month period, however the level should not exceed 120 dBL at any time;
- recommended maximum for ground vibration is 5mm/s, PVS vibration velocity; and
- PVS level of 5mm/s may be exceeded for 5% of the blasts in a 12 month period, however the level should not exceed 10 mm/s at any time.

As the levels which cause human discomfort are lower than those which generally cause structural damage to buildings, compliance with the above standards generally means that the potential to cause damage buildings is minimal.

Blasting exceedances are predicted to occur at three privately-owned receivers. However all currently have a landholder agreement with Yancoal. The Department's review of Stratford's blast monitoring results shows a high degree of compliance with these limits. The Department is confident that Yancoal would be able to operate in compliance with the relevant blasting criteria.

Summary and Conclusion

Mine noise, particularly during night hours, can be a very sensitive issue for nearby residents. After consideration of the various alternatives regarding the project's hours of operation, the Department has come to the conclusion that operations in the Avon North and Stratford East open cut pits should be approved on a 24-hour basis. A key reason for this is that the Department is satisfied that eliminating night-time mining would not significantly reduce night-time noise levels for residents. To eliminate night-time mining has been modelled to result in a potential reduction of only about 1 dB(A) for the residents of Stratford village, a level of noise reduction not normally considered to be perceptible.

The Department is satisfied that, due to the physical constraints of the narrow open cut pits, eliminating night-time mining at either one or both pits would extend the length of mining operations by between 1 and 6 years, the Net Production Benefit to Australia would fall by \$21 to \$58 M, and more extensive waste emplacements would be required. The costs to Yancoal and the community (in terms of a longer mining operation) would all come without substantive benefits in night-time residential amenity.

The Department has recommended conditions of consent that require Yancoal to use real-time noise monitors at Stratford and Craven villages as components of its noise mitigation, monitoring and management measures.

Should this real-time noise monitoring indicate that Yancoal's operations are approaching any of the relevant noise criteria, then the company would have to modify or cease some or all its operations to meet that criterion. This is particularly important for some residents of Stratford village, where noise impacts are predicted to be close to the relevant noise limits.

The Department supports the noise mitigation measures proposed by Yancoal, particularly the meteorological forecasting and additional real-time monitoring. The conditions recommended by the Department require Yancoal to incorporate these within a fully revised Noise Management Plan for the project. The Department has also recommended a number of other noise management measures for Stratford. These include requirements to:

- implement additional mitigation measures (such as double glazing and air conditioning) at residences where noise impacts are predicted to exceed the relevant criteria;
- acquire any property if noise emissions exceed, or are predicted to exceed, 40 dB(A), if requested by the landowner;
- implement best practice noise mitigation on site;
- develop a comprehensive Noise Management Plan, including: - an expanded and upgraded management system; and, monthly attended compliance monitoring;
- investigate noise complaints and undertake applicable management measures; and
- communicate regularly with the community, including publicly reporting monitoring results, and effectively responding to enquiries and complaints.

With these measures in place, the Department believes that the noise impacts of the project can be managed to an acceptable level.

5.2 Air Quality

The EIS includes an air quality impact assessment (AQIA) undertaken by PAEHolmes which considered the project's impacts on air quality from emissions of particulate matter in the form of PM₁₀, PM_{2.5}, Total Suspended Particulates (TSP) and deposited dust.

The EPA reviewed the AQIA and confirmed that it was satisfactorily conducted in accordance with its *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. The AQIA indicated that the risk of adverse impacts at sensitive receptors is low, provided that operations are well-managed and consistent with those proposed in the EIS. The criteria against which the assessment was carried out are listed in **Table 4** below.

Table 4: Air quality criteria

Pollutant	Averaging Period	Criterion/Standard	Agency
PM ₁₀	Annual mean	30 µg/m ³	EPA
	24-hour max	50 µg/m ³	EPA
PM _{2.5}	Annual mean	8 µg/m ³	Air NEPM Advisory Reporting Standard ¹
	24-hour average	25 µg/m ³	
TSP	Annual mean	90 µg/m ³	NHMRC ²
Deposited Dust	Annual	Max increase of 2 g/m ² /month Max total of 4 g/m ² /month	

1. The Air NEPM is the National Environment Protection Measure for Ambient Air Quality – includes the national air quality standards set by the National Environment Protection Council.
2. The National Health and Medical Research Council.

Existing air quality

Existing operations at Stratford comply with relevant air quality criteria, as follows:

- PM₁₀ annual average levels are around 11 µg/m³ (against a criterion of 30 µg/m³);
- PM_{2.5} annual average levels are around 4 µg/m³ (against a criterion of 8 µg/m³);
- TSP annual average levels are around 28 µg/m³ (against a standard of 90 µg/m³); and
- deposited average annual dust levels are currently around 1 g/m²/month (against a standard of 4 g/m²/month).

The AQIA applied the following levels for background air quality in the vicinity of Stratford in the absence of mining (estimated from air quality monitoring data from Stratford and augmented by data from the Rocky Hill Coal Project):

- annual average PM₁₀ – 8 µg/m³;
- annual average PM_{2.5} – 3 µg/m³;
- annual average TSP – 20 µg/m³; and
- annual average dust deposition - 1 g/m²/month.

Submissions

NSW Health questioned the appropriateness of assuming a control efficiency of 90% for modelling of dust emissions from haul roads (ie that 90% of predicted dust lift-off could be prevented by regular wetting of the road surface or other dust control measures). Yancoal was therefore required by the Department to re-run the model with control efficiencies set at 65% and 80% and to justify its use of a 90% control factor. Yancoal provided an investigation report into haul road dust control efficiencies measured and achieved at its Duralie Coal Mine. This investigation demonstrated that control efficiencies of up to 95% were achieved, provided that the moisture content of the haul road surface was maintained at 8% or higher. The Department is therefore satisfied that the use of a 90% dust control efficiency factor in the AQIA is justified and the resulting predictions should be used as the basis of assessment of impacts.

The EPA has reviewed the AQIA and concludes that the risk of adverse impacts at sensitive receivers is low, provided operations are well-managed and consistent with those proposed in the EIS. NSW Health reviewed the EIS and notes that, as there is currently no threshold for safe exposure to particulate air pollution, the project could be expected to have some level of impact on human health, as would be the case with any coal mining project, particularly for open cut coal mining.

The submissions from the community groups and individuals suggest that the impact of the project on air quality is one of the most significant community concerns. A number of people believe that emissions from Stratford currently have a significant adverse impact on air quality and that this has resulted in health impacts on people living in the area.

As people in the area are reliant on tank water for drinking water, many people are also concerned that dust from Stratford is deposited in water tanks and results in additional health risks. GSC, community groups and individuals all asked that Yancoal apply various measures, including the cleaning of water tanks and filters, the monitoring of water quality in tanks and an investigation into the provision of reticulated water to Stratford village.

Predicted air quality impacts

The AQIA modelled air quality for the three 'worst-case years' of the project, namely Years 2, 6 and 10. Cumulative impacts associated with the proposed Rocky Hill Coal Project were included in the modelling. Emissions from AGL's Gloucester Gas Project were too low (at the receivers identified in the EIS) to contribute any measureable additional impact.

Overall, the opportunity for cumulative air quality impacts is diminished by the separation between Stratford and the Rocky Hill Coal Project, with the latter being about 5 km north of Stratford. For residences in this area, when air quality impacts from Stratford are at their greatest due to southerly winds, impacts from the Rocky Hill Coal Project would be negligible or zero. When northerly winds are experienced, the circumstances would be reversed.

As both northerly and southerly winds are seldom experienced during any given day, the opportunity for cumulative air quality impacts over a 24-hour period is slight. However, cumulative air quality impacts are possible over longer periods, and are therefore reflected in the annual average cumulative impact assessments.

Figures 7 and 8 provide an illustration of the changing pattern of project-related air quality impacts over the life of the project. These figures show predicted maximum 24-hour average PM_{10} concentrations from the project alone for Years 2 and 10. They show elevated levels to the north and northeast of mining operations for Year 2, with a contraction from these areas by Year 10 and elevated levels to the south. Importantly, air quality impacts are concentrated within those lands owned either by Yancoal or AGL. Elevated levels for privately-owned lands are modest and well within relevant air quality criteria. This pattern is generally repeated for all air quality parameters considered in the AQIA.

Finally, it should be noted that the predicted cumulative air quality impacts are substantially higher at Receiver 270, when compared to other receivers. Receiver 270 is one of the most northerly residences considered in the model, being approximately 5 km north of SMC and close to the proposed Rocky Hill Coal Project. However, in all modelling scenarios considered, SMC's operations made either zero or negligible contribution to the higher cumulative values at Receiver 270.

Predicted annual average PM_{10} concentrations

The cumulative annual average PM_{10} concentrations (including background) in Stratford village are predicted to range between 10 and 12 $\mu\text{g}/\text{m}^3$, well-below the criterion of 30 $\mu\text{g}/\text{m}^3$. At Craven, the levels are predicted to be from 12 to 16 $\mu\text{g}/\text{m}^3$. Levels for all other privately-owned receivers, with the exception of Receiver 270, are predicted to be less than 11 $\mu\text{g}/\text{m}^3$.

Predicted maximum 24-hour average PM_{10} concentrations

The probability that cumulative PM_{10} emissions (including background) would exceed the maximum 24-hour average criteria is summarised in **Table 5** for three locations close to Stratford village.

The predicted exceedances at Stratford village and the Cassar property (Receiver 59) are within the accepted range of up to 5 days a year. The predicted exceedances at Craven increase from 0.8 to 5.4 days a year and are therefore marginally outside the acceptable range.

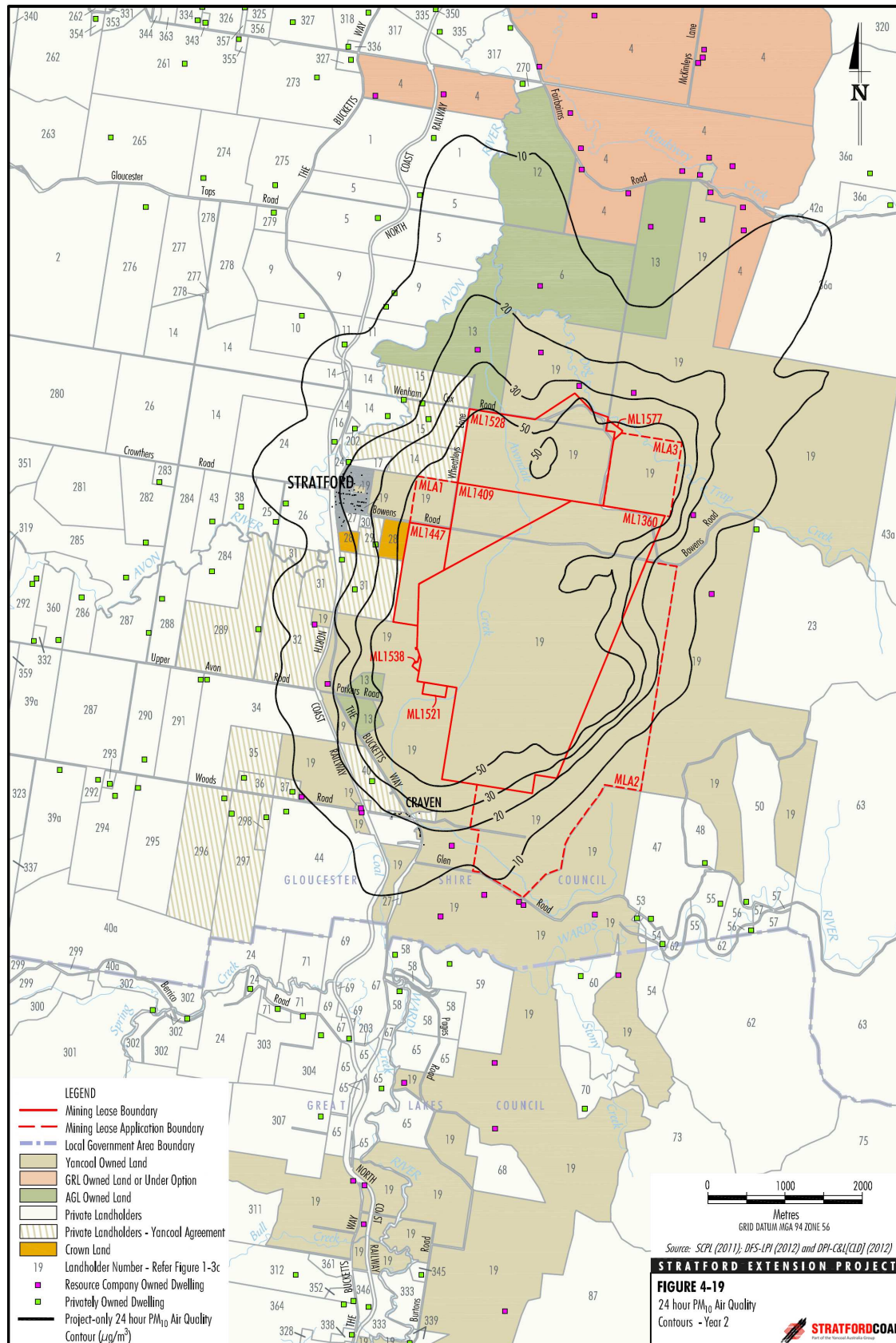


Figure 7: Predicted maximum 24-hour average PM₁₀ concentrations (Year 2 project only)

