

LAND COURT OF QUEENSLAND

CITATION: *Hancock Galilee Pty Ltd v Currie & Ors* [2017] QLC 35

PARTIES: **Hancock Galilee Pty Ltd**
(applicant)

v

Bruce Bede Currie and Annette Helen Currie
(first and second respondents)

Coast and Country Association of Queensland Inc.
(third respondent)

Mackay Conservation Group
(fourth respondent)

North Queensland Conservation Council
(fifth respondent)

**Paul Anthony Anderson, Janice Marie Anderson and
Peter Neil Anderson**
(objectors)

**Chief Executive Department of Environment and
Heritage Protection**
(statutory party)

FILE NO/s: MRA713-13
EPA714-13

DIVISION: General division

PROCEEDING: Application for a mining lease and objections to its grant,
objections to environmental authority.

DELIVERED ON: 4 July 2017

DELIVERED AT: Brisbane

HEARD ON: 19, 20, 21, 22, 23, 26, 27, 30 October 2015

HEARD AT: Brisbane

MEMBER: WL Cochrane

ORDER/S:

- 1. Pursuant to s 269(1) of the *Mineral Resources Act 1989* I recommend to the Honourable Minister administering the *Mineral Resources Act 1989* that mining lease MLA 70425 be granted over the application area for the period sought.**
- 2. Pursuant to s 190(1)(a)(ii) of the *Environmental Protection Act 1994* I recommend to the administering authority that the Environmental Authority be issued in the terms of the draft Environmental Authority issued on 5 July 2013.**

CATCHWORDS:

MINING – MINING LEASE – RECOMMENDATIONS – OBJECTIONS
ENVIRONMENT – DRAFT – ENVIRONMENTAL AUTHORITY – OBJECTIONS

Environmental Protection Act 1994, s 3, s 5, s 8, s 125, s 160, s 181, s 182, s 185, s 190, s 191, s 219, s 220, s 222, s 223, s 334ZP, s 334ZR

Environment Protection Biodiversity Conservation Act 1999, s 191

Mineral Resources Act 1989, s 232, s 238, s 260, s 265, s 269, s 422

Mineral Resources and Other Legislation Amendment Regulation (No. 1) 2017

National Environmental Protection Council (Queensland) Act 1994

Petroleum and Gas (Production and Safety) Regulation 2004

State Development and Public Works Organisation Act 1971

The Water Reform and Other Legislation Amendment Act 2014

Water Act 2000

Adani Mining Pty Ltd v The Land Services of Coast and Country Inc & Ors [2015] QLC 48

Commercial Union Assurance Company of Australia Limited v Ferrcom Pty Ltd (1991) 22 NSWLR 389

Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection (2014) 35 QLCR 56

Telstra Corporation v Hornsby Shire Council (2006) 146 LGERA 10

APPEARANCES:

DG Clothier QC, with Mr S Webster (instructed by Ashurst Australia) for the applicant

BB Currie for the first and second respondents, in person

Dr CJ McGrath of Counsel (instructed by Environmental Defender's Office (Qld)) for the third respondent

P Julien, research analyst for the fourth respondent, in person
W Tubman, coordinator, and K Kelly for the fifth respondent,
in person

SOLICITORS: AM Ireland, Lawyer, Litigation Unit, Department of
Environment and Heritage Protection, for the statutory party

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Background

- [1] On the 12 December 2013 this Court received, pursuant to the provisions of the *Mineral Resources Act 1989* ('the MRA') and the *Environmental Protection Act 1994* ('the EPA'), a referral of both mining objections and environmental objections which relate to an application made by Hancock Galilee Pty Ltd for a mining lease MLA 70425 and an environmental authority which related to a proposal to develop a combined underground and open cut thermal coal mine in the Galilee basin in Central Queensland.
- [2] The project is generally referred to as the Kevin's Corner Mine.
- [3] The proposal intended to achieve an output of approximately 30,000,000 tonnes of coal per annum.¹
- [4] The relevant applications for both the mining lease and the Environmental Authority were made in December 2009.
- [5] In documents accompanying the application for a mining lease the applicants provided an overview description of the proposed mining program in the following terms:²
- "Hancock Galilee is investigating the opportunity to develop the Kevin's Corner Coal Project, a large scale thermal coal mine in the Galilee Basin of Queensland, Australia that will be supported by privately owned and operated rail and port infrastructure facilities.
- Upon final development, the Project will produce 30mt pa of export quality thermal coal over a 30 year plus mine life. The coal will be transported more than 400km to its currently preferred port location at Abbott Point in Queensland. It is the current intention of Hancock Galilee to enter into an agreement with a partner to develop the Kevin's Corner Coal Project.
- The project is located approximately 50km north of the township of Alpha, 130 km south-west of the township of Clermont and approximately 360km south-west of Mackay in Central Queensland, Australia."
- [6] The Kevin's Corner Project was designated as a project of state significance by the Coordinator-General pursuant to s 26(1)(a) of the *State Development and Public Works Organisation Act 1971* ('the SDPWOA'). Because of that designation the applicant was obliged to compile and deliver to the Coordinator-General a

¹ See Attachment 3 to the referral (application for mining lease).

² Ibid page 38.

comprehensive environmental impact statement together with a supplementary environmental impact statement and a number of other reports which were made publicly available and which attracted comment.

- [7] The Coordinator-General considered the material contained in the environmental impact statement and other materials and produced a report which was provided on 30 May 2013.
- [8] That report from the Coordinator-General recommended the Kevin's Corner Project proceed on the basis of certain imposed conditions and recommendations and as a consequence of that recommendation the delegate of the Minister responsible for the *Environmental Protection Act* issued a draft Environmental Authority which was consistent with the requirements of the SDPWOA and the EPA subject to a number of conditions.
- [9] The project also required the concurrence of the Commonwealth Government pursuant to the *Environmental Protection and Biodiversity Conservation Act 1999* ('the EPBCA') and on 1 November 2013 the Commonwealth Minister granted environmental approval for the mine to proceed pursuant to the EPBCA. Again that approval carried with it a number of conditions.³
- [10] As is pointed out in the Coordinator-General's Evaluation Report, attachment 36 to the environmental impact statement:⁴
- "On 11 September 2009 the then Coordinator-General declared this project to be a 'significant project' under section 26(1)(a) of the *Queensland State Development and Public Works Organisation Act 1971* (SDPWO Act). This declaration initiated the statutory environmental impact evaluation procedure of Part 4 of the Act, which required the proponent to prepare an EIS for the project.
- The SDPWO Act was amended in December 2012 (with the amendments taking effect on 21 December 2012). The amendments have renamed 'significant project' to 'coordinated project.' The project will be referred to as a coordinated project throughout this evaluation report."
- [11] In that Coordinator-General's report the following components of the proposed development were identified.⁵

³ Ex 52.36.

⁴ Ex 52.36, page 12.

⁵ Ex 52.36, page 3.

- **“Two open-cut mine areas**—with a combined area of 21 km², extending over an initial strike length of 6.5 km reducing to a steady strike length of 4 km.
- **Three underground mine areas**—longwall panels would be approximately 400 metres (m) wide, between 3.5 km to 6 km long and an average extraction height of 4.5 m for the Central and Southern mines and 3.5 m for the northern mine. The width of coal left between longwall panels would be between 33.5 m and 46 m. Subsidence of up to a maximum of 2.9 m deep is expected at the surface.
- **Coal handling and preparation facilities**—including sizing facilities for open-cut and underground operations, an overland conveyor system, automated stacking and reclaim facilities, a multi-module coal handling and preparation plant (CHPP), rail loop and spur.
- **Mining infrastructure area**—site operations control facilities, site vehicle parking, heavy vehicle tyre change facilities, vehicle wash facilities, servicing and maintenance workshops, small stores and first aid facilities.
- **Mine waste and water facilities**—tailings storage facility, overburden emplacements and off-stream water dams.
- **Light industrial area**—workshop, warehouse, storage and welding facilities located along the mine access road adjacent to rail, power and water supplies and the airport. Other mine and support services located in this area would include security, administration, waste management and environmental management facilities.
- **Accommodation village**—suitable for accommodating a workforce of approximately 2000 employees, situated approximately 10 km from the mine.
- **Airport**—a 2.5 km runway to cater for aircraft up to and including an Airbus A230 or Boeing 737 located 8 km east of the project mine infrastructure area.

The following components would be located on the mining lease (refer to Figure 2.3):

- **rail spur**—2km (17.8 km including both on- and off-lease components) of rail infrastructure connecting to the proposed Alpha Coal project railway
- **mine access road**—8km realignment of the Jericho-Degulla Road
- **stock route**—to be realigned where possible with the Jericho-Degulla Road alignment.”

[12] The proposed mining endeavour is not, in a sense, a standalone project. As the Coordinator-General’s report pointed out, there are a number of dependencies on and

relationships with other projects. Those dependencies and relationships are set out in the report as follows:⁶

“The project depends on the completion of the following projects, which are currently at various stage of receiving environmental and other approvals including the:

- Alpha Coal project—an open cut coal mine adjoining the southern boundary of the Kevin’s Corner mine footprint and a rail line with a 60 mtpa capacity, which is proposed to be used but the Kevin’s Corner Project to transport product coal to Abbot Point. I determined that the Alpha Coal project could proceed subject to conditions on 24 May 2012. The project received the Commonwealth Environment Minister’s approval of the controlled action, subject to conditions on 23 August 2012.
- Galilee Basin Transmission Project – a higher voltage power transmission line proposed by Powerlink, which would provide power to the mine site and other Galilee Basin projects via a new 275-kilovolt transmission line from the existing Lilyvale Substation (near Emerald) to a new substation near Alpha.
- Abbot Point Coal Terminal X110 Expansion Project (also known as Terminal 3 (T3)) – a new onshore coal terminal where coal from the Kevin’s Corner and Alpha coal projects for which Hancock Coal Infrastructure Pty Ltd is the preferred developer. The project received the Federal Environment Minister’s approval of the controlled action, subject to conditions, on 10 October 2012.

The impacts of the rail corridor, for transporting coal from both the Kevin’s Corner and Alpha Coal mines, were considered as part of the Alpha Coal project.

The Kevin’s Corner project is also dependent on the ability of the proponent to acquire access to 120 gigalitres of externally sourced water over the 30 year life of the mine (the subject of separate approvals) from the following two sources:

- Purchase water allocation from the Emerald Fairbairn Dam in association with a dedicated water pipeline
- Flood harvesting from the Belyando River.”

[13] As indicated above, consequent upon review by the State Coordinator-General of the environmental impact statement the Commonwealth Coordinator-General recommended that the Kevin’s Corner project proceed on the basis on a number of imposed conditions and recommendations.⁷

[14] The recommended conditions include:

⁶ Ex 52.36, page 9.

⁷ Ex 36 Ex ADM-10 and Ex 52.36, pages 192 to 199.

- (a) “Conditions which would require the proponent to detail the final offset sites proposed to satisfy matters of national environmental significance (and state-significant biodiversity values offset requirements).
- (b) A number of draft EA conditions to ensure effective rehabilitation of the project site. In particular all land disturbed by mining activities must be rehabilitated in accordance with rehabilitation completion criteria (as specified in the rehabilitation management plan and rehabilitation must commence progressively as areas become available.
- (c) A number of conditions and recommendations that apply to the construction and operation of the project in order to protect surface water and ground water values.
- (d) Recommendations to relevant state departments for the collation of monitoring data and the risk based assessment of regional cumulative impact from proposed mining activities to address potential cumulative impacts on regional water resources, including potential impacts on existing water users, aquatic habitat loss and impacts on ecological systems.
- (e) Conditions for inclusion as part of any *Environment Protection Biodiversity Conservation Act (Cth)* approval in order to address potential impacts on matters of national environmental significance.”

[15] A full copy of the Coordinator-General’s conditions is attached to this decision as Annexure A.

[16] Conditions Imposed by the Federal Minister for the Environment pursuant to s 130(1) and 133 of the *Environment Protection Biodiversity Conservation Act 1999* is annexed hereto as Annexure B.

Legislative Requirements

[17] Because this matter involves both objections pursuant to the provisions of the *Mineral Resources Act 1989* and objections made pursuant to the provisions of the *Environmental Protection Act 1994* it is necessary to identify the relevant requirements of each of those acts.

[18] The MRA sets out the processes to making objections to the grant of a mining lease.

[19] Section 260 of that Act is the relevant section and provides that any objections are to be made in writing, lodged with the chief executive in the approved form and set out grounds of objection and the facts and circumstances relied upon by the objector in support of those grounds.

[20] Section 265 of the MRA applies and deals with the situation (as in the present case) where there is a properly made objection for an application to a mining lease and the

application for a mining lease relates to an application under s 125 of the EPA for an environmental authority for a mining activity relating to a mining lease and where an objection to that environmental authority has been made under the EPA or where the applicant for an environmental authority has requested that the application for the Environmental Authority should be referred to the Land Court.

[21] Section 265 of the MRA then imposes an obligation upon the chief executive to refer:

- (a) the application for the mining lease;
- (b) all properly made objections for the application for the mining lease;
- (c) all objection notices relating to the application for the environmental authority given under the Environmental Protection Act 1994, section 182(2);
- (d) if the applicant for the environmental authority has requested the EPA administering authority to refer the application to the Land Court under the Environmental Protection Act, section 183—a copy of the request.

[22] Once those matters are attended to the Land Court fixes a date for hearing.

[23] The requirements imposed upon the Court for its making of a recommendation to the Honourable the Minister are set out in s 269.

[24] Section 269(2) of the MRA provides that the Land Court must make a recommendation to the Minister that the application be granted or rejected in whole or in part.

[25] Relevantly for this particular matter s 269(3) provides:

A recommendation may include a recommendation that the mining lease be granted subject to such conditions as the Land Court considers appropriate, including a condition that mining should not be carried on above a specified depth below specified surface area of the land.

[26] Section 269(4) of the MRA sets out the criteria which the Court is required to take into account and consider.

[27] Those criteria are whether:

- (a) the provisions of this Act have been complied with; and
- (b) the area of land applied for is mineralised or the other purposes for which the lease is sought are appropriate; and
- (c) if the land applied for is mineralised, there will be an acceptable level of development and utilisation of the mineral resources within the area applied for; and
- (d) the land and the surface area of the land in respect of which the mining lease is sought is of an appropriate size and shape in relation to—
 - (i) the matters mentioned in paragraphs (b) and (c); and

- (ii) the type and location of the activities proposed to be carried out under the lease and their likely impact on the surface of the land; and
- (e) the term sought is appropriate; and
- (f) the applicant has the necessary financial and technical capabilities to carry on mining operations under the proposed mining lease; and
- (g) the past performance of the applicant has been satisfactory; and
- (h) any disadvantage may result to the rights of—
 - (i) holders of existing exploration permits or mineral development licences; or
 - (ii) existing applicants for exploration permits or mineral development licences; and
- (i) the operations to be carried on under the authority of the proposed mining lease will conform with sound land use management; and
- (j) there will be any adverse environmental impact caused by those operations and, if so, the extent thereof; and
- (k) the public right and interest will be prejudiced; and
- (l) any good reason has been shown for a refusal to grant the mining lease; and
- (m) taking into consideration the current and prospective uses of that land, the proposed mining operation is an appropriate land use.

[28] In this matter I confirm that I have taken into account and considered in detail each of the s 269(4) criteria for the purpose of making my recommendation and have included details of my consideration of each criterion under s 269(4) where an objection has been made which has related to any of those relevant criteria.

[29] The statutory requirements of the *Environmental Protection Act 1994* are somewhat different.

[30] The object of the EPA is set out in s 3 which provides that:

The object of this Act is to protect Queensland’s environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (*ecologically sustainable development*).

[31] The obligations pursuant to the act which are imposed, inter alia, upon this Court are set out in s 5 provides:

If, under this Act, a function or power is conferred on a person, the person must perform the function or exercise the power in the way that best achieves the object of this Act.

[32] Because issues relating to the environment are central to at least part of this decision it is appropriate to give some consideration to how the Act defines “environment” which it does in s 8, in the following terms:

Environment includes—

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) all natural and physical resources; and
- (c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and
- (d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

[33] Section 160 of the EPA provides for the right of any entity, within the submission period, to make a submission to the administering authority about the application.

[34] Once the statutory party makes a decision on the application for the draft Environmental Authority in accordance with Chapter 5, Part 5, Division 2, Subdivision 2 of the EPA, the applicant and any submitters are notified of the decision (see s 181) and a submitter may then, pursuant to s 182 of the EPA, give a written notice to the statutory party that they request their submission to be taken to be an objection to the application.

[35] The statutory party then, pursuant to the obligations imposed upon it under s 185 of the EPA, refers the matter(s) to the Land Court for the making of an objections decision.

[36] Pursuant to the EPA, the administering authority acted in accordance with the Act's requirements and referred to the objections to the Land Court.

[37] The hearings under the MRA and EPA were conducted at the same time.

[38] The EPA sets out in s 190 and s 191 the nature of the objection decisions and what the Court must consider:

190 Nature of objections decision

- (1) The objections decision for the application must be a recommendation to the administering authority that –
 - (a) if a draft environmental authority was given for the application—
 - (i) the application be approved on the basis of the draft environmental authority for the application; or
 - (ii) the application be approved, but on stated conditions that are different to the conditions in the draft environmental authority; or
 - (iii) the application be refused; or
 - (b) if a draft environmental authority was not given for the application—

- (i) the application be approved subject to conditions; or
 - (ii) the application be refused.
- (2) However, if a relevant mining lease is, or is included in, a coordinated project, any stated conditions under subsection (1)(a)(ii) or (b)(i)—
- (a) must include the Coordinator-General's conditions; and
 - (b) can not be inconsistent with a Coordinator-General's condition.

191 Matters to be considered for objections decision

In making the objections decision for the application, the Land Court must consider the following—

- (a) the application;
- (b) any response given for an information request;
- (c) any standard conditions for the relevant activity or authority;
- (d) any draft environmental authority for the application;
- (e) any objection notice for the application;
- (f) any relevant regulatory requirement;
- (g) the standard criteria;
- (h) the status of any application under the Mineral Resources Act for each relevant mining tenure.

