

LAND AND ENVIRONMENT COURT OF NEW SOUTH WALES

Gloucester Resources Ltd v Minister for Planning and Another

[2019] NSWLEC 7

Preston CJ

13-17, 20-24, 27-28 August, 16, 30 November, 7, 14 December 2018, 8 February 2019

Development — Ecologically sustainable development — Open cut coal mine — Impacts on existing, approved and likely preferred uses of land in vicinity — High visual impact — Negative social impacts — Impacts of mine on climate change — Assessment of greenhouse gas emissions including downstream emissions of development — Causal link between project's cumulative greenhouse gas emissions and climate change and consequences — Economic and public benefits of mine and other land uses — State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW), cll 7(1)(b)(i), 12, 14(2) — Environmental Planning and Assessment Act 1979 (NSW), ss 4.15(1)(a), 4.36(1) — Environmental Planning and Assessment Regulation 2000 (NSW), Sch 1, cl 7 — Gloucester Local Environmental Plan 2010 (NSW).

Ecologically Sustainable Development — Environmental impact assessment — Open cut coal mine — Impacts on existing, approved and likely preferred uses of land in vicinity — High visual impact — Negative social impacts — Impacts of mine on climate change — Assessment of greenhouse gas emissions including downstream emissions of development — Causal link between project's cumulative greenhouse gas emissions and climate change and consequences — Economic and public benefits of mine and other land uses — State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW), cll 7(1)(b)(i), 12, 14(2) — Environmental Planning and Assessment Act 1979 (NSW), ss 4.15(1)(a), 4.36(1) — Environmental Planning and Assessment Regulation 2000 (NSW), Sch 1, cl 7 — Gloucester Local Environmental Plan 2010 (NSW).

The applicant, a mining company (GRL), wished to mine coal from an open cut coal mine over a period of 16 years. The location of the proposed open cut mine was close to a township which had a core of urban development and a periphery of rural-residential estates and smaller agricultural and agri-tourism properties. The outlying holdings of the town were within one to two kilometres of the boundary of the proposed mine.

GRL lodged an amended development application and amended environmental impact statement (EIS) which stated that the principal coal product to be produced was coking coal used in the manufacture of steel. The maximum run-of-mine (ROM) coal production would be 2 million tonnes per annum and the total ROM coal production would be 21 million tonnes.

The Air Quality and Health Risk Assessment for the amended EIS estimated the Scope 1 and Scope 2 emissions to be about 1.8Mt CO₂-e over the life of the mine and Scope 3 emissions to be at least 36Mt CO₂-e. The estimated Scope 3 emissions were limited to the emissions from the combustion of product coal from the project by end users. The emissions from shipping of product coal were not included. Greenhouse gas emissions (GHG emissions) from the combustion of product coal by end users were downstream emissions.

Of the relevant site area of approximately 832ha, about 500ha would be disturbed throughout the life of the proposed mine.

Of the submissions on the amended development application, 90% opposed the proposed mine and of the submissions from the applicable postcode, 83% opposed it.

The first respondent (the Minister), by his delegate the Planning and Assessment Commission, refused consent to the proposed mine.

The proposed mine was State significant development under s 89C(1) (s 4.36(1)) of the *Environmental Planning and Assessment Act 1979* (NSW) (EPA Act).

Section 4.15(1)(a) of the EPA Act required the consent authority, in determining a development application for State significant development, to take into consideration the provisions of any environmental planning instrument.

The major part of the site of the proposed mine (77%) was zoned E3 Environmental Management, under the *Gloucester Local Environmental Plan 2010* (NSW) (GLEP 2010) and residents impacted by the proposed mine were largely located near to that zone.

Clause 1.2(2) of GLEP 2010 stated that the aims of GLEP were:

- (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,
- (f) to encourage a mix of housing to meet the needs of the community,
- (g) to provide a secure future for agriculture.

Clause 7(1)(b)(i) of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (NSW) (Mining SEPP) made mining permissible with consent in the E3 Environmental Management zone, notwithstanding that mining was prohibited in that zone by GLEP 2010.

The Mining SEPP prevailed over GLEP 2010 to the extent of any inconsistency.

Clause 12 of the Mining SEPP relevantly provided as follows:

Before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

- (a) consider:
 - (i) the existing uses and approved uses of land in the vicinity of the development, and
 - (ii) 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
 - (iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and
- (b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii), and
- (c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).

Clause 14(2) of the Mining SEPP required consideration of an assessment of the GHG emissions (including downstream emissions) of development for the purposes of mining.

Clause 7 of Sch 1 of the *Environmental Planning and Assessment Regulation 2000* (NSW) provided that an EIS had to address certain environmental assessment requirements including the likely impact on the environment of the development and the reasons justifying the carrying out of the development, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development (ESD). The principles of ESD were defined to be the precautionary principle, inter-generational equity, conservation of biological diversity and ecological integrity, and improved valuation, pricing and incentive mechanisms.

Held: (1) In determining the development application for the project, the Court, exercising the function of the consent authority, is required to balance the public interest in approving or disapproving the Project.

Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc (2014) 86 NSWLR 527; 200 LGERA 375, applied.

(2) Balancing the benefits and costs of the project is a qualitative and not quantitative exercise requiring intuitive synthesis of the relevant factors.

Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Ltd (2013) 194 LGERA 347, applied.

(3) The project will have significant social, amenity and visual impacts on the existing, approved and likely preferred uses of land in the vicinity of the mine. The incompatibility of uses will not be avoided or minimised by the proposed mitigation measures or outweighed by the public benefits of the mine.

(4) Determining the uses of land in the vicinity of the development involves consideration of not only the proximity or nearness in space of the uses of land to the proposed mine, but also visual considerations and “demographic and geographic features of the area”.

Abley v Yankalilla District Council (1979) 22 SASR 147; 58 LGRA 234, applied.

(5) The proposed mine will have unacceptable visual impacts and adversely impact the rural and scenic character of the surrounding valley. The visual impacts justify refusal of the project, both by themselves and including the consequential social impacts they would cause.

(6) The proposed mine will have significant adverse social impacts on people's way of life; community, including particular demographic groups in the area; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; and fears and aspirations. The social impacts justify refusal of the project.

(7) The community responses are aspects of the public interest.

Telstra Corporation Ltd v Hornsby Shire Council (2006) 67 NSWLR 256; 146 LGERA 10; *Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* (2014) 86 NSWLR 527; 200 LGERA 375, applied.

(8) Knowing the uses to which a place is or may be put may affect a resident's perception of amenity.

Broad v Brisbane City Council [1986] 2 Qd R 317; (1986) 59 LGRA 296; *Telstra Corporation Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256; 146 LGERA 10, applied.

(9) The reasonable expectations of residents of the subject locality are informed by the current planning controls in the applicable planning scheme.

Harris v Scenic Rim Regional Council (2014) 201 LGERA 12, applied.

(10) An evaluation must be made of the reasonableness of the claimed perceptions of adverse effect on the amenity of the subject locality. An evaluation of reasonableness involves the identification of evidence that can be objectively assessed to ascertain whether it supports a factual finding of an adverse effect on the amenity of the subject locality.

Telstra Corporation Ltd v Hornsby Shire Council (2006) 67 NSWLR 256; 146 LGERA 10, applied.

(11) The impact of an action includes not only the direct but also the indirect influences or effects of the action. The likely impacts of a development include both direct and indirect impacts.

Minister for Environment and Heritage v Queensland Conservation Council Inc (2004) 139 FCR 24; 134 LGERA 272, applied.

(12) The public interest includes the principles of ESD.

Minister for Planning v Walker (2008) 161 LGERA 423, applied.

(13) The principles of ESD can involve consideration of the impact of a development on climate change and the impact of climate change on a development.

Gray v Minister for Planning (2006) 152 LGERA 258; *Taralga Landscape Guardians Inc v Minister for Planning* (2007) 161 LGERA 1; *Aldous v Greater Taree City Council* (2009) 167 LGERA 13; *Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221, applied.

(14) The construction and operation of the proposed mine and the transportation and combustion of the coal from the mine, will result in the emission of greenhouse gases, which will contribute to climate change.

(15) Consideration of the Mining SEPP, the amended EIS and development application for the project, the impacts of the project on the environment, and the public interest justify considering not only the Scope 1 and Scope 2 emissions (associated with the operation of the mine) but also the Scope 3 emissions (associated with transportation and combustion of coal products) of the project.

(16) There is a causal link between the project's cumulative GHG emissions and climate change and its consequences. The project's cumulative GHG emissions would contribute to the global total of GHG concentrations in the

atmosphere and thereby affect the climate system and cause climate change impacts. In this way, the project would be likely to have indirect impacts on the environment, including the climate system, the oceanic and terrestrial environment, and people.

(17) All anthropogenic greenhouse gas emissions contribute to climate change. That the aggregate emissions of a project represent only a small portion of the global total of greenhouse gas emissions does not matter. All greenhouse gas emissions are cumulatively important and must be addressed through abatement from a range of small sources.

Gray v Minister for Planning (2006) 152 LGERA 258; *Massachusetts v Environmental Protection Agency* 127 S Ct 1438 (2007); *Urgenda Foundation v The State of the Netherlands* (unreported, Hague Dist Ct, C/09/456689/HA ZA 13-1396, 24 June 2015); *The State of the Netherlands v Urgenda Foundation* (unreported, 200.178.245/01, 9 October 2018), considered.

(18) The possibility of greenhouse gas emission reduction by sources or sinks unrelated to the project, where no specific offsetting is proposed, is not relevant in assessing the project.

(19) The possibility that another coal mine will be approved in another country with less stringent environmental policies to meet global demand for coking coal and thus the greenhouse gas emissions would nonetheless occur was not proven or inevitable.

(20) A consent authority must assess development applications for fossil fuel projects on their individual merits taking into account the associated GHG emissions and likely impacts on climate change in absolute or relative terms.

(21) The acceptability of a proposed development of a natural resource depends not on the location of the natural resource, but on its sustainability.

(22) In this case, the exploitation of the coal resource would not be a sustainable use and would cause substantial environmental and social harm as:

- (i) the project would have high visual impact over the life of the mine.
- (ii) the project would cause noise, air and light pollution that would contribute to adverse social impacts.
- (iii) the project would have significant negative social impacts on people's way of life; community; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; and fears and aspirations.
- (iv) the project would cause distributive inequity, both within the current generation and between the current and future generations.
- (v) the project would be a material source of GHG emissions and contribute to climate change.

(24) The unacceptable planning, visual and social impacts justify the refusal of the project and are the better reason for refusal. The GHG emissions of the project and its likely contribution to adverse impacts on the climate system, environment and people provide a further reason for refusal.

Cases Cited

Abley v Yankalilla District Council (1979) 22 SASR 147; 58 LGRA 234.

Aldous v Greater Taree City Council (2009) 167 LGERA 13.

Australian Conservation Foundation v Latrobe City Council (2004) 140 LGERA 100.

Border Power Plant Working Group v Department of Energy v Department of Energy 260 F Supp 2d 997 (2003).

BP Australia Ltd v Campbelltown City Council (1994) 83 LGERA 274.

Broad v Brisbane City Council [1986] 2 Qd R 317; (1986) 59 LGRA 296.

- Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Ltd* (2013) 194 LGERA 347.
- Coast and Country Association of Queensland Inc v Smith* [2016] QCA 242.
- Coast and Country Association of Queensland Inc v Smith* [2015] QSC 260.
- Commonwealth v Tasmania (Tasmanian Dam Case)* (1983) 158 CLR 1.
- Environment and Heritage, Minister for v Queensland Conservation Council Inc* (2004) 139 FCR 24; 134 LGERA 272.
- Gippsland Coastal Board v South Gippsland Shire Council (No 2)* [2008] VCAT 1545.
- Gray v Minister for Planning* (2006) 152 LGERA 258.
- Hancock Coal Pty Ltd v Kelly (No 4)* (2014) 35 QLCR 56.
- Harris v Scenic Rim Regional Council* (2014) 201 LGERA 12.
- Hub Action Group Inc v Minister for Planning* (2008) 161 LGERA 136.
- Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221.
- Massachusetts v Environmental Protection Agency* 549 US 497 (2007).
- Mid States Coalition for Progress v Surface Transp Bd* 345 F (3d) 520 (2003).
- Montana Environmental Information Center v US Office of Surface Mining* 274 F Supp 3d 1074 (2017).
- Myers v South Gippsland Shire Council* [2009] VCAT 1022.
- Myers v South Gippsland Shire Council (No 2)* [2009] VCAT 2414.
- Netherlands, The State of the v Urgenda Foundation* (unreported, 200.178.245/01, 9 October 2018).
- Northcape Properties Pty Ltd v District Council of Yorke Peninsula* [2008] SASC 57.
- Planning, Minister for v Walker* (2008) 161 LGERA 423.
- Rainbow Shores Pty Ltd v Gympie Regional Council* [2013] QPEC 26.
- San Juan Citizens Alliance v United States Bureau of Land Management* 326 F Supp 3d 1227 (2018).
- Sierra Club v Federal Regulatory Commission* 867 F (3d) 1357 (2017).
- Taralga Landscape Guardians Inc v Minister for Planning* (2007) 161 LGERA 1.
- Telstra Corp Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256; 146 LGERA 10.
- Urgenda Foundation v The State of the Netherlands* (unreported, Hague Dist Ct, C/09/456689/HA ZA 13-1396, 24 June 2015).
- Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* (2014) 86 NSWLR 527; 200 LGERA 375.
- WildEarth Guardians v United States Bureau of Land Management* 870 F (3d) 1222 (2017).
- Wollar Progress Association Inc v Wilpinjong Coal Pty Ltd* [2018] NSWLEC 92.

Appeal

These proceedings concerned the environmental impact assessment of a proposed open cut mine following refusal of a development application for the project by the first respondent. The facts of the case are set out in the judgment.

A Galasso SC with *C Ireland*, for the applicant.

K Stern SC with *T Phillips* and *M Sherman*, for the first respondent.

R White, for the second respondent.

Cur adv vult

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8 February 2019

Preston CJ.

An open cut coal mine is proposed

1 There is a valley, near Rocky Hill, that a coal mine proposes to cut and fill. The Gloucester valley is a creature of a unique topographic feature. The valley is the floor of a nest, the sides being ranges east and west. The Bucketts is the rocky range to the west. The Mograni range is the mountain range to the east. Both ranges are forest clad. Over aeons, the ranges have eroded. The foothills are talus and slopes, broken by gullies and creeks. The valley floor is an alluvial plain, through which the Avon River flows.

2 In this topographical embrace nestles the country town of Gloucester. The valley and footslopes surround the town. The higher ranges complete the enclosure. The setting is scenic and serene. An idyll, some suggest.

3 Beneath the surface of the valley lies the mineral resource of coal. Geological forces have pushed productive seams of coal near to the surface in the valley beneath Rocky Hill.

4 A mining company, Gloucester Resources Limited (GRL), wishes to mine this coal. It has proposed an open cut coal mine to produce 21 million tonnes of coal over a period of 16 years.

5 The location of this coal resource, and hence the open cut mine, is close to the town of Gloucester. The town has a core of denser urban development and a penumbra of rural-residential estates and smaller agricultural and agri-tourism properties. These outliers of the town are within one to two kilometres of the boundary of the proposed mine. Some properties within the rural-residential estates are only about a kilometre from the mining pit. They are even closer to the large earthen barrier that will be constructed to shield the mining pit from direct view.

6 The proposed mine has divided the community of Gloucester. Of the submissions on the amended development application, 90% opposed the mine and of the submissions from the Gloucester postcode, 83% opposed the mine. They are concerned about the noise and dust impacts of the mine, the adverse impacts on the visual amenity and rural and scenic character of the valley, and the social impacts on the community. They are also concerned that the opening of a new coal mine will contribute to climate change. The supporters of the mine primarily invoke the economic benefits that a new mine will bring, including local employment and expenditure.

7 The proponent, GRL, unsuccessfully applied to the Minister for Planning for development consent for the Rocky Hill Coal Project. The Minister, by his delegate the Planning and Assessment Commission, refused consent to the mine. GRL appealed to this Court. The Court on the appeal exercises the function of the Minister as the consent authority to determine the development application for the Rocky Hill Coal Project.

8 I have determined that GRL's development application for the Rocky Hill Coal Project should be refused. The mine will have significant adverse impacts on the visual amenity and rural and scenic character of the valley, significant adverse social impacts on the community and particular demographic groups in the area, and significant impacts on the existing, approved and likely preferred uses of land in the vicinity of the mine. The construction and operation of the mine, and the transportation and combustion of the coal from the mine, will

result in the emission of greenhouse gases, which will contribute to climate change. These are direct and indirect impacts of the mine. The costs of this open cut coal mine, exploiting the coal resource at this location in a scenic valley close to town, exceed the benefits of the mine, which are primarily economic and social. Development consent should be refused.

The development application for the Rocky Hill Coal Project

9 GRL lodged a development application for consent to carry out the Rocky Hill Coal Project on 18 December 2012. The Rocky Hill Coal Project is State significant development within the meaning of s 89C(1) now s 4.36(1) of the *Environmental Planning and Assessment Act 1979* (NSW) (EPA Act). It is development for the purposes of coal mining as defined in Item 5 of Sch 1 to State Environmental Planning Policy (State and Regional Development) 2011 (NSW) (SEPP SRD) and is declared by cl 8 of SEPP SRD to be State significant development. The Minister for Planning is the consent authority for State significant development (the former s 89D(1) now s 4.5 of the EPA Act). Accordingly, GRL lodged its development application with the Department of Planning and Environment (the Department).

10 The originally proposed development was to extract 2.5 million tonnes per year of run-of-mine (ROM) coal from a new open cut mine and to construct a coal handling and preparation plant as well as an overland conveyor to transport product coal to a dedicated load-out bin and rail loop for transportation to the Port of Newcastle.

11 On 11 August 2016, the Minister's delegate agreed to accept, and GRL lodged, an amended development application and amended environmental impact statement (EIS) for the State significant development of the Rocky Hill Coal Project (under cl 55(1) of the *Environmental Planning and Assessment Regulation 2000* (NSW) (EPA Regulation)). The amended EIS for the amended Rocky Hill Coal Project stated that the principal coal product to be produced from the Rocky Hill Coal Mine is coking coal which is used in the manufacture of steel. The maximum ROM coal production would be 2 million tonnes per annum and the total ROM coal production would be 21 million tonnes.

12 The Rocky Hill Coal Project is estimated to be developed, operated and rehabilitated over a period of up to 21 years. The site establishment and construction stage would occur over a period of approximately 10 months, mining operations would occur over a period of approximately 16 years and final void backfilling and closure would occur over approximately 3 years.

13 Of the site area of approximately 832ha, about 500ha would be disturbed throughout the life of the Rocky Hill Coal Project.

14 The proposed mine is to consist of the following principal components, the location of which is identified in Figure B to the Executive Summary to the amended EIS:

- (a) Three contiguous open cut pits (Avon, Bowen Road and Main Pits) varying in depth from approximately 80m to 220m, lying to the west of what is currently McKinley's Lane;
- (b) a long-term "amenity barrier" to the west and north of the site stretching for around 2.5km north-south, with variable height, rising between 10-40m above the natural ground level (amended EIS, p 2-42), as well as two interim barriers which are intended to visually screen areas of activity and provide for noise mitigation;

- (c) a consolidated in-pit and permanent out-of-pit overburden emplacement (at the base of the hill after the incline commences) and an interim overburden emplacement (which would be removed at the cessation of coal extraction with the overburden materials from that area used to backfill the final void);
- (d) a ROM pad and associated breaker station comprising a feed conveyor, rotary breaker, a sized coal conveyor and coal bin from which the trucks would be loaded; and
- (e) a new sealed 4.4km private haul road to be used by multi-combination trucks to transport ROM coal from the coal bin at the Rocky Hill Site to the Stratford Mining Complex.

15 During an approximate 10 month period following the grant of development consent and other required approvals, GRL proposes to undertake site establishment activities, including the construction of water management structures and the private haul road and upgrading of the surrounding public roads.

16 Sequential mining operations would involve the following:

- (a) Vegetation clearing – around 51.8ha of remnant native vegetation is to be progressively cleared.
- (b) Soil removal and stockpiling – topsoil (to a depth of 10-15cm) and subsoil (to a further depth of 60-85cm) from the pit site will be stripped and stored until the sequence of mining allows its transfer onto the final landform.
- (c) Overburden removal – the majority of overburden from the initial 2 years of mining would be used to construct the western and northern amenity barriers. Subsequently, the overburden would be placed within the proposed footprint of disturbance either beyond the open cut pits or within the open cut pits. Reject (rock) materials from the rotary breaker would be collected from the reject stockpile and backloaded by haul trucks to the overburden emplacement where they would be mixed randomly with the overburden. As the final landform is progressively developed from Year 3 onwards, long-term revegetation activities would be undertaken.
- (d) Coal recovery – the coal exposed in each open cut pit would be removed by excavator and transported by haul truck to the ROM pad.
- (e) Rehabilitation – areas of disturbance would be progressively rehabilitated (either temporarily or permanently). The final void would be backfilled in an attempt to create a landform resembling the landscape prior to development. The achievability of this aim was questioned by the Minister.

17 The construction workforce for the mining development would be 60 persons and the operations workforce would be 110 persons. The amended EIS states that GRL has “retained its target of 75% of locally resident employees by the end of Year 3 operations”. While this may be GRL’s target, the achievability of such target was questioned by the Minister.

18 Mining operations would occur during the daytime during Years 1-3 (7am-6pm Monday to Friday and 8am-1pm Saturday) and the daytime and evening (7am-10pm Monday to Saturday) from Years 4-16.

19 During operations, there are expected to be approximately 156 to 278 light vehicle movements and 10 to 18 heavy vehicle movements occurring per day.

Peak operational traffic movements would occur around shift start and finish times, between 6am and 7am, 1.45pm and 2.45pm, 5.30pm and 6.30pm and 10.15 and 10.45pm.

The assessment and determination of the development application

20 As required by the former s 89F(1) of the EPA Act, the amended Project Application was placed on exhibition from 17 August to 14 October 2016. At the conclusion of this exhibition period, the Department had received 2,570 submissions, with 2,308 in objection and 261 in support. Thus, approximately 90% of submissions opposed the mining development. Of the 2,308 objections received, 2,294 were individual letters (including 1,108 form letters) and 14 were from special interest groups. 72% of objectors raised the visual impacts of the mine as a reason for refusal. 66% of objectors raised the location of the mine and its proximity to other land uses.

21 Pursuant to cl 85A of the EPA Regulation, on 26 October 2016, the Department wrote to GRL requesting a response to this second round of submissions. GRL provided its response on 19 June 2017. In October 2017, the Department published its environmental assessment report on the amended Rocky Hill Coal Project. The Department concluded:

Having assessed all matters relevant to the amended project as set out in this report, the Department does not consider that the amended project is able to or should be approved, and the Department does not recommend that the Commission approve the development.

22 On 23 October 2017, the amended development application was referred to the Planning and Assessment Commission, as the delegate of the Minister, for determination. On 14 December 2017, the Commission determined the amended development application under the former s 89E(1) of the EPA Act by refusing consent to the application. The Commission gave three reasons:

- (1) The creation and operation of an open cut coal mine in this proposed location, within the RU1 and E3 zones of the Gloucester Local Environmental Plan 2010, is in direct contravention of each zone's objectives;
- (2) The residual visual impact of the mine would be significant throughout all stages of the Project; and
- (3) The Project is not in the public interest.

The appeal to the Court against the Minister's refusal

23 On 19 December 2017, GRL filed an appeal under then s 97 now s 8.7 of the EPA Act against the Minister's refusal of consent. On 23 April 2018, the Court ordered that Gloucester Groundswell Inc be joined as a party to the proceedings, pursuant to s 8.15(2) of the EPA Act. Gloucester Groundswell is a local community action group concerned about the impacts of the Rocky Hill Coal Project on the local community and on the local and wider environment.

24 The Minister and Gloucester Groundswell raised numerous contentions as to why they said development consent should be refused to the Rocky Hill Coal Project. As finally pleaded in the Minister's amended statement of facts and contentions filed 23 May 2018 and Gloucester Groundswell's statement of facts and contentions filed 1 May 2018, the principal contested issues may be summarised as:

- (1) the incompatibility of the proposed mine with the existing, approved and likely preferred uses of land in the vicinity of the proposed mine,

- under cl 12 of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (NSW) (the Mining SEPP);
- (2) the adverse visual impacts of the mine;
 - (3) the adverse social impacts of the mine, including social impacts caused by the noise, dust and visual impacts of the mine;
 - (4) the economic and public benefits of the mine are uncertain and overstated and not shown to be greater than the public costs of the mine; and
 - (5) the Rocky Hill Coal Project is not in the public interest because:
 - (a) of the matters in (1) to (4) above; and
 - (b) it is contrary to the principles of ecologically sustainable development because the direct and indirect greenhouse gas emissions of the mine will contribute to climate change.

The planning framework for determining the mine proposal

- 25 As noted above, GRL's development application for the Rocky Hill Coal Project is in respect of State significant development. The power to determine a development application in respect of State significant development is in s 4.38(1) of the EPA Act, which provides:

The consent authority is to determine a development application in respect of State significant development by:

- (a) granting consent to the application with such modifications of the proposed development or on such conditions as the consent authority may determine, or
- (b) refusing consent to the application.

- 26 Although development consent may not be granted if the development is wholly prohibited by an environmental planning instrument (see s 4.38(2)), development consent may be granted despite the development being partly prohibited by an environmental planning instrument (s 4.38(3)). These subsections are not engaged in the facts of this case. As explained below, the applicable Gloucester Local Environmental Plan 2010 (NSW) (GLEP 2010) permits open cut coal mining with consent in the RU1 Primary Production zone (which applies to 23% of the site of the Rocky Hill Coal Project) but prohibits open cut coal mining in the E3 Environmental Management zone (which applies to 77% of the site). However, cl 7(1)(b) of the Mining SEPP makes mining permissible with consent in the E3 Environmental Management zone because development for the purposes of extensive agriculture may be carried out without consent in that zone. The Mining SEPP prevails to the extent of any inconsistency over GLEP 2010. Development for the purpose of mining is therefore permitted on the whole site.

- 27 Section 4.15 of the EPA Act applies to the determination of the development application for State significant development (s 4.40 of the EPA Act). Section 4.15(1) provides:

- (1) In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:
 - (a) the provisions of:
 - (i) any environmental planning instrument, and
 - (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been

notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and

- (iii) any development control plan, and
- (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and
- (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),
that apply to the land to which the development application relates,
- (b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,
- (c) the suitability of the site for the development,
- (d) any submissions made in accordance with this Act or the regulations,
- (e) the public interest.

28 The relevant environmental planning instruments are the Mining SEPP and GLEP.

29 The aims of the Mining SEPP are stated in cl 2 to include:

The aims of this Policy are, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries:

- (a) to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and
- (b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and
- (b1) to promote the development of significant mineral resources, and
- (c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources, and ...

30 The Mining SEPP applies to all of New South Wales (cl 4). If the Mining SEPP is inconsistent with any other environmental planning instrument, the Mining SEPP prevails to the extent of the inconsistency (cl 5(3) of the Mining SEPP and see s 3.28(1)(a) of the EPA Act).

31 Clause 7 of the Mining SEPP makes certain mining development permissible with consent, including “mining carried out ... on land where development for the purposes of agriculture or industry may be carried out (with or without consent)” (cl 7(1)(b)(i) of the Mining SEPP). “Mining” is defined in cl 3(2) of the Mining SEPP to mean:

the winning or removal of materials by methods such as excavating, dredging, or tunnelling for the purpose of obtaining minerals, and includes:

- (a) the construction, operation and decommissioning of associated works, and
- (b) the stockpiling, processing, treatment and transportation of materials extracted, and
- (c) the rehabilitation of land affected by mining.

32 Open cut mining is a type of mining and is defined in cl 3(2) of the Mining
SEPP to mean “mining carried out on, and by excavating, the earth’s surface but
does not include underground mining”.

33 As explained below, GLEP 2010 permits without consent development for
the purposes of extensive agriculture in the E3 Environmental Management
zone and permits without consent development for the purposes of extensive
agriculture and with consent development for the purposes of agriculture in the
RU1 Primary Production zone. Extensive agriculture is a type of agriculture and
is defined in GLEP 2010 to mean “any of the following: the production of crops
or fodder (including irrigated pasture and fodder crops) for commercial
purposes, the grazing of livestock for commercial purposes, beekeeping, or a
dairy (pasture-based)”.

34 Clause 7(1)(b)(i) of the Mining SEPP therefore makes mining permissible
with consent in the E3 Environmental Management zone, notwithstanding that
mining is prohibited in that zone by GLEP 2010. The Mining SEPP prevails
over GLEP 2010 to the extent of any inconsistency.

35 Clause 12 of the Mining SEPP requires the consent authority, before
determining a development application for mining, to consider the compatibility
of the proposed mine with other land uses in the vicinity of the mine. Clause 12
provides:

Before determining an application for consent for development for the purposes of
mining, petroleum production or extractive industry, the consent authority must:

(a) consider:

(i) the existing uses and approved uses of land in the vicinity of the
development, and

(ii) 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

(iii) any ways in which the development may be incompatible with any
of those existing, approved or likely preferred uses, and

(b) evaluate and compare the respective public benefits of the development
and the land uses referred to in paragraph (a) (i) and (ii), and

(c) evaluate any measures proposed by the applicant to avoid or minimise any
incompatibility, as referred to in paragraph (a) (iii).

36 Clause 12 is critical to the Minister’s and Gloucester Groundswell’s principal
contention that the Rocky Hill Coal Project should be refused. I will address the
clause in more detail when I deal with that contention.

37 Clause 12AB identifies various non-discretionary development standards for
mining for the purposes of s 4.15(2) and (3) of the EPA Act (cl 12AB(2) of
Mining SEPP). The object of the clause is stated in cl 12AB(1):

The object of this clause is to identify development standards on particular matters
relating to mining that, if complied with, prevents the consent authority from
requiring more onerous standards for those matters (but that does not prevent the
consent authority granting consent even though any such standard is not complied
with).

38 The development standards identified in cl 12AB include standards with
respect to the cumulative noise level (cl 12AB(3)) and cumulative air quality
level (cl 12AB(4)). The standards for the cumulative noise level and cumulative
air quality level were amended after the hearing of the appeal concluded. State

Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Air and Noise Impacts) 2018 (NSW), which commenced on 21 September 2018, applies to development applications made but not finally determined, before the commencement of the amendment (cl 23 of the Mining SEPP).

39 The amended cumulative noise level standard in s 12AB(3) is:

The development does not result in a cumulative amenity noise level greater than the recommended amenity noise levels, as determined in accordance with Table 2.2 of the Noise Policy for Industry, for residences that are private dwellings.

40 The “Noise Policy for Industry” is defined in cl 12AB(9) to mean “the document entitled *Noise Policy for Industry* published by the Environment Protection Authority and in force as at the commencement of this clause”. That NSW Noise Policy for Industry is the policy published in 2017. It replaced the NSW Industrial Noise Policy 2000.

41 The amended cumulative air quality level standard in cl 12AB(4) is:

The development does not result in a cumulative annual average level greater than 25 µg/m³ of PM₁₀ or 8 µg/m³ of PM_{2.5} for private dwellings.

42 This cumulative air quality level is stricter than the former cumulative air quality level in two respects: firstly, it lowers the cumulative annual average level of particles sized PM₁₀ from 30 µg/m³ to 25 µg/m³ and, secondly, it introduces a cumulative annual average level for particles sized PM_{2.5}, which is 8 µg/m³.

43 Subsections 4.15(2) and (3) of the EPA Act regulate the consent authority’s consideration of the non-discretionary development standards. Those subsections provide:

- (2) If an environmental planning instrument or a regulation contains non-discretionary development standards and development, not being complying development, the subject of a development application complies with those standards, the consent authority:
 - (a) is not entitled to take those standards into further consideration in determining the development application, and
 - (b) must not refuse the application on the ground that the development does not comply with those standards, and
 - (c) must not impose a condition of consent that has the same, or substantially the same, effect as those standards but is more onerous than those standards, and the discretion of the consent authority under this section and section 4.16 is limited accordingly.
- (3) If an environmental planning instrument or a regulation contains non-discretionary development standards and development the subject of a development application does not comply with those standards:
 - (a) subsection (2) does not apply and the discretion of the consent authority under this section and section 4.16 is not limited as referred to in that subsection, and
 - (b) a provision of an environmental planning instrument that allows flexibility in the application of a development standard may be applied to the non-discretionary development standard.

44 There was a limited contest between the parties as to the effect of s 4.15(2). The Minister and Gloucester Groundswell argued that s 4.15(2) does not preclude an assessment of the qualitative aspects of the development which may be affected by the matters to which the non-discretionary development standards

relate and that cl 12AB of the Mining SEPP does not constrain a consent authority from refusing consent or imposing conditions of consent in relation to any matter or measurement that is not covered by the non-discretionary standards identified in cl 12AB of the Mining SEPP. GRL argued that, in some cases, the respondent's submissions overstepped the mark of what can be considered under s 4.15(2) of the EPA Act and cl 12AB of the Mining SEPP. I will address this contest when I deal with the issues of the adverse noise impacts and the economic and social impacts.

45 Clause 12A requires the consent authority to consider the Minister's voluntary land acquisition and mitigation policy. Subclause 12A (2) provides:

- (2) Before determining an application for consent for State significant development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider any applicable provisions of the voluntary land acquisition and mitigation policy and, in particular:
 - (a) any applicable provisions of the policy for the mitigation or avoidance of noise or particulate matter impacts outside the land on which the development is to be carried out, and
 - (b) any applicable provisions of the policy relating to the developer making an offer to acquire land affected by those impacts.

46 The "voluntary land acquisition and mitigation policy" is defined in cl 12A(1) to mean "*Voluntary Land Acquisition and Mitigation Policy* approved by the Minister and published in the Gazette on the date on which State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Air and Noise Impacts) 2018 is published on the NSW legislation website" (which was 21 September 2018).

47 Clause 14, 15, 16 and 17 of the Mining SEPP require the consent authority, before granting consent to the development for the purposes of mining, to consider whether the consent should be issued subject to conditions relating to natural resource management and environmental management (cl 14), resource recovery (cl 15), transport (cl 16) and rehabilitation (cl 17).

48 Clause 14(2) of the Mining SEPP also requires consideration of an assessment of the greenhouse gas emissions (including downstream emissions) of development for the purposes of mining.

49 GLEP 2010 is the applicable local environmental plan. The particular aims of GLEP 2010 stated in cl 1.2(2) are:

- (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,
- (f) to encourage a mix of housing to meet the needs of the community,
- (g) to provide a secure future for agriculture

50 The majority of the site of the Rocky Hill Coal Project (77%) is zoned E3 Environmental Management. The objectives of the E3 zone are:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To conserve biological diversity and native vegetation corridors, and their scenic qualities, in a rural setting.

51 Land uses permitted without consent in the E3 zone include extensive agriculture, which is defined to include the production of crops or fodder for commercial purposes, raising of livestock for commercial purposes or a pasture-based dairy. Land uses permitted with consent in the E3 zone include various residential and tourism uses, such as backpackers' accommodation, bed and breakfast accommodation, camping grounds, caravan parks, dual occupancies, dwelling houses, eco-tourist facilities and farm stay accommodation. Land uses prohibited in the E3 zone include industries, high density residential uses and retail and wholesale uses, as well as any other development not specified as being permitted without consent or with consent. Mining, including open cut mining, would fall into this last mentioned category and is prohibited in the E3 zone by GLEP 2010.

52 The minority of the site of the Rocky Hill Coal Project (23%) is zoned RU1 Primary Production. The objectives of the RU1 zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To encourage eco-tourism enterprises that minimise any adverse effect on primary industry production and the scenic amenity of the area.

53 Land uses permitted without consent in the RU1 zone include extensive agriculture. Land uses permitted with consent in the RU1 zone include various types of agriculture; various residential tourism uses, such as backpackers' accommodation, bed and breakfast accommodation, camping grounds, caravan parks, dual occupancies, dwelling houses, eco-tourist facilities and farm stay accommodation; various types of industries; and open cut mining. The land uses that are prohibited in the RU1 zone are any development not specified as being permitted without consent or with consent.

54 In the vicinity of the proposed mine there are large lot residential estates, including the Forbesdale, Thunderbolt and Avon River Estates, which are zoned R5 Large Lot Residential. The objectives of the R5 zone are:

- To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality.
- To ensure that large residential lots do not hinder the proper and orderly development of urban areas in the future.
- To ensure that development in the area does not unreasonably increase the demand for public services or public facilities.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

55 There is a restricted range of land uses permitted without consent in the R5 zone. The land uses that are permitted with consent in the R5 zone include dual occupancies, dwelling houses and bed and breakfast accommodation. Land uses that are prohibited in the R5 zone are any development not specified as being permitted without consent or with consent. Mining, including open cut mining, falls into this category and is prohibited.

56 The Gloucester Development Control Plan 2010 (DCP) applies to the site of the Rocky Hill Coal Project. In the Guidelines for subdivision in rural and environmental protection zones, the DCP “requires the protection of the environment and scenic qualities and character of the area by minimising the impact areas and retaining existing vegetation” (p 105 of the DCP).

The impacts of the mine on existing, approved and likely preferred uses

57 The Minister’s principal contention as to why the Rocky Hill Coal Project should be refused was the incompatibility of the proposed mine with other land uses in the vicinity, contrary to cl 12 of the Mining SEPP. Clause 12 requires the consent authority to make three evaluations. The first, in cl 12(a) is to consider:

- (i) the existing uses and approved uses of land in the vicinity of the development, and
- (ii) 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
- (iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses.

The vicinity of the development

58 Subclause 12(a) of the Mining SEPP refers to land uses “in the vicinity of the development”. The parties’ planners, Mr Ryan for GRL and Mr Darroch for the Minister, agreed that from a planning perspective, the “vicinity” of the development extends beyond the land directly abutting the site of the Rocky Hill Coal Project. Determining the uses of land in the vicinity involves consideration of not only the proximity or nearness in space of the uses of land to the proposed mine, but also visual considerations and “demographic and geographic features of the area” (*Abley v Yankalilla District Council* (1979) 22 SASR 147 at 152-153; 58 LGRA 234 at 239-240).

59 The planners agreed that the area in the “vicinity” of the proposed mine is generally described in Mr Ryan’s evidence (at [14] and Figure 1) as extending, in the north, to the north of the town of Gloucester; in the south, to the south of the Stratford Mine Complex; in the east, to the Mograni Range; and in the west, to the rise of the Bucketts Range. The planners agreed that the Forbesdale, Avon River and Thunderbolt rural residential estates and the town of Gloucester were included within this area of the vicinity.

60 Mr Ryan stated that identification of the “vicinity” of a development, in a planning context, turns on the question of “what land is potentially open to experiencing some impact from a particular development?” Thus the areas that lie within the “vicinity” of a given mining proposal will turn on the nature and extent of the potential impacts of that proposal. Mr Darroch generally agreed with this approach but did not consider that the operational measures implemented to mitigate the impacts of the development may affect how one views its “vicinity”; that is, the sphere of potential impacts.

61 Mr Darroch further observed that one should not take a static approach to the land uses in the “vicinity” of the proposed Rocky Hill Site as “the occupants and visitors to the valley are never fixed in any area”. He provided the example of a resident of the Forbesdale Estate, who will not just experience the impacts of the proposed mine statically from their living room window or front yard, but who will be impacted by the mine as they move through the whole of the space characterised as the “vicinity”. Indeed, many of the objectors referred to their enjoyment of their rural properties by reason of their ability to horse ride and walk around the large parcels of land.

The existing, approved and likely preferred uses

62 Subclause 12(a) of the Mining SEPP requires consideration of three types of uses of land in the vicinity of the development: existing uses, approved uses and likely preferred uses.

63 Existing uses are uses of land that are actual, physical and lawful. The planners agreed, and I find, that the existing uses in the vicinity of the proposed mine include: residential (including rural-residential estates); tourism uses (including tourist and visitor accommodation and tourism activities); agri-business (such as the Hillview Herb Farm) and agriculture (including cattle grazing, hobby farms and dairy farming); and uses associated with Gloucester township, including commercial (retail and business), recreational facilities (such as the golf course) and social infrastructure facilities (such as the high school and the hospital). Mr Ryan also included the Stratford Mine as an existing land use in the vicinity. Mr Darroch observed that there was some overlap between tourist, residential and agricultural uses, with rural lifestyle “tree changers” supplementing their income by providing tourist accommodation and engaging in farming activities.

64 Approved uses are uses that have been approved by the grant of development consent under the EPA Act, but have not commenced in accordance with the consent. The planners agreed, and I find, that the approved land uses, to which development consents have been granted in the last 12 months, include new and modified dwellings, modifications to commercial premises and boundary adjustments.

65 Likely preferred uses refer to uses of the land that, having regard to land use trends, are likely to be the preferred uses of land in the vicinity.

66 The planners agreed that indicators of land use trends, giving rise to likely preferred uses, are: the historical, current and approved uses of the land; the planning controls under the applicable land use zonings, including the range of permissible uses in each zone, the objectives of each zone, and the development standards for development in the zone, such as the minimum lot size; uses identified in State, regional and local strategic plans, studies and strategies as being preferred future uses; and economic circumstances.

67 Mr Darroch further observed that land use trends indicating the likely preferred uses may be observed from historical progressions in planning instruments and planning strategies. In this regard, he compared the express aims of the GLEP 2010 to those contained in the preceding instrument, the Gloucester Local Environmental Plan 2000 (GLEP 2000) and identified a “very significant change and significant indicator of trend”, namely, a shift away from the former objective of protecting “prime crop and pasture land” to an objective of protecting “rural lands”, indicating a focus on a broader range of land uses in the rural areas than just crop and pasture land. Mr Darroch considered that the

change in the objective from protecting “prime crop and pasture land” to providing “a secure future for agriculture” recognises a change in the type of rural activity and agricultural pursuits.

68 Mr Darroch also identified an increased emphasis in GLEP 2010 (when compared with GLEP 2000) on promotion of the principles of ecologically sustainable development, conservation of biological diversity and recognition of the cumulative impacts of climate change (cl 1.2(2)(d) and (e) of GLEP 2010).

69 A comparison of the GLEP 2000 and GLEP 2010 zoning maps reveals, in this regard, that a substantial parcel of land toward the south of the Forbesdale estate, previously zoned as the equivalent of what is now RU1 (Primary Production), has been rezoned E3 (Environmental Management) under the current GLEP 2010.

70 Mr Darroch noted an even more pronounced shift in land use trends when GLEP 2010 is compared to the still earlier instrument, being Gloucester Local Environmental Plan 1984, the aims of which were to “provide for the orderly expansion of urban development arising from mining projects in the Shire of Gloucester, and to ensure that the existing rural and natural qualities of the Shire are preserved”. The GLEP 2010 objectives contain no mention of mining projects. Mr Darroch considered that the change from “seeking the orderly expansion of urban development arising from mining projects” to the GLEP 2010 aims “to manage the resources of Gloucester”, “to protect rural lands, natural resources and assets of heritage significance” and “to manage development to benefit the community” (cl 1.2(2)(a), (b) and (c)), is a clear indicator of the progression that has led to the current rural land use trends.

71 Mr Darroch also considered the Gloucester Shire Council Housing Development Strategy 2006 (NSW) (HDS 2006) – described as the “cornerstone of the studies and strategies informing the preparation of the GLEP 2010 and the change in land use trends between 2000 and 2010” – to be important to ascertainment of relevant land use trends which inform the likely preferred uses in the vicinity of the Rocky Hill Site. The HDS 2006 noted that (p 16):

In 2000 Gloucester Shire Council gazetted the current Local Environmental Plan to guide development, including subdivision and housing, for a minimum period of twenty years. At this time, Gloucester Shire was undergoing a decline in population due to the impacts of a change in the timber industry and dairy deregulation.

In 2003, a development boom began to emerge across Australia and the excitement that was initiated by the Baby Boomer generation had a substantial impact on all residential, rural residential and rural land holdings across the shire.

72 The HDS 2006 also included the following analysis of “Rural lifestyle housing” (p 26):

The problem with the utilisation of land areas of 100 Ha for generally dwelling construction is that the land available for agricultural activities requiring larger parcels is becoming limited and very expensive. Due to this rise in land value, the purchase of land for traditional agriculture is no longer viable, as a greater return is being realised from the subdivision and sale of the land.

73 The HDS continued (pp 28-29):

The development concessions available and the subdivision of lots to obtain a dwelling entitlement have resulted in a progressive change to the agricultural landscape in Gloucester Shire. The traditional farms that have been impacted by

government policy and economic change are now developing as residential lots with agriculture as a supplementary activity. This agricultural change has fragmented traditional agriculture; however is allowing the emergence of a variety of agricultural industries to develop as indicated in the Local Environmental Study.

Rural housing is developing and is taking a number of forms, from weekend occupation of caravans and rural sheds to the construction of large homes and entertaining facilities. An emergence of home business operations is occurring as people are opting out of city life and running businesses partly from the rural home. Other permanent business opportunities are growing in the boutique agricultural sector and in bed and breakfast, farm stays and tourism ventures.

New rural housing does have the draw back of conflicts with agricultural activities as to times of operation of machinery, fertilizer spreading, spray control and burning off of vegetation. Generally complaints have been received by Council from new residents who have purchased land for life style reasons and have not recognized the right to farm principle. These complaints are very small in number.

The positives of new rural housing is that rural areas that experienced a decline in population have been revitalized by new residents who are adding to rural activities, joining the rural fire service and participating in local activities in th[eir] respective community groups. This revitalization of rural communities is a positive transition.

74 Mr Darroch observed that, according to the HDS 2006, the location of future land release areas for the kinds of “lifestyle” farms/dwellings to which the strategy refers is to the south-east of the Gloucester village, and directly to the north of the proposed mine site, which gives an indication of the likely preferred uses in these areas.

75 Mr Darroch further observed that the change from historically agriculture on large lots towards the rural lifestyle agriculture of the “tree changers” is also commented upon in the Agricultural Strategy for Gloucester Shire 2015 (NSW) (GAS 2015) which notes that “[t]here are a large number of hobby or life-style farms in the Shire. This is primarily the result of retirees and some life-style change people moving to the area because of its attractive climate, scenery and location”(p 13). Mr Darroch identified that this “confirms the changing trends from large lot cropping and grazing to rural lifestyle land use, which contributes to an understanding of the ‘likely to be preferred uses of land in the vicinity of the development’”. The GAS 2015 also emphasised the “clean and green environment” could be a marketing attribute both for Gloucester tourism and agricultural businesses (pp 16-17).

76 Mr Ryan agreed with Mr Darroch’s comments on the GAS 2015 that hobby farms and small scale farms had both positive and detrimental effects in the Shire.

77 Mr Darroch further considered that the tourism uses described in the GAS 2015 and HDS 2006 were likely preferred uses with a propensity to grow in the area.

78 In this connection, the Destination Management Plan for 2015-2018 identified tourism as a key component in creating a strong economy and noted that a key outcome was “an improved quality and number of tourism facilities, products and operators” (p 4).