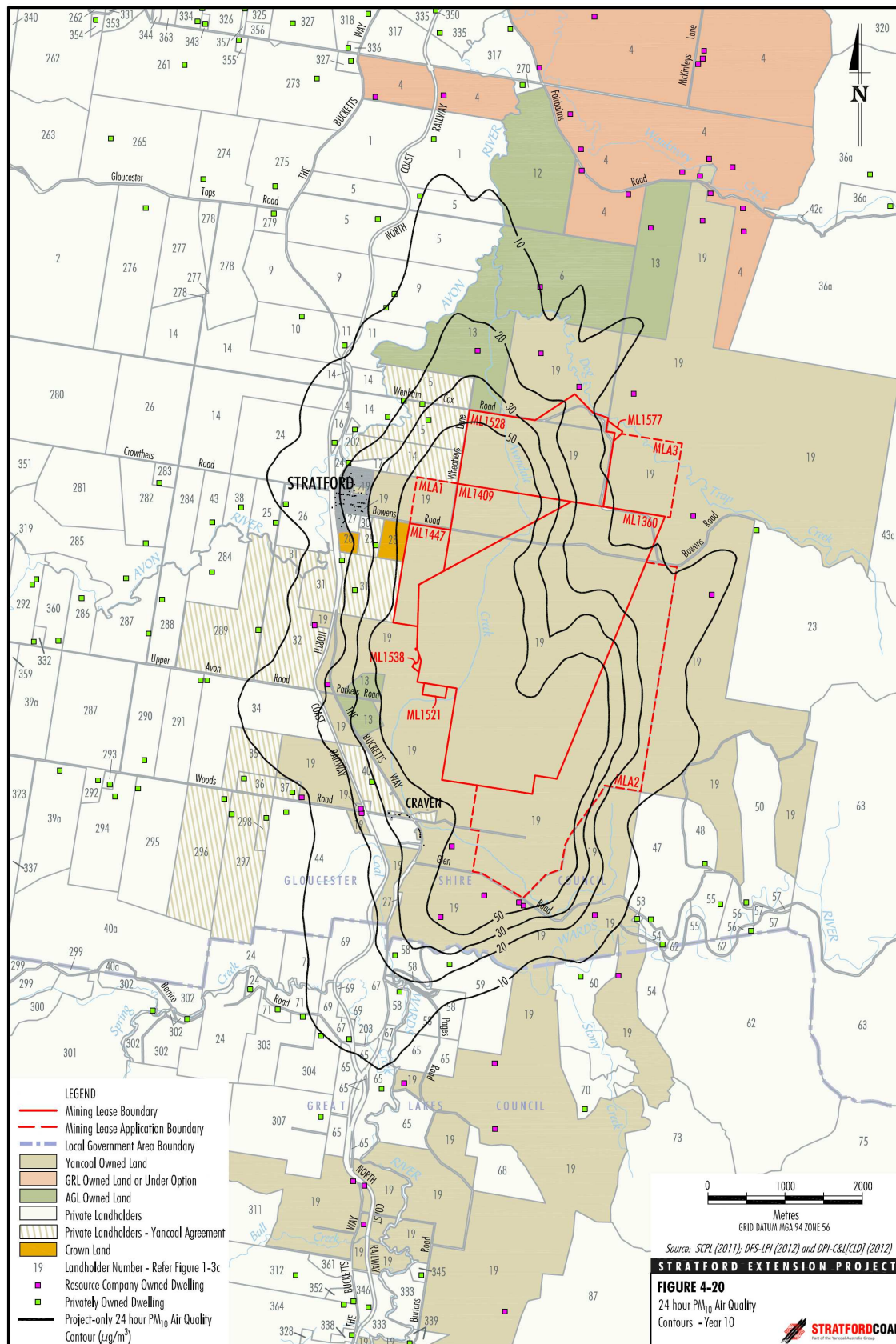


Figure 8: Predicted maximum 24-hour average PM_{10} concentrations (Year 10 project only)

Table 5: Probability of exceeding the 24-hour average PM₁₀ criterion

Location	Current probability of exceeding the 24-hour average PM ₁₀ criterion (%) and number of days/year	Future probability of exceeding the 24-hour average PM ₁₀ criterion (%) and number of days/year
Stratford	0.17% (0.6 days/year)	0.27% (0.9 days/year)
Craven	0.14% (0.5 days/year)	1.5% (5.4 days/year)
Cassar	0.23% (0.8 days/year)	0.8% (2.9 days/year)

However, the predicted exceedances in **Table 5** are overestimated, as emissions from current Stratford operations form part of the background air quality data and are therefore double-counted. Yancoal proposes to install a real-time air quality monitor at Craven and use predictive meteorological monitoring to aid its management of dust generating activities on those days when local air quality is at risk of approaching or exceeding the 24-hr PM₁₀ criterion of 50 µg/m³.

The Department considers this to be reasonable and effective approach to manage and avoid short-term spikes in particulate levels for the entire project, particularly for the Craven area. The Department has recommended conditions of consent that would require Yancoal to implement its commitments for the proactive management of local air quality.

Predicted annual average PM_{2.5} concentrations

Cumulative impact predictions of the annual average PM_{2.5} concentrations (including background) at Stratford and Craven villages range between 3 and 4 µg/m³; well-below the relevant advisory criterion of 8 µg/m³. In rural areas near Stratford village, the concentrations are predicted to be 4 µg/m³ or less, with the project's maximum contribution predicted to be 1 µg/m³.

Predicted 24-hour PM_{2.5} concentrations

The AQIA predicts that the advisory reporting standard of 25 µg/m³ would be met at all privately-owned receivers.

Predicted annual average TSP concentrations

All privately-owned receivers, except Receiver 270, are predicted to experience cumulative TSP concentrations between 20 and 34 µg/m³; well-below the assessment criteria of 90 µg/m³. Project-only contributions to cumulative annual average TSP levels range from 0 to 14 µg/m³.

Predicted levels of deposited dust

All privately-owned receivers, except Receiver 270, are predicted to receive dust deposition levels of 1.2 g/m²/month or less; which is well-below the criterion of 4 g/m²/month.

Emissions from the transport of coal to Newcastle

The AQIA included a consideration of dust emissions from the rail transport of coal between Stratford and the Port of Newcastle, based on test work undertaken at the University of Newcastle. The investigation determined that the dust extinction moisture (DEM) level for coal railed from Stratford is 5%. That is, if the moisture content of the surface layer of coal in rail wagons is greater than 5%, then dust lift-off during the rail journey is minimal.

The ARTC has recently undertaken two studies of dust emissions from Hunter Valley trains, concentrating on laden and unladen coal trains. Key conclusions of these studies have been challenged and the NSW Government has requested a review by the NSW Chief Scientist and Engineer. In July 2013, a *Coal Train Pollution Signature Study* was released by the Coal Terminal Action Group. All these studies indicate that all trains, including laden and unladen coal trains, are a source of dust within the rail corridor. However, the most significant spikes in emissions were associated with diesel fumes, rather than dust liftoff from coal wagons.

Coal is loaded into the wagons with a moisture content of 7 to 8% and analysis of coal received at the Port of Newcastle during the summer months of January and February 2012 confirmed that moisture levels remained above 5%. On this basis, the Department is satisfied that dust emissions from coal wagons from Stratford would only be a minor contributing source to overall rail corridor particulate levels.

Mine-owned residences

Although the air quality at the majority of mine-owned receivers is not predicted to exceed the current air quality criteria, recommended conditions would require Yancoal to provide its tenants with information on the health impacts of mine dust, local air quality monitoring data and penalty-free options should the tenants wish to break their leases.

Dust and water tanks

Given that the highest predicted project-only dust deposition rate is 0.2 g/m²/month, which is well-below the EPA's criterion of 2 g/m²/month, the Department considers that there would be minimal impacts on the quality of water in household rainwater tanks.

The Department notes studies into the properties of tank water from Stratford village, which found that, when compared to tank water collected at Barrington and Copeland villages (20 to 30 km distant towards the Barrington Tops), there was no statistical difference in assessed water quality. Another study of water quality at Camberwell in the Hunter Valley, with much higher levels of dust deposition, indicated that tank water quality presented no health issues.

The Department considers that, based on an examination of the available studies and surveys relating to water quality in water tanks in Stratford village, the probability of health impacts from this level of dust is very low.

Proposed mitigation and management of air quality impacts

The air quality predictions in the AQIA are based on the implementation at the project of a number of existing and proposed mitigation measures, including:

- minimising the area of disturbance as far as practicable;
- undertaking progressive revegetation as soon as practicable;
- watering the coal handling area, haul roads and coal stockpiles;
- watering coal prior to transportation from Stratford; and
- revegetating topsoil stockpiles.

At DRE's request, Yancoal re-considered its scheduling of recovery of reject material from its Western Co-disposal Area and now proposes to complete recovery operations in a staged manner to allow progressive rehabilitation, rather than the bulk of rehabilitation occurring at the end of the project. This adjustment to the project would have a small but positive effect on predicted air quality, due to the resultant decrease in active operational areas.

Yancoal also proposes to install two Tapered Element Oscillating Microbalance (TEOM) dust monitors at the villages of Stratford and Craven to continuously monitor PM₁₀ and PM_{2.5}. The TEOMs, combined with predictive and real-time meteorological monitoring, would allow Yancoal to actively manage any expected short-term increase in emissions.

Greenhouse Gas Emissions

The EIS includes a greenhouse gas (GHG) assessment which considered direct and indirect GHG emissions associated with the project, including:

- Scope 1 emissions (direct emissions from the burning of fuel on-site at Stratford and from the release of fugitive CH₄ from coal seams during mining operations);
- Scope 2 emissions (indirect emissions from the generation of the energy used by the project); and
- Scope 3 emissions (indirect emissions including downstream emissions from the end use of coal mined at Stratford).

As shown in **Table 6**, the most significant direct GHG emissions results from the combustion of fuel on-site and the fugitive emissions of methane released from coal seams during open cut mining. The fugitive emissions figure is very conservative, since a site-specific emissions factor was determined in 2009 that is less than 2% of the Commonwealth Government's default value which was used in the GHG assessment.

Total Scope 1 emissions from the project would be approximately 1.6 Mt CO₂-e, or approximately 0.1 Mt CO₂-e per annum. This is about 0.03% of Australia's commitment under the Kyoto protocol (591.5 Mt CO₂-e).

Table 6: GHG emissions (life of mine)

		Emissions in tonnes of CO ₂ equivalent	Total Emissions (t CO ₂ -e)
Scope 1	Diesel used in Mining Operations	643,244	
	Release of Fugitive Methane during Mining	963,405	
	Vegetation Clearing	43,270	
			1,649,919
Scope 2	Electricity	265,794	
			265,794
Scope 3	Diesel production and transporting	49,053	
	Electricity	53,756	
	Combustion of Product Coal	38,627,124	
	Rail	45,818	
			38,775,751

The Department acknowledges the threats posed by global warming and climate change. Nevertheless, the Department considers that the direct contribution of the project to national and global GHG emissions would be very small and significantly outweighed by the positive aspects of the project, including its contribution to employment and the NSW economy. The Department also considers that refusing the project would be unlikely to have any measureable impact on global GHG emissions as the gap in the international market would be filled by coal sourced from other suppliers, both foreign and domestic.

The Department has recommended a condition requiring Yancoal to implement all reasonable and feasible measures to minimise the emission of GHGs on site.

Summary and Conclusion

In summary:

- there are no predicted annual average PM₁₀ or TSP exceedances at privately-owned receivers (either from the project alone or cumulatively);
- there are no predicted exceedances of the PM_{2.5} advisory standards at privately-owned receivers (either from the project alone or cumulatively);
- there are no predicted exceedances of the annual average dust deposition criteria at privately-owned receivers (either from the project alone or cumulatively);
- there are no predicted exceedances of the 24-hour PM₁₀ criteria from the project alone; and
- there is a possibility of the maximum 24-hour PM₁₀ average criteria of 50 µg/m³ being exceeded at the village of Craven, where the conservatively-modelled likelihood of exceedances increases from 0.5 to 5.4 days a year.

The Department believes that the AQIA has demonstrated that the project would be able to continue to operate in compliance with the current air quality criteria and standards, with the only predicted exceedance being minor in nature (ie the conservatively-estimated probability of exceedance of the 24-hour PM₁₀ criteria of 50 µg/m³ in the village of Craven of 5.4 days a year, against the standard of no more than 5 days a year). With improved real-time monitoring, the Department believes that the project would be able to operate so as to avoid any air quality exceedances and would, other than for truly exceptional weather events, comply fully with all relevant criteria and standards.

In simple terms, the AQIA has determined that the Stratford Extension Project would not increase the level of air quality impacts above those experienced from existing mining operations. Notwithstanding this level of predicted compliance, background air quality would continue to be diminished by the project and, as noted by NSW Health, epidemiological studies would suggest that there would continue to be some associated, but unquantified, health impacts, and that these impacts would be extended by about 11 years. The issue remains whether such an impact is acceptable in the context of the overall environmental, economic and social benefits and costs of the project.

The Department supports the proposed management and mitigation measures proposed by Yancoal, particularly the implementation of real-time air quality monitoring systems. The Department considers that all reasonable and feasible air quality mitigation measures would be employed at the mine and that, on balance, the proposal should proceed.

The Department has prepared recommended conditions that would require Yancoal to:

- comply with current air quality criteria;
- implement all reasonable and feasible mitigation and management measures to minimise air quality impacts;
- develop a comprehensive Air Quality Management Plan, that includes real-time monitoring of PM₁₀ near the villages of Stratford and Craven;
- acquire any residence or property if dust emissions exceed the applicable land acquisition criteria, if requested by the landowner;
- provide tenants of mine-owned properties with information regarding the potential health-related impacts associated with mine dust;
- allow tenants of mine-owned residences to terminate tenancy agreements without penalty;
- implement a monitoring program of tank water quality for residents close to Stratford;
- investigate air quality complaints and respond effectively to enquiries or complaints; and
- publicly report on its environmental performance.

5.3 Surface Water

Introduction

Stratford is located in the upper reaches of the Manning River catchment. The project area drains via Avondale Creek and Dog Trap Creek to the Avon River, which flows northwards past the village of Stratford to enter the Gloucester River at Gloucester. These watercourses and their catchments are shown on **Figure 9**.

A number of ephemeral drainage lines emanate from the ridges east of Stratford and drain westwards towards Avondale Creek. About a quarter of the catchment of the Avondale Creek has been captured by the existing Stratford water management system. The catchment divide that separates both the surface water catchments and groundwater systems in the Gloucester Valley is at Craven, just south of the project area. Surface and ground water systems are interconnected in the region and within the Stratford area. Streams such as Avondale and Dog Trap Creeks are naturally 'gaining' streams, ie they gain baseflow from groundwater systems.

Mining at Stratford commenced in 1995. Monitoring of the Avon River undertaken since 1994 shows no increase in salinity. Over 10 years of monitoring of the macroinvertebrate composition of the Avon River, Avondale and Dog Trap Creeks has also indicated that mining operations have not affected stream health. Water quality in these streams is instead affected by agricultural activities, with elevated turbidity (due to stock accessing creeks for water) and nitrogen and phosphorus (from cattle effluent and fertiliser use).