[39] The term “standard criteria” referred to in s 191(g) is defined in Schedule 4 to the EPA to mean:

standard criteria means—

- (a) the following principles of environmental policy as set out in the Intergovernmental Agreement on the Environment—
 - (i) the precautionary principle;
 - (ii) intergenerational equity;
 - (iii) conservation of biological diversity and ecological integrity; and
- (b) any Commonwealth or State government plans, standards, agreements or requirements about environmental protection or ecologically sustainable development; and
- (d) any relevant environmental impact study, assessment or report; and
- (e) the character, resilience and values of the receiving environment; and
- (f) all submissions made by the applicant and submitters; and
- (g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—
 - (i) an environmental authority;
 - (ii) a transitional environmental program;
 - (iii) an environmental protection order;
 - (iv) a disposal permit;
 - (v) a development approval; and
- (h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and

- (i) the public interest; and
- (j) any relevant site management plan; and
- (k) any relevant integrated environmental management system or proposed integrated environmental management system; and
- (l) any other matter prescribed under a regulation.

[40] The reference in that definition to the “Intergovernmental Agreement on the Environment” is clarified further in Schedule 4 in the following terms:

Intergovernmental Agreement on the Environment means the agreement made on 1 May 1992 between the Commonwealth, the States, the Australian Capital Territory, the Northern Territory and the Australian Local Government Association.

Note—

A copy of the Intergovernmental Agreement on the Environment is in the National Environment Protection Council (Queensland) Act 1994, schedule.

[41] That agreement appears as a schedule to *National Environment Protection Council (Queensland) Act 1994* and relevantly contains the following provisions:

3.5.1 Precautionary principle

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- (ii) an assessment of the risk-weighted consequences of various options.

3.5.2 Intergenerational equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

3.5.3 Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity should be a fundamental consideration.

[42] The precautionary principle has been widely considered by this and by other Courts in Australia.

[43] Preston CJ said in *Telstra Corporation v Hornsby Shire Council*:⁸

“The application of the precautionary principle and the concomitant need to take precautionary measures is triggered by the satisfaction of two conditions precedent or thresholds: a threat of serious or irreversible environmental damage and scientific uncertainty as to the environmental damage. These

⁸ (2006) 146 LGERA 10 [128].

conditions or thresholds are cumulative. Once both of these conditions or thresholds are satisfied, a precautionary measure may be taken to avert the anticipated threat of environmental damage, but it should be proportionate.”

[44] In his decision Preston CJ went on to observe that:⁹

“Determining the existence of a threat of serious or irreversible environmental damage does not involve, at the stage of assessing the first condition precedent, any evaluation of the scientific uncertainty of the threat... If there is not a threat of serious or irreversible environmental damage, there is no basis upon which the precautionary principle can operate.”

[45] Her Honour President MacDonald of this Court gave detailed consideration to the observations of Preston CJ in the context of the precautionary principle in her decision in *Adani Mining Pty Ltd*.¹⁰

[46] In that case her Honour paraphrased the following sections from the decision of Preston CJ:

“The second condition precedent required to trigger the application of the principle is that there be a “lack of full scientific certainty”. The uncertainty is as to the nature and scope of the threat of environmental damage. Full scientific certainty is not required. If there is no, or not considerable scientific uncertainty, the second condition precedent is not satisfied and even though there is a threat of serious or irreversible environmental damage (that is, the first condition precedent is satisfied) the precautionary principle will not apply. The threat of serious irreversible environmental damage can be classified as relatively certain because it is possible to establish a causal link between an action or event and environmental damage, to calculate the probability of their occurrence, and to insure against them. Measures will still need to be taken but these will be preventative measures to control or regulate the relatively certain threat of serious or irreversible environmental damage, rather than precautionary measures which are appropriate in relation to uncertain threats.

If each of the two conditions precedent is satisfied the precautionary principle will be activated. At this point the evidentiary burden of proof shifts. A decision-maker must assume that the threat of serious or irreversible environmental damage is no longer uncertain but is a reality. The burden of showing that the threat does not exist or is negligible reverts to the proponent of the development. The rationale for requiring this shift of the burden of proof is to ensure preventative anticipation; to act before scientific certainty of cause and effect is established. The preference is to prevent environmental damage rather than to remediate it.

The function of the precautionary principle is, therefore to require the decision-maker to assume that there is or there will be a serious or irreversible threat of environmental damage and to take this into account,

⁹ (2006) 146 LGERA 10 [137] and [138].

¹⁰ *Adani Mining Pty Ltd v The Land Services of Coast and Country Inc & Ors* [2015] QLC 48 (citations omitted).

notwithstanding that there is a degree of scientific uncertainty about whether the threat exists.

There is nothing in the formulation of the precautionary principle which requires the decision-maker to give the assumed factor (the serious or irreversible environmental damage) overriding weight compared to the other factors required to be considered, such as social and economic factors, when deciding how to proceed. The effect of the shift in the evidentiary burden of proof simply means that, in making the final decision, the decision-maker must assume that there will be serious or irreversible environmental damage. That factor must be taken into account in the calculus which decision-makers are instructed to apply under environmental legislation.

The precautionary principle should not be used to try to avoid all risks. Rationality also dictates that the precautionary principle and any preventative measure cannot be based on a purely hypothetical approach to the risk, founded on mere conjecture which has not been scientifically verified.

The type and level of precautionary measures that will be appropriate will depend on the combined effect of the degree of seriousness and the irreversibility of the threat and the degree of uncertainty. This involves assessment of risk, namely the probability of the event occurring and the seriousness of the consequences should it occur. The more significant and more uncertain the threat, the greater the degree of caution required.

Prudence also suggests that some margin for error should be retained until all the consequences of the decision to proceed with the development are known. One means of retaining a margin for error is to implement a step-wise or adaptive management approach, whereby uncertainties are acknowledged and the area affected by the development plan, program or project is expanded as the extent of uncertainty is reduced. An adaptive management approach might involve the following core elements:

- monitoring impacts of management or decisions based on agreed indicators;
- promoting research, to reduce key uncertainties;
- ensuring periodic evaluation of the outcomes of implementation, drawing lessons, and review or adjustment, as necessary, of the measures or decisions adopted;
- establishing an efficient and effective compliance system.

The precautionary principle embraces the concept of proportionality, that is that measures should not go beyond what is appropriate and necessary in order to achieve the objectives in question. A reasonable balance must be struck between the stringency of the precautionary measures, which may have associated costs, such as financial, livelihood and opportunity costs and the seriousness and irreversibility of the potential threat.

The precautionary principle, where triggered, does not necessarily prohibit carrying out the development plan, program or project until full scientific certainty is attained. The solution is to assess the risk-weighted consequences of various options and select the option that affords the appropriate degree of precaution for the set of risks associated with the option.

The precautionary principle is but one of the sets of principles of ecologically sustainable development. It should not be viewed in isolation, but rather as part of the package. This means that the precautionary measures that should be selected must not only be appropriate having regard to the precautionary principle itself, but also in the context of the other principles of ecologically sustainable development, including inter-generational and intra-generational equity and the conservation of biological diversity and ecological integrity.”

[47] The standard criteria in the EPA identifies, at paragraph (i), the public interest as another matter to which this Court must give consideration.

[48] As the President MacDonald observed in *Adani Mining Pty Ltd*.¹¹

“The public interest involves a discretionary balancing exercise of the widest import confined only so far as the subject matter and the scope and purpose of the statute may enable.”¹²

[49] It might be noted at this point that this proposal is a mining activity which is included in a coordinated project so that any conditions recommended must include the Coordinator-General’s conditions and cannot be inconsistent with the Coordinator-General’s conditions.

[50] Ms Ireland on behalf of the statutory party reminded the Court that the conditions which are attached to the draft Environmental Authority, except for conditions from H11 to H14 which conditions concern biosolids, are conditions imposed by the Coordinator-General as per Appendix 1 of the Coordinator-General’s Evaluation Report.¹³

[51] The consequence of that is that this Court’s recommendation with respect to the conditions attached to the draft Environmental Authority can only consist of recommendations for additions of or extensions to those Coordinator-General’s conditions.

[52] This is not a case in which some ancillary conditions have been imposed by the Coordinator-General as a consequence of its assessment so consequently, with respect to all of the conditions, nothing that I recommend can be inconsistent with those conditions.

¹¹ Ibid [43].

¹² In making that observation her Honour drew attention to *O’Sullivan v Farrer* (1989) 168 CLR 210 [216]; *Water Conservation & Irrigation Commission (NSW) v Browning* (1947) 74 CLR 492 [504] and [505]; *McKinnon v Secretary, Department of Treasury* [2006] HCA 45; (2006) 228 CLR 423.

¹³ T 2-44, lines 21 to 25.

- [53] Further, no objections in respect of or submissions relating to conditions H11 to H14 have been raised in this case.
- [54] It has been commented on by other Members of this Court that there is some small degree of tension between the objects of the EPA and those of the MRA.
- [55] The key objective of the MRA is to encourage and permit the mining of the State's mineral resources while, as outlined above, the EPA has the objective of protecting Queensland's environment while allowing for ecologically sustainable development.
- [56] Mineral resources are, by their nature, immovable and must be exploited where they are located.
- [57] It is an inescapable fact that from time to time mineral resources are discovered in areas which have already been developed for other purposes, most notably pastoral and agricultural uses.
- [58] The exploitation of mineral resources in such circumstances inevitably results in the disruption and, occasionally, the cessation of those other activities.
- [59] Such an outcome is sought to be accommodated by the compensation provisions of the MRA.
- [60] Similarly it is an inevitability that mining activities will have some impact upon the environment as they are by their nature generally permanently or temporarily destructive of some element of the environment. Hence the acknowledgement in the legislative articulation of the "precautionary principle" that there is a need to avoid wherever practicable serious or irreversible damage to the environment.
- [61] That clearly recognises that sometimes environmental damage will be unavoidable and irreversible.
- [62] As I think is generally widely known, mining projects of the magnitude of what is proposed by Hancock Galilee Pty Ltd have to confront various levels of approval including, relevantly, both Commonwealth and State Government scrutiny. This Court has no jurisdiction with respect to Commonwealth matters but it is trite to observe that this mining project cannot proceed without the approval of the

Commonwealth Government, in particular, pursuant to the provisions of the *Environment Protection and Biodiversity Conversation Act 1999*.

[63] On 1 November 2013 the Minister for the Environment the Honourable Greg Hunt MP signed an approval decision in respect of the project.¹⁴

[64] That approval decision, effective until 30 October 2073 was subject to a number of conditions.

[65] Because of the way in which the hearing of this matter proceeded it is not necessary nor appropriate for me to identify those conditions in particular detail save to observe that, with respect to some of the matters raised by the objectors, the conditions included:

- (a) Identification of the project area;
- (b) The identification of disturbance limits for EPBC listed species;
- (c) The identification and articulation of a biodiversity offset strategy which needs to approved by the relevant Commonwealth Minister;
- (d) Provision for biodiversity offset funding and administration;
- (e) The creation of an offset management plan, again subject to ministerial approval;
- (f) A rehabilitation plan;
- (g) A Rewan Formation Connectivity Research Plan which focused upon the Rewan Formation within the area impacted by the mine, which included but was not limited to, an investigation into methods, including seismic surveys to determine the type, extent and location of faulting and fracturing and an examination of the hydraulic properties of the Rewan Formation, to better characterise the Rewan Formation and the contribution of fractures and faults to connectivity;
- (h) A water monitoring and management plan which included the identification of:
 - I. Baseline monitoring network;
 - II. Numerical ground water model;
 - III. Numerical bore monitoring network;
 - IV. Numerical for the identification of threshold and exceedance limits;
 - V. Management and response actions.
- (i) Final void water monitoring and management plan. (The conditions are annexed as Annexure B.)

The Objections Pursuant to the *Mineral Resources Act 1989*

Coast and Country Association of Queensland (CCAQ) Objection

¹⁴ Ex 38, page 125.

[66] By letter dated 5 September 2013, the Environmental Defenders Office (EDO), acting as the lawyers for the Coast and Country Association of Queensland Incorporated, lodged objections to each of the mining lease and the environmental authority.

Grounds of Objections

1. The application for the mining leave (**the Lease Application**) for the Kevin's Corner Coal Mine Project (**the Project**) should be refused under the *Mineral Resources Act 1989* (Qld) (**MR Act**) considering;
 - (a) **Groundwater:** It has not been adequately demonstrated that the Project will not have an unacceptable adverse impact on groundwater and related species and ecosystems considering s 269(4)(j), (l), (m) of the MR Act. In particular:
 - i. It has not been adequately demonstrated that the Project will not have an unacceptable adverse impact on the environment by changes to the quality and quantity of groundwater considering s 269(4)(j) of the MR Act;
 - ii. The absence of adequate scientific information about a potential impact with severe and long term impacts is good reason to refuse Lease Application consider s 269(4)(l) of the MR Act; and
 - iii. The adverse environmental impacts and potentially severe adverse environmental impacts caused by these proposed mining operations on groundwater make it an inappropriate use of the land when current land use does not pose a similar threat considering s 269(4)(m) of the MR Act.
 - (b) **Surface water:** It has not been adequately demonstrated that the Project will not have unacceptable adverse impacts and potentially severe and long term adverse impacts on the quantity, quality and ecology of surface water and related species that have not been adequately assessed considering s 269(4)(j), (l) and (m) of the MR Act. In particular:
 - i. the Project will have an unacceptable adverse impact on the environment by adverse impacts on surface water quality, quantity and ecology (including related species) considering s 269(4)(j) of the MR Act;
 - ii. The absence of adequate scientific information about potentially severe and long term impacts is good reason to refuse Lease Application considering s 269(4)(l) of the MR Act; and
 - iii. The adverse environmental impacts and potentially severe adverse environmental impacts caused by these proposed mining operations on surface water by the creation of a permanent final void, alienating the land from current and future production use, make it an inappropriate use of the land when current land use does not pose a similar threat considering s 269(4)(m) of the MR Act.

- (c) **Climate change:** It has not been adequately demonstrated that the Project will not increase the likelihood, severity and longevity of the environmental harms that will result from climate change, considering the combined effect of s 269(4)(j) and (l) of the MR Act.
- (d) **Biodiversity:** It has to be adequately demonstrated that the Project will not have unacceptable adverse impacts on biodiversity considering s 269(4)(j), (l) and (m) of the MR Act. In particular:
 - i. The Project will have adverse impacts on the environment by adverse impacts on biodiversity considering s 269(4)(j) of the MR Act;
 - ii. The absence of adequate scientific information about potentially severe and long term adverse impacts on biodiversity is good reason to refuse the Lease Application considering s 269(4)(l) of the MR Act; and
 - iii. The adverse environmental impacts and potentially severe adverse environmental impacts caused by these proposed mining operations on biodiversity is an inappropriate use of the land when current use does not pose a similar threat considering s 269(4)(m) of the MR Act.
- (e) **Economic and social matters:** It has not been adequately demonstrated that the Project will not have adverse economic impacts, considering s 269(4)(j) and (l) of the MR Act. In particular:
 - i. The definition of environment in the MR Act is broad and includes, amongst other things, social and economic conditions consider s 8 of the EP Act.
 - ii. The Project will have adverse economic impacts and potentially severe adverse economic impacts caused by these proposed mining operations on local, regional, state and global economies and communities considering s 269(4)(j) of the MR Act, including:
 - A. Downward pressure on employment in other industries by directly competing for labour or economic pressure on other industries;
 - B. Economic costs of impacts on the environment through the impacts which result from the contribution of the Project to climate change.
 - iii. The adverse economic impacts of the Project have not been adequately assessed.
 - iv. The failure to demonstrate a net economic benefit from the Project, through a total cost benefit analysis which includes assessment of the adverse economic impacts, is a good reason to refuse the Project considering s 269(4)(l) of the MR Act.
 - v. the adverse economic impacts and the potentially severe adverse economic impacts caused by these

- proposed mining operations make it an inappropriate use of the land when current land use does not pose a similar threat.
- vi. There is not sufficient economic need for the project to justify the Impacts and risks set out in grounds 1(a)-1(d) above.
 - (f) **Public interest:** The adverse impacts and risks of the Project to groundwater, surface water, climate change and the economy described in 1(a) to 1(e) above collectively outweigh the purported benefits of the Project and justify refusal on the basis that it would prejudice the public right and interest considering s 269(4)(k) of the MR Act.
2. In the alternative to 1 above, if the application is not refused, conditions should be imposed to address grounds raised in 1 above.

The Opening of Coast and Country Association of Queensland Inc

[67] In the course of his opening Dr McGrath told the Court that there were, effectively, three limbs to the case being raised by Coast and Country Association of Queensland Inc (CCAQ).

[68] The first of those was, as Dr McGrath submitted, that there was no material difference to the evidence presented to the Court in what is colloquially referred to as the Alpha case¹⁵ and that in the present case, and that accordingly the findings of fact in the orders made in the present case should be identical to those in the Alpha case.

[69] He also opened what at that stage he said was his second point, namely that:¹⁶

“The applicant’s evidence on groundwater is deeply unsatisfactory and the impacts on groundwater in the area surrounding Alpha and Kevin’s Corner mines are likely to be far greater than the applicants suggests, particularly on the farms to the north of the mines.”

[70] Dr McGrath’s third point was that the applicant’s EIS overstates the potential economic benefits of the mine.

[71] Obviously all of those matters depend upon the evidence which is adduced before me and I am not obliged nor entitled to simply say, “Well the evidence is similar to the Alpha case and therefore the outcome should be the same”.

[72] With respect to the Alpha case I note that in that case the Court heard evidence from 22 witnesses, the vast majority of whom were experts in one area or another.

¹⁵ *Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection* (2014) 35 QLCR 56.

¹⁶ T 2-8, lines 42 to 45.

[73] In the present case, where the issues were much more confined, the Court heard evidence from only eight witnesses.

[74] In attempting to articulate his client's case in simplistic terms Dr McGrath, having regard to what he said was the misapprehension by the applicant's experts of the patterns of water flow within the aquifer, said:¹⁷

“Dr Webb, my client's expert on ground water, has proposed what he sees as the only plausible mechanism to explain the observed ground water flow in the Colinlea Sandstone on the mine site, that there must be recharge occurring in the ranges to the west and southwest of the site. He proposed it, your Honour, as a hypothesis and as scientific fashion, but it's – I'll put it in the unscientific terms, it's the only plausible explanation that makes sense based on what's observed on site and that something must be driving it.

There must be recharge there for the simple reason that without recharge a hydraulic head could not be maintained that is driving the ground water across the mine site.”

[75] Earlier in the course of his opening Dr McGrath propounded the following:¹⁸

“Now, the problem with that is that the data collected from the Colinlea Sandstone on the sites of the Alpha and Kevin's Corner Mines shows that, in fact, ground water in those strata – sorry, in the Colinlea Sandstone is flowing up the dip to the right of this diagram. That is, on the side it's flowing from the southwest to the northern and northeast corner of the site. So it's moving up and across the site. So it's flowing up-dip. Now, there must be an explanation for the flow actually recorded on the site and the explanation must be that the applicant's conceptualisation of the geology and hydrogeological – I'll reword that. The explanation must be that the applicant's geological and hydrogeological conceptualisation of the region is wrong.