79 The planners agreed, and I find, that the likely preferred uses, having regard to the land use trends in the vicinity of the Rocky Hill Coal Project, include:

agri-business and agriculture; rural dwellings and farm stays; large lot residential dwelling houses; tourism accommodation and tourism operators, including agri-tourism; and residential and non-residential uses associated with the Gloucester township.

80 Although Mr Ryan added mining as a likely preferred use, this was rejected by Mr Darroch. The requirement for the consent authority to examine the likely preferred uses under clause 12 of the Mining SEPP only arises for development that is otherwise permissible with consent under the Mining SEPP. If the fact that a mining proposal were permissible with consent was enough to lead to a conclusion that mining is a likely preferred use, the consideration and balancing process provided for under clause 12 would have little work to do. Mr Darroch stated, in this regard:

[I]f it were sufficient for permissibility of a use to lead to a conclusion that the use is a Likely Preferred Use, there would be no need for the SEPP to refer to land use trends or preferred uses, which necessarily makes DR's [David Ryan's] argument circular.

81 I agree that mining should not be considered to be a likely preferred use in the vicinity of the mining merely because the Mining SEPP makes mining permissible with consent in the zones in the vicinity of the proposed mine.

The impact of the proposed mine on the likely preferred uses

82 Paragraph 12(a)(ii) of the Mining SEPP requires consideration of whether the proposed mine is likely to have a significant impact on the likely preferred uses in the vicinity of the proposed mine. The Minister and Gloucester Groundswell contended that the Rocky Hill Coal Project would have significant visual impacts, amenity impacts (by reason of the noise and air quality impacts) and social impacts on the likely preferred uses. GRL contended that the design and operation of the Rocky Hill Coal Project, and the mitigation measures GRL proposes, will ensure that the proposed mine will not have a significant impact on the likely preferred uses. I analyse the visual, amenity and social impacts in successive sections of the judgment below. For the reasons I give below, I find that, by reason of the visual, amenity and social impacts, the Rocky Hill Coal Project will have a significant impact on the likely preferred uses in the vicinity of the proposed mine.

The incompatibility with the existing, approved or likely preferred uses

83 Paragraph 12(a)(iii) of the Mining SEPP requires consideration of any ways in which the proposed mine may be incompatible with any of the existing, approved or likely preferred uses. Subclause 12(c) of the Mining SEPP requires an evaluation of any measures proposed by the applicant to avoid or minimise any incompatibility found under cl 12(a)(iii).

84 The Minister and Gloucester Groundswell contended that the Rocky Hill Coal Project will be incompatible with existing, approved and likely preferred uses in the following ways: the adverse impact on the rural character of land in the vicinity; the adverse impact on the residential and rural-residential uses in the vicinity; the adverse impacts on the agricultural uses in the vicinity; and the adverse impacts on tourism uses in the vicinity. The Minister and Gloucester Groundswell contended that the measures proposed by GRL will not avoid or minimise to an acceptable degree the incompatibility of the Rocky Hill Coal Project with the rural character and the residential, rural-residential, agricultural and tourism uses in the vicinity of the proposed mine.

85 GRL contended that the measures it proposed to mitigate the visual, amenity, and social impacts, including the amenity barriers to minimise visual and noise impacts, and the proposed conditions of consent, will ensure that the Rocky Hill Coal Project is not incompatible with the existing, approved and likely preferred uses in the vicinity of the proposed mine.

86 I address the visual, amenity, and social impacts of the proposed mine in successive sections below. For the reasons I give below, I find that the Rocky Hill Coal Project, by reason of its visual, amenity and social impacts, will be incompatible with the existing, approved and likely preferred uses in the vicinity and that the measures proposed by GRL will not avoid or minimise this incompatibility.

The comparative public benefits of the mine and other land uses

87 Subclause 12(b) of the Mining SEPP requires an evaluation and a comparison of the respective public benefits of the proposed mine and the existing, approved and likely preferred uses of land in the vicinity of the proposed mine. GRL contended that the Rocky Hill Coal Project will provide public benefits in terms of an economic benefit to NSW in order of \$224.5 million, in net present value terms, over the life of the mine; employment opportunities in the local community, with GRL expressing a desire to have 75% local employees; and economic opportunities for local suppliers, with GRL expressing a desire to spend 74% of total non-wage operational expenditure in the Taree-Gloucester area.

88 The Minister and Gloucester Groundswell contended that the claimed public benefits of the Rocky Hill Coal Project are uncertain and have been substantially overstated by GRL. In comparison, the Minister and Gloucester Groundswell contended that the public benefits of the existing, approved and likely preferred uses, if left unaffected by the proposed mine, are certain and will be substantial. Gloucester Groundswell also contended that the proposed mine will have significant public disbenefits by reason of the direct and indirect greenhouse gas emissions attributable to the mine, contributing to climate change.

89 I address the public benefits of the mine and other land uses below. For the reasons I give below, I find that the public benefits of the Rocky Hill Coal Project have not been proven to outweigh either the public costs of the proposed mine or the public benefits of the existing, approved and likely preferred uses in the vicinity if those uses were left unaffected by the proposed mine.

The visual impacts of the mine

90 There was some disagreement between the parties' experts on visual impacts, Mr Wyatt for GRL and Mr Moir for the Minister, as to the methodology that should be employed to assess the visual impacts of the proposed mine, including the applicability in Australia of the UK Guidelines for Landscape and Visual Impact Assessment. Nevertheless, in the end, there was general agreement on the approach that should be followed in order to assist the visual impacts of the Rocky Hill Coal Project. This involved:

- (a) an analysis of the existing visual environment to determine the baseline against which the visual impacts of the proposed mine are to be assessed;
- (b) a viewpoint analysis to identify sites likely to be affected by the proposed mine;

- (c) an assessment of the extent of the visual impacts of the proposed mine on the viewpoints, including the visual impacts during the life of the mine and, after completion of mining, the cumulative visual impacts of the mine and the night lighting impacts of the mine; and
- (d) an assessment of the extent to which the visual impacts are mitigated by the proposed mitigation measures.

The existing visual environment

91 Analysis of the existing visual environment includes identification and appraisal of the visual catchment, visual quality, landscape character, visual sensitivity and landscape values.

92 The visual catchment or viewshed of the proposed mine is the study area for the visual impact assessment. The viewshed is the area that may potentially be visually affected by the proposed mine. Mr Wyatt explained that the viewshed is not the same as the extent of visibility, as it might be possible to see components of the mine from areas outside the viewshed. Rather, the viewshed is the area from which there could be a visual impact.

93 Defining the viewshed is based on the elevations of the components of the mine and the parameters of human vision. Mr Wyatt noted that the town of Gloucester and the surrounding rural area in which the proposed mine is to be located is a landscape that includes both natural and man-made elements. In this type of landscape, the viewshed is defined by a distance at which the largest element of the mine would be an insignificant or negligible element in a viewer's field of view. The central field of view in human vision is approximately 10 degrees (15 degrees whilst sitting). An object which takes up less than 5% of this 10 degrees cone of view may be discernible. However, it is an insignificant element in a landscape which has other signs of human modification.

94 Mr Wyatt said that the viewshed for the mine is based on a distance at which a 50m visual barrier takes up 0.5 degrees of the vertical field of view. The vertical field of view is between 10 degrees to 15 degrees. Therefore, the viewshed of the mine would extend to a point at which a 50m high exposed face of the mine earthworks will take up less than 5% of the normal vertical field of view (ie 0.5 degrees). The distance of 6km was used by Mr Wyatt to define the edge of the viewshed or study area for this visual assessment.

95 Mr Wyatt noted that within a viewshed, differing zones of visual impact can be determined based upon the distance of the viewer to the exposed face of the largest visual component of the mine. The visual impact of the mine at 6km is obviously less than the visual impact of the mine seen from a distance of 0.5km, as the apparent height and scale of the mine changes as a person moves nearer or further away.

96 Mr Wyatt noted that at 6km, a fully visible face of the mine earthworks 50m in height would be approximately 0.5 degrees in vertical angle, and this is defined as the limit of the viewshed. Between 1km to 3km, there would be a visually noticeable visual impact where the face of the visual barrier would be visible in the landscape in most lighting conditions. The landscape between the view and the mine can reduce visual impact, more so if vegetation is closer to the viewer. Between 0.5km to 1km, a visually prominent visual impact occurs where the exposed faces of the mine earthworks have increased visibility and are visually prominent in the landscape. Vegetation is less effective at screening the mine, unless the vegetation is in close proximity to the viewer. At less than

0.5km, a visually dominant visual impact would occur where the component of the mine visible at this distance would dominate the landscape. Vegetation, to be effective as a screen, must be located immediately adjacent to the viewer.

97 The visual quality of the landscape refers to the value of the landscape to the community. Mr Moir explained that scenes of high visual quality are those which are valued by a community for the enjoyment, sense of place and improved amenity they create. Conversely, scenes of low visual quality are of little value to the community, with a preference that they be changed and improved, often through the introduction of landscape treatments. Mr Moir explained that the assessment of the visual quality of the landscape has regard to the following parameters:

- visual quality increases as relative relief and topographic ruggedness increases
- visual quality increases as vegetation pattern variations increase
- visual quality increases due to the presence of natural and/or agricultural landscapes
- visual quality increases owing to the presence of water forms in the landscape (without the water becoming a featureless expanse) and related to water quality and associated activity.
- visual quality increases with increases in land use compatibility.

98 Visual sensitivity is the measure of how critically a change to the existing landscape is viewed by people from different areas. Mr Moir explained that the assessment of visual sensitivity is based on the number of people affected, land use within the view and the distance of the viewer from the proposal. In considering the sensitivity of the receptor, two factors are considered: (a) the susceptibility of the receptor to the type of change arising from the specific proposal and (b) the value attached to the receptor. The magnitude of sensitivity is affected by: the size and scale of the effect, the geographical extent of the area affected, the duration of the effect and its reversibility.

99 Mr Moir explained that sensitivity assessment can be supported using a matrix approach. High, moderate and low ratings can be assigned to refer to the degree of visual sensitivity of a particular land use to a visual impact within a particular distance of that use. For example, Mr Moir assessed that residential uses, whether residences in a township or rural residences, would have a high visual sensitivity within 0km to 2km and within 2km to 4.5km, moderate visual sensitivity within 4.5km to 7km and low visual sensitivity at greater than 7km. Mr Wyatt agreed that the visual sensitivity is always considered to be high for residential receptors.

100 Mr Wyatt adopted a different approach of assessing landscape sensitivity by reference to landscape units. Landscape units are based on the physical characteristics of the area within the viewshed. The characteristics that assist in defining the landscape units include geology, vegetation, topography and drainage patterns, as well as the extent of man-made modifications and urban development. Mr Wyatt identified three landscape units within the viewshed of the mine. These are:

- Gloucester Valley Floor – farmland: This is the landscape unit on which the mine would be sited and comprises the majority of the land within the viewshed. The relatively gentle undulations and the extensive clearing has created an attractive rural setting with the occasional rural farm residences.

- Gloucester Valley Floor – urban/rural residential areas: The urban areas of Gloucester as well as Avon River, Forbesdale and Thunderbolt Estates are located on this valley floor.
- Gloucester Valley ranges: The ranges to the east and west define the Gloucester Valley and are typically well forested.

101 Mr Wyatt assessed the sensitivity of these landscape units within the viewshed of the mine to undergo change from the mine. He found:

- (a) Gloucester Valley Floor – farmland: Medium sensitivity. This unit is man-modified, contains other infrastructure and mining and is not as topographically dramatic as the escarpments on either side of the valley.
- (b) Gloucester Valley Floor – urban/rural residential areas: Low-medium sensitivity. This landscape unit contains many man-made elements and alterations. Abundance of built form and other visual elements lessens the sensitivity of these areas.
- (c) Gloucester Valley escarpments: High. The escarpments define the valley and are the major attraction to locals and visitors travelling along The Bucketts Way. The presence of the open rural area in the foreground and their forested slopes increases the attractiveness of these escarpments.

102 In oral evidence, Mr Wyatt accepted that the high percentage of survey respondents who indicated that they were concerned about the visual impacts of the proposed mine suggested that there was a high degree of sensitivity amongst residents and other persons who responded to the survey. Mr Moir similarly considered that survey information of this kind reflected the high value that the community placed in the scenic amenity provided by the landscape surrounding the town of Gloucester.

103 The landscape values refer to the relative value attached to individual elements of a landscape. Mr Moir explained that:

Assessment of landscape values considers the relative value attached to individual elements of the landscape based on how they are perceived by a community, local area, nation or by the international community. Evidence of how a landscape is recognised can be observed in statutes and local planning documents, historic and cultural elements (location and aspect of built forms in the landscape, songs, art, desire lines), tourism activities and promotional material indicating value attached to the identity of the particular area.

104 Mr Moir explained that landscape values can be indicated through factors such as:

- Landscape quality – this refers to the intactness of the landscape from visual, functional and ecological perspectives and its condition.
- Scenic quality – this relates to aesthetic values, sense of place and other intangible qualities.
- Rarity – this refers to the value of the landscape due to unique elements, features or attributes.
- Representativeness – this refers to the landscape being a good example of its type.
- Conservation interests – this relates to the presence of features that indicate that the landscape has value in its own right.
- Perceptual qualities – this involves perceptions or experiences of the area, such as experiences of being in the wilderness or tranquillity.

- Community consensus – this relates to opinions as expressed by the public on the importance of the landscape.
- Cultural association – this refers to the association of particular people, artists, writers or events in history that contribute to perceived landscape value.

105 Mr Wyatt agreed in oral evidence that, when assessing visual impact, it is important to have an understanding of the subjective viewpoints or perceptions of those who will see the proposed mine, and that these are matters of significance in the visual impact assessment. Further, to the extent that a place is recognised for its landscape characteristics or scenic quality across geographical and cultural boundaries, this is relevant to the value that is placed on the landscape.

106 Mr Wyatt also said that, to the extent that indigenous communities placed particular value on the landscape, this “undoubtedly ... would increase the value of the landscape” and that documents indicating there is a cultural heritage associated with the area, both from an indigenous and non-indigenous background, are relevant to inform the visual assessment. Similarly, Mr Moir said that where there are “any cultural values whether they be Aboriginal or European ... they have to be taken into consideration, and they do contribute to the sensitivity of the landscape”.

107 The visual impact experts assessed the landscape values in the catchment. Dr Lamb, who prepared the historic heritage assessment in the amended EIS, found:

- a. The Gloucester Basin section of the valley is of moderate to high aesthetic quality as a result of the interaction between the distinctive geological formations and the cleared, rural lands of the valley floor.
- b. The Gloucester Bucketts are of high aesthetic significance and landmark quality ... and have also been the inspiration for artistic achievement and were mentioned in historical and commemorative accounts of the values of the place. They are important to tourism and the image of the setting of Gloucester and of local significance.

(pp 12-12.)

108 Mr Moir addressed many of the factors that indicate landscape values. In relation to scenic quality and rarity, Mr Moir found:

After assessing the landscape character of Gloucester and its setting, it is my opinion that the setting of Gloucester is both unique (rare) and of high scenic quality. The landscape formations of the dramatic and unusual Bucketts Ranges and furrowed slopes of the Mograni Ranges combined with the mosaic landscape patterns of undulating farmland interspersed with the vegetation of the Gloucester and Avon Rivers as they move towards their junction on the valley floor, involve a combination of landscape elements that cannot be experienced elsewhere in the Gloucester Basin. These elements would have contributed to the original settlers choosing this location to site the town.

109 Further, Mr Moir says as to scenic quality:

In my view the surrounds of the mine site have a high scenic quality that extends from the north of Stratford through to the northern side of the town of Gloucester. While the area extending from Wards River to Barrington all have a scenic quality, Lamb fails to recognise that the area as indicated on the figure has a particularly distinctive and high scenic value possessing a combination of landscape features that are not present throughout the Gloucester Basin. In my view, the area

surrounding the proposed mine site is a unique and distinctive setting, given the presence of the monolithic Bucketts Range which is both unique and imposing, particularly when viewed in its juxtaposition with the human scale of the town. The Bucketts Range and its surrounding scenery is clearly the dominant element within the surrounding context.

110 As to cultural association, Mr Moir found:

It is an emotive and iconic landscape and the juxtaposition of the dramatic Bucketts with the rolling pasture was remarkable enough to feature as the subject of well-known impressionist and leader of the Heidelberg School, Arthur Streeton, and late 18th century Australian artist Thomas Boyd (amongst others).

111 As to community consensus, Mr Moir referred to how the landscape is viewed in the planning instruments and strategies. Mr Moir noted that the land surrounding Gloucester was rezoned in GLEP 2000 for the purpose of environmental protection. When the strategic planning and zoning were revisited following completion of the 2005 Local Environmental Study, the environmental conservation zones around town were extended to the south. The 7(d) zone was converted to E2/E3 zones, which have zone objectives as follows:

Zone E2 Environment Conservation

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic value.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Zone E3 Environmental Management

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic value.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To conserve biological diversity of native vegetation corridors, and their scenic qualities, in a rural setting.

112 Mr Moir noted that the majority of the proposed Rocky Hill Coal Project sits within the E3 Environmental Management zone. Mr Moir noted that the Gloucester Shire Council submission in 2013 to the Rocky Hill Coal Project, highlighted as grounds of objection that: "The proposed mine compromises Council's ongoing intent to protect the scenic qualities of the town of Gloucester from inappropriate development, as specified in the Gloucester Local Environmental Plan 2010."

113 Mr Moir noted that community consensus was reflected in the responses to surveys of the community conducted by the former Gloucester Shire Council, in response to the original EIS submission in 2013. Around 80% of survey respondents opposed the mine, with over 75% concerned about impacts on visual amenity, water, dust, noise, agriculture and town character. In response to the overwhelming majority of dissent in the community, the former Gloucester Shire Council voted to oppose the development of the mine.

114 Mr Moir noted that Gloucester Shire Council's submission in 2013 stated that:

There is a strong sense of place and connection of Gloucester residents to their local area. Sense of place is comprised of the meanings, beliefs, symbols, values and feelings that individuals or groups associate with a particular locality. Gloucester residents, whether living in the area for generations or newly arrived,

have developed strong connections to this area. That sense of place has been challenged by the potential significant changes that may result as a consequence of this large scale extractive industry activity. Each major proposal has caused psychological stress for individuals in our community.

115 Mr Moir noted that in August 2016, Mid-Coast Council submitted a comprehensive report objecting to the amended proposal on the same grounds as the objection to the original proposal. The 2016 Mid-Coast Council submission noted that: “The number of submissions the Department of Planning and Environment received in response to the 2013 Rocky Hill submission, correlated with the results of the former Gloucester Council, was 1399 opposing the mine and 345 in favour.” In response to the amended mine proposal in 2016, 2634 individual submissions were received by the Department of Planning and Environment during the public exhibition phase. Of these submissions, 2376 were objecting to the proposal. 72% of submissions opposed to the mine listed visual impacts as a key reason for their objection. Mr Moir noted that in October 2017, the newly elected Mid-Coast Council voted again to maintain the objection to the proposed mine, reiterating the statement made by the Council administrator, Mr John Turner in 2016, that “this coal mine proposal is simply in the wrong place” and is “simply too close to residential areas”.

116 Mr Moir drew the conclusion from these consistent objections to the proposed mine by Gloucester Shire Council, Mid-Coast Council and members of the community that the visual landscape forms a significant part of the character of the Gloucester town and region and is highly valued by the community and the many visitors to the area. There is a significant concern amongst the community that there will be a negative impact on the perception of the town, its character and its economy if the Rocky Hill Coal Project were to proceed.

117 Mr Moir opined that, having regard to the Gloucester Shire Council, Mid-Coast Council and other agency and community submissions, it is clear that the proximity of the proposed mine to the town of Gloucester, and in particular its relationship to key character elements that dominate the setting of the town (ie the Bucketts and Mograni Ranges and the Avon River floodplain), is a significant concern for the Gloucester community and a threat to the values that inform their connection with the landscape and sense of place.

118 Mr Wyatt did not assess the landscape values of his three landscape units in the viewshed of the mine. Nevertheless, Mr Wyatt did accept that:

The Gloucester Valley with a gently undulating valley floor, enclosed on both sides by the ranges, creates a scenic appearance that is attractive to visitors and locals alike. This is an attractive landscape with high visual appeal.

119 Both Dr Lamb and Mr Wyatt identified the Gloucester valley as being of high significance, for social, cultural or spiritual reasons to the Barrington-Gloucester-Stroud Preservation Alliance, a community group.

120 The landscape of the Gloucester valley also has cultural association and importance to Aboriginal people. Although neither Mr Wyatt nor Mr Moir specifically considered the significance and value of the landscape to Aboriginal people, there was evidence before the Court establishing the particular value that the landscape holds for Indigenous people. Mr Manikas, an Aboriginal man who gave evidence on behalf of the Cook family, said:

Jack Cook was the last of the traditionally initiated elders from the region in his era prior to the family being displaced from Gloucester. Jack realised with the displacement of the aboriginal people from the area the traditional ways were ending therefore he buried the King Stone on the Bucketts, because it was regarded as “the most sacred tribal ground”. This King Stone was similar in significance to Uluru to the local people of Gloucester.

...

From the King Stone and the initiation routes, the scar trees, burial sites and birthing sites. All these locations are scattered though the Gloucester area and proposed mining site or adjacent to the site. Many cannot be identified due to the sacred nature of the sites. If the mine progresses, all this history will become a mystery to the descendants of Jack and Jessie Cook

- 121 A submission on behalf of Aboriginal elder, Kim Eveleigh, also reflected a deep indigenous connection to country:

We are the Aboriginal people of this land, so don't you dare ignore us, pay attention and listen as this is our Spiritual connection to our land, we the Gooreengai people belong to the Significa[nt] Buckan Valley in Gloucester it is our past, present and future. If you allow it to be destroyed you cannot fix It, stop it before it begins. Everything from our Ancestors has been removed all we have left is our Dreaming of our land ...

This is our land that has a strong spiritual history of the Dreaming, scar trees, grave sites, stories of Elders that dance upon this ground, men, women and family bora rings. ...

Along the range there are many birthing water holes and shelters and there were once women's paintings that were destroyed by Europeans. The valley is a Significant Sacred place as this is our Ancestors daughters birthing and naming area, as they travelled over this part of the land they shared knowledge of our Ancestor's medicines, hunting and gathering of food, the weaving of fishing baskets while singing to the spirits of the Ancestors ...

- 122 Although each of Dr Lamb and Mr Wyatt accepted the scenic qualities of the Rocky Hill site and its vicinity, Mr Moir considered that both the visual impact report of Mr Wyatt and the visual impact assessment in the amended EIS of Dr Lamb proceeded from an erroneous premise in that they failed to adequately recognise the significance of the visual and landscape values of the town and community of Gloucester and thus downplayed the landscape character. In effect, Mr Moir noted that Mr Wyatt and Dr Lamb approached the Rocky Hill Site in isolation from its visual setting and without recognising the viewshed within which it is located; thus positing the site as effectively comprising a parcel of readily replaceable agricultural land which could be found anywhere in the Gloucester basin. However, as Mr Moir observed:

... the area surrounding the proposed mine site is a unique and distinctive setting, given the presence of the monolithic Bucketts Range which is both unique and imposing, particularly when viewed in its juxtaposition with the human scale of the town. The Bucketts Range and it[s] surrounding scenery is clearly the dominant element within the surrounding context.

- 123 I accept the evidence of Mr Moir and of the Aboriginal people who gave evidence that the landscape within the visual catchment of the proposed mine is of high visual quality and has high landscape values, for the reasons given by Mr Moir and by the Aboriginal people. The land uses in the vicinity of the proposed mine of residential, rural-residential, tourism and agri-tourism have high sensitivity to changes in the landscape caused by the proposed mine.

The viewpoints likely to be affected

- 124 The visual impact experts used a number of viewpoints to assess the visual impact of the proposed mine. Dr Lamb, in the visual impact assessment in the amended EIS, identified 59 representative viewing places or “viewing situations”. Dr Lamb grouped the viewing situations into four categories on the basis of their visual exposure to the proposed Rocky Hill Coal Project and the composition of the views they would experience:
- Category 1: Distant, elevated view places to the north and northwest (eg Kia Ora Lookout and The Bucketts walking track);
 - Category 2: View places to the northwest and north-northwest of the Mine Area (part of the The Bucketts Way, rural residences adjacent to The Bucketts Way and rural-residential estates accessed off Jacks Road);
 - Category 3: View places west of the Mine Area (The Bucketts Way and some of the rural residences in the Forbesdale Estate locality); and
 - Category 4: Views from Fairbairns Road southwest and south of the Mine Area.
- 125 Dr Lamb prepared photomontages for six viewing places, being VP15 The Bucketts Way opposite number 4257; VP16 Grantham Road; VP25 Jacks Road; VP33 Kia Ora Lookout; VP36 The Bucketts Walking Track site 2 and VP45 The Bucketts Way near number 4434.
- 126 Dr Lamb determined the number of residences with likely or possible views from internal living areas in categories 2, 3 and 4, taking into consideration formal orientation, topographic location and the blocking and screening effects of vegetation and buildings, as being:
- Category 2: 84 residences, 19 with likely or possible views from internal living areas.
 - Category 3: 27 residences, 14 with likely or possible views from internal living areas.
 - Category 4: 2 residences, 1 with likely or possible views from internal living areas.
- 127 Mr Wyatt selected 17 viewpoints in the residential estates and rural residential properties within about 2.5km of the proposed mine, along The Bucketts Way and at the public lookouts of Kia Ora Lookout and Mograni Lookout. Mr Wyatt prepared photomontages for four viewpoints being VP1 corner Jacks Road and Waukivory Road (1.1km from the mine); VP5 Grantham Road, east of Fairbairns Road (1.1km from the mine); VP6 Fairbairns Road (0.6km from the mine); and VP16 The Bucketts Way #6 (2.7km from the mine).
- 128 Mr Moir used the viewpoints selected by Dr Lamb and Mr Wyatt and added other viewpoints in proximity to the viewpoints of Dr Lamb and Mr Wyatt. Mr Moir also prepared photomontages for six viewpoints being VP01 Forbesdale Close (off Fairbairns Lane); VP03 Fairbairns Lane; VP05 Jacks Road (same as Dr Lamb’s VP25); VP06 Jacks Road; VP13 Bucketts Way; VP14 Bucketts Walking Track (same as Dr Lamb’s VP36). The original photomontages contained errors in locating the mine in the photomontages but these errors were corrected in the photomontages attached to the joint report of the visual experts.
- 129 Mr Moir also considered that the proposed mine will have dynamic visual impacts for persons driving north along The Bucketts Way towards Gloucester and for passengers on the train heading north into Gloucester:

It is my opinion that both the Lamb and Wyatt reports have not considered the impact of the proposal when viewed from The Bucketts Way upon the character of the town of Gloucester. For many, the first impression of Gloucester is formed when travelling north along The Bucketts Way when the valley opens up in the approach to Gloucester and the town is first viewed nestled between the towering Bucketts Range to the west and the Mograni Range to the east. If the proposal were to proceed the Rocky Hill mine would become part of this experience. This would drastically change the character and the perception of the town for visitors and residents. As much of the tourism in the area is based on the scenic quality of the area and its surrounds, these perceptions are likely to be negative.

This is also likely to be the case for passengers on the train heading north into Gloucester. If the proposal proceeds, railway passengers will have views to the Rocky Hill mine and the private road connecting Rocky Hill with Stratford. In this event, passengers on the train would experience a greater cumulative effect of the mining in the Gloucester Basin as the railway passes close to the Duralie mine and has views to the Stratford mine. Due to the proposed private road connecting the Stratford mine rail facility with the proposed Rocky Hill Coal Mine, the rail travellers arriving into Gloucester will experience nearly 10km of continuous mining activity prior to their arrival into Gloucester Station.

Methodology for assessing the visual impacts

130 Although the visual impacts experts differed in their assessments of the level of visual impacts of the Rocky Hill Coal Project, there was similarity in the basic methodology used. The overall level of visual impact was determined by weighting the level of visual effect by the visual sensitivity of the view place and viewer.

131 Mr Moir explained that: “‘Visual effect’ is defined as the interaction between the proposal and the existing visual environment. It is often expressed as the level of visual contrast of the proposal against its setting or the background in which it is viewed.” Mr Moir explained that visual effect is measured as either low, moderate or high depending on the level of visual contrast:

Low visual effect occurs when a proposal blends in with its existing landscape when viewed due to a higher level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening, often using a combination of landform and vegetation.

Moderate visual effect occurs where a proposal is visible and contrasts with its viewed landscape, however, there has been some degree of integration (eg good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development).

High visual effect results when a proposal has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

132 Mr Moir explained that the combined impact of visual sensitivity against visual effect can be shown in a matrix:

VISUAL IMPACT TABLE				
		VISUAL EFFECT		
		HIGH	MODERATE	LOW
VISUAL SENSITIVITY	HIGH	High Impact	High Impact	Moderate Impact
	MODERATE	High Impact	Moderate Impact	Low Impact
	LOW	Moderate Impact	Low Impact	Low Impact

133 For example, for viewpoints in residential properties (such as the dwellings in the large lot residential estates) with a high visual sensitivity, if the visual effect is high, because of the high visual contrast between the proposed mine, including the amenity barriers, and the existing visual environment, the overall visual impact will be high.

134 Although Mr Wyatt adopted a similar approach of weighting the level of visual effect by the visual sensitivity, he adopted different criteria for determining the scale of visual effects. For public domain viewpoints, Mr Wyatt used four criteria to assess the visual effects:

- Visibility: The visibility of the mine can be affected by intervening topography, vegetation and buildings.
- Distance: The distance of the viewer from the proposed nearest component of the mine. The level of visual impact decreases as distance increases.
- Landscape character and viewer sensitivity: The character of the surrounding landscape, both around the site and adjacent to the viewing location, must be considered. Generally, a man-modified landscape is considered of lower sensitivity and a pristine landscape is considered highly sensitive. A residential townscape would be given a higher sensitivity than an industrial landscape.
- Number of viewers: The level of visual impact decreases where there are fewer people able to view the mine. Alternatively, the level of visual impact increases where views are from a recognised vantage point. Viewer numbers from a recognised vantage point would be rated as high.

135 Mr Wyatt's assessment of visual effect from private domain viewpoints was slightly different to the assessment from public domain viewpoints. He said that:

An assessment of viewer numbers is not relevant and the landscape sensitivity is always rated as "high" as it must be recognised that people feel most strongly about the view from their house and from their outdoor living spaces. Furthermore, occupants of residential properties are regularly observing from their house, whereas persons viewing the Mine Area from publicly accessible viewpoints are typically only at those points for comparatively short periods of time.

The visibility of the mine and the distance between the residential location and the Mine Area are the two criteria that vary within an assessment of the visual impact from a residential property. Viewer sensitivity is always rated at "high".

136 Mr Wyatt used the same scale of effects for the assessment of the visual impact from both public domain viewpoints and private domain viewpoints. Mr Wyatt graded the scale of effects from nil to high:

Nil – there would be no perceptible visual change.

Negligible – minute level of effect that is barely discernible over ordinary day-to-day effects. The assessment of a “negligible” level of visual impact is usually based on distance. That is, the mine would either be at such a distance that, when visible in good weather, the mine would be a minute element in the view within a man-modified landscape or it would be predominantly screened by intervening topography and vegetation.

Low – visual impacts that are noticeable but that will not cause any significant adverse impacts. The assessment of a “low” level of visual impact would be derived if the rating of any one of four criteria, that is visibility, distance, viewer numbers and landscape sensitivity, is assessed as low. Therefore, a mine in a landscape which is man-modified, and which already contains many buildings or other similar earthworks, may be rated as a low level of visual impact. Similarly, if the distance from which it is viewed means that its scale is similar to other elements in the landscape it would also be assessed as a low level of visual impact.

Medium – visual impact occurs when significant effects may be able to be mitigated/remedied. The assessment of a “medium” visual impact will depend upon all four assessment criteria being assessed as higher than “low”.

High or unacceptable adverse effect – extensive adverse effects that cannot be avoided, remedied or mitigated. The assessment of a “high or unacceptable adverse effect” from a publicly accessible viewpoint requires the assessment of all four factors to be high. For example, a highly sensitive landscape, viewed by many people, with a mine in close proximity and largely visible would lead to an assessment of an unacceptable adverse effect.

137 Mr Wyatt’s criteria and scale of effects were criticised by the Minister in at least three respects. First, Mr Wyatt takes account of whether the visual effects “may be able to be mitigated/remedied”, regardless of whether they are actually mitigated or remedied. The visual effects of the proposed mine are the actual visual effects of the change in the landscape caused by the proposed mine. These actual visual effects remain unless and until they are mitigated or remedied. Only the actuality and not the potentiality of mitigation of the visual effects can reduce the level of visual effect. As Mr Moir said in oral evidence, the visual effect is to be assessed at a particular point of time. If there is no mitigation at that point of time, the visual effect is to be assessed at that point of time without considering the mitigation.

138 Second, on Mr Wyatt’s approach, an assessment of high or unacceptable adverse effect from a public domain viewpoint, such as a lookout or scenic walking track, can only be reached if all four factors are assessed to be high. Mr Moir observed that this would mean that the visual impact from a public domain viewpoint with low viewer numbers will be low, even if the proposed mine has high visibility, is close in distance and the landscape has high sensitivity.

139 Third, Mr Moir criticised Mr Wyatt’s application of the criteria and scale of effects to the viewpoints used by Mr Wyatt, particularly the residential viewpoints where Mr Wyatt said he always rated viewer sensitivity as high. The only two criteria used by Mr Wyatt for residential viewpoints that varied were the visibility of the mine and the distance between the residential location and the mine. Mr Wyatt did not rate the visual impact from any residential viewpoint as being high or unacceptable. Of the eight residential viewpoints, two were rated by Mr Wyatt as medium impact with this reducing to low within 3 years and negligible within 7 years due to the construction and planting of the

amenity barriers. Five residential viewpoints were rated by Mr Wyatt as low moving to negligible and one residential viewpoint was rated by Mr Wyatt as negligible. Mr Moir notes that for these viewpoints, there is no description of how the criteria in the methodology were applied by Mr Wyatt to achieve the determined ratings.

140 I find that there is a force in these criticisms of Mr Wyatt's criteria and scale of effects. These deficiencies in approach affect the reliability of Mr Wyatt's assessment of the visual impacts of the Rocky Hill Coal Project.

141 The assessment of the overall visual impacts of the proposed mine also involves consideration of the cumulative visual effects and the effects of night lighting. Mr Moir explained the cumulative effects of the development:

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with it or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future.

Cumulative effects may also affect the way a landscape is experienced and can be positive or negative.

The review of the cumulative impact is likely to include:

- The impact of the development, when added to the combined impacts of all other existing developments (whether they are the same type of development or different) and environmental characteristics of the area;
- The impact of other types of change predicted to occur in the area; and
- The impact of the whole development (this includes different scheme components that also require planning consent).

In determining cumulative effects of the proposed project together with other projects, consideration is given to whether the subject proposal is of significantly different character and can therefore create a new landscape type.

142 Mr Moir explained the effects of night lighting:

Light pollution has impact on ecology, wildlife and human health. There is evidence that alteration to the night time environment has negative implications on physiology, behaviour, mortality and reproductive stress across a wide range of species ...

The consequences of night time light pollution due to new development can be mitigated in the following ways: prevention of areas being artificially lit; limitation of the duration of lighting; reduction of the "trespass" of lighting into areas that are not intended to be lit (such as the night sky); change the intensity of lighting; and change the spectral composition of such lighting.

The experts' assessment of the visual impacts

143 The visual impact experts differed in their assessments of the visual effect and the visual sensitivity, and hence in their determination of the overall visual impacts.

144 Dr Lamb, in the visual impact assessment in the amended EIS, concluded that the overall levels of visual effects would be:

- There would be an overall low level of visual effects on Gloucester township and on views from the distant lookout sites.
- There would be a moderate level of visual effects on category 4 and a moderate-high level on category 2 and 3 viewing situations, particularly in the first 3 years of operation.

145 Dr Lamb weighted these levels of visual effects by two criteria, visual compatibility and view place and viewer sensitivity, to arrive at an assessment of the level of visual impacts. Dr Lamb considered that the compatibility of the Rocky Hill Coal Project with the physical and visual attributes of the landscape should lead to a down-weight on the significance of impacts relative to the extent of the visual effects. However, Dr Lamb considered that the sensitivity, both view place and viewer sensitivity, should be recognised as giving an up-weight to the significance of impacts because:

- There are high viewer sensitivity situations in the public domain in Category 3 places, including limited sections of The Bucketts Way and some roads in Forbesdale.
- There are moderate-high viewer sensitivity situations in some Category 3 places in Forbesdale and some rural-residential properties accessed off The Bucketts Way and Jacks Road.
- Evening lighting is a factor that increases sensitivity.

146 Dr Lamb's conclusion of the overall level of visual impacts was:

- There would be moderate visual impacts on some locations in the public and the private domains. The impacts would be greatest during the first 3 years of the operation.
- The impacts would not be the result of visibility of the mining activity, but would be caused by the need to construct the western and northern amenity barrier to limit visibility of mining activity and its audibility. The use of overburden to construct a final landform behind them when finally revealed, though higher than the existing landform of the Mine Area, would lead to low residual impacts.
- For the life of the amended Project, some parts of the landform would be changing toward achieving the final landform. As a result, from time to time, small sections on the upper surface of the overburden emplacements would not have been vegetated and would be exposed to view.

147 Mr Wyatt concluded that the overall visual impact from public domain viewpoints, whether highways, local roads or recreation reserves, would be low. On Mr Wyatt's scale, "low" visual impacts are "visual impacts that are noticeable but that will not cause any significant adverse impacts".

148 Mr Wyatt assessed the overall visual impact from urban areas and rural-residential estates situated at some distance from the mine to be "negligible". On Mr Wyatt's scale of effects, a "negligible" visual impact is a "minute level of effect that is barely discernible over ordinary day-to-day effects". Mr Wyatt's reason for assessing the visual impacts as negligible was because: "Much of the urban and rural residential areas within the viewshed are well screened by topography as shown in the Seen Area Analysis mapping and additional screening is provided by existing planting that would also screen or filter views to the mine. Foreground vegetation and buildings will further screen the mine from view."

149 Mr Wyatt differed in his assessment of visual impacts from various rural residential properties within the viewshed. He considered that: "Many rural residential properties within the viewshed have extensive vegetation (planted and natural) around the house and associated outside entertainment areas. Therefore, views to the mine from these residences are often screened from view." Mr Wyatt did not assign a rating from his scale of effects to the visual impact from these rural residential properties. Next, Mr Wyatt considered

residential properties with clear sightlines to the mine. He concluded that: “Where there are clear sightlines, the gently undulating nature of much of the topography within the viewshed, means that the earthworks associated with the mine would have a relatively minor impact.” Again, Mr Wyatt did not assign a rating from his scale of effects to the visual impact from these properties. The only residences that Mr Wyatt did assign a rating from his scale of effects were for the nearest houses (those within 1km of the mine boundary). Mr Wyatt said:

The nearest houses (those within 1km from the Mine Area boundary) will have a *Medium* level of visual impact whilst the nearest amenity barrier is being created. A medium level of visual impact would occur when “significant effects may be able to be mitigated/remedied”. The assessment of a “medium” visual impact would depend on all four assessment criteria being assessed as higher than “low”.

In this assessment the *Medium* level of visual impact is a conservative assessment that is only applicable to the closest houses, with clear views and where it is recognised that such a level of impact is only likely in the short term. This is a landscape that is regularly ploughed and whose soil is disturbed and then re-sown as pasture.

Once pasture and the re-vegetation of trees and shrubs occur, the visual impact would be mitigated through the life of the mine.

At completion, the western and northern amenity barrier would be removed from inside and the material replaced in the void to create a landscape which is similar to the pre-mine landscape. The visual impact at this time would be *Nil*.

150 Critical to Mr Wyatt’s assessment of the overall visual impacts being mostly negligible or low was his belief in the effectiveness of the amenity barriers in screening the visual impacts of the mine and that the amenity barriers themselves will not have visual impacts. The only time period when Mr Wyatt considered that the closest houses will experience a medium level of visual impact is during the first 3 years of mine operations when the amenity barriers are being created. Once the amenity barriers are created, Mr Wyatt considered that the visual impact is reduced to negligible.

151 Mr Wyatt considered that the cumulative visual impact of the mine would be negligible. His reason was that:

There are other mines in the Gloucester Valley. The addition of this mine into this rural landscape would not significantly change the overall character of the valley and the adjoining escarpments. The distances between adjacent mines, even if they were visible, ensures that the mines are separate elements in the landscape rather than being a continuous edge to highways or local roads.

152 Mr Wyatt considered that the visual impact of the night lighting associated with the mine would be negligible. His reason was that:

The Gloucester Valley is not without light sources. The limited hours of mining operation beyond dusk would reduce the night time impacts of the majority of the mine associated lighting. After evening mining operations are completed, the remaining lighting would be security lighting not dissimilar to other lighting visible from The Bucketts Way and other roads in the viewshed.

153 Mr Moir assessed the overall visual impacts of the proposed mine from private domain viewpoints in residential and rural-residential properties to be high and from public domain viewpoints nearer the mine, such as along The Bucketts Way, to be high and from public domain viewpoints at greater distance from the mine, such as The Bucketts walking trail and more distant parts of The Bucketts Way, to be moderate.

154 Mr Moir considered that both Dr Lamb and Mr Wyatt had significantly downplayed the impacts of the proposed mine on the residences on the eastern side of The Bucketts Way along Fairbairns Road, Grantham Road, Forbesdale Close and Jacks Road. Mr Moir considered that the overall visual impacts upon these residences would be high. Mr Moir considered that both Dr Lamb and Mr Wyatt had also overstated the effectiveness of the northern and western amenity barriers in mitigating the impacts of the proposed mine for these residences.

155 Mr Moir considered that both Dr Lamb and Mr Wyatt had also underestimated the visual effects of the ongoing earthworks of the proposed mine. Mr Moir stated:

Both Lamb and Wyatt suggest that once the Northern and Western Amenity Barriers are constructed that the impacts will be negligible as the workings of the mine will be concealed behind these barriers. While it may be the case that the mine workings are concealed, there will be significant impacts over a three year period as the amenity barriers are constructed and ongoing impact over the life of the mine as the overburden is placed, at heights well above the amenity barriers, on the foothills of the ranges to the east. In addition to this, once the mine ceases working, there will be a further three years of deconstruction of the amenity barriers and associated earthworks to achieve the final landform, that will then have to be remediated. Even if the vegetation of the amenity barriers is as successful as both the Lamb and Wyatt report[s] assume it will be, it is my assessment that the earthworks surrounding the mine workings will result in ongoing moderate to high impact on residents and public domain and upon the character of Gloucester for the entire life of the mine. Further, even once complete remediation of the final landform has been achieved (assuming this can be achieved) the landscape will not mimic the existing landscape as the modified soil conditions, shallow subsoils, changes in site hydrology and the broad scale methods of planting proposed will not result in vegetation patterns or communities that are consistent with the adjoining land that has not been disturbed by mining. This disturbed landscape will always appear different to its surrounds.

156 Mr Moir noted that GRL's mitigation of the visual impacts of the proposed mine is dependent on the successful revegetation of the amenity barriers and areas of permanent overburden emplacement. Mr Moir considered, however, that there was a considerable risk of partial or total failure of the vegetation:

The proponent's mitigation strategy is dependent on the successful implementation of planting on the Northern and Western Amenity Barriers and the area of permanent overburden. It is my opinion that the assumptions on growth rates and the success of the revegetation of the amenity barriers and the permanent overburden are optimistic at best. The current soil profiles of the alluvial floodplain landscape and lower slopes where the mine and amenity barriers are located are characterised by deep top soils down to 50cm and subsoils down to below 140cm. Planting on the amenity barriers will be in 15cm of topsoil and 25cm of subsoil. These soils will be placed on compacted overburden, which is primarily rock. The slopes of the Northern and Western amenity barriers are also North and West facing which will be fully exposed to the brunt of the afternoon summer sun. These are challenging conditions for vegetation to establish and survive, and, considering the shallow depth of the soil, the compacted subgrade and aspect, and the likelihood of soils becoming heated and hydrophobic, it is my opinion that there is considerable risk of total or localised failures of the vegetation.

157 In the visual experts' joint report Mr Moir said:

It is not my opinion that landscape or pasture cannot be established on the outward slopes of the barriers. However, it remains my opinion that there is a risk of partial or wholesale failure of the rehabilitation due to a combination of factors including:

- the aspect of the barrier (west facing),
- slope (10-18 degrees which makes retention of water difficult),
- extent of compaction of the subgrade combined with the relatively shallow subsoil layer (250mm) and topsoil (150mm) which will make it difficult for trees to establish,
- and presence of salinity in the overburden.

It is my opinion that while the vegetation may establish, it is highly unlikely that it will appear similar to the improved pasture fragmented by roads and pockets of established and remnant trees that currently exist on the alluvial soils of the valley floor.

158 Mr Moir also disagreed with Dr Lamb and Mr Wyatt's conclusion that the rehabilitated landscape after mining has been completed will have nil visual impact. Mr Moir concluded that:

... although the attempt has been made to avoid "engineered" landforms, it is my opinion that the rehabilitated landform and its vegetation will always contrast with the surrounding landscape due to the changes in topography, hydrology, soil depth and the timing of rehabilitation which tends to reduce variation in vegetation type, size and diversity.

159 Mr Moir therefore concluded that the visual impact of the mine would continue indefinitely.

160 As noted earlier, Mr Moir also considered that the proposed mine will have a visual impact for persons travelling northward along The Bucketts Way and in a train on the railway towards Gloucester. Mr Moir considered that there would be a cumulative impact for passengers on the north coast rail line heading north as the infrastructure and coal transport activity on the connecting road between the proposed Rocky Hill Mine and the Stratford Mine would be visible. Mr Moir also considered that there would be viewpoints along The Bucketts Way into the proposed mining site, which would have a cumulative impact on persons driving along The Bucketts Way to Gloucester.

161 I agree with Mr Moir's assessment of the overall visual impacts of the Rocky Hill Coal Project.

High visual effect

162 I find that the visual effect of the Rocky Hill Coal Project will be high. The proposed mine will have a high visual contrast with the surrounding landscape, which will not be ameliorated by the amenity barriers or the revegetation of the amenity barriers, permanent overburden emplacements or rehabilitated post mining landforms.

Visibility

163 The Rocky Hill Coal Project will be visible from many private domain viewpoints at residential properties in the vicinity, including along Jacks Road and Waukivory Road, the large lot residential estates of Thunderbolt Estate, Avon Road Estate and Forbesdale Estate and Grantham Road, and rural properties, including properties off The Bucketts Way and Fairbairns Road. The Rocky Hill Coal Project will be visible from public domain viewpoints, including the public roads of Jacks Road, Waukivory Road, Maslens Lane,

Grantham Road, Forbesdale Close, Fairbairns Road and The Bucketts Way, the public North Coast Railway, the public lookouts of Kia Ora Lookout and The Bucketts Way toward the Mograni Lookout, and the public walking track along the ridge of The Bucketts.