Surface water assessment

The Stratford Extension Project would affect the local surface water catchments in several ways as shown in **Figures 2** and **10**. Principally, the project would:

- alter the size of the catchments of Avondale Creek and its tributary that flows between the existing Stratford Main Pit and the proposed Avondale North open cut pit (see **Figure 10**);
- install up-slope diversion channels to direct clean water away from the Avon North, Roseville West and Stratford East open cuts;
- require a 600 m section of the key tributary of Avondale Creek to be diverted to the south of the Avon North open cut;
- construct an additional haul road culvert crossing of Avondale Creek to connect the Roseville West and Bowens Road North open cuts and in the process potentially restrict flood flows of the creek;
- impact Avondale and Dog Trap Creeks by capturing groundwater contributing to creek base flow;
- alter catchments of Avondale Creek and its key tributary in the final proposed landform and consequently alter long-term stream flows; and

- leave 3 final mining voids, with a surface area of 138 ha and a combined catchment of 185 ha, which would be excised from the local creek catchments.

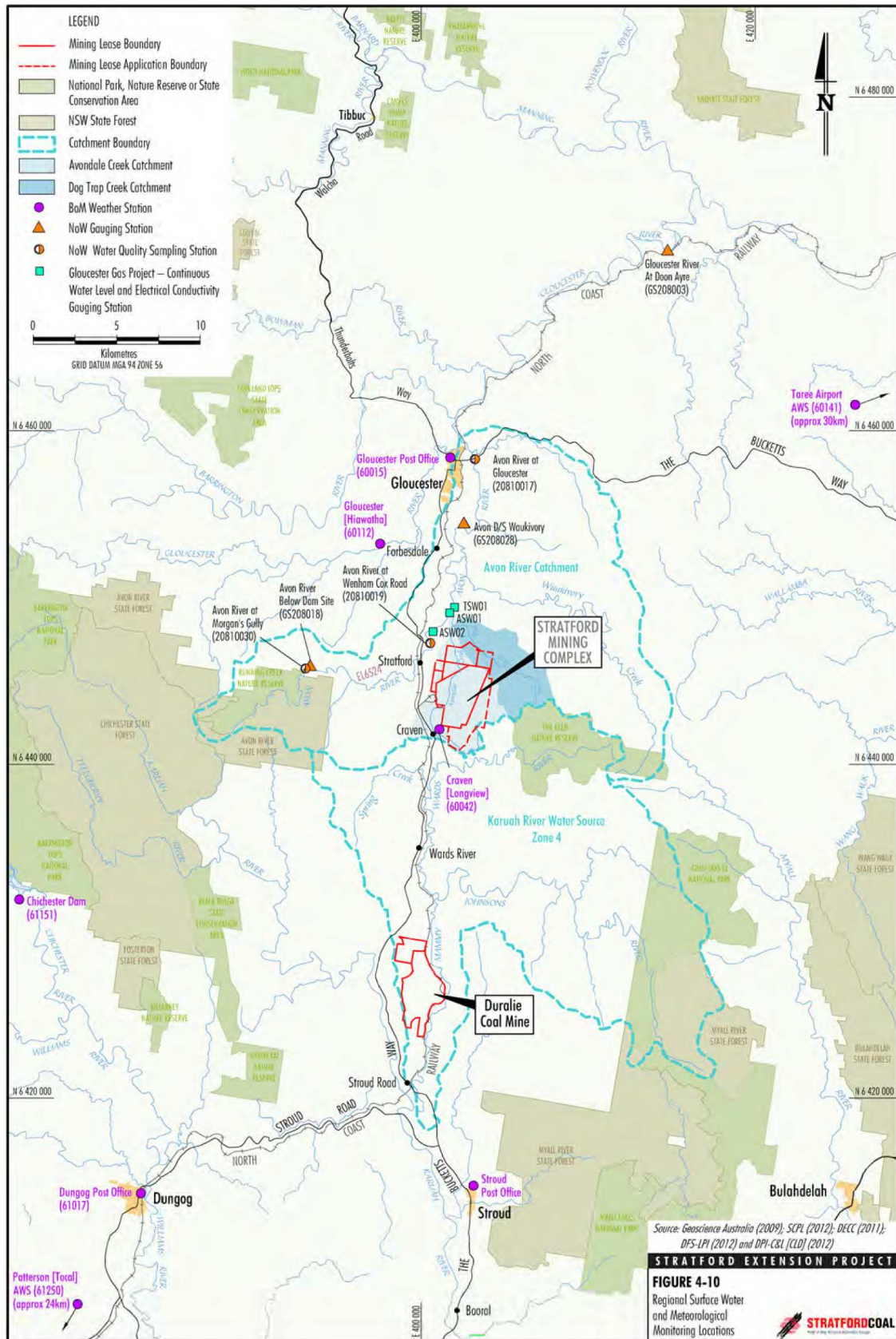


Figure 9: Avon River, Avondale and Dog Trap Creek catchments

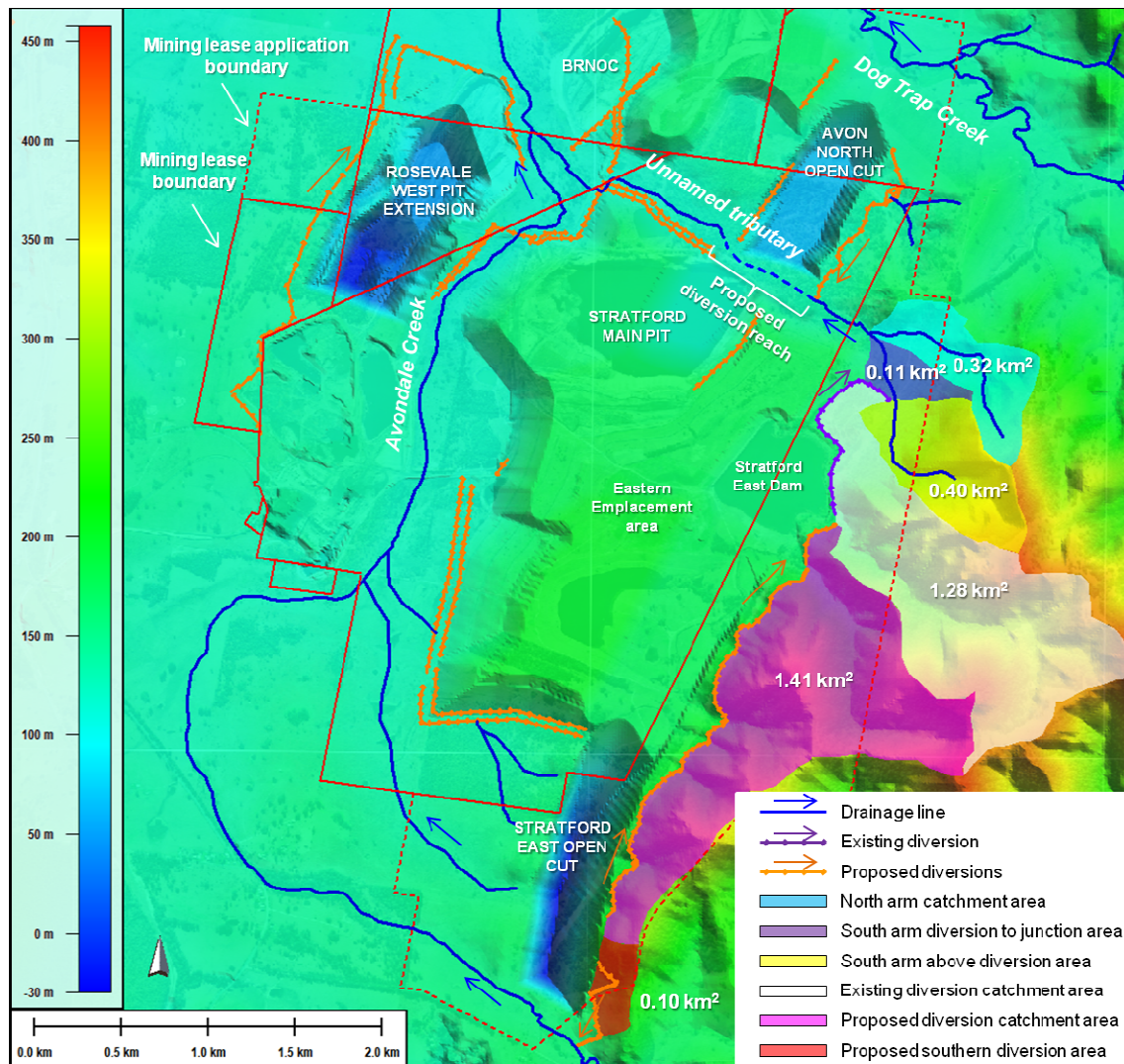


Figure 10: Changes in catchment area of key tributary of Avondale Creek

At the completion of mining operations, and by the time the proposed final landform would be revegetated, many of the proposed stream diversions would be 'reversed' and the project's impacts on local catchment areas would be significantly reduced. That is, the project's maximum impacts on local catchments would only occur for about 11 years. For example, the Avondale Creek catchment is the most affected by the project. This stream originally had a catchment of 15.5 km² upstream of its confluence with its key tributary. Stratford's water management system currently captures 40% of this catchment, and this would increase to 53% as a result of the project. However, following mine closure only 19% (or 2.9 km²) of the catchment would be permanently diverted.

The EIS demonstrated that flow volumes in local waterways are proportional to their catchment areas. Therefore, reducing catchment areas would lead to reduced surface water flows. Only Dog Trap Creek and the Avon River supply surface water to licensed users (45 licences; 1,997 ML/year allocation; 95% used for irrigation). The EIS predicts that flows could be reduced for these users by 3 to 4% without any discernible effect on their ability to take water. The quantum of these reductions is insufficient to affect the flow characteristics of either stream.

Following the completion of mining, permanent losses to stream flows would be less than 1%. Predictions are that Dog Trap Creek would experience a long-term reduction in baseflow of 0.02 ML/day and that Avondale Creek a long-term reduction of less than 0.05 ML/Day.

The proposed construction of haul road culvert crossings of Avondale Creek would have a very minor impact on the flooding regime of local streams. In high flood flows, the culvert would restrict water flow and could cause upstream flood depth to increase by up to 2 cm. As all affected lands are owned by Yancoal, there would be no impacts to other landowners. There would also be no impact to downstream landowners during times of flood flows.

Acid rock drainage

The EIS identified that a relatively few geological strata within the mining sequence could, following oxidation, produce acid rock drainage. Such strata form less than 5% of strata in the Roseville West and Avon North open cuts, but may be as high as 35% at the Stratford East open cut. Yancoal proposes to deal with this issue by monitoring and ensuring that overburden derived from these strata is emplaced below the water table to exclude air and thereby greatly reduce the potential for oxidation. A review of the historic management of potential acid rock drainage practices has shown this issue to be well-managed at the site. As the characteristics of the geological strata in the Stratford Extension mining areas are marginally less likely to contain rocks capable of producing acid drainage, the Department believes that a continuation of current monitoring and management practices would also be effective.

Final voids and final landform

The creation of 3 final voids, with a total catchment of 185 ha (1.85 km²) would reduce long-term flows in the Avon River but, as it has a total catchment of 292 km², these impacts would be very small. A major consideration for this project is to ensure that water collecting within the 3 final voids, mainly derived from groundwater inflows, does not overflow or 'spill' from these impoundments into local surface waterways, affecting water quality and aquatic ecosystems.

The final voids are designed so that they would not overflow and contribute saline or poor quality water to local stream flows. Modelling has been undertaken with 123 years of historical meteorological data and tested with robust sensitivity analyses and potential climate change scenarios. In all cases modelled, none of the voids would 'spill' into local streams.

The final landform of the project site has been designed so that water from rehabilitated areas would be directed through retained sediment dams, to act as flow energy dissipaters and to settle sediment prior to its entry to natural stream channels. The up-slope diversion of the Stratford East open cut would be removed and much of this catchment diverted to the Stratford East Dam before being allowed to enter the natural stream channels.

One of the main surface water risks associated with this project is the geomorphic stability of the key tributary to Avondale Creek (see **Figure 10**), particularly as Yancoal proposes to laterally divert, by 150 m, a 600 m section of this creek to accommodate the southern portion of the Avon North open cut. Not only would this diversion need to be carefully engineered for stability, it would need to handle increased flows associated with its acceptance of waters from the up-slope diversion above the Stratford East open cut. Yancoal engaged a fluvial geomorphological expert (Dr Chris Gippel) to investigate this tributary and provide recommendations for its management.

As is shown in **Figure 10**, this key tributary has already been subject to highly altered flows as a result of existing mining at the site. The original catchment area of 40 ha above the entry point of the up-slope diversion has been increased by 318% to 168 ha. The proposed Stratford Extension would increase this to 310 ha, or 770% greater than the original catchment.

Dr Gippel's inspection of the tributary indicated little change in its geomorphic structure when compared to an inspection report of 1997, which was undertaken prior to changes in the catchment area. This is attributed to the forested cover of the upper reaches of the tributary and the well-vegetated lower and flatter reaches of the stream. Accordingly, if the stream channel has proved resilient to a quadrupling in catchment, it is possible that the stream would remain resilient under the additional changes associated with the project. The Department supports Dr Gippel's recommendations of:

- requiring the construction of a stormwater detention basin at the outlet of the up-slope diversion;

- further modelling of peak flows to support the final design of the 600 m diversion of the tributary;
- longitudinal surveys of the tributary to define existing nick points; and
- geomorphological inspections conducted every 2 years.

Conclusion

The surface water study recommended the following management actions, which are supported by the Department:

- improved and increased monitoring of surface water flows and quality;
- management of water used on site for irrigation of rehabilitation areas;
- monitoring of strata and on-site water bodies for potential acid rock drainage;
- annual checks of the site's water balance;
- annual bathymetric surveys of co-disposal storages to obtain accurate estimates of remaining storage volumes; and
- annual checks of the geomorphic stability of up-slope diversion channel and stream diversions.