The applicant, understandably, has very good data for the mine site because that's the place where it's proposing to mine and things like ground water flow and faulting are major issues for mine planning. It has to deal with them and it also wants to find out, you know, how much resource is there. So it does a lot of drilling on the mine site. So it's got really good data there. But outside of the mining lease areas the data is far more sketchy.

[76] He had previously explained that, so far as his client was concerned, their main focus was on groundwater issues but that it raised economics “to make the case that economics do not trump other issues like groundwater in the precautionary principle.”¹⁹

¹⁷ T 2-10, lines 35 to 43.

¹⁸ T 2-10, lines 18 to 26.

¹⁹ T 2-9, lines 11 to 12.

Mackay Conservation Group Inc. Objection

[77] By letter dated 6 September 2013, the Mackay Conservation Group Inc. lodged objections to each of the mining lease and environmental authority:

“Considering sections 269(4)(j), (k), (l) and (m) of the Minerals Resources Act 1989, the application for mining lease 70425 for the Kevin’s Corner Coal Mine should be refused for the following good reasons:

- 1) there is not adequate information to demonstrate that the mine and its operations will not cause unacceptable and significant adverse environmental impacts regarding biodiversity, particularly threatened species, in comparison to the current use of the land;
 - 2) there is not adequate information to demonstrate that the mine and its operations will not cause unacceptable adverse economic impacts; and
 - 3) as proposed, the mine will prejudice the public interest.
- Otherwise, if the application is not refused, conditions should be imposed that address the above issues.”

[78] The Mackay Conservation Group did not actively participate in the hearing itself but did make written submissions.

The approach of NQCC – Ms Tubman

[79] By letter dated 5 September 2013, the North Queensland Conservation Council lodged objections to each of the mining lease and environmental authority.

Regarding: Mining Lease (application) 70425

On land described as: Lot 1007 on NPW828 Resources Reserve, Lot 1788 on PH886 Pastoral Holding 1211788, Lot 3533 on SP247396 Pastoral Holding 12/3533, Lot 649 on SP232649 Pastoral Holdings 12/649, Lot 681 on PH406 Pastoral Holding 12/681, Lot4994 on SP233100 Pastoral Holding 12/4994 and Degulla Road Reserve, located approx. 50 Km north west of Alpha township.

Grounds of objection:

1. Assessment of the adverse cumulative impacts of the mine, including but not limited to associated infrastructure and the impacts or anticipated impacts of other existing and proposed mines in the central Queensland region, is inadequate.
2. The cumulative impact of the mine and other existing and proposed mines needs further examination, including the spatial, temporal and interactive or synergistic impacts across the full range of issues and sectors subject to impact.
3. The project, along with other existing and proposed projects, will make an unacceptably large contribution to depleting the global carbon budget that must be met if there is to be a good chance of remaining under 2 degrees Celsius warming, as detailed in the 2013 report *The Critical Decade*.
4. Given the uncertainty of the global greenhouse emissions management regime, the term of the lease is not acceptable. If global emissions continue at the current rate, the carbon budget will be exhausted by around 2028, early in the life of this mine. New global agreements scheduled for 2015 may make

the mine uneconomic. In such a situation, major damage to the environment would be done for limited, largely private, economic gain.

5. The conditions imposed are inadequate to ameliorate cumulative impacts and do not require outstanding 6. Cumulative impact assessment work to be completed.

6. The conduct of the mine would contravene part (d) of the Objectives of the Mineral Resources Act (MRA) 1989, as well as sections 269 (4) e, and (i) to (m) of the Act.

[80] In the course of the opening of the case Ms Tubman on behalf of NQCC was able to succinctly articulate the approach of the organisation she represented.

[81] She said:²⁰

“The first Kevin’s Corner mine in the Galilee Basin represents a significant challenge for governance in Queensland. This court, as part of that governance, will decide whether or not the objections to the State Government’s approval of the mine have merit. North Queensland Conversation Council, NQCC, argues that a robust and dispassionate assessment of the proposal would have resulted in its rejection. Kevin’s Corner – the name suggest something small, something diminutive, but the proposed Kevin’s Corner mine will be huge.

As we’ve heard, with two open-cut pits and three underground longwall operations it will extract 30 million tonnes of coal every year for 30 or more years. It will be one of the largest coal mines in Australia, and indeed one of the largest in the world. For that reason alone it is imperative that the full impacts of the mine must be known and assessed before it can go ahead. Without a good cumulative impact assessment the full impact of this massive project on the environment, on the community and on the economy cannot be properly determined.”

[82] Ms Tubman went on to clarify that by asserting that, on her reading of the MRA and the EPA, their provisions necessarily require this Court to consider the cumulative impacts of not only this mine but all other mines in the area. She said:²¹

“Obviously cumulative impact assessment is an essential – a fundamental part of the process by which the regulators and the courts decide on behalf of the people which development proposals they will allow and which they will not. Kevin’s Corner project has been assessed by the coordinator general and by the delegate of the Department of Environment and Heritage. Is it possible that they have not given sufficient weight to the fact that such an essential component of the assessment process is lacking? The evidence, we contend, points to that being the case.

The importance of cumulative impact assessment is also apparent in the Environment Protection Act. Section 14, which refers to environmental harm, states:

²⁰ T 1-92, line 25 to 40.

²¹ T 1-94, line 40 to T 1-95, line 28.

Environmental harm may be caused by an activity whether the harm is a direct or indirect result of the activity or whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

The Act is, in essence, pointing to the nature of the assessment required under the EIS, which demands consideration of the direct, indirect and combined or cumulative impacts.

In a period of rapid development, the critical nature of cumulative impact assessment is increasingly recognised. Much of that recognition has been generated not by legislation but by an appreciation of two simple facts, substantiated over and over again by incontrovertible evidence. The first is that activities do not occur in isolation. They occur, and must be assessed, in context. The second is that the whole is greater than the sum of the parts. The synergistic interaction of the parts, or the impacts, as well as the sum of the impacts themselves, must be considered if the whole impact is to be identified. Cumulative impact assessments or CIA amongst laypeople are seen as a means of avoiding the phenomenon of death by a thousand cuts or creeping normality.”

[83] It became clear that Ms Tubman’s main point in her submissions to the Court was that she and the organisation she represents seek a requirement that an environmental impact assessment ought to be done on the basis of cumulative impact assessment that goes beyond even partial consideration of two immediately adjacent mines.

[84] She said:²²

“NQCC contends that information that would enable decision-makers to properly assess whether or not this project could be the straw that breaks the camel’s back has not been provided. At some point in the decision making process, a judgment needs to be made as to whether the cumulative impacts begin to outweigh the purported benefits. Until some proper semblance of a cumulative impact assessment has been done to inform that decision, approval of the project should not be given.”

[85] Ms Tubman pointed to a document entitled Cumulative Impacts: A Good Practice Guide for the Australian Coal Mining Industry published by the Centre for Social Responsibility in Mining at the Sustainable Minerals Institute of the University of Queensland.²³

[86] Upon being invited by me to identify any particular social impacts that she said should have been more particularly assessed, she said:²⁴

²² T 1-96, lines 41 to 46.

²³ T 1-100, lines 23 to 27.

²⁴ T 1-102, lines 8 to 10.

“I would suggest there are a number, but at this stage we would like just to refer to the fly-in, fly-out, the impacts on communities, the impacts on how families and communities relate. I’ll leave it at that. There are lots of others.”

[87] In a later dialogue she succinctly summarised her views in the following terms:²⁵

“The expert witness reports provided by the applicant failed to acknowledge these deficiencies. Impacts arising from the use of the rail infrastructure to carry coal from the Kevin’s Corner mine to Abbott Point, and from the shipping of the coal from Kevin’s Corner through the Great Barrier Reef have not been considered in the cumulative impact assessment for the Kevin’s Corner project, despite the fact that they are essential to the mine itself. They would have been considered under the Good Practice Guide and they are just as relevant as the impacts of other mines. To exclude them suggests either a failure to understand the nature of cumulative impact assessments, or worse, an intention to exclude them. Either way the failing is unacceptable and contributes to making the decision to approve the mine insupportable.”

[88] Ms Tubman concluded her opening by informing the Court of the following:²⁶

“And I conclude – and it is clear from the examination of the cumulative impact assessment information provided in the EIS, in the supplementary EIS and in later documentation, the process has, we contend, been massively deficient. It does not provide the information needed by decision makers. As a result, informed decisions have not been made and because of the paucity of the approach taken, it will be impossible to make such decisions, even if the forward work plan reports were to be provided as scheduled. How can informed decisions be made in the essential – in the absence of essential information? How can it be said that conditions which may be placed in the project will be adequate when the extent of environmental harm has not been established? How can it be assumed that adequate conditions would even exist?”

Cumulative impact assessment is not some new, trendy addition to the project assessment process. The requirements for the information to be provided in order to contribute to decision-making have been around for some time. Guidance on how to undertake cumulative impact assessments has been around for a similar period. It is a critical component of decision-making. It is an awareness of the fact that projects must be assessed in context rather than in isolation because the whole is very often greater than the sum of the parts. What has sufficed in the past can no longer be accepted.

It is acknowledged that cumulative impact assessment is a significant body of work but is now recognised as essential information, especially in the case of massive, irreversible developments such as Kevin’s Corner. And in relation to that, robust information must be provided to decision makers in order for them to make a scientifically-based and incontrovertible assessment. The harm which could result from the project may well be too great to allow for its approval. And I thank you on behalf of NQC for the opportunity to present to the court our objection.”

²⁵ T 1-102, lines 35 to 45.

²⁶ T 1-105, lines 12 to 39.

[89] In response to those observations, Mr Clothier of Queens Counsel reminded the Court that firstly, NQCC was not proposing to produce any evidence in respect of the matters that were opened and secondly, to the extent that specific mention was made of greenhouse gas and climate change issues in relation to cumulative impact assessment, those matters did not form any part of the current objection and in fact had been expressly abandoned.

[90] I am also bound to observe that, as compelling as some of the logic of the good practice guide for Australian Coal Mining Industry may be, it is not received any legislative endorsement from either the Queensland and or the Commonwealth governments.

Bruce Currie and Annette Currie Objection

[91] By letter dated 2 September 2013, Bruce Bede Currie and Annette Helen Currie lodged objections to each of the mining lease and environmental authority:

“We, Bruce Bede Currie and Annette Helen Currie of “Speculation”, Jericho in the state of Queensland do hereby give notice that we object to draft environmental authority no. MIN101016810 on the following grounds:

1. The applicant has not adequately investigated the importance of our bores or the impact of proposed mining on them.

- a. Our two bores on “Speculation” are absolutely indispensable to our grazing business. They underpin our productivity and the value of our property. We are close to both the Kevin’s Corner project and the Alpha Coal project, so direct and cumulative impact must be considered and precautionary principle should be applied.
- b. While the bore water supply is supplemented by some dams, these are often dry due to lack of rain – they are not a reliable source.
- c. Currently the water from the two bores supports between 1,300 and 1,800 cattle, depending on our trading activities.
- d. Without the bores ‘Speculation’ would carry only a fraction of its present herd and would lose most of its present market value.
- e. Hancock Galilee Pty Ltd, in its bore survey, did not identify our bores and did not adequately investigate the potential drawdown from its proposed mining activities or the cumulative effect with the other proposed mines nearby. No predictive contours have been provided showing where there is no drawdown so it is not possible for our bores to be classified not as risk.
- f. By contrast, the EIS of Waratah Coal just south of MLA 70425 did include bores west of its lease including monitoring bores in its

assessment. It found that mining drawdown may affect bores in the shallow Tertiary and Permian aquifers within 11km to 30km of the mine. Our bores are well within that drawdown range from the Hancock lease, and the private bores of various other owners are also at risk.

- g. Hancock Galilee Pty Ltd, Kevin's Corner project, SEIS – Groundwater Report indicates predicted direct impact and cumulative drawdown contours for both Kevin's Corner project and Alpha Mine project do not support Hancock Galilee's claim that our groundwater and bores will not be impacted, in fact they will be at considerable risk.
 - h. As Hancock Galilee Pty Ltd is of the belief that they will not impact on our bores, they have failed to adequately develop strategies for alternative water supplies and management of groundwater impacts if their predictive modelling is incorrect and fails.
 - i. Despite Currie's efforts, desire, and need to get an agreement on our properties long and short term groundwater management, Hancock Galilee Pty Ltd has deliberately prevented discussions from proceeding so parties could negotiate and bring about the consensus required for a signed agreement.
2. ***Environmental authority should only be granted to Hancock Galilee Pty Ltd after it has entered into make-good agreements with all potentially-affected bore owners.***
- a. The former DERM's conditions – now recommended by the Coordinator General in his Report for a Hancock Galilee Pty Ltd water licence – would not protect our water supply. It is a scheme designed by, and to be administered by, the same organisation and possibly the same individuals that have condoned and defended the miners breaching environmental conditions and damaging our bores by leaving their drill holes unplugged.
 - b. Even if a departmentally administered make-good scheme could be effective in practice, the administering authority's sustained negligence in allowing the law to be blatantly breached and aquifers to be damaged should disqualify it and its personnel from any role requiring impartial and thorough enforcement of make-good obligations.
 - c. The onus of proof of impaired capacity of a bore rests on us as the bore owner – the State has an obligation to ensure that, as a prerequisite to approval, Hancock Galilee Pty Ltd enters into an agreement which will ensure the necessary evidence is gathered and is accessible to us.
 - d. Data to be produced under the Coordinator General's scheme is too remote – i.e. limited to water levels (not sustainable yield) and water quality in designated monitoring bores. The scheme's criteria for impaired capacity of the private bore (based on the number of stock watered) are subjective, nebulous, imprecise and open to endless argument – those criteria would fall far short of the required standard of proof of damage to our private bore.

- e. If the Chief Executive did direct the miner to make good as provided in the Coordinator General's scheme, it would be unlikely to survive a legal challenge because the evidence require to justify it (proper baseline testing, appropriate trigger values and regular monitoring of the individual bore) would not have been gathered.
- f. An agreement between miner and landholder is the appropriate basis for a make-good scheme – i.e. an agreement such as is in place at the Callide mine. Hancock Galilee Pty Ltd has committed itself to make-good agreements, but there is no evidence that it has a working knowledge of and is committed to the provisions required for such an agreement to be effective, nor that it intends to settle these agreements before mining commences, nor that it would fairly and objectively decide which landholders should be offered its agreement.
- g. To be effective and enforceable an agreement must establish a fully transparent scheme which, through independent expert assessment at the miner's expense and with dispute resolution procedures available if needed, provides:
 - (i) baseline testing of each individual bore to determine, in particular, the pre-mining sustainable yield and water quality
 - (ii) trigger values for declining yield, quality etc
 - (iii) regular monitoring of each individual bore
 - (iv) process for investigation and response if adverse effects are identified
 - (v) make-good and/or compensation provisions
 - (vi) ongoing protection after mining ceases.

The facts and circumstances relied upon in support of the grounds of objection are as stated above.”

Paul, Janeice, Peter and Julia Anderson Objection

[92] By letter dated 4 December 2013, Paul, Janeice, Peter and Julia Anderson lodged objections to each of the mining lease and environmental authority:

“Grounds of Objection.

1. The application for the grant of the mining lease for the Kevin's Corner Project should be declined on the basis that the provisions set out in the Mineral Resources Act 1989(QLD)(MRA) have not been fully complied with in regards to Groundwater.
 - (a) In reference to MRA section 269 (4)(g): Our previous experiences in attempting to negotiate on an effective make good agreement to protect our groundwater with the Applicant have been less than satisfactory.
 - (b) In reference to MRA section 269 (4)(h): The mining lease should not be granted until Landholders in regions who's [sic] groundwater may potentially be impacted by the mine individually or cumulatively have entered into Make Good Agreements to protect their businesses.

- (c) In reference to MRA section 269 (4)(j): The cumulative impacts that mine dewatering will have on the quality and quantity of groundwater has not been sufficiently investigated therefore the extent thereof the mine will impact the environmental values of agriculture (stock and domestic watering) is unknown.
- (d) In reference to MRA section 269 (4)(k): A regional cumulative model of the impacts mine dewatering will potentially have on the quality and quantity of groundwater has not been done. This clearly prejudices the rights and interests of landholders and dependent businesses in the region to know what the likely extent the impacts will have on their livelihoods.
- (e) In reference to MRA section 269 (4)(l): There is insufficient evidence to demonstrate how the Applicant will be able to provide alternate water supplies on a permanent basis during and after the life of the mine to landholders. The Mining Lease should not be granted until cumulative impacts in the region are modelled and evidence is provided how the impacts on groundwater will be mitigated.
- (f) In reference to MRA section 269 (4)(m): The current use of the land in the Mining lease and surrounding regions is agriculture. The Mining lease should not be granted until the cumulative impact mine dewatering will have on surrounding region is modelled to know if the proposed mining operation is an appropriate land use in consideration of its impacts on the agricultural industry.

2. In the event the mining lease is granted, conditions should be imposed that will adequately meet the provisions above that have been neglected.”

[93] Notwithstanding the apparent breadth of the grounds of objection of all objectors in respect to each of the mining lease and Environmental Authority, at the hearing of the matter the issues became much more focused and common, in particular the evidence focused on:

- (a) Ground water
- (b) Economics
- (c) Cumulative impacts
- (d) Biodiversity

[94] Notwithstanding the focus on those narrow issues in the hearing of this referral the applicant engaged a number of experts to prepare reports within their areas of expertise.

[95] Not all experts were cross examined by every party entitled to do so.

The Evidence of Dr Adrian Zammit – Water Quality Scientist

[96] Dr Zammit, a water quality scientist with over twenty years' experience,²⁷ was asked 17 questions expressed in the following terms:²⁸

“Question 1

Describe the existing surface water quality environment in the area potentially impacted by the proposed Kevin's corner project (Project).

Question 2

What were the assessment requirements of the EIS Terms of Reference in relation to the Project's potential impacts on surface water quality?

Question 3

What work was performed to address the assessment requirements of the EIS Term of Reference and to undertake the surface water quality impact assessment?

Question 4

In your opinion, was the work performed to address the assessment requirement of the EIS Terms of Reference and to undertake the surface water quality impact assessment in accordance with standard professional practice for this type of proposed project?

Question 5

In your opinion, was the work performed to address the assessment requirements of the EIS Terms of Reference and to undertake the surface water quality impact assessment inadequate because the regional cumulative impacts covering surface water impacts were not adequately addressed?