- 164 The visual impact experts identified many of these viewing places. Mr Wyatt's seen area analysis graphically displayed the large extent of areas from which all or part of the amenity barriers would be visible (Figure 18 of Wyatt's report June 2018, p 25). I also had the advantage of visiting a number of the viewing places during the Court view and seeing the high visibility of the Rocky Hill site, which had been helpfully marked with orange flags indicating the location of the amenity barriers, yellow flags indicating the extent of the mining pits, and orange and white banners indicating other points in the mine. The various flags and banners could be readily identified from many viewing places, indicating the visibility of the Rocky Hill site.

Distance

- 165 The viewing places from which the Rocky Hill site is visible are at various distances from the site. The residential properties are closest to the site. The closest residential properties (not owned by GRL) to the west of the mine site are in the Forbesdale Estate off Grantham Road and Fairbairns Road. The Jacksons' property, which will have a direct sight line to the western amenity barrier, is around 500m from the property boundary and 835m from the closest point of disturbance (the western edge of the amenity barrier). At this distance of between 0.5 to 1km, the amenity barrier will be visually prominent in the landscape (Wyatt report June 2018, p 19). About 12 dwelling houses on properties off Fairbairns Road, Grantham Road and Forbesdale Close are within 1.7km of the closest point of disturbance (according to GRL's response to submissions, p 2-406). At distances between 1km to 3km, the amenity barriers will be visible in the landscape and "a visually noticeable visual impact would occur" (Wyatt report June 2018, p 19). The residence of Collins and Barrett, accessed off Fairbairns Road and to the south of the Forbesdale Estate, is the closest residence to the mining pit. It is 860m from the closest point of disturbance (the western amenity barrier). Again, at this distance of less than a kilometre, the amenity barriers would be visually prominent in the landscape.
- 166 The nearest residences not owned by GRL to the north of the Mine Area are along Jacks Road and in the Avon River Estate. The closest residence in the Avon River Estate is 1.98km from the closest point of disturbance (the northern and western edges of the amenity barriers). Other residences in the Avon River Estate and Thunderbolt Estate are located 2km to 3km from the closest point of disturbance (GRL's response to submissions, p 2-406). The Robinsons' dwelling house off Jacks Road, with clear sight lines to the northern amenity barrier and the area of permanent overburden emplacement in the north of the mine site, is about 2.1km from the closest point of disturbance (GRL's response to submissions, p 601-603 and amended EIS, Appendix 7, Table A 7.3, p A7-14). The Robinsons' rural property, however, extends southwards and becomes much closer to the boundary of the Rocky Hill site and the amenity barriers of the mine will be clearly visible from much of their property.
- 167 To the east of the mine area, there are a couple of dwellings off McKinley's Lane that are 365m and 420m respectively from the closest points of

disturbance (the northern extent of the permanent overburden emplacement) (GRL's response to submissions, p 2-408). GRL has an option to acquire these properties if the mine proceeds.

- 168 The Berecrys rural property is to the east and south east of the Rocky Hill site. Elevated vantage points on the Berecrys property (referred to as "sunset champagne spot" and "orchid rock") afford uninterrupted views over the mine area, including into the mine pit. The access to the Berecrys property is by Fairbairns Road, which will cross the private haul road used to haul coal from the Rocky Hill Mine to the Stratford Mine Complex. Elements of the Rocky Hill Coal Project, including the haul road and trucks and the amenity barriers, will be clearly visible to the Berecrys when they access their property. The residences on the Berecrys property are further away (over 1.5km from the closest point of disturbance) and, being over the ridge, will not have a view to the mine area.
- 169 Rural properties off The Bucketts Way will have sight lines to the mine area. The Frasers' rural property (used for dairy farming) is within about 1.5km of the closest point of disturbance (the western amenity barriers) (GRL's response to submission, Figure 2.25.4, p 2-411). The residence on the Frasers' property is further away (2.2km) (amended EIS, Appendix 7, Table A 7.3, p A7-14). The rural property rises to the west away from the Avon River and has sight lines to the mine area. The western amenity barrier and the permanent overburden emplacements on the footslopes of the Mograni Range will be visible. At distances between 1km to 3km, these mine earthworks would have a visually noticeable visual impact.
- 170 The mine area will be visible from various viewing places along the North Coast Railway and The Bucketts Way. At its closest, the railway line is 1.12km from the nearest point of disturbance (the western and northern amenity barriers) and sweeps around the Forbesdale Estate between 1.12km to 2km from the amenity barriers. To the south of the Forbesdale Estate, the railway line is between 2km and 3km from the western amenity barrier (GRL's response to submissions, Figure 2.25.4, p 2-411). The Bucketts Way is further west than the railway line. The Bucketts Way, at the intersection of Fairbairns Road with The Bucketts Way, is 2km from the closest point of disturbance (the western and northern amenity barriers). To the north and to the south of that intersection, The Bucketts Way moves further away to be between 2km to 3km from the amenity barriers (GRL's response to submissions, Figure 2.25.4, p 2-411). Noticeable visual impacts would occur from viewing places along the railway line and The Bucketts Way at distances between 1km to 3km, where the amenity barriers would be visible in the landscape.
- 171 Jacks Road and Waukivory Road, north of the Rocky Hill site, come progressively closer to the mine area. Jacks Road at the intersection with Maslens Lane is 1.88km from the closest point of disturbance (the northern amenity barrier). The intersection of Jacks Road with Waukivory Road is 1.1km from the mine area (Wyatt Report June 2018, p 29). After Jacks Road becomes Waukivory Road, the distance of Waukivory Road to the mine area decreases until it becomes 200m from the closest point of disturbance near the intersection with McKinleys Lane (GRL's response to submissions, Figure 2.25.3, p 2-410).

172 Fairbairns Road, where it leaves the Forbesdale Estate, is around 1.2km from the closest point of disturbance (the western amenity barrier) and then tracks around 700m or less from the amenity barrier until it crosses the private haul road at the south of the mine area.

173 The public lookouts are more distant, Mograni Lookout is 6.2km and Kia Ora Lookout is 10.4km from the Rocky Hill site. The mine earthworks would be discernible in the landscape but the distance would reduce their visual influence.

Cognitive mapping

174 The visual impact experienced by viewers of the Rocky Hill Coal Project will be more than just the visual impact at any particular viewpoint. People build a cognitive map of the locality and the impact of the mine in that locality. Mr Wyatt considered that, to the extent that the distance of the mine was known to individuals, this would form part of their cognitive map of the locality, even at such times as the mine itself was out of sight. So too, Mr Moir considered that the impact of a particular development on a mental map of the area extends beyond its visibility, and that the development becomes part of the character of the landscape of the setting. Mr Moir further stated that the view of mining projects from a visual perspective is generally negative.

Low integration

175 The visual effect of the Rocky Hill Coal Project will be higher because of the lower degree of integration. As Mr Moir explained, the degree of integration is affected by the form, shape, pattern, line, texture and colour of the proposed landforms as compared to the existing landscape as well as the extent of retention of existing vegetation and the provision of screen landscaping. As I find below, the landforms proposed during and after mining will not integrate well with the existing landforms, leading to a high visual contrast with the surrounding landscape.

Topographic location, form and shape

176 I find that the proposed landforms will not mimic the existing landscape. The elevated northern and western amenity barriers and the filled and rehabilitated mine pits, will be located in and near the alluvial floodplain, where there are currently no such topographical features. The permanent overburden emplacements will raise and extend westwards the footslopes of the ridgeline of the Mograni Range. The mining topographical features will look out of place in the existing landscape. The markedly lower land to the north, west and south of the amenity barriers will accentuate the incongruity of the raised landforms resulting from mining operations.

177 Although the amenity barriers will be shaped and scalloped to appear less regular, from the various viewing places, the irregularity in form, shape and line will blur and become less perceptible. From northern viewpoints, the northern amenity barrier will appear as a bund running in a straight line east to west at right angles to the north to south orientation of the Mograni Range. Although the line of the toe of the western amenity barrier is intended to be curved to run roughly parallel to the line of the Avon River, rather than being a straight line, from western viewpoints the amenity barrier will still appear as a continuous exposed face, more akin to a man-made levee bank following the nearby river to the west then a natural footslope of the Mograni Range that is distant to the

east. Again, from viewing places to the west, especially between 1km to 3km away, the irregularities in form, shape and line will blur and become less perceptible and the amenity barriers will appear undifferentiated.

178 The form, shape and line of both the northern and western amenity barriers and the filled and rehabilitated mine pits will appear incongruous in the existing landscape that is currently characterised by having a sparsely vegetated alluvial floodplain at the base of the ridgelines of the Mograni Range. The amenity barriers will have the effect of obscuring the existing views of the interaction between the geological formations of the Mograni Range and the cleared lands of the alluvial floodplain, which is a feature of the landscape that underpins the visual experts' assessment of the landscape's aesthetic quality and high value.

179 Dr Lamb noted:

The amenity barriers within the Mine Area would initially contrast with the existing landform and character, being orientated perpendicular to the predominant watercourses from the side slopes and parallel to the underlying coals seams. They would be aligned horizontally across the view line as seen from Category 3 viewing situations ...

The excavation line of the clean water diversion channels also runs across the slope and, particularly if it was able to be perceived in elevation from a similar relative level, has the potential to contrast with the existing topography and landform.

(Lamb report, p 3-31.)

180 Mr Moir similarly observed that the line of the amenity barriers will contrast with the existing topography.

181 The amenity barriers will be of a significant size in the landscape. They will cover an area of 95 hectares. They will be of considerable height. At one point, the northern amenity barrier will be 41m above the natural ground level (supplementary information for the PAC 17 November 2017, p 3), but otherwise they will be between 10m and 40m above existing ground levels (amended EIS, p 4-117). They will run for a considerable length of around 2.5km. The slopes and angles of the amenity barriers, within their proposed location, will contrast with the slopes and angles of the existing landscape. The permanent overburden emplacements are even more massive. They will cover an area of 185 hectares. The overburden emplacements will run for almost the length of the mine site (scaled at over 3km). The overburden emplacements on the foothills of the Mograni Range will rise to heights well above the amenity barrier. The final landform will be up to approximately 45m higher than existing ground levels within parts of the footprint of the permanent overburden emplacement (amended EIS, p 2-74). They will be visible as additional man-made features in the landscape.

Materials, texture and colour

182 The Rocky Hill Coal Project involves extensive earthworks, from commencement to completion of mining. In its initial phases, the mine area will be cleared and soil, subsoil and overburden will be excavated. Dr Lamb concluded that:

There will be high visibility of the initial stripping of soil, subsoil and overburden in the area of the southern section of the Avon pit and of topsoil within the footprint of the eastern and northern amenity barrier, and the construction of the western and northern amenity barrier and possibly visibility of excavated surfaces associated with the clean water diversion drain.

183 Dr Lamb also stated that viewers in areas within 1km to 3km, including in Grantham Road and the Forbesdale Estate, would be:

close enough for texture and colour contrasts to potentially be perceived in greater detail than Category 1 views, such as the form and face gradients of interim amenity barriers, colour, texture and form of rehabilitation vegetation, topography of changing landform as it is shaped and then rehabilitated and possible excavated faces above parts of the clean water diversion channel, etc.

(Lamb report, p 3-31.)

184 These bare areas of earth will contrast with the surrounding landscape. They will not appear as ploughed fields in the landscape, contrary to Mr Wyatt's assertion. As Mr Moir observed, the earth and the amount of rock in the overburden will have a different appearance to harrowed or ploughed soil in a field. The size and extent of the exposed earthworks will be greater than any ploughed field. The earthworks will involve the excavation, emplacement and embankment of soil, subsoil and overburden in ways that will appear quite different to the flat topography and regularity of a ploughed field. The slope, shape, height, length, and width of the amenity barriers and the overburden emplacement areas will have an appearance quite different to and in contrast to the existing landforms and landscape (Moir report, [88]).

185 The amenity barriers will be constructed during the first three years. During this period, although sections of the barriers will be progressively soiled, seeded and vegetated with grasses, recently constructed sections will be bare before they are vegetated. As the barriers are raised in height, the parts lacking vegetation will be towards the top of the barriers, which will be more visible. In creating the progressive sections of the barriers, the soil on the top layer will need to be stripped so that the next section of the barriers can be added. This stripping of the soil from the top layers will be visible.

186 The progressive placement of overburden in the overburden emplacement areas will also be visible. Again, although overburden emplacement areas will be progressively soiled, seeded and vegetated, the parts where there is active emplacement will appear as exposed earth before emplacement is completed and the parts can be vegetated. At the cessation of mining operations, the activities of reclaiming and redistributing earthen material from the amenity barriers and areas of overburden emplacement to fill the mine pits and the ROM pad area will be visible for around a year. Mr Moir noted that the topsoil on the barriers will need to be stripped before the overburden is pulled back into the pit, exposing the earthen material. The placement of overburden and soils and reshaping of the final landforms of the barriers, mining pits and overburden emplacement will also be visible.

187 Together, the activities involved in the construction of the barriers, including the progressive raising of the barriers and the emplacement of overburden, as well as the dismantling of the amenity barriers and the reclaiming and reshaping of the barriers, mine pits and overburden emplacement areas, will result in areas of earthworks that will appear quite different by reason of their materials, texture and colours to the surrounding landscape.

188 This contrast in materials was noted in the Department's Environmental Assessment Report (October 2017) on the Project:

Another cause of visual impact from these barriers would be the high visual contrast of the overburden materials used in their construction with the

surrounding verdant landscape. The Department is aware that the visual “flare” of the pale and visually bright overburden materials against vegetated landscapes would diminish with the application of topsoil and the establishment of grasses and shrubs on the barrier faces. However, this heightened visual clash of colours would most likely remain an element of the project for several years, as each barrier is progressively constructed.

(p 46.)

Vegetation

189 There will be the loss of all existing vegetation in the footprint of the mine area in order to undertake mining operations. The resulted bare earth surfaces will contrast with the grassed and treed surrounding landscape.

190 The amenity barriers will be progressively seeded and vegetated predominantly with pasture grasses but with some higher density trees and shrubs as a temporary measure. The permanent vegetation will not be planted until after the cessation of mining operations and the amenity barriers and dismantled and reshaped into their final landform. Most of the overburden emplacement areas, once they achieve their final landform, will be permanently vegetated. However, the overburden emplacement to the north of the administration area will be reclaimed and the material redistributed to fill the mine pit (Lamb report, p 3-35). That area would therefore be temporarily vegetated whilst mining continued and would only be permanently vegetated when mining ceases and the area is reshaped into its final landform.

191 The temporary vegetation of the amenity barriers and overburden emplacement areas will contrast with the existing vegetation of the surrounding landscape. The temporary vegetation of the interim overburden emplacement is proposed to be by seeding pasture grasses directly into subsoil without topsoil. I agree with Mr Moir that “seeding directly into subsoil without any topsoil or amelioration generally leads to very slow establishment, patchy results and, due to the lack of organic material in the soil, poor soil structure and subsequently poor water retention” and that “this method of establishing vegetation ... is likely to have limited success” (Moir report, [95]). The Department’s Environmental Assessment Report similarly expressed concern about the risk of failure of revegetation:

The Department also considers GRL’s aim to quickly establish a vegetative cover on the outer faces of the barriers to be subject to considerable risk of underperformance or failure. These barriers represent a relatively hostile environment for establishing an extensive cover of grasses and shrubs. The proposed vegetation would need to contend with a highly-disturbed substrate with limited soil moisture retention characteristics, moisture stress in low-rainfall periods, and the susceptibility of steep slopes to erode prior to establishment of deep-rooted vegetation. Each setback to the establishment of the planned grasses and shrubs would lead to an increase in the anticipated visual impacts of the amended project.

(p 46.)

192 The likely limited success of the revegetation of these temporary areas will result in vegetation cover that contrasts with existing vegetation of the surrounding landscape.

193 The temporary vegetation of the amenity barriers is also likely to have limited success. Only 25cm of subsoil and 15cm of topsoil are proposed to be spread on the outer surfaces of the slopes of the amenity barriers. Once the soils

are in place, the surface would be harrowed or ripped parallel to the contour before proceeding with a pasture mix and fertiliser. These shallow soil depths contrast with the current soil profiles of the existing alluvial floodplain and lower slopes, which have deep topsoils down to 50cm and subsoils to below 140cm. The shallow soils of the amenity barriers will be placed on compacted overburden, which is primarily rock. This will affect subsoil drainage and soil moisture availability.

194 The slope at the barriers and overburden emplacements will be steeper than the existing landforms, affecting water runoff, infiltration and retention. Mr Moir noted that planting on the amenity barriers will be installed into gradients ranging from 10 to 18 degrees. The steeper the slope the more difficult it becomes to retain water in the soil and the more challenging it becomes to successfully establish vegetation (Moir report, [93]). The slopes of the northern and western amenity barriers will be north and west facing and thereby will be fully exposed to the harsh afternoon summer sun.

195 Mr Moir concluded that “considering the shallow depth of the soil, the compacted subgrade and aspect, and the likelihood of soils becoming heated and hydrophobic ... there is considerable risk of total or localised failures of the vegetation” (Moir report, [92] and [93]). I agree.

196 Mr Wyatt did not have a satisfactory response to these concerns. Mr Wyatt could only assert that, in his experience, some vegetation would be able to be established on the amenity barriers and overburden emplacement areas. But that is not an answer to the concern that whatever grassed vegetation might survive on these man-made landforms, it will have an appearance quite different from the vegetation of the existing and surrounding landscapes.

197 Mr Moir also identified the risk of salinity affecting the revegetation. Mr Moir stated:

It is identified in the EIS that as a result of the depth of excavation that salinity is likely to be an issue with groundwater feeding into the mine workings and with the overburden in general. The EIS identifies that the dams proposed within the mine area are likely to become saline. The EIS also proposes that revegetated areas including the Northern and Western Amenity Barriers may be irrigated from these dams. Considering the species proposed for remediation are primarily locally occurring species where soils are not saline and the vegetation is not exposed to salt laden winds, salinity is a factor that will adversely impact the success of the proposed revegetation. Further, the salinity in the overburden may become an issue on the lower slopes of the barriers as it dissolves and leeches downhill with rainfall runoff. This potentially will lead to wholesale failure or patches of planting failures on the lower slopes of the amenity barriers. As areas of overburden will have higher levels of salinity than others this may affect the consistency of success of the remediation planting leading to a patchy appearance.

(Moir report, [94].)

198 I agree that the salinity of the groundwater is likely to adversely affect the growth and success of the planted vegetation.

199 The revegetation of the final landforms will also contrast with the vegetation of the existing and surrounding landscapes. The permanent vegetation, comprised of pockets of dense tree and shrub planting in broader pasture areas, is also unlikely to grow so as to have the same appearance as the vegetation of the surrounding landscape, for the reasons given by Mr Moir. I agree with Mr Moir’s conclusion that:

Further, even once complete remediation of the final landform has been achieved (assuming this can be achieved) the landscape will not mimic the existing landscape as the modified soil conditions, shallow subsoils, changes in site hydrology and broad scale methods of planting proposed will not result in vegetation patterns or communities that are consistent with the adjoining land that has not been disturbed by mining. The disturbed landscape will always appear different to its surroundings.

(Moir report, [102].)

Change over time

200 The views of the Rocky Hill Coal Project will not be static, but will continuously change over time. Earthwork activities will be carried out throughout the life of the mine and in rehabilitating the areas disturbed by mining.

201 The amenity barriers will be constructed over a 3 year period. As noted earlier, these barriers are large, around 2.5km in length, between 10m to 41m in height and 95 hectares in area. The barriers will be constructed in lifts of between 5m and 10m and sections of between 400m to 500m in length. Each section shaped and prepared for revegetation would cover approximately 2 hectares. The revegetation involves spreading of soil, harrowing or ripping parallel to the contour, and seeding with pasture species. These activities, and the plant and machinery used to undertake the activities, will be visible throughout the period of construction of the amenity barriers.

202 The emplacement of overburden, both in the interim and permanent areas, will similarly involve continuous earthwork activities, which activities and the plant and machinery used in undertaking the activities will be visible over the life of the mine.

203 On cessation of mining, the activities and the plant and machinery used in undertaking the activities of dismantling and reshaping the amenity barriers, reclaiming and reshaping overburden emplacements, filling and remediating the mine pit, and otherwise reshaping and revegetating the final landforms will be visible for around a year.

204 These ongoing construction works impact on the character of the landscape and increase the visual impact of the mine. As Mr Moir noted, there will be a “change in intensity from the current low intensity dairy farming to what will appear as continuous and ongoing earthworks involving plant and machinery well beyond the scale of normal farming equipment” (Moir report, [84]). I agree with Mr Moir that both Dr Lamb and Mr Wyatt, in their respective assessments of the visual impacts of the mine, have ignored “the ongoing impact of the activity of the earthworks associated with the construction of the amenity barriers and the placements of the overburden on the foothills to the north east”. Mr Moir continued:

The northern and western amenity barriers may screen the extraction workings of the mine, however, in my view they do not ameliorate the overall visual impacts of the proposal. That is because the visual impact arising from the construction and deconstruction of the so called mitigation measures and the impacts from the works associated with placement of the overburden on the lower slopes of the range will constitute significant visual impacts in their own right and will be visible above the amenity barriers.

(Moir report, [96].)

205 Mr Darroch similarly observed:

The visual impacts of the proposed mine can only be partially ameliorated by buffers which themselves create an on-going and constantly changing impact, as they are constructed, modified, vegetated and then dismantled to in-fill the void.

The remedial works themselves would appear to be ever evolving during the life of the project. The Wyatt visual analysis demonstrates how much on-going change is wrought on this landscape and its character over time.

206 As Mr Moir explained, these ongoing mining activities, and the movement of plant and machinery involved in undertaking these activities, changes the fairly static view that currently exists, which in turn changes the visual character and causes visual impact.

Night lighting

207 The night lighting of the Rocky Hill Coal Project will also have visual impacts.

208 The amended EIS states that the period of evening lighting of the mine would effectively extend from dusk to 10pm (ie, from about 5pm-10pm in winter to 8pm-10pm in summer), Monday to Saturday. GRL also proposes that, after completion of operations at 10pm, lighting will be left on for security purposes. The level of proposed security lighting is not identified but, as is noted in the Department's Environmental Assessment Report (p 46), "[e]ven after active mining operations close, it is normal for significant amounts of mine lighting to be left on overnight for security purposes".

209 Lighting impacts from the project would reduce the amenity for all residents living near the proposed mine, not just those with a direct line of sight of the mine site. In this regard, Mr Wyatt stated in his report that "[t]here is no doubt that the area surrounding the Mine Area is relatively dark" and that, "[a]ssuming that residents place a value on the dark sky, then the proposed lighting, when activated, would be a change to the existing situation". However he considered that visual impact from lighting must be assessed in a context where:

- people are home at night and, when the inside lights are on, windows act like mirrors reflecting the interior of the house and not allowing views to mine lighting; and
- when curtains or blinds are closed, there is also no visibility to the proposed lights in the surrounding area.

210 Mr Darroch challenged Mr Wyatt's suggestion that the visual impact of night lighting would be low, assuming residents will close their curtains or blinds:

The application puts the burden for dealing with a change in character from rural low level light to industrial lighting every Monday to Saturday till 10:00pm and most likely every night through the night [given the proposed security lighting] on the occupants of the surrounding properties in the vicinity suggesting the occupants should close their curtains or blinds, and deal with the impact themselves. This involves a significant assumption in the first instance that rural properties have curtains or blinds (where the normal reasons of privacy and light spill don't require them) and secondly that if they do have curtains or blinds that they are of sufficient opacity to block out the light impacts from the proposed mine.

211 In oral evidence, Mr Wyatt accepted that, for residents who are awake with their lights off, and who have no blinds or curtains, the mine lighting will be visible until 10pm, and that the headlights of vehicles exiting the mine site at

10pm will also be a visual impact. In a context where, as Mr Moir noted, part of being in the country and the experience for visitors is “the dark sky and the ability to see stars”, Mr Wyatt’s assessment of the lighting impacts of the proposal as low are likely to have been significantly understated.

212 The Department’s Environmental Assessment Report concluded (p 46):

Light spill from each of these activities would limit views of the evening sky (ie being able to see the stars) and may account for direct (line-of-sight) lighting impacts as well. The proposed development would have a significant impact in terms of light pollution in the Gloucester Valley, with ambient light from the proposal likely to be intrusive for residents of the Gloucester community who currently experience largely uninterrupted evening skies set in a rural landscape lit only by the moon and stars. The Department considers that lighting impacts from the amended project would be a factor in reducing the amenity for all residents living near the proposed mine, not just those with a direct line of sight to the mine area.

213 I agree with the Department, Mr Moir and Mr Darroch that the lighting impacts of the Project will be intrusive for residents in the vicinity and will reduce materially the visual amenity of the residents.

Cumulative visual impact

214 There will be a cumulative visual impact of the mine. People travelling north on the North Coast Railway or The Bucketts Way will view other mines, principally the Stratford Mine complex, before viewing the Rocky Hill Coal Project. Mr Moir opined, and I agree, that travellers would experience cumulative impacts of mining activities on these journeys to Gloucester.

215 There will also be a cumulative visual impact from viewing locations where currently the Stratford mine complex is visible and the Rocky Hill Coal Project would become visible. Examples are The Bucketts Way heading towards Gloucester after passing the Mograni lookout and the rural properties off The Bucketts Way, from where both mining sites will be visible.

High visual sensitivity

216 The parties’ experts agreed that viewpoints within residential and rural residential properties have a high visual sensitivity. These account for most of the viewing locations. I consider, for the reasons given by Mr Moir, that viewpoints within rural properties and public domain viewpoints, such as the lookouts and scenic walking track, also should be assessed as having high visual sensitivity.

High visual impact

217 As noted earlier, the visual impact of the Rocky Hill Coal Project is the combined impact of visual sensitivity against visual effect. I have found that the Rocky Hill Coal Project will have high visual effect, because of the high visual contrast between the proposed mine and the existing visual environment. I have also found that the viewpoints, both in private and public properties, have high visual sensitivity. The combined impact of a high visual effect with high visual sensitivity is a high visual impact.

218 The high visual impact will be experienced from multiple viewpoints on private and public land. This high visual impact in turn has a significant impact on and is incompatible with the land uses carried out on the land. The high visual impact will significantly affect the residential amenity, use and enjoyment of residential and rural residential properties. It also affects rural properties

involved in tourism and agri-tourism, because of the adverse effects on guests' and customers' use and enjoyment of the properties and the goods and services provided by the properties.

219 These findings are consistent with the findings of the Department's Environmental Assessment Report (pp 44, 46):

The Department considers that there is little doubt that the amended project would have a significant impact on the visual and scenic values of the Gloucester Valley, and on the visual amenity of the nearby rural-residential estates. The unmitigated impacts of the proposal would be significant, both for nearby residents and for travellers on The Bucketts Way.

...

However, the Department considers that, in the Gloucester Valley, noise/visual barriers of the scale and extent proposed are highly likely to create significant visual impacts in their own right, particularly given their considerable height and the steepness of their outer slopes (10°-18°). The proposed barriers would significantly visually contrast with the existing landscape ...

...

The Department considers that the barriers would in themselves present a high visual impact. This is particularly the case within the E3 Environmental Management zone, where a primary objective is to preserve the visual amenity and rural character of the lands surrounding Gloucester. The barriers would remain highly visible, even if well-vegetated. Only when final rehabilitation was well-established could it be considered that the visual impact of the amended project in the surrounding landscape was low.

220 The Department concluded:

The Department recognises the significance of the local landscape to the local community, as evidenced in the many submissions raising visual impacts as a key concern. A significant number of objectors considered that the proposed visual mitigation barriers would themselves be visually intrusive. The Department agrees with these submissions.

The amended project is located at the foothills of the Mograni Range, whilst the rural-residential estates are located on the rise in the centre of the Gloucester Valley, between the Mograni and the Gloucester Bucketts Ranges. The "saucer" shape of the landscape means that, while GRL proposes to construct visual barriers to shield views of the mine, certain aspects of the mine site would be visible at all times from many of the residential properties in the estates, from The Bucketts Way and from higher, more distant viewing locations.

The Department considers that the visual barriers would be scenically intrusive, albeit episodically. They may well be, at times, almost as intrusive as the features they are intended to screen. They certainly would not blend seamlessly into the surrounding landscape or go unnoticed by local residents, travellers or tourists. The Department considers that, given their spatial and temporal scale and method of construction and location, the proposed visibility barriers would not sufficiently ameliorate the visual impact of the mine, but rather substitute one substantial visual impact for another, albeit lesser, impact.

It is unlikely that there would be any period during the mine's operation or rehabilitation when the amended project would be visually inconspicuous. While the visual impact of the project would definitely be greatest during the times of initial construction and final re-shaping of the barriers, the Department considers that substantial visual impacts would continue throughout the life of the mine. It is the Department's, and Council's, assessment that the residual visual impact of the mine would be significant throughout all stages of the project and refusal of the amended project is recommended on these grounds alone.

221 The conclusions of high visual impact and significant impact on visual amenity, use and employment of surrounding residential uses are also consistent with the conclusions in the Planning Assessment Commission's Determination Report (p 12):

The presence of a 497ha disturbance within the landscape would not represent a development that is sympathetic to the Gloucester Valley's character and would impact on far-ranging and localised views. The Commission finds that due to the significant impact of the mine on the character of the landscape, it is inconsistent with the underlying strategic aims and objectives of the land use zonings of the GLEP, (in particular E3 Environmental Management within which much of the site is located), to protect the scenic amenity of Gloucester township and the broader Gloucester Valley by retaining the scenic and rural surroundings of the town.

The Commission finds that due to the proximity of the project there would be significant views of the mine site from properties off Grantham and Fairbairns Roads in the Forbesdale Estate to the west. These properties currently experience uninterrupted views across the valley floor to the Mograni Ranges and there is no significant topography that blocks views towards the proposed mine site. The construction and operation of a mine and the considerable landforms created as a result would represent incongruous and significant features in the landscape, which would negatively affect the visual amenity currently enjoyed by residents. This visual amenity would be further impacted by lighting from the construction and operation of the mine.

The Commission finds that the amenity barriers would be substantial structures in the wider landscape as well as at a localised visual level, where the distance of the barriers to the nearest residential receiver would be approximately 350m. The Commission considers there is a risk that the establishment of vegetative cover for the barriers may be impaired by adverse climatic conditions, prolonging the adverse visual impact of the newly formed earth walls. The Commission finds that the barriers would not sufficiently fulfil one of their intended purposes, which is to protect the visual amenity of local residents; would be visually intrusive; and shares the Department's view that they would substitute one substantial visual impact for another.

The Commission supports the Department's and Council's assessment that the residual visual impact of the mine would be significant throughout all stages of the project and the subsequent recommendation that the project be refused consent.

222 I agree with and adopt these findings and conclusions of the Department and Planning Assessment Commission. The visual impacts of the Project, both by themselves and by reason of the consequential adverse effects on existing, approved and likely future uses of land in the vicinity, and the social impacts that the visual impacts will likely cause, justify refusal of consent for the Project.

The amenity impacts of the mine

223 The Minister and Gloucester Goundswell contended that the Rocky Hill Coal Project would adversely affect the amenity of residents in the locality because of the noise and dust impacts of the mine. The diminution in amenity would in turn cause social impacts.

Noise impacts

224 The mine will change the noise environment for residents and visitors. Mine noise will be audible in the Gloucester locality for the first time, a point made by the Environment Protection Authority in its letter to the Department of Planning dated 7 July 2017.

225 The mine noise will comply with the non-discretionary development standard for noise in cl 12AB(3) of the Mining SEPP (as amended). State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Air and Noise Impacts) 2018 amended the development standard in cl 12AB(3) of the Mining SEPP to specify that the cumulative noise levels of the development are based no longer on the acceptable amenity noise levels, as determined in accordance with Table 2.1 of the Industrial Noise Policy 2000, but instead on the recommended amenity noise levels, as determined in accordance with Table 2.2 of the Noise Policy for Industry 2017.

226 Despite this change to cl 12AB(3) of the Mining SEPP, the relevant residential amenity noise level in the former Industrial Noise Policy and the current Noise Policy for Industry are identical. The current development standard is that the development does not result in a cumulative amenity noise level greater than the recommended amenity noise levels, as determined in accordance with Table 2.2 of the Noise Policy for Industry, for residences that are private dwellings. Table 2.2 specifies the recommended amenity noise levels for residential receivers as follows:

Receiver	Noise amenity area	Time of day	LAeq, dB(A)
(see Table 2.3 to determine which residential receiver category applies)			Recommended amenity noise level
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45

227 The evidence of the noise experts, Mr Glenn Thomas for GRL and Mr Stephen Gauld for Gloucester Groundswell, was that the mine will meet the recommended amenity noise levels for each category of residential receiver. The residences adjacent to The Bucketts Way and the Gloucester urban residences would be categorised as suburban residential receivers. The cumulative amenity noise level of the mine will not exceed the recommended amenity noise level of 55dB(A) in the day and 45dB(A) in the evening at the suburban residential receivers.

228 The rural residences along Jacks Road and Waukivory Road, in the Forbesdale, Thunderbolt and Avon River estates and other rural residences (excluding residences located adjacent to The Bucketts Way) would be

categorised as rural residential receivers. The cumulative amenity noise level of the mine would not exceed the recommended amenity noise level of 50dB(A) in the day and 45dB(A) in the evening at these rural residential receivers. With one exception, the predicted noise levels also will be more than 10dB(A) below the recommended noise levels for rural residential receivers. The exception is the nearest rural residential receiver to the Rocky Hill Coal Project site, which is property #6 (Campbell) on Waukivory Road immediately to the north of the site, where the predicted evening noise amenity level is 38dB(A), which is less than 10dB(A) below the recommended 45dB(A). GRL has entered a put option with the owner of this property to purchase the property if consent is granted to the mine. If GRL purchases the property, the property would no longer be considered to be privately owned and the policy would no longer apply (Thomas report, p 7).

229 The noise impact of the mine is not limited to the amenity noise levels of the mine; the intrusiveness noise levels also need to be considered.

230 The Noise Policy for Industry states that the intrusiveness noise levels “are used in combination with the amenity noise level to assess the potential impact of noise, assess reasonable and feasible mitigation options and subsequently determine achievable noise requirements” (p 9). The Noise Policy for Industry says that:

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the LAeq descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.

(p 9.)

231 The background noise level to be used for assessment purposes is to be determined by the method outlined in Fact Sheets A and B to the Noise Policy for Industry. This is termed the rating background noise level. The intrusiveness noise level is therefore determined to be the rating background noise level plus 5dB.

232 The Noise Policy for Industry sets minimum assumed rating background levels and hence minimum project intrusiveness noise levels. Table 2.1 provides:

Time of day	Minimum assumed rating background noise level (dB[A])	Minimum project intrusiveness noise levels (LAeq 15 minute db[A])
Day	35	40
Evening	30	35
Night	30	35

233 The time periods are defined to be: day (7am-6pm Monday to Saturday and 8am-6pm Sundays and public holidays), evening (6pm-10pm) and night (10pm-7am Monday to Saturday and 10pm-8am Sundays and public holidays).

234 Applying this assessment methodology, GRL’s noise expert adopted rating background levels for suburban residential receivers of 35dB(A) in the day time

and 30dB(A) in the evening and for rural residential receivers of 30dB(A) in both the daytime and evening, and project intrusiveness noise levels of 5dB(A) greater than these rating background levels.

235 With the exception of two privately owned rural residential receivers, the highest predicted intrusive noise levels from the Rocky Hill Coal Project will not exceed the adopted rating background levels by more than 5dB(A) and therefore the daytime and evening intrusiveness noise criteria will be met for both suburban and rural residential receivers. The two exceptions are:

- (a) Property #7 (Ansell and Murray) on Waukivory Road with predicted evening intrusive noise levels of 36 LAeq (15 minute) in years 4 and 7 in and out of the pit, which exceeds the minimum project noise intrusiveness level of 35 LAeq (15 minute); and
- (b) Property #6 (Campbell) on Waukivory Road immediately north of the Rocky Hill Coal Project site, with a predicted evening intrusive noise level of 39 LAeq (15 minute) and 40 LAeq (15 minute) for years 4 and 7 in and out of the pit, which exceeds the minimum project noise intrusiveness level of 35 LAeq (15 minute) (Thomas report, pp 8-9 and Thomas letter of 2 November 2018, pp 1-2, attached to the affidavit of Mr Thomas of 2 November 2018).

236 The residual noise exceedance at property #7 is less than 2dB(A) above the applicable evening minimum project intrusiveness noise level for rural residential receivers of 35 LAeq (15 minute). This is considered “negligible” in accordance with the Voluntary Land Acquisition and Mitigation Policy (September 2018), Table 1 and would not require voluntary mitigation or land acquisition. The residual noise exceedance at property #6 is between 3-5dB(A) above the applicable evening minimum project intrusiveness noise level of 35 LAeq (15 minute), but the increase in total cumulative industrial noise level resulting from the development is less than 1dB. This is considered “marginal” in accordance with the Voluntary Land Acquisition and Mitigation Policy, Table 1, and would require mitigation by providing mechanical ventilation only. GRL have entered into a put option to purchase property #6. The agreement between GRL and the owner of property #6 is a “negotiated agreement” for the purposes of the Voluntary Land Acquisition and Mitigation Policy (Thomas letter of 2 November 2018, pp 2-3 and Mr Gauld agreeing in his letter of 30 November 2018 annexed to Mr Gauld’s affidavit of 30 November 2018).

237 In these circumstances, GRL submitted that the intrusiveness of noise from the Rocky Hill Coal Project should be considered to be acceptable.

238 Gloucester Groundswell contended nevertheless that the mine noise would still impact on the receiving residents’ acoustic amenity, relying on Mr Gauld’s evidence. Mr Gauld explained that the impact of an intrusive noise is “highly dependent on the environment in which it is experienced” (Joint Report of Noise Experts, [4.25]). Mr Gauld noted that the background noise level for the rural residential receivers is much lower than the minimum assumed rating background levels in the Noise Policy for Industry. The measured background noise levels vary between 26dB(A) and 35dB(A) in the day and between 24dB(A) and 30dB(A) in the evening. In contrast, under the Noise Policy for Industry, the minimum assumed rating background levels are 35dB(A) in the day and 30dB(A) in the evening.

239 The predicted mine noise levels will be greater than 5dB(A) above these lower measured background noise levels, allowing the predicted mine noise

levels to “emerge” from the background noise level to a greater extent than if the measured background noise levels had actually been the minimum assumed rating background levels. Mr Gauld prepared a table (Exhibit G10) which showed noise emergence of up to 10dB(A) above measured background noise levels on some winter evenings with southerly winds of up to 3m per second at various properties in the Avon River Estate and Thunderbolt Estate, during years 4, 7, 10, 17 and 18 of mining operations. Southerly winds of less than or equal to 3m per second occur on approximately 30% of the evenings in winter and are a feature of the locality.

240 Mr Gauld stated that this greater level of emergence will make the predicted mine noise levels more noticeable and cause a higher level of impact on the residents’ acoustic amenity than in an environment where the measured background noise level is higher. Mr Gauld concluded that “the presence of a very low background noise level, together with the predicted noise with significant low frequency content, is likely to cause an unacceptable noise impact for nearby residents even if the Project’s noise emission meets the PSNL’s in the INP” (Joint Report of Noise Experts, [4.29]-[4.32]).

241 Mr Gauld also predicted that the mine noise is likely to be considered to be “offensive noise” as defined by the *Protection of the Environment Operations Act 1997* (NSW) (Gauld report, [109], [110] and Gauld letter of 30 November 2018).

242 Mr Gauld’s opinion about the high impact of the mine noise for nearby residents remained the same notwithstanding the change from the Industrial Noise Policy to the Noise Policy for Industry (Gauld letter of 30 November 2018, p 1). Indeed, Mr Gauld noted that the Noise Policy for Industry increased by 5dB(A) both the minimum assumed rating background noise level for daytime from 30dB(A) to 35dB(A) and the minimum project intrusiveness noise levels from 35dB(A) to 40dB(A). The emergence of the allowable noise level in the Noise Policy for Industry will be 5dB(A) greater than was allowed by the Industrial Noise Policy. If GRL wanted to take advantage of the additional 5dB(A) afforded by the Noise Policy for Industry, the impact on residents would be greater than is currently proposed and would be more offensive (Gauld letter of 30 November 2018, pp 1, 2).

243 Mr Gauld also identified two other factors that will add to the impact of the mine noise on the residents. One is that the mine noise will be a noise source that is new and heard by the residents for the first time. The other factor is that most of the residents hearing the mine noise will not be in favour of the mine, which adds to the impact. The combination of the factors of the greater emergence of the mine noise from the very low background noise level, the mine noise being a new noise source and the residents not being in favour of the mine that causes the noise, will result in the residents being adversely affected acoustically (Gauld oral evidence, Transcript, 22/08/18, p 480).

244 Gloucester Groundswell submitted that the mine noise level may in practice be greater than predicted. The predicted noise levels depend on GRL implementing all reasonable and feasible noise mitigation measures. Gloucester Groundswell referred to the concerns raised by the Environment Protection Authority about the “practicality of regularly limiting mining activities in an operational mine, and ... that the modelling for this project is optimistic about the available noise mitigation measures ... The EPA questions whether the assumed and restrictive operational controls would be regularly put into practice

on a large mine with a workforce of in excess of 100 employees”. The EPA advised that “the number of residents receiving noise above the intrusive criterion could be significantly greater than predicted if noise levels were slightly under-predicted, or not all necessary mitigation measures are implemented to meet the noise limits” (EPA letter dated July 2017, Exhibit P).

245 Gloucester Groundswell submitted that the EPA’s concerns were confirmed by Mr Thomas’s evidence. Mr Thomas confirmed that the extensive noise management measures identified in Table 24 of the Amended EIS Noise, Blasting and Vibration Assessment are required to be implemented in order to achieve the predicted noise levels, and that these noise levels were calculated without including alarms or communication horns. Further, scheduling to avoid working in areas outside the pit on evenings with southerly winds, most likely in the winter, will be required. Mr Thomas conceded that “if the noise mitigations don’t perform to their specification, they [the noise levels] would be higher” (Transcript, 22/08/18, p 471).

246 Even with the operational controls, Mr Thomas identified that it will still be necessary for the mine to shut down evening operations under certain weather conditions. As Mr Thomas explained, “having achieved that noise level under those weather conditions which is the prevailing assessable weather condition in accordance with the INP, to achieve 35 decibels it’s necessary to switch off some of the equipment” (Transcript, 22/08/18, p 462).

247 When asked to explain the process by which shut downs would occur, Mr Thomas confirmed that even with live noise monitoring triggering alarms, an extensive process is required from people with multiple delegations before action is likely to be taken to shut down operations and there is no clear proposal on exactly what plant would be shut down, for how long or what would trigger a restart of operations (Transcript, 22/08/18, pp 465-468).

248 Gloucester Groundswell submitted that there is also no noise management plan before the Court that could give the Court confidence that such shut down procedures could be reliably implemented. Mr Thomas conceded that he had not seen a noise management plan “because one does not exist to the extent that one would be required under the consent. At this stage we have a noise impact assessment for the project” (Transcript, 22/08/18, pp 468-469).

249 Gloucester Groundswell submitted that even if the mine noise were to meet the noise criteria in the Noise Policy for Industry, the mine will still cause intrusive noise for residents in the vicinity of the mine, which will cause unacceptable social impacts.

250 GRL responded to Gloucester Groundswell’s submission that the mine noise would have unacceptable impacts on the residents’ acoustic amenity.

251 First, GRL submitted that the fact that the mine noise levels will meet the accepted noise criteria for amenity noise and intrusive noise in the Noise Policy for Industry is evidence that the mine will not have a negative noise impact. The noise criteria in the Noise Policy for Industry have been selected to protect the majority of the community (90%) from the adverse effects of noise for at least 90% of the time. GRL referred to the evidence of Mr Gauld who relied on the statement in the former Industrial Noise Policy that:

The criteria in this document (Section 2) have been selected to protect at least 90 per cent of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90 per cent of the time. Provided the criteria in this document are achieved, then it is unlikely that most people would consider the

resultant noise levels excessive. In those cases when the project-specific noise levels are not, or cannot be, achieved, then it does not automatically follow that those people affected by the noise would find the noise unacceptable.

(p 3 of Industrial Noise Policy.)

252 GRL submitted that therefore only 10% of the population living in the vicinity of the mine might potentially be affected and even then this small minority of persons may not find the mine noise to be unacceptable.

253 GRL also submitted that the criteria in the Industrial Noise Policy, selected to protect 90% of the population from adverse noise effects for at least 90% of the time, include the rating background level to be used for assessment purposes. In the Industrial Noise Policy, where the rating background level is found to be less than 30dB(A), then it is set to 30dB(A) (p 24). This is relevant in this locality where measured background noise levels can be less than 30dB(A). In these locations, the Industrial Noise Policy set the rating background level at 30dB(A).

254 GRL submitted that, therefore, the criteria in the Industrial Noise Policy, including the rating background level, addressed the very concern raised by Mr Gauld about the impact of mine noise on residential receivers in locations where the background noise level is less than 30dB(A).

255 GRL submitted that the same argument continues to hold good with respect to the Noise Policy for Industry, which also sets minimum assumed background rating levels to be used for assessment purposes.

256 Secondly, GRL submitted that the acceptability or unacceptability of the noise levels should not be assessed by reference to the subjective beliefs of residents who are opposed to the mine. Rather, the objective noise criteria in the Noise Policy for Industry should be applied to determine whether the mine noise will have acceptable or unacceptable impacts on residential receivers. However, if subjective beliefs are to be considered, GRL referred to the affidavit evidence of members of the local community who live in proximity to the Duralie and Stratford mines, and who are familiar with the noise generated by those mines. Those people said that the noise likely to be generated by the Rocky Hill Coal Project would not be louder than the trains which pass through Gloucester on a regular basis. GRL submitted that, although the mine noise might be a new source of noise, it will not be so different from other noise sources already experienced by the residents.

257 Thirdly, GRL submitted that the Court would not proceed on the basis that the reasonable and feasible mitigation measures could not or would not be implemented. Mr Thomas confirmed that the proposed mitigation measures are reliable, that they are tried technologies, and that they would be implemented for the Project (Transcript, 22/08/18, p 469.) Mr Gauld accepted that GRL has proposed a range of reasonable noise control and management measures that are conventional, current and best practice for open cut mines (Transcript, 22/08/18, pp 501, 507).

258 GRL submitted that appropriate conditions of consent can be imposed to ensure that the feasible and reasonable mitigation measures are implemented, including a condition requiring the preparation and implementation of a mine noise management plan.

259 I find that the predicted noise levels from the Rocky Hill Coal Project will comply with the recommended amenity noise levels and project intrusiveness noise levels in the Noise Policy for Industry. The first is the nondiscretionary

development standard in cl 12AB(3) of the Mining SEPP. I find that the mine would not result in a cumulative amenity noise level greater than the recommended amenity noise levels, as determined in accordance with Table 2.2 of the Noise Policy for Industry, for residences that are private dwellings. The second is the accepted criteria for assessing the acceptability of the intrusiveness of the mine noise. Both criteria in the Noise Policy for Industry are intended to protect the majority (90%) of the population living in the vicinity of the mine for at least 90% of the time.

260 Nevertheless, I find that the mine will still cause residual noise impacts on residents in the vicinity of the mine. I accept Mr Gauld's evidence that the mine noise levels will emerge from the background noise levels in locations where the measured background noise level is less than 30dB(A). This will make the mine noise levels more noticeable and more likely to impact the residents' acoustic amenity. These residents, if they are opposed to the mine, are more likely to find this new impact on their acoustic amenity to be unacceptable.