The Department considers that, with the implementation of the water management systems as set out in the EIS for both operational and post-mining stages of the project, and the application of the recommended monitoring and review actions, the project can proceed and be ultimately decommissioned with only minimal impact to the streams of the Avon River catchment.

5.4 Groundwater

Introduction

There are two groundwater systems in the vicinity of Stratford, the:

- fractured rock groundwater systems, which include shallow rock groundwater-bearing structures and the Gloucester Coal Measures; and
- alluvial groundwater system, which includes the sediments associated with Dog Trap Creek, Avondale Creek and the Avon River.

The shallow rock groundwater is brackish and contains water that is several thousand years old while the coal seams in the Gloucester Coal Measures contain brackish to slightly saline groundwater in the order of thousands to tens of thousands of years old. The alluvial groundwater is typically brackish and young (less than a few hundred years old). The marked difference in the age of these different waters indicates limited connectivity, particularly between the alluvial aquifer and the shallow rock aquifer.

The project area has a temperate climate with moderate to high rainfall and recharge of the groundwater system occurs from both rainwater and runoff infiltration. The typical depth to groundwater is generally 1 – 10 m below the surface in the vicinity of Stratford and the direction of groundwater flow is from the southeast to the northwest.

Groundwater assessment

Dr Noel Merrick of Heritage Computing undertook a groundwater assessment of the project which:

- identified groundwater users;
- identified whether groundwater dependent ecosystems were a feature of the site; and
- developed a numerical groundwater model to predict potential groundwater impacts, based on a 15.2 x 17 km grid (179 km²) with 13 individual layers representing the alluvium and various geological strata.

This groundwater report was peer reviewed by Dr Frans Kalf (arranged by Yancoal) and Mr Peter Dundon (on behalf of the Department). Both are noted groundwater experts, as is Dr Merrick. Both were satisfied by, and agreed with, the report's conclusions and proposed management and mitigation measures. Mr Dundon also considered that *'...the study has been appropriately conservative in its approach to impact assessment, and cumulative impact assessment with other projects in the area, namely the Rocky Hill Coal Project and the AGL*

Coal Seam Gas Project'. The Department is therefore confident in the methodology employed by Heritage Computing and its predicted outcomes.

The assessment analysed field data and found that there is clear evidence of a mining effect on groundwater in the regolith, interburden rocks and coal seams. Groundwater sinks have developed in the existing voids, which has altered local groundwater flows towards the voids and produced surrounding cones of depressurisation. However, there is no discernible effect on the alluvial groundwater system.

Groundwater modelling

As open cut mining operations penetrate the water table, water flows into the pits, which is then pumped from the pits to allow mining operations to proceed. On completion of mining operations, each pit is either backfilled with overburden, used for storage of water or coal rejects or allowed to accumulate intercepted groundwater. In all circumstances, these 'uses' of the void lead to reducing flows of groundwater to the pit, as increasing water levels within the pit reduce the groundwater gradient towards the pit and, as a consequence, groundwater inflows abate. This is demonstrated in **Table 7** which shows groundwater inflows to each pit reducing over time. For example, flows to the Bowen Road North pit reduce to zero by Year 7, by which time this pit is proposed to be completely backfilled.

Table 7: Predicted pit inflows for each open cut (ML/Day)

Year	Bowens Road North	Roseville West	Avon North	Stratford East	Total
1	0.29	0.69	0.23	0.11	1.32
2	0.40	0.61	0.23	0.11	1.35
3	0.40	0.43	0.22	0.13	1.18
4	0.42	0.49	0.24	0.12	1.27
5	0.43	0.50	0.23	0.11	1.27
6	0.43	0.48	0.32	0.09	1.32
7	0.00	0.50	0.28	0.09	0.87
8	0.00	0.46	0.27	0.10	0.83
9	0.00	0.44	0.23	0.07	0.74
10	0.00	0.43	0.23	0.17	0.83
11	0.00	0.46	0.20	0.08	0.74

Overall the groundwater modelling predicts that:

- combined pit inflows range between 0.7 and 1.3 ML/day during the life of the project;
- average pit inflows are 1.0 ML/day for the 11 years of the project;
- final year pit inflows are 0.7 ML/day;
- pit inflows stabilise at 0.6 ML/day, once final void water levels reach equilibrium; and
- there would be negligible change in groundwater quality as a result of mining either in the short or long-term.

As indicated in the surface water section of this report, modelling was undertaken to quantify the likelihood and magnitude of potential drawdown and water quality impacts, which found that there would be negligible groundwater drawdown in the alluvial sediments and negligible reduction in natural baseflow to surface stream systems.

Cumulative impacts

Heritage Computing concluded that the Rocky Hill and Stratford Extension projects would have very little overlap between their cones of depressurisation. The Gloucester Gas project would lead to substantial groundwater impacts as it would cause significant drawdown in the watertable between the project and Stratford village. These impacts would be in the order of 1 to 2 m for the private bores near the village and no impact for the private bore to the south (see **Figure 11** for bore locations). The gas project would reduce pit inflows by up to 0.5 ML/Day if wells were drilled in the project area, but only by 0.1 ML/day if the gas wells were to be located outside this area.

AGL responded that the assumptions used in the groundwater model about the Gloucester Gas project are quite conservative and therefore over-predict the cumulative impacts. The modelling assumes that all of the 110 Phase 1 gas wells would be in simultaneous production during the 11 years of the Stratford Extension project. The modelled water extraction from gas production therefore ranges between 4.4 and 6.6 ML/Day, while the Gloucester Gas project is in fact limited by conditions of approval to a maximum of 2 ML/Day. In addition AGL plans to operate far fewer than 110 gas wells at any one time. The Department agrees that the prediction of cumulative groundwater impacts is quite conservative.

Water bores

In the vicinity of Stratford there is little reliance on groundwater bores as surface water resources are abundant and of better quality. There are only 12 private bores within 5 km of Stratford; 11 in Stratford village and a rural residential bore south of Stratford. These bores are licensed for stock and domestic use. No mining effects have been observed in any privately-owned bore in Stratford village. However, a company-owned bore to the east of the village has recorded a minor decline of about 0.5 m from 2003 to 2010.

Simulations indicate that future mining would have a minimal effect on water levels in the private bores near Stratford village (less than one metre fall in water levels). Based on a nominal 1.0 m limit of drawdown, the predicted maximum extent of groundwater drawdown is 1.6 km from the Roseville West Pit Extension, 1 km from the Avon North open cut and 0.8 km from the Stratford East open cut. This would not affect private beneficial users of groundwater (see **Figure 11**).

Groundwater licensing

The project has the potential to intercept groundwater from two water sources, associated with fractured rock and alluvial aquifers. The relevant alluvial source is the *Lower North Coast Unregulated and Alluvial Sources 2009*, which is managed under the *Water Management Act 2000* (WMA). Groundwater extraction from the fractured rock aquifer is not yet covered by a water sharing plan under the WMA, and therefore remains regulated under the *Water Act 1912*.

The EIS predicted that annual groundwater volumes requiring to be licensed over the life of the project would be 600 ML/year, based on the maximum predicted volumes. Average volumes are predicted to be 470 ML/year.

Yancoal currently holds a combined total volumetric licence allocation of 1,021 ML/year under the *Water Act 1912* for its operations at Stratford, which is considerably greater than the predicted maximum requirement of 600 ML/year.

The numerical model has also accounted for water that could be lost from the alluvial groundwater source. Yancoal currently holds a combined total of 140 ML per unit volumetric licence allocations under the *Water Management Act 2000* for unregulated rivers in the Avon River Water Source, which is greater than the predicted maximum inflows from the alluvial groundwater system for the project (ie 54 ML). There is only one other known groundwater licence with a total entitlement of 20 ML/year for the Avon River Water Source.

The Department is satisfied that the project can proceed without the need for any increase in its current groundwater licence allocations.

Consideration of the IESC's advice

The IESC's advice has been considered in the Department's assessment of surface and groundwater matters and potential influences to terrestrial and aquatic habitat. It has also been considered by Yancoal and in Peter Dundon's peer review. The Department considers that:

- matters raised concerning 3 specific frog species are not to be particularly relevant, since there is a general absence of suitable habitat for these species on the site and they have not been identified in site surveys undertaken between 1994 to 2011;
- the areal extent of the Stratford Extension groundwater model (15 x 17 km, or 179 km²) is of sufficient scope to address potential cumulative impacts;

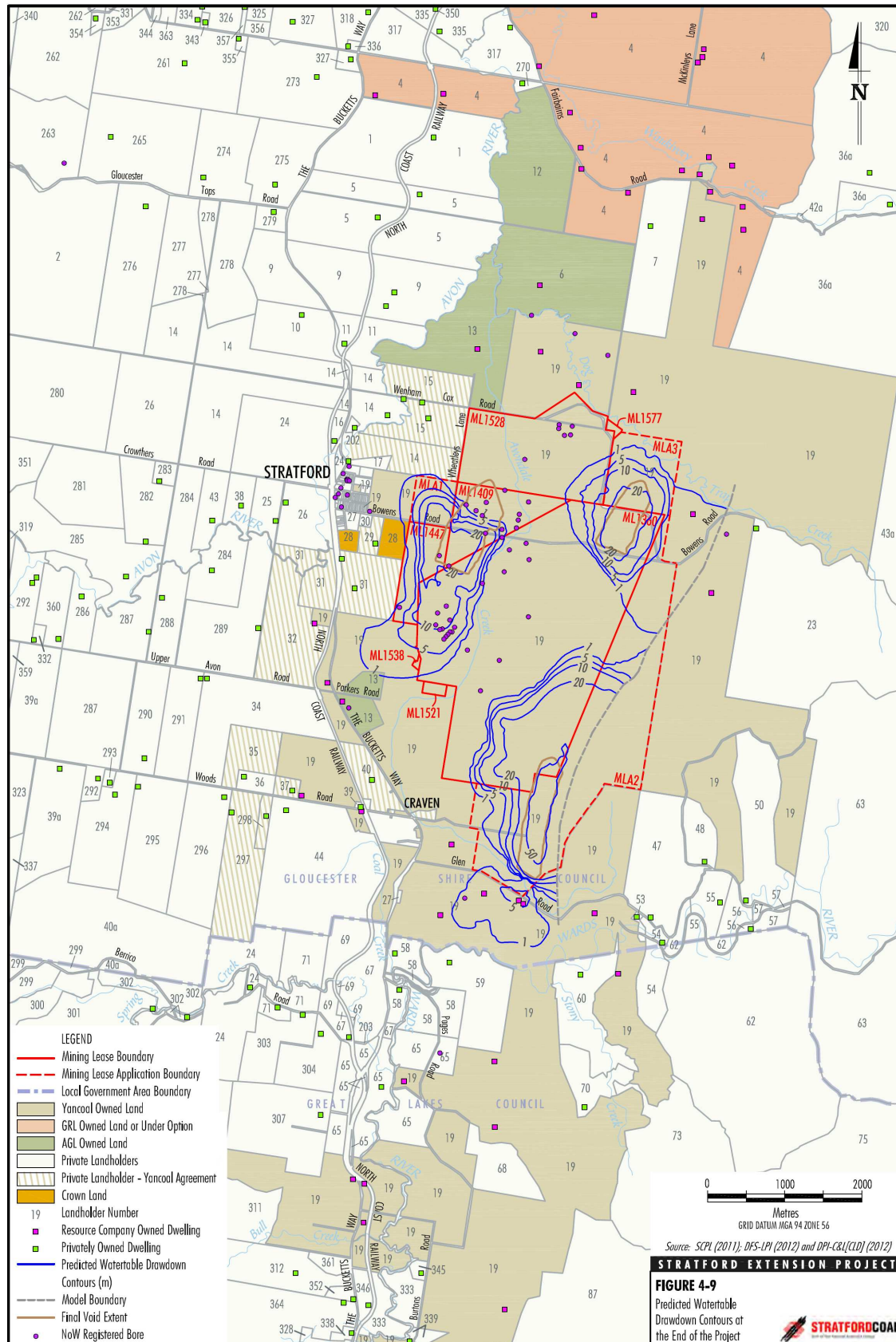


Figure 11: Predicted watertable drawdown contours at the end of the project

- matters relating to the confidence to be placed in the modelling of groundwater systems and likely impacts of both the project alone, and cumulatively with the Gloucester Gas and the Rocky Hill Projects, have been adequately addressed in Yancoal's response and by the peer reviews by Dr Kalf and Mr Dundon;
- confidence in the site water balance has been addressed in a similar way. It is important to note that Yancoal has committed to annual reviews and refinement of both the water balance and the water model in the light of the preceding year's monitoring data. Accordingly, the accuracy of predictions is likely to improve over time;
- the water studies demonstrated that the project would have minimal impact on local surface water flow volumes or quality and that groundwater captured by mining operations would be retained on site;
- opportunities for and limitations on backfilling of final voids has been considered in the Department's assessment; and
- additional groundwater monitoring has been recommended and would be made available, along with data already obtained, to the Bioregional Assessment of the Northern Sydney Basin region.

The Department is satisfied that all matters raised in the IESC's advice have been fully considered in the assessment and that relevant recommendations for conditions of consent have been made concerning surface and groundwater protection and management.

Conclusion

The Department considers that potential project-specific and cumulative impacts on groundwater resources have been comprehensively assessed in the EIS and that the predictions of the groundwater modelling are robust. The Department's confidence in the groundwater modelling and its conclusions is increased by the two peer reviews.

Heritage Computing has recommended that Yancoal's existing groundwater monitoring program be supplemented by the installation of 7 additional monitoring bores, and that data from the groundwater monitoring program be used to validate modelling predictions and the production of an annual site water balance.

NOW also recommended that additional groundwater monitoring bores be installed to track predicted post-mining groundwater recovery rates. The Department has recommended that these measures are incorporated into a revised Water Management Plan.

The Department's view is that the proposal's impacts on groundwater are acceptable and would mainly be limited to the project site. The main long-term impact would be the creation of 3 final voids which would become largely filled with saline water, over time. This water would not discharge from the voids, nor migrate from the site into the surrounding groundwater resources or affect the quality of baseflow of surface streams. The Department has recommended conditions of consent requiring Yancoal to produce and implement a revised Groundwater Management Plan, expand its groundwater monitoring network and review the site water balance each year.