Question 6

In your opinion, have all potential adverse impacts on surface water quality been adequately described in the EIS, SEIS and supplementary material?

Question 7

What conclusions were reached regarding the potential impacts of the Project on surface water quality?

In answering this question, identify the extent to which the Project is likely to impact on the region's water quality through:

- a) Releases of coal dust to waterways;
- b) Long-term effects of accidental and controlled released of contaminants to waters, including whether such impacts are likely to be “significant”;

²⁷ Ex 47, page 35.

²⁸ Ex 47, pages 1 to 7.

- c) Contamination of surface water by flooding from tailings dam overflow;

Question 8

In your opinion:

- a) What is the likelihood of interconnectivity between groundwater and surface water, including surface water features (e.g. springs)?
- b) What is the likelihood and significance of direct and indirect impacts of Project drawdown of groundwater on surface water, including surface water features (e.g. springs);

Question 9

In your opinion to what extent will the final void:

- a) Impact on or cause any surface water contamination?
- b) Impact on surface water quality?

Question 10

In your opinion, will the Project have a significant impact on surface water quality?

Question 11

Identify any condition in the Coordinator-General's Report, the draft Environmental Authority and/or EPBC Act Approval relevant to the potential impacts of the project on surface water quality.

Question 12

In your opinion, is there sufficient, adequate and accurate information to provide a reasonable level of scientific certainty to support your conclusions in relation to the above?

Question 13

To the extent your opinion is that there is a degree of scientific uncertainty regarding the potential impacts of the Project on surface water quality, to what extent (if any) do the conditions in the Coordinator-General's Report, draft Environmental Authority and/or EPBC Act Approval address that uncertainty?

Question 14

Provide your opinion as to whether:

- a) The assessment of the cumulative impacts to surface water:
 - (i) is "inadequate information";
 - (ii) is based on "inadequate information"
- b) The methods used for assessing the cumulative impacts on surface water are "manifestly inadequate", including whether reference was made to relevant guidelines, and if so, which guidelines;

- c) The cumulative impact of the Project on surface water “needs further examination, including the spatial, temporal and interactive or synergistic impacts”;
- d) Appendix O of the SEIS considers surface water “to a minimal extent only”;
- e) The ‘China First/Waratah or Alpha South mines’ are in the same catchment, and if so, whether they should have been included in the flood model in Appendix O;

Question 15

We have attached updated versions of Tables X-3 to X-6, which originally appeared in Appendix X of the EIS. Could you please consider these updated tables and indicate:

- a) Whether any further additional information is available in respect of the projects listed in the updated tables; and
- b) Whether any projects (identified using the methodology and selection criteria specified in Appendix X of the EIS) should be added to, or removed from, the updated tables.

Question 16

In your opinion, is the new information identified in the updated tables – taking account of any changes to that information made pursuant to question 15 – likely to:

- a) Materially change the assessment of cumulative impacts of the Project on surface water, including the outcomes or conclusions of that cumulative impact assessment?
- b) Give rise to a need to adjust the conditions imposed on the Project relevant to potential cumulative impacts on surface water?

Question 17

In your opinion, is the environmental authority application supported by enough information regarding surface water to allow the administering authority to decide the application?”

[97] It is unnecessary to outline in detail the analysis carried out by Dr Zammit but within his report he summarises his conclusions in the following terms:²⁹

“In summary, I state that:

- a) The available surface water quality data from the defined watercourses identified within and in the vicinity of the Project provide sufficient data to establish background or reference water quality for the area;
- b) The surface water quality of the area is naturally variable due to the ephemeral nature of the watercourses;
- c) The surface water quality has naturally elevated levels of turbidity and nutrients probably as a result of grazing activities in the area;

²⁹ Ex 47, pages 30 to 31.

- d) The surface water quality has elevated concentrations of a number of metals including aluminium, iron, copper and zinc, which may be a reflection of the soil mineralogy in the area;
- e) The assessment methodology used in the reports that supported the mining lease application and EA application was comprehensive and consistent with standard industry practice, and complied with legislative and guideline requirements;
- f) Given the conditions stated in the draft EA, Coordinator-General's Report and the EPBC Act Approval, the risk of mine contaminated water from any part of the Project including the void and the tailings storage dam, having an impact on the receiving surface water environment is negligible;
- g) Groundwater drawdown will not significantly impact any surface water feature or groundwater dependent vegetation within or in the vicinity of the Project;
- h) The surface water cumulative impact assessment was undertaken using publicly available data for existing and proposed projects locally, regionally and state-wide, consistent with standard industry practice for a project of this kind;
- i) The information regarding the surface water environment provided to support the EA application was scientifically robust and comprehensive, and of a standard that allowed the administrative authority to decide the application."

[98] Dr Zammit was not required for cross examination and accordingly his report and, in particular, his conclusions with respect to surface water go unchallenged.

[99] In my view, to the extent that it may later be relevant, Dr Zammit's unchallenged evidence may be accepted as a complete answer to any criticism of the EIS which was conducted or of his conclusions with respect to potential impacts of surface water resources.

The Evidence of Dr David Dique – Ecologist

[100] Dr Dique had been engaged by the applicant to prepare a report on the potential ecological impacts of the proposed mining project.

[101] Dr Dique prepared a report which became evidence before the Court.³⁰

[102] In his report Dr Dique carried out what he described as an expert assessment of a number of objection-related questions.

³⁰ Ex 45.

[103] In his report Dr Dique provided an overview of the assessment of environmental impacts which were identified and considered in the environmental impact statement and its supplementary material.

[104] In his report he concluded:³¹

“In my opinion, the EIS, SEIS and supporting documents provide adequate information to assess the likely direct and indirect impacts associated with the project proposed at MLA 70425 in accordance with the project specific Terms of Reference and in line with industry standard. The Project commitments and conditions manage any post approval risk with additional information requirements to determine the full extent of cumulative impacts and offset requirements. In most cases, the conditions of the project require Administering Authority approval for specific components, before the Project can proceed to manage any uncertainty. Indeed, proponent commitments for offsets (e.g. proposed black throated finch offsets) go above and beyond what is required by relevant offset policies. It is therefore my view that the Project will not have a significant impact on the Ecology of MLA 70425.”

[105] Dr Dique was required for cross examination by Ms Kelly on behalf of the North Queensland Conservation Council. Consideration of the evidence extracted by Ms Kelly (and by Ms Tubman) needs be contemplated in the context of the concession in their final submissions³² that:

“The Objector no longer pursues Ground 5 in so far as it states that ‘the conditions imposed are inadequate’ and ‘offsets have not been demonstrated to be an effective means’.”

[106] In her cross examination of Dr Dique, Ms Kelly took him to Appendix X Cumulative Impacts of the Environmental Impact Statement.³³

[107] In particular she wished to cross examine him about Table X7 - Potential Cumulative Impacts – Kevin’s Corner Project.³⁴

[108] That Table X7 identified a number of environmental values:

- Land
- Land use
- Landscape character
- Nature conservation
- Surface water
- Groundwater

³¹ Ex 45, page 41.

³² Final Submission of North Queensland Conservation Council to Land Court of Queensland, page 2, para 8.

³³ Ex 52.22, page 1530.

³⁴ Ex 52.22, Appendix X, page 1542.

- Air quality
- Greenhouse gas
- Noise
- Waste
- Traffic and transport
- Cultural heritage
- Social and community
- Economics

[109] It then identified a number of projects including the adjacent project of Waratah Galilee Coal Mine and then a number of other regional, state and national projects.

[110] Appendix X acknowledged that:³⁵

“A conservative approach to the cumulative impact assessment was taken by assuming simultaneous construction of all projects. However, this is unlikely to be the case as some projects may be deferred or some may even be cancelled.

On this basis, the nature and extent of the potential cumulative impacts are summarised in the following sections.”

[111] Ms Kelly was concerned that the only projects which appeared to be relevant in the context of nature conservation in that table were the Alpha Project and the Waratah Galilee Coal Mine Project.

[112] Dr Dique conceded that from a regional perspective it would be worthwhile considering the other projects in the Galilee Basin.

[113] The evidence about what should have been included in a cumulative impact assessment was clarified by an objection taken by Mr Clothier who pointed out that what Dr Dique had said was not that all of the projects should have been looked at, but that they should have been included in the assessment in the context of the subject proposal if a regional analysis was to be conducted.

[114] Dr Dique assisted the Court by saying, “the point I’m trying to make in this passage is these are summary statements of what’s taken from the report in the way its reported impacts associated with biodiversity. Further on in the section, I also state that the report identifies the scope of additional work that will be undertaken as part of a cumulative impact assessment.”³⁶

³⁵ Ex 52, page 1544.

³⁶ T 2-116, lines 26 to 30.

[115] He clarified that further in his next answer to cross examination when he said:³⁷

“So in my knowledge of the projects throughout the Galilee Basin and the extensive footprint of some of those projects, what is reported for Kevin’s Corner is a much reduced footprint and significance of impact that’s been reported in the EIS. So on that basis, given that Kevin’s Corner has a much smaller relative impact compared to the other projects, it would seem reasonable to me, without the information being presented, that the overall cumulative impact may not be impacted as much as one might think from the Kevin’s Corner project.”

[116] When the cross examination was taken over by Ms Tubman she was concerned to explore the question of cumulative impact assessment and the impact of other mines in the Galilee Basin which might impact upon the amount of habitat.

[117] She told the Court, “in order to appreciate the impact of the Kevin’s Corner mine, it’s important to know what else is happening in the area. That’s a quite normal accepted context of cumulative impact assessment.”³⁸

[118] Dr Dique responded to that proposition by saying:³⁹

“I think there’s some terminology being mixed up a little. From a – quantifying impacts to vegetation communities is different to quantifying impacts to habitats for individual species. Habitats for species may not necessarily align with the vegetation community. So there’s two separate things. So when looking at a cumulative impact assessment and in consideration of neighbouring activities, it’s important to consider vegetation communities on their own for they have their own conservation significance and status and to then also look at habitats for individual species that may be a combination of some of those vegetation communities or in fact non-remnant vegetation communities.”

[119] In response to further cross examination, Dr Dique gave a useful summary of the processes, as he saw them, which had been gone through for the purpose of providing a cumulative assessment statement and its usefulness. He said:⁴⁰

“My final statement is that the risk – the level of risk associated with undertaking the post-approval work that has been nominated as part of the cumulative impact assessment, I think, is – is – is fine, and I’m comfortable with that that work will be done post approval. I guess in context of the project and the cumulative impact assessment – and it helps to put it in context, if we look at the impact assessment that has been undertaken for biodiversity, the project itself looks at avoidance as the first item, with the project footprint mainly being in cleared areas. So that’s the first one. The second one is a set of mitigation measures for direct and indirect impacts, largely associated with subsidence from underground mining activities. That

³⁷ T 2-116, lines 35 to 42.

³⁸ T 2-121, lines 35 to 37.

³⁹ T 2-121, line 39 to T 2-122, line 2.

⁴⁰ T 3-5, lines 21 to 43.

seems appropriate and there's a suite of different types of mitigation measures associated with it. Any residual impacts are then offset through what is a reasonably comprehensive offset strategy and plan that is aligned with where government has identified to have strategic offset – offsetting across the region. So it's consistent with government. Rightly so then the qualitative assessment that has been undertaken around cumulative impacts identifying the potential risk for and cumulative impact for nature conservation to be low. With that risk being low, in my view it is appropriate to undertake post-approval works associated with cumulative impact assessment. Indeed – and I can't quite recall the wording precisely within the terms of reference, I think the terms of reference says to consider cumulative impact assessment associated with some of the biodiversity values, and it has indeed been considered with a risk that is low with some post-approval quantitative assessment to be undertaken.”

[120] Dr Dique's response to a challenge that the cumulative impact assessment should have been carried out on a more regional basis is contained within his report where he says:⁴¹

“Additionally, in my opinion, due to the relatively small area to be cleared in the regional context, the scale of potential cumulative impact, and extent, does not warrant additional focus outside of what is already reported. Specifically, offsets are proposed to account for the ‘extinction debt’, and are likely to be recognised in the future. Indeed the offset commitments by the proponent are over and above what is required by relevant offset policies.

Nevertheless, this is a topic which could be considered in the context of the proposed further Cumulative Impact Assessment.”

[121] In the course of their cross examination of Dr Dique, Ms Tubman and Ms Kelly drew his attention to the aforementioned document entitled Cumulative Impacts: A Good Practice Guide for the Australian Coal Mining Industry.⁴²

[122] Dr Dique was specifically asked about the definition of cumulative assessment in that guide which was in the following terms:

“Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of an activity on society, the economy and the environment.”

[123] Dr Dique accepted that as a fair definition.

[124] The NQCC really presses for a more comprehensive cumulative impact assessment which they describe as a critical component of the assessment of proposed projects.

⁴¹ Ex 45, page 41, para 5.

⁴² Ex 65.

- [125] I did not understand Dr Dique's evidence to be to the effect that he was opposed to rigorous and extensive cumulative impact assessment but I did understand his views to be that the compliance by the applicant with the conditions of the environmental permit together with the Commonwealth Government requirements will lead to a more comprehensive and regionally informed cumulative impact assessment.
- [126] The submission by the Mackay Conservation Group addressed the evidence of Dr Dique and, effectively, challenged his conclusion that the project has complied with the Queensland Government's biodiversity policy and consequently he believes that the impact assessment is satisfactory.
- [127] Basically the same propositions were, fortunately for the Mackay Conservation Group, put by Ms Kelly and Ms Tubman.
- [128] Unfortunately, the balance of the final submissions made by Mackay Conservation Group consists of propositions advanced out of published works which were not put to Dr Dique and data relating to rainfall patterns during various seasons which were unsourced and none of which, of course, were put to Dr Dique.
- [129] Further the Mackay group's submissions refer to a number of other publications which did not find their way into evidence and the content of which was not put to Dr Dique. Consequently the submissions are more in the way of unsworn and unchallenged assertions than a reference to the evidence of Dr Dique or indeed any of the other evidence that was placed before the Court.
- [130] The group is obviously well-meaning and well-read with respect to the issues concerning it but have not been able to make submissions in a way which effectively challenges the evidence of Dr Dique.
- [131] What should be of some comfort to that group is the fact that their concerns were otherwise addressed by Dr McGrath in his cross examination and by Ms Kelly and Ms Tubman.
- [132] At the end of the day the evidence of Dr Dique satisfies me that, with respect to the issues relating to biodiversity and cumulative impacts, the raft of conditions and obligations imposed upon the applicant are adequate to address those issues in a meaningful way.

[133] My view in that regard is strengthened by the requirement in the Environmental Authority for ongoing post-approval programmes, assessment and reporting.

The Evidence of Andrew David Mifflin – Executive General Manager Development Projects

[134] Mr Mifflin is an employee of the applicant company with responsibility of the following aspects of the project:

- (a) Exploration;
- (b) Mine designing planning strategies;
- (c) Continuous improvement;
- (d) Environmental safety and health regulation and compliance;
- (e) Approval processes;
- (f) Stakeholder engagement.

[135] Mr Mifflin swore two affidavits which were admitted into evidence as exhibits 36 and 37.

[136] Mr Mifflin was required for cross examination by Dr McGrath and Mr Currie.

[137] Despite lengthy cross examination of Mr Mifflin, the only use sought to be made of the evidence adduced from him was to highlight Mr Mifflin's acceptance that there had been a collapse from historical highs of the coal price since 2011.

[138] Dr McGrath in his submissions sought to rely upon that coal price variability as evidence that the applicant's analysis was based on a coal price well above the current market and, accordingly, the alleged benefits may have been overstated.

[139] The CCAQ closing submissions submitted as follows:⁴³

“Overall, the failure of Hancock to take into account the uncertainty's of coal price predictions and subsequent falling price, as part of their economic assessment and the risks associated to the project as a result, undermines the ability of this Court to adequately assessed [sic] the beneficial and adverse economic impacts of the project.”

[140] Mr Mifflin's evidence about the fluctuation in the coal price was that, “the coal price has done what it has done at least six or seven times in my career where you cycle from a high down a low”.⁴⁴

⁴³ CCAQ Closing Submissions, page 49, para 178.

⁴⁴ T 2-70, lines 13 to 15.

[141] Dr McGrath drew Mr Mifflin's attention to a document which was entitled Coal Futures Trading Basics.

[142] It was suggested to Mr Mifflin, "it's then an objective way if you're a company looking to sell to – or you're developing a mine – this [i.e. coal futures prices] is a way to look at what price you might be getting when you're producing coal in, say, two years' time, isn't it?" to which Mr Mifflin responded that he wouldn't be using that particular approach.⁴⁵

[143] Mr Mifflin explained what he said was the appropriate approach in the following terms:⁴⁶

"For the volumes that we're talking about, your Honour, and the timeline to develop the mine, the pricing from – as shown on the exhibit before, if we were to start construction now, it'd be four years before the mine came up, and what happens in those next four years – you've got a number of analysts and they'll give you a whole heap of opinions of where this is going to go. The mine needs to be viable once you make the decision to construct the mine based on a – obviously a base that you can manage with. But you do need, usually through equity buy-in, long-term volume contracts, and normally the equity buyers are power companies who are looking for their new supply, obviously at as low a price as they can get, and for long-term delivery and certainty of delivery. This is something that's very, very short term. It's more of a trading platform."

[144] Mr Mifflin went on to confirm that, in his view coal, futures trading was a speculative way of trading and not one that was relied upon by coal miners.⁴⁷

[145] Mr Currie in his cross examination of Mr Mifflin was concerned, at the outset, to clarify the relevance of identified "at risk bores" being located on properties which could, theoretically, have been purchased by the applicant.

[146] His questions were posed in the context of the utility of "make good" commitments on land which could theoretically pass into the ownership of the applicant.

[147] It is a little difficult to glean exactly what his point was but it seemed to be a concern that if the drawdown of the aquifers on those properties was substantial then, because of the position of his property Speculation (previously called Toolbar), he could suffer similar drawdown.⁴⁸

⁴⁵ T 2-74, lines 18 to 20.

⁴⁶ T 2-74, lines 27 to 37.

⁴⁷ T 2-74 line 39 to T 2-75 line 25.

⁴⁸ T 2-82 to T 2-83.