261 This does not necessarily mean that the impact is unacceptable for the purposes of assessing compliance with the cumulative noise level development standard in cl 12AB(3) of the Mining SEPP or the issue of noise generally. As GRL submitted, cl 12AB(3) of the Mining SEPP and the Noise Policy for Industry set the criteria for assessing the acceptability of noise from industrial sources. The predicted mine noise levels will meet these criteria. The difficulty is, however, that residential receivers with very low background noise levels will not be placated by being told that the mine noise levels comply with the applicable criteria in the Noise Policy for Industry and are therefore considered to be acceptable. The residents will continue to have annoyance reactions to the mine's intrusiveness noise levels and cumulative amenity noise levels. This persistent annoyance is likely to have social impacts. Existing residents may leave Gloucester and new residents may be inhibited from replacing them. Uses dependent on a "clean and green" environment, including a quiet acoustic environment, will be adversely affected, causing further social impacts. These social impacts are examined in the next section.

262 Consideration of the social impacts of the mine's intrusiveness noise levels and cumulative amenity noise levels is not precluded by cl 12AB(3) of the Mining SEPP. The development standard for cumulative amenity noise level in cl 12AB(3) of the Mining SEPP does not prevent a consent authority from refusing consent on grounds relating to, or imposing conditions to regulate, project-related noise impacts that are not the subject of that development standard or social impacts resulting from project-related noise impacts. The negative social impacts that are likely to be caused by residents' annoyance reactions to project-related noise are not impacts that are the subject of the development standard in cl 12AB(3) of the Mining SEPP.

263 The noise impacts of the mine, although not a ground in itself to refuse the development application for the Rocky Hill Coal Project, nevertheless do contribute to adverse social impacts that are a ground for refusal.

Dust impacts

264 Mining operations will affect air quality. The question is whether the effect on air quality is acceptable. This is to be determined by reference to the applicable standard.

265 Clause 12AB(4) of the Mining SEPP (as amended) sets a non-discretionary development standard for cumulative air quality level. This standard is that the

development does not result in a cumulative annual average level greater than 25µg/m³ of PM₁₀ or 8µg/m³ of PM_{2.5} for private dwellings. This standard was introduced by the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Air and Noise Impacts) 2018. The amendment reduced the cumulative annual average PM₁₀ criterion from 30µg/m³ to 25µg/m³ and introduced an annual average of PM_{2.5} of 8µg/m³ for private dwellings.

266 GRL's air quality expert, Ms Judith Cox, undertook further air quality modelling after the amendment came into force on 21 September 2018 to update the air quality and health risk assessment undertaken for the amended EIS. The further modelling provided cumulative contours of PM₁₀ and PM_{2.5} (including the contribution from diesel emissions) for comparison against the criteria for voluntary land acquisition in the revised Voluntary Land Acquisition and Mitigation Policy. Ms Cox found that there are no predicted exceedances of the revised Voluntary Land Acquisition and Mitigation Policy criteria at any of the receptors/receivers. The figures provided by Ms Cox of the cumulative contour plots of PM₁₀ and PM_{2.5} for years 1, 4, 7 and 10 show that there is no privately-owned land predicted to experience an exceedance of either the PM₁₀ and PM_{2.5} voluntary land acquisition criteria on more than 25% of land (Cox letter dated 15 November 2018, annexed to the affidavit of Ms Cox of 15 November 2018). Ms Cox's evidence was not contested by the Minister or Gloucester Groundswell.

267 I find that the cumulative air quality level will comply with the development standard in cl 12AB(4) of the Mining SEPP. The mine's cumulative air quality level is not a ground for refusing development application for the Rocky Hill Coal Project.

268 Nevertheless, the residents' concerns about the mine's potential adverse effects on air quality, and the concomitant threat to their health and the health of their family, may have social impacts. Concerned residents may leave Gloucester and not be replaced by people who are put off by the perceived risk of deteriorated air quality and effects on their health. Uses that depend on Gloucester having, and being seen to have, a clean and green environment will also be adversely affected. These lead to negative social impacts, which are discussed in the next section.

269 The negative social impacts caused by residents' concerns about the project-related air quality impacts, including the perceived threat to their health and the health of their families, are not impacts that are the subject of the cumulative air quality level development standard in cl 12AB(4) of the Mining SEPP. That development standard does not prevent a consent authority from refusing consent on grounds relating to, or imposing conditions to regulate, project-related air quality impacts that are not the subject of the development standard or social impacts resulting from project-related air quality impacts.

The social impacts of the mine

What are the social impacts?

270 The Rocky Hill Coal Project will have social impacts, both positive and negative. The *Social Impact Assessment Guideline* (Department of Planning and Environment, 2017), to be used in assessing the social impacts of State significant mining, petroleum and extractive industry development, describes a social impact as "a consequence experienced by people due to changes

associated with a State significant resource project” (p 5). The Guideline lists nine key categories in which social impacts may occur: way of life; community; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; personal and property rights; decision-making systems; and fears and aspirations (p 5). The Guideline states:

As a guide, social impacts can involve changes to people’s:

- *way of life*, including:
 - how people live, for example, how they get around, access to adequate housing
 - how people work, for example, access to adequate employment, working conditions and/or practices
 - how people play, for example, access to recreation activities
 - how people interact with one another on a daily basis
- *community*, including its composition, cohesion, character, how it functions and sense of place
- *access to and use of infrastructure, services and facilities*, whether provided by local, state, or federal governments, or by for-profit or not-for-profit organisations or volunteer groups
- *culture*, including shared beliefs, customs, values and stories, and connections to land, places, and buildings (including Aboriginal culture and connection to country)
- *health and wellbeing*, including physical and mental health
- *surroundings*, including access to and use of ecosystem services, public safety and security, access to and use of the natural and built environment, and its aesthetic value and/or amenity
- *personal and property rights*, including whether their economic livelihoods are affected, and whether they experience personal disadvantage or have their civil liberties affected
- *decision-making systems*, particularly the extent to which they can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms
- *fears and aspirations* related to one or a combination of the above, or about the future of their community.

271 I will assess the social impacts of the Rocky Hill Coal Project under these nine categories, although the categories are interlinked. Changes associated with the Rocky Hill Coal Project may directly, indirectly or cumulatively impact in one or more of these categories. For example, changes to people’s visual, acoustic or air quality environment may affect people’s surroundings, health and wellbeing, way of life and community, as well as people’s fears and aspirations about these matters (see p 34 of the Guideline).

272 Social impacts can be positive or negative; tangible or intangible; direct, indirect or cumulative; directly quantifiable, indirectly or partly quantifiable or only able to be described and assessed in qualitative terms; and experienced differentially (p 6). The Guideline states:

Social impacts vary in their nature, and can be:

- positive (for example, increased local and regional job opportunities) or negative (for example, increased prevalence of certain physical health conditions)
- tangible (for example, availability of affordable housing) or intangible (for example, social cohesion)

- direct (that is, caused by the project), indirect (that is, caused by a change that is caused by the project), or cumulative (see Box 1)
- directly quantifiable, indirectly or partly quantifiable (including by using proxy indicators), or only able to be described and assessed in qualitative terms
- experienced differently:
 - by different people and groups within a community (for example, an increase in the cost of housing may be positive for homeowners wanting to rent out or sell their properties, but negative for individuals and families wanting to enter the same market)
 - by different communities (for example, people neighbouring a project may experience most of the noise and dust impacts, while people in the region's nearest town may experience most of the job opportunities)
 - at different times and stages of the project (for example, construction and commissioning, operation, decommissioning and closure, and post closure management).

273 Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of activities on society, the economy and the environment. The cumulative impacts can arise from a single activity, multiple activities or from interactions with other past, current and foreseeable activities (p 7). The Guideline notes that cumulative impacts can arise in three main ways:

- “Spatial” impacts are those that occur over the same area. For example, trucks from multiple operations may produce a cumulative noise impact along a common haulage route.
- “Temporal” impacts are those that vary over time. For example, the construction of multiple large projects over the same timeframe may produce a spike in temporary workers in an area, creating a short-term cumulative shortage of accommodation.
- “Linked” impacts involve more complex interactions, such as where an impact triggers another or where a single activity has multiple impacts. For example, a resource project may generate noise and dust, consume local water resources, and increase traffic on local roads and services. The combination of these varied impacts may result in a cumulative impact on the social fabric of a locality.

274 Social impacts need not only be actual, they can also be perceived. The Guideline gives an example:

For instance, when a community or individual perceives resource project-induced changes as detrimental and unable to be suitably managed or controlled, stress may result. This is more likely to occur when the change event is perceived as being harmful, threatening or challenging; and the community or person perceives that they do not have the resources, coping strategies and/or support available to manage or influence the disruptions caused by the event.

275 The materiality of the social impact will be affected by the impact characteristics of extent, duration, severity and sensitivity of the impact. The Guideline explains these impact characteristics:

Characteristic	Definition	Material effect examples (indicative only)
Extent	The geographical area affected by the impact (or the number or proportion of people or population groups who are affected)	<ul style="list-style-type: none"> • impacts occur beyond the site boundary • impacts on large geographical area (for example, suburb or region, or larger) • impacts affect a large proportion of a population group • impacts will have ripple effects on multiple matters
Duration	The timeframe over which the impact occurs	<ul style="list-style-type: none"> • permanent impact • life of the project or longer • specific project phase • frequently occurring impact
Severity	Scale or degree of change from the existing condition as a result of an impact	<ul style="list-style-type: none"> • scale or degree of change from existing condition is substantial • will take substantial time and effort to reverse or ameliorate • ecological or community function, process, health, lifestyle, or livelihood is expected to change substantially or be substantially disrupted
Sensitivity	Susceptibility or vulnerability of people, receivers or receiving environments to adverse changes caused by the impact, or the importance placed on the matter being affected. Attributes of sensitivity include: conservation status; intactness; uniqueness or rarity; resilience to change and capacity to adapt; replacement potential; impacts on vulnerable people; and/or of value or importance to the community	<ul style="list-style-type: none"> • disturbance of listed heritage, including Aboriginal heritage • impacts on sensitive receivers (for example, hospital, school, residential area) • unique or widely recognised assets or values will be disturbed

Changes to people's way of life

276 Social impact related to “way of life” includes changes in how people live, work, play and interact with each other.

277 GRL contended that the mine would have positive social impacts in terms of increasing local employment and invigorating the local economy. GRL expressed a target of 75% local employees and an expectation that 74% of total non-wage operational expenditure would be spent in the Taree-Gloucester area. These targets underpin GRL’s estimate of the economic benefits to the local area. For the reasons I give below in the section on economic benefits of the mine, the potential economic benefits of the mine are uncertain but in any event have been substantially overstated by GRL.

278 The social researcher called by Gloucester Groundswell, Dr Hedda Askland, identified that the potential employment and economic benefits for the local area may not be realised (Askland report, pp 18-21).

279 Dr Rebecca Lawrence, the social researcher called by the Minister, also queried whether the positive social benefits of local employment will be realised, having regard to increased automation and digitalisation of the mining industry that have labour displacing effects (Lawrence report, pp 32-33).

280 As a consequence, I assess the positive social impacts on local employment and the local economy to be “unlikely” to occur and the scale of improvement or benefit to local employment or the local economy to be only “moderate”. The significance of the positive social impact on local employment and the local economy would accordingly be “moderate” (see pp 42 and 43 of Appendix C of the Guideline).

281 This moderate positive social impact of the mine on local employment and the local economy may, however, be countered by negative social impacts of the mine on local employment and the local economy. Many people who objected to the Project expressed concern that the mine may affect competing land uses that depend on a clean and green environment, such as tourism and agri-tourism. Tourism operators were deeply concerned about the impact that the Project might have on the image of Gloucester as a “green tourism destination” (Askland report, [31], [32] and [34] and Joint Social Impacts Expert Report, p 17). Ms Naomi Kilby, Managing Director of Barrington Outdoor Adventure Centre, encapsulated the concern:

Scenic nature is our business, so any activity that threatens the scenic nature of our region also threatens our business, our livelihood, and the livelihoods of our staff ... We have spoken to our clientele and the overwhelming reasons that they chose this region is for its natural beauty, clean air, clean water and for the peace and quiet. A ten per cent drop in customers will make my business marginal. A 20 per cent drop will send me out of business ... If you factor in the impact of the destruction of Gloucester’s clean green image by having an open cut coal mine on your doorstep, then I believe the impact of Rocky Hill Coal mine will be much greater than 20%.

(Kilby statement of evidence.)

282 Ms Trudy Schultz, who runs a local tourism business, Accommodation Gloucester, made a similar submission at the hearing. Ms Schultz said that tourism is a key economic driver for Gloucester’s future and that this tourism is largely driven by the natural environment:

My guests mostly come to visit our World Heritage Barrington Tops, as well as our clean, pristine wilderness areas and rivers ... When speaking with guests

about why they visit Gloucester, the main reason is the back to nature country experience Gloucester offers and the relaxed feeling that ... driving into Gloucester, the picturesque country views ... gives them. Peace and tranquillity highly rank in their comments.

283 However Ms Schultz was concerned that the mine would adversely affect tourism: “The majority of guests have said they would not come back if a mine went ahead ... no-one wants to visit ... and holiday in a mining town.”

284 Ms Karen O’Brien, owner of the Hillview Herb Farm, an agri-tourism operator, asked rhetorically: “Who will want to visit, consume produce, buy plants from a garden in such close proximity to an open cut mine?”

285 Any closure or downturn in such businesses may reduce local employment and non-wage operational expenditure in the local area. The scale of these disbenefits may offset the scale of any benefits of the mine for local employment and the local economy.

286 There is also a temporal concern. The benefits of the mine will be received for the life of the Project only, while the disbenefits of the mine may persist for longer. Even after mining operations have finished, the damage to the clean and green environment of the Gloucester area, and the image of such an environment, may endure.

Changes to people’s community

287 Social impact related to community includes changes in the composition, cohesion, character and function of community and people’s sense of place.

288 Residents in the vicinity of the Rocky Hill Coal Project expressed concern that the Project had already changed, and was likely in the future to change, community composition, cohesion and character. GRL has purchased rural and rural-residential properties surrounding the Project site, leading to the departure of valued neighbours and community members. Former owner-residences have become rental residences, decreasing new neighbours’ investments in the properties and the neighbourhood (Askland report, pp 22-23).

289 The Rocky Hill Coal Project has caused, and is likely to continue to cause, social divisions in the community between people who oppose and people who support the Project. A large majority of the community oppose the Project. This is indicated by the number of submissions made to the Department of Planning and Environment in response to the original and amended EIS. As stated in the Department’s Environmental Assessment Report (pp i, 1, 6), the Department received 1,744 submissions to the original Project, of which approximately 90% were objections, and 2,570 submissions to the amended project, of which 2,308 were objections. The survey taken on behalf of Gloucester Shire Council in 2012 found that 82% of the 406 people surveyed opposed the mine. Strong opposition was also detected in the ReachTEL survey conducted in 2017, in which it was identified that 73.2% of the community disagreed with the Project (Askland report, [67]).

290 Dr Askland identified that a person’s position in relation to the Project relates to “matters of proximity” or how close the person is to the Project in terms of geographical, economic and moral variables:

The notion of “matters of proximity” ... refers specifically to spatial, moral and socio-economic distance between individuals and a land use change. Spatial proximity refers to the geographical distance between an individual and the area of proposed land use change. Moral proximity refers to how the proposed land use change aligns “with an individual’s moral framework and their world-view

(overarching philosophy or outlook; conception of the world)” ...; that is, philosophical, ontological, ideological and affective dimensions that embed an individual’s sense of right and wrong. Socio-economic proximity refers to issues such as employment, income/livelihood, political representation and voice.

(Askland report, [68].)

291 Dr Askland observed that:

These three “matters” were very much present in the primary data collected through semi-structured interviews, with a general pattern suggesting that those who support the mine would generally be people:

- who live in the northern part of Gloucester and whose properties are physically removed from the mine site; and/or,
- who will benefit financially from the Project, through direct or indirect employment and contract work; and/or
- who endorse an economic rationalist ideology and express a distinct belief in economic progress and modernisation.

In contrast, those who oppose the mine would generally be people:

- who live within the neighbouring estates, in Gloucester South or the township; and/or
- who will not benefit financially from the mine; and/or
- who hold environmental values or have endured an emotionally intense experience of engaging with the extractive industries.

(Askland report, [68]-[69].)

292 Dr Askland concluded that:

Based on this, it is obvious that support for and opposition to the Project and the Modification fall along the lines of people who see themselves as potential benefactors of, versus sufferers from, the Project. The tension between these groups is evident in how people speak about the Project, with a clear labelling of the other groups along ideological lines of “environmentalists”, “eco-evangelists”, “greenies” versus “conservatives” and “rednecks”. These stereotypes are used in a derogatory manner and are examples of the deep-seated division within the community.

The stereotypes and labels that people use are indicative of the significant impact that the Project has already had on Gloucester as a community. The primary data collected during my visit to Gloucester confirms that the Gloucester community has been divided over mining for many years.

(Askland report, [71]-[72].)

293 Dr Askland examined the key impacts on social cohesion, concluding that the Project has caused “deep-seated antagonism within the community” (Askland report, pp 26-32).

294 The Social Impact Assessment prepared for the amended EIS and Dr Roberta Ryan, the social researcher called by GRL, did not dispute that the Project has split the community but suggested that existing tensions would subside when the proposed mine is either approved or refused. Dr Askland disagreed, opining that “approval of the mine will intensify existing land-use conflicts in the area”. Dr Askland’s opinion was based on her “observation of what has happened in other mining communities in the Hunter and Mid-Western regions, including Bulga and Wollar, where the direct environmental and social impacts of mining operations have intensified social conflict, turning former supporters of the mines into anti-mining activists” (Askland report, [75]).

295 On the other hand, Dr Askland considered that refusal of the mine may “ease community tension and stress and rebuild community harmony”. Dr Askland’s opinion was based on the “observation that what the supporters of the mine want is not the Project in its own right but the positive economic benefits that employment in a diverse economy will bring. A rejection of the Project may lead the community to think alternatively about how to diversify the economy and build a sustainable economic platform that will see the community prosper” (Askland report, [75]).

296 Dr Askland also raised concern that the mining workforce may change the social composition of the community and the current rural town atmosphere (Askland report, [76] and Joint Social Impacts Expert Report, p 24).

297 Dr Lawrence criticised the Social Impact Assessment’s analysis of the social impacts of an influx of mining workers, including the proportions and impacts of mine workers who will live in the town or drive in-drive out (DIDO) each working day, changes in crime rates (Lawrence report, pp 18-19) and “gender-related impacts” such as masculinisation of the town, brothels, and alcohol-related non-domestic assaults (Lawrence report, p 22). Dr Lawrence considered that it is likely that a majority of mine workers will be DIDO workers, given that Gloucester is within driving distance of major urban areas, such as Newcastle, the short life-span of the project (19 years) and the experiences of other rural towns affected by mining. Dr Lawrence considered that Gloucester will be adversely affected by DIDO workers, including the following social impacts:

- 1) Displacement of low income and vulnerable groups as DIDO workers seek temporary accommodation;
- 2) Increased prices of temporary accommodation otherwise used by tourists;
- 3) Some alcohol related anti-social behaviour generally associated with both FIFO and DIDO work forces including gender-related impacts, such as masculinisation of the town, brothels and alcohol-related crimes.

(Joint Social Impacts Expert Report, p 23.)

298 Dr Lawrence also noted that there can be social impacts on the source communities and families of DIDO workforces, including high rates of psychological distress, family breakdown and a feeling of disconnection to family and community (Joint Social Impacts Expert Report, pp 23-24).

299 The Social Impact Assessment did not address the social impacts of the influx of mining workers. Dr Ryan considered that the social impacts posited by Dr Lawrence would not eventuate. One reason was that Dr Ryan thought that mining has been part of the Gloucester area for more than 100 years (Joint Social Impacts Expert Report, p 22). Dr Lawrence and Dr Askland rebutted this suggestion. Nowhere in the history of coal mining in the Gloucester area has there been an open cut coal mine of the scale of the Project within such close proximity to rural residential estates and the town of Gloucester (Joint Social Impacts Expert Report, pp 9, 24). The second reason of Dr Ryan was her estimate that DIDO workers would only be around 4% of the total workforce of Gloucester (around 30-40 workers) (Joint Social Impacts Expert Report, p 22). Dr Lawrence noted that GRL’s target of 75% of local employees is simply a recommendation and may not be achieved. Dr Askland observed that Dr Ryan’s estimate of a limited influx of non-local workers is based on a best-case scenario. This is highly problematic (Joint Social Impacts Expert Report, pp 23,

24). Dr Ryan therefore was of the opinion that the Project is unlikely to have the negative social impacts associated with large numbers of DIDO workers (Joint Social Impacts Expert Report, p 22).

300 Dr Ryan contended that the Project would bring a positive change to the population. She identified Gloucester as having an ageing population, exacerbated by retired “tree changers” moving into the area and a decline in the working age population (Ryan report, p 9 and Joint Social Impacts Expert Report, pp 12, 34). Dr Ryan considered that the Project would increase the working age population. Dr Ryan opined that refusal of consent for the Project would “see a reduction in diversity and vibrancy of the town”. She considered that “there is a need to ensure the community maintains a strong mix of people of all ages and family compositions”. She perceived that “there is a risk that the changing demographic and lack of growth in the younger populations will see Gloucester turn into a form of retirement settlement, one which is challenged by limited population diversity to be a vibrant community”. Dr Ryan considered that approval of the Project “would increase, rather than reduce, the social and economic diversity within Gloucester” (Joint Social Impacts Expert Report, p 39).

301 Dr Ryan considered that:

There are a number of residents who have been aware of the Project for some time and have considered the Project to have a positive impact on the day to day functions of the town of Gloucester and essentially their “way of life”. With anticipated benefits to the local businesses within the town and potentially a slight increase in the number of people living and working within the town and immediate surrounds, the vibrancy is anticipated to increase.

(Ryan report, p 65.)

302 Submissions made by supporters of the Project at the hearing expressed the hope that the Project “will help to stimulate employment opportunities for local workers and provide an incentive for these people to stay in the community and find gainful employment” (affidavit of Mr Williams, [13], and see also affidavit of Mr Shaw, [12] and Ryan report, p 11).

303 Dr Lawrence contested that Gloucester is unique in having an ageing population; it is a trend Australia-wide. Out-migration of young people in rural and regional areas in NSW is also common. It is not a trend specific to Gloucester and cannot be attributed to a lack of mining jobs (Joint Social Impacts Expert Report, p 13).

304 Dr Lawrence disputed that Gloucester has a skewed age profile. Older people work and generate employment in several sectors (Joint Social Impacts Expert Report, p 40). Dr Lawrence observed that any unemployment issues in Gloucester are unlikely to be solved by the Project.

305 Dr Lawrence observed that an influx of higher paid mine workers for specific mine-related work is likely to itself be a source of social division as the jobs will largely go to people who do not currently reside in the town and will not represent an employment opportunity for residents who are presently unemployed.

306 Dr Lawrence also noted that approving the Project is not the only viable solution to Gloucester’s ageing population. The Social Impact Assessment fails to assess the “no-go scenario”, such as other forms of sustainable alternative economic futures, including tourism and rural economies based on a diversity of land uses (Joint Social Impacts Expert Report, pp 13-14).

307 Dr Askland disagreed with Dr Ryan's narrative about ageing tree changers not contributing to the town and the community profile not being ideal. Dr Askland listed the benefits brought by tree changers, including "cultural and social capital, as well as financial capital, that they are willing to invest through local spend". Dr Askland noted that out-migration of young people is mostly due to education, not lack of employment. Dr Askland corroborated Dr Lawrence's observation that the Project is not the only opportunity to build economic stimuli and the non-development scenario should have been assessed (Joint Social Impacts Expert Report, p 15, 21 and 40).

308 The Department's Environmental Assessment Report (p 74) stated that:

The Department considers that an influx of mining workers would cause Gloucester to lose part of its current rural town atmosphere. The presence of an operating mine on the southern outskirts of the town would be well known. The presence of a cadre of workers dependent on a Project that has a medium-term outlook (10-16 years) would change the social dynamic of the town. For a portion of the town this would be a positive, but for most of the town it would be an unwelcome change to current circumstances.

309 I find that the Project will affect adversely the social composition of the community and the current rural town atmosphere, for the reasons given by Dr Askland and Dr Lawrence. I accept and adopt their responses to Dr Ryan's arguments about the change to the community's composition, for the reasons that they give.

310 The Rocky Hill Coal Project will severely impact on people's sense of place.

311 Dr Lawrence and Dr Askland both emphasised the broad dimensions of the concept of sense of place. They both criticised the narrow definition of the concept used in the Social Impact Assessment in the amended EIS and by Dr Ryan who conflated sense of place with amenity and limited the social impact assessment to the visual impact of the mine as a critical aspect of amenity.

312 Dr Lawrence explained:

However, sense of place has many dimensions, including, for example, cultural and historical connections, and feelings of belonging and attachment to place and the environment. Sense of place is the "everyday connection individuals have with their local spaces that gives their life meaning in the present. Having a sense of place contributes to a person's wellbeing, general health and life satisfaction". Sense of place may be experienced both cognitively (intellectually) or viscerally (through the body or emotions) and may involve the experience of all the different senses. Sense of place therefore cannot be reduced to a narrow question of visual changes in a place or the environment, but should engage with how these changes are experienced by people in a variety of different ways.

(Lawrence report, p 30.)

313 Dr Askland noted that there is a "strong connection between place, self-identity and how people perceive and value the environment" (Askland report, [135]). Dr Askland explained that:

Place is, as Cheng, Kruger and Daniels (2003: 99) assert, "not an inert physical container for biophysical objects and human actions" but rather a social construct that intersects social and political processes, biophysical attributes and processes, and social and cultural meanings. Place can be seen in line with what Malpas (1999: 193) describes as the "densely woven unity of life as lived"; a definition that emphasises the rhythms of everyday life and habitation as central to the

notion of and experience of place. This notion of place intimately connects it to notions of subjectivities and socialites, identity and community, and it links it to practices that produce relationships, local environments and modes of being (Farrugia et al 2018: 4). In rural areas, the notion of place is often attached to ideas of “rurality”. Rurality is, as I discuss with my colleagues in a recent publication on local politics of rural land use (Farrugia et al 2018: 4), is “popularly associated with the notion of ‘community’”, which in rural areas often “signifies harmonious and densely knit social relations offering a form of deep belonging and a close relationship with nature”. This relationship speaks to what can be identified as “emotional geographies”, a term that points to how people may form positive emotional bonds with familiar localities (McManus, Albrecht and Graham 2014: 58). Such relations will often be influenced by length of residence—that is, how long a person has resided within an area—but may also be established through the resonance between the qualities of a place and deep-seated, often unconscious, ontological drivers, as in the case of Wendy, cited above, who speak about an immediate spiritual connection to the place. It is beyond this report to analyse what this relationship is but it is important to note how such positive emotional bonds form part of people’s sense of place and sense of self as this underpins the likelihood for intense emotional responses in circumstances when such a place is threatened by unwanted change (McManus, Albrecht and Graham 2014).

The strong responses that have been triggered by the Project should be seen in relation to how the biophysical landscape surrounding Gloucester, including the site of the proposed Project, forms part of people’s sense of place. Landscape takes on different meaning: in everyday use and in planning discourse it is often approached “objectively” to describe natural scenery. However, as indicated above, landscapes are also socially constructed and through people’s engagement with their natural environment imbued with meaning (Low and Lawrence-Zúñiga 2003: 16).

The physical environment is, thus, imbued with social meaning, mediated through past, present and anticipated relationships with place. The deep-seated sense of disruption caused by the Project relates to this; the conflict and impact that the Project will have is a reaction to the threat it poses to the personal and collective relationship that the local people have with the environment. As such, potential impacts related to place and community do not only relate to the sense of distress and loss captured in the notion of solastalgia. They are also about the “affective bond between people and place or setting” (Tuan 1974: 4)—what in geographical scholarship is termed “topophilia”—and the threat that the Project poses to this relationship.

To rephrase, the risks associated with the Project in relation to sense of place relate to:

- i. the physical destruction of a loved environment; and,
- ii. the rupture of a positive emotional bond between self and environment, which is central to people’s sense of self and place.

McManus, Albrecht and Graham (2014: 59) state that Indigenous people and people who live closely to the land and soil will often have a more intense feeling/emotion towards their environment. This emotion cannot be quantified yet the devastation that can come from seeing a much loved landscape being desolated should not be underestimated. By introducing the notion of solastalgia, Albrecht (2005) has aspired to generate greater conceptual clarity about the devastation that can happen in such circumstances. Environmental destruction generated by negative transformation to the biophysical and built environment, caused by open-cut coal mining, climate change, urbanisation, gentrification, toxic pollution of places and climate change, are factors that can lead to such loss.

Another concept that is useful to explain the issue at stake is *eritalgia* (Askland, forthcoming). *Eritalgia* is a concept developed to capture the future-related component of place, what has earlier been described as pre-solastalgic tension or eco-anxiety (Albrecht 2012), though it also encapsulates the sense of temporal rupture by which individuals no longer can imagine themselves in a future place.

314 Both Dr Lawrence and Dr Askland considered that the Rocky Hill Coal Project would impact significantly on people's sense of place. Dr Askland referred to her interviews where people expressed a deep sense of belonging to Gloucester and the need for Gloucester as a special place to be protected (Askland report, [29]-[32], [36], [129]-[133]).

315 Dr Askland also referred to the local people's evidence given at the hearing about their relationship with Gloucester as a place and their fears as to how the mine will harm that relationship. Dr Askland emphasised the need, in order to understand the level of social impact that the Project has had and will have, to consider people's stories about the psychoterratic (earth-related) relationships that local people have to Gloucester as a place. The notion of "psychoterratic relationships" refers to "the relationship between the biophysical and built environment and human mental and physical health" (Askland report, [143]). Dr Askland concluded:

In my opinion, a similar case can be made in relation to the Rocky Hill Coal Project. There is no doubt that the local people have strong emotional attachments to Gloucester as a place and that the natural environment is essential to this. The importance of amenity and scenery is captured in the Gloucester LEP, which has established an intention to protect the natural environment surrounding Gloucester and establish it as a rural township set within agricultural and pristine natural environments. My assessment suggests the Project's projected impact on the natural environment will deter negatively on people's sense of place.

(Askland report, [145].)

316 Dr Askland summarised her argument that the Project will cause a change to people's sense of place as follows:

- Gloucester residents have a deep attachment to Gloucester as a place;
- central to people's sense of place is the natural beauty and scenic value of the area, as well as the sense of community and its country town characteristics;
- sense of place builds on the relationships between sociality, environment and ontology, with temporal interlinking between past, present and future;
- the impact the Project has had during the planning phase and is projected to have if approved is, at large, a reflection of how it is misaligned with and jeopardises this relationship, which is central to sense of place, community and well-being;
- the Project is associated with the risks of the physical destruction of a loved environment and the rupture of a positive emotional bond between self and environment (central to people's sense of place);
- mitigation strategies do not address the lived experience of place and emotional bonds individuals have to physical environment, (conversely, they will in themselves be detrimental in terms of amenity, scenery and sense of place).

(Joint Social Impacts Expert Report, p 21.)

317 Dr Askland observed that the proposed mitigation strategies in the social impact assessment will do nothing to address the social impacts of topophilia and solastalgia. The mitigation strategies are based on a logic that disregards the

lived experience of place and the strong emotional bonds that individuals form to their physical environments. Dr Askland considered that the mitigation strategies will in themselves be detrimental in terms of social impacts related to amenity, scenery and sense of place (Askland report, [142]). Dr Askland gave the example of the proposed mitigation of visual impacts by amenity barriers, which fail to address the meaning that local people attach to Gloucester as a place, with subsequent underestimation of the potential impact of the Project on people's sense of place, identity and community (Askland report, [28]).

318 Dr Ryan's assessment of the impact of the Rocky Hill Coal Project on the sense of place and community was more confined. Dr Ryan focused on the impacts on amenity, including visual, acoustic and dust. Based on GRL's experts' opinions that there would be no unacceptable visual, acoustic or dust impacts, Dr Ryan concluded that "the overall impacts of the Project are restricted to a very small, discrete number of residences ... depending on the specifics of the particular impact (visual, dust etc) being considered" (Joint Social Impacts Expert Report, p 32). Dr Ryan did not consider that these amenity impacts would cause social impact on people's sense of place or community. Conversely, Dr Ryan concluded that "the overall impact on the sense of place and community will be more negative than positive if the Project is not approved due to impact on employment and economic prosperity of the Gloucester town and local community" (Joint Social Impacts Expert Report, p 32).

319 Dr Ryan accepted that the Project would alter the community and its sense of place from those that currently exist but "one is not 'better' than the other". Dr Ryan suggested that: "A community will grow and the sense of place will still be present during operation and after completion. The sense of place will adjust and change with the times as a new community is brought into the area." (Ryan report, p 15).

320 I find that the Rocky Hill Coal Project will negatively impact on the composition, cohesion and character of the community and local people's sense of place. I accept the evidence of Dr Askland and Dr Lawrence on the social impacts on community, which I find is compelling. These experts' evidence is corroborated by the evidence of the local people who object to the Project. The evidence of the local people, given in their written submissions on the original and the amended Project, in their written statements tendered in Court and in their oral evidence at the hearing, amply and persuasively demonstrated people's strong attraction and attachment to Gloucester as a place and the major negative impacts that the Project has had, is having and will have on their psychoterratic relationship to this place. The local people's evidence also explained the major negative impacts of the Project on community composition, cohesion and character.

321 As explained in the section on the visual impacts of the Project, I find that the Project, even with the proposed mitigation measures such as the amenity barriers, will have high visual effect, because of the high visual contrast between the proposed mine and the existing visual environment, and the viewpoints, both in private and public properties, have high visual sensitivity. The combined effect of a high visual effect with high visual sensitivity is a high visual impact. There will be a significant impact on the scenic and landscape character of the town of Gloucester and its surroundings. The high visual impact will significantly affect people's sense of place and hence community.

322 I find that the consequence of the potential negative social impact on
community to be “major” and the likelihood of that social impact to be “likely”,
with a resultant social risk rating of “extreme” (see Figure 6, p 42 of the
Guideline).

323 The Social Impact Assessment for the amended EIS and Dr Ryan’s evidence
were flawed in methodology, coverage of issues and dependence on other expert
evidence that is also flawed. The flaws in methodology were critically exposed
by Dr Lawrence and Dr Askland in their individual expert reports, the Joint
Social Impacts Expert Report and their oral evidence at the hearing. I adopt
their analysis.

324 The coverage of issues was limited and many critical issues were not
addressed, including a broad consideration of the impact of the proposal on the
community and on people’s sense of place. Sense of place was conflated with
amenity and the focus was on the impacts of the Project on visual, acoustic and
air quality amenity.

325 The dependence on GRL’s experts’ opinions that the Project would not have
unacceptable visual, acoustic and air quality impacts made the conclusion that
there would not be social impacts vulnerable. I have found, for example, that
the Project will have high visual impact. Dr Ryan accepted that, if the Court
were to conclude that the Project would have an adverse visual impact on
residents living in and around Gloucester, then the Project will have an adverse
social impact (Transcript, 24/08/18, p 721). Dr Ryan agreed that if the Project
were to have an adverse impact on the rural character of land south of the town
of Gloucester, that would be a negative social impact (Transcript, 24/08/18,
p 720). Dr Ryan also accepted that a change in what people perceive as
important or treasured landscapes has a social impact (Joint Social Impacts
Expert Report, p 724). Dr Askland and Dr Lawrence agreed with these
conclusions.

Changed access to and use of infrastructure, services and facilities

326 Social impact related to access to and use of infrastructure, services and
facilities involves how the proposed mine may affect the provision of
infrastructure, services and facilities by local, state and federal governments,
for-profit and not-for-profit organisations and volunteer groups.

327 The Social Impact Assessment for the amended EIS analysed the impact of
the Rocky Hill Coal Project on social infrastructure capacity, including
childcare, healthcare, community services and facilities, employment and
housing. The Social Impact Assessment concluded that community services and
facilities will, overall, be able to accommodate social changes triggered by
population growth associated with the Project (Askland report, [49]). GRL
proposes a local employment target of 75% of the workforce needed for the
Project. If this target is achieved, the Social Impact Assessment indicated that
there will be increased demand for and pressure on local services:

- i. Current childcare providers and preschools will not be able to
accommodate the projected increase and there will be a need to increase
capacity;
- ii. Healthcare services will be placed under increased stress. Whilst it is
assessed that the population rise “will not add undue pressure to [the]
aging cohort within the local health system who, because of chronic
disease, require high levels of resource servicing” (Key Insights 2016:
106), there will be a need for more staff to meet increased service demand.

Moreover, mental health concerns and a lack of generalist services, in particular for families with children, imply that health providers will be under increased stress. The SIA recommends that this area is systematically monitored but otherwise does not problematize the issues.

- iii. School education infrastructure will be able to cope with potential population increase. There will, however, need to be a significant expansion of vocational education in order to meet the needs of GRL and incoming employees and families.
- iv. The emphasis on a locally based employment force may have both positive and negative impacts on the housing. Housing stress and social inequality may result from pressure on the local housing market.

(Askland report, [50(i)-(iv)].)

328 The Social Impact Assessment concluded that emergency services are likely to be negatively impacted by the Project and responses from relevant service providers indicate confidence in delivering the necessary level of service (Askland report, [51]).

329 The social impact experts called by the parties, Dr Ryan for GRL, Dr Lawrence for the Minister and Dr Askland for Gloucester Groundswell, did not disagree with these assessments of the impacts of the Project on community services and facilities. Dr Lawrence did note, however, that the social impact assessment did not adequately cover mental health services in the list of social infrastructure. These services are likely to be scarce and there is a lack of generalist mental health services for families with children (Lawrence report, p 28). This lack of mental health services in the area is of importance because one of the likely social impacts of the Project is mental health issues.

330 Dr Askland and Dr Lawrence also adverted to other impacts related to infrastructure and traffic. Dr Askland noted that the submissions by the public and Mid-Coast Council raised concerns that the Council would not be able to maintain road infrastructure that could be impacted by mining operations (Askland report, [78]).

331 Concerns were also raised by residents close to the Project about the increased noise that will result from traffic generated by mining operations. Although the traffic-related noise would comply with the relevant local and sub arterial road criteria, residents in proximity to the Project, such as along Jacks Road and Waukivory Road, will be aware of the changed conditions during peak operational traffic movements. This will occur during shift changes (between 6am and 7am, 1:45pm and 2:45pm, 5:30pm and 6:30pm, and 10:15pm and 10:45pm). The Department assessed the peak hours to be in the hour before 7am and the hour after 10pm, when workers will travel to and from work in a concentrated traffic flow against a background of relatively low background traffic levels (Askland report, [79]).

332 Dr Askland noted that the affected residents are concerned that, even if the Project complies with relevant traffic-related noise requirements, the residents will still experience noise impacts. They point to the current rural ambience and quiet that form the soundscape of the area and are concerned that the concentrated traffic flows will adversely impact on this quiet soundscape (Askland report, [80]).

333 Dr Askland noted that both Jacks Road and Waukivory Road will need to be upgraded in order to sustain the increased traffic generated by the Project. Although the amended EIS promoted these road upgrades as a community

benefit, the residents argued that the upgrade is only needed if the Project goes ahead. As such, the road upgrades are not a community benefit, but rather a facilitator of traffic-related noise impact (Askland report, [81]).

334 Dr Lawrence criticised the Social Impact Assessment for its failure to address the social impacts of increased traffic generated by the Project. Dr Lawrence pointed out that a sizeable proportion of the workforce may commute to the mine, particularly along The Bucketts Way. The Social Impact Assessment did not provide any local data on current accident rates or local black spots or assess the risk and cost of any increase in accidents due to the Project. Dr Lawrence observed:

This is particularly concerning since the town is accessed by The Bucketts Way, which is reportedly known to be “notorious” for its accident rate and this is particularly unsuitable as a commuter route.

(Lawrence report, p 33.)

335 Dr Ryan did not address in her expert report the social impact of increased traffic and traffic related noise. She observed that:

The surrounding properties and the township of Gloucester will not be impacted by movement of heavy mining equipment or coal transportation to and from the site as a new private haul road is proposed as part of the Project to reduce the impact on the local road network of the township of Gloucester.

(Ryan report, p 65.)

336 But this was not the concern of the residents or the other social impact experts.

337 I find that there will be some social impact associated with the use of road infrastructure by reason of traffic related noise and increased road accidents, as Dr Askland and Dr Lawrence have explained. The increase in traffic related noise would compound the increase in noise from mining operations. Although both traffic related noise and mining related noise might comply with the relevant noise criteria, both sources of noise will have negative social impact on residents in proximity of the mine. Affected residents will be sensitive to the noise and have a high level of concern about the noise. The noise from both sources will reinforce residents’ opposition to the mine.

338 I assess the consequence of the potential negative social impact of noise from the Project as “moderate” and the likelihood of that social impact to be “likely”, with a resultant social risk rating of “high” (see Figure 6, p 42 of the Guideline).

339 Any increase in road accidents by workers commuting to and from the mine might have major or catastrophic consequences for human health and safety. But in the absence of a proper evaluation of what increase in road accidents might occur and what might be the consequence of any increase, it is difficult to evaluate the significance of any associated negative social impacts.

Impact on people’s culture

340 Social impact related to culture includes shared beliefs, customs, values and stories, as well as connections to land, places and buildings. Culture includes both Aboriginal and European culture and heritage.

341 The Rocky Hill Coal Project will adversely impact on people’s culture in two key ways: impacts on Aboriginal culture and connection to Country and impact on heritage-scenic quality.

342 The Social Impact Assessment for the amended EIS failed to assess the social impacts of the Rocky Hill Coal Project on Aboriginal people. Dr Lawrence

observed that Aboriginal people have not been adequately addressed in the social baseline. There was no information about their socioeconomic status, their way of life, or their fears and aspirations about the future (Lawrence report, pp 18, 20). Dr Lawrence considered that community consultations and stakeholder meetings do not appear to have included specific consultations with Aboriginal people or Aboriginal organisations. This was concerning “given that culturally appropriate consultations with Aboriginal people, as a marginalised and vulnerable population, is considered best practice in SIA methodology” (Lawrence report, p 24). Dr Lawrence stated:

Aboriginal people of the Gloucester area have expressed concern in the media and through submissions to the DPE that consultations with them have been inadequate regarding the Aboriginal cultural heritage assessment. Further, it would seem that targeted consultations with Aboriginal people and organisations have been completely absent in the SIA process itself concerning broader issues of the proposed project’s impacts on Aboriginal culture, rights, interests and connections to Country. It is a standard requirement of SIA practice that Indigenous peoples be consulted in culturally appropriate ways and that particular attention be paid to the impacts of a project on them. Yet, there is no discussion in the social baseline (or elsewhere) of the significance of the Gloucester area to Aboriginal people’s way of life, or their culture, historically or presently. It is a significant failing of the SIA that it does not assess, or even discuss, the impacts of the proposed project on Aboriginal rights, interests and connections to Country.

(Lawrence report, pp 26-27.)

343 Dr Askland also considered that the Social Impact Assessment failed to adequately assess the importance of Country and landscape that will be affected by the Project to the Aboriginal people and, as a consequence, to assess the social impact of the Project on Aboriginal people.

344 Dr Askland noted that, during her field trip to Gloucester, concerns were expressed about the impacts of the Project on “Aboriginal cultural heritage values embedded in the landscape”. Aboriginal people expressed concern about three aspects. First, that Aboriginal people and Aboriginal epistemology were excluded in the consultation and assessment process. Dr Askland records an Aboriginal elder, Sarah, saying that the area of the Project is of “great significance to the Aboriginal community” and that “she, as well as her community, have felt excluded from the consultation process, with the company demonstrating ‘an unwillingness to engage with our Aboriginal heritage, history, culture and the spiritual dimension permeating all aspects of our life and beliefs’ (Sarah, Aboriginal elder, written communication, 23 May 2018). The lack of recognition of Aboriginal heritage, ontology and epistemology incites a decolonial process which, in Sarah’s words ‘mimics the historical relationship between Government and our People – relegate, move and dismiss’” (Askland report, [85]-[86]).

345 Second, the area of the Project has been inadequately surveyed for Aboriginal sites. The amended EIS indicates that nine Aboriginal sites will be affected by the mine, but Aboriginal representatives say that the whole area has not been surveyed. There is a risk that unidentified Aboriginal sites might be impacted by the mine. If so, there would be a direct social impact on the Aboriginal community. But the uncertainty as to whether unidentified Aboriginal sites might be impacted itself causes social impact on the Aboriginal community. Dr Askland stated:

The EIS documentation indicates that nine Aboriginal sites will be affected by the mine. According to Aboriginal representatives the whole area has, however, not been surveyed. According to the Aboriginal elders and in light of my analysis, there is potential for significant loss of both tangible and intangible heritage. This is concerning and a matter that will have significant social impact on the Aboriginal population. As Sarah states:

[t]he emotion that is stirred up by the possibility that the area that holds our Ancestor's spirits may be changed forever and no longer be a place of wellbeing for people that share our connection to the place, is crippling.

(Sarah, Aboriginal elder, written communication 23 May 2018.)

(Askland report, [87].)

346 Third, there has been an inadequate acknowledgement of the importance of Country and landscape to the Aboriginal people. Heritage value lies not merely in particular Aboriginal sites but in the landscape as a whole. Dr Askland referred to the communication of another Aboriginal elder, Jane, who said "this place to me is sacred" and explained how her "culture is ancient" and illustrated, through reference to metaphors and stories, how culture is embedded in the land. "She also explains how the area in and around Gloucester holds distinct significance as a past meeting point and ground for large initiation rituals. The landscape thus holds spiritual significance and is in itself a matter of heritage." (Askland report, [88]).

347 The importance of the whole landscape was emphasised in the submissions of two Aboriginal knowledge holders given at the hearing. Janine Phillips, speaking for Kim Eveleigh and Ken Eveleigh, Elders and knowledge holders of the Worimil/Goorengai people, described the cultural significance of the Gloucester or Buckan valley and the Waukivory (including Mograni) Range to the east and The Bucketts Range to the west: "The Bucketts Range is the man, the Waukivory Range is the woman, the Gloucester valley/Buckan is the family, it is a complete cycle of life that should not be disturbed or separated." The valley itself "is a significant sacred place as this is our Ancestor's daughters' birthing and naming area, as they travel over this part of the land they shared knowledge of our Ancestors' medicines, hunting and gathering of food, the weaving of fishing baskets whilst singing to the spirits of the Ancestors".

348 Mr Michael Manikas gave evidence on behalf of the Cook family, traditional owners of land in the Gloucester area. He observed that, because of past violence against and displacement of Aboriginal people, knowledge about Country and culture in the Gloucester area is incomplete: "We just don't know the full extent of the importance of this area." However, "knowledge has been retained by many of our elders and we are in the early phases of capturing and collating that knowledge. We're learning where the sacred ceremonial sites were for women's business and men's business, along with other important areas." Mr Manikas expressed concern that: "If the mine goes ahead, the family will lose some of our connection with each other and this place as the land will be destroyed. The culture and connection we have been rebuilding will be once again lost. Gloucester and the surrounding valley is an extremely valuable resource to our family in its current state."