5.5 Biodiversity

Flora impact assessment

The EIS includes a flora assessment of the project area and the proposed Biodiversity Offset Areas, undertaken by FloraSearch. This assessment had the benefit of drawing on flora assessments undertaken in 1994, 2001, 2007, 2008, 2010 and two surveys from 2011. This intensity of survey effort, by differing flora experts, gives confidence to the quality of vegetation identification and mapping for the project site. **Figure 12** shows the current distribution of both native and non-native vegetation for the project area. About 105 ha of native vegetation and 195 ha of non-native vegetation (principally pasture with scattered native trees) would need to be cleared to enable the project to proceed.

Within the project area, the flora assessment did not identify any threatened flora species, populations, endangered ecological communities (EECs) or critical habitat listed under either the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC

Act) or the NSW *Threatened Species Conservation Act 1995* (the TSC Act). While DoE indicated that the *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* EEC may potentially occur on the site, no evidence of that community has been found in any of the flora surveys undertaken.

FloraSearch also identified 8 threatened flora species that may possibly occur in the project area, although they had not been found. An 'assessment of significance' (using the 'Seven Part Test' criteria under the TSC Act) was carried out for these species. This concluded that the project would have no significant impact on any of the 8 species.

Figure 13 shows the proposed final landform, the vegetation linkages through the proposed Biodiversity Enhancement Area and Yancoal's proposed Biodiversity Offset Strategy (BOS) areas. **Table 8** provides a comparison of the amount of each vegetation type proposed to be cleared with the amount proposed for inclusion in the BOS areas. In all instances, the BOS areas contain a greater area of each vegetation type than Yancoal proposes to remove. Both the Department and OEH are satisfied that the proposed BOS meets relevant OEH and DoE guidelines to offset the project's vegetation impacts.

The vegetation to be cleared includes 13.5 ha of *Vegetation Type 8 HU526 – Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands*. This vegetation type is considered by OEH to be part of the '*Subtropical coastal rainforest of the NSW North Coast bioregion*' EEC. It has been extensively cleared in the Gloucester Valley and the surrounding areas as a result of past farming practices.

However, the proposed BOS contains 30 ha of this vegetation type. As well, a significant amount of the cleared land in the BOS would have previously supported this vegetation type and, with suitable management, has some potential to regenerate. OEH's view is that conditions of consent should include a requirement to enhance the establishment of this vegetation type within the offset areas. The Department has included this requirement in its recommended conditions.

The Department considers that Yancoal has also avoided impacts on flora by minimising the disturbance footprint of its open cut pits and overburden emplacement areas where possible, and by using existing infrastructure. The 105 ha of native vegetation proposed to be cleared lies above the coal resource and there is little scope to further reduce the extent of this clearing.

Fauna impact assessment

The terrestrial fauna assessment, undertaken by Australian Museum Business Services (AMBS), identified native fauna that are known to occur, or are likely to occur, in the project area and then assessed the potential impact of the project on these species. The potential direct impacts on fauna were identified as:

- loss of habitat types through clearing;
- loss of connectivity within the local landscape;
- loss of foraging, breeding and roosting habitat;
- loss of hollow-bearing trees;
- removal of dead wood and dead trees; and
- loss of individuals and/or local populations.

AMBS also identified possible indirect impacts, including fragmentation of habitat and introduction of weeds.

AMBS identified 65 fauna species listed as threatened under the TSC Act and/or the EPBC Act reported within, or likely to occur within a 20 km radius of, the project area. Of these, 28 threatened species (15 birds and 13 mammals) have been recorded within the project area.

Following an assessment of the habitat on and around the project area, AMBS concluded that there were 33 threatened fauna species that could possibly be affected to some degree by the project. Of these, the species most likely to be affected would be the Glossy-black Cockatoo, Speckled Warbler, Grey-crowned Babbler (eastern subspecies), Varied Sittella, Brush-tailed Phascogale, Squirrel Glider, Long-nosed Potoroo and New Holland Mouse.

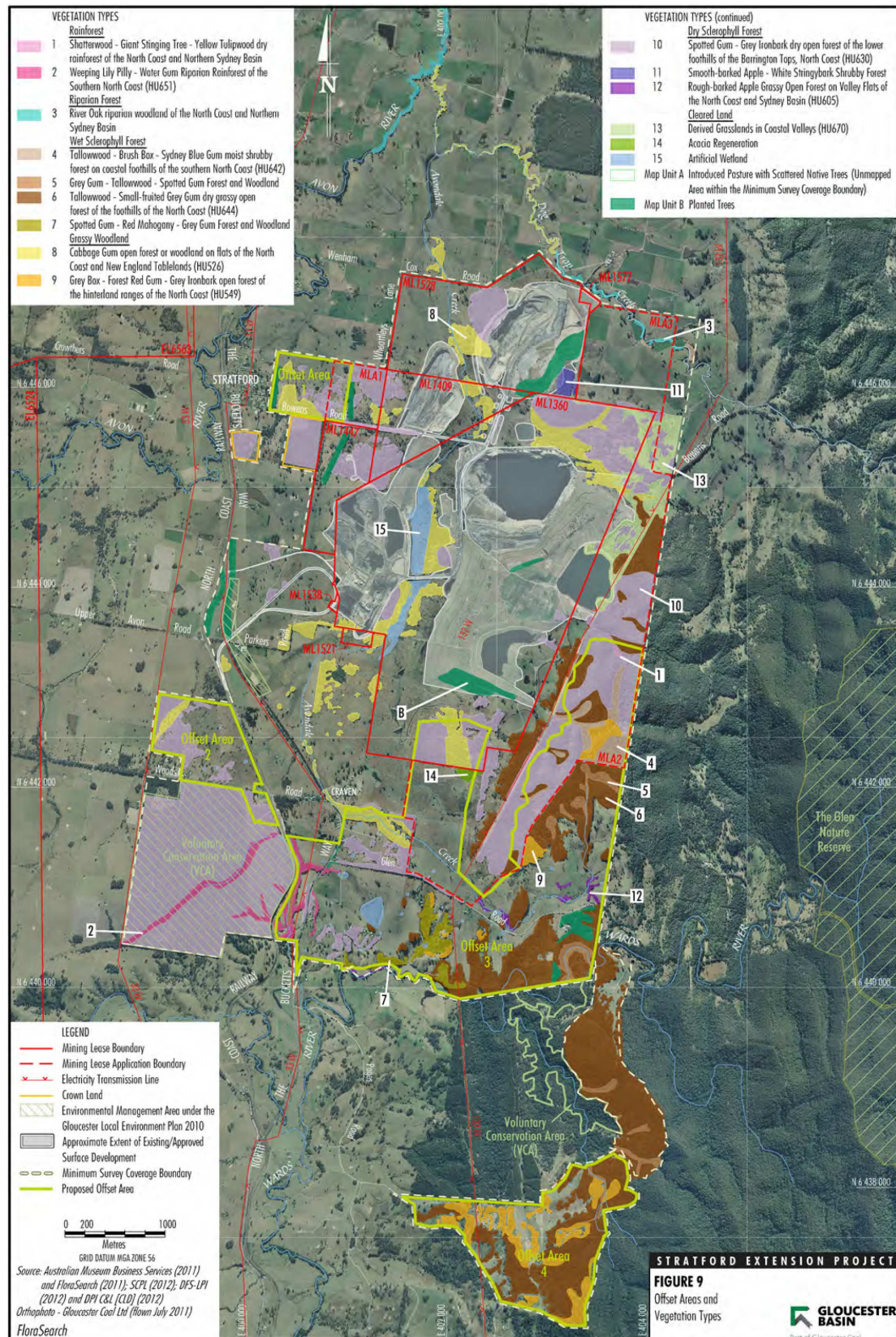


Figure 12: Vegetation types of the project and BOS areas

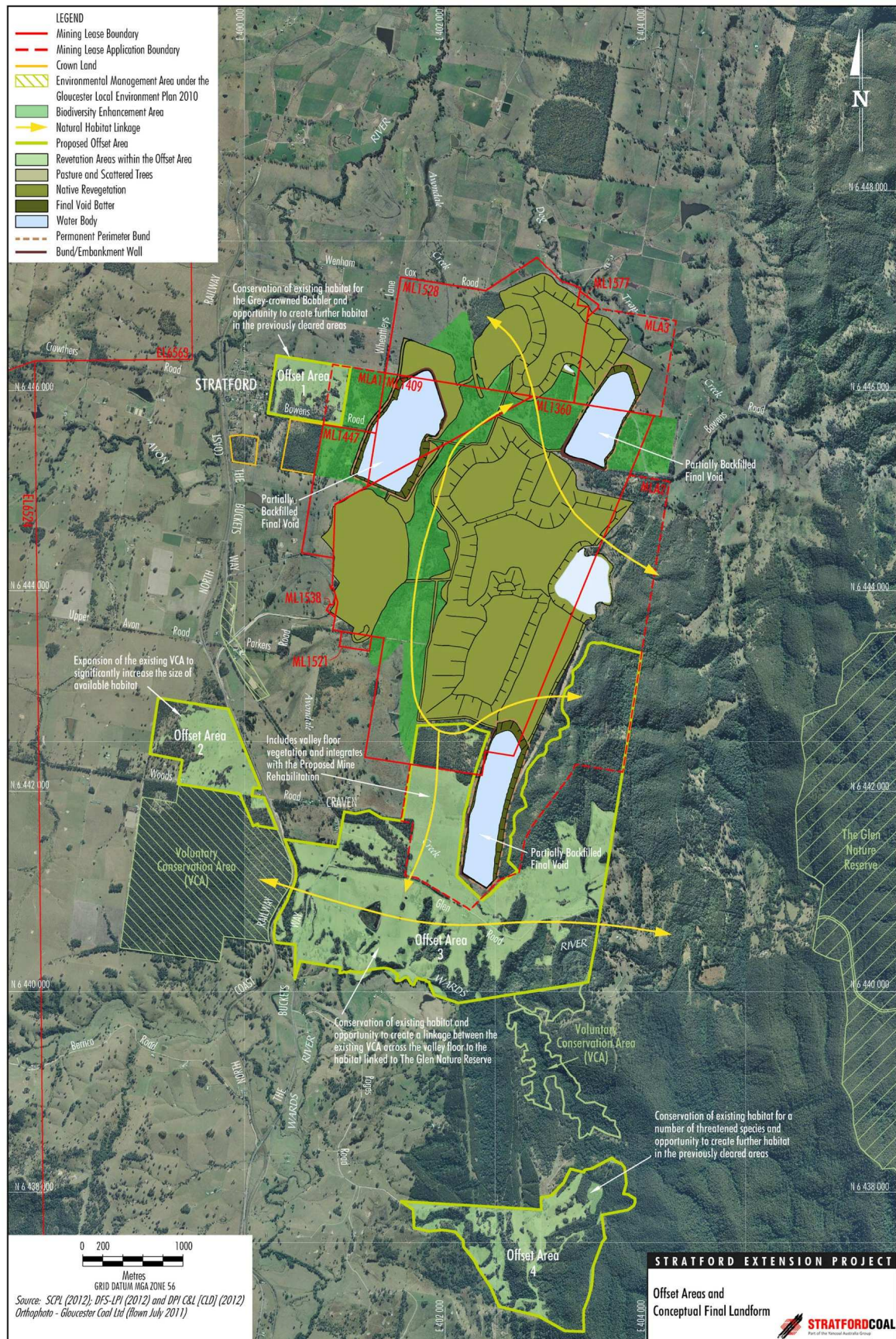


Figure 13: Final landform and offset areas

Table 8: Native vegetation – comparison of proposed cleared and offset areas

Vegetation Type	Additional Surface Development (ha) (Figure 4-21)	Approximate Area to be Offset (ha)
1: Shatterwood - Giant Stinging Tree – Yellow Tulipwood dry rainforest of the North Coast and northern Sydney Basin	0	0.7
2: Weeping Lily Pilly – Water Gum Riparian Rainforest of the Southern North Coast	0	8.5
4: Tallowwood – Brush Box – Sydney Blue Gum moist shrubby forest on coastal foothills of the southern North Coast	0.2	20
5: Grey Gum – Tallowwood Spotted Gum Forest and Woodland	0	18
6: Tallowwood – Small-fruited Grey Gum dry grassy open forest of the foothills of the North Coast	19	194.5
7: Spotted Gum – Red Mahogany – Grey Gum Forest and Woodland	0	16.5
8: Cabbage Gum open forest or woodland on flats of the North Coast and New England Tablelands	13.5	30
9: Grey Box – Forest Red Gum – Grey Ironbark open forest of the hinterland ranges of the North Coast	0	50
10: Spotted Gum – Grey Ironbark dry open forest of the lower foothills of the Barrington Tops, North Coast	65	142
12: Rough-barked Apple Grassy Open Forest on Valley Flats of the North Coast and Sydney Basin	0	3.5
13: Derived Grasslands in Coastal Valleys	5.5*	0*
14: Acacia Regeneration	0.5	2
15: Artificial Wetlands	0	8
Total	103.7 (rounded to 105 ha)	493.7 ha (rounded to 490 ha)

Following ‘assessments of significance’, AMBS concluded that the impacts of the project would not be significant for any of these 33 species, with the possible exception of the Squirrel Glider. The Squirrel Glider was considered to have the potential to be significantly affected in the short-term due to the proposed removal of habitat and a temporary increase in isolation of some known habitat areas. In the medium to long-term, however, the assessment concluded that the proposed offset strategy would improve the status of this species by the provision of additional habitat and improved linkages. A number of mitigation measures (including installation of nest boxes, relocation of cleared hollows, planting of additional feed trees/shrubs and erection of glider poles) are also proposed to mitigate the impact of the project on the Squirrel Glider. Monitoring of individuals (through trapping and fitting of radio collars) and monitoring of the use of the nest boxes and glider poles would be undertaken and reported on Yancoal’s website.

The Department considers that with the implementation of these mitigation measures for the Squirrel Glider, and the extent of additional habitat that would be provided by the proposed Rehabilitation and Revegetation Plan and BOS, the potential impacts of the project on threatened fauna have been appropriately avoided, minimised and mitigated.

All broad fauna habitat types that occur within the project area also occur in the proposed BOS areas and the amount of each habitat type in the offset areas is greater than the amount that would be lost due to the project. As a result, the Department considers that fauna biodiversity in the region would be maintained or improved in the medium to long-term.