- [148] A second limb of his concerns expressed through his cross examination was the accuracy of the surveys which had been undertaken of the extent and levels of groundwater supplies.
- [149] Mr Currie was also concerned that while he had four bores on his property, of which two were currently utilised, the applicants had not surveyed the bores on his property so as to identify the current level of water in his bores or the flow rates which were achievable from them.⁴⁹
- [150] Mr Mifflin pointed out that there was a proposed monitoring bore in close proximity the corner of the Speculation property⁵⁰ and that bore was on a contour which lay on Mr Currie's land.⁵¹
- [151] I noted this point that Mr Currie had not at that stage then entered into a make good agreement with the applicant. Clearly he was keen to do so – but only on a basis which protected his water supply.
- [152] Mr Mifflin was at pains to try and explain the role of the modelling and the approach taken by the applicant to entering into make good agreements and contemplating future impacts on water levels in aquifers on the subject and adjoining sites.
- [153] This is exemplified in the following passage of his evidence while being cross examined by Mr Currie:⁵²

“What will occur is that the groundwater dewatering for the mines will start very small and gradually grow over time. That dewatering will be based on the modelling, and hence we will have an empirical way of knowing that the modelling is either correct or insufficient in some way. As the Alpha test pit verified the water model that was done for Alpha and Kevin's Corner, as the Kevin's Corner mine starts, that dewatering will empirically support the model that's been done for Kevin's Corner. So any changes to that will be made at that time, and further modelling has to be redone as part of our water management plan under state legislation, and the water management and monitoring plan for federal legislation. And so those contours will gradually grow over time, and by the time it reaches its final 30-year, 40-year life, as indicated on figure 10-11, we will have a very detailed empirical set of data that would be used to further make sure we knew exactly where that model was going, if that explains to your Honour, Mr Currie.

⁴⁹ T 2-89.

⁵⁰ T 2-91, lines 8 to 17.

⁵¹ T 2-91, line 43.

⁵² T 2-95, line 34 to T 2-96, line 31.

To me – and with all respect, Mr Mifflin, that’s all well and good from the company, but what does that do for my business security? They’ll know what’s happened. If you’ve got predictive modelling showing where the drawdowns are going to be, why couldn’t there be a contour showing where the modelling is going to finish? Because you’re predicting what’s going to happen – there’s no contour saying, well, this is as far as we expect – we predict we’re going to go?---I suppose from a risk point of view, as all risks on projects, you try and mitigate those risks, and if we were to put a zero contour on there, we could very well argue that people outside of that zero, we’re not going to go and talk to, whereas what we’ve taken is a conservative approach that we have a one metre and a-half a metre contour, and we – as we’ve already said, we cannot give 100 per cent absolute guarantee; therefore, we are talking to people – and have successfully talked to people about arrangements that we need to enter into to give them that water security, such that the modelling were not to be correct and their bores were to be affected.

Well, excuse me, but I still – that confuses me, because you undertook a bore survey in the east where there’s no contours even going outside your mining lease, over six kilometres outside that mining lease on the east. So that’s showing me – you’ve said then that those contours are going to terminate, because they all stop, and you went ahead and did a bore survey which I calculate roughly – unfortunately – it’s 12kilometres away from the last drawdown contour to the east?---If I could - - -

That’s part of your bore survey?---If I can explain that the survey shouldn’t be mistaken for being information that will inform make good agreements. The survey was done on a basis of informing the groundwater modelling and the groundwater report, so there would be bores on here that we – in the survey that we wouldn’t have to do make good agreements for, and there would be bores on here that we would have to do make good agreements for. I think we – if what I’m understanding is correct, you’re confusing the survey with being every bore that was surveyed is ones that are going to be affected. That wasn’t the case. This work predates the modelling, so this work was done to inform the modelling.”

Groundwater Evidence – Mr Mark Stewart and Dr John Webb

[154] With respect to the issue of groundwater the court had the benefit of reports prepared by the applicant’s expert Mr Mark Stewart and by an expert engaged by the third respondent, Coast and Country Association of Queensland Incorporated, Dr John Webb.

[155] Mr Stewart’s expert reports became exhibit 38 & 40 before the courts.

[156] Dr Webb prepared expert reports which became exhibits 57, 58 & 59.

[157] In accordance with usual practice there were meetings between Mr Stewart and Dr Webb which resulted in the production of two joint expert reports dated 2 April 2015 and 10 July 2015 which became exhibits 39 & 41 respectively.

[158] In order to understand the evidence given by Mr Stewart and Dr Webb, it is necessary to have some basic concept of the geology and stratigraphy in the area in which it is proposed to develop the coal mine and in the area of which may be susceptible to the consequences alleged by the objectors.

[159] In his report⁵³ Mr Stewart provides a summary of the geology in the area.

[160] He sets it out in the following terms:⁵⁴

“Table 5-1 Galilee Basin stratigraphy underlying the Project MLA 70425

Era	Period	Basin	Unit	Rock types
Cainozoic	Quaternary (present to 2.6 Million years)			Alluvium
	Tertiary (65 to 2.6 Million years)			Argillaceous sandstone, laterite and clay, where laterite is extremely weathered, leached residue
Mesozoic	Triassic (201 to 252 Million years)	Eromanga / Galilee	Rewan Formation	Green-grey mudstone, siltstone and labile sandstone
Palaeozoic	Permian (252 to 299 Million years)	Galilee	Bandanna Formation	Coal seams A and B, labile sandstone, siltstone, and mudstone
			Colinlea Sandstone	Coal seams C, D, E and F, labile and quartz sandstone
	Late Carboniferous to Early Permian (299 to 359 Million years)	Drummond	Joe Joe Formation	Mudstone, labile sandstone, siltstone, shale and thin carbonaceous beds

The proposed mining activities target coal seams within the Colinlea Sandstone that are largely flat dipping (1-2°) from a depth of 50 to 75 m in the east to 300 m in the west. These mining activities will potentially impact, considering longwall mining in the underground workings, on all the stratigraphic units above the Joe Joe Formation presented in Table 5-1.

⁵³ Ex 38.

⁵⁴ Ibid page 19.

The open cut mining will remove all overlying geology to access both the C and D coal seams within the Colinlea Sandstone.

The longwall mining, which results in goaf (controlled cave process in response to coal seam removal (Figure 5-1)), will cause alteration in the overlying units.”

[161] The location of the coal deposits within the target area is described in the following terms by Mr Stewart:⁵⁵

“The Project’s target coal deposits occur within the Colinlea Sandstone unit, which are uncomfortably overlain by Tertiary and Quaternary sediments (Table 5-1). The thickness of Tertiary and Quaternary sediments varies from 20 m to 60 m, across the proposed mine area. There are four coal seams in the Colinlea Sandstone designated, from upper to lower, as C, D, E and F. The interburden is named based on the coal seams it occurs between. For example the C-D sandstone lies between the C and D coal seams.”

[162] The main area of the disagreement between Mr Stewart and Dr Webb is with relation to Dr Webb’s assertion that there is or may become folding of strata within the geology.

[163] Each of Mr Stewart and Dr Webb were called and were cross examined at length about their reports and views.

[164] In their extensive written submissions CCAQ submitted to the Court that there were two critical flaws in the applicant’s case.

[165] The first of those was said to be:⁵⁶

“The hydraulic heads measured by the groundwater monitoring network on the Alpha and Kevin’s Corner mine sites show recharge to the D-E sandstone is occurring to the west of the mine along the Great Dividing Range and to the south”.

[166] The second critical flaw was said to be that:⁵⁷

“The Applicant’s groundwater numerical model defies reality”.

[167] With respect to the first critical flaw identified by CCAQ, Dr McGrath in his submissions pointed out that both Mr Stewart and Dr Webb agree that the hydraulic heads measured by the groundwater monitoring network on the Alpha and Kevin’s

⁵⁵ Ibid page 23.

⁵⁶ CCAQ Closing Submissions, page 5.

⁵⁷ CCAQ Closing Submissions, page 12.

Corner mine sites show recharge to the DE sandstone is occurring to the west of the mine along the Great Dividing Range and to the south.⁵⁸

[168] In the course of cross examination and, in a more forceful way in their written submissions, CCAQ placed significant weight upon what was presented and concluded in what is referred to as the Alpha case.

[169] I am bound to observe that I am not particularly moved by what is said to have occurred or been found in the Alpha case. I am bound only by the evidence placed in front of me. Reading someone else's decision is not evidence.

[170] My determination in respect of the present proceeding is to attend to the evidence that was adduced before me and then to make a recommendation based upon my assessment of that evidence – not upon the assessment of some evidence which may or may not have been given in another case, nor do I feel bound by conclusions reached in another case by another member.

[171] Indeed, as CCAQ points out, Mr Stewart acknowledged that in the present proceeding his evidence is different from the evidence given by him in the Alpha case.⁵⁹

[172] Unsurprisingly in his cross examination of Mr Stewart, Dr McGrath put to him that the broad methodology of considering hydrogeological issues is to first look at the hydrostratigraphy and then to look at structural factors.

[173] Without coming out and saying it clearly, Dr McGrath's cross examination of Mr Stewart seemed, in part, directed towards suggesting (at the very least) that there was something sinister in the material which had been advanced by Mr Stewart in evidence given in the Alpha case and material of that sort to which he failed to refer in the present case.

[174] The process of joint expert meetings between Dr Webb and Mr Stewart demonstrated the benefit of such meetings because it became clear, by the time one reads the second joint expert report and then the supplementary report prepared by each of Mr Stewart and Dr Webb, that the joint meeting process elicited exchanges of information

⁵⁸ See T 5-83, lines 7 to 13 and T 3-91 line 9.

⁵⁹ T 5-14, line 44 to T 5-15 line 24.

between the two experts which caused each of them to somewhat modify their findings and opinions.

[175] In his supplementary report Mr Stewart provides, what I regard as a useful summary, of the differences in approach between himself and Dr Webb. He says as follows:⁶⁰

“OPINION AND FINDINGS

Summary

The main points of disagreement included the evaluation and interpretation of geological data, which resulted in differences in opinion regarding the influence on the predicted impacts.

I note that where information was limited the approach adopted was to consider the worst case scenario. This approach allowed for consideration of the largest potential impact on the groundwater resources over a 30 year mine life and for 300 years post mining.

Key areas of disagreement included:

- The mechanisms of groundwater movement within the study area containing the Kevin’s Corner coal project, including recharge and discharge;
- The nature of the geology and geological structures within the model domain and the influence of geology on the groundwater regimes;
- The conceptualisation of groundwater resources; and
- The influence of post mining infrastructure and the management of impacts through Environmental Authority conditions.

I consider that the use of site specific (hard) data obtained from bore logs, drilling programs, aquifer tests, groundwater quality sampling, bore census, and detailed groundwater modelling allowed for the assessment of potential groundwater impacts to a high degree of confidence.

Comments and possible concepts provided by Dr Webb are based only on a preliminary assessment of surficial geology, through remote sensing, with limited confirmation using available data.

I note that the geological conceptualisation I present is adopted by all other projects within the eastern edge of the Galilee Basin and has been supported by a third party review. There is no data that supports the geological conceptualisation of Dr Webb.

In addition, all available field data, collected literature, and Galilee Basin data compiled post EIS supports the modelled conceptualisation.

⁶⁰ Ex 40, page 3.

I note that consideration of Dr Webb's geological conceptualisation was included in the predictive modelling, which I undertook during the Alpha court hearing. The increased recharge and aquifer properties suggested by Dr Webb were included in the predictive model, but the model could not match measured groundwater levels across the model domain (i.e. could not be calibrated). This indicated that the elevated aquifer properties and recharge, suggested by Dr Webb, were not representative of the actual site conditions and groundwater movement within the model domain.

In any case, the modelled output, comprising projecting groundwater drawdown around the mine, is based on the geology to be directly disturbed during mining and not the geology within a portion of the Great Dividing Range where Dr Webb considers increased recharge and aquifer properties occur.

I consider that the groundwater approval conditions included in the Coordinator-General's Evaluation Report, the Approval Decision, and the Environmental Authority for the Kevin's Corner Coal Mine will allow for the optimum management of possible groundwater impacts."

[176] Dr Webb's expert report had said:⁶¹

"When mining of the Alpha and Kevin's Corner leases is complete, a final void will remain at the western edge of the open cut (Figures 10c,d). Modelling shows that this will cause a cone of depression drawing groundwater flow almost radially toward the void (due to negative climate balance), with the lake water in the final void becoming progressively more saline over time due to evaporation, and the surface of the lake equilibrating at about 250 m AHD, always below the potentiometric surface for the CD sandstone to the east, west and south (the modelling suggests that there will be groundwater outflow to the north). The void will permanently intercept ~70% of groundwater flow from the probable recharge areas defined in this study. The final mine void will therefore cause a permanent lowering of the potentiometric surface to the north of the mine, and any resulting deleterious effects on the springs, surface drainages, Degulla lagoon and local agricultural groundwater use will be permanent. This can be easily overcome by filling the final void, and thereby allowing the groundwater system to re-establish (approximately) the pre-mining configuration. The ground surface over part of the open-cut area would be probably several meters lower than before mining commenced, and would have to be graded so that it did not divert Lagoon Creek, but the impact on the groundwater system would be much less than leaving a final void."

[177] As a result of a second meeting between Mr Stewart and Dr Webb, which occurred on 27 February 2015, they were able to identify further points of agreement. Those points of agreement are as follows:⁶²

Points of Agreement

20. The ground water experts are in general agreement on the following matters:

⁶¹ Ex 57, para 76.

⁶² Ex 39, pages 9 to 13.

Point 5
Southern Model Boundary

21. It was proposed by Dr Webb that the southern model boundary, due to its close proximity to the Lagoon Creek surface water divide, be altered to a no-flow boundary. A no-flow boundary would be more accurate should the groundwater system mimic the surface water system, so that both have a divide in the same place.

22. Mr Stewart provided groundwater level data, for the Colinlea Sandstone across the area including a location to the south of the surface water divide (Figure 1 in Attachment 1). These water level data indicate that there is no groundwater divide at the surface water divide.

23. Based on the regional groundwater level data it was agreed that the use of a constant head boundary (as used in the latest model) was appropriate for the southern model boundary.

Point 6
Groundwater Throughflow

24. Mr Stewart had calculated the mean groundwater flow rate (referred to as the Darcy velocity, q) using the equation:

- Equation 1 $q = Ki$
Where: K is the hydraulic conductivity (in m/day)
 i is the hydraulic gradient

25. Dr Webb indicated that the correct approach was to include effective porosity to the equation (equation 2) so as to determine the average linear velocity of groundwater moving through the aquifer(s).

- Equation 2 $v = Ki / n$
Where: v is the average linear velocity
 n is the effective porosity

26. Mr Stewart agrees with Dr Webb that this approach allows for the calculation of water flow between pores within the sediments or aquifers.

27. It was further agreed that the groundwater movement through the sediments across the model domain is very slow, 1000's of years.

Point 7
Groundwater Chemistry

28. Mr Stewart agrees with the comments compiled by Dr Webb in his Expert Report (2014), paragraph 53 which discusses inert sediments having little or no influence on groundwater chemistry even over a long period of time.

Point 8
Extent of Fold Structures

29. Dr Webb considers the fold structures he is proposing converge to the south (expert report paragraph 36), such that there is little or no evidence of folding to the south of the Kevin's Corner and Alpha coal projects.

30. Mr Stewart discussed the available seismic data, specifically CAR 82-49, which has been conducted to adjacent and parallel to the Alpha – Jericho road (Figure 2 in Attachment 1). The available seismic data indicates uniformly dipping strata with no evident folding.

Point 9

Coordinator-General's Report Recommendations

31. The Coordinator-General's Report specified 6 recommendations in relation to groundwater (Appendix 4, Recommendations 1, 2, 3, 7, 8, and 9) and 2 conditions (Appendix 3, Conditions 2 and 3) were discussed.

32. With regards to Recommendation 3 it was agreed that the trigger levels relate to groundwater levels rather than groundwater chemistry, this is not specifically stated.

33. It was agreed that the Regional Water Balance Model must include consideration of surface water and groundwater interaction, including springs.

Point 10

High Recharge Rates

34. Mr Stewart, in his Expert Report (2014), included issues regarding recharge included in the other coal project models within the eastern edge of the Galilee Basin. Dr Webb highlighted these higher recharge rates, compared to the recharge rates adopted in the Kevin's Corner modelling.

35. Mr Stewart noted that the higher recharge rates included in the South Galilee model (RPS Aquaterra, 2012), Galilee Coal Project (Heritage Computing Report, 2013), and Waratah Coal China First: Groundwater Assessment (E3 Consult, 2010 required drains, surface water discharge, or very deep root depths (>10m) to balance these models.

36. It was agreed that these higher recharge rates used in some of these models were not appropriate for the study area.

Point 11

Rewan Formation and Drawdown Propagation

37. Dr Webb correctly highlights the error made by Mr Stewart regarding the Rewan Formation limiting westward propagation of the cone of depression (Dr Webb's report paragraph 75). It was agreed that the Rewan Formation prevents upward propagation of dewatering impacts but does not affect drawdown within the Permian units.

Point 12

Albro Springs

38. Dr Webb indicated that siliceous deposits were identified around the Albro Springs. These springs, labelled Albro Springs (1 and 2) in Dr Webb's Figure 2 (Dr Webb's Expert Report, 2014), are considered to be permanent. The springs are evident in **Plate 1**.

Plate 1 Google Earth image of Albro Springs dated 29/09/2013

39. The siliceous deposits plus the evidence of standing water at the springs during the dry season (September, as illustrated in Figure 4-1 of Kevin's Corner SEIS Appendix L groundwater report (URS, 2012a)), indicates that these springs are more likely permanent rather than seasonal as originally considered by Mr Stewart.

Point 13

Broken Topography Recharge

40. Dr Webb has considered that the two areas of broken topography along the Great Dividing Range (to the west and southwest of MLA70425), with a total area of ~ 400 km², are the likely recharge areas for the Permian units within the Kevin's Corner and Alpha coals project MLAs.

41. It was agreed that should fracturing within these area from preferential recharge pathways, these structures would not comprise the entire 400 km².

Additional Points of Agreement

42. The joint expert discussion of the groundwater modelling for the Alpha Coal Project MRA082-13 and EPA083-13 (report dated 02 August 2013), included data and assessment of the Kevin's Corner MLA 70425. It is considered that these points of agreement are still relevant to the Kevin's Corner study. These are:

Point 14

Tertiary Material

43. The Tertiary cover comprises laterite and saprolite, where the saprolite comprises clay-rich residual material considered to be Permian sediments altered during the Tertiary period and iron-cemented Tertiary sediments.

Point 15

Groundwater Discharge

44. No groundwater discharge, from the Permian (Bandanna Formation and Colinlea Sandstone) aquifers, to the ephemeral creeks and rivers within the Alpha and Kevin's Corner coal mine leases has been reported.

Point 16

Hydrographs

45. The confined aquifer hydrographs (time series graphs of groundwater levels and rainfall) indicate little or no response to seasonal rainfall variation due to slow recharge rates.