349 Dr Ryan accepted that there needed to be, but there had not been, a reasoned and comprehensive assessment of the social impacts of the Project on the Aboriginal people, particularly having regard to the significant proportion of Aboriginal people in the area (around 9.5%) (Transcript, 24/08/18, pp 744,

748). Dr Ryan accepted that, based on the statements of Ms Phillips and Mr Manikas, the Project could have a real potential social impact on the sense of place of Aboriginal people (Transcript, 24/08/18, p 748). Dr Ryan accepted that, in the absence of any detailed assessment of social impact on Aboriginal people, uncertainty about the potential impacts on Aboriginal people would be high and worst case scenarios should have been modelled and a precautionary approach should have been taken (Transcript, 24/08/18, p 752).

350 The Rocky Hill Coal Project will also impact negatively on the value of Gloucester as a heritage-scenic place. The people of Gloucester who are opposed to the Project have a strong conception of Gloucester as a place of high heritage-scenic value. They see the story of Gloucester as a settled, rural character embedded in the scenic qualities of the landscape. This heritage-scenic place might not hold statutory heritage listing, but it nevertheless contributes to people's sense of place. People fear that the Project will impact severely on this historic landscape and their sense of place (Askland report, [92]-[93]).

351 I find that the Project will have significant negative social impacts on culture. The Project will adversely affect Aboriginal people of the area, by impacting their culture and Country. The impacts are not merely to the individual Aboriginal sites that have already been identified, but also there is the risk that other unidentified Aboriginal sites might be affected. There is also the broader impact on the landscape that is of high spiritual significance to the Aboriginal people. The Aboriginal elders who spoke to Dr Askland and gave evidence at the hearing expressed a high level of concern about the adverse effects of the Project on their Country and culture. The negative social impacts will affect a large proportion of the population group of Aboriginal people, itself a sizeable population group as approximately 9.5% of Gloucester's population are of Aboriginal descent (Ryan report, p 27, Table 9 and Joint Social Impacts Expert Report, p 41). The negative social impacts will endure, not only for the duration of the Project, but long afterwards. The rehabilitation of the mine will not heal the harm to Country and culture. The scale or degree of change from the existing condition as a result of the social impact of the Project will be substantial. The Aboriginal people, and their cultural heritage, have high sensitivity to the adverse changes caused by the Project. The Aboriginal people and their Country are highly susceptible or vulnerable to the adverse changes caused by the social impacts of the Project. The Aboriginal people place high importance on the existing landscape and its contribution to their life and culture. By reason of these impact characteristics (see Table 5, p 36 of the Guideline), the consequence of the negative social impacts on Aboriginal people will be "major" and the likelihood of the negative social impacts is "likely", resulting in an "extreme" social risk rating (see Figure 6, p 42 of the Guideline).

352 I find that the Project will also impact on the heritage-scenic values, for the reasons I have given earlier in the discussion of the impact of the Project on people's sense of place.

Impact on people's health and wellbeing

353 Social impact related to health and wellbeing incorporates both physical and mental health.

354 The Rocky Hill Coal Project will cause dust and particulate emissions, noise emissions and night lighting impacts. These have the potential to affect people's health and wellbeing, both directly and indirectly. Air, noise and light pollution can directly affect people's health and wellbeing, if the pollution is sufficient,

but it can also affect people's perception of their health and wellbeing, such as by increasing stress and anxiety, which can affect their mental health. This indirect effect on people's mental health is significant in this case. As I have found earlier, the Project may well comply with the applicable criteria for air quality and noise, but people perceive that the Project will have a negative impact on their health and wellbeing.

355 Many residents and objectors expressed concern about the particulate pollution from the mine and its potential impact on their health and the health of their families. Some said the pollution free environment of Gloucester was a motivating reason for their tree change from the city to the country (Askland report, [36]). Mr and Mrs Arney, residents in the Thunderbolt Estate who made a submission at the hearing, were examples of "tree changers" who chose to retire to Gloucester to escape the traffic congestion, noise and air pollution of Sydney. The benefits to their health and wellbeing from the tree change have been significant. Prior to moving to Gloucester, Mrs Arney suffered from bronchitis, which required the use of a medical puffer, and Mr Arney had a long history of sinusitis, which required surgery. Since moving to Gloucester, their health has improved and they now live in good health without bronchial or sinus issues.

356 Some said that their concerns about the impact of particulate pollution on health would cause them to leave Gloucester if the Project were to be approved. Mrs Soupidis, a local wife, mother, music teacher and active community member, who made a submission at the hearing, is one example. Mrs Soupidis's children suffer from asthma. She and her husband are frightened about the risk of air quality impacts of the open cut mine on their asthmatic children and said that they may move from Gloucester if the mine were to proceed. The loss of the Soupidis family from Gloucester would have impacts on the Gloucester community. Both Mr and Mrs Soupidis are experienced music teachers and active community members.

357 Another example is Mr and Mrs Seale, also local teachers who are heavily involved in the local community. They chose to raise their family in Gloucester because of the clean environment, particularly the rivers and rainfall. They chose to make their home in the Avon River Estate, their property having frontage to the Avon River. If the mine goes ahead, Mr Seale said he and his family would leave Gloucester. This would not only mean that the Seale family would leave the home and the river that they love, but it would also be a significant loss to the community as the school would lose two teachers and they would take their extensive volunteer involvement in the community elsewhere.

358 People did not feel that they were being alarmist in holding health concerns about the mine; they felt fortified by the submissions of local medical doctors and the literature on the health damage caused by fine particles in coal mining areas. Dr Lyford, for example, made a submission at the hearing about the potential deleterious health impacts on the population of Gloucester of particulate pollution from mines. Dr Lyford has been a General Practitioner in Gloucester for 32 years. He is concerned that if the Rocky Hill Coal Project were to be approved, previous improvements in air quality in the area will be lost and the town population would be exposed to high incidence of flare ups in asthma and chronic obstructed pulmonary disease.

359 Many residents also expressed concern about noise and night lighting. Even if the noise from the mine complied with the applicable noise criteria, residents were concerned that they would nevertheless be impacted by noise from the mine, especially given the low background noise environment. These concerns are justified. As I have found earlier, the mine will cause residual noise impacts on residents in the vicinity of the mine. Mine noise levels will emerge from the background noise levels in locations where the measured background noise level is less than 30 dBA. This will make the mine noise levels more noticeable and more likely to impact the residents' acoustic amenity. These residents, if they are opposed to the mine, are more likely to find that this new impact on their acoustic amenity is unacceptable.

360 Night lighting would disturb the dark rural environment, not only up until the end of mining operations at 10pm, but also afterwards as the workforce leaves and security lights remain on. The Department's Environmental Assessment Report found that, even with the lighting management plan to address lighting impacts, light spill would not be completely controlled. Light spill would be readily seen from nearby residences and post operation lighting for security would still impact local residences. The Environmental Assessment Report (p 46) concluded:

The proposed development could have a significant impact in terms of light pollution in the Gloucester Valley, with ambient light from the proposal likely to be intrusive for residents of the Gloucester community who currently experience largely uninterrupted evening skies set in a rural landscape lit only by the moon and stars. The Department considers that lighting impacts from the amended project would be a factor in reducing the amenity for all residents living near the proposed mine, not just those with a direct line of sight to the mine area.

361 These impacts of particulate, noise and light pollution may affect mental and physical health. Dr Askland illustrated the link between physical and mental health by reference to a local mother whose daughter suffers from asthma:

The local mother whose daughter suffers from asthma, cited above, explained to me how she is constantly monitoring her daughter's health and is in a constant state of alertness to the asthma flaring up. She explained how her daughter at present has to be taken to the emergency on average twice a year. She holds a deep-seated fear that the Project will aggravate her daughter's illness; a fear that is supported by research and evidence from other coal-mining regions. The question of dust is, thus, not only a matter of physical health but can also be correlated to mental health due to increased anxiety and stress. A local doctor who participated in my research explained how in his practice he has observed how "chronic stress impairs the immune system and raises BP [blood pressure] etc and the link between psychosocial stress and physical health damage [is] inseparable" (Steward, local doctor, written communication 17 May 2018). Similarly, as stated above, physical health impacts due to lighting and noise are linked with stress, sleep disturbance and performance. The link between physical health and mental health is, thus, important to take into consideration.

(Askland report, [109].)

362 Dr Lyford, the local doctor who made a submission, also noted that:

The intrusion of light and noise into what had previously been a quiet environment will result in high levels of mental illness. I have seen this decline in mental health in those living near mine sites at Duralie and Stratford during all

phases of production. I have seen many cases of depression and anxiety as people struggle with noise, sleep disturbance, loss of life goals and reduction in property values as the mine encroaches upon them.

363 Dr Askland also explained how “environmental change may lead to distress, dispossession and displacement” (Askland report, [113]). Dr Askland said that:

For the residents within the proximity of the mine, the correlation between social and mental health impact is strong. The risks associated with the Project incite a fear about the future and they unsettle plans. More recent residents to the area speak with melancholy and distress about the decision to move to Gloucester; what was going to be a move to a quiet, rural place has for them become a nightmare marked by constant insecurity. Their properties have become devalued, their future plans put on hold. This will be addressed at greater length below. What is important to note here is how the various social impacts interlink, the insecurities that they place on individual livelihoods and wellbeing, the increased sense of risk and vulnerability, transforming into experiences of loss and dispossession.

(Askland report, [115].)

364 Dr Lawrence was critical of the Social Impact Assessment’s assessment of the impacts of the Project on human health and mental health. In relation to mental health, Dr Lawrence said:

The SIA reports a series of significant findings about mental health issues associated with open cut coal mining, but only concludes that more research is needed (KI/SIA p 102). There is, however, a substantive literature on the psychological and mental health issues encountered by mine workers, particularly non-resident workers (for example, depression, relationship difficulties, alcohol misuse), people living near mines (loss of sense of place and solastalgia) and vulnerable population groups in the areas in which they work or are temporarily housed.

For example, the SIA has not dealt with mental health impacts on low income families displaced by incoming mine workers, although displacement is reported as a concern for members of the community. The SIA also does not consider mental health impacts of an influx of mainly male and relatively wealthy workers on vulnerable population groups in the town, for example on unemployed or low income men, or young women, or Aboriginal people. This literature is available but has not been assessed or addressed in the section on mental health.

(Lawrence report, p 28.)

365 Dr Lawrence was also critical of the failure to assess how increased noise and dust, even if they complied with the applicable criteria, might impact on mental health and wellbeing. Dr Lawrence stated:

Moreover, the section on health refers in multiple instances to monitoring incorporated in the applicant’s own Noise Vibration and Blasting Assessment and Air Quality and Risk Assessment, but with no regard for how increased noise and dust may impact upon people’s well-being, sense of place or way of life more generally (regardless of whether technical thresholds are met or not). In other words, even if technical thresholds for noise and dust are not breached by the applicant during operations, there is a real concern amongst community members (evidenced in submissions to the DPE) that their well-being and way of life will be negatively affected.

Here it would have been relevant for the SIA to address the impacts of noise and dust not only as technical issues to be addressed by monitoring, but to actually assess people’s fears and aspirations about their future: what will their day to day life look like with the Rocky Hill coalmine? Will they be able hang their clothes

on the line, have their windows open, or let their children play in the backyard, without fearing the impacts of coal dust?

(Lawrence report, p 29.)

366 Dr Ryan accepted that adverse noise, dust and air quality impacts on residents and the community are matters for consideration in assessing the social impacts of the Project, “both people’s concern about them in terms of perceived impacts, as well as the materiality of those impacts on affected residents” (Transcript, 24/08/18, p 727 and see also p 730). Dr Ryan conceded in her oral evidence at the hearing that people planning to move away from Gloucester because of a perception of negative health impacts, as well as impacts of the mine on social cohesion, were factors relevant to an assessment of social impacts of the mine (Transcript, 24/08/18, pp 732-736).

367 I find that the Project is likely to affect local residents’ health and wellbeing in the ways explained by Dr Askland and Dr Lawrence, as well as by Dr Lyford, and the Department. The particulate, noise and light pollution from the Project may well comply with the applicable regulatory criteria, but will still be perceptible by local residents. The residents are likely to have a high level of concern about the particulate, noise and light pollution from the Project. This concern is likely to raise stress and anxiety, potentially affecting mental health and physical health. These are social impacts in themselves. They might also lead to other social impacts. People who value living, working and playing in a clean and green environment may leave the Gloucester area, adversely affecting the local community and economy.

368 I find that the consequence of the potential social impacts on health and wellbeing is “major” and the likelihood of that social impact is “likely”, resulting in an “extreme” social risk rating.

Impact on people’s surroundings

369 Social impact related to surroundings include access to and use of ecosystem services, public safety and security, access to and use of the natural and built environments, and aesthetic qualities and amenity.

370 A key concern of residents living in the vicinity of the Rocky Hill Coal Project is that the Project will severely impact on the surroundings, including the natural environment, and impact on its aesthetic value and amenity. Dr Askland considered that this concern of social impact on people’s surroundings was justified (Askland report, [116]). Dr Ryan accepted in oral evidence at the hearing that, if the Court were to find that the Project would have an adverse impact on the rural character of Gloucester and its surrounds or an adverse visual impact on residents in the vicinity of the Project, those would be negative social impacts (Transcript, 24/08/18, pp 720-721).

371 I have explored, and have found substantiated, the residents’ concerns about the Project’s impacts on people’s way of life, community, culture, and health and wellbeing. The Project will substantially affect the surroundings and people’s sense of place.

372 These social impacts can also be seen to be impacts on the amenity of the place. The concept of the amenity of a place or locality is wide and flexible. Some aspects of amenity are practical and tangible. Examples include the traffic, noise, nuisance, appearance and way of life in the locality. Other aspects of amenity are intangible and subjective. They include the standard or class of

the locality and the reasonable expectations of residents in the locality: *Broad v Brisbane City Council* [1986] 2 Qd R 317 at 320; (1986) 59 LGRA 296 at 299.

373 Amenity may embrace the effect of a place on the senses and the residents' perception of the locality. Knowing the uses to which a place is or may be put may affect a resident's perception of amenity: *Broad v Brisbane City Council* at 326; 304; *Telstra Corporation Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256; 146 LGERA 10 at [190].

374 The reasonable expectations of residents of the locality are informed by the current planning controls in the planning scheme. Residents should expect that land in the locality will be put to one of the uses to which land may be put without development consent and may be put to one of the uses permitted with the consent of the consent authority: *Harris v Scenic Rim Regional Council* (2014) 201 LGERA 12 at [217].

375 As I have explained in the earlier section on planning, the applicable local environmental plan, GLEP 2010, permits open cut coal mining with consent in the RU1 Primary Production zone (which applies to 23% of the site) but prohibits open cut coal mining in the E3 Environmental Management zone (which applies to 77% of the site). Residents impacted by the mine are largely located near to the E3 Environmental Management zone. The Mining SEPP does make mining permissible with consent in the E3 Environmental Management zone, notwithstanding that mining is prohibited in that zone by GLEP 2010. However, before granting consent for mining, the consent authority must consider the matters in cl 12 of the Mining SEPP, including whether the proposed mining is likely to have a significant impact on, or be incompatible with, the existing, approved, or likely preferred uses of land in the vicinity of the proposed mine.

376 The residents in the vicinity of the proposed mine should be taken to expect that open cut coal mining is prohibited over the great majority of the site under GLEP 2010, but may be permitted with consent if the consent authority is satisfied that the proposed mine is not likely to have a significant impact on, and is not incompatible with, existing, approved and likely preferred uses of land in the vicinity of the proposed mine.

377 As I have found above, mining is not an existing, approved or likely preferred use of the land in the vicinity of the proposed mine. I also find that even with the mitigation measures proposed, such as the amenity barriers, the mine will be incompatible with the existing, approved and likely preferred uses. I have found earlier that the Project, including the amenity barriers, will have high visual impact in the Gloucester valley. As both the Department and the Planning Assessment Commission concluded, the high visual impact is inconsistent with the underlying strategic aims and objectives of the land use zonings of GLEP 2010, in particular the E3 Environmental Management zone within which much of the Project site is located, to protect the scenic amenity of the Gloucester township and the broader Gloucester valley by retaining the scenic and rural surroundings of the town (Department's Environmental Assessment Report, p 46 and Planning Assessment Commission's Determination Report, p 12).

378 As noted in *Telstra v Hornsby Shire Council* at [192], in determining the nature and scope of amenity and the impact of a proposed development on amenity, the consent authority may consider the community responses to the proposed development as set out in the submissions made to the consent authority. The community responses are aspects of the public interest. In

considering the community responses, an evaluation must be made of the reasonableness of the claimed perceptions of adverse effect on the amenity of the locality. An evaluation of reasonableness involves the identification of evidence that can be objectively assessed to ascertain whether it supports a factual finding of an adverse effect on the amenity of the locality: *Telstra v Hornsby Shire Council* at [193] and [194]. As the NSW Court of Appeal noted in *Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* (2014) 86 NSWLR 527; 200 LGERA 375 at [295]:

Likewise, we consider that community responses to the project were relevant to the public interest. As his Honour pointed out, at [430], the evidence of the community responses was relevant to a consideration of noise impacts, air quality, visual impacts and more generally, the social impacts on the community. All of those factors were aspects of the overall public interest.

379 In this case, I find that the residents' concerns regarding the adverse effects on the amenity of the locality caused by the high visual impact of the Project, and the particulate, noise and light pollution of the Project, are reasonable and supported by the expert evidence referred to in the earlier sections. The Project is "likely" to have a "major" impact on the amenity of the locality, resulting in an "extreme" social risk rating (see Figure 6, p 42 of the Guideline).

Impact on people's personal and property rights

380 Social impact related to personal and property rights includes issues related to economic livelihood and whether or not people experience personal disadvantage or have their civil liberties affected.

381 Dr Askland identified social impacts on personal and private rights. First, people who would be most severely affected by the Rocky Hill Coal Project have had their properties purchased. Nearly all of the properties adjoining the Project site have been acquired by GRL. Dr Askland opined that:

Their community has been broken through GRL's purchasing of properties, and significant stress about the future has been incited in remaining residents who have become isolated. The interviews with residents living in proximity to the mine indicate that there has been little transparency and communication with local residents regarding what will happen to them and their properties. Since the late 2000s, mining-related resettlement and displacement of the population living within the vicinity of the Project area have taken place. The onus has, in this process, been placed on the individual land holder and GRL. Through the voluntary acquisition policy, the responsibility (and success) of negotiation has been placed on the individual landholders. This process has reduced transparency and exposed the community to distress; it has not supported a fair and equal process. Moreover, interviewees explain that they have experienced a sense of disempowerment in dealing with GRL because of gag-clauses, which has limited transparency.

(Askland report, [117].)

382 Second, Dr Askland noted that some residents who sold their properties to GRL did so reluctantly:

A number of examples of this were offered during conversations with local residents, who told me stories of how former neighbours had decided to sell due to concern over how stress would impact health concerns (eg reactivate cancer), worry about deteriorating health due to age and inability to sell at a later stage if the mine was approved, pressure and intimidation from mine officials to sell properties. The stories are often accompanied by accounts of how these

individuals did not really want to leave and about the devastation that was felt when seeing their life work being destroyed.

(Askland report, [122].)

383 One of the residents who made a submission at the hearing, Ms Montague, spoke of residents who used to live along Fairbairns Road before reluctantly selling their properties to GRL, being upset by having to sell the homes that they loved and having to move away from a thriving community of neighbours and friends.

384 Third, people in proximity to the mine, but whose property has not yet been acquired by GRL, are concerned that “they will be left with stranded assets”. They are concerned that their property will be stranded because, unless GRL purchases their property, no one else will purchase it because of the proximity to the mine and the impacts of the mine. Dr Askland considered that this is a type of displacement, which is not considered at all in the Social Impact Assessment. Dr Askland explained:

The lack of acknowledgement of the notion of displacement may be a reflection of a restricted understanding of the phenomenon of displacement, which is approached in the SIA as an unproblematic movement of people or artefacts in space. Displacement is, however, not simply about movement of people from one place to another. Conversely, as scholarship on migration, displacement and resettlement show ... displacement can happen when people are still in place and may manifest as a lived experience, conditioned through the spatial, temporal, cultural, and social specificities in which individuals experience their everyday life. Displacement is, thus, not something that is simply a matter of movement in space; conversely, the condition of displacement—characterised by distress and disruption associated with a sense of lost home, powerlessness, hopelessness and lack of autonomy to decide own future—is a state of being that can happen to people in response to significant changes in natural, cultural and social milieus. There is no recognition of displacement as a condition in any of the social impact assessments conducted for the Project.

(Askland report, [118].)

385 Fourth, the NSW Voluntary Land Acquisition and Mitigation Policy, required to be considered by cl 12A of the Mining SEPP, triggers acquisition or mitigation measures only if specified noise or air quality criteria are exceeded; it does not take into consideration emotional impact. Dr Askland suggested, however, that:

There is, however, no security or ease for the residents whose properties are located in close proximity to the proposed mine site. The VLAMP does not take into consideration emotional impact but relies on technical measures of impact. The various matters of impact merge with one another and the lived experience of living with a mine next door is very different to what any technical measurements of noise or air quality can capture. Solastalgia is, here, of importance as it refers the changes to place that is triggering distress. Emotional distress caused by the mine is as real as noise impacts or air quality, and has significant impact on people’s well-being and health, with potential intergenerational impacts.

(Askland report, [120].)

386 Fifth, people who do not obtain a right to acquisition of their property may have the right to mitigation of certain impacts on their property or their house. Dr Askland noted:

Those who do not obtain acquisition rights may get mitigation rights. This is, however, not straightforward and mitigation strategies do not necessarily

acknowledge how people live. An example brought forward by a number of interviewees was the suggestion to provide insulation to reduce noise impact. As one Forbesdale resident explained during the interview, however, he did not move to the country to be inside and the noise would follow him and his children in their everyday life (G4M). Similarly, with reference to visual impact, another Forbesdale resident ironically laughed at the idea of waking up in the morning to look out at the view but only see a vegetated amenity wall (G18F).

(Askland report, [123].)

387 Dr Ryan did not consider that there would be negative social impacts on people's property and personal rights. She relied on the Project's reliance with applicable regulatory criteria, such as noise and air quality criteria, and for taking acquisition or mitigation measures if the criteria were to be exceeded. Dr Ryan considered that the scheme proposed by GRL to protect the value of properties, which may suffer negative impacts due to perceived impacts from the Project (the Voluntary Price Protection Initiative), will also address impacts that will arise from perceived impacts (Joint Social Impacts Expert Report, p 36).

388 I find that the Project has caused these social impacts on personal and property rights described by Dr Askland, but impacts on people's property and personal rights are unlikely to endure if the Project were to be approved. Any grant of development consent would fix the properties that need to be acquired or on which mitigation measures need to be carried out as well as specify the process for acquisition and mitigation. The past negotiation process, about which residents have complained, and the uncertainty as to what acquisition or mitigation might happen in the future, would not continue. There still would be stress and anxiety associated with living with a mine next door, and being unable to sell their property, but these would manifest themselves in other types of social impacts, such as on people's way of life, community, culture, health and wellbeing and surroundings, rather than on people's personal and property rights.

Impact on people's decision-making systems

389 Social impact related to decision-making is specifically related to the extent to which individuals and groups experience a say in the decisions that affect their lives and if they have access to complaints, remedy and grievance mechanisms.

390 Dr Askland referred to residents' sense of powerlessness and helplessness in the decision-making process for approval of the Project and the acquisition of affected properties as evidence of this type of social impact.

391 GRL referred to the campaign run by the residents opposing the mine, which was successful in that both the Department and the Minister, by his delegate the Planning Assessment Commission, determined that consent should be refused, and the resident action group, Gloucester Groundswell, was joined as a party and participated in the appeal by GRL against the refusal of consent, as evidence that the residents have had a say in decisions that affect their lives.

392 I find that there will be a social impact on residents and Aboriginal people who will be affected by a decision to grant consent to the Project in terms of the limitations on those people being able to meaningfully participate and control the decision-making process, but these limitations flow from the planning system (including the EPA Act, the EPA Regulation and the Mining SEPP and

their implementation) and not from GRL's proposed mine. The social impact concerning the decision-making systems is not a particular consequence of the Rocky Hill Coal Project, but rather of the planning system.

People's fears and aspirations

393 Social impact related to people's fears and aspirations can relate to any of the types of social impacts discussed above or to the future of people's community. The above discussion has referred repeatedly to people's fears and aspirations. Mostly, the discussion has focused on the fears and aspirations of people who oppose the Project, because these refer to negative social impacts. Opponents fear that the Project will negatively impact the local economy by impeding growth and development of industries and businesses that depend on a clean and green environment (such as tourism and agri-tourism) and population growth from people attracted by the clean and green environment and quiet rural character moving to Gloucester to live, work and play. Opponents fear the physical impacts of the Project on scenery and amenity, the particulate, noise and light pollution from the Project, the increased traffic along roads associated with the mine, the loss of Gloucester as a special place, the various social impacts, and the impact that the Project will have on the climate. These fears about the future for them, their community and their surroundings have caused and will continue to cause social impacts (see further Askland report, [128]).

394 People who support the Project also have fears and aspirations. Supporters hope that the Project will bring population growth and economic progress for the Gloucester area. They hope that mining will diversify and grow the local economy. They hope that it will lessen the dependence on sectors such as tourism and on population groups such as "tree changers" who settle in the area for lifestyle reasons. Supporters downplay potential negative effects such as visual, dust, noise, amenity and social impacts, believing that these impacts can and will be managed to adequately protect the environment and people (see Askland report, [128]).

395 I find that most of the articulated fears and aspirations of people who oppose the Project are reasonable and have justification in the evidence. Elsewhere in the judgment, I have explained why I consider that the Project will have substantial visual impacts, dust and noise impacts that will lead to social impacts on people's way of life, community, health and wellbeing, and surroundings, other social impacts, impacts on existing, approved and likely preferred future uses of land in the vicinity of the Project, and impacts on the climate. Opponents' fears are based in specific, concrete, likely effects, of the Project: *Telstra v Hornsby Shire Council* at [193]-[195]. These impacts are what people fear will happen if the Project were to be approved.

396 On the other hand, I do not consider that the fears and aspirations of people who support the Project are likely to transpire. There is little evidence that refusal of consent to the Project will materially impede the growth and diversification of the economy. Although the mining sector would not grow if the Project were not to be approved, mining is not the only opportunity for growth of the local economy and employment in the Gloucester area. Alternative sectors, such as tourism and agri-tourism, have already grown to take advantage of the clean and green environment and are likely to continue to grow if the Project were not to be approved. People have moved to the Gloucester area for lifestyle reasons and are likely to continue to do so if the Project were not to be approved. As Dr Lawrence and Dr Askland pointed out,

the Social Impact Assessment fails to assess the no go scenario, what would be the economic and employment impacts, and hence social impacts, if the Project were not to be approved.

397 The supporters' belief that negative environmental and social impacts will be able to be managed so as to adequately protect the environment and people is mistaken, for the reasons I have given elsewhere. The aspiration that approval of the Project will substantially increase the local economy and employment has not been established. The claimed economic and employment benefits of the Project are uncertain, but in any event are substantially overstated for reasons I give elsewhere.

Distributive inequity of the Project

398 A further social impact, revealed in the other types of social impact discussed earlier, is the distributive injustice or inequity that would result from approval of the Rocky Hill Coal Project. Distributive justice concerns the just distribution of environmental benefits and environmental burdens of economic activity. Distributive justice is promoted by giving substantive rights to members of the community of justice to share in environmental benefits (such as clean air, water and land, a quiet acoustic environment, scenic landscapes and a healthy ecology) and to prevent, mitigate, remediate or be compensated for environmental burdens (such as air, water, land and noise pollution and loss of amenity, scenic landscapes, biological diversity or ecological integrity). Issues of distributive justice not only apply within generations (intra-generational equity) but also extend across generations (inter-generational equity).

399 The principle of intra-generational equity provides that people within the present generation have equal rights to benefit from the exploitation of natural resources as well as from the enjoyment of a clean and healthy environment: *Telstra v Hornsby Shire Council* at [117]. The principle of inter-generational equity provides that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for future generations (see s 6(2)(b) of the *Protection of the Environment Administration Act 1991* (NSW)); *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Ltd* (2013) 194 LGERA 347 at [486], [492].

400 Dr Lawrence criticised the Social Impact Assessment for failing to address distributive equity:

Throughout all stages of the SIA process, the SIA has failed to engage adequately with critical issues of distributive equity, that is, how the impacts and benefits of the proposed project are likely to be distributed temporally (across time), spatially (geographically) and socially (amongst different groups within society, particularly those who are marginalised or vulnerable, or least likely to obtain a direct or indirect benefit from the project).

...

The question of distributive equity is often of particular significance for Aboriginal people, as they are a historically marginalised group who have experienced considerable impacts and harms from developments, but generally seen few net benefits.

(Lawrence report, pp 8, 13.)

401 Dr Lawrence considered that the Project would cause distributive inequity:

The majority of the economic benefits of the Project will primarily go to the people who do not live in the Gloucester Township: they will go to the mining

company and their shareholders by way of global flows of capital to the suppliers of the mine (presumably based in urban centres such as Newcastle), to DIDO workers living outside of Gloucester, and to the NSW Government (and the broader population of NSW) by way of revenue. The local economic benefits of the Project will be limited to those local business and local people who may benefit from local contracts and local employment, which as I note above, will be limited. In other words, the economic good from the Project will primarily be distributed to people outside of Gloucester, any local benefits will be short-term, spanning the 19 years of the life of the mine.

On the other hand, the harms of the Project in terms of social and environmental impacts, will be experienced locally by those in closest proximity to the mine, ie the people of Gloucester. They will be long-term and extend beyond the life of the mine (see previous point on sense of place and long-term rehabilitation challenges).

This concerns a fundamental question of distributive inequity that cannot be mitigated by the recommended mitigation measures detailed in the applicant's SIA by Key Insights, or in RR's [Roberta Ryan's] expert report (section 7.2).

(Joint Social Impacts Expert Report, p 38.)

402 Dr Askland concurred with Dr Lawrence:

I concur with RL's [Rebecca Lawrence's] statement above. The distributional inequity of the Project cannot be mitigated by the recommended mitigation measures and the local community will carry a disproportionate cost.

As I state in my expert statement, Project and Modification present, in my opinion, moral concerns relating to the weighting of social, economic and environmental impacts. This is not only a question of distributional equity across space but also across time. Inter-generational equity has not been addressed. In relation to this Particular it should also be questioned if a green field mine in 2018 is in the public interest. The proposed mine is a green field mine, which will radically transform a rich agricultural landscape with distinct heritage and significance.

(Joint Social Impacts Expert Report, p 38.)

403 Dr Ryan accepted that the Social Impact Assessment did not assess distributional equity and that this was necessary for a comprehensive Social Impact Assessment (Transcript, 24/08/18, pp 744, 745). Dr Ryan agreed that distributional equity needs to be considered, but suggested that she had done so in her report as part of her discussion on the impact on amenity (wellbeing, way of life, sense of place, and future fears and aspirations), social dynamics, and change to community profile as a result of an influx of workers, as well as in her discussion of mitigation and enhancement measures (Joint Social Impacts Expert Report, p 43).

404 Dr Lawrence disputed that Dr Ryan had dealt with questions of distributive equity in her report:

I disagree with RR's [Roberta Ryan's] contention that her expert report (section 7) deals with questions of distributive equity. For example, RR does not address how any of the social impacts will play out for Aboriginal people specifically, even though they are approximately 9% of the population, are a vulnerable group, and are likely to be pushed out of the housing market by an influx of mine workers (both resident and non-resident). This concerns a failure to consider the social distributive inequity of the Project. Neither the Key Insights SIA nor RR's report identify or explore social impacts for these and other vulnerable population groups, such as women in the town. Further, the proposed benefits of employment

and training relate to a group of skills largely held by men in the workforce. The gender dynamics and impacts on the proposed RHCP [Rocky Hill Coal Project] have not been addressed.

I disagree with RR's contention (above) that she has considered distributive equity when considering "the extent to which the mitigation measure is acceptable to those who are expected to be affected by the potential negative social impact". For example, the amenity barriers proposed by the applicant do not appear to have been accepted by those living in closest proximity to the mine as an acceptable mitigation. This concerns a failure to consider the spatial distributive inequity of the Project. It is also not clear which aspect of distributional equity a visual barrier would address.

The Key Insights SIA and RR's expert report have not considered the temporal distributive inequity of the Project. The extraction of finite natural resources for the economic benefit of people today necessarily implies a burden on future generations, for the simple reason that the resource has been used, and the social and environmental legacies will remain for future generations.

I refer also to my previous response above in relation to Gloucester Groundswell's particular E, regarding the spatial and economic distributive inequity of the Project, given the majority of economic benefits will go to those outside of Gloucester.

(Joint Social Impacts Expert Report, p 44.)

405 Dr Askland concurred with Dr Lawrence:

I concur with RL's [Rebecca Lawrence's] argument as it is presented here and in her expert witness report.

I also note in my expert witness report the distributional inequalities of the Project and the failure of the mitigation strategies to address this. Distributive equity is an issue in relation to special cultural and temporal factors.

In relation to distributional equity it should also be noted how there is a pattern within the data that suggests that support or objection to the mine follows the logic of proximity. I explained this in my expert report, paragraphs 68 and 69.

(Joint Social Impacts Expert Report, p 45.)

406 I find that the Rocky Hill Coal Project will raise issues of distributive equity, both intra-generational equity and inter-generational equity, as Dr Lawrence and Dr Askland have explained. The burdens of the Project, the various negative environmental, social and economic impacts, will be distributed to people in geographical proximity to the Project. The physical impacts of the Project, such as the high visual impact and the particulate, noise and light pollution, will be experienced by people in geographical proximity to the Project. As Dr Askland observed: "There is a distinct inequity embedded in the development. It exposes a particular part of the local population – those within the estates in close proximity to the mine site – to distinct impact which is not accounted for" (Askland report, [12]). These physical impacts in turn trigger social impacts on these people.

407 The physical impacts of the Project will affect some groups in the community, including marginalised and vulnerable groups, more than other groups. The Project will have particular negative impacts on Aboriginal people whose Country is to be mined. They have strong cultural and spiritual connections to Country, which will be severely damaged by the Project. This will cause negative social impacts to a disadvantaged and vulnerable group in society.

408 The Project may also impact on other disadvantaged groups within the community, such as lower socio-economic groups and people over the age of 55 years, but the Social Impact Assessment for the Project fails to assess the potential social impacts on such disadvantaged groups. The Minister submitted that:

Having regard to Professor Ryan's acknowledgement that 30.2% of the population of the Gloucester suburb in 2016 was over 65 years of age, and the age distribution for the Gloucester LGA in the KI SIA which suggested that the proportion of residents over 55 years of age within the LGA was 42.8%, it was apparent that a significant proportion of residents was in the over 55 age bracket. Professor Ryan accepted that, in such circumstances, any reliable social impact of the proposal needed to take into account the impact of those in that age bracket.

(Minister's written submissions, [268].)

409 This particular social group might be more susceptible to the physical impacts of the Project. The Minister submitted:

At KI SIA p 14-98, there is an identification that populations that are the most vulnerable include elderly people with existing respiratory and cardiovascular disease and young children with asthma. Professor Ryan was unsure as to whether or not this particular area of health impact was an area of general uncertainty but accepted that a background assessment of the vulnerability of the population to a health impact of this kind might be a particularly urgent assessment in an elderly community. Again, there appeared to be no such assessment in the KI SIA, despite the fact that health is a key area that should be the subject of a social impact assessment.

(Minister's written submissions, [271].)

410 I accept these submissions. There is, therefore, uncertainty and a real risk that the Project might disproportionately affect disadvantaged groups within the community, thereby causing distributive inequity.

411 The carrying out of the Project will clash with the moral framework and worldview of people who value the environment generally and the scenic landscape and place of Gloucester particularly. The Project will adversely affect this group in the community.

412 The carrying out of the Project will also affect the livelihood, income and employment of people and businesses that depend on the current high quality of the environment, such as the tourism and agri-tourism industries. Again, in turn, these impacts on these people and businesses may generate social impacts.

413 These negative environmental, social and economic impacts (burdens) will be distributed to these people and groups in the community. The economic and social benefits of the Project will, however, be distributed to other people and groups. Economic benefits from the Project will flow to GRL and its shareholders, investors and financiers, its employees and contractors, its suppliers, others who will benefit financially from the Project, and federal, state and local governments that will benefit from taxation and rating revenues. Such people and bodies believe in economic growth and development and the distribution of the economic benefits to them aligns with their moral framework and worldview. The people who benefit are likely to live sufficiently geographically distant from the Project so as not to be affected, or to be less affected, by the physical impacts of the Project.

414 The result is inequity in the distribution of the environmental, social and economic burdens and benefits of the Project within the current generation (intra-generational inequity).

415 There is also inequity in the distribution between current and future generations. The economic and social benefits of the Project will last only for the life of the Project (less than two decades), but the environmental, social and economic burdens of the Project will endure not only for the life of the Project but some will continue for long after. The visual impact of the Project, even after mining rehabilitation, will continue. The natural scenery and landscape will be altered forever, replaced by an artificial topography and landscape. The social impacts on culture and community, especially for the Aboriginal people whose Country has been mined, will persist. A sacred cultural land created by the Ancestors of the Aboriginal people cannot be recreated by mine rehabilitation. As discussed below, the Project will emit greenhouse gases and contribute to climate change, the consequences of which will burden future generations.

416 The benefits of the Project are therefore distributed to the current generation but the burdens are distributed to the current as well as future generations (inter-generational inequity).

Conclusion on the social impacts of the Project

417 The Rocky Hill Coal Project will cause a variety of negative social impacts, many of which are likely to have a high or extreme social risk rating. These negative social impacts will not be able to be mitigated or managed. The mitigation measures proposed by GRL, in the Social Impact Assessment and elsewhere, lack clear connection with the key social impacts likely to be caused by the Project and hence will not be effective in mitigating these social impacts.

418 Dr Lawrence analysed the 22 mitigation measures suggested in the Social Impact Assessment, noting that they are mostly recommendations not commitments; lack enforceable content or even guidance as to their substance; are not tangible, deliverable or likely to be durably effective; and do not address the issues of serious concern to the community (such as dust, noise and visual impacts) (Lawrence report, pp 34-36). Dr Lawrence concluded:

The proposed mitigation measures and recommendations are primarily aspirational, rather than actual commitments by the applicant, and they are not demonstratively achievable or enforceable. Further, they are neither appropriate nor proportionate to the social impacts they are being asked to address. For example, a Community Grants Fund is proposed in order to address all manner of social impacts of the proposed mine, including increased pressure on health services, and increasing housing stress etc, yet it is not clear whether or how a Community Grants Fund can actually address these complex social issues, which involve capacity, resource and legislative issues that are arguably beyond the remit or responsibility of the applicant.

In my opinion these recommendations do not constitute adequate or reasonable mitigations and in particular fail to address the main concerns of local residents in Gloucester.

(Lawrence report, p 10.)

419 Dr Askland too observed that the recommended mitigation strategies not only fail to address key social impacts but may exacerbate impacts, giving the example of the proposed amenity walls (Askland report, [26]-[28]).

420 I agree with Dr Lawrence and Dr Askland that the proposed mitigation measures will not be effective in mitigating the significant negative social impacts that I have found will be caused by the Project.

421 The social impact assessment process does seek to identify, evaluate and weigh both the positive social impacts as well as the negative social impacts (see the Guideline and also Dr Ryan, Transcript, 24/08/18, p 764). GRL, the Social Impact Assessment and Dr Ryan have identified positive social benefits associated with the Project, mostly regarding boosts to the local economy and employment and concomitant social benefits. But the evidence establishes that there will be significant negative social impacts. Just as the Department concluded in the Environmental Assessment Report (p 72) and the Planning Assessment Commission concluded in its determination (p 19), I find that the Project will have significant negative social impacts on people's way of life; community; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; and fears and aspirations. The Project will also cause distributive inequity. I find that, although the Project has the potential to generate some positive social benefits, including from the local economy and employment, these benefits will be outweighed by the significant negative social impacts that the Project will cause. The significant net negative social impacts are a justification for refusing consent to the Project.

The impacts of the mine on climate change

Gloucester Groundswell's argument for refusal of the mine

422 Gloucester Groundswell contended that the Rocky Hill Coal Project should be refused because the greenhouse gas (GHG) emissions from the Project would adversely impact upon measures to limit dangerous anthropogenic climate change. The effects of carbon in the atmosphere arising from activities in the Project site, and the burning of the coal extracted from the mine, are inconsistent with existing carbon budget and policy intentions to keep global temperature increases to below 1.5° to 2° Celsius (C) above pre-industrial levels and would have a cumulative effect on climate change effects in the long term. Gloucester Groundswell submitted, "in light of that substantial planning harm, and the critical importance of combatting climate change now, the Project should be refused". Gloucester Groundswell developed this argument as follows.

423 The Rocky Hill Coal Project will cause, directly and indirectly, emissions of greenhouse gases (GHGs). The most significant GHGs will be carbon dioxide (CO₂) and methane (CH₄). Different gases have different greenhouse warming effects (referred to as global warming potentials) and emission factors take into account the global warming potentials of the gases. The estimated emissions are referred to in terms of CO₂ equivalent (CO₂-e) emissions by applying the relevant global warming potential (Air Quality and Health Risk Assessment for the amended EIS, p 2A-158).

424 Project-related GHG emissions can be direct or indirect.

425 Direct GHG emissions are emissions that occur from sources that are owned or controlled by the reporting entity. Direct GHG emissions are principally the result of the following types of activities undertaken by an entity:

- (a) Generation of electricity, heat or steam. These emissions result from combustion of fuels in on-site stationary sources;

- (b) Physical or chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials (eg the manufacture of cement, aluminium, etc.);
- (c) Transportation of materials, products, waste and employees. These emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources (eg trucks, trains, ships, aeroplanes, buses and cars);
- (d) Fugitive emissions. These emissions result from intentional or unintentional releases (eg equipment leaks from joints, seals, packing and gaskets); CH₄ emissions from coal mines and venting; hydrofluorocarbon emissions during the use of refrigeration and air conditioning equipment; and CH₄ leakages from gas transport.

(Air Quality and Health Risk Assessment, p 2A-157.)

426 Direct GHG sources for the Rocky Hill Coal Project include emissions from undertaking mining operations, including vegetation stripping, release of fugitive methane during open cut mining and combustion of fuels by vehicles, plant and equipment during mining operations (referred to as Scope 1 Emissions) (Air Quality and Health Risk Assessment, p 2A-159).

427 Indirect GHG emissions are emissions from the generation of purchased energy products (principally electricity) by the entity (referred to as Scope 2 emissions). In relation to coal mines, Scope 2 emissions typically cover electricity that is purchased or otherwise brought into the organisational boundary of the entity. For the Rocky Hill Coal Project, the principal Scope 2 emissions will be indirect emissions associated with on-site electricity (Air Quality and Health Risk Assessment, p 2A-158 and p 2A-159). Scope 2 emissions physically occur outside the boundary of the coal mine, such as at the power station that generates the electricity that is purchased. These are “upstream” indirect emissions.

428 Other indirect GHG emissions are emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity (referred to as Scope 3 emissions). Examples of Scope 3 emissions are emissions from the extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services. In the case of the Rocky Hill Coal Project, Scope 3 emissions will include emissions associated with the extraction, processing and transportation of diesel and the transportation and combustion of product coals. Emissions from the combustion of product coal are “downstream” emissions as they physically occur at the power stations or steel mills combusting product coal from the mine (Air Quality and Health Risk Assessment, p 2A-158 and p 2A-159).

429 The Air Quality and Health Risk Assessment for the amended EIS estimated the CO₂-e (tonnes) for Scope 1, 2 and 3 emissions for the Project as being 1,566,685 (Scope 1 emissions), 241,891 (Scope 2 emissions), and 36,283,171 (Scope 3 emissions) (Table 18.1, p 2A-160).

430 The Scope 3 emissions figure is an underestimate, as emissions from the shipping of product coal were not included due to the uncertainties in emission estimates, including in future export destinations and limited data on emission factors and/or fuel consumption for ocean going vessels (Air Quality and Health Risk Assessment, p 2A-159).

431 The emission of GHGs impacts the environment. Greenhouse gases change the climate by trapping outgoing heat (long wave radiation) from the earth’s surface and retaining it in the lower atmosphere and at the surface, thus

increasing the energy of the climate system and raising its average temperature. The Intergovernmental Panel on Climate Change (IPCC), the world's most authoritative assessment body on the science of climate change, found that:

It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcings together.

(IPCC, Climate Change 2014: Synthesis Report. Contributions of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [(Core Writing Team, R K Pachauri and L A Meyer (eds)], IPCC, Geneva, Switzerland, p 48.)

432 The IPCC define the “extremely likely” confidence level as having a probability occurrence of between 95-100%.

433 Currently, global average surface temperature is about 1 degree higher than pre-industrial levels and 2014, 2015, 2016 and 2017 have been the four hottest years on record (National Oceanic and Atmospheric Administration, USA (NOAA) (2018), *Global Climate Report – Annual 2017* cited by Professor Steffen in his expert report, [10]). The rise in atmospheric CO2 concentration is up to 10 times faster than the most rapid changes in the geological record. Since 1970, global average surface temperature has been rising at a rate of 1.7°C per century, compared to a 7,000 year background rate of change of about 0.01°C per century (Steffen report, [11]).

434 The IPCC, in its recent IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels, found:

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a *likely* range of 0.8°C to 1.2°C. Global warming is *likely* to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. (*high confidence*) (Figure SPM.1) {1.2}

Reflecting the long-term warming trend since pre-industrial times, observed global mean surface temperature (GMST) for the decade 2006-2015 was 0.87°C (*likely* between 0.75°C and 0.99°C) higher than the average over the 1850-1900 period (*very high confidence*). Estimated anthropogenic global warming matches the level of observed warming to within ±20% (*likely* range). Estimated anthropogenic global warming is currently increasing at 0.2°C (*likely* between 0.1°C and 0.3°C) per decade due to past and ongoing emissions (*high confidence*). {1.2.1, Table 1.1, 1.2.4} (IPCC, 2018: Summary for Policymakers. In: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V Masson-Delmotte, et al (eds)]. World Meteorological Organization, Geneva, Switzerland, p 6.)

435 Global average surface temperature is not the only feature of the climate system that is changing. Other features of the climate system that are changing include changes in the basic circulation patterns of the atmosphere and the ocean; increasing intensity and frequency of many extreme weather events; increasing acidity of the oceans; rising sea levels and consequent increases in coastal flooding; and intensification of the hydrological cycle (Steffen report, [12]). See for a general summary of the observed changes to the climate system and the anthropogenic causes, IPCC, Climate Change 2014: Synthesis Report, 39-54 and M R Allen et al, 2018, “Framing and Context”, Chapter 1 and O Hoegh-Gulderg et al, 2018, “Impacts of 1.5°C Global Warming on Natural

and Human Systems”, Chapter 3 in *Global warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V Masson-Delmotte, et al (eds)]. World Meteorological Organization, Geneva, Switzerland, and a summary of the consequences of the changing climate, Kevin E Trenberth, “Climate change caused by human activities is happening and it already has major consequences” (2018) 36 *Journal of Energy and Natural Resources Law* 463-481.