Aquatic ecology

The EIS’s aquatic ecology assessment, undertaken by frc environmental (FRCE), assessed the existing condition of, and potential impacts of the project on, the aquatic ecology of streams in the project area and surrounds.

The main local waterways are the Avon River, located west of the project area, and Dog Trap Creek and Avondale Creek (and its tributaries) which flow through, or adjacent to, the project area. Potential impacts of the project are vegetation clearing and earthworks, haul road crossings, impact on surface water quality, and obstructions to fish passage.

No threatened aquatic species or EECs listed under the *Fisheries Management Act 1994* were considered likely to occur in the project area or its surrounds.

No significant changes to flows in local streams are expected to result from loss of catchment area and potential impediments to fish passage at road crossings can be managed by good design. The proposed BOS would also conserve and enhance a number of watercourses (Avondale Creek headwaters, Wards River and drainage lines) and their catchments.

Survey results, underpinned by regular monitoring undertaken since 2001, show that the ecological condition of the Avon River and its tributaries has improved over the last three years and that Stratford has had no adverse impacts on these streams. FRCE concludes that, if Yancoal continues to achieve its objective of zero discharge of mine water, then the risk of impacts to aquatic ecosystems is low.

The Department considers that the implementation of the project, as set out in the EIS, would have minimal impact on the aquatic ecology of the Avon River catchment. Conditions related to the protection of aquatic ecology have been included in recommendations for an Erosion and Sediment Control Plan, a Rehabilitation Plan and a Biodiversity Management Plan.

Proposed Biodiversity Offset Strategy

Yancoal proposes to compensate for its biodiversity impacts by revegetating the project area after mining and through implementing a Biodiversity Offset Strategy (BOS). The Rehabilitation and Revegetation Plan for the project proposes that 350 ha of revegetated woodland/open forest would be established on the project area, including corridors that link isolated natural remnants to the vegetated range east of Stratford. The proposed BOS consists of four Biodiversity Offset Areas (BOAs) close to Stratford, as shown on **Figures 12 and 13**.

The four BOAs have been chosen in accordance with OEH's biodiversity offset principles; which support selecting areas that are close to the area of proposed disturbance, complement the existing reserve system and take into consideration the characteristics of the native vegetation and fauna habitat that would be lost as a result of the proposal.

The four BOAs total 935 ha, including 490 ha of existing native vegetation, 435 ha of cleared land and 10 ha of native plantation trees. By comparison, the land that would be cleared for the project includes 105 ha of native vegetation and 195 ha of cleared land with planted trees. In terms of connectivity, two of the offset areas (Areas 2 and 3) expand on existing areas conserved under Voluntary Conservation Agreements (VCAs). In addition, habitat within Area 3 is linked through vegetation on private property to OEH's 2,750 ha Glen Nature Reserve.

As shown on **Table 8**, the BOAs contain the same vegetation types as are present within the proposed surface disturbance area. The BOAs contain all broad fauna habitat types located in the project area. A number of threatened species are known to inhabit the BOAs; including six birds, six non-flying mammals and five bats.

Stratford's 1994 consent required revegetation of the final landform to create an 88.7 ha wildlife corridor linking existing areas of native vegetation with the heavily-vegetated ridgeline east of Stratford. The project would prevent this wildlife corridor being realised. However, the proposed rehabilitation and revegetation plan includes a replacement Biodiversity Enhancement Area of 240 ha. Given its larger size and its ability to provide linkages, the Department is satisfied that it would fulfil the intent of the original wildlife corridor, namely to link existing areas of vegetation.

GSC is supportive of the potential for BOAs 3 and 4 to improve biodiversity and connectivity in the Craven Valley wildlife corridor. However, GSC raised a number of issues relating to the timing, adequacy, connectivity, density of hollow-bearing trees, and the impact of other potential uses in the offset areas.

OEH has advised that the BOS adequately addresses its offset principles and represents a suitable compensatory package of vegetation types and habitats that are proportionate or better than those that would be lost as a result of the project. The Department is satisfied with the adequacy of the BOS, but believes that it would be improved by the use of artificial hollows and nesting boxes to compensate for the removal of natural tree hollows.

Although the proposed BOS areas contain 10 dwellings, up to four future gas wells, electricity easements and a pipeline easement; each of these activities is limited to a few hectares which have not been included in the offset calculations. The Department considers that the impact of these uses on the proposed BOS areas would be minimal and could be further minimised through appropriate management, such as boundary fencing.

Conclusion

In summary, the Department considers that the impact of the project on biodiversity has been appropriately avoided and minimised where possible and the residual impacts are adequately mitigated by the proposed management measures.

The Department considers that the proposed BOAs, with a total area of 935 ha and containing all the vegetation types proposed to be cleared, adequately compensates for the project's proposed clearing of 300 ha. The proposed Rehabilitation and Revegetation Plan includes the establishment of an additional 350 ha of revegetated land.

The Department considers that, in total, these measures would ensure that the project results in a net improvement to biodiversity in and around Stratford over the medium to long-term, principally through the protection of native vegetation and revegetation of large areas of pasture lands to provide linkages between isolated remnants of native vegetation.

The Department has recommended conditions that would require Yancoal to establish its proposed BOS, and prepare and implement a Rehabilitation Management Plan and a Biodiversity Management Plan for the project.

5.6 Roads and Traffic

The project would increase the traffic impacts of the existing operation in two ways. First, the re-introduction of night-time mining operations would result in a doubling of the workforce to 250, which would result in small increases in the volume of traffic using local roads during shift-change times. Second, the project would extend the use of roads for a further 11 years.

Road Network Performance

The EIS included a traffic impact assessment for the project. This assessment considered the potential cumulative impacts of the project on the performance of the road network, assuming that the Gloucester Gas, Rocky Hill and Stratford Extension projects all proceed and that there would also be a 3% growth in background traffic (additional to traffic generated by the projects).

This cumulative assessment found that the performance, capacity, efficiency and safety of the road network would not be adversely affected by the project (both mid-block and at key intersections).

Upgrades and Realignments

The project requires two road realignments:

- Wenham Cox Road would be realigned around the Avon North pit to link up with Bowens Road; and
- Wheatleys Lane would be realigned around the Roseville West pit extension to link up with Bowens Road (see **Figure 2**).

These realignments would result in negligible impact, and need to be carried out to the satisfaction of GSC.

In its submission, GSC sought a number of upgrades to the road network, including:

- substantial upgrades of The Bucketts Way, including the provision of northbound and southbound passing lanes;

- upgrades of Wenham Cox Road and Wheatleys Lane; and
- upgrades to several intersections, including the:
 - intersection of Wenham Cox Road and The Bucketts Way, to provide protected right-hand and left-hand turning lanes;
 - intersection of the mine access road and The Bucketts Way; and
 - intersection of Wenham Cox Road and Wheatleys Lane.

While the scope of this request was narrowed following the provision of additional information by Yancoal, GSC maintains its position that many of these upgrades are essential in order for it to support the project. The Department has investigated the merits of GSC's requests carefully, and concluded that the upgrades to the mine access road intersection and the Wenham Cox Road / Wheatleys Lane intersection are justified. Under the recommended conditions of consent, Yancoal would be required to carry out these upgrades to the satisfaction of GSC within 6 months of the grant of consent.

However, the Department does not support GSC's request for the other upgrades, principally because it would be inequitable to make Yancoal pay the full cost of these works as:

- the passing lanes on The Bucketts Way are to improve the safety of regional traffic flows, rather than for mine traffic alone, and the mine traffic represents a reasonably small fraction of regional traffic; and
- the intersection of Wenham Cox Road and The Bucketts Way is located to the north of Stratford village, within a 90 kph speed zone. A review of the safety record of this intersection indicates that it has not been the site of motor vehicle accidents during the operation of the mine. Mine-generated traffic would constitute about one-third of all traffic using this intersection. However, the project itself would not increase mine-related traffic volumes at this intersection, which are relatively low at 44 light vehicle and 4 heavy vehicle movements per day. Accordingly, the project would not alter the risk of accidents at this intersection.

In the Department's view, if these upgrades are to proceed, then their costs should be borne principally by the RMS, GSC, GLC and the Federal Government.

Nevertheless, Yancoal has agreed to pay GSC \$550 per employee per year to fund the provision of infrastructure and services to the project, and the Department notes that GSC would have the discretion to allocate some of these funds to contribute to any upgrades of the road network surrounding the project.

Road Maintenance

In submissions, both GSC and GLC sought contributions from Yancoal towards the maintenance of the road network, but principally The Bucketts Way. However, there were inconsistencies between each Council's request.

The Department has considered this matter in some detail, and concluded that, as the impacts of the project on the local road network would be negligible, Yancoal's promised contributions to GSC would more than cover its share of the road maintenance costs for local roads.

However, in relation to The Bucketts Way, the Department has taken into consideration:

- the fact that it is a regional road, and therefore attracts funding (on a 50/50) basis from RMS;
- traffic from the project would make up a relatively small proportion of the traffic on the road;
- most of the damage to the road would be caused by heavy vehicles, including those associated with the project; and
- any maintenance contribution should include funding for general maintenance and for one reseal of the relevant section of The Bucketts Way during the 11 year life of the project.

After discussions with the Department about these factors, Yancoal has developed a formula to provide for an annual road maintenance contribution for The Bucketts Way to both Councils, which reflects project impacts. The Department supports this formula, and believes the cost estimates for both general maintenance and reseals are reasonable and in line with current industry estimates.

The main benefit of the formula is that contributions would be based on actual (rather than predicted) use of the road, and that the funds would be directed equitably between the Councils according to the actual impacts of the project. The Department has recommended conditions to require Yancoal to make payments to both Councils in accordance with the formula, and to carry out the necessary monitoring to give effect to the regime.

In summary, the Department believes the project would have minor impacts on the performance of the surrounding regional and local road network, as it is essentially a continuation of the existing operation with some minor increases in peak traffic levels during shift change overs. Nevertheless, Yancoal should be required to:

- realign both Wenham Cox Road and Wheatleys Lane around the proposed mining pits to the satisfaction of GSC;
- upgrade the mining access road intersection and Wenham Cox Road / Wheatleys Lane intersection; and
- pay annual contributions to both GSC and GLC for the maintenance of The Bucketts Way

With these measures in place, the Department believes the traffic impacts of the project would be acceptable.

5.7 Aboriginal Heritage

Kayandel Archaeological Services undertook an Aboriginal Cultural Heritage Assessment (ACHA) for the project. As shown in **Figure 14**, the ACHA identified:

- 12 previously unrecorded Aboriginal heritage sites (open scatters, isolated finds and scarred trees);
- 2 potential archaeological deposits (PADs); and
- 1 potential cultural area (CTS-1), comprised of a rocky outcrop, small waterfall and rock pools in a bushland setting (see **Photographs 1 and 2** below).



Photographs 1 and 2: Views of the potential cultural area, CTS-1

The ACHA considered the proposed impacts of the project on these sites and 3 previously recorded sites and found that the project would be likely to destroy:

- 3 open scatters;
- 2 scarred trees of moderate significance; and
- 4 isolated finds.

The EIS identified that the potential cultural heritage site, which is a natural rock formation, may be sensitive to ground vibration impacts.

There may be additional cultural items or sites within the project area, particularly in the vicinity of Dog Trap Creek near the proposed road re-alignment and in the denser, undisturbed vegetation on the foothills east of the project area, where local Aboriginal stakeholders identified two PADs.

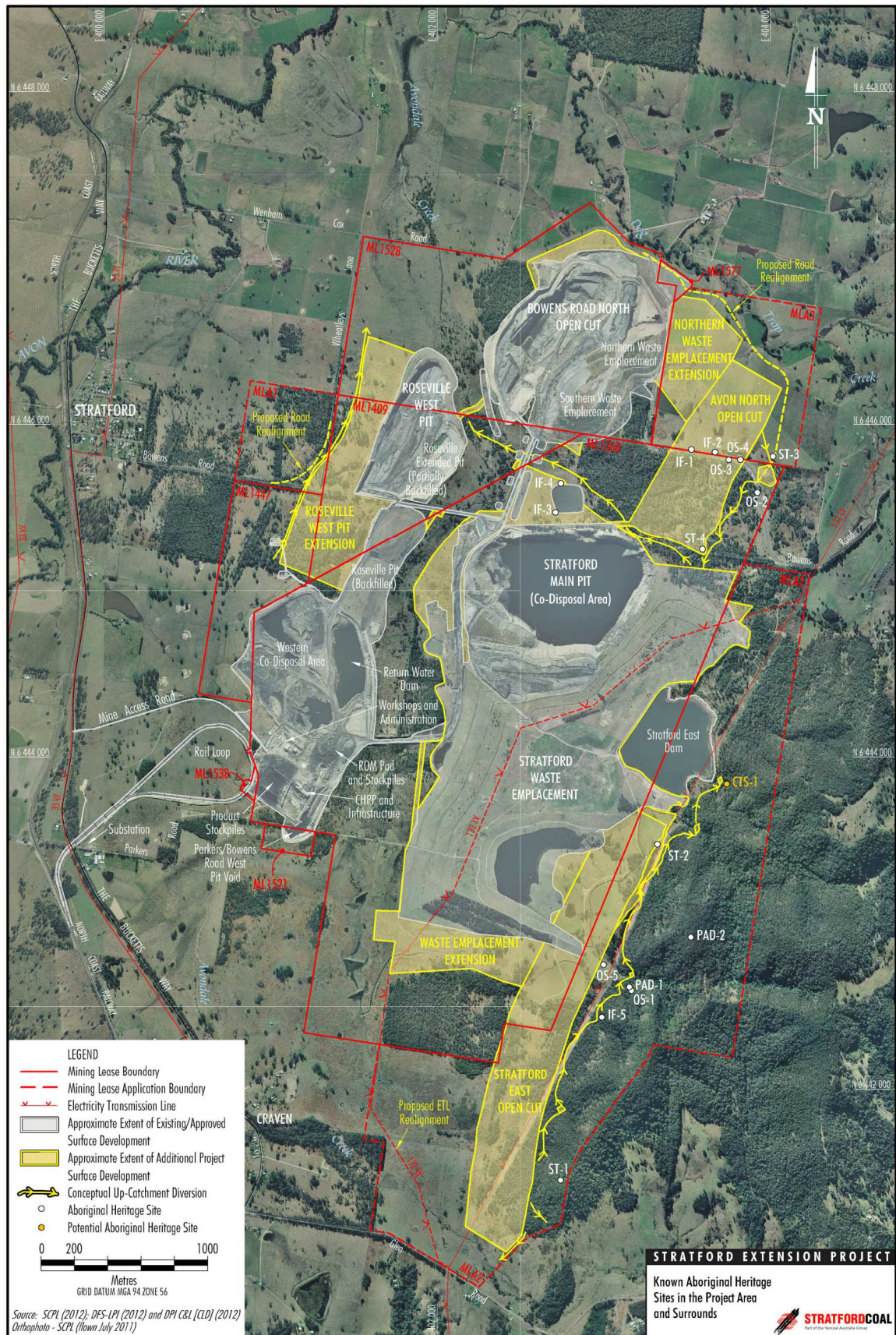


Figure 14: Aboriginal cultural heritage sites

Measures to minimise and manage the impacts of the project on Aboriginal cultural heritage values, as identified in the EIS, have been supported and augmented by OEH and incorporated into the Department's proposed conditions, which require:

- development of a Heritage Management Plan;
- ongoing involvement of the Aboriginal community in the management of Aboriginal cultural heritage at the site;
- employment of protective measures for Aboriginal objects close to proposed ground disturbance activities, such as scarred tree ST-3 adjacent to the proposed realignment of Wenham Cox Road;
- provision of access for Aboriginal stakeholders to cultural sites;
- induction and education programs for staff and contractors; and
- further investigation and inspections by Aboriginal stakeholders during topsoil stripping activities in the river terrace adjacent to Dog Trap Creek, for the proposed realignment of Wenham Cox Road.