Point 17

GAB Groundwater Quality Risk

46. There is little or no risk to groundwater quality within the Great Artesian Basin (GAB) aquifers as a result of the proposed Kevin's Corner mining project.

Point 18 Final Voids

47. The local groundwater flow patterns and resources will be impacted in perpetuity due to on the final void acting as a "sink". It was agreed that the potential impacts of the final void on groundwater resources can be addressed through the provision of alternative water supply, as per the Applicant's make-good commitment and enforcement through the provisions of the *Water Act 2000*."

[178] In the course of his lengthy cross examination of Mr Stewart, Dr McGrath was keen to extract from him a concession that he had done a different conceptualisation for the geological model used in groundwater modelling for the Kevin's Corner case.⁶³

[179] Dr McGrath was particularly interested in the Permian flow (i.e. flow of groundwater in the Permian layers).⁶⁴

[180] With respect to those Permian layers and the recharge of them, under cross examination by Dr McGrath, Mr Stewart told the Court:⁶⁵

"And they're the Permian layers that you're referring to?---Yes. Permian would have all the coal measures.

Yes?---Yes.

And they're the main aquifers of interest across the side, aren't they?---That's correct. On the lease area, yes.

Yes. So where do you say the water is coming from in them that's moving across the side?---From the south.

From the south, yes?---Yes. If you look at the geological map, the Colinlea Sandstone and Bandanna outcrop in the groundwater divide to the south of Alpha – the town of Alpha. So there's no cover there, so it gets recharged in that area.

Right. And so you're saying it gets in what, in the ranges to the south?---To the south. That's right. And that's their predominant head because we have water level data across the entire sort of eastern edge."

⁶³ See T 3-64, line 46.

⁶⁴ T 3-64.

⁶⁵ T 3-65, lines 27 to 39.

[181] Trying to articulate verbally what was shown diagrammatically in the reports, Dr McGrath got Mr Stewart to agree that the sequence of water movement was from the Clemantis down through the Rewan down to Bandanna until the water reaches Colinlea which is under the range and to the west of the mine.⁶⁶

[182] Accepting that characterisation Mr Stewart said that he “acknowledged that there was minor recharge in the west and the majority of the recharge came from the south”.

[183] In response to the question from me, Mr Stewart confirmed that his view of the source of the recharge was because the regional groundwater flow was to the north and because the Colinlea and Bandanna outcrops were without any cover.⁶⁷

[184] Dr McGrath continued to press Mr Stewart about his view of where the recharge waters were coming from.

[185] Dr McGrath asked Mr Stewart:⁶⁸

“can you identify – well, give us your explanation. I don’t want to cut you off, but can you explain where you say the recharge is occurring, and can you try and describe it in words as well so that it can be recorded, because obviously your finger movements aren’t picked up with the transcript?---I understand. Thank you.”

[186] In response to that invitation Mr Stewart said as follows:⁶⁹

“WITNESS: Sorry, your Honour. So unfortunately, this – the – this map is cut of, but this dashed and solid line is the Great Dividing Range, the centre of it, and 45 further down to the south is the town of Arthur, and just south of that is that outcrop area that I mentioned, where the Colinlea and the Bandanna, 80, again, higher elevation, higher head. That’s why we have the head at 370 - - -

HIS HONOUR: Yes?--- - - - which is the most south water level we have for that Permian [indistinct] So the groundwater is moving, and there’s a divide, so flow is to the north-east and also then to the north-west. And as it occurs in the elevated areas, we’re still getting some flow from the south to north, but we’re also getting contribution along the dividing range, which we see as that divide.

DR McGRATH: Can I just record that for the transcript. So you just indicated we’re still getting recharge along the Great Dividing Range, and that’s – you indicated with your finger – essentially the blue area immediately to the west of the mining leases. Up and down at that point was

⁶⁶ T 3-77.

⁶⁷ T 3-77, lines 44 to 46.

⁶⁸ T 3-80, lines 34 to 38.

⁶⁹ T 3-80, line 44 to T 3-81, line 35.

the movement you were making. Was that - - -?---If we take the – yes, the groundwater divide to match the top of the Great Dividing Range - - -

Yes?--- - - - map area, yes.

Okay. So recharge is occurring to the – you say it’s - - -?---We’re getting that vertical downward movement of water.

Yeah, that’s fine. So it’s occurring to the south, but it’s also occurring along the range to the west of the mining lease?---And you can see that by the change in the contours.

HIS HONOUR: And, Mr Stewart, that recharge, as I understand your evidence, is not occurring only to the east of the crest of the Great Dividing Range?---That would – it would occur.

It was also occurring to the west - - -?---Yes.

- - - of the crest?---Where the Colin, Clematis and the Moolayember units are to the west.

Yes.”

[187] Further, in attempting to clarify his position, Mr Stewart confirmed to me that while Mr McGrath seemed to be focusing on recharge between D and B, that was not the only band within the recharge that was occurring.⁷⁰

[188] Dr McGrath proceeded to contrast the view of Dr Webb with that of Mr Stewart and the following dialogue occurred between them in the course of cross examination:⁷¹

“Okay. And so is your disagreement with Dr Webb that you say there’s no need for the faulting and fissures, some preferential flow pass through the Rewan that has broken up somewhat so that water can get through. Instead of just being the aquitard, there’s a recharge area that gets through the Rewan. You don’t accept that, do you?---No, I just – I haven’t seen any evidence of that in the Rewan.”

[189] Dr McGrath was at pains to seek to have Mr Stewart concede that his view of the recharge process was incorrect as evidenced by the following passage of cross examination:⁷²

“Is that then – are you happy with those four – as I understand it, you’ve got four elements there. We’ve got weight, saturated units above it, recharge and should I add to recharge the Clematis sandstone on range? Is that a fair description of what you said?---Where the divide would occur. And that’s a, you think, significant reason for the divide?---I think it would allow for the highest head in the units.

⁷⁰ T 3-82, lines 8 to 17.

⁷¹ T 3-84, lines 41 to 45.

⁷² T 3-88, lines 28 to 47; T 3-89, line 16 to T 3-90, line 28.

Okay. But that's – obviously going through the Rewan and it's the vertical groundwater gradient as well. So pressure higher at the top and then a lower potentiometric - - -?---We'd have to have the lowest at the – in the DE sandstone.

Okay. You describe this, though – sorry, and that – that's all. I just want to give you every opportunity to put all your cards on the table and say why there's that groundwater divide there?---That's what I can think of, yes.

Yes. Okay. And yes, if we look at what potentiometric surface means – can we just go and look at, say, a definition in your report at 121 of your report at line 3296 halfway down the page, potentiometric in brackets - - -?---Sorry. Could you give me that - - -

...

HIS HONOUR: Right. I have that. And we're looking at potentiometric, are we?

DR McGRATH: Yes. Potentiometric – I can't see it. Is that a typo that the potentiometric is repeated in brackets? It's – it seems to be spelt the same.

HIS HONOUR: Potentiometric.

DR McGRATH: Do you have it, Mr Stewart?---Sorry. I'm - - -

Yes. One twenty-one, bottom right-hand corner. The potentiometric surface is - - -?---Potentiometric surface.

- - - the surface that represents the level to which groundwater will rise in case bores intersecting confined aquifers, also known as piezometric surface?---Right. So it's the confined aquifer water level.

Yes. And the confined aquifer is, by definition, water can't penetrate through readily, can it?---It has to be confined above and below by an aquitard.

And that's the Rewan, isn't it? In – for the Clematis [indistinct] and there's some other – sorry, on a regional scale, the Rewan is a significant aquitard. We already know that. Can I take you to Dr Webb's definition of potentiometric surface. So his glossary – so on page 85, the bottom, the definition of potentiometric surface. Do you have that?---I do have it.

So:

An imaginary surface representing the static head of groundwater and defined by the level to which water will rise in a tightly case bore or well.

Do you accept that?---That's right.

And that's what you meant by your – when you said the D-E sandstone potentiometric surface. Now, if we just turn back to the word “head” - - -

HIS HONOUR: Well, just while we're looking at detail in these definitions, Mr Stewart, before – and this doesn't seem to be inconsistent between you and Dr Webb – when you were being asked about the definition attached to

your report, you made the point that it needs to be in a confined aquifer?---
Yes.

Dr Webb's definition seems to contemplate an unconfined aquifer but reserves to that phenomenon the description water table. Do you see the difference?---I do.

Do you disagree with that?---Typically it refers to the water table in the unconfined aquifers.

Yes?---Which is measurable. So I'm not sure why it's an imaginary surface. Be the water in the unconfined aquifer – the level of the water.

You can measure it if you put a piezometer down and find out exactly what level it's at?---That's right, where as the confined aquifer, there's a pressure between those - - -

Top and bottom?--- - - - the below and the above, so only when you pierce that - - -

Yes?---Otherwise it's a theoretical - - -

It's like pricking in a hole in a balloon?--- - - - how far that water would - - -
The water will come out.”

[190] Mr Stewart was disinclined to agree the potentiometric surface was “an imaginary surface” on the basis that he said “he wouldn't use the word imaginary because the level was in fact measurable and would represent the static head of groundwater.”⁷³

[191] Understanding of Mr Stewart's views requires recognition that there existed a confined aquifer in the D strata.

[192] Mr Stewart told the Court that the addition of water, albeit in small amounts, “the response to that change in pressure is measured at the imaginary potentiometric surface.”⁷⁴

[193] I sought clarification from Mr Stewart as to the simple meaning of his evidence and that is clarified in the following dialogue.⁷⁵

“HIS HONOUR: So can I – just so I understand, what you're telling me is that if we're dealing with a confined aquifer and we've got water confined in the aquifer and therefore under pressure - - -?---Yes.

- - - an incompressible element, water - - -?---Yes.

⁷³ T 3-90, lines 33 to 40.

⁷⁴ T 3-91, lines 18 to 19.

⁷⁵ T 3-91, line 40 to T 3-92, line 14.

- - - as the increased weight plays on the confining structures, not on the water but on the confining structures - - -?---And the permeability - - -

---the more weight when that confined aquifer is penetrated will mean that the water will rise to a higher level. Is that what you've told me?---That – that would be a component of that higher head.

Okay. That's what I understood. Thank you.

DR McGRATH: But that's not what a head is defined as, is it? Because there's no element of weight of mountain on top when you - - -?---No, just pressure.

Yeah. It's the potential energy of groundwater at the screened interval in the bore produced by water pressure at that point, and due to the elevation of the recharge area of the aquifer, and you read "and the elevation of the screened interval". But it's produced by water pressure. That's in the – that's the very definition of the potentiometric surface and what gives it that head? - Yes."

[194] The fundamental point of Mr Stewart's evidence as contrasted with that of Dr Webb was, to my mind, clarified by the following passage of cross examination.⁷⁶

"Do you mean you're adding water or weight?---Water from the gradient – the vertical gradient. So you're getting that recharge, albeit slow, which would cause a response in the water level. So you've just increased the pressure by adding water.

DR McGRATH: No, you've increased the head. Are you saying that there's - - -?---The head. Measurable head, yeah.

But you're saying that these heads are felt all the way through the different confining layers above it. That's what you're saying, that you can have it – the pressure that's down in the D-E sandstone is from the weight of things above it?---They contribute to the confining pressures.

Then how do you ever get – we went through this situation before, where there is less pressure – sorry, there's the greatest pressure nearer the top of the ground?---Yes.

We went through that example and we looked at those diagrams. We can actually have groundwater flowing up?---Flowing upwards, yes.

Under your conceptualisation, there's always going to be – it's always – you're always going to have more head the deeper you go. Is that what you say occurs?---No. In this instance, we're saying that the D-E sandstone has a lower head, allowing vertical gradient to flow downwards. And that's the recharge into that unit."

[195] Dr McGrath sought to contrast Mr Stewart's evidence given viva voce with what was in fact opened by Mr Clothier of Queens Counsel for the applicant.

⁷⁶ T 3-93, lines 10 to 31.

[196] In the course of his opening Mr Clothier had said:⁷⁷

“MR CLOTHIER: There’s perhaps a little in the east, but it’s not considered to be significant, I don’t think, by any expert. The Great Dividing Range is in the west, and there’s diffuse recharge in the west. There’s a difference of view about that – about the way in which it gets in. The evidence indicates, to Mr Stewart, the recharge is very small. And that evidence, as I said, indicate – includes a lack of any significant measured response to rainfall events in the deeper aquifers. And the calibrated model, which has been calibrated by reference to the data actually measured from the site and various things – the calibrated model indicates to him very low levels of recharge. And part of the reason, he thinks, for that is that, as your Honour would appreciate, on the Great Diving Range the water is under pressure because there are strata above it – there is strata above the Permian, and that pressure can assist in creating the higher pressure in the Permian, and not a lot of water is required to get in to in fact maintain the current aquifer parameters.

Now, as I indicated to your Honour, an area of contention between the expert is – the experts is the amount of recharge. Dr Webb, particularly, suggests that it may be much more than Mr Stewart thinks, according to his modelled outputs.

HIS HONOUR: So, at the end of the day, is Mr Stewart’s a – sort of a water balance model approach, where you accept some dewatering but assume it’s compensated for by recharge?

MR CLOTHIER: He has conducted a water balance within his model. Yes.

HIS HONOUR: Yes.

MR CLOTHIER: Correct. And that takes into account that the water has to cross the site. And what – and he says what we know about the site is very good. We know how much water it can take and how quickly it can move.

HIS HONOUR: So the transportation time is significant - - -

MR CLOTHIER: Very slow.

HIS HONOUR: - - - it’s slow but significant in the overall conclusions?

MR CLOTHIER: Over a very, very lengthy period of time. Yes, your Honour. But he has a degree of confidence in his – in the modelling work, based upon it being based on data. And he doesn’t say it’s perfect – and I’ll come to that. No one says it’s perfect. But he has a degree of confidence, and he certainly thinks it’s adequate for decision-making purposes. As I said, at an earlier stage, in the Alpha hearing, Dr Webb had indicated a much, much higher level of recharge, according to his calculations. Mr Stewart modelled that and he couldn’t get the model to calibrate, he couldn’t get it to work, according to the [indistinct] on the site. Well, that’s according to what Dr Webb indicated was the level of recharge at that stage. There’s been some change in movement in his position since then, but I won’t open that.

⁷⁷ T 1-54, line 20 to T 1-55, line 38.

Now, as the mining will be below the level of the water table and as dewatering and depressurisation is required for the mining to occur, there will be significant impacts on a more local scale, according to Mr Stewart. Those impacts will be to groundwater quantity, rather than quality, according to Mr Stewart. Quality is proposed to be managed through appropriate design of things, like [indistinct] storage facilities and the creation and implementation of management systems, as you'd expect. There are also conditions that relate to quality, that I'll come to. And, as far as we can see in the evidence, there's no suggestion that the conditions are in adequate or that mining would be a real threat to any quality of groundwater.

Mr Stewart's conclusion is that there'll be a marked impact on local groundwater resources within the Permian. The impact will be on local bores used for domestic and stock purposes. Based on the bore survey that's been conducted and the modelling that he's conducted, a number of bores have been identified as potentially at risk. The assessment is based upon drawdown curves resulting from the modelling."

- [197] Dr McGrath in his cross examination of Mr Stewart was keen to point out that although Mr Stewart and Dr Webb were in agreement that the hydraulic heads measured by the groundwater monitoring network on both the Alpha site and the Kevin's Corner site showed recharge to the D-E sandstone was occurring to the west of the mine along the Great Dividing Range and to the south, on Dr McGrath's case, the failure by Mr Stewart to plot the hydraulic head in the D-E sandstone⁷⁸ for bore AVP-14 made a material difference to the groundwater contours and flow directions in the western and south-western parts of the Alpha lease area.
- [198] Dr McGrath used a great deal of time and effort to press Mr Stewart about the consequences of not incorporating the measured heads at AVP-14.⁷⁹
- [199] He conducted an exercise which involved asking Mr Stewart to estimate where the 305 meter water head contour might be relative to AVP-14.
- [200] I must acknowledge, at this point, that I still am somewhat bewildered as to the probative worth of that lengthy passage of cross examination. My scepticism as to its worth is borne out by some of what Dr McGrath submitted in his submissions.⁸⁰
- [201] As a consequence of that cross examination the highest Dr McGrath has been able to put it is to speculate as to the impact on Mr Stewart's report.

⁷⁸ T 4-58, lines 20 to 31.

⁷⁹ T 4-44 to T 4-52.

⁸⁰ See for example, CCAQ Closing Submissions paragraph 66, 67, 68, 69 and 70.

[202] True it is that he did extract from Mr Stewart,⁸¹ an acknowledgement that at one point on the contour drawing flow across a contour line at 90 degrees as is conventional would demonstrate that there was more flow coming from the west at that point and, according to Dr McGrath, more consistent with the report prepared by Dr Webb.

[203] Acknowledgement of that proposition was asserted to support the view expressed by Dr Webb that there was a significant amount of recharge coming from the west.⁸²

[204] In his written submissions Dr McGrath submitted:

“Again, during re-examination of Mr Stewart the Applicant chose not to present any more accurate groundwater contours incorporating the hydraulic head from AVP-14 or to correct any errors that had been made by Mr Stewart in drawing the contours by hand. Nor did the Applicant seek an adjournment to be able to do so or call any other witnesses knowledgeable in the data who could correct any errors. Again, the Court can infer from this that such evidence would not have assisted the Applicant in establishing an error in the contours drawn by Mr Stewart in Exhibits 79 and 80.

For these reasons, the hydraulic heads measured by the groundwater monitoring network on the Alpha and Kevin’s Corner mine sites show recharge to the D-E is occurring to the west of the mine along the Great Dividing Range and to the South. The very fact that the flow from the west is evident at bore AVP-14 indicates that the recharge from the west must be significant in the context of groundwater flow in the D-E sandstone across the Alpha and Kevin’s Corner sites. This follows from the data and basic principles of flow diagrams discussed above at [9]-[11].”⁸³

[205] Later in his submissions Dr McGrath relied upon the dicta in *Commercial Union and Assurance Company of Australia Limited v Ferrcom*⁸⁴ where Handley JA drew adverse inferences against the party for failing to examine a witness in chief or in reply on topics where the evidence would have been unfavourable to the party, raising an inference that such evidences may have been adduced would have exposed facts unfavourable to that party.

[206] In the *Commercial Union* case his Honour Handley JA said as follows:

“There appears to be no Australian authority which extends the principles of *Jones v Dunkel* to a case where a party fails to ask questions of a witness in chief. However I can see no reason why those principles should not apply when a party by failing to examine a witness in chief on some topic, indicates “as the most natural inference that the party fears to do so”. This fear is then

⁸¹ T 4-58, lines 29 to 31.