436 Professor Will Steffen, an earth systems scientist who is an Emeritus Professor at the Australian National University, Senior Fellow of the Stockholm Resilience Centre and Member of the Climate Council of Australia, called by Gloucester Groundswell, summarised the impacts of climate change that are already being experienced:

The impacts of climate change are already being felt around the world. As reported by the IPCC (2013), the most authoritative assessment body on the science of climate change, some of the most important impacts are:

- a) Warmer and/or fewer cold days and nights over most land areas.
- b) Warmer and/or more frequent hot days and nights over most land areas.
- c) Increases in the frequency and/or duration of heat waves in many regions.
- d) Increase in the frequency, intensity and/or amount of heavy precipitation (more land areas with increases than with decreases).
- e) Increases in intensity and/or duration of drought in many regions since 1970.
- f) Increases in intense tropical cyclone activity in the North Atlantic since 1970.
- g) Increased incidence and/or magnitude of extreme high sea levels.

The impacts of climate change are also being felt in many ways across Australia, especially in the form of changes in extreme weather events (CSIRO and BoM 2015), *Climate Change in Australia – Technical Report*, CSIRO and (Bureau of Meteorology, Melbourne)

The evidence for the influence of climate change on worsening extreme weather includes:

- a) The fact that all extreme weather events are now occurring in an atmosphere that is warmer and wetter than it was 70 years ago (Trenberth K E (2012) “Framing the way to relate climate extremes to climate change”, *Climatic Change*, 115: 283-290;
- b) Long-term data records show observed changes in the nature of extreme weather; and
- c) Climate models run with and without the additional greenhouse gases in the atmosphere from human emissions show the increase in likelihood that a specific extreme weather event would have occurred because of climate change.

The most important of these climate-related impacts are (CSIRO and BoM 2015):

- a) Australia’s average surface temperature has increased by 0.9°C from 1910 to 2014 (and now to over 1.0°C).
- b) Many heat-related records were broken in the summer of 2012-2013, and again in the two most recent summers. 2013 was Australia’s hottest year on record.
- c) Heat waves have increased in duration, frequency and intensity in many parts of the country.

- d) Cool-season rainfall has declined in southeast and southwest Australia and wet-season rainfall has increased in northern Australia.
- e) Heavy daily rainfall has accounted for an increased proportion of total annual rainfall over an increasing fraction of the Australian continent since the 1970s.
- f) Extreme fire weather days have increased at 24 out of 38 monitoring sites from 1973-2010 due to warmer and drier conditions.
- g) For 1966-2009 the average rate of relative sea-level rise along the Australian coast was approximately 1.4 millimetres per year.

Southeast Australia has experienced many of the impacts that have been observed around Australia as a whole (CSIRO and BoM 2015). In particular, these include:

- a) Changes in heatwaves, such as more frequent occurrence, increasing number of heatwave days and the hottest day of a heatwave becoming even hotter.
- b) Increases in the Forest Fire Danger Index have occurred mostly in the southeast region of the continent.
- c) Strong drying trends in cool-season rainfall since 1990.
- d) Three-fold increase in coastal flooding in the Sydney region through the 20th century.

The NSW mid-north coast region and adjacent inland areas have also experienced many impacts of climate change. These include:

- a) The incidence of coastal flooding events has likely increased by approximately threefold through the 20th century, as observed in Sydney Harbour (the nearest observation station with long-term records) (Church et al (2006), "Sea level rise around the Australian coastline and the changing frequency of extreme sea-level events", *Australian Meteorological Magazine* 55: 253-260).
- b) Heatwaves have worsened in the following ways:
 - (i) the number of heatwave days is increasing;
 - (ii) the first heatwave of the season is occurring earlier; and
 - (iii) the hottest day of a heatwave is becoming hotter (Perkins S and Alexander L (2013) "On the measurement of heat waves", *Journal of Climate* 26: 4500-4517).
- c) In terms of bushfire weather, there are no long-term monitoring stations in the NSW mid-north coast region, but further inland in central-west NSW there has been a significant increase in the McArthur Forest Fire Danger Index (FFDI) from 1973 to 2013 (CSIRO and BoM 2015). At Nowra on the NSW South Coast, there has also been an increase in the FFDI from 1973 to 2013, although of a smaller magnitude than for the central-west NSW station (Clarke H, Lucas C and Smith P (2013), "Changes in Australian fire weather between 1973 and 2010", *International Journal of Climatology* 33: 931-944).
- d) Observations show mixed changes in rainfall patterns for the region. For the northern wet season (October to April), rainfall has been above average for the 1997-2013 period. For the southern cool season (April to September), rainfall has been above average along the coast but below average in some inland areas (CSIRO and BoM 2015).

437 The most recent State of the Climate 2018 report of the Bureau of Meteorology and CSIRO provides an updated summary of changes in the climate of Australia.

438 Professor Steffen also predicted the likely future changes in the climate of Australia and the mid NSW north coast region and adjacent inland region:

Future climate change will be driven in the near-term (several decades into the future) by the further amount of greenhouse gas emissions emitted by human activities, and in the longer term by both human emissions and feedbacks in the climate system (eg, melting of permafrost, collapse of the Amazon rainforest) that could emit significant additional amounts of greenhouse gases to the atmosphere.

The projections for future changes in Australia's climate include (CSIRO and BoM 2016):

- a) Temperatures will continue to increase, with more hot days and fewer cool days.
- b) Oceans around Australia will warm further and acidification will continue.
- c) Tropical cyclones are projected to decrease in number but increase in intensity.
- d) Extreme rainfall events are likely to be more intense.
- e) Harsher fire weather is projected for southern and eastern Australia.
- f) Further decreases in winter rainfall for southern continental Australia, with an increase in droughts.

Projected changes in the climate of mid-NSW North Coast region and adjacent inland region (as part of the East Coast region) include (<https://www.climatechangeinaustralia.gov.au/en/>, based on CSIRO and BoM 2015):

- a) Average temperatures will continue to increase in all seasons (*very high confidence*).
- b) More hot days and warm spells are projected with *very high confidence*. Fewer frosts are projected with *high confidence*.
- c) Decreases in winter rainfall are projected for East Coast South with *medium confidence*. Other changes are possible but unclear.
- d) Increased intensity of extreme rainfall events is projected, with *high confidence*.
- e) Mean sea level will continue to rise and height of extreme sea-level events will also increase (*very high confidence*).
- f) A harsher fire-weather climate in the future (*high confidence*).

(p 5.)

439 To address these impacts of GHG emissions on the climate system, the terrestrial and oceanic environment and the people of the planet, governments around the world have not only agreed the United Nations Framework Convention on Climate Change in 1992 but in 2015 agreed in the Paris Agreement to “(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change” (Article 2). Article 4.1 of the Paris Agreement calls for net zero emissions in the second half of the century:

In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century ...

440 Australia is a party to both the Climate Change Convention and the Paris Agreement. Under the Paris Agreement, each party commits to make its contribution to keeping the global average temperature rise to the 1.5-2°C range by reducing their GHG emissions through their Nationally Determined

Contributions (NDC). Australia's NDC is to reduce GHG emissions by 26-28% below 2005 levels by 2030. The NSW Government has endorsed the Paris Agreement and has set a more ambitious objective to achieve net zero emissions by 2050 (see NSW Climate Change Policy Framework, October 2016, pp 4, 5).

441 A commonly used approach to determine whether the NDCs of the parties to the Paris Agreement cumulatively will be sufficient to meet the long-term temperature goal of keeping the global temperature rise to between 1.5°C and 2°C is the carbon budget approach. The carbon budget approach is based on the well-proven relationship between the cumulative anthropogenic emissions of GHGs and the increase in global average surface temperature. The carbon budget approach "is a conceptually simple, yet scientifically robust, approach to estimating the level of greenhouse gas emission reductions required to meet a desired temperature target", such as the Paris Agreement targets of 1.5°C or 2°C (Steffen report, [38]). The approach is based on the approximately linear relationship between the cumulative amount of CO₂ emitted from all human sources since the beginning of industrialisation (often taken as 1870) and the increase in global average surface temperature (Figure 2 in IPCC (2013) Summary for Policy Makers, cited in Steffen report, [39]). Once the carbon budget has been spent (emitted), emissions need to become "net zero" to avoid exceeding the temperature target. "Net zero" emissions means the magnitude of CO₂ emissions to the atmosphere is matched by the magnitude of CO₂ removal from the atmosphere (Steffen report, [40]).

442 The carbon budget required to meet a temperature target is influenced by at least three areas of uncertainty: the probability of meeting the target; accounting for other greenhouse gases; and accounting for feedbacks in the climate system. Professor Steffen explained these three areas of uncertainty:

There are several key areas of uncertainty that influence the carbon budget required to meet a temperature target:

- a) *Probability of meeting the target.* Higher probabilities of meeting a given temperature target (eg, 2°C) require a more stringent carbon budget. Thus, there is a critical trade-off: relaxing the carbon budget to make it more feasible to meet means that there is a lower probability of achieving the desired temperature target.
- b) *Accounting for other greenhouse gases.* Non-CO₂ gases (eg, methane (CH₄) and nitrous oxide (N₂O)), which are important contributors to warming, are assumed to be reduced to zero at the same rate as CO₂ is reduced to zero. If non-CO₂ gases are not reduced, or reduced more slowly than CO₂, then the CO₂ budget is reduced accordingly. Most of the CH₄ and N₂O emissions arise from the agricultural sector, where emission reductions are generally considered to be more difficult and expensive to achieve than for the electricity generation sector. Thus, carbon budgets are often configured on the basis that reduction of CO₂ emissions from the electricity and transport sectors is more technologically feasible and less expensive than for the non-CO₂ gases, and therefore CO₂ emissions should be reduced even further to compensate for the continued emission of non-CO₂ gases.
- c) *Accounting for feedbacks in the climate system.* Carbon cycle feedbacks, such as permafrost melting or abrupt shift of the Amazon rainforest to a savanna, are not accounted for in the carbon budget approach. Including estimates for these would reduce the budget further (Ciais et al 2013). These are likely to be very significant. Quantitative estimates suggest that at a 2°C temperature rise (the upper Paris accord target), about 100-200 Gt

C (billion tonnes of carbon, emitted as CO₂) of additional emissions to the atmosphere (about 10-20 years' worth of human emissions at current rates) would be emitted (Ciais et al 2013; Steffen et al 2018). The upper estimate would virtually wipe out the remaining carbon budget (see Table 1 below).

(Steffen report, [41].)

443 Professor Steffen demonstrated how the carbon budget approach can be used for the 2°C temperature target in the Paris Agreement:

Applying the carbon budget for a 2°C target demonstrates how it can be used. The IPCC estimates that for a greater than 66% probability of limiting global average temperature rise to no more than 2°C, cumulative human emissions since 1870 must be less than 1,000 Gt C (emitted as CO₂) (IPCC 2013). If non-CO₂ greenhouse gases are not reduced at the same rate, the carbon budget must be reduced by up to a further 210 Gt C to 790 Gt C (see 41b) above). From 1870 through 2017 cumulative human emissions have been about 575 Gt C (Collins et al 2013; Le Quéré C et al 2017). The remaining budget then becomes 215 Gt C.

The current rate of human emissions of CO₂ is about 10 Gt C per year (Le Quéré et al 2017), so at these present rates of emissions, the carbon budget would be consumed in little more than two decades (at about 2040).

I summarise this analysis in tabular form below:

<i>Table 1: Carbon budget for a 66% probability of restricting temperature rise to no more than 2°C</i>	
<i>Budget Item/Process</i>	<i>Gt C</i>
Base budget based on IPCC (2013)	1,000
Accounting for non-CO ₂ greenhouse gases	-210
Historical emissions through 2017	-575
<i>Remaining budget to net zero emissions</i>	<i>215</i>

The conclusion is that the world has 21-22 years of emissions (at current rates) remaining before the world's economy must reach net zero emissions (215 Gt C divided by 10 Gt C per year = 21.5 years).

(Steffen report, [42]-[45].)

444 The carbon budget approach has implications for the rate of reduction of GHG emissions towards their eventual phasing out (achieving net zero emissions). The rate of emission reductions is affected by the peaking year, which is the year in which global emissions peak before starting their downward trajectory. Delaying the peaking year increases the rate at which emissions need to be reduced. Professor Steffen, relying on Figueres, C et al (2017), "Three years to safeguard our climate", *Nature* 546:593, showed in a figure the emission reduction trajectories for meeting the Paris Agreement Targets (Figure 3 of Steffen report). Professor Steffen suggested that 2020 is probably the earliest that global emissions can peak. He considered it important that they do at that time because "[d]elaying the peak just five further years would create a subsequent emission reduction trajectory that would be impossible to follow economically or technologically" (Steffen report, [48]).

445 Professor Steffen said that:

The clear message from any carbon budget analysis, under any reasonable set of assumptions regarding probabilities of actually meeting the budget and the sensitivity of the climate system to the level of greenhouse gases in the atmosphere, is that fossil fuel combustion must be phased out quickly, at the rate of the curves shown in Figure 3.

(Steffen report, [49].)

446 Professor Steffen considered that the phasing out of fossil fuel combustion necessitates not exploiting and burning most of the world's existing fossil fuel reserves:

Most of the world's existing fossil fuel reserves – coal, oil and gas – must be left in the ground, unburned, if the Paris accord climate targets are to be met. I say that because the exploitation, and burning, of fossil fuel reserves leads to an *increase* in CO₂ emissions when meeting the Paris accord climate targets requires a rapid and deep *decrease* in CO₂ emissions.

(Steffen report, [50].)

447 Professor Steffen considered that if most of the world's existing fossil fuel reserves need to be left in the ground unburned, no new fossil fuel developments should be allowed:

An obvious conclusion that follows from this fact is that: No *new* fossil fuel development is consistent with meeting the Paris accord climate targets. That is, paragraphs 47-50 above demonstrate clearly that to meet the Paris accord, emissions must be reduced rapidly and deeply (cf Figure 3 below), and to do this requires the rapid phase-out of *existing* fossil fuel mines/wells. It is an obvious conclusion that no new fossil fuel developments can therefore be allowed.

(Steffen report, [51].)

448 Professor Steffen referred to the study by McGlade C and Ekins P (2015), "The geographical distribution of fossil fuels unused when limiting global warming to 2°C", *Nature* 517: 187-190:

An economic analysis of a generous global carbon budget highlights the implications of meeting the Paris accord climate targets for the Australian fossil fuel sector (McGlade and Ekins 2015). Based on a 50% probability of meeting the CO₂ temperature target, the global budget for the 2011-2050 period was estimated by the authors at 300 Gt C, somewhat higher than the budget in Table 1. The study showed that if all of the world's existing fossil fuel reserves were burned, about 780 Gt C would be emitted as CO₂, about 2.5 times greater than the allowable budget. Globally, 62% of the world's existing fossil fuel reserves need to be left in the ground, unburned, to remain within the carbon budget.

Meeting the carbon budget consistent with the Paris accord climate targets therefore means that not only must currently operating mines and gas wells be closed before their economic lifetime is completed (obvious from point 52 above – 780 is much larger than the assumed budget of 300), but also that no approved (but not yet operating) and no proposed fossil fuel projects, based on existing reserves, can be implemented. This analysis applies to the Rocky Hill Coal Project.

McGlade and Ekins (2015) then applied an economic analysis to the three types of fossil fuels – coal, oil and gas – and to the various regions of the world that are major producers of fossil fuels. Based on their analysis, 88% of global coal reserves are unburnable for any purpose (it is the CO₂ emissions that matter for the carbon budget approach, not the purpose for which the fossil fuel is burnt). The regional analysis yielded even more stringent conditions for Australia's fossil

fuel industry (Australia is the only major fossil fuel producer in the OECD Pacific region; other countries in the region are only minor producers of fossil fuels). Over 90% of Australia's existing coal reserves cannot be burned to be consistent with the Paris accord 2°C target, and certainly not with the more stringent Paris accord 1.5°C target.

(Steffen report, [52]-[54].)

449 Professor Steffen concluded from this analysis of the carbon budget that:

The conclusions from this – or any other analysis based on a carbon budget – are:

- Australia's existing fossil fuel industries must be phased out as quickly as possible, with most of the Australian fossil fuel reserves (and nearly all of Australia's coal reserves) left in the ground.
- Development of new fossil fuel reserves, no matter how small, is incompatible with any carbon budget assuming a 50% or better chance of the budget meeting the temperature target (see paragraph 41a): that is, a very generous budget) and with Australia's commitments to the Paris accord.
- Based on this analysis, approval of the development of the Rocky Hill Coal Mine is inconsistent with the carbon budget approach towards climate stabilisation.

(Steffen report, [55].)

450 Professor Steffen contended that the refusal of the Rocky Hill Coal Project is justified on this carbon budget approach regardless of the fact that the total GHG emissions of the Project would be a small fraction of total global emissions. Professor Steffen noted that:

... global greenhouse gas emissions are made up of millions, and probably hundreds of millions of individual emissions around the globe. All emissions are important because cumulatively they constitute the global total of greenhouse gas emissions, which are destabilising the global climate system at a rapid rate. Just as many emitters are contributing to the problem, so many emission reduction activities are required to solve the problem.

(Steffen report, [57].)

GRL's argument for approval of the mine

451 GRL did not contest that climate change is real and happening and that anthropogenic GHG emissions must be reduced rapidly in order to meet the internationally agreed temperature targets of 1.5°C or 2°C. GRL did, however, contest that the Rocky Hill Coal Project needs to be refused in order to achieve these temperature targets.

452 First, GRL contended at the outset that Gloucester Groundswell's argument of "no new coal mines, anywhere" is not required by any international agreement (the Climate Change Convention or the Paris Agreement) or Commonwealth or State law. Internationally, countries have a discretion to determine how, by their nationally determined contributions, reductions in GHG emissions will be achieved. Australia's NDC is to reduce its emissions by 26 to 28% below 2005 levels by 2030. There are no governing structures under the Paris Agreement that predetermine how these reductions should occur. In particular, there are no sectoral or commodity-based emission targets or budgets (referring to the expert report of Dr Fisher, [8], [107]). Similarly, Commonwealth and State laws do not specify how Australia's NDC emission reductions need to be achieved and, in particular, do not specify that no new coal mines can be approved. GRL submitted that the Court, in determining this

appeal, “to adopt a policy of no new coal mines would be to impermissibly legislate a strict rule of general application without jurisdiction to do so” (GRL closing submissions, [249]).

453 Secondly, GRL contended that, in determining the application for consent for the Rocky Hill Coal Project, the Court can take into consideration Scope 1 and Scope 2 emissions but not Scope 3 emissions. GRL noted that a country that is a party to the Climate Change Convention and the Paris Agreement is to account for GHG emissions in its country, but not in other countries. Australia needs to account for Scope 1 and Scope 2 emissions associated with a coal mine in Australia, but not for Scope 3 emissions associated with the combustion of coal product in other countries.

454 Thirdly, GLR contested that the carbon budget approach demands that new coal mines generally, and the Rocky Hill Coal Project in particular, should not be approved. The long-term temperature goal in the Paris Agreement, and Australia’s NDC, can be achieved in different ways. Dr Brian Fisher, an agricultural economist with BA Economics Pty Ltd and formerly the Executive Director of the Australian Bureau of Agriculture and Resource Economics, called by GRL, referred to the World Meteorological Organisation (WMO 2017) statement that the carbon budget can be represented by: “emissions from fossil fuel combustion + emissions from land use change = growth in the concentration in the atmosphere + amount going (chemically and biologically) into the ocean + amount going into terrestrial vegetation and soils” (Fisher report, [45]).

455 Dr Fisher considered that “the calculation of the carbon budget ‘nets out’ carbon sinks and reservoirs”. He considered that “the greater the uptake of carbon by the natural environment, the higher the ‘carbon budget’ (as defined by emissions from all human sources) would be before global emissions concentrations reach their target threshold” (Joint Report of Climate Change Experts, [26]).

456 Professor Steffen disputed Dr Fisher’s conception of the carbon budget:

The carbon budget approach does not use “net emissions”. Carbon cycle dynamics, which are referred to [in] the proponent’s expert report as emissions being “... (to some extent) balanced by carbon uptake in the natural environment”, are already accounted for in the ESMs [Earth System Models used by the IPCC] that are used to calculate the carbon budget. The carbon budget is based on actual emissions (not “net emissions”) of carbon dioxide from all human sources (currently about 90 per cent of these emissions of ~10 billion tonnes of carbon (as CO₂) per annum originate from the burning of fossil fuels).

(Joint Report of Climate Change Experts, [30].)

457 Drawing on his conception of the carbon budget, Dr Fisher observed that the growth in carbon concentration in the atmosphere can be reduced by reducing the input of CO₂ to the atmosphere by emissions from human activities, both emissions from fossil fuel combustion and emissions from land use change. Emissions from fossil fuel combustion can be reduced by increasing renewable energy capacity, improving energy productivity and increasing use of innovation and clean technology, such as carbon capture and storage (Fisher report, [79]-[83] and Joint Report of Buckley and Fisher, [12]-[16]). The carbon concentration in the atmosphere can also be reduced by increasing the amount

of carbon going into terrestrial vegetation and soil. Methods to sequester (or store) carbon dioxide include through reforestation and afforestation (Fisher report, [84]).

458 Hence, GRL contended, whilst not approving new coal mines might be consistent with reducing GHG emissions, it is not the only way to achieve the desired emission reduction targets.

459 Fourthly, GRL submitted that the choice of action to reduce emissions should be guided by the principle of efficiency in abatement. Dr Fisher considered that:

The size of the global abatement task calls for making emissions reductions where they count most and generate the least economic and social harm. That is, focus needs to be applied to achieving meaningful emissions reductions from large sources where it is cost-effective and alternative technologies can be brought to bear. There is an extensive literature on the sector decarbonisation requirements that will have the greatest abatement impact in the shortest timeframe, and the focus is predominantly on electricity generation and transport.

Achieving abatement at least cost is critical. If Australia were, for example, to ban all production and exports of coking coal and iron ore (both raw materials are overwhelmingly used to produce steel), it would destabilise our economy, substantially cut employment, and remove a major source of government revenue. These consequences would have multiple flow-on effects including for Australia's capacity to innovate, and to adopt new clean technologies that allow decarbonisation while sustaining everyday activities.

Economic efficiency and thus social welfare are maximised when abatement occurs from the lowest cost sources. Abatement costs vary widely between countries, sectors and activities and are often project dependent. Preventing the development of the Rocky Hill Coal Project would incur greenhouse gas abatement costs approximately two orders of magnitude higher than what is currently being achieved under the Federal Government's Emissions Reduction Fund and therefore would be grossly economically inefficient and contrary to Australian society's best interests.

(Fisher report, [13]-[15].)

460 Fifthly, GRL noted that the Rocky Hill Coal Project will produce coking or metallurgical coal not thermal or steaming coal. Thermal coal is typically burned to generate steam which runs turbines to generate electricity. Coking coal is an essential ingredient in the manufacture of steel from iron ore. Dr Fisher considered that:

This distinction is important because while the use of thermal coal for electricity generation can be substituted by other fuel sources, such as gas and renewables, there are limited substitutes for the use of coking coal in primary steel production.

(Fisher report, [53].)

461 Dr Fisher noted that "steel is integral to our society", not only being a basic input to many critical goods and services, including healthcare, telecommunications, transport, clean water and agriculture, but also in producing and distributing energy and improving energy efficiency, including in renewable energy supply, such as in wind turbines, in reinforcing concrete dams for hydroelectricity and in equipment used for natural gas extraction (Fisher report, [54]-[55]).

462 Coking coal is used in the main way in which steel is produced, by the integrated steel making process. This process involves the use of a blast furnace for iron making, followed by a basic oxygen furnace (BOF). Dr Fisher noted that in 2016, 74% of the world's steel was produced using coking coal via

integrated BOF smelting. In this process, iron ore is melted to produce pig iron, using coke as fuel. Coke is the product derived from coking coal when impurities have been removed. The carbon rich pig iron is converted to steel by blowing oxygen through it. Steel production using BOF technology requires significant raw materials as input. Almost all coking coal is used in coke ovens for integrated BOF smelting and 98% of iron ore used in steel making (Fisher Report, [57]).

463 The other way to produce steel is by the electric arc furnace (EAF). The EAF process does not involve iron making. The EAF process relies on an electric charge between two electrodes to deliver heat to melt scrap metal. It uses recycled steel and avoids the need for raw material processing. While the EAF process does not require coking coal as a raw material, many furnaces are reliant on electricity generated from coal fired power stations. Dr Fisher noted that a little under 26% of global steel was produced using the EAF process. The primary limiting factor to greater use of EAF is the availability and supply of scrap steel (Fisher report, [59]).

464 Mr Manley, a geologist and Director, Metals and Mining Consulting with Wood Mackenzie, called by GRL, supported Dr Fisher's view of the limited substitutability of coking coal in steel making. Mr Manley considered that: "Steel making technology based on the blast furnace route is mature. It is also the only major currently commercially operational route for creating iron from iron ore." (Joint Report of Coal Demand Experts, p 5). Mr Manley expected that "basic oxygen furnaces (BOF) will be the preferred steel-making route due to their higher efficiencies" (Manley report, [5.15]).

465 Whilst Mr Manley accepted that a change in steel making technology would change the forecast and demand for coking coal, he noted that "[t]here is no currently proven technology that can replace carbon in primary iron reduction" and "[t]here is significant emplaced steelmaking capacity utilising carbon" (Joint Report of Coal Demand Experts, p 5). Mr Manley accepted that "[s]crap steel recycling will increase slightly over time", enabling increased production of steel by the EAF process. Wood Mackenzie forecasted that the global market share for electric arc furnace produced steel would rise from 27% in 2018 to 31% by 2035. As this increase is only slight, "significant primary iron ore reduction will still be required over the forecast period" (Joint Report of Coal Demand Experts, p 5).

466 Dr Fisher believed that global demand for steel is likely to increase, as India and other emerging Asian countries develop. The increased demand will likely be met by steel produced using the BOF process. The key ingredients in BOF steel making are coking coal and iron ore. Australia is the world's largest exporter of coking coal, with around 30% of global coking coal demand met by international trade (Fisher report, [60]).

467 Mr Manley also predicted the global demand for seaborne metallurgical (coking) coal will rise in the next two decades:

Global demand for seaborne metallurgical coal will rise from 300 Mt presently to 370 Mt by 2035. Although the long-term outlook sees a 70 Mt rise in demand, only 11 Mt of this growth is required by 2024. Asian demand remains flat over this period, as declines in Japan and China are made up for with moderate growth from India. Nearly all of the growth that is forecast to take place occurs in countries in EMEARC [Europe, Middle East, Africa, Russia and the Caspian].

From 2024 to 2035, seaborne metallurgical coal demand is forecast to rise by 59 Mt, almost completely driven by India's appetite for higher imports. Demand in countries in the Americas would only grow by 4 Mt during these years, while the demand from those in EMEARC would increase by 4 Mt. Japan's seaborne demand will continue to decline as the mature economy slows and the population ages, leading to less demand for steel. Japan's imports are expected to fall from about 60 Mt this year to 47 Mt in 2035.

(Manley report, [5.19]-[5.20].)

468 These predicted increases in global demand for coking coal were challenged by Mr Tim Buckley, an energy economics and financial analyst called by Gloucester Groundswell. Mr Buckley noted that Wood Mackenzie's modelling of demand for coking coal does not take account of changes in policy, financial markets and technology that will drive a reduction in GHG emissions in order to achieve the temperature targets under the Paris Agreement. The Wood Mackenzie modelling and Mr Manley's report do not provide any forecast for coking coal demand for achieving the International Energy Agency's Sustainable Development Scenario and the Paris Agreement's goal of limiting the increase in global average temperatures to between 1.5°C and 2°C (Joint Report of Coal Demand Experts, p 3 and Transcript, 21/08/18, p 437).

469 Mr Buckley considered that if regard is had to the measures that will be taken under the Paris Agreement to limit climate change, demand for coking coal will decline. Mr Buckley referred to the International Energy Agency's World Energy Outlook 2017 Report that modelled a Sustainable Development Scenario (SDS). The SDS is broadly consistent with the world having a 50% chance of limiting climate change to 2°C above pre-industrial levels (Buckley report, [32]). The SDS forecasts a decline in global demand for coking coal of about 39% relative to 2016 by 2040:

The SDS forecasts a 39% decline in coking coal, slightly less than the 52% decline in total global coal use by 2040 vs. 2016. This suggests a reduction in global supply is needed, not new capacity beyond already approved mines.

(Joint Report of Coal Demand Experts, p 3 and see Buckley report, [29].)

470 Indeed, Mr Buckley believed that IEA's estimate of a 39% fall in coking coal demand by 2040 may be an underestimate, as stronger global policy efforts to deliver on the Paris Agreement commitment of limiting global warming to between 1.5°C and 2°C above pre-industrial levels reduce demand (Buckley report, [37]-[40]). In particular, Mr Buckley referred to policies being implemented in Australia's key export markets (namely, China, Japan, South Korea and India) to lower carbon emissions. These policies include national emissions trading schemes, coal taxes, industry targets, pollution controls, supply restrictions and policy targets to promote lower emissions alternatives (Buckley report, [90]-[113], [133]-[138]).

471 Mr Buckley also considered that the global demand for coking coal will be adversely affected by new technology developments that reduce the need for coking coal in steel production.

472 Mr Buckley challenged Dr Fisher's and Mr Manley's views that there is currently, and will continue to be over the life of the project, limited substitutes for coking coal to produce steel by the BOF process. Mr Buckley considered that:

The advent of new technology developments could well see the need for coking coal in steel production removed within the life of the proposed project. Actions

needed to deliver on the Paris Agreement (such as a wider adoption of an emissions trading scheme (ETS) and / or a wider application of a coal tax and / or new restrictions on the supply of coal) would accelerate this technology innovation by enhancing its commercial viability.

(Buckley report, [20].)

473 Mr Buckley referred to new technologies and processes that replace the current reliance on coking coal to manufacture steel. First, HYBRIT is the brand for a Swedish development project to make “fossil free steel” from iron ore and hydrogen, removing entirely the need for coking coal and carbon emissions (Buckley report, [141]-[143]). Second, FINEX is a brand developed by South Korea’s POSCO that allows for the use of lower quality thermal coal in substitution for coking coal in steel manufacturing (Buckley report, [141], [148]-[151]). Third, pulverised coal injection (PCI) is used in many of the world’s major steelworks. Finely ground coal is injected with the hot blast directly into the raceway of the furnace to provide energy reductant in addition to that from the coke bed, thus replacing some of the coke with cheaper non-coking or weakly-coking coal. The PCI process increases the economic efficiency of steel making by using lower cost coals to reduce consumption of higher cost prime coking coals (Buckley report, [50] and footnote 18, and see Manley report [3.12]-[3.15]).

474 Fourth, electric arc furnaces promote steel recycling in lieu of coking coal and iron ore. As steel production by EAF processes increases, demand for coking coal and iron ore is forecast to decline (Buckley report, [141], [152]-[154]).

475 Mr Buckley also referred to technological innovations to replace structural steel in buildings with timber composites. A decrease in demand for structural steel would in turn decrease demand for coking coal to produce steel (Buckley report, [141], [155]).

476 Mr Buckley concluded:

In my opinion, technology change and market forces enhanced by energy policy changes are highly likely to combine to create demand substitution, curtailing demand and hence prices for coking coal consistent with or in-excess of the 40% global decline forecast by the IEA, with a consequent material adverse impact on the project.

(Buckley report, [161].)

477 On the supply side, Mr Buckley considered that there will be sufficient production capacity to meet this declining demand for coking coal, without approving new coking coal mines:

Given the implications of the IEA’s scenario forecast for a 40% or more decline in global coking coal demand by 2040, in my opinion there is sufficient existing production capacity, in operation or already approved and under development, to meet current and likely future market demand for coking coal, particularly as there is some scope for substitution between various grades of coal.

(Buckley report, [14] and see [165].)

478 In particular, Mr Buckley considered that there is more than enough existing Australian production capacity to supply the global market needs for coking coal (Buckley report, [16], [18]).

479 Mr Buckley noted that there are a number of new coking coal mines already in operation, or approved and under development, across Australia, such that the

Rocky Hill Coal Project is not required (Buckley report, [168]). The vast majority of Australian coking coal production and reserves are located in Queensland (Buckley report, [169], [174]-[178]). Although the Rocky Hill Coal Project will produce coking coal with high fluidity, which is highly sought after by steelmakers, there are several alternative sources of high fluidity coking coal in Queensland and many coking coal mines in North America (Joint Report of Coal Demand Experts, p 2 and see Manley report, pp 13-14 and Figure 6 on the fluidity values of Australian coking coals). Mr Manley produced a figure (Exhibit W), after giving evidence, that showed coking coal mines with a maximum fluidity of approximately 1000 DDPM or more include Integra (underground), Broadmeadow, Wongawilli, Goonyella and Moranbah North. Mines that produce both coking coal and thermal coal and have a maximum fluidity of approximately 1000 DDPM or more including Astar, Duralie, Stratford, Kestrel, Dawson Complex, Tahmoor, Appin and Byerwen (Gloucester Groundswell closing submissions, [57]-[58]).

480 Mr Manley doubted whether the IEA's Sustainable Development Scenario would be achieved:

The mechanisms to achieve SDS (whether policy proscribed or technological breakthrough) are not defined and without significant technological advancement are unlikely to be achieved within the forecast period.

(Joint Report of Coal Demand Experts, p 3.)

481 Mr Manley did not consider that the technological innovations referred to by Mr Buckley would become commercially viable and utilised widely within the life of the Project so as to materially reduce demand for coking coal.

482 In response to Mr Buckley's suggestion that there is some interchangeability of thermal and coking coals, Mr Manley said that there was limited substitution between thermal coal and metallurgical coal: coals of thermal coal quality do not have the ability to make coke while metallurgical coals can behave poorly in thermal coal applications. Mr Manley did accept, however, that coke blends require coals with different properties. The benchmark Hard Coking Coal is coal that can make a strong coke on its own or it can be blended with other coals (that cannot make a strong coke on their own) to still make a strong coke. While coal from the Rocky Hill Coal Project will not make a strong coke on its own, the high fluidity would provide the "glue" between Hard Coking Coal and Semi Soft Coking Coal. Coal from the Rocky Hill Coal Project would therefore be useful for coke makers to reduce their input costs by being able to make a strong coke with less high priced material and lower coke rates (ie the total carbon required in steelmaking) (Joint Report of Coal Demand Experts, pp 4-5). Mr Manley contended that "on a coal quality basis, the RH Project would therefore find a home in the market for its coal based on the quality parameters" (Joint Report of Coal Demand Experts, p 2).

483 GRL contended, therefore, that given the continued critical role of steel to society, the limited substitutes for using coking coal in primary steel production and the likely demand for coking coal from the Rocky Hill Coal Project, the Rocky Hill Coal Project should be approved, regardless of the associated GHG emissions.

484 Sixthly, GRL submitted that economic, social and environmental rationales for banning development of individual coal mines on the basis of GHG emission are poor. Dr Fisher explained this argument:

On an environmental front, Australian coal mines operate to some of the highest environmental standards in the world (AusTrade 2018). Aside from the strong commercial incentive to limit energy use in the operation of the Project, regulations ensure a strict recognition and accounting of emissions. This is not the case in all countries where coal mining occurs.

Moreover, Australian coking coal is amongst the highest quality in the world, making it relatively less emissions intensive. Higher energy content and lower impurity coal results in higher quality coke, which in turn requires less coke input and higher productivity per unit of steel produced (World Steel Association 2016).

From an economic perspective, given the limited substitutes for coking coal in steel making, there is strong projected demand for coking coal as large countries such as India industrialise and intensify their steel use (NERA 2016). If demand is not met from Australian coal mines, investment will flow to other large coal producers and mines will be developed in countries such as India and Indonesia.

From a social standpoint, local benefits such as direct and indirect employment associated with the construction and ongoing operation of the Project also need to be taken into account and weighed against the uncertain long-term impacts of carbon emissions produced by the mine.

(Fisher report, [65]-[68].)

485 Professor Steffen responded to Dr Fisher saying:

These points are irrelevant. There are many discussions around the social and economic implications of climate change. Strong social and economic arguments could also be made for very rapid emissions reductions. My point is that to have any chance of meeting the Paris 2°C target, carbon emissions around the world need to be DECREASING rapidly and deeply; opening up and using new fossil fuel reserves or resources INCREASES carbon emissions, in conflict with what is required under the Paris Agreement. This is the scientific reality based on a comparison of the current level of fossil fuel exploitation compared to any reasonable estimate of the remaining carbon budget. There is no room for any new fossil fuel development. The challenge is to rapidly and deeply reduce emissions from existing fossil fuel industries and activities.

(Joint Report of Climate Change Experts, [21].)

The GHG emissions of the Project support refusal of the Project

Both direct and indirect GHG emissions should be considered

486 The Rocky Hill Coal Project will result in GHG emissions. The Air Quality and Health Risk Assessment for the amended EIS estimated the Scope 1 and Scope 2 emissions to be about 1.8Mt CO₂-e over the life of the mine and Scope 3 emissions to be at least 36Mt CO₂-e. The estimated Scope 3 emissions are limited to the emissions from the combustion of product coal from the Project by end users, such as steel mills and electricity power stations, as the emissions from shipping of product coal were not included. GHG emissions from the combustion of product coal by end users are downstream emissions.

487 Although GRL submitted that Scope 3 emissions should not be considered in determining GRL's application for consent for the Rocky Hill Coal Project, I find they are relevant to be considered.

488 At the most basic level, the consent authority must consider and determine the particular development application that has been made to carry out the State significant development of the proposed coal mine (s 4.38(1) of the EPA Act). For State significant development such as the Rocky Hill Coal Project, the development application is required to be accompanied by an environmental

impact statement (s 4.12(1) and s 4.39(1)(a) of the EPA Act and cl 50(1)(a) and Sch 1, cl 2(1)(e) of the EPA Regulation). The environmental impact statement must address the environmental assessment requirements of the Secretary as well as the content requirements in Sch 1, cl 7 of the EPA Regulation, including the likely impact on the environment of the development and the reasons justifying the carrying out of the development, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development (ESD). The principles of ESD are defined to be the precautionary principle, inter-generational equity, conservation of biological diversity and ecological integrity, and improved valuation, pricing and incentive mechanisms (cl 7(4) of Sch 1 of the EPA Regulation). As I note below, consideration of the principles of ESD can involve consideration of climate change.

489 The amended EIS for the Rocky Hill Coal Project included the Air Quality and Health Risk Assessment which contained a “Greenhouse Gas Assessment”. The Greenhouse Gas Assessment was prepared in accordance with the World Resources Institute/World Business Council for Sustainable Development, *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard Revised Edition* (2004); *National Greenhouse and Energy Reporting (Measurement) Determination 2008* and the Department of Environment and Energy, National Greenhouse Accounts Factors, August 2015. Each of these documents define and describe how to account for three scopes of GHG emissions, Scope 1, Scope 2 and Scope 3 emissions. The Greenhouse Gas Assessment expressly assessed the Scope 3 emissions of the Project.

490 The determination of the development application for the Rocky Hill Coal Project requires consideration of the Environmental Impact Statement accompanying the development application, and that Environmental Impact Statement included a Greenhouse Gas Assessment of the Scope 1, Scope 2 and Scope 3 emissions of the Project.

491 Section 4.15 of the EPA Act applies to the determination of the development application for the State significant development of the Rocky Hill Coal Project (s 4.40 of the EPA Act). Section 4.15(1)(a) of the EPA Act requires the consent authority, in determining a development application, to take into consideration the provisions of any environmental planning instrument. One applicable instrument is the Mining SEPP. Clause 14(2) of the Mining SEPP provides:

Without limiting subclause (1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programs or guidelines concerning greenhouse gas emissions.

492 “Downstream emissions” of a coal mine include Scope 3 emissions from the transportation and combustion of coal product from the mine.

493 Another applicable environmental planning instrument is GLEP 2010. A particular aim of GLEP 2010 is “to embrace and promote the principles of ecologically sustainable development” and “to recognise the cumulative impacts of climate change” (cl 1.2(2)(d)). The direct and indirect GHG emissions of a development contribute to the cumulative impacts of climate change.

494 A consent authority, in determining a development application, is also required to take into consideration the likely impacts of the development,

including environmental impacts on the natural and built environments (see 4.15(1)(b) of the EPA Act). The likely impacts of a development include both direct and indirect environmental impacts.

495 As the Full Federal Court of Australia held in *Minister for Environment and Heritage v Queensland Conservation Council Inc* (2004) 139 FCR 24; 134 LGERA 272 at [53], the impact of an action includes not only the direct but also the indirect influences or effects of the action:

“Impact” in the relevant sense means the influence or effect of an action: *Oxford English Dictionary*, 2nd ed, vol VII, 694-695. As the respondents submitted, the word “impact” is often used with regard to ideas, concepts and ideologies: “impact” in its ordinary meaning can readily include the “indirect” consequences of an action and may include the results of acts done by persons other than the principal actor. Expressions such as “the impact of science on society” or “the impact of drought on the economy” serve to illustrate the point. Accordingly, we take s 75(2) to require the Minister to consider each way in which a proposed action will, or is likely to, adversely influence or effect the world heritage values of a declared World Heritage property or listed migratory species. As a matter of ordinary usage that influence or effect may be direct or indirect. “Impact” in this sense is not confined to direct physical effects of the action on the matter protected by the relevant provision of Pt 3 of Ch 2 of the EPBC Act [*Environment Protection and Biodiversity Conservation Act 1999*]. It includes effects which are sufficiently close to the action to allow it to be said, without straining the language, that they are, or would be, the consequences of the action on the protected matter.

496 The Court later indicated that “‘all adverse impacts’ includes each consequence which can reasonably be imputed as within the contemplation of the proponent of the action, whether the consequences are within the control of the proponent or not” (at [57]).

497 The Court held that the adverse impacts of the action, the Nathan Dam on the Dawson River, were not confined to the adverse impacts of the construction and operation of the dam, but included the adverse impacts of the use of water downstream from the dam, including its use for growing and ginning cotton (at [60]).

498 The consent authority is also required to consider the public interest (s 4.15(1)(e) of the EPA Act). The public interest has been held to include the principles of ESD: see *Telstra v Hornsby Shire Council* at [124] and *Minister for Planning v Walker* (2008) 161 LGERA 423 at [42], [43]. In turn, the principles of ESD, particularly the precautionary principle and principle of inter-generational equity, have been held to require consideration of the impact of a development on climate change and the impact of climate change on a development: see, for example, *Gray v Minister for Planning* (2006) 152 LGERA 258; *Taralga Landscape Guardians Inc v Minister for Planning* (2007) 161 LGERA 1; *Aldous v Greater Taree City Council* (2009) 167 LGERA 13; and *Hunter Environment Lobby Inc v Minister for Planning* [2011] NSWLEC 221.

499 Many courts have held that indirect, downstream GHG emissions are a relevant consideration to take into account in determining applications for activities involving fossil fuel extraction or combustion or electricity generated by fossil fuel combustion.

500 In *Australian Conservation Foundation v Latrobe City Council* (2004) 140 LGERA 100, the environmental impacts of downstream GHG emissions that

were likely to be produced by the then operating (but now closed) Hazelwood power station was held to be a relevant consideration in determining whether to approve a proposed amendment to a planning scheme to facilitate the mining of coal fields to supply coal for the power station (at [46], [47], [49]).

501 In *Gray v Minister for Planning*, the Scope 3 emissions from the downstream use (burning) of coal mined from the proposed Anvil Hill coal mine in the Hunter Valley was held to be a relevant matter that needed to be taken into consideration in the environmental assessment and approval of the coal mine (at [126], [130]).

502 In *Coast and Country Association of Queensland Inc v Smith* [2016] QCA 242, the Queensland Court of Appeal determined that, in making a decision under s 223 of the *Environmental Protection Act 1994* (Qld) as to whether to recommend the granting of an environmental approval for a coal mine, the Land Court is either required to consider (per McMurdo P at [11]) or is not precluded from considering (per Fraser JA at [45] and Morrison JA at [51]) Scope 3 emissions. Although not an issue for the Court of Appeal, the Land Court had determined (and the Supreme Court had confirmed) that in considering the factor in s 269(4)(k) of the *Mineral Resources Act 1989* (Qld), as to whether “public rights and interests will be prejudiced” by the granting of the mining lease, the Land Court is empowered to consider Scope 3 emissions: *Hancock Coal Pty Ltd v Kelly (No 4)* (2014) 35 QLCR 56 at [218] (Land Court) and *Coast and Country Association of Queensland Inc v Smith* [2015] QSC 260 at [39] (Queensland Supreme Court).

503 In *Wollar Progress Association Inc v Wilpinjong Coal Pty Ltd* [2018] NSWLEC 92, Sheahan J accepted that the consent authority (the Planning Assessment Commission as delegate of the Minister), in determining the development application for the proposed open cut coal mine, was required by cl 14(2) of the Mining SEPP to consider the GHG emissions of the proposed mine, including the downstream emissions, but found that the consent authority had done so. Sheahan J noted that: “The term ‘downstream emissions’ is not defined, but is commonly understood to denote the greenhouse gas emissions relating to sold goods and services and thus caused by end users’ use of the product (eg coal) produced by a project” (at [126]). Sheahan J found that the consent authority had, as a matter of fact, given “close consideration” to an assessment of the greenhouse gas emissions (including the downstream emissions) of the proposed mine (at [180]-[183] and referring to and adopting as findings the submissions in [141]-[159]).

504 In the United States, courts have held an environmental impact assessment of a project or a decision to be inadequate due to its failure to consider the downstream or upstream greenhouse gas emissions relating to the proposed project or decision.

505 In *Border Power Plant Working Group v Department of Energy v Department of Energy* 260 F Supp 2d 997 (2003), the environmental impact assessment for proposed electricity transmission lines was held to be inadequate for failure to discuss the upstream greenhouse gas emissions from new power plants in Mexico that would be connected by the proposed electricity transmission lines with the power grid in Southern California at [18], [42].

506 In *Mid States Coalition for Progress v Surface Transp Bd* 345 F (3d) 520 (2003), the environmental impact assessment for a proposed rail line, which would provide a less expensive and hence a likely more utilised route by which

low sulphur coal could reach power plants, was held to be inadequate for failure to consider the possible downstream effects of the likely increase in coal consumption, including climate change. The Court of Appeals held that “it would be irresponsible for the Board to approve a project of this scope without first examining the effects that may occur as a result of the reasonably foreseeable increase in coal consumption” (at 550).