The Department acknowledges that the project would destroy 9, and possibly 10, known Aboriginal heritage sites. It is not possible for these sites to be avoided, except with substantial impacts to the economic and operational viability of the project. In accordance with the wishes of the local Aboriginal stakeholders, conditions of consent have been prepared that require the physical objects within these sites to be salvaged and either relocated within the local environment or taken to a registered Keeping Place in accordance with the relevant legislative requirements of the *National Parks and Wildlife Act 1974*. An additional condition requiring Yancoal to monitor and manage ground vibrations when it undertakes blasting operations within 1 km of the potential cultural heritage site has been prepared.

The Department is satisfied that, following the implementation of all proposed mitigation measures, the project should proceed in accordance with a Heritage Management Plan, which incorporates monitoring and management of identified sites that would not be directly impacted by the project.

5.7 Socio-Economic Considerations

The Stratford Extension Project has a capital investment value of \$75 M, and would result in a range of significant economic benefits that must be considered in weighing its overall merits. As part of the EIS, Gillespie Economics (Gillespie) has conducted an economic assessment of the project in accordance with relevant guidelines. This assessment indicates that the project would have a Net Production Benefit to Australia in the range of \$145 to \$174 M, including around \$84 M in revenue to the NSW Government in royalties and \$39 M in Commonwealth taxes.

Gillespie estimates that the project would lead to the following average annual economic activity in the regional economy (ie Gloucester and Great Lakes LGAs) throughout its life:

- \$215 M in annual direct and indirect output;
- \$89 M in annual direct and indirect value added;
- \$24 M in annual direct and indirect household income; and
- 250 direct and indirect jobs.

For the NSW economy, the corresponding predictions are:

- \$340 M in annual direct and indirect output;
- \$175 M in annual direct and indirect value added;
- \$72 M in annual direct and indirect household income; and
- 714 direct and indirect jobs.

GSC raised a number of concerns about the adequacy and accuracy of Gillespie's economic analysis and provided a critical analysis of it by Dr Gerald McCalden. Dr McCalden criticised the Gillespie analysis on the basis that it:

- presents a bias which is focused on Yancoal's commercial interests;
- trivialises, dismisses and ignores many negative impacts on the local community;
- utilises a 'bizarre' amalgam of Great Lakes and Gloucester LGAs as the 'local region';

- does not provide sufficient background information of underlying assumptions used in the economic modelling; and
- ignores personal and public health costs.

The Department generally accepts the economic analysis conducted by Gillespie, as the methodology used is in accordance with the Department's draft *Guidelines for Economic Effects and Evaluation in EIA* which incorporates consideration of environmental impacts.

The Department considers that, despite notable differences between the Gloucester and Great Lakes LGAs in terms of population size and the strength of seaside tourism in Great Lakes, grouping of these two LGAs as a 'local region' is reasonable. This is where most of Stratford's current workers reside (58%) and it is also likely to be where most of the proposed increased workforce of 125 would reside. Stratford is located within 2 km of the boundary of the two LGAs, and not to include consideration of Great Lakes Shire could be criticised just as strongly as including it. What is important is that the basis for comparison of economic impacts for what has been described as the 'local region' has been clearly set out by Gillespie.

Dr McCalden and GSC point out that coal prices have fallen in the time since the EIS was published. Gillespie provided a sensitivity analysis for both a 20% increase and decrease for a range of parameters included in the economic analysis. This shows that the Net Production Benefit of the project to Australia was relatively insensitive to most parameters except for the price obtained for coal sales and costs of production. A 20% decrease in coal prices (without other adjustments to the cost of production) would reduce the Net Benefit to Australia to \$23 M. Current (November 2013) spot prices paid for coal loaded at the Port of Newcastle are at, or even lower than, the lower value used in the sensitivity analysis. Accordingly, the project is likely to be under economic pressure as evidenced by Yancoal's decision to suspend operations in the Roseville West Pit and reduce employment from 125 to 71 to reduce its production costs. However, the project has an 11-year life, and coal prices are expected to fluctuate over that time and not necessarily remain at current low values. The economic analysis has also used Yancoal's projections of expected coal price returns over the mine life, which are based on long-term contract prices, rather than 'spot' prices for one-off cargoes.

What would not drastically change are the inputs of the project to the Australian economy, although these may reduce or vary somewhat. Coal royalties, Commonwealth taxes, wages, and payment for goods and services would all still be delivered at reasonably stable levels, even in times of low profitability for Yancoal. The main impacts of low coal prices are to displaced workers and Yancoal's return on investment, rather than any substantive change to the Net Benefit to Australia.

The Department is generally satisfied that Gillespie's economic analysis has used reasonable values and assumptions in order to place an economic value on the costs of the project proceeding, such as use of water and the costs of GHG emissions. Many of the impacts identified in community submissions, including loss of agricultural production, visual, noise, air quality and blasting impacts have been assessed by assuming that these values are incorporated in the value of land purchased by Yancoal in the areas surrounding Stratford or the entering into of compensation agreements with affected landowners. The Department considers this approach to be generally reasonable, but acknowledges that there would be some low-level residual economic impact for properties further removed from the mine, and possibly to the perception of the tourism attributes of an 'unspoilt' Gloucester Valley.

These residual impacts are very low except for those properties identified in the noise assessment as being significantly impacted, and for which noise mitigation and property purchase options are recommended. The economic value of these impacts would not materially alter the outcome of Gillespie's assessment.

Direct impacts to tourism would be negligible as the proposed mine extension is located away from tourist activities such as camping, bushwalking, 4-wheel driving, kayaking, farm stays, tea houses or bed and breakfast establishments. The main impacts are associated with visual impressions of the Valley for visitors travelling along The Bucketts Way. As demonstrated in the EIS, current views of the mine's operations for such travellers are distant, and of relatively low

and diminishing impact as overburden emplacements are progressively revegetated. While the height of these emplacements is proposed to be increased and visual impacts would in turn increase, they are still assessed as being low and acceptable. Accordingly, potential economic impacts to tourism would relate to perceptions, rather than direct impacts.

The project represents a continuation and enhancement of the current level of economic activity in the region. Direct employment at Stratford is currently 71 but would rise to a maximum of 250 due to the proposed increase in the mining fleet from 33 to 66 items and planned introduction of an extra shift of workers to sustain operations on a 24-hour basis.

Gillespie estimates that the project would result in 269 additional people living in the region (based on a household of 2.6 persons). This is likely to increase demand for housing in the area and could force up rents, which could in turn affect housing affordability for low-income households and potentially displace some tourist accommodation. Whilst the owners of accommodation establishments would benefit, some changes to accommodation patterns in the region would result. Consequently, Gillespie predicts that many of the new workers (42%, based on existing patterns) may reside in adjacent LGAs (ie neither Gloucester nor Great Lakes Shires) and commute to work at Stratford.

Dr McCalden has raised the demolition of houses in the path of mining operations as an additional impact on the availability of housing. No houses are in the path of the proposed extension of mining operations. However, 10 houses are located on properties purchased for the proposed BOS. None of these houses have been directly included in the BOS area and local housing stocks would therefore be maintained, often with the former landowners in residence. As noted by Dr McCalden, the former piggery and residence adjacent to Stratford and on land owned by AGL, has already been demolished.

The estimated population growth for the local region due to the combined establishment of the Gloucester Gas Project, the Rocky Hill and Stratford Extension Projects is an extra 762 people. Gillespie considers this to be an upper estimate and that alternative residential locations are available, as well as the potential for a greater proportion of new residents to settle in Great Lakes Shire, which is better placed than Gloucester Shire to absorb additional residents.

The potential increase in population would occur in a staged manner, as it is almost certain that, if approved, the Stratford Extension would proceed prior to the other two projects since it:

- has advanced much further through the planning assessment process than Rocky Hill; and
- effectively does not need a construction phase, as it is an extension of an existing operation, rather than a new development.

Other potential impacts of an increased regional population include:

- increased demand for health services;
- pressure on school enrolments;
- increased demand for child care facilities;
- increased demand for recreational facilities and community infrastructure;
- potential social divisions;
- changing sense of place;
- skilled labour shortages and difficulty retaining workers in non-mine sectors; and
- potential increased crime rates during the construction phase.

Other than liaising closely with GSC and community service providers about its plans and timing, providing apprenticeships and traineeships for some workers, continuing sponsorship of sporting and community organisations and providing community enhancement contributions to GSC for the provision of local infrastructure and services (see below), Yancoal proposes to leave the provision of housing and community services to the market and Government agencies.

The Department considers this approach to be appropriate, given the project is unlikely to generate any significant social impacts within the region.

In its submission, GSC sought extensive community enhancement contributions from Yancoal, totalling about \$680,000 a year. According to GSC, these contributions would be spent on:

- implementing a community enhancement program in the LGA;
- supporting GSC's environmental assessment of mining operations in the region;
- initiatives under the Gloucester Education Fund and Gloucester Agricultural Enhancement Fund; and
- developing a surface and groundwater plan for the Gloucester and Avon Rivers.

Yancoal dismissed GSC's request as unreasonable, saying:

- it was significantly greater than its current contributions to GSC, even though the project's impacts would be similar to the impacts of the mine's existing operations: and
- the contribution (along with GSC's request for road upgrades and maintenance contributions) would represent about 18% of the capital investment value of the project as a whole in a regulatory regime where the default contribution for projects to the provision of infrastructure and services is 1% of the capital investment value.

Yancoal subsequently agreed to pay GSC \$550 a year for each employee at the mine. This would translate to about \$1.5 million over the life of the project, and represent about 2% of the capital investment value of the project as a whole.

The Department believes this offer is reasonable, and commensurate with the likely impacts of the project, and its demand for the provision of local infrastructure and services.

5.8 Other Issues

Although the project would have a number of other impacts, the Department is satisfied that these can be adequately mitigated or managed through appropriate conditions of consent. These are considered in **Table 9**.

Table 9: Consideration of other issues

Issue	Consideration	Conclusion/Recommended Conditions
<i>Non-Aboriginal Heritage</i>	There are 5 items of local heritage significance, but no items of State or regional significance in the vicinity of the project area. The 5 local heritage items are: • Stratford Timber Railway (cutting and routes 1 and 2); • The Glen Timber Railway; • Stratford Cemetery; and • Craven Village. The Gloucester LEP also list two places with identified heritage values near the project, namely: • The Glen-Craven Logging Tramline, Glen Road; and • Avon Valley Colliery Site, Waukivory Road, Waukivory. As none of these listed heritage items are located within 300 m of proposed mining operations, there would be no direct project-related impacts. In 1976, the National Trust of Australia (NSW) listed the Vale of Gloucester Landscape Conservation Area, which includes the project area. However, this listing is advisory only, has no statutory weight and has not been recognised or replicated in the Gloucester LEP. The landscape values of the listed area relate to its history. The heritage assessment in the EIS considered that the existing and proposed rehabilitated mine landforms do not, and would not, significantly	The project would have no direct impact on listed heritage items.