⁸² T 5-84, lines 39 to 41.

⁸³ CCAQ Closing Submissions, page 9, para 21 to 22.

⁸⁴ *Commercial Union Assurance Company of Australia Limited v Ferrcom Pty Ltd* (1991) 22 NSWLR 389, 418.

“some evidence” that such examination in chief “would have exposed facts unfavourable to the party”: see *Jones v Dunkel* (at 320-321) per Windeyer J. Moreover in *Ex parte Harper; Re Rosenfield* [1964-5] NSW 58 at 62, Asprey J, citing *Marks v Thompson* 1 NYS 2d 215 (1937) at 218, held that inferences could not be drawn in favour of a party that called a witness who could have given direct evidence when that party refrained from asking the crucial questions.”

[207] It must be recognised that those comments were made in the context of an insured party having made no attempt to prove that it could and would have obtained insurance cover for a mobile crane and his Honour was disinclined to infer favourably to the insured about those matters when no attempt had been made to prove them by direct evidence.

[208] I do not think those facts and the comments of Handley JA are apposite in the present case.

[209] Earlier in his written submissions Dr McGrath had made the following submission:⁸⁵

“Despite Mr Stewart’s rather startling admissions that relevant data from the groundwater monitoring network had been omitted, the Applicant chose not to re-examine him in relating to this matter to:

- (a) present more accurate (computer generated) bore hydrograph data; or
- (b) correct any errors that had been made by using the printed versions of the hydrographs; or
- (c) correct any errors that had been made by Mr Stewart in drawing the contours by hand; or
- (d) establish that the data from monitoring bore AVP-14 had been validly excluded due to some error in the equipment or for some other reason; or
- (e) prove that the absence of the data from monitoring bore AVP-14 in parts of the groundwater analysis had not occurred in other areas; or
- (f) prove that all relevant data had ultimately been incorporated into the groundwater model and not influenced the choice of model parameters.”

[210] I do not recall Dr McGrath having established that other appropriate witnesses were available to give evidence and it is clear that a party is under no obligation to call further evidence if it comes to the view that has sufficiently dealt with a particular topic.

⁸⁵ CCAQ Closing Submissions, page 22, para 71.

- [211] In the present case Mr Stewart readily conceded that the data monitoring bore AVP-14 had not been incorporated into the modelling. Apart from the failure to incorporate that data into any later modelling nothing emerged from the evidence of Mr Stewart which established that failure was in any way significant.
- [212] Mr Clothier in re-examination clarified and, to my mind, focused some of the differences between Dr Webb and Mr Stewart.
- [213] Mr Stewart was taken to work done by Salva Geological who had constructed a three-dimensional geological model which Mr Stewart confirmed had, as its purpose, to understand the relationship with the project geology and the Great Artesian Basin.⁸⁶
- [214] In further re-examination it was clarified that one function of the Salva Geological Model was to work out what geological units were in the Galilee and the Great Artesian Basin further to the west and secondly, to provide input into the conceptual groundwater model for the two mining lease areas i.e. Kevin's Corner and Alpha.⁸⁷
- [215] Mr Stewart explained that the information of stratigraphy underlay pre-mining conceptual models but that the information outside the lease areas is less well known than that inside the lease areas.⁸⁸
- [216] In response to the question "What is the significance of the geological conceptual model outside the lease area?" Mr Stewart responded that "It provides the thickness of the units and the depth of those units".⁸⁹
- [217] Mr Stewart was then asked "And how does the difference in concepts perhaps between you and Dr Webb, that is, broad open folding versus no broad open folding, translate to impacting upon the model accuracy, in your view?" Mr Stewart responded "The difference is how the groundwater divide is – forms, which we both accept is the model boundary, so any predictions inside the model aren't predicted by any change there".⁹⁰

⁸⁶ T 5-68, lines 15 to 16.

⁸⁷ T 5-68, lines 20 to 26.

⁸⁸ T 5-68, lines 43 to 44.

⁸⁹ T 5-68, lines 46.to 47.

⁹⁰ T 5-69, lines 1 to 5.

- [218] Mr Clothier also elicited from Mr Stewart the observation that having made a handwritten change to the 300 contour in an attempt to accommodate the existence and observations from monitoring bore AVP-14 that did not affect his view of what was contained in paragraph 94 of exhibit 39 that is that based on groundwater level measurements for the Colinlea sandstone, that the groundwater flow is predominantly from south to north where the majority of the groundwater recharge is occurring to the south within the Permian strata outcrop. Further Mr Stewart said that the modelling technique of applying recharge calculations to the aquifers had no significant effect on the modelled outcomes. It may permit the drawdown to extend into a greater area but it wouldn't increase the drawdown cone in any marked measurable extent.⁹¹
- [219] Ms Kelly in her cross examination focused upon the groundwater loss from the area in perpetuity and the altered groundwater levels immediately adjacent to the final voids.
- [220] Mr Stewart, under cross examination, conceded that the groundwater loss would be in perpetuity as would the altered groundwater levels.
- [221] As to the project's cumulative impact modelling, which Mr Stewart had described as being incompatible for inclusion without modification, he conceded that the modelling did indicate that the additional mine de-watering would result in deeper drawdown where drawdown cones overlapped.⁹²
- [222] The drawdown cones to which he referred in making that concession were those for both the Alpha project and the Kevin's Corner project.⁹³
- [223] Having regard to the high level of mining activity in and around the subject area constituted by the Waratah Coal Mine, the China First Coal Mine, the South Galilee Project and the proposed Alpha North Coal Project he conceded that there were a number of overlapping drawdown cones in the general area when all of those mines were in operation.

⁹¹ T 5-78, lines 20 to 25.

⁹² T 5-56, line 15.

⁹³ T 5-56, lines 20 to 23.

[224] That is to say that Ms Kelly's cross examination focused in part upon the cumulative impacts of all of the mining activity occurring in the general area.

[225] I enquired of Ms Kelly, "Are you going to ask me to accept that it is going to have an impact on the reserve in some way other than the identified impact of a drawdown of a meter or half a meter in groundwater levels?" to which Ms Kelly responded by saying that she merely asked that the possibility of an impact be considered.⁹⁴

[226] I enquired of Ms Kelly whether that possibility of an impact that she wished to have considered would have been without identification of precisely what the impact might be which she confirmed.

[227] Building upon the cross examination conducted by Ms Kelly the following passage concluded her cross examination including some questions posed by me arising out of her cross examination which passage I think exemplifies the difficulties confronted by the applicants, opponents of the proposal and the authorising authorities.

"MS KELLY: So there is words there talking about uncertainty analysis, you would agree?---That's part of the modelling process, yes.

And the simplification of the groundwater system?---Yes.

That's what it's saying?---To – to mimic what we're measuring onsite, yes.

Thank you. So if there are still those uncertainties and we're looking, actually, here at a cumulative model of impacts of groundwater over a significant area, it's those – there isn't sufficient detail and certainty on those impacts, how can you be – consider that there might be conditions that would address those impacts without that fuller knowledge?---So the – the relevant conditions that are part of this approval is to provide the data for a larger model, which has been undertaken by the Geoscience Australia. So companies like GVK are providing all their monitoring data, their water level data, their model information and the same for Waratah and Galilee. So that will give you a more regional model. And as you say, looking at the drawdowns over - - -

Yes?--- - - - the larger area, yes.

That could well be after the event, would you agree, and some years down the track that they could find that these impacts were more significant than thought?---Hence, each mine would have to do their monitoring, do their remodelling, refinement, predictions, reassessment and provide that back into that regional model. So it will be an ongoing step. And there are conditions if it gets – if the model – or if the actuality is different to the model, then you'd have to modify your mining, possibly, so that you would

⁹⁴ T 5-57, lines 36 to 41.

prevent dewatering. Or you would have different approval conditions required.

HIS HONOUR: What form would those modifications for the mining take to avoid the dewatering consequences?---You may – you may try a different mine method or truncate mining to the west, depending on the – on the possible impact, your Honour.

Would that be consistent with the sort of things that the mine might also do to make good?---No, your Honour. I think the make good would be more ensuring water security in the area, both for use and environmental purposes.

And how would that be done?---The one that I've seen most recently is the Carmichael Mine approvals where they're predicting to have some drawdown out of the GAB and the condition is that they must replace, I think, five times the volume of that water back into the aquifer. So either with artificial recharge or some sort of drainage system.”⁹⁵

[228] Under cross examination by Mr Clothier of Queens Council Dr Webb acknowledged that he conceptualised geological folding under the Great Dividing Range.⁹⁶

[229] He went on to inform the Court that there were three possible impacts of that folding.

[230] Those impacts were:

- (a) To explain the western boundary condition.
- (b) To explain a mechanism for recharge along the western boundary consequent upon Dr Webb's conceptualisation that along the axis of the anticlines there may be fractures which give a greater opportunity for water to enter the aquifers.
- (c) There may be an effect in relation to the amount of recharge which Dr Webb say, pursuant to the conceptualisation is localised.

[231] Dr Webb went on to inform the Court that his conceptualisation of folding under the Great Dividing Range explains the outcrop pattern across the landscape and that in its turn explains the mechanism for recharge.

[232] He relies upon his conceptualisation to explain the opportunity for the higher recharge which he contends is getting into the aquifer system.⁹⁷

⁹⁵ T 5-59, line 16 to T 5-60, line 13.

⁹⁶ T 5-85, line 25.

⁹⁷ T 5-86.

[233] Dr Webb in the second of the joint reports on groundwater prepared by himself and Mr Stewart explained his views in the following terms:⁹⁸

“167. Although the Rewan Formation is an effective aquitard on a regional scale, recharge to the Bandanna-Colinlea aquifer is occurring through the Rewan Formation beneath the topographically elevated ranges to the west of the Kevin’s Corner lease, because the hydraulic head in the aquifer is also elevated beneath this area, i.e. the groundwater divide coincides with the topographic divide. Groundwater in the Bandanna-Colinlea aquifer flows to either side of the divide, as shown clearly by Fig. 4-10 in Mr Stewart’s Supplementary Report. This pattern of groundwater flow can only be maintained if groundwater recharge to the aquifer is occurring beneath the ranges. Therefore the Rewan Formation in this area is allowing recharge through it to the underlying aquifer, and I believe that this is most likely occurring through faults and fractures. Canso Resources (1983) notes that “in the vicinity of the Great Dividing range the sandstones are seen to be highly fractured”. This is consistent with the proposal that recharge is occurring through fractures along the ranges.”

[234] Mr Stewart’s response to those observations by Dr Webb was as follows:⁹⁹

“170. As detailed in my Supplementary Report, starting at Line 207, an assessment of the Rewan Formation will be undertaken to achieve compliance with the environmental approval conditions. The construction of groundwater monitoring bores off lease and within the GAB Rewan Group and Clematis Sandstone will allow for further assessment of the aquifer hydraulic parameters within the Rewan Formation.

171. It is considered that the drilling targets will be scientifically sited, using available geophysical and structural data, plus available bore logs, This [sic] will allow for the drilling of bores in both areas of enhanced groundwater potential (zones of secondary processes) and areas of pristine unaltered Rewan Formation. The resultant bores can then be utilised to assess the connectivity within and across the Rewan Formation.

172. These bores will be subject to aquifer testing, using core samples, in-situ packer testing, and down-geophysics, will allow for the assessment of zones of increases permeability, such as faulting, fracturing, or sandstone lenses.

...

174. In addition, long duration constant rate pump out tests will be conducted. These tests will include observation bores, in the overlying Clematis Sandstone and underlying Permian coal seams. It is considered that vibrating wire piezometers will be installed in the observation bores, with sensors within the Rewan Formation and Clematis Sandstone and Permian coal. These bores will assist in achieving the aims or the approval condition (developing groundwater level thresholds, assessing the vertical movement of groundwater within the Rewan Formation, and acting as early warning/model validation points over time.

⁹⁸ Ex 41, page 63, para 167.

⁹⁹ Ex 41, page 66, para 170 to 172 and pages 66 to 67, para 174 to 177.

175. In addition, it is considered that the Rewan Formation connectivity research will include:
- Fault zone analysis to accurately estimate fault zone hydraulic properties that may influence the Rewan connectivity;
 - Fault seal capacity to determine the capacity of the fault to block hydraulic connectivity;
 - Rock type juxtaposition assessment to estimate across fault leakage potential based on rock properties;
 - Fault reactivation potential considering the mechanical strength of the fault, the in-situ stress and the pore pressure;
 - Shale Gouge Ratio (SGR) related to fault zone permeability;
 - Pore pressure distribution; and
 - Along fault leakage risk.
176. All of which will aid in sub-vertical geological structures within the Rewan Formation.
177. I consider that the Rewan Formation assessment, in conjunction with other approval condition Rewan Formation research along the eastern edge of the Galilee Basin, will allow for an accurate of assessment of discrete fractures and faults and the risk of increased connectivity across the Rewan Formation, the barrier between the Permian coal and the GAB aquifers.”

[235] It seems fairly clear upon a consideration of all of the evidence adduced through each of Mr Stewart and Dr Webb that both of those experts acknowledge that the modelling has limitations.

[236] Mr Stewart did not dismiss out of hand Dr Webb’s speculation about recharge and the impacts on the western boundary.

[237] As was pointed out in the submissions of CCAQ, Mr Stewart acknowledged the importance of the conceptual hydrogeological model.

[238] CCAQ’s submissions included the following:¹⁰⁰

“The importance of the conceptual hydrogeological model was not disputed. As noted earlier, at [28], Mr Stewart agreed that groundwater modelling involves two broad steps of developing:

- (a) a conceptual hydrological model; and
- (b) a numerical model (computerised model).

Mr Stewart accepts that it is standard practice to consider stratigraphy and subsequently analyse structural features such as folding or faulting that affect groundwater flow.”

[239] CCAQ in their closing submissions also sought to get mileage out of concessions made by Mr Stewart that since the time of giving his evidence in what has become

¹⁰⁰ CCAQ Closing Submissions, page 24, para 79 to 80.

referred to as the Alpha case there has been some revision of his position. This was particularly the case with respect to the issue of recharge along the Great Dividing Range.

[240] CCAQ sought to rely upon that modification of his position to assert that his evidence was confused, unrealistic and conflicting regarding recharge to the D-E sandstone through the Rewan.

[241] I do not accept that. In response to a question from me Mr Stewart confirmed that the modelling process was an iterative process whereby once the mine starts they would be continually compiling data and getting better and better iterations of what is really occurring compared to what was modelled to occur.¹⁰¹

[242] At about the same time in the course of evidence Mr Clothier took Mr Stewart to some of the cross examination, in particular the contention that he had changed his evidence from the Alpha case, and took him to a joint expert report dated 2 August 2013 in which there occurred a sentence which said “groundwater recharge occurs along the entire Great Dividing Range to the west and south” with which proposition Mr Stewart said he had agreed.¹⁰²

[243] Reference to the two sets of conditions, with both of which the applicant must comply, demonstrates that there are already extant very onerous conditions in respect of groundwater matters.

[244] Significantly, the EPBC conditions include the submission for the approval of the Minister of a Rewan Formation Connectivity Research Plan that characterises the Rewan Formation within the area impacted by the mine.

[245] The detail articulated in the conditions speaks for itself.

[246] In addition the miner is required to develop a Water Monitoring and Management Plan for the Federal Minister’s approval.

[247] On any reading of those conditions they are both extensive and onerous.

The Water Reform and Other Legislation Amendment Act 2014

¹⁰¹ T 5-62, lines 32 to 36.

¹⁰² T 5-63, line 27 and Ex 86.

[248] Both the applicant and CCAQ made submissions to the Court in respect of the implications of the *Water Reform and Other Legislation Amendment Act* (WROLAA) which was introduced into the Queensland Parliament and passed on 5 December 2014.

[249] Part 4 of WROLAA, which has now come into effect, inserted a new chapter 12A ('Provisions about water for mineral development licenses and mining leases') into the *Mineral Resources Act*, which provided, amongst other things:

334ZP Entitlement to use underground water

(1) The holder of a mineral development licence or mining lease may take or interfere with underground water in the area of the licence or lease if the taking or interference happens during the course of, or results from, the carrying out of an authorised activity for the licence or lease.

334ZR Authorisation for Water Act

Taking, interfering with, or using underground water under section 334ZP is authorised for the Water Act.

[250] The *Mineral Resources and Other Legislation Amendment Regulation (No. 1) 2017* was made by the Governor in Council on 2 February 2017 and commenced on 3 February 2017.

[251] That regulation amends the *Mineral Resources Regulation 2013*, the *Petroleum and Gas (Production and Safety) Regulation 2004* and the *Water Regulation 2016*. Those amendments were required as a result of the provisions inserted into the MRA and the *Petroleum and Gas (Production and Safety) Act 2004* by the WROLAA relating to the taking of underground water by resource authority holders.

[252] The recent amendments prescribe the process mining or petroleum tenure holders (including lessees) must follow to measure and report on the volume of water taken under their statutory right to take "associated water".

[253] Recognising that the amendment wrought by WROLAA had not commenced at the time the parties in this matter were making submissions to the Court, CCAQ in their submissions observed as follows:¹⁰³

"The relevant parts of the WROLAA have not yet commenced; however, they will commence automatically on 6 December 2015 if the government does not extend the commencement date. The current law is therefore, while the Applicant currently requires a water licence to carry out its mining

¹⁰³ CCAQ Closing Submissions, page 58, para 225.

activities, it will not require a water licence from 6 December 2015 onwards. This has important implications for the reliance that the Court may place on later approvals under the Water Act should the Court be unsatisfied with the groundwater evidence as occurred in the Alpha case.”

[254] In anticipation of that sort of a submission the applicant’s submissions pointed out, in my view correctly, as follows:¹⁰⁴

“100. However, if by the time this Court delivers its decision the amendments to the *Water Act* have come into effect, there will be new and significant safeguards. A very substantial part of the amendments is to extend the operation of the present Chapter 3 of the *Water Act* (which presently concerns underground water management in respect of the actions of petroleum tenure holders) to apply to mining lease holders also. The regime in Chapter 3 would:

- (a) require Hancock to submit an initial underground water impact report (containing the matters set out in s 376), including a water monitoring strategy conforming with s 378, and to update it over the life of the mine;
- (b) provide public notice of the report and allow submissions to be made by members of the public;
- (c) permit the chief executive to impose conditions of the approval of the report;
- (d) also require Hancock to undertake a baseline assessment, and submit a baseline assessment plan, regarding the effect of its operations on water bores;
- (e) require Hancock to enter into make good agreements with both immediately affected and possible long term affected owners of bores;
- (f) if a dispute arises as to the proper content of a make good agreement which cannot be resolved, require the Land Court to decide what the terms of the agreement should be.