507 In *Montana Environmental Information Center v US Office of Surface Mining* 274 F Supp 3d 1074 (2017), the US District Court found that the US Office of Surface Mining and Enforcement’s (OSM) environmental assessment of a proposed expansion of an underground coal mining operation was not sufficient in law. The Court found that OSM failed to take a hard look at the indirect and cumulative effects of the transportation and combustion of coal from the mine and the associated downstream greenhouse gas emissions. While OSM had calculated greenhouse gas emissions associated with coal transportation, it had not considered other indirect effects from coal trains, including the health, economic and environmental impacts of diesel emissions, noise, vibration, rail congestion and coal dust (at 1091, 1093). The Court found that OSM, despite quantifying greenhouse gas emissions from coal combustion, failed to adequately assess the indirect and cumulative impacts of greenhouse gas emissions from the mine expansion. The Court found that it was arbitrary and capricious to quantify the socioeconomic benefits while failing to quantify costs of the greenhouse gas emissions from the mine (at 1098). The OSM’s conclusion that there would be no effects from the emissions, because other coal would be burned in its stead, was illogical and inflated the benefits of the action while minimising its impacts (at 1098 and see 1104). The OSM’s environmental assessment failed to adequately address the indirect and cumulative impacts of greenhouse gas emissions for expansion of the mine (at 1099).

508 In *Sierra Club v Federal Regulatory Commission* 867 F (3d) 1357 (2017), environmental groups and landowners challenged the decision of the Federal Energy Regulatory Commission (FERC) to approve the construction and operation of three new interstate natural gas pipelines. In the split opinion, the US Court of Appeals held that the environmental impact statement for the pipelines project should have estimated the amount of downstream greenhouse gas emissions that would result from the burning of the gas transported by the pipelines in Florida power plants (at 1371):

We conclude that the EIS for the South-east Market Pipelines Project should have either given a quantitative estimate of the downstream greenhouse emissions that will result from burning the natural gas that the pipelines will transport or explained more specifically why it could not have done so. As we have noted, greenhouse-gas emissions are an indirect effect of authorizing this project, which FERC could reasonably foresee, and which the agency has legal authority to mitigate. *See* 15 USC § 717f(e). The EIS accordingly needed to include a discussion of the “significance” of this indirect effect, *see* 40 CFR § 1502.16(b), as well as “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” *see WildEarth Guardians*, 738 F.3d at 309 (quoting 40 CFR § 1508.7).

(At 1374.)

509 The Court of Appeals held that the fact that downstream emissions might be partially offset by reductions elsewhere (eg retirement of dirtier, coal-fired power plants) did not excuse FERC from making the emissions estimates (at 1375).

- 510 In *San Juan Citizens Alliance v United States Bureau of Land Management* 326 F Supp 3d 1227 (2018), citizens groups challenged the decision of the US Bureau of Land Management (BLM) and US Forest Service to lease parcels of federal mineral estate land in the Santa Fe National Forest in New Mexico for oil and gas mining on grounds that the decision violated the National Environmental Policy Act (NEPA). In relation to greenhouse gas emissions, the US District Court held that NEPA required BLM to take a hard look at the impacts of greenhouse gas emissions, including quantifying and analysing the impacts of foreseeable downstream greenhouse gas emissions from combustion of produced oil and gas likely to be developed from the leases. The Court concluded that “BLM’s failure to estimate the amount of greenhouse gas emissions which will result from consumption of the oil and gas produced as a result of development of wells on the leased areas was arbitrary” (at 1244).
- 511 In relation to BLM’s conclusion that “the very small increase in [GHG] emissions that could result from approval of the action alternatives would not produce climate change impacts that differ from the No Action Alternative”, the Court found that “without further explanation, the facile conclusion that this particular impact is minor and therefore ‘would not produce climate change impacts that differ from the No Action Alternative’ is insufficient” to comply with the obligation to take a hard look at the cumulative effects of the proposed action (at 1248).
- 512 The Court set aside BLM’s finding of no significant impact and ordered the matter be remanded to BLM “to take a hard look at the impacts of greenhouse gas emissions, including foreseeable downstream greenhouse gas emission from the combustion of the produced oil and gas likely to be developed from the leases” (at 1250, 1256).
- 513 I find, therefore, that the consideration of the impacts of the Project on the environment and the public interest justify considering not only the Scope 1 and Scope 2 emissions but also the Scope 3 emissions of the Project.
- All GHG emissions contribute to climate change
- 514 All of the direct and indirect GHG emissions of the Rocky Hill Coal Project will impact on the environment. All anthropogenic GHG emissions contribute to climate change. As the IPCC found, most of the observed increase in global average temperatures is due to the observed increase in anthropogenic GHG concentrations in the atmosphere. The increased GHG concentrations in the atmosphere have already affected, and will continue to affect, the climate system. The current and future impacts of climate change were summarised by Professor Steffen and have been set out earlier in the judgment.
- 515 The direct and indirect GHG emissions of the Rocky Hill Coal Project will contribute cumulatively to the global total GHG emissions. In aggregate, the Scope 1, 2 and 3 emissions over the life of the Project will be at least 37.8Mt CO₂-e, a sizeable individual source of GHG emissions. It matters not that this aggregate of the Project’s GHG emissions may represent a small fraction of the global total of GHG emissions. The global problem of climate change needs to be addressed by multiple local actions to mitigate emissions by sources and remove GHGs by sinks. As Professor Steffen pointed out, “global greenhouse gas emissions are made up of millions, and probably hundreds of millions, of individual emissions around the globe. All emissions are important because cumulatively they constitute the global total of greenhouse gas emissions, which

are destabilising the global climate system at a rapid rate. Just as many emitters are contributing to the problem, so many emission reduction activities are required to solve the problem” (Steffen report, [57]).

516 Many courts have recognised this point that climate change is caused by cumulative emissions from a myriad of individual sources, each proportionally small relative to the global total of GHG emissions, and will be solved by abatement of the GHG emissions from these myriad of individual sources.

517 In *Australian Conservation Foundation v Latrobe City Council*, the Victorian Civil and Administrative Tribunal found that there was a sufficient nexus between the planning scheme amendment to facilitate coal mining and the environmental effect of greenhouse gases that were likely to be produced by the use of the coal burnt by the Hazelwood power station (at [46]).

518 In *Gray v Minister for Planning*, Pain J held:

Climate change/global warming is widely recognised as a significant environmental impact to which there are many contributors worldwide but the extent of the change is not yet certain and is a matter of dispute. The fact there are many contributors globally does not mean the contribution from a single large source such as the Anvil Hill Project in the context of NSW should be ignored in the environmental assessment process. The coal intended to be mined is clearly a potential major single contributor to GHG emissions deriving from NSW given the large size of the proposed mine. That the impact from burning the coal will be experienced globally as well as in NSW, but in a way that is currently not able to be accurately measured, does not suggest that the link to causation of an environmental impact is insufficient.

(At [98].)

519 Overseas, in *Massachusetts v Environmental Protection Agency* 127 S Ct 1438 (2007), the US Supreme Court rejected the government agency’s argument that “its decision not to regulate greenhouse gas emissions from new motor vehicles contributes so insignificantly to petitioners’ injuries that the agency cannot be haled into federal court to answer for them” (at [523]). For the same reason, the agency argued that there was not any realistic possibility that the relief that the petitioners seek would mitigate global climate change and remedy their injuries (at [523]). The Supreme Court held that the agency overstated its case:

Its argument rests on the erroneous assumption that a small incremental step, because it is incremental, can never be attacked in a federal judicial forum. Yet accepting that premise would doom most challenges to regulatory action. Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop ... They instead whittle away at them over time, refining their preferred approach as circumstances change and as they develop a more nuanced understanding of how best to proceed.

(At [524].)

520 The Supreme Court, in any event, considered that “reducing domestic automobile emissions is hardly a tentative step. Even leaving aside the other greenhouse gases, the United States transportation sector emits an enormous quantity of carbon dioxide into the atmosphere ... Judged by any standard, US motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations and hence, according to practitioners, to global warming” (at [524]-[525]).

521 In *Urgenda Foundation v The State of the Netherlands* (unreported, Hague Dist Ct, C/09/456689/HA ZA 13-1396, 24 June 2015), the Hague District Court rejected the Dutch government’s argument that the Dutch contribution to worldwide emissions is only small:

This argument does not succeed. It is an established fact that climate change is a global problem and therefore requires global accountability. It follows from the UNEP report that based on the reduction commitments made in Cancun, a gap between the desired CO₂ emissions (in order to reach the climate objective) and the actual emissions (14-17 Gt CO₂) will have arisen by 2030. This means that more reduction measures have to be taken on an international level. It compels all countries, including the Netherlands, to implement the reduction measures to the fullest extent as possible. The fact that the amount of the Dutch emissions is small compared to other countries does not affect the obligation to take precautionary measures in view of the State’s obligation to exercise care. After all, it has been established that any anthropogenic greenhouse gas emission, no matter how minor, contributes to an increase of CO₂ levels in the atmosphere and therefore to hazardous climate change. Emission reduction therefore concerns both a joint and individual responsibility of the signatories to the UN Climate Change Convention ... Therefore, the court arrives at the opinion that the single circumstance that the Dutch emissions only constitute a minor contribution to global emissions does not alter the State’s obligation to exercise care towards third parties ...

(At [4.79].)

Due to the severity of the consequences of climate change and the great risk of hazardous climate change occurring – without mitigation measures – the court concludes that the State has a duty of care to take mitigation measures. The circumstance that the Dutch contribution to the present global greenhouse gas emissions is currently small does not affect this.

(At [4.83].)

522 The District Court further explained the causal link:

From the above considerations, particularly in 4.79, it follows that a sufficient causal link can be assumed to exist between the Dutch greenhouse gas emissions, global climate change and the effects (now and in the future) on the Dutch living climate. The fact that the current Dutch greenhouse gas emissions are limited on a global scale does not alter the fact that these emissions contribute to climate change. The court has taken into consideration in this respect as well that the Dutch greenhouse gas emissions have contributed to climate change and by their nature will also continue to contribute to climate change.

(At [4.90].)

523 The Hague Court of Appeal in *The State of the Netherlands v Urgenda Foundation* (unreported, 200.178.245/01), dismissed on appeal the State’s defence that “the Dutch greenhouse gas emissions, in absolute terms and compared with global emissions, are minimal, that the State cannot solve the problem on its own, that the worldwide community has to cooperate ... and this concerns complex decisions for which much depends on negotiations” (at [61]), saying:

These arguments are not such that they warrant the absence of more ambitious, real actions. The Court, too, acknowledges that this is a global problem and that the State cannot solve this problem on its own. However, this does not release the State from its obligation to take measures in its territory, within its capabilities,

which in concert with the efforts of other states provide protection from the hazards of dangerous climate change.

(At [62].)

524 The Hague Court of Appeal also dismissed the State's defence that there was a lack of a causal link:

The State's defence of the lack of a causal link also fails. First of all, these proceedings concern a claim for imposing an order and not a claim for damages, so that causality only plays a limited role. In order to give an order it suffices (in brief) that there is a real risk of the danger for which measures have to be taken. It has been established that this is the case. Moreover, if the opinion of the State were to be followed, an effective legal remedy for a global problem as complex as this one would be lacking. After all, each state held accountable would then be able to argue that it does not have to take measures if other states do not do so either. That is a consequence that cannot be accepted, also because Urgenda does not have the option to summon all eligible states to appear in a Dutch Court.

(At [64].)

The Project's emissions will contribute to climate change

525 There is a causal link between the Project's cumulative GHG emissions and climate change and its consequences. The Project's cumulative GHG emissions will contribute to the global total of GHG concentrations in the atmosphere. The global total of GHG concentrations will affect the climate system and cause climate change impacts. The Project's cumulative GHG emissions are therefore likely to contribute to the future changes to the climate system and the impacts of climate change. In this way, the Project is likely to have indirect impacts on the environment, including the climate system, the oceanic and terrestrial environment, and people.

526 The approval of the Project (which will be a new source of GHG emissions) is also likely to run counter to the actions that are required to achieve peaking of global GHG emissions as soon as possible and to undertake rapid reductions thereafter in order to achieve net zero emissions (a balance between anthropogenic emissions by sources and removals by sinks) in the second half of this century. This is the globally agreed goal of the Paris Agreement (in Article 4(1)). The NSW government has endorsed the Paris Agreement and set itself the goal of achieving net zero emissions by 2050. It is true that the Paris Agreement, Australia's NDC of reducing GHG emissions in Australia by 26 to 28% below 2005 levels by 2030 or NSW's Climate Change Policy Framework do not prescribe the mechanisms by which these reductions in GHG emissions to achieve zero net emissions by 2050 are to occur. In particular, there is no proscription on approval of new sources of GHG emissions, such as new coal mines.

527 Nevertheless, the exploitation and burning of a new fossil fuel reserve, which will increase GHG emissions, cannot assist in achieving the rapid and deep reductions in GHG emissions that are necessary in order to achieve "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century" (Article 4(1) of the Paris Agreement) or the long-term temperature goal of limiting the increase in global average temperature to between 1.5°C and 2°C above pre-industrial levels (Article 2 of the Paris Agreement). As Professor Steffen explained, achieving these goals implies phasing out fossil fuel use within that time frame. He contended that one of the implications of the carbon budget approach is that

most fossil fuel reserves will need to be left in the ground, unburned, to remain within the carbon budget and achieve the long-term temperature goal. The phase out of fossil fuel use by the second half of this century might permit a minority of fossil fuel reserves to be burned in the short term. From a scientific perspective, it matters not which fossil fuel reserves are burned or not burned, only that, in total, most of the fossil fuel reserves are not burned. Professor Steffen explained, however, that the existing and already approved but not yet operational mines/wells will more than account for the fossil fuel reserves that can be exploited and burned and still remain within the carbon budget. This is the reason he considered that no new fossil fuel developments should be allowed.

528 GRL contended that nevertheless the Rocky Hill Coal Project should be one of the fossil fuel reserves that should be allowed to be exploited and burned for four reasons.

No specific proposal to offset the Project's emissions

529 The first reason GRL gave was that the increase in GHG emissions associated with the Project would not necessarily cause the carbon budget to be exceeded, because, as Dr Fisher had argued, reductions in GHG emissions by other sources (such as in the electricity generation and transport sectors) or increases in removals of GHGs by sinks (in the oceans or terrestrial vegetation or soils) could balance the increase in GHG emissions associated with the Project.

530 I do not accept this reason. It is speculative and hypothetical. There is no evidence before the Court of any specific and certain action to "net out" the GHG emissions of the Project. A consent authority cannot rationally approve a development that is likely to have some identified environmental impact on the theoretical possibility that the environmental impact will be mitigated or offset by some unspecified and uncertain action at some unspecified and uncertain time in the future. This is not a case where the applicant for development consent commits to taking specific and certain action to mitigate and offset the environmental impact of the proposed development. In the climate change context, for example, an applicant for development consent could commit to reducing the GHG emissions of the development by deploying emission reduction technologies, such as carbon capture and storage, or offsetting the GHG emissions of the development by increasing the removal of GHGs in the atmosphere by establishing sinks, such as by reforestation or afforestation of land. The Rocky Hill Coal Project, however, is not proposed to be carbon neutral. GRL has not proposed to balance the emissions by sources with removals by sinks.

Possibility of abatement unrelated to the Project not relevant

531 The second reason given by GRL was based on Dr Fisher's argument that "the size of the global abatement task calls for making emissions reductions where they count most and generate the least economic and social harm" (Fisher report [13]). Dr Fisher considered that refusing approval to individual coal mines, such as the Rocky Hill Coal Project, would not achieve this abatement at least cost.

532 I do not accept this second reason. A consent authority, in determining an application for consent for a coal mine, is not formulating policy as to how best to make emissions reductions to achieve the global abatement task. The consent authority's task is to determine the particular development application and

determine whether to grant or refuse consent to the particular development the subject of that development application. Where the development will result in GHG emissions, the consent authority must determine the acceptability of those emissions and the likely impacts on the climate system, the environment and people. The consent authority cannot avoid this task by speculating on how to achieve “meaningful emissions reductions from large sources where it is cost-effective and alternative technologies can be brought to bear” (Fisher report, [13]). Such emissions reductions from other sources are unrelated to the development that is the subject of the development application that the consent authority is required to determine.

533 If the consent authority considers that the GHG emissions of the development for which consent is sought, and the impacts of those emissions, are unacceptable, and as a consequence determines that the development should be refused in order to avoid the emissions and their impacts, it would not be rational to nevertheless approve the development because greater emissions reductions could be achieved from other sources at lower cost by other persons or bodies. As Mahoney JA observed in *BP Australia Ltd v Campbelltown City Council* (1994) 83 LGERA 274 at 279, the function of a consent authority:

... is, in the exercise of discretionary powers, to take into consideration the relevant considerations, to weigh them one against the other, and to determine what in the light of those considerations, should be done. Ordinarily, it would not be right for such a body to conclude that the effect of the relevant considerations is that one thing should be done and yet, without more, to do another. The grant of a discretion is the grant of the authority to do what the authority sees as the discretionary considerations to warrant being done.

Assumptions of market substitution and carbon leakage unproven

534 The third reason GRL advanced for approving the Project was that the GHG emissions of the Project will occur regardless of whether the Project was approved or not, because of market substitution and carbon leakage. On market substitution, Dr Fisher suggested that having regard to the limited substitutes for coking coal in steel making and the strong projected demand for coking coal as large countries such as India industrialise and intensify their steel use, “if demand is not met from Australian coal mines, investment will flow to other large coal producers and mines will be developed in countries such as India and Indonesia” (Fisher report, [67]). There will therefore be at least the same amount of GHG emissions, merely coming from those other mines rather than from the Project.

535 On carbon leakage, Dr Fisher argued that GHG emissions could actually increase if coal mining were to be moved from Australia to other countries. Dr Fisher said that Australian coal mines operate to some of the highest environmental standards in the world and regulations ensure a strict recognition and accounting of GHG emissions, but this is not the case in all countries where coal mining occurs (Fisher report, [65]). This situation is sometimes referred to as “carbon leakage” where, as a result of more stringent climate policies or more stringent application of climate policies in a country, businesses move their production from that country to other countries with less ambitious climate policies or less ambitious application of climate policies, which can lead to a rise in global GHG emissions.

- 536 I reject this third reason. On carbon leakage, GRL has failed to substantiate, in the evidence before the Court, that this risk of carbon leakage will actually occur if approval for the Rocky Hill Coal Project were not to be granted. Although there was some disagreement between the experts on coal demand, Mr Buckley and Mr Manley, they did agree that there were other coking coal mines, both existing and approved, in Australia that could meet current and likely future demand for coking coal, including coking coal with the properties of the coal from the Project. This would mean that the demand for coking coal would be met by Australian coking coal of the highest quality in the world from Australian coal mines operating to the highest environmental standards in the world. There is, therefore, unlikely to be a moving of coal mining abroad or carbon leakage.
- 537 A similar carbon leakage argument was rejected by the Hague Court of Appeal in *The State of Netherlands v Urgenda Foundation*. The Court of Appeal held that the State had failed to substantiate that the risk of carbon leakage – the risk that companies will move their production to other companies with less strict greenhouse gas reduction obligations – will actually occur if the Netherlands were to increase its efforts to reduce greenhouse gas emissions before 2020 (at [57]).
- 538 The market substitution argument is also flawed. There is no certainty that there will be market substitution by new coking coal mines in India or Indonesia or any other country supplying the coal that would have been produced by the Project. As both Professor Steffen and Mr Buckley explained, countries around the world are increasingly taking action to reduce greenhouse gas emissions in their countries, not only to meet their nationally determined contributions but also to reduce air pollution. Mr Buckley listed the energy, climate and environmental policies being implemented in the key countries heavily reliant on coal, including China, India, Japan and South Korea. India, one of the countries in which Dr Fisher suggested market substitution and carbon leakage might occur, has imposed a coal tax on all coal, both thermal and coking coal, and both domestic and imported coal (Buckley report, [106]); introduced controls to deal with chronic and rising air pollution, including new emissions control regulations on its power sector and plans to greatly expand renewable energy capacity (Buckley report, [110]); and launched a Green Power Corridor investment program to build grid transmission capacity for renewable energy projects (Buckley report, [123]).
- 539 If approval for the Project in the developed country of Australia were to be refused, on grounds including the adverse effects of the mine's GHG emissions on climate change, there is no inevitability that developing countries such as India or Indonesia will instead approve a new coking coal mine instead of the Project, rather than following Australia's lead to refuse a new coal mine. Developed countries such as Australia have a responsibility, including under the Climate Change Convention, the Kyoto Protocol and the Paris Agreement, to take the lead in taking mitigation measures to reduce GHG emissions (see for example, Article 4(4) of the Paris Agreement and also *Urgenda Foundation v The State of Netherlands* at [4.79]). Developing countries which are parties to the Climate Change Convention and Paris Agreement also have committed to taking ambitious efforts to achieve a balance between anthropogenic emissions by sources and removal by sinks of GHGs in the second half of this century (Article 4.1) of the Paris Agreement and the long-term temperature goal of

limiting the increase in global average temperature to well below 2°C above pre-industrial levels (Article 2 of the Paris Agreement). The parties are required to prepare, communicate and maintain successive nationally determined contributions that they intend to achieve and to pursue domestic mitigation measures with the aim of achieving the objectives of such contributions (Article 4.2 of the Paris Agreement). Each party's successive nationally determined contribution is to reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances (Article 4.3).

540 Developing countries might consider that domestic mitigation measures to achieve their nationally determined contributions for reducing GHG emissions should include not approving new development for the exploitation or burning of fossil fuel reserves. Developing countries may be encouraged to take such mitigation measures by developed countries taking the lead in doing so in their countries. Hence, there is no certainty that refusal of consent to the Project will cause a new coal mine in another country to substitute coking coal for the volume lost in the open market by refusal of the Project.

541 Thirdly, the ability of a new coking coal mine in another country to substitute for any volume of coal lost by refusal of the Project will depend on the market, including the demand and supply of substitute sources of coal and any difference in price between coal from the Project and from other substitute sources, which price difference might affect substitutability. Without any evidence about the existence and effect of these market forces on substitutability, no assumption can be made that there would be market substitution by coal from new coal mines in other countries if the Project were to be refused.

542 The market substitution assumption was rejected in *WildEarth Guardians v United States Bureau of Land Management* 870 F (3d) 1222 (2017). The US Bureau of Land Management (BLM) had approved coal leases that would expand coal mines partially within national grassland. The BLM concluded that approving the coal leases would not result in higher national GHG emissions than the "no action alternative" of declining to issue the leases because the same amount of coal would be sourced from elsewhere even if the leases were not issued. This was termed the "perfect substitution assumption".

543 The US Court of Appeals held that the BLM acted arbitrarily and capriciously in concluding that there was no real world difference between issuing the coal leases and declining to issue them because the third party sources of coal would be perfectly substituted for any volume of coal lost on the open market should the BLM decline to issue the leases (at 1233). The Court of Appeals held that BLM's perfect substitution assumption lacked any support in the administrative record. The BLM did not point to any information indicating that the specified national coal deficit under the "no action alternative" could be easily filled from elsewhere, or at a comparable price. The BLM did not refer to the nation's stores of coal or the rate at which those stores may be extracted. The BLM did not analyse the specific difference in price between coal from the leased areas and other sources, even though such a price difference would affect substitutability (at 1234). The Court of Appeals held:

That this perfect substitution assumption lacks support in the record is enough for us to conclude that the analysis which rests on this assumption is arbitrary and capricious

(At 1235.)

544 The Court of Appeals also concluded that “the assumption itself is irrational (ie contrary to basic supply and demand principles” (at 1236), holding that “it was an abuse of discretion to rely on an economic assumption, which contradicted basic economic principles, as the basis for distinguishing between the no action alternative and the preferred alternative” (at 1237-1238).

545 There is also a logical flaw in the market substitution assumption. If a development will cause an environmental impact that is found to be unacceptable, the environmental impact does not become acceptable because a hypothetical and uncertain alternative development might also cause the same unacceptable environmental impact. The environmental impact remains unacceptable regardless of where it is caused. The potential for a hypothetical but uncertain alternative development to cause the same unacceptable environmental impact is not a reason to approve a definite development that will certainly cause the unacceptable environmental impacts. In this case, the potential that if the Project were not to be approved and therefore not cause the unacceptable GHG emissions and climate change impacts, some other coal mine would do so, is not a reason for approving the Project and its unacceptable GHG emissions and climate change impacts: see Kane Bennett, “Australian climate change litigation: Assessing the impact of carbon emissions” (2016) 33 EPLJ 538 at 546-548; Justine Bell-James and Sean Ryan, “Climate change litigation in Queensland: A case study in incrementalism” (2016) 33 EPLJ 515 at 535.

Producing coking coal not a justification for GHG emissions

546 The fourth reason GRL advanced for approving the Project is that the GHG emissions associated with the Project are justifiable. GRL contended that the Project will produce high quality coking coal, not thermal coal, which is needed for the main way of producing steel, by the BOF process; steel is critical to our society; and there are limited substitutes for coking coal in steel production.

547 I find that GRL overstates this argument. It may be true that currently most of the world’s steel (around 74%) is produced using the BOF process, which depends on coking coal, and although technological innovations might reduce the proportion of steel produced using the BOF process, for the reasons given by Mr Buckley, there is still likely to be demand for coking coal for steel production during the life of the Project.

548 The current and likely future demand for coking coal for use in steel production can be met, however, by other coking coal mines, both existing and approved, in Australia. Whilst it is not necessary in order for coking coal to be able to be used in steel production for it to have the particular properties of the coking coal that would be produced by the Rocky Hill Coal Project, such as having high fluidity, there are a number of Australian mines that produce high fluidity coking coal. Coking coal mines with a high fluidity of approximately 1000 DDPM or more include Integra (Underground), Broadmeadow, Wongawilli, Goonyella and Moranbah North. Mines that produce both coking coal and thermal coal and have a maximum fluidity of approximately 1000 DDPM or more including Austar, Duralie, Stratford, Kestrel, Dawson Complex,

Tahmoor, Appin and Byerwen. Hence, demand for coking coal for use in steel production will be able to be met by supply from other Australian mines if the Project is not approved.

549 On this basis, it is not necessary to approve the Project in order to maintain steel production worldwide. The GHG emissions of the Project cannot therefore be justified on the basis that the Project is needed in order to supply the demand for coking coal for steel production.

The Project's poor environmental and social performance justifies refusal

550 I return to the point made by Professor Steffen that, in order to remain within the carbon budget and achieve the long-term temperature goal of holding the increase in global average temperatures to between 1.5°C and 2°C above pre-industrial levels, most fossil fuel reserves will need to remain in the ground unburned.

551 This admits that some fossil fuel reserves can be exploited and burned in the short-term. The question is which fossil fuel reserves should be allowed to be exploited and burned. Professor Steffen accepted that already approved and operational fossil fuel mines/wells could continue, although he considered that they also will need to be rapidly phased-out. He considered that these existing and approved fossil fuel developments already account for the GHG emissions that could be allowed and still keep within the carbon budget.

552 While this argument is logical, it does assume that all existing and approved fossil fuel developments will continue and there will be no reduction in GHG emissions from these sources. It gives priority to existing and approved fossil fuel developments, along the lines of "first in, best dressed". It also frames the decision as a policy decision that no fossil fuel development should ever be approved.

553 I consider the better approach is to evaluate the merits of the particular fossil fuel development that is the subject of the development application to be determined. Should this fossil fuel development be approved or refused? Answering this question involves consideration of the GHG emissions of the development and their likely contribution to climate change and its consequences, as well as the other impacts of the development. The consideration can be in absolute terms or relative terms.

554 In absolute terms, a particular fossil fuel development may itself be a sufficiently large source of GHG emissions that refusal of the development could be seen to make a meaningful contribution to remaining within the carbon budget and achieving the long-term temperature goal. In short, refusing larger fossil fuel developments prevents greater increases in GHG emissions than refusing smaller fossil fuel developments.

555 In relative terms, similar size fossil fuel developments, with similar GHG emissions, may have different environmental, social and economic impacts. Other things being equal, it would be rational to refuse fossil fuel developments with greater environmental, social and economic impacts than fossil fuel developments with lesser environmental, social and economic impacts. To do so not only achieves the goal of not increasing GHG emissions by source, but also achieves the collateral benefit of preventing those greater environmental, social and economic impacts.

556 In the case of the Rocky Hill Coal Project, the aggregate GHG emissions over the life of the Project are sizeable, although the Project is not one of the

largest coal mines in Australia. The Minister noted that the proposed production of the Rocky Hill mine appears to be about a third of the production of the average coal mine in NSW (Minister's closing submissions, [423]). Refusal of consent to the Project would prevent a meaningful amount of GHG emissions, although not the greater GHG emissions that would come from refusal of a larger coal mine. However, the better reason for refusal is the Project's poor environmental and social performance in relative terms. As I have found elsewhere in the judgment, the Project will have significant and unacceptable planning, visual and social impacts, which cannot be satisfactorily mitigated. The Project should be refused for these reasons alone. The GHG emissions of the Project and their likely contribution to adverse impacts on the climate system, environment and people adds a further reason for refusal. Refusal of the Project will not only prevent the unacceptable planning, visual and social impacts, it will also prevent a new source of GHG emissions. I do not consider the justifications advanced by GRL for approving the Project, notwithstanding its GHG emissions, are made out for the reasons I have given earlier.

The economic and public benefits of the mine and other land uses

557 The public benefits of the proposed Rocky Hill Coal Project need to be considered in two ways: first, whether the benefits of the Project outweigh its costs to the members of a specified community and, secondly, whether the public benefits of the Project outweigh the public benefits of other land uses.

558 The first way assists the consent authority to take into consideration the relevant matters of "the likely impacts of that development including environmental impacts on both the natural and built environments and social and economic impacts in the locality" and "the public interest" (s 4.15(1)(b) and (e) of the EPA Act). The relevant community for assessing the likely impacts is the community of the locality and for assessing the public interest is the collective public interest of households in New South Wales (see Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (December 2015), p 1 (Economic Assessment Guidelines)).

559 Two tools are used to provide information for these two relevant matters. A cost benefit analysis (CBA) is used to assess the public interest by estimating the net present value of the Project to the NSW community. A local effects analysis (LEA) is used to assess the likely impacts of the Project in the locality (Economic Assessment Guidelines, p 1).

560 The second way assists the consent authority to evaluate and compare the respective public benefits of the Project and the existing, approved and likely preferred uses of land in the vicinity of the Project, as required by cl 12(b) of the Mining SEPP.

The net economic benefits of the Project

561 I will start with the first way. GRL, as part of the amended EIS, submitted an Economic Assessment by Deloitte Access Economics, June 2016 (DAE 2016 Report), which included a cost benefit analysis and a local effects analysis in accordance with the Economic Assessment Guidelines. GRL tendered a revised CBA and LEA by Mr Stephen Brown of Cadence Economics (Brown report), which significantly increased the net benefits of the Project, both to the NSW community and to the locality.

562 The Department considered that the net benefits predicted by the DAE 2016 Report "are overwhelmed by the uncertainty created by substantial volatility in

coal prices over the last 5 years” (Environmental Assessment Report, p 69). The Minister submitted that the predicted benefits in not only the DAE 2016 report, but even more so in the Brown report, were uncertain and in any event overstated. The net benefits of the Project would likely be significantly less than either report estimated. The Minister’s assessment was based on the report of Mr Rajaratnam of The Centre for International Economics (Rajaratnam report).

563 I agree with the Minister’s assessment that the predicted benefits of the Project are uncertain and in any event substantially overstated. I will commence with the cost benefit analysis.

564 Cost benefit analysis estimates and compares, on a common basis, the total benefits and costs of a project to members of the specified community of NSW. All costs and benefits are quantified and monetised, if feasible and material, using the common unit of the Australian dollar in current day prices. The values are aggregated into a single metric, the expected net present value (NPV) of net benefits of the project (Economic Assessment Guidelines, p 2).

565 Some impacts are difficult to quantify objectively. Valuation of some impacts might be at least partly subjective or not possible. Such unquantified impacts are not included in the NPV, but they need to be reported alongside the NPV if they are material. As a consequence, a positive NPV does not necessarily mean that the project is in the public interest. The consent authority may assess unquantified impacts or information about the project to be determinative (Economic Assessment Guidelines, pp 2, 3).

566 The CBA compares the costs and benefits of a project to the base case where the project does not proceed. The purpose is to focus on the incremental change in economic, environmental and social impacts caused by the project relative to the existing land use (Economic Assessment Guidelines, p 7).

567 CBA includes all first round (primary) impacts of a project, both direct and indirect, but not second round or flow on effects. The direct impacts reflect the revenues of the project less the opportunity cost of resources (such as land, labour and capital) used for the project (Economic Assessment Guidelines, p 4). The direct benefits include net producer surplus attributable to the NSW community, royalties paid to the NSW government, local government rates and local contributions paid to the relevant NSW local council, and the proportion of company income tax paid to the Australian government that is attributable to NSW (Economic Assessment Guidelines, pp 9-12).

568 Indirect impacts are impacts on third parties. They include all the environmental, social and health costs and benefits and associated public expenditure (Economic Assessment Guidelines, p 4). Indirect benefits include any economic benefit to existing landholders, workers and suppliers (Economic Assessment Guidelines, p 12). Indirect costs include net environmental, social and transport costs, net public infrastructure costs and indirect costs to other industries (Economic Assessment Guidelines, p 15).

569 The Minister challenged the estimates of the total benefits of the Project attributable to NSW, both the direct benefits and the indirect benefits. Mr Rajaratnam contended that GRL’s estimated direct benefits of the royalties and company income tax likely to be paid were significantly overstated and were likely to be much less. Mr Rajaratnam contended that Mr Brown has grossly overestimated the worker benefits and supplier benefits, unlike the DAE 2016 which considered that the Project would not generate any net economic benefit to workers or suppliers. The Minister also contended that the indirect

costs of the Project would be greater than GRL contended, including because many environmental and social costs have not been quantified or included in the NPV.

Direct economic benefit: royalties

570 The economic benefit of royalties is dependent on the quantity of coal extracted and the price of coal. For open cut coal, the royalty is an Ad Valorem royalty of 8.2% of the total value of the mineral recovered (the ex-mine value) (Economic Assessment Guidelines, p 10). Both the DAE 2016 report and the Brown report estimated the NPV of royalties to be \$63.4 million dollars. Mr Rajaratnam contended that this figure was an overestimation because:

- (a) the assumed coal price used in the estimate exceeded the likely coal price forecasts;
- (b) the assumed coal price was too high as it failed to capture the specific quality of coal from the Project and instead assumed the coal would sell at 90% of the forecast price for high quality metallurgical coal;
- (c) the assumed volume of coal extracted was too high as it failed to account for temporary or permanent cessation of production if future coal prices fell below cost thresholds for the Project;
- (d) the assumed proportional yield of higher priced metallurgical (or coking) coal (97%) to lower priced thermal coal (3%) from the Project was too high; and
- (e) the product coal yield as a proportion of ROM coal, the coal qualities of the coal mined, and the geological conditions may be less favourable than predicted (see Environmental Assessment Report, p 69).

571 On the coal price forecasts, Mr Rajaratnam explained that the best estimates of coal prices during the life of the Project were provided by GRL's coal demand expert, Mr Manley, of Wood Mackenzie, as they are long-term forecasts consistent with the production profile of the mine and seek to account for the specific quality of the coal from the Project. For metallurgical coal, Wood Mackenzie forecasted prices ranging from A\$150.20 to A\$168.98 per tonne in 2019 reaching a low point of A\$120.93 to A\$136.05 per tonne in 2020, before rising again in the years beyond (Rajaratnam report, [2.21] referring to Figures 14 and 15 of the Wood Mackenzie report). The range in price reflects Wood Mackenzie's view that price discounts (for metallurgical coal) will be between 10-20% off the benchmark price. For thermal coal, price discounts from the thermal coal benchmark price of between 1-3% are expected. Wood Mackenzie forecasted prices ranging from A\$68.20 to A\$69.60 per tonne in 2009, rising to a peak of around A\$91.40 per tonne in 2022 before falling in later years (Rajaratnam report, [2.22]).

572 Mr Rajaratnam advocated using the lower bound estimates in the price range for metallurgical coal and thermal coal. The lower bound refers to the lowest point estimates within a likely range of forecasts, and does not necessarily reflect an estimate of how far prices can fall. It is not a "worst case scenario" in comparison to historical prices. Rather, it represents a reasonable but pessimistic view of future prices (Rajaratnam report, [2.27]). The lower and upper bound prices of Wood Mackenzie reflect the uncertainty regarding the discount to the benchmark prices. There is an equal chance of the lower bound and the upper bound price occurring (Rajaratnam report, [2.28]).

- 573 Mr Rajaratnam contended that there is justification for further reducing the lower bound price forecasts. Under the lower bound scenario, it is assumed that the mine would continue to operate at the same capacity, while paying less in royalties and corporate income tax. This assumption may not be correct. If a significantly lower coal price occurred, operations of the mine may cease for a period of time until prices recovered sufficiently or cease permanently if prices are not expected to recover. The Wood Mackenzie report noted that the marginal cost of Australian supply is lower than US\$100 per tonne or A\$133 per tonne. Mr Rajaratnam said that this suggests that the threshold for temporarily ceasing operations will be close to (but below) A\$133 per tonne. Mr Rajaratnam noted that Wood Mackenzie's lower bound price forecast for metallurgical coal falls below this threshold for the period 2020 to 2025 (Rajaratnam report, [2.34]).
- 574 Mr Rajaratnam also noted that the Wood Mackenzie report only presents information on the expected price in each year. Its statistical forecasting approach would account for the fact that there is a probability of distribution around its forecasts and the reported result reflects the average of a range of outcomes. The forecast prices could be substantially lower than the reported average, although the probability of this occurring may be low. The relevance of this lower price is that it may trigger the temporary or permanent shut down of the Project (Rajaratnam report, [2.35]).
- 575 If the Project were to shut down because of lower prices, no royalties or corporate income tax would be paid for the period in which operations cease and the NPV of the Project would be reduced because of the longer delay before the benefits of the Project are realised (Rajaratnam report, [2.32], [2.35]).
- 576 Mr Rajaratnam also contended that adopting the lower bound in the price range may be appropriate to reflect the risk preferences of the community. If there are considerable environmental and social impacts due to the Project and there is some uncertainty regarding the ability to adequately mitigate these impacts, it may be appropriate to adopt a lower bound in the price range (Rajaratnam report [2.36]).
- 577 Based on Wood Mackenzie's price forecasts and using the same production profile as Mr Brown, Mr Rajaratnam estimated royalties as between A\$57-A\$64 million (in NPV terms). This range did not take into account the fact that the mine could temporarily or permanently cease production if future coal prices fell below cost thresholds for the Project. Given this, Mr Rajaratnam suggested that the range of forecast royalties is likely to be lower than A\$57-A\$64 million (in NPV terms) (Rajaratnam report, [2.38]).
- 578 The Wood Mackenzie report also stated that the proportional yield of metallurgical coal to thermal coal is likely to be between 93% and 95% not the 97% assumed by Mr Brown. As metallurgical coal sells for a higher price than thermal coal, this reduces the royalties paid (as they are Ad Valorem) (Rajaratnam report, [2.12]).
- 579 Mr Brown accepted at the hearing that the Wood Mackenzie price forecasts for coal for the Project are likely to be more accurate and should be adopted to estimate the direct benefit of royalties.
- 580 I accept and adopt Mr Rajaratnam's analysis of the direct benefit of royalties and find that the forecast royalties are likely to be lower than the A\$57 million (in NPV terms) lower bound figure, rather than the A\$63.4 million figure suggested by the DAE 2016 report and Mr Brown.

Direct economic benefit: company income tax

581 The CBA should estimate the total annual company income tax payable for each year of the life of the Project. The proportion of company income tax attributable to NSW is estimated by applying the proportion of Australia's population based in NSW (32%).

582 The DAE 2016 report and the Brown report estimated the company income tax apportioned to NSW as A\$19.1 million (in NPV terms). This figure was based on an estimate of net profits of the Project, including a straight line depreciation schedule, which were assumed to be taxed at 30%. Of this, 32% is attributed to NSW (Brown report, [3.11]).

583 Mr Rajaratnam challenged this figure, saying it is unlikely that GRL will pay company income tax in the amounts assumed by the DAE 2016 report or the Brown report. Mr Rajaratnam contended that GRL, like other coal mining companies, will minimise its tax payments within the rules of the tax system. Mr Rajaratnam reviewed the Australian Tax Office's information on mining companies' total income and tax payments for the last three financial years (2014, 2015 and 2016) and found that the tax paid by these companies ranged from around 2.7% to 6.8% on total income, far below the 30% rate assumed by DAE and Mr Brown. For four coal mining companies operating in the Hunter Valley, (including Yancoal Australia Ltd which operates the nearby Stratford and Duralie coal mines), the tax payable as a proportion of total income in the financial years of 2014, 2015, and 2016 respectively was: BHP Billiton Mitsui Coal Pty Ltd (5%, 3.5% and 2.8%); Ulan Coal Mines Ltd (0.1%, 0% and 0%); Coal and Allied Industries Ltd (4.6%, 2.4% and 3.6%) and Yancoal Australia Ltd (0%, 0% and 0%) (Rajaratnam, [2.43] and Table 2.4 and [2.44] and Table 2.5).

584 Based on the prices in the Wood Mackenzie report, Mr Rajaratnam estimated that total income of GRL from the Project would range from A\$718 million to A\$806 million (in NPV terms). Applying the range of 2.7% to 6.8% of total income, the company income tax payable would be A\$49 million to A\$55 million (in NPV terms). Assuming that 32% of tax payments are apportioned to NSW, this equates to between A\$6.2 million and A\$17.5 million (in NPV terms) (Rajaratnam report, [2.45]).

585 Mr Brown accepted at the hearing that the Economic Assessment Guidelines required an estimate of the company income tax that would be paid by the proponent of the mine during the life of the mine (Transcript, 23/08/18, pp 605, 607). Mr Brown accepted that tax minimisation occurred amongst large companies and assumed that it is likely that GRL would take such steps as are lawfully available to it to minimise the tax that it had to pay (Transcript, 23/08/18, pp 606-607).

586 I accept and adopt Mr Rajaratnam's estimate of the company income tax apportioned to NSW that is likely to be paid by GRL as a result of the Project. As he said, "in the absence of a detailed review of the company's financial accounts and gearing structure etc, using the actual tax payment of similar companies is the most robust approach" (Joint Economic Expert Report, p 4). On this approach, Mr Rajaratnam estimated a range of A\$6.2 million to A\$17.5 million. The lower bound of this range seems more likely given the low tax paid by mining companies operating in the Hunter Valley, with the possibility that no company income tax might be paid by GRL at all, as at least two mining

companies have been able to achieve. The estimated benefit of company income tax apportioned to NSW would be considerably lower than the estimated A\$19.1 million of Mr Brown.

Indirect economic benefit: worker benefits

587 The DAE 2016 report stated that the Project “is not anticipated to generate any significant additional benefits to workers in NSW” (p 15-36). In so concluding, the DAE 2016 report applied the Economic Assessment Guidelines which state that:

The economic benefit to workers is the difference between the wage paid in the mining project and the minimum (reservation) wage that the workers would accept for working elsewhere in the mining sector. The minimum wage reflects the employment opportunity costs, skill level required and the relative disutility of an employment position

(p 13.)

588 The Economic Assessment Guidelines elaborate (in footnote 14 on p 13) that:

The reservation wage is the minimum wage a worker has to be paid to work in a particular industry. In view of the hours of work and working conditions, there is a reasonable possibility that workers’ reservation wages in mining are higher than in other industries, and take into account hours of work and working conditions.

589 The DAE 2016 report stated:

It is conservatively assumed that workers employed by the amended Project are not expected to receive a wage premium. This assumes that workers will receive a net wage consistent with market rates. To provide an indicative estimate, this net wage is estimated to be \$73,941, that being the average annual income for a full-time worker in the mining industry in the Taree-Gloucester SA3, based on ABS Census data scaled up to 2016 prices using the mining industry Wage Price Index (ABS, 2016a), and discounted for predicted income tax payable using ATO’s individual income tax rates (ATO 2016).

This approach assumes that there is no wage increase for workers already working in the mining sector and any wage increase accrued from gaining employment in the Project from outside the mining sector or from other areas of NSW is compensation for changes in working conditions, rather than an premium.

(p 15-36.)

590 Mr Brown sought to inflate the benefit to workers by adopting a different methodological approach to that required by the Economic Assessment Guidelines. His method to estimate worker benefits was to start with the wages earned in the mine, minus the opportunity cost of labour working in the mining sector, minus the wage difference due to skills and the disutility to work in the industry (Brown report, [3.18]).

591 For the wages earned in the mine, Mr Brown used the estimated full-time equivalent workers over the life of the Project (95) multiplied by the average coal mining wage (A\$120,265 per annum), yielding a total payment to workers over the mine life of A\$181.8 million, which equates to A\$82.4 million in NPV terms.

592 For the opportunity cost of labour, Mr Brown assumed that 75% of the Project’s workforce would have the average wage in the Gloucester area (of \$47,925) and 25% would have the average wage elsewhere in NSW (of \$64,005), giving a weighted average of \$51,903. When this average wage is

multiplied by the number of full-time equivalent workers, the total payments to existing or future workers who would not be working in the mine is \$78.5 million, which equates to \$35.5 million in NPV terms.

593 With respect to the third factor, Mr Brown assumed that “there is not disutility of working in a mine compared with any other form of employment”, so made no deduction for any wage difference due to skills and the disutility to work in the mining industry (Brown report, [3.28]).

594 Accordingly, Mr Brown calculated the worker benefits to be the difference between the payments made to workers under the Project (\$82.4 million) less the total payments to workers should the Project not proceed (\$35.5 million), being \$46.8 million (Brown report, [3.28] and Table 4).

595 Mr Rajaratnam criticised Mr Brown’s approach. First, Mr Brown’s approach did not accord with the methodology for determining the economic benefit to workers in the Economic Assessment Guidelines. The economic benefit to workers is the difference or premium between the wage paid to workers in the Project and the minimum (reservation) wage that workers would accept to work elsewhere in the mining sector. The minimum wage reflects the employment opportunity costs (of alternative employment), skill level required and the relative disutility of an employment position (Rajaratnam report, [3.13]).

596 Mr Rajaratnam expressed the concept of the wage premium graphically in Figure 3.1. The grey shaded bar represents the wage that an average worker in the region currently receives. The red shaded area (above the grey shaded area) represents the additional amount the average worker could currently receive in the mining sector if they had the right skills as well as the additional amount needed to compensate a worker for other factors such as greater hardship for working in a mine compared to their existing job. The teal shaded area (above the red shaded area) is the impact on the mining wage due the increased demand for labour if the Project were approved. This teal shaded area is described as the wage premium for inclusion as a benefit to workers in the CBA (Rajaratnam report, [3.13]).

597 As the Economic Assessment Guidelines note, “a zero wage premium is a useful starting assumption” (p 13):

An appropriate starting assumption should be that workers do not receive a wage premium, even if they will earn more working in the mining sector.

- If workers are already working in the mining sector, it is not generally the case that one mine will pay significantly more than other mines for workers doing a similar job in similar conditions.
- If a mine will employ workers that are currently working locally, but not in the mining sector, a mine may need to offer higher wages to compensate for more physically demanding work, tougher conditions etc. In this case, the benefit to the worker from higher pay will be offset by the costs associated with greater hardship etc.
- If a mine needs to attract workers from other parts of NSW, it may need to pay them more than they are earning in their existing or previous jobs so that they will relocate. For example, a mine that employs truck drivers in a remote area may need to offer a higher wage than is paid to drivers of similar trucks in the city or large towns. If so, the difference between the minimum wage necessary to get a truck driver to relocate and the standard wage of the city or town is not a valid wage premium.