	detract from the overall Valley landscape. The Gloucester Valley is clearly important to GSC and the community as a cultural landscape. This was articulated in a number of the submissions, particularly that of the Barrington Gloucester Stroud Preservation Alliance (BGSPA).	
<i>Visual Impacts</i>	The Gloucester Valley is a strongly defined landform comprising a range of natural and rural land uses with moderate to high scenic values. Views of Stratford are generally limited from the surrounding areas due to its location on the undulating valley floor. The dominant local feature is the north-south orientated ridgeline immediately to the east of the project at 470 m AHD. The impacts of the project on the visual character of the area would be: • clearing of vegetation; • modification of the landform through pits and overburden emplacements; and • night-lighting. The Northern Waste Emplacement would increase in maximum height from 160 to 165 m AHD and the Stratford Waste Emplacement would increase in height from 184 to 196 m AHD. These emplacements would generally rise above the surrounding landscape by about 45 m and 65 m respectively. The BGSPA asked that the proposed overburden emplacements be reconfigured to reduce their bulk and intrusiveness. GSC raised concerns about the impact of strip planting of trees along roads on the heritage landscape qualities of the Valley. The major tree planting would be undertaken along Glen Road in Year 1 to screen the project and to form part of the revegetation of Offset Area 3. The revegetation of this area would have the dual benefit of screening the Stratford East pit and overburden emplacements from the Glen Road as well as providing connectivity between native vegetation. NSW Health, along with other submissions, was concerned that the project would increase night-lighting effects for surrounding residents, potentially affecting residents sleep and the rural character of the Gloucester Valley.	The Department recognises that the landscape would be permanently altered as a result of the project. The Department supports the proposed configuration of emplacement areas as any reduction in their height would necessitate an increased footprint with commensurate impacts to biodiversity values. However, with appropriate management, the project area can be reshaped and revegetated to visually approximate its pre-mining condition from most public viewing points and not significantly detract from the visual or cultural landscape values of the Gloucester Valley. The Department considers that through progressive rehabilitation and vegetation screening and ensuring that the final rehabilitated height of the emplacements would be below the eastern ridgeline when viewed from the west that visual impacts of the project would not be significant from most public viewpoints. The provision of a visual vegetative screen along the Glen Road is seen as a critical element of visual impact mitigation for the project. Although views at this location would be altered from open paddocks to dense vegetation, this is in keeping with the character of other bushland sectors along the Glen Road. The establishment and monitoring of the tree screens is included in the recommended Biodiversity Management Plan condition. The Department has recommended a condition of consent requiring Yancoal to operate its lighting equipment on the site in accordance with the relevant Australian Standard and to minimise lighting impacts.
<i>Agricultural Impacts</i>	The EIS showed that the Rural Land Capability of the project area ranges from Class IV to VIII, and Agricultural Suitability is either Class 4 or 5 land. The nearest Strategic Agricultural Land is located	The 770 ha of grazing land that would be lost as a result of the project is neither highly productive nor identified as Strategic

	on the Avon River, about 2 km to the west of the project. The project would result in the loss of 770 ha of grazing land, including about 380 ha of grazing land in the proposed biodiversity areas. This represents about 0.6% of the area under agricultural use in the Gloucester and Great Lakes LGAs. The economic impact of this loss represents about three jobs and a reduction \$0.3 M per annum in agricultural output in these two LGAs.	Agricultural Land. The Department considers that the loss of this agricultural land would not have a significant impact on agricultural production or the rural economy in the area.
<i>Complaints Management System</i>	NSW Health, along with other submissions, was concerned that the management of complaints by Yancoal could be more effective in addressing the community's concerns with the mine's operation.	The Department considers that the recommended conditions of consent provide an effective framework for addressing complaints made about the mine's operations. However, this is an area that can usually benefit from regular review to ensure appropriate communication channels are in place and effective. This is one review element of the independent Environmental Audits that are required every 3 years.

6. RECOMMENDED CONDITIONS

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

- prevent, minimise, and/or offset adverse impacts of the development;
- ensure standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the development.

The recommended conditions are strengthened when compared to the existing conditions of consent for the Stratford Mining Complex, and reflect current best practice for the regulation of open cut coal mines in NSW.

7. CONCLUSION

The Department has thoroughly assessed the proposed development in accordance with Section 79C and the objects of the EP&A Act, including:

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

The Stratford Extension Project would mine 21.5 Mt of ROM coal and produce about 15 Mt of soft coking and thermal product coal with an export value of at least \$1,200 M, even at the low 'spot' prices for coal that currently prevail.

The Department considers that the proposed development would not significantly increase the environmental impacts of Stratford. In essence, the proposed extension represents a

continuation of an existing mining operation at production rates lower than previous levels. That is not to say that predicted impacts would be the same as in the past. Extension of open cut mining operations, in particular to the south, would impact on different lands to those affected by existing or former mining operations.

Mine noise, particularly during night hours, can be a very sensitive issue for nearby residents. After careful consideration of the various alternatives regarding the project's proposed hours of operation, the Department recommends that operations in the Avon North and Stratford East open cut pits are approved on a 24-hour basis. A key reason for this is that the Department is satisfied that eliminating night-time mining would not significantly reduce night-time noise levels within Stratford village, since the potential reduction is predicted to be only about 1 dB(A).

However, the Department has recommended conditions of consent to safeguard residential amenity (particularly due to noise impacts) by setting noise levels at which Yancoal would be required to undertake noise mitigation works at residences or offer to purchase properties. This is particularly important for the residents of Stratford village, where noise impacts are predicted to be close to the relevant noise limits. In addition, Yancoal would be required to utilise real-time noise monitoring systems at the villages of Stratford and Craven to actively control its noise emissions. Yancoal has either purchased, or entered into compensation agreements with all but 4 landowners where noise impacts are currently predicted to exceed the relevant criteria.

The Department is satisfied that, due to the physical constraints of the narrow open cut pits, eliminating night-time mining at either one or both pits would extend the length of mining operations by between 1 and 6 years, the Net Production Benefit to Australia would fall by \$21 to \$58 M, and more extensive waste emplacements would be required. The costs to Yancoal and the community (in terms of a longer mining operation) would all come without substantive improvements in night-time residential amenity.

The development would clear 105 ha of native vegetation. The Department is satisfied with the overall biodiversity offset and enhancement and rehabilitation measures proposed by Yancoal.

The Department acknowledges that the proposed development would increase some of the mine's existing environmental impacts, including noise, rail traffic associated with coal haulage, increases in road traffic volumes associated with an expanded workforce, visual aspects and impacts on potential Squirrel Glider habitat. However, the Department believes that these impacts would not be significant, and can be minimised, managed and offset through appropriate conditions of consent.

It is important to note that GSC objects to the development, is strongly averse to 24-hour mining operations, and is concerned about the provision of an equitable share of the economic benefits of the mining proposal to the local community should it proceed. Nonetheless, it is also important to note that many more public submissions were received in support than objected to the proposal.

In respect of the recently-approved requirements of the Mining SEPP, the Stratford Extension Project is considered to be a relatively significant coal resource due to its size, quality and availability; and because it forms an extension of the existing Stratford Mining Complex and would utilise the site's existing infrastructure. The proposed development would contribute \$75 million of additional capital investment and \$84 million to the State through royalties. Finally, it would also result in a range of significant beneficial social and economic impacts, including a proposed increase to 250 jobs to enable 24-hour mining operations to proceed.

On balance, the Department believes that the proposed development represents a logical progression of existing mining operations at the Stratford Mining Complex, that the site proposed for the development is suitable, and that the benefits of the proposed extension significantly outweigh any potential costs. Consequently, the Department believes that the Stratford Extension Project is consistent with the objects of the EP&A Act, is in the public interest, and should be approved subject to conditions.

Some properties to the south of the project (such as 58, 59, 60, 60, 65, 68 and 70) are surrounded by mine-owned land. The owners of these properties claimed this had affected their ability to sell their properties, and argued they should be given acquisition right to address this impact.

The Department has met with these owners, inspected the relationship between these properties and the surrounding mine-owned land, and investigated the impacts of the project on these properties.

Following this investigation, the Department has concluded that the project would have negligible impact on these properties. It also concluded that there is a distinct difference between being located in close proximity to the mine and to mine-owned land. In the relevant areas the mine-owned land is indistinguishable from the surrounding privately-owned land, and is used for a range of agricultural and biodiversity uses. Consequently the Department does not believe the landowners of this privately-owned land should be given acquisition rights.

In conclusion, despite some arguments about the details of the economic assessment of the project, the Department is satisfied that the project would result in economic benefits to the region, State and Australia. While the mine itself would generate little demand for local infrastructure and services, the project would require additional workers, some of whom could move to the area. The Department is satisfied that there is more than enough capacity in the region for these workers to be accommodated without generating any significant impacts. Yancoal has agreed to pay GSC \$550 a year for each worker on site, and the Department believes this would be sufficient to enable GSC to provide local infrastructure and services to the project.

8. RECOMMENDATION

It is **RECOMMENDED** that the Planning Assessment Commission, as delegate of the Minister for Planning and Infrastructure:

- **considers** the findings and recommendations of this report;
- **approves** the development application, subject to conditions; and
- **signs** the attached instrument of consent (Appendix A).



Howard Reed
Manager
Mining Projects

28.11.13



David Kitto
Director
Mining Projects



28.11.13

Chris Wilson
Executive Director
Development Assessment Systems & Approvals

APPENDIX A: RECOMMENDED CONDITIONS OF CONSENT

APPENDIX B: CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

SEPP (State and Regional Development) 2011

The proposed development is 'State Significant Development' as it meets the classification 'development for the purpose of coal mining' under Clause 5 of Schedule 1 of the *SEPP (State and Regional Development) 2011*, and therefore requires development consent from the Minister for Planning and Infrastructure.

SEPP No.33 – Hazardous and Offensive Development

Yancoal undertook a preliminary hazard analysis in accordance with *SEPP No.33 – Hazardous and Offensive Development*. The project is consistent with the land use zoning for the surrounding lands. Consequently, the Department is satisfied that the proposed development does not pose a credible risk under SEPP 33 to surrounding land uses, and is therefore consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No.44 – Koala Habitat Protection

The SEPP requires a consent authority to consider the presence of any core or potential koala habitat. The EIS includes a detailed fauna assessment which found that there are no koalas in the development area, and therefore there is no 'core koala habitat'. However, there is potential Koala habitat within the project area due to the presence of feed tree species. SEPP 44 does not prevent a consent authority granting consent to a development that is located in potential koala habitat. In this case, the Department notes that the proposed development would not result in any significant impacts on potential koala habitat, and consequently the proposed development is not inconsistent with the aims, objectives, and requirements of SEPP 44.

SEPP No.55 – Remediation of Land

The EIS incorporates a Preliminary Investigation carried out in accordance with SEPP 55. The findings of this investigation indicate that there are no contamination issues on those parts of the site which would involve 'a change of use'. Some localised land contamination involved with current operations was identified along with recommendations for its treatment. The Department is satisfied that the project is generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (Infrastructure) 2007

SEPP (Infrastructure) 2007 requires a consent authority to notify relevant public authorities about developments that may affect public infrastructure or public land. The Department has notified RMS, GSC, GLC and relevant electricity authorities (ie TransGrid). None of these authorities objected to the proposed development, and any recommendations made by these authorities have been considered by the Department, and incorporated into the conditions of consent where appropriate. This satisfies the requirements of *SEPP (Infrastructure) 2007*.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Under the *State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007* (Mining SEPP), there are a number of matters that must be considered by the consent authority prior to granting development consent:

1. Clause 7 (1) (b) of the Mining SEPP makes mining permissible with consent on any land where development for the purposes of agriculture or industry may be carried out (with or without development consent). Consequently, the proposed development is permissible with consent, and the consent authority may determine the application.
2. Part 3 of the Mining SEPP requires the consent authority to consider the following:
 - a. the significance of the coal resource
 - b. compatibility of the proposal with other land uses;
 - c. natural resource management and environmental management;
 - d. resource recovery;
 - e. road transport; and

f. rehabilitation.

Recent amendments to Part 3 of the Mining SEPP require that the consent authority must consider the significance of the coal resource the subject of the development application, and that this matter is to be the consent authority's 'principal consideration' under that Part (although not under section 79C of the EP&A Act).

The Stratford Extension Project is considered to be a relatively significant coal resource due to its size, quality and availability; and because it forms an extension of the existing Stratford Mining Complex and would utilise the site's existing infrastructure. The proposed development would contribute \$75 million of additional capital investment and \$84 million to the State through royalties. Finally, it would also result in a range of significant beneficial social and economic impacts, including a proposed increase to 250 jobs to enable 24-hour mining operations to proceed.

The Department has fully considered all other matters listed under Part 3 in its merit assessment (see Section 5 of this report). Having considered these matters in detail, the Department is generally satisfied that the proposed development should be approved subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner.

One issue in regard to compatibility with other land uses and natural resource management is the potential interaction of the project with AGL's approved Gloucester Gas Project. The uncoordinated implementation of either of these projects could significantly impact on the other. Yancoal and AGL have been meeting regularly to address all key areas of potential interaction and/or conflict. One of the outcomes has been Yancoal's commitment to certain timeframes, in accordance with its planned timing of mining operations, to allow AGL to construct and operate seven proposed gas wells within mining tenements held by Yancoal.

The Department is satisfied that the proposed development is generally consistent with the requirements of Part 3 of the Mining SEPP and that the proposed development should be approved subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner.

Hunter Regional Environmental Plan 1989 (Heritage)

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

Gloucester Local Environmental Plan 2010

The Department has considered Yancoal's detailed review of the relevant provisions of the *Gloucester Local Environmental Plan 2010*.

Clause 1.2 of the Gloucester LEP outlines the general aims of the LEP. Those aims relevant to the proposed development include:

- (2) *The particular aims of this Plan are as follows:*
- (a) *to manage the resources of Gloucester,*
 - (b) *to protect rural lands, natural resources and assets of heritage significance,*
 - (c) *to manage development to benefit the community,*
 - (d) *to embrace and promote the principles of ecologically sustainable development, conservation of biological diversity and sustainable water management, and to recognise the cumulative impacts of climate change,*
 - (e) *to protect, enhance and provide for biological diversity, including native threatened species, populations and ecological communities, by long term management and by identifying and protecting habitat corridors and links throughout Gloucester,*
- ...

(g) to provide a secure future for agriculture.

The proposed development is generally consistent with the aims of the Gloucester LEP as:

- it would be developed in such a manner that would minimise and mitigate potential impacts on natural resources (including soil and water), rural lands and areas of Aboriginal and non-Aboriginal heritage significance;
- it would facilitate continued employment opportunities and expenditure in the region;
- it would be developed in accordance with ESD principles, conservation of biological diversity and sustainable water management;
- potential impacts on native threatened species, populations and ecological communities have been considered, and biodiversity enhancement areas and a biodiversity offset for the Project have been developed; and
- it would be developed in a manner that would minimise and manage potential impacts on agricultural production and the soil stability of nearby lands. Residual impacts associated with the sterilisation of some agricultural land would be offset by the economic benefits of the proposed development.

The Department has also considered the compatibility of the proposed development with the zoning objectives that apply to the land within the development area. The Department is satisfied that the proposed development can be undertaken in a manner that is generally consistent with the aims, objectives and provisions of the LEP, subject to adherence to the recommended conditions of consent.

APPENDIX C: SUBMISSIONS

(See attached CD)

APPENDIX D: RESPONSE TO SUBMISSIONS

(See attached CD)

APPENDIX E: ADDITIONAL INFORMATION

(See attached CD)

APPENDIX F: ENVIRONMENTAL IMPACT STATEMENT

(See attached CD)