(p 13.)

598 Contrary to the comparison required by the Economic Assessment Guidelines, Mr Brown incorrectly compared the average coal mining wage (instead of the wage paid in the Project) to the weighted average non-mining wage (instead of the minimum or reservation wage of workers in the mining sector).

599 Second, Mr Brown assumed that there is no disutility of working in the mining sector and there are no additional skills needed to work in a mine compared to an average job. These assumptions are not only at odds with the Economic Assessment Guidelines that refer to the “wage difference due to skills and disutility to work in mining industry” (see p 13 and Chart 3.8 on p 14), they also lack evidentiary foundation. Mr Rajaratnam noted that Mr Brown put forward no evidence in support of his assumptions (Rajaratnam report, [3.9]).

600 Mr Brown suggested at the hearing that the difference between the average wage and the mining wage might be attributable to the productivity of mine workers facilitated by the deployment of significant amounts of capital in the mining industry, but conceded that this opinion was not based on detailed research or analysis particular to the mining industry (Transcript, 23/08/18, p 588).

601 Mr Rajaratnam disputed Mr Brown’s suggested reason, saying that it is contrary to economic theory. Mr Rajaratnam said:

I’m starting from the position that the labour market is in “equilibrium” and that there are good reasons that there are differences in wages in the economy such as skill levels, physical needs and “disutility”. If there are no “good reasons” then I would expect the mining wage and the average wage to converge (ie not a large differential between the two).

(Joint Expert Report of Economic Experts, p 4.)

602 Mr Rajaratnam explained that:

In my view, if workers could so readily transition from the “average” job to a coal mining job then economic theory would suggest that market forces would work to remove the wage differential. For example, a worker currently being paid \$50,000 per year would be willing to work for, say, \$80,000 in a mine. The mine would not need to pay the average mining wage of \$120,000 to attract the worker and the average mining wage would be “bid down” substantially. The fact that there remains a substantial wage differential would support the view that there are other factors driving this wage differential. That is, factors such as the additional hardship of working in mines compared to the “average” job and that additional skills needed to work in a mine would explain the wage differences.

(Rajaratnam report, [3.10].)

603 Mr Rajaratnam explained the reasons for the difference in the mining wage compared to the wage in other sectors (Rajaratnam report, [3.17]-[3.21]). These include the disutility of working in the mining sector and the skill differences between working in the mining sector and other sectors (Rajaratnam report, [3.22]-[3.30]).

604 Mr Rajaratnam noted that growth in mining wages has been associated with strong growth in mining employment in key mining areas across NSW. This would imply that if the Project were approved, resulting in additional demand for mining labour, there would be some increase in mining wages (Rajaratnam report, [3.31], [3.32]). Mr Rajaratnam developed an econometric model to estimate what this increase in mining wages might be (Rajaratnam report, [3.33]-[3.61]). He estimated the wage premium per worker, multiplied it by the

number of workers in the new mine, and converted the product to a net present value figure. This NPV was then halved to reflect the different marginal utility of additional workers to the mine. This equated to \$4.3 million (in NPV terms) in additional benefits due to the Project (Rajaratnam report, [3.61]). This figure is far less than the \$46.8 million estimate of Mr Brown for worker benefits.

605 I accept and adopt Mr Rajaratnam criticism of Mr Brown's approach and estimate of worker benefits. If there will be any worker benefits of the Project, they are likely to be small and in the order of magnitude of Mr Rajaratnam's figure of \$4.3 million (in NPV terms).

606 It is possible that any worker benefits may be lower still, if there is higher initial unemployment in the Gloucester area. Mr Rajaratnam's econometric model found that a higher initial employment rate in a local government area reduces the positive impact of mining employment on mining income (Rajaratnam report, [3.52]-[3.54]). GRL's social impact expert, Dr Ryan, suggested that there was an increasing unemployment rate (Transcript, 24/08/18, pp 716-717). If so, this would reduce the positive impact of mining employment on mining income and hence the worker benefits.

Indirect economic benefit: supplier benefits

607 Local suppliers may receive an economic benefit by achieving higher surpluses through supplying a mining project. This economic benefit reflects producer surplus created for suppliers. This should be net of any producer surplus loss because of a reduction in an existing industry (Economic Assessment Guidelines, p 14). The value of economic benefit to suppliers attributed to NSW should reflect expected input-shares for NSW and non-NSW suppliers to the Project (Economic Assessment Guidelines, p 15).

608 The DAE 2016 report concluded that the Project "is not anticipated to generate any significant additional producer surplus for suppliers in NSW to the mining operations" (p 15-37). The DAE 2016 report stated:

The Applicant has advised that an estimated 74% of suppliers would come from within the Taree-Gloucester SA3 and the majority of the remainder from the rest of NSW.

To estimate the net benefits to suppliers it is necessary to examine the extent to which the amended Project will deliver additional producer surplus relative to what they would otherwise receive in the base case.

Given that the amended Project generates additional demand for services relative to the base case, there are likely to be some flow on impacts for suppliers. As a result, it is possible that the amended Project may deliver additional benefits. However, these benefits are difficult to measure as the outcomes of suppliers under the base case are not readily observable. Accordingly, it is conservatively assumed that suppliers to the amended Project will earn similar margins relative to what they could have received from other sources under the base case.

This approach is likely to be conservative as current economic circumstances mean that, in the base case, suppliers that would provide goods and services to the amended Project may have difficulty finding other buyers for their goods and services. In the base case, these suppliers may earn significantly less than in the amended Project case. In this scenario, there could be benefits to NSW accruing through increase income for suppliers.

(p 15-37.)

609 Mr Brown sought to inflate the benefits to suppliers by using his firm's Regional Input-Output model (Brown report, [3.32]). This is a specialised

modelling tool of Mr Brown's firm and the results are dependent on the assumptions embedded in the model. Mr Brown did not make the model or the assumptions embedded in the model available to Mr Rajaratnam or the Court (Rajaratnam report, [4.3]). Mr Brown's results were therefore not able to be tested or verified. Mr Rajaratnam undertook preliminary modelling, using his centre's equivalent model, but the results were orders of magnitude different to Mr Brown's results (Rajaratnam report, [4.9]).

610 Mr Brown estimated the economic benefit to suppliers as a producer surplus generated from goods and services from NSW being provided under the Project. These were based on expenditure on non-wage operational costs that were estimated to be \$896.9 million, which equates to \$408.7 million in NPV terms over the period 2016 to 2034 using a real discount rate of 7% (Brown report, [3.30], [3.31]). These figures differ from Table 5 in the Brown report, which gives the total non-wage operational costs as \$901.7 million (instead of \$896.9 million) and the NPV of non-wage operational costs as \$408.3 million (instead of \$408.7 million). In oral evidence, Mr Brown suggested that the increase in non-wage operational costs in Table 5 was "possibly a typo" (Transcript, 22/08/18, p 533).

611 Mr Brown's estimated economic benefit to suppliers (producer surplus) was based on his Regional Input-Output model. Mr Brown said that he customised the model to generate a NSW-specific Input-Output table so as to not include benefits generated in other Australian states (Brown report, [3.32]).

612 Mr Brown said that:

The producer surplus estimates are based on Type I multipliers which limit the benefit to direct gross operating surplus generated by NSW suppliers. This methodology does not account for second round, nor induced consumption, effects that are captured within the CGE [computable general equilibrium] modelling.

(Brown report, [3.33].)

613 Using outputs from his Regional Input-Output model, Mr Brown estimated a "gross operating surplus ratio" of 0.20 (20%), which he applied to the non-wage operational costs for each of the year 2016 to 2034 and the total non-wage operational costs to generate estimates of the supplier benefits attributed to NSW. The total non-wage operational costs and the total supplier benefits attributable to NSW were then converted to NPV terms using a 7% real discount rate. Table 5 of the Brown report summarised the estimates. However, application of the gross operating surplus ratio of 0.20 to the non-wage operational costs does not arithmetically result in the figures given for supplier benefits attributable to NSW in Table 5. Mr Brown suggested that this might be "due to rounding" (Note to Table 5).

614 Mr Brown concluded that "the total supplier benefits are estimated to be \$182.0 million in real 2016 Australian dollars, which equates to \$82.4 million in NPV terms over the period 2016 to 2034 using a 7% real discount rate (Brown report, [3.34]).

615 Mr Brown provided no further explanation in his report of how he derived the estimates for non-wage operational costs, gross operating surplus ratio or producer surplus. In the Joint Expert Witness report he said:

There are a number of key assumptions underpinning my calculation of supplier benefits. At the outset, I exclude any benefits from expenditure on capital expenditure and I exclude any benefits accruing to the workforce. Any benefits derived from the operational expenditure are related to an estimate of additional

margin that might be earned by suppliers in other regions (once all input, including imported inputs) are accounted for.

(Joint Expert Witness report of Economic Experts, p 4.)

616 In oral evidence, Mr Brown said his estimate of total non-wage operational costs of \$896.9 million (in [3.31] of the Brown report but not in Table 5) was taken or interpreted from the DAE 2016 report and was not independently analysed. However, the figure of \$896.9 million does not appear in the DAE 2016 report and Mr Brown could not vouch for its accuracy (Transcript, 22/08/18, pp 527, 528, 531-532).

617 Mr Brown said in oral evidence that his figure of \$896.9 million for total non-wage operational costs included goods and services purchased in the operation of the mine but excluded capital expenditure and wages. He said that all plant and equipment (including bulldozers and excavators) was excluded from the figure (Transcript, 22/08/18, pp 530-531). Mr Brown considered that large items of plant and equipment purchased by the Project, such as bulldozers and excavators, were not included in the figures in the DEA 2016 report from which he said he derived the non-wage operational cost figure, because “that’s the description in the report they gave” (Transcript, 22/08/18, p 531).

618 Mr Brown was referring to the “operating costs” that DAE estimated to be \$491 million. In fact, however, the DAE 2016 report said to the contrary that the “operating costs encompass the expenditure incurred as a direct result of extracting ROM coal, processing it into saleable product and delivering it to a port before loading (known as free-on-board (FOB) cost) as well as ongoing expenditure on the purchase and maintenance of equipment and machinery necessary for production, environmental monitoring, mitigation and rehabilitation activities” (p 15-29).

619 Mr Brown later suggested that this statement in the DAE 206 report that operating costs include expenditure on the purchase of equipment and machinery necessary for production might refer to “spares or something like that, not the original capital expenditure” or “the major purchase of machinery” (Transcript, 23/08/18, p 566).

620 Mr Brown ultimately accepted that he did not know what equipment and machinery the DAE 2016 report included in their operating costs (Transcript, 22/08/18, p 566). This meant that he had no way of knowing the extent to which the total operating costs of \$491 million in the DAE 2016 report included purchase of equipment and machinery as opposed to other operating expenses (Transcript, 22/08/18, p 567). This affected the figure Mr Brown used for the non-wage operational costs in his model.

621 Mr Rajaratnam also identified that the operating costs of \$491 million (in NPV terms), on which Mr Brown’s non-wage operational costs of \$408.7 million (in NPV terms) was based, included expenditure which may not be associated with supplying mining services, such as the cost of mitigating environmental impacts, biodiversity offset costs, and land purchases (Rajaratnam report, [4.5], [4.8]). It may also include cost items such as royalties and taxes and the cost of environmental licences. These costs should not be attributed to suppliers (Rajaratnam report, [4.8]).

622 As the Economic Assessment Guidelines state, the value of economic benefit to suppliers attributed to NSW should reflect expected input-shares for NSW and non-NSW suppliers for the Project (p 15). Mr Brown said in oral evidence that he had assumed that 75% (sic, in fact 74%) of suppliers would come from

NSW, although this was not stated in his report. He said that the figure of 75% was advised by GRL (Transcript, 22/08/18, p 529). Mr Brown did not form any view as to whether that was an accurate or inaccurate figure, but accepted it as “it seemed like a reasonable figure” (Transcript, 22/08/18, p 529).

623 Mr Brown was referred to the Key Insights Report which contained an estimation of the locational apportionment of capital and construction, including mining equipment. No mining equipment was to be sourced locally, 15% was to be sourced from NSW, 35% was to be sourced from other parts of Australia and the remaining 50% was to be imported. Mr Brown accepted that if expenditure on mining equipment was included within the figure that he had derived from the DAE 2016 report for non-wage operational costs, his assumption that 75% of suppliers would come from NSW would be grossly overstated and instead only about 15% of the expenditure would be from NSW (Transcript, 22/08/18, p 571). Mr Brown did no other analysis of the geographical locations of suppliers to the Project, merely accepting the advised figure of 75% from NSW (Transcript, 22/08/18, p 534). Mr Rajaratnam also expressed concern that some portion of the services by suppliers estimated by Mr Brown may be attributable to suppliers outside of NSW (Rajaratnam report, [4.8]).

624 Mr Brown accepted that the question of whether there will be any producer surplus to any particular supplier by reason of the Project would depend very much upon the individual supplier’s business. Mr Brown did not undertake any analysis of any individual supplier’s business (Transcript, 22/08/18, p 532). Instead, Mr Brown applied the same gross operating surplus ratio of 0.20 to the estimated non-wage operational costs to achieve the supplier benefit figures, regardless of the business of the particular suppliers (Transcript, 22/08/18, pp 533, 534). The 0.20 ratio of the Regional Input-Output model was used as a proxy for all of the businesses that supplied the Project (Transcript, 22/08/18, p 534).

625 Mr Brown accepted that he had not explained in his report, and he did not explain in his oral evidence, what inputs he had put into the Regional Input-Output model to arrive at his estimate of supplier benefits, how he had derived the inputs he had put into the Regional Input-Output model or, to the extent the Regional Input-Output model had been customised to generate a NSW specific Input-Output table so as not to include benefits generated in other Australian states, he had not explained how that had been done (Transcript, 22/08/18, p 528). Mr Brown accepted in oral evidence that, given the nature of the assumptions that he had used in estimating supplier benefits, there was a “very real likelihood” that the assumptions he put into his Regional Input-Output model would not accurately reflect what would happen at the Rocky Hill Coal Project (Transcript, 22/08/18, p 540).

626 Notwithstanding the high levels of uncertainty with Mr Brown’s assumptions and modelling process for estimating supplier benefits, Mr Brown used a sensitivity test of plus and minus 10%, which was premised on there being a high degree of certainty, rather than a sensitivity test of plus and minus 25%. Mr Brown had indicated in his report that:

Where there are considered to be higher levels of uncertainty with the figures, a range of plus and minus 25 per cent is used. In areas where the figures are deemed more certain, a range of plus and minus 10 per cent is used.

(Brown report, [6.2].)

627 Mr Brown applied the sensitivity test of plus and minus 10% only to the non-wage operational costs and did not apply it to the gross operating surplus ratio of 0.20 that resulted from his Regional Input-Output model.

628 As the Economic Assessment Guidelines state, any producer surplus created by the Project for suppliers should be net of any producer surplus loss because of a reduction in an existing industry (p 14). Mr Brown assumed that the impact of the Project on other industries would be zero for the purpose of estimating supplier benefits (Transcript, 22/08/18, p 542). However, Mr Brown accepted that a reduction in the tourism industry in Gloucester and a transfer of workers from existing businesses in Gloucester to the Project could both potentially lead to a producer surplus loss because of reduction in existing industry (Transcript, 22/08/18, p 543).

629 Given these concerns about Mr Brown's estimates of supplier benefits, Mr Rajaratnam undertook his own modelling to estimate any benefits to suppliers of services to the mining sector. These services include construction services, engineering services, environmental management services, explosives and electricity supplies. These relate to "intermediate inputs" and do not include a range of other costs such as tax and royalty payments (Rajaratnam report, [4.10]).

630 Mr Rajaratnam explained how a new mine might generate additional producer surplus and hence benefits to suppliers:

Suppliers to a new mine may receive additional "producer surplus" by being able to charge a higher price for their services due to the increased demand caused by the Project. In a competitive market where price equals marginal cost and there is highly elastic supply, this impact would be zero. That is, in the long term new firms can enter the market and it is difficult for existing suppliers to charge higher prices. In reality, this impact is likely to be greater than zero, particularly in the short term, as firms [take] time to respond to the increased demand for their services.

This economic benefit reflects producer surplus created for suppliers. This should be net of any producer surplus loss because of a reduction in an existing industry. The value of economic benefit to suppliers attributed to NSW should reflect expected input-shares for NSW and non-NSW suppliers for the Project.

An increase in mining production in NSW from a new mine can increase producer surplus to all industries that supply to the mining industry (the red and teal shaded area of chart 4.1). The estimation of values for the economic benefit to local suppliers from a new mine needs to distinguish between producer surplus to all suppliers to the mining industry (teal shaded area) and producer surplus to suppliers to the new mine (red shaded area). For the purposes of estimating values of the economic benefit to local supplies, only the producer surplus to industries supplying to the new mine is relevant (red shaded area).

(Rajaratnam report, [4.11]-[4.13].)

631 Mr Rajaratnam said that the lower bound estimate of supplier premiums to NSW and local suppliers arising from a new mine is zero based on competitive markets where suppliers can readily respond to changes in demand for their services (Rajaratnam report, [4.14]).

632 Mr Rajaratnam estimated the upper bound of supplier premiums using a computer generated equilibrium model of the Australian economy. He found:

The upper bound estimate of supplier premiums is estimated using a computer general equilibrium model of the Australian economy, CIE-REGIONS. An increase in mining production of \$100 million in NSW by a new mine (not mine specific) results in expenditure of \$35 million on intermediate inputs:

- \$23.5 million sourced from NSW local suppliers
- \$6.5 million sourced from interstate
- \$5 million imported from overseas.

(Rajaratnam report, [4.15].)

633 Focusing on the producer surplus to suppliers of the Project, Mr Rajaratnam found:

The producer surplus to local suppliers of the new mine (the red triangle in chart 4.1) was estimated based on the direct impact and short-run supply elasticities. That is, suppliers gain by being able to charge a higher price to service the additional mining activity due to the Project. Based on the modelling undertaken by my team using the CIE-REGIONS model, the producer surplus (economic benefit) to NSW suppliers created by additional mining activity is:

- approximately 0.01 per cent of expenditure on locally sourced intermediate inputs
- approximately 0.007 per cent of total expenditure on intermediate inputs sourced locally, interstate and overseas.

For example, if a new mine spends \$100 million on intermediate inputs, this implies the economic benefit to NSW suppliers supplying to the new mine is \$7 000.

(Rajaratnam report, [4.17]-[4.18].)

634 Mr Rajaratnam concluded:

If I adopt the non-wage operational expenditure profile presented in table 5 in Stephen Brown's report (assuming that these all relate to intermediate inputs), this equates to supplier benefits of \$2.86m (in NPV terms) based on the estimate that 0.007 per cent of expenditure on intermediate inputs is a benefit to suppliers.

(Rajaratnam report, [4.19].)

635 Mr Brown accepted that his modelling exercise to estimate supplier benefits was "so shrouded in uncertainty that Mr Rajaratnam's estimate is just as valid" as Mr Brown's estimate (Transcript, 22/08/18, pp 536-537).

636 I find that any economic benefit to suppliers by achieving higher surpluses through supplying to the Project will be small, in the order of magnitude of Mr Rajaratnam's estimate \$2.86 million (in NPV terms). It may even be that there are no supplier benefits, as the DAE 2016 report concluded. Mr Brown's inflated figure of \$408.7 million (in NPV terms) is unreliable and unproven. Mr Brown's inputs and methodology are uncertain and not able to be tested or verified. A number of inputs seem plainly wrong. I accept and adopt the critical analysis of Mr Brown's estimates by Mr Rajaratnam and the Minister in cross-examination, summarised above.

Indirect costs

637 Indirect costs include the net environmental, social and transport costs, net public infrastructure costs and indirect costs to other industries (Economic Assessment Guidelines, p 15).

638 Environmental and social impacts of mining projects include impacts to air quality, ambient noise, biodiversity, greenhouse gas emissions, groundwater, non-Aboriginal heritage, Aboriginal heritage, surface water and visual amenity.

Transport related impacts may occur, such as increased traffic congestion (Economic Assessment Guidelines, p 15). Guidance on how to identify and value environmental, social and transport costs is provided by the Technical Note Supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (April 2018) (Technical Notes).

639 The DAE 2016 report quantified the net environmental, social and transport costs as \$9.9 million (in NPV terms), of which \$3.3 million were attributable to the NSW community (p 15-37 and Table 4.6). These figures incorporate the quantified costs associated with air quality (\$0.14 million), greenhouse gas emissions (\$3.13 million) and noise impacts (\$1,854). The impacts to Aboriginal heritage, non-Aboriginal heritage, biodiversity, water, traffic and transport, and visual amenity were not quantified and were considered qualitatively.

640 The DAE 2016 report concluded that the Project would not generate any additional public infrastructure costs for any level of government (p 15-48).

641 The DAE 2016 report did not quantitatively assess whether the Project would cause any indirect costs to other industries in the CBA, but did discuss qualitatively the effects of the Project on other local industries in the LEA (section 5.5). The DAE 2016 report discussed the impact of the Project on agricultural use of land within the Project site, but not on any other land in the vicinity (p 15-61). The DAE 2016 report concluded that the Project “is not expected to have any material effects on tourism and business travel” (p 15-61).

642 The Economic Assessment Guidelines note that a new mining project may impact on the surplus obtained from other industries, such as tourism. The Guidelines suggest that:

It is preferable if these effects are measured through environmental impacts, where applicable. For example, tourism might be impacted by air pollution and then the most direct way to estimate this impact is to value it through the approach for air pollution.

(p 17.)

643 The Economic Assessment Guidelines recognise that there may be some unquantified impacts from this approach. Where these are likely to be significant, “consideration should be given to the loss of surplus in these other industries” (p 17).

644 For environmental, social and transport related costs, Mr Brown adopted the figures in the DAE 2016 report for air quality and ambient noise (Brown report, [3.55], [3.69]). Mr Brown took a different approach to apportioning the cost of additional greenhouse gas emissions to NSW. The DAE 2016 report had quantified the costs of the Scope 1 and Scope 2 emissions (but not Scope 3 emissions) generated by the Project to be \$9.73 million (in NPV terms). On the basis that the NSW share of the Australian population is 32%, \$3.13 million was attributed as a cost to the NSW community (DAE 2016 report, p 15-41). This apportionment accorded with the approach for apportionment of benefits and cost to NSW recommended in the Economic Assessment Guidelines (see, for example, pp 10, 11 (Table 3.4), 12 (Table 3.6) and 15 (Table 3.9) and Technical Note 9 dealing with estimating and costing GHG emissions, pp 48, 49).

645 Mr Brown, however, considered that the DAE 2016 report had overestimated the costs of GHG emissions to the NSW economy. He said that “climate change

is a global issue and apportioning of these costs by the NSW population in total Australia population does not fully recognise the global nature of the greenhouse gas issue". He considered that:

A more reasonable estimate to apportion the NSW costs of greenhouse gas emissions is to consider the NSW population in a global context (0.1 per cent). When this calculation is undertaken ... the costs of greenhouse gas emissions falls to \$0.01 million in NPV terms over the period 2016 to 2034 using a 7 per cent real discount rate.

(Brown report, [3.60]-[3.62].)

646 I find Mr Brown's approach to apportionment of the costs of GHG emissions to be unsound. Mr Brown cites no authority in support. It is inconsistent with the method for apportionment of benefits and costs required by the Economic Assessment Guidelines and the Technical Note. It is also inconsistent with the rationale for including in the estimated costs of GHG emissions of the Project the Scope 1 and Scope 2 emissions (which occur physically in NSW) but not necessarily Scope 3 emissions (which may occur outside of NSW or overseas). Under the Climate Change Convention and the Paris Agreement, Australia needs to account for Scope 1 and Scope 2 emissions that occur in Australia but not for any Scope 3 emissions that occur outside of Australia. Apportionment of Scope 1 and Scope 2 emissions that occur in Australia by the proportion of the NSW population to the Australian population logically attributes the cost of the Scope 1 and 2 emissions to the NSW community.

647 Mr Brown otherwise adopted a zero cost for the impacts that the DAE 2016 report had assessed qualitatively to biodiversity, traffic and transport costs, water (surface and groundwater), Aboriginal heritage, non-Aboriginal heritage and visual amenity (Brown report, Table 7).

648 Mr Brown agreed with the DAE 2016 report that there are no expected additional public infrastructure costs required by either the NSW government or the local council (Brown report, [3.94]).

649 Unlike the DEA 2016 report which only discussed the impacts on other industries qualitatively, Mr Brown sought to quantify the impacts on other industries. In relation to agriculture, Mr Brown limited his analysis to the impact of the Project on agricultural use of land within the Project site, and did not consider other land in the vicinity. He assigned a value of zero for the indirect costs associated with agricultural production (Brown report, [3.105]).

650 In relation to tourism, Mr Brown considered that the conclusion of the DAE 2016 report that there are not likely to be significant impacts on tourism appeared to be reasonable (Brown report, [3.108]). Mr Brown identified that of the visitors to the Gloucester region who were assessed to be statistically significant, all were NSW residents either visiting friends and relatives or holidaying in the region. Mr Brown considered that:

This implies that, at the NSW level, any adverse impacts on tourism are likely to be zero. This is because if tourism is discouraged in the region because of the Project, a reasonable assumption is that this cohort of tourists would visit other parts of NSW instead resulting in no net change in tourism expenditure across the state.

(Brown report, [3.113].)

651 Mr Brown said that any adverse effects relating to tourism are a matter for the LEA, rather than the CBA. He nevertheless considered that some tourism to the Gloucester region might be discouraged by the Project. He estimated a 10%

reduction in tourism numbers per annum to the Taree-Gloucester SA3 region, which would imply a loss of \$2.4 million in 2016 Australian dollars in NPV terms over the period 2016-2034 using a 7% real discount rate (Brown report, [3.120]).

652 Mr Brown revisited the impact of the Project on tourism in his supplementary report (July 2018). He said:

... I have found no compelling evidence, based on the nature of tourism in the Gloucester region and the Visual Impact Expert Report, that there will be a significant impact on tourism in the town of Gloucester.

Should there be any adverse consequence to tourism in Gloucester, the likely impacts will be relatively small. For example, using a methodology consistent with a CBA approach undertaken in the expert witness economic analysis report that I submitted on 8 July 2018, an illustrative 10 per cent reduction in tourism numbers would cost the town of Gloucester between \$160,000 to \$190,000 per annum.

(Brown supplementary report, [5.7]-[5.8].)

653 Mr Brown sought to support his zero estimate on the impact of the Project on tourism on the basis that “there are positives and negatives that would be associated with the mine”. In terms of positives, Mr Brown suggested that the mine would enhance friends and relatives visiting people working in the mine and increase business travel associated with the mine. Mr Brown accepted “of course there may well be negatives”. But he thought that the positives may balance out the negatives, so went with a zero estimate (Transcript, 23/08/18, p 573).

654 I find that the assessments of both the DAE 2016 report and Mr Brown of the environmental, social and transport costs, and the indirect costs to other industries, to be deficient.

655 First, the assessments are dependent on the findings and conclusions of GRL’s expert reports that there will be no, or no significant, environmental and social impacts of the Project. For example, the assigning of a value of zero for the indirect costs associated with visual amenity was based on Dr Lamb’s visual impact assessment that there would be only temporary visual impacts in the short term (Brown report, [3.86]-[3.92] and the DAE 2016 report, pp 15-47 and 15-48).

656 I have found that the assessments of GRL’s experts of the environmental and social impacts of the Project have significantly underestimated the likely severity, extent and duration of the environmental and social impacts of the Project. In particular, I have found that the Project will have significant impacts on visual amenity and social impacts. There has been no economic assessment of the indirect costs if the environmental and social impacts of the Project were to be as significant as I have found they will be.

657 Secondly, the assessments of the impact on and the indirect costs to other industries were limited. In relation to agriculture, both the DAE 2016 report and Mr Brown limited the assessment to the impact of the Project on agricultural use of land within the Project site, and did not consider whether the Project might impact on agricultural uses of land in the vicinity of the Project. Mr Brown accepted that he did not consider the impact of the Project on agri-tourism businesses or small agricultural holdings in the vicinity (Transcript, 23/08/18, p 573). Mr Brown accepted that if families who operated smaller dairies, such the Frasers and the Williams, moved away from the area and

nobody took over their dairies, the area would lose the production or the value generated from those business (Transcript, 23/08/18, p 579). Mr Brown did not consider such a loss of production or value in his analysis (Transcript, 23/08/18, p 579). The possibility of a loss of economic benefits associated with small agricultural and agri-tourism businesses was raised by a number of objectors to the Project.

658 In relation to other industries, Mr Brown accepted that if the presence of the mine caused people within industries in Gloucester to move from the region and therefore take businesses out of the area, that would be an indirect cost of the Project to other industries (Transcript, 23/08/18, p 573). Mr Brown accepted that his assessment of the impact of the Project on other industries was based more on assumption than analysis (Transcript, 23/08/18, p 574).

659 In relation to tourism, Mr Brown's assessment that the indirect cost to the tourism industry in NSW is zero was not informed by any expertise in the tourism industry (Transcript, 22/08/18, p 524) or any empirical research or analysis of individual businesses in the tourism industry in the Gloucester region (Transcript, 23/08/18, p 573).

660 Mr Brown's criticism of the Destination NSW tourism figures, which had estimated that tourism contributed \$51 million per annum to Gloucester, was founded on an assumption that Destination NSW had based their figures on statistics for the Hunter Region of NSW (Brown supplementary report, [3.9]). This assumption was incorrect. Destination NSW's figures for Gloucester were based on data for the North Coast NSW not the Hunter region (see baseline analysis of Tourism in Mid Coast NSW, p 73).

661 Mr Brown accepted that the tourism industry in the Gloucester region is growing; that it is an industry in which significant amounts are being expended within the entire local government area of Gloucester; and that anything that had an adverse impact on that industry is capable of having a significant economic impact on the entire Gloucester local government area (Transcript, 23/08/18, pp 577-578).

662 Having regard to these deficiencies in Mr Brown's analysis, although he accepted that the Project would have negative impacts on tourism, his flawed analysis did not accurately quantify the negative impacts and his suggestion that the positive impacts of the Project on tourism would balance out the negative impacts is not supportable.

663 In these circumstances, I find that the indirect costs of the Project to other industries are likely to be much greater than assessed by the DAE 2016 report or Mr Brown, although it is not possible on the evidence to quantify the indirect costs to other industries.

Conclusion on the cost benefit analysis

664 I find that the economic benefits of the Project, assessed by Mr Brown in his CBA, are uncertain and in any event substantially overstated. The total direct benefits of the Project are likely to be much lower than he claimed, because less royalties and company income tax will be paid by GRL. The total direct benefits will be in the order of \$20 million (in NPV terms) less than those claimed by Mr Brown. The indirect benefits of the Project will be very small. I find that any worker benefits or supplier benefits will be small, perhaps even none, and nowhere near the inflated values assigned by Mr Brown. On Mr Rajaratnam's estimates, the total indirect benefits would be in the order of \$122 million (in NPV terms) less than those claimed by Mr Brown.

665 Conversely, the total indirect costs of the Project are likely to be greater than those assessed by Mr Brown. Environmental, social and transport related costs are likely to be greater than the low values assigned by Mr Brown, but these cannot be quantified on the evidence. There are likely to be indirect costs to other industries, including the agricultural, agri-tourism and tourism industries, but these also cannot be quantified on the evidence. Certainly, the costs will be greater than the zero value assigned by Mr Brown.

666 The consequence of the significantly smaller direct and indirect benefits and the greater indirect costs will be a significantly reduced net economic benefit of the Project.

667 Although this much reduced NPV of the Project might still be positive, this does not mean that the Project is in the public interest (Economic Assessment Guidelines, p 3). First, there is still considerable uncertainty as to the magnitude of the net economic benefits of the Project. The direct and indirect benefits might be smaller than Mr Rajaratnam estimated and the indirect costs may be much greater than anyone has estimated. The positive net economic benefit might therefore not be large.

668 Secondly, the unquantified impacts of the Project, particularly the visual, amenity and social impacts discussed elsewhere in the judgment, are significant and need to be assessed qualitatively and balanced against the quantified net economic benefits: see *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Ltd* at [39]-[41]. I find that these unquantified impacts of the Project should be determinative of the application for consent.

669 Thirdly, issues of distributive equity need to be considered. As explained earlier, there is distributive inequity in the distribution of the benefits of the Project (which are largely economic benefits) and the burdens or costs of the Project (such as the environmental, social and economic costs). This distributional inequity is between members of the present generation (intra-generational equity), such as by affecting different parts of the local community differently and having different impacts on different socio-economic and vulnerable groups. The distributional inequity is also between the present and future generations (inter-generational equity), such as by groups within the current generation receiving economic benefits but future generations experiencing environmental costs (Economic Assessment Guidelines, p 19).

Local effects analysis

670 A local effects analysis (LEA) is intended to be complimentary to the cost benefit analysis (CBA). The LEA translates the effects estimated in the CBA for the NSW community to the impacts on the local communities near the Project site. The LEA identifies and enumerates local effects that have been incorporated in the CBA in order to inform communities, identify local impacts and changes and provide information that will assist in developing mitigation plans and strategies. It is not intended that components of the LEA can be added together to provide a single summary measure or that an LEA measures economic welfare outcomes (Economic Assessment Guidelines, pp 5, 20). The LEA is not intended to capture the full range of effects experienced by local people as a result of the Project, but rather prioritises and analyses the following effects of the Project: effects relating to local employment and income, effects relating to non-labour project expenditure, effects on other local industries, and environmental and social effects (Economic Assessment Guidelines, pp 5, 21).

671 The DAE 2016 report included a LEA (section 5), prepared in accordance with the Economic Assessment Guidelines. The LEA noted that the results of the LEA were not in addition to those in the State level CBA, but rather the results presented were largely already covered in the CBA. The LEA noted that the components of the LEA cannot be added together to provide a single summary measure – each item reported presented a different local effect. The LEA noted that it did not measure economic welfare outcomes (p 15-64).

672 The LEA analysed the local effects of the Project, which were required to be analysed by the Economic Assessment Guidelines, of effects relating to local employment (section 5.3), effects relating to non-labour project expenditure (section 5.4), effects on other local industries (section 5.5) and environmental and social effects (section 5.6).

673 As the Economic Assessment Guidelines require, the LEA did not add together the results from these sections of the effect of the Project on the locality. The results were presented in Table 5.6 (Estimated local effects – site establishment and construction stage) and Table 5.7 (Estimated local effects – ongoing operations). The DAE 2016 report summarised the LEA results as follows:

Overall, the amended Project is expected to directly employ around 32 FTE persons from the locality during the site establishment and construction stage and 73 FTE per year from the locality during ongoing operations, incremental to the base case. This direct employment is expected to result in a net increase in income of the locality of \$0.4 million during the site establishment and construction stage and \$1 million a year during ongoing operations, equivalent to 7 and 16 additional FTE respectively (assuming that these individuals would earn the average wage in the locality if they weren't employed at the Project).

In addition to employment, the amended Project is expected to result in the direct expenditure of \$23 million a year in the locality on non-labour inputs during the site establishment and construction stage and \$48 million a year in the locality during ongoing operations.

The amended Project also creates external costs to the locality. The largest external cost is expected to be from air quality impacts. The total value of quantifiable external effects to the locality is estimated to be around \$1000 during the site establishment and construction stage and \$23,000 a year during ongoing operations.

(pp 15-64, 15-65.)

674 Mr Brown included a local effects analysis in his report (section 4), but it was not prepared in accordance with the Economic Assessment Guidelines in a number of respects. The LEA was a CBA for the Taree-Gloucester region. Like his CBA for NSW, his LEA sought to estimate the direct and indirect benefits of the Project and the indirect costs of the Project, calculate the NPV of these benefits and costs, and derive the net economic benefit to the Taree Gloucester region (see Table 11). Mr Brown concluded:

The net benefits of the Project to the Taree-Gloucester region is estimated to be \$117.3 million in NPV terms over the period 2016 to 2034 using a 7 per cent real discount rate.

(Brown report, [4.21].)

675 Mr Brown's LEA involved analysing effects of the Project other than the effects that the Economic Assessment Guidelines state should be analysed; adding together the components of the LEA to provide a single summary

measure (the net economic benefits), which the Economic Assessment Guidelines state should not be done; and measuring the economic welfare outcomes (including the indirect economic benefits to workers and suppliers and the net economic benefit to the Taree-Gloucester region), which the Economic Assessment Guidelines state that an LEA is not intended to measure.

676 Mr Brown's analysis of the direct and indirect benefits and the indirect costs in the LEA suffered from the same deficiencies as his analysis of the direct and indirect benefits and indirect costs in his CBA (addressed above). In particular, his estimates of worker benefits and supplier benefits were based on assumptions and methodologies that were inconsistent with the Economic Assessment Guidelines, uncertain and unproven (as explained above).

677 Mr Brown's assessment of worker benefits to the Taree-Gloucester region was also based on the assumption, provided to him by GRL, that 75% of workers would reside in or relocate to the Gloucester area (Brown report, [4.5]). That assumption was not proven on the evidence. The Department in its Environmental Assessment Report considered that it was unlikely that the Rocky Hill Coal Project would exceed the proportion of 38% of workers from the former Gloucester local government area employed by the nearby Stratford coal mine (p 72). Mr Brown had noted the Department's view in his report (Brown report, [2.17]). The annual reviews of Yancoal, which operates the Stratford mine, show that the proportion of local workers employed in the mine has increased in the last five years from the 38% figure, to be 60% in 2016 and 2017, however, the area defined as the local area in which workers reside expanded to include Gloucester, Stroud and Dungog.

678 Mr Brown conceded in oral evidence that he could not see any reason why the percentages of local employees at the Stratford mine would not provide a reliable guide for the potential proportion of local employees in the Rocky Hill Coal Project (Transcript, 23/08/18, p 581). The fact that local employees are already employed at the Stratford mine might mean that they might not be available to be employed at the Rocky Hill Coal Project, which might suggest that the percentage of local employees might be lower at the Rocky Hill Coal Project than at the Stratford mine (Transcript, 23/08/18, p 581).

679 Mr Rajaratnam also questioned whether the Rocky Hill Coal Project will have the assumed 75% of local workers. He considered that:

While there may be some opportunity to draw employment from local residents from the Mid-coast region, the employment profile (ie direct employment) may end up more like the neighbouring mining LGAs, where a large proportion of employment in the mines is filled from outside the local residents.

(Rajaratnam report, [3.30].)

680 If the percentage of local workers is lower than Mr Brown's assumed 75%, as seems highly likely, his estimate of worker benefits would need to be reduced.

681 I find Mr Brown's LEA to be unreliable and unhelpful. Contrary to GRL's submission, because of its deficiencies, Mr Brown's LEA does not prove that the Project will deliver net economic benefits to the Taree-Gloucester region.

The respective public benefits of the Project and other land uses

682 The second way in which the public benefits of the Rocky Hill Coal Project need to be considered is by evaluating and comparing the respective public benefits of the Project and the existing, approved and likely future uses of land in the vicinity of the Project (under cl 12(b) of the Mining SEPP).

683 The public benefits of the Project have been evaluated above. The public
benefits of the existing, approved and likely future uses of land in the vicinity of
the Project have not been evaluated, by way of economic assessment, in the
same way as the public benefits of the Project have been evaluated.

684 Mr Brown endeavoured to quantify “the economic contribution of tourism to
the town of Gloucester”, which he estimated to be within a range of \$4.7
million and \$5.8 million in 2014 per annum (Brown supplementary report,
[5.6]). This estimate was however, flawed, not only for the reasons I have earlier
identified, but also because it focused on a different community (the town of
Gloucester) rather than the community of NSW (which was the focus of the
CBA of the Project) or the vicinity of the Project (which is the focus of cl 12 of
the Mining SEPP). There was no other economic assessment of other uses of
land in the vicinity of the Project in order to quantify the public benefits of the
other land uses. Accordingly, it is not possible on the evidence to evaluate and
compare quantitatively the respective public benefits of the Project and the other
land uses.

685 In terms of a qualitative evaluation, I have listed earlier in the judgment the
uses of land that are existing uses, approved uses and likely preferred uses.
These include residential, tourism, agri-tourism and agricultural uses. These
uses undoubtedly yield public benefits, including economic benefits. The Project
will impact on these uses. For the reasons I have given earlier, by reason of the
Project’s visual, amenity and social impacts, the Project will have a significant
impact on the likely preferred uses and will be incompatible with the existing,
approved and likely preferred uses. As a consequence, the Project will adversely
affect the public benefits of the existing, approved and likely preferred land
uses.

Balancing the benefits and the impacts of the mine

686 The task of determining the development application for the Project, in
essence, requires the Court, exercising the function of the consent authority, “to
balance the public interest in approving or disapproving the Project, having
regard to the competing economic and other benefits and the potential negative
impacts the Project would have if approved”: *Warkworth Mining Ltd v Bulga
Milbrodale Progress Association Inc* at [171].

687 The Rocky Hill Coal Project will yield public benefits, including economic
benefits, but it will also have significant negative impacts, including visual,
amenity, social and climate change impacts and impacts on the existing,
approved and likely preferred uses of land in the vicinity of the Project, which
are all costs of the Project. Balancing the benefits and costs of the Project is, in
the end, a qualitative and not quantitative exercise. I have previously likened it
to a process of intuitive synthesis of the relevant factors: *Bulga Milbrodale
Progress Association Inc v Minister for Planning and Infrastructure and
Warkworth Mining Ltd* at [141]. Forms of economic assessment such as cost
benefit analysis, which quantify, monetise and aggregate different factors, assist
but are not a substitute for the intuitive synthesis required of the consent
authority in determining the development application.

688 I find that the negative impacts of the Project, including the planning impacts
on the existing, approved and likely preferred land uses, the visual impacts, the
amenity impacts of noise and dust that cause social impacts, other social
impacts, and climate change impacts, outweigh the economic and other public

benefits of the Project. Balancing all relevant matters, I find that the Project is contrary to the public interest and that the development application for the Project should be determined by refusal of consent to the application.

689 GRL submitted that the location of the coal mine is dictated by the location of the geological resource of the coal. Unlike other types of development, which can be moved elsewhere to avoid or mitigate adverse impacts, the location of a coal mine cannot be changed. GRL submitted that it cannot promote a development that addresses this coal resource and also accommodate every negative impact of doing so (Transcript, 27/08/18, p 846).

690 However, the fact that the coal resource is in the location of the Gloucester valley does not mean that the resource there must be exploited, regardless of the adverse impacts of doing so. A development that seeks to take advantage of a natural resource must, of course, be located where the natural resource is located. But not every natural resource needs to be exploited.

691 A dam can only be located on a river, but not every river needs to be dammed. The environmental and social impacts of a particular dam may be sufficiently serious as to justify refusal of the dam. The proposed hydroelectric dam on the Gordon River in southwestern Tasmania (later inscribed on the World Heritage List) is an example of a dam with unacceptable environmental and social impacts (considered in the Tasmanian Dams Case, *Commonwealth v Tasmania (Tasmanian Dam Case)* (1983) 158 CLR 1).

692 Seaside residential development can only be built at the seaside, but not every seaside development is acceptable to be approved. For example, the likely impact of coastal processes and coastal hazards on coastal development, including with climate change, may be sufficiently serious as to justify refusal of the coastal development, as the various courts and tribunals decided in *Northcape Properties Pty Ltd v District Council of Yorke Peninsula* [2007] SAERDC 50, upheld on appeal *Northcape Properties Pty Ltd v District Council of Yorke Peninsula* [2008] SASC 57; *Gippsland Coastal Board v South Gippsland Shire Council (No 2)* [2008] VCAT 1545; *Myers v South Gippsland Shire Council* [2009] VCAT 1022; *Myers v South Gippsland Shire Council (No 2)* [2009] VCAT 2414; and *Rainbow Shores Pty Ltd v Gympie Regional Council* [2013] QPEC 26.

693 Mining development might only be able to be undertaken at the location of the mineral resource, but not every mining development is acceptable to be approved. Fossil fuel reserves underlie the city and the harbour of Sydney, but no longer would coal mining in Sydney be regarded as acceptable, environmentally or socially, as the NSW Land Appeal Court held as far back as 1895 in *Re Sydney Harbour Collieries Co* (1895) 5 Land Appeal Court Reports 243 (discussed in Tim Bonyhady, “A Useable Past: The Public Trust in Australia” (1995) 12 EPLJ 329 at 333-336).

694 The acceptability of a proposed development of a natural resource depends not on the location of the natural resource, but on its sustainability. One of the principles of ecologically sustainable development is the principle of sustainable use – the aim of exploiting natural resources in a manner which is “sustainable” or “prudent” or “rational” or “wise” or “appropriate”: *Telstra Corp Ltd v Hornsby Shire Council* at [109]. This principle also has an ecological core: use of natural resources needs to be within ecological limits. The use of natural resources should be “within their capacity to sustain natural processes while maintaining the life-support systems of nature” (to use the words of one of the

objects of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth), although that statute is not directly applicable to this application in NSW).

695 In *Hub Action Group Incorporated v Minister for Planning* (2008) 161 LGERA 136 at [70], I observed that:

The principle of sustainable use of natural resources involves the exploitation of natural resources in a way which is sustainable in the long-term and which reduces environmental harm. It involves consideration of the effects of use on all natural resources, certainly the effect of the use on the resources the intended subject of the activity but also the effect that the use of those resources might have on the sustainable use of other resources.

696 In this case, the exploitation of the coal resource in the Gloucester valley would not be a sustainable use and would cause substantial environmental and social harm. The Project would have high visual impact over the life of the mine of about two decades. The Project would cause noise, air and light pollution that will contribute to adverse social impacts. The Project will have significant negative social impacts on people's way of life; community; access to and use of infrastructure, services and facilities; culture; health and wellbeing; surroundings; and fears and aspirations. The Project will cause distributive inequity, both within the current generation and between the current and future generations.

697 The Project will be a material source of GHG emissions and contribute to climate change. Approval of the Project will not assist in achieving the rapid and deep reductions in GHG emissions that are needed now in order to balance emissions by sources with removals by sinks of GHGs in the second half of this century and achieve the generally agreed goal of limiting the increase in global average temperature to well below 2°C above pre-industrial levels.

698 By reason of these various impacts, the Project will have significant impacts on, and be incompatible with, the existing, approved and likely preferred uses of land in the vicinity of the Project.

699 In short, an open cut coal mine in this part of the Gloucester valley would be in the wrong place at the wrong time. Wrong place because an open cut coal mine in this scenic and cultural landscape, proximate to many people's homes and farms, will cause significant planning, amenity, visual and social impacts. Wrong time because the GHG emissions of the coal mine and its coal product will increase global total concentrations of GHGs at a time when what is now urgently needed, in order to meet generally agreed climate targets, is a rapid and deep decrease in GHG emissions. These dire consequences should be avoided. The Project should be refused.

Orders

700 The Court orders:

- (1) The appeal is dismissed.
- (2) State significant development application No SSD5156 for the amended Rocky Hill Coal Project is determined by refusal of consent to the application.

Appeal dismissed

Solicitors for the applicant: *McCullough Robertson Lawyers*.

Solicitor for the first respondent: Department of Planning and Environment.

Solicitor for the second respondent: Environmental Defenders Office.

J VENEZIANO