101. Thus, on any view there will be further significant assessment of the groundwater effects of the mine before any mining can lawfully commence.

102. The proper approach to be taken in this proceeding (regardless of the state of the law when this Court delivers its recommendations) is in line with the approach taken in the Coordinator-General’s report:

- (a) to consider and analyse the potential impacts of groundwater issues on the environment as part of the

¹⁰⁴ Applicant’s Written Submissions, page 23, para 100 (citations omitted).

broader considerations under MRA s 269(4) and EPA s 223;

- (b) in considering and analysing the matters in (a) above, to recognise that further detailed examination of these issues will also occur, and further conditions may also be imposed, under the *Water Act* processes.”

[255] In my view, while the WROLAA and the subsequent legislation bring about some changes in the entitlements to groundwater for the holders of a mining lease, the potential outcome for those lease holders is little changed recognising the obligations that are extant pursuant to the *Water Act*.

[256] In addition to those requirements there are also the requirements of the Environmental Authority as well as the Federal Government requirements. Notwithstanding the concerns expressed by Dr Webb (in a speculative way since he himself had carried out no actual investigations) and the concessions made by Mr Stewart about the limitations which attach to the modelling that has been done. I am not satisfied that any reservations which may remain at the present time will not, with adherence to all of the conditions, be able to be satisfactorily managed and are not sufficiently serious to warrant recommending that the Environmental Authority and consequently the mining lease should not be granted.

[257] The third respondent CCAQ drew the Court’s attention to the decisions in earlier cases involving other applications for mining leases and environmental permits in other parts of the Galilee Basin. In particular their submission focussed on *Hancock Pty Ltd v Kelly and Ors*¹⁰⁵ and, as pointed out elsewhere in these reasons, it was contended that this Court be bound by the findings in that case.

[258] Any perusal of his Honour Mr Smith’s reasons in the Alpha case demonstrated clearly that the scientific evidence adduced in that case given by no less than four experts (Mr Stewart, Mr Hair, Dr Webb and Dr Mudd) was much more complex and detailed than the evidence adduced in the present case.

¹⁰⁵ *Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection* (2014) 35 QLCR 56.

- [259] Whether the absence of more detailed scientific and hydrogeological evidence in the present case was an oversight by the parties or was an attempt to simplify the relatively complex conclusions that were advanced on behalf on each party is unclear.
- [260] However it is trite to say that, if the ambition was to simplify the decision making process of this Court, that ambition has failed.
- [261] On the one hand the Court is left with the evidence of Mr Stewart which is based upon field studies analysis and modelling, and on the other hand the evidence of Dr Webb which has no foundation in what might be termed hard data and seems to be based, necessarily, upon speculation and hypothesising.
- [262] It is clear that the conditions imposed by both the State and Federal agencies are designed to provide ongoing clarification of the situation with respect to interference with groundwater resources and that those conditions require a response from the miner in the event that the application for a mining lease and an environmental permit is successful.
- [263] Dr Webb as an expert was left in a position where he had no independently gathered observations which, to my mind, would satisfy me that he was able to displace the modelling and conclusions of Mr Stewart.
- [264] That is not to say that Dr Stewart's evidence was without blemish. He conceded that in earlier evidence in other cases he had made mistakes and even in the present case had failed to account for data available from one particular bore.
- [265] However on balance I prefer the evidence of Mr Stewart over the evidence of Dr Webb generally because I find Mr Stewart's evidence to be based upon proper observations and analysis of those observations.
- [266] Any modelling necessarily involves estimations, assumptions and inferences but in the present case I prefer the approach of Mr Stewart over that of Dr Webb.
- [267] Part of the difficulty with Dr Webb's evidence was that it appeared to be premised on an assumption that this Court would somehow take in and rely upon the evidence and findings in the Adani case – which process I am not willing to adopt.

- [268] It is clear that considerable further work needs to be done and should be done pursuant to the conditions imposed by the two environmental authorities.
- [269] It is true as well that there does remain uncertainty with some aspect of water recharge and groundwater levels post-mining.
- [270] Water modelling is an essentially complex and iterative process however I am satisfied that the conditions require adoption of that iterative process and will result in deeper knowledge and a capacity to confront any issues which later emerge.
- [271] On balance, having heard the cross examination of both witnesses, I have come to the view that Mr Stewart's work, based as it is upon full investigation and modelling, is more likely to have drawn the correct conclusions.
- [272] The consequence of that preference is an acceptance that, while Mr Stewart acknowledges that the long term impact upon groundwater and the drawdown of groundwater by virtue of the mining operations will have some impact on groundwater in the surrounding area and consequently upon surrounding grazing and farming properties, only future and ongoing studies and monitoring will ascertain the true effect.
- [273] That conclusion is not sufficient however, in my view, to invoke the precautionary principle and recommend against approval of the application for a mining lease and an environmental permit.
- [274] I note in passing that in any event, in my view at least, the provisions of the EPA contemplate some inevitable change to the environment. The extent and consequences of that change are matters which will be determined and managed in the future.

The Evidence of Robert Storrs – Environmental Scientist

- [275] The Court also had the benefit of evidence from Mr Robert Storrs who holds a Bachelor of Environmental Science in Land Resources and practices as an environmental scientist.
- [276] Mr Storrs had been instructed by the solicitors for the applicant to prepare a report in response to 11 questions, namely:

“Question 1

What were the assessment requirements of the Terms of Reference in relation to cumulative impacts?

Question 2

What work was performed to address the cumulative impact assessment requirements of the Terms of Reference?

Question 3

In your opinion, was the work performed to address the cumulative impact assessment requirements of the Terms of Reference in accordance with standard professional practice for this type of proposed project?

Question 4

In your opinion, does the cumulative impact assessment conducted for the Project satisfy the methodology described in EIS Appendix X, Sections 3 and 4?

Question 5

In your opinion, was the cumulative impact assessment inadequate because of one or more of the following matters:

- (a) failure to address the impacts of the GVK rail and port facilities;
- (b) failure to consider adequately and/or provide supporting data in relation to the impact of other proposed projects in the Galilee Basin such as the Alpha West, Alpha North and Degulla Projects;
- (c) failure to quantify adequately and/or provide supporting data in relation to impacts, relying largely on qualitative measures;
- (d) failing to consider adequately and/or failing to provide supporting data in relation to “past and present pressures: - please refer to the response to question 20 in the North Queensland Conservation Council’s further and better particulars relating to the mining lease application and the environmental authority application for details of “past and present pressures”;
- (e) failing to determine adequately and/or failing to provide supporting data in relation to a pre-determined baseline (being studies and data required in relation to the various impacts in order to have a basis on which to compare impacts from existing or proposed projects) which would indicate the existing conditions and the capacity of the environment to absorb further impacts;
- (f) failing to determine adequately and/or failing to provide supporting data in relation to the negative impacts;
- (g) there is no process to assess a complete cumulative impact report prior to final approvals for the project;
- (h) the Cumulative Impacts Assessment Report in Appendix O of the SEIS considers only some of the impacts and primarily those associated with the Alpha and Kevin’s Corner Mines, and there is no discussion or assessment of interactive or synergistic impacts arising from those impacts that have been identified;

- (i) “much cumulative assessment work remains to be done” and/or “the vast bulk of the work is yet to be done”.

Question 6

In your opinion:

- (a) is the Centre for Social Responsibility in Mining and Centre for Water in the Minerals Industry’s Good Practice Guide for the Australian Coal Mining Industry on Cumulative Assessment relevant to assessment of cumulative impacts for the Project?
- (b) to the extent that it is relevant, is there sufficient evidence to demonstrate that the goals or requirements of the guide will be met?

Question 7

Identify any conditions in the Coordinator-General’s Report, the draft Environmental Authority and/or EPBC Act Approval relevant to the potential cumulative impacts of the Project.

Question 8

In your opinion, is there sufficient, adequate and accurate information to provide a reasonable level of scientific certainty regarding the potential cumulative impacts of the Project?

Question 9

To the extent your opinion is that there is a degree of scientific uncertainty regarding the potential cumulative impacts of the Project, to what extent (if any) do the conditions in the Coordinator-General’s Report, draft Environmental Authority and/or EPBC Act Approval address that uncertainty?

Question 10

Please indicate:

- (a) whether any additional information is now available on the projects listed in Appendix X, Tables X-3 to X-6 of the EIS; and
- (b) whether any new projects (identified using the methodology and selection criteria specified in Appendix X of EIS) should now be added to Table X-3 to X-6 based on information that is currently available.

Question 11

In your opinion, is any new information identified pursuant to question 10 likely to materially change:

- (a) the cumulative impact assessment conducted for the Project?
- (b) conditions imposed on the Project relevant to potential cumulative impacts?”

- [277] I do not propose to recite each of the answers Mr Storrs gave to the 11 questions as they speak for themselves and it is unnecessary to repeat them here.
- [278] Mr Storrs was cross examined by Dr McGrath and Ms Kelly.
- [279] Dr McGrath's cross examination was very short and focussed on getting Mr Storrs to agree that, to the extent that his report dealt with matters relating to hydrogeology or groundwater or to economic issues, they be deferred to other experts.¹⁰⁶
- [280] Ms Kelly then cross examined Mr Storrs. Early on in the cross examination it became clear that the focus of Ms Kelly's cross examination was on the issue of greenhouse gas, which was a ground of objection specifically abandoned by the group she represented.¹⁰⁷ I did not permit such cross examination to proceed.
- [281] Ms Kelly then moved to the issue of cumulative impacts generally. She managed to elicit from Mr Storrs a concession that some of the conclusions of the EIS could have been more clearly expressed.
- [282] Mr Storrs also conceded that some potential impacts could have been more comprehensively expressed.¹⁰⁸
- [283] Ms Kelly put to Mr Storrs a number of entirely credible propositions regarding what could potentially have been included in any cumulative impact assessment.
- [284] Mr Storrs agreed generally with such potentiality but disagreed that their omission, at this stage, diminished the worth of the assessment.
- [285] In response to cross examination by Ms Kelly he said:¹⁰⁹

“But that's – would you agree that it doesn't look like a very good cumulative impact assessment when so much of the work is put off to the future, and there is very easily accessible data that hasn't been provided?---No, I don't agree with that. I think the baseline is being assessed, and the data that was available at that point in time has been aggregated and put into this. I think if you look at the guideline, which we looked at earlier, it talks about a life cycle of how you do cumulative impact assessment. And the idea is that you look at that across the whole life cycle of the project, and the first three steps within that are getting the scope right, working out what the impacts are going to be, and then doing an assessment. And then after that, you then look

¹⁰⁶ T 7-60, line 46 to T 7-61, line 2.

¹⁰⁷ T 7-66, lines 19 to 45.

¹⁰⁸ T 7-72, lines 1 to 22.

¹⁰⁹ T 7-76, lines 17 to 31.

at is it working? Do we need to change it? All those sort of things. So for this project, they've got to that first three steps, and then until construction starts you really can't move on with those other ones, and so that's an appropriate time to then redo that, and as you say, we'll talk about it in a second. But there's a number of steps within the appendix O, I think it was, which is the SEIS, which says the proponent will go back and revisit those over time."

[286] Having reviewed the evidence, it seems clear that the main point of difference between Mr Storrs and Ms Kelly is that Ms Kelly's cross examination focussed upon aspects of cumulative assessment which could be been extended or expanded (many of which were acknowledged by Mr Storrs); whereas Mr Storrs' approach as an environmental scientist was to consider the adequacy of what was actually done in all of the studies which comprised the EIS.

[287] Mr Storrs in his report concluded:

"SUMMARY OF CONCLUSIONS

In summary, I state that:

- (a) The cumulative impact assessment undertaken for the Project EIS and SEIS are consistent with the industry standard and were deemed to meet the Coordinator-General's Terms of Reference;
- (b) Considering industry standards for cumulative impact assessment, the Project cumulative impact assessment is adequate;
- (c) The information regarding cumulative impact assessment was of a suitable standard that allowed the administrative authorities to determine the application;
- (d) Given the conditions stated in the draft EA, Coordinator-General's report and the EPBC Act Approval, potential cumulative impact from the Project is considered minimal."

[288] The difficulty for Ms Kelly is that, while the scope and detail of the investigations which did occur could have been expanded, no evidence before me suggests that the conclusions would have been any different.

[289] To the extent that the state and federal conditions required ongoing surveillance, reporting and mitigation, I am satisfied that they adequately address the concerns expressed by Ms Kelly.

The Evidence of Christopher Loveday – Assessment Manager DEHP¹¹⁰

¹¹⁰ Ex 66.

- [290] Mr Loveday was the delegate of the administering authority responsible for the decision, pursuant to the EPA, to allow the application to proceed and the issuance of the draft Environmental Authority.¹¹¹
- [291] Mr Loveday was cross examined by Dr McGrath and Ms Kelly.
- [292] Dr McGrath's cross examination established that Mr Loveday did not profess expertise in hydrogeology, groundwater or economics.¹¹²
- [293] Ms Kelly's cross examination focussed on the topic of cumulative assessment.
- [294] Mr Loveday acknowledged that his affidavit did not refer to the NQCC objection with respect to cumulative impact assessment because, as he explained, "At the time when I wrote my affidavit, I didn't believe that it was necessary to include given that the cumulative impacts and the assessment of cumulative impacts were undertaken by the Coordinator-General".¹¹³
- [295] Mr Loveday also acknowledged that he was familiar with the industry guide on cumulative impact assessment having encountered it probably five years earlier.¹¹⁴
- [296] Ms Kelly took Mr Loveday to task with respect to his role in signing off on the draft Environmental Authority.
- [297] She extracted from Mr Loveday an acknowledgement that a number of outcomes in respect of groundwater, nature conservation, biodiversity conservation and wildlife generally may have cumulative impacts when considered in the context of other nearby resource projects.¹¹⁵
- [298] Mr Loveday explained his position as being that he did not sign off on the Environmental Impact Statement because that was the function of the Coordinator-General.¹¹⁶

¹¹¹ Ex 66, para 5.

¹¹² T 7-93, line 46 to T 7-94, line 7.

¹¹³ T 7-95, lines 13 to 15.

¹¹⁴ T 7-95, lines 25 to 29.

¹¹⁵ See T 7-96 to T 7-98.

¹¹⁶ T 7-99, line 8.

- [299] He told the Court “There was a significant amount of work done through the EIS process as part of – obviously, through the bilateral agreement – the assessment bilateral. And the Coordinator-General did state in his evaluation report that the CG’s process had fulfilled the requirements of the assessment bilateral.”¹¹⁷
- [300] He went on to advise the Court, “I think there was a significant amount of information that went into the cumulative impact report that was done by the Coordinator-General. I don’t have his evaluation report here to refer to, but there was a significant amount of work that was done by the Coordinator-General which formed part of the application documents which I obviously assessed.”¹¹⁸
- [301] Ultimately, it became clear that Ms Kelly was seeking to provoke criticism of Mr Loveday for what was not contained in a document for which he had no responsibility.
- [302] I also take comfort from the fact, as was confirmed by Mr Loveday, it is the Federal Department of Environment which is responsible for enforcing the *Environment Protection and Biodiversity Conservation Act 1999*.¹¹⁹
- [303] To the extent that it is relevant to the State Government’s role in the assessment process, I am satisfied that Mr Loveday had regard not only to the terms of the Environmental Authority but also to the steps which necessarily had to be taken at various stages in the course of initiating the project which steps required reporting and compliance.

Economics

- [304] As already indicated from the outline of the opening submissions of the various parties only CCAQ has raised the issues which relate to economic outcomes should this project proceed.
- [305] It will be recalled that in his opening Dr McGrath told the Court that the parties he represented had raised economics only “to make the case that economics do not trump other issues like groundwater in the precautionary principles”.

¹¹⁷ T 7-99, lines 16 to 20.

¹¹⁸ T 7-99, lines 27 to 31.

¹¹⁹ T 7-100, lines 15 to 17.

- [306] That observation seems to contain within it a concession that with respect to matters of economics some benefits will accrue to the community as a result of the development of this mine. It is, of course, part of Dr McGrath's arguments that the benefits may be outweighed by the costs in terms of impacts on other industries and upon employment.
- [307] The Court had the benefit of expert reports by two economists.
- [308] The applicant engaged the services of Mr Marcus Brown, an economist, who had prepared a report and a supplementary report which subsequently became exhibits 42 and 44.
- [309] The objector to CCAQ engaged the services of Mr Roderick Campbell who also prepared two expert reports which became exhibit 60 and exhibit 61.
- [310] The two economic experts conducted a joint meeting and prepared, consequent upon that meeting, a joint expert report which became exhibit 43.
- [311] A key point of distinction between the approaches of each of the two economics experts was that Mr Brown conducted an assessment based on impact assessment and not on a cost benefit analysis approach. This difference in approach by the two experts is clarified and summarised in the opening statement of their expert report they said, by way of general agreement:

“Economic assessment of the Kevin's Corner project was based on “impact assessment” and not on “cost benefit analysis”. We agree that cost benefit analysis and impact analysis are different approaches to assessing a given project.

Cost benefit analysis is an evaluative tool. It assesses the costs and benefits of a project to all relevant stakeholders and asks “does this project make society better off?” or alternatively “should this project go ahead?” More technically, cost benefit analysis assesses changes in economic welfare.

Impact assessment does not assess the merits of a project per se – whether its costs outweigh its benefits – but instead attempts to estimate how the project might affect other parts of the economy. Impact assessment does not assess whether a project is financially viable or economically desirable, but estimates impacts of a project should it proceed.”¹²⁰

¹²⁰ Ex 43, page 2.

[312] CCAQ was at pains to identify the many shortcomings of the input-output methodology and indeed relied upon an acknowledgement by Mr Brown in an appendix which he had prepared as part of the project EIS where he said:¹²¹

“The input-output approach has a number of limitations, which may result in overestimation of impacts:

- The absence of capacity constraints such that the supply of each good is perfectly elastic, implying that each industry can supply whatever quantity is demanded of it and there are no budget constraints.
- The assumed linearity and homogeneity of the input function, which implies constant returns to scale and no substitution between inputs. This occurs because the approach assumes inputs purchased by each industry area function only of the level of output of that industry.
- Each commodity, or type of commodity, is supplied by a single industry sector, implying there is only one method used to produce each commodity and each sector has only a single primary output.
- Multipliers are derived from the 2005-06 Input-Output tables and reflect the structural dependence of the economy at that time. These tables have been augmented to reflect broad level structural change across the national economy by industry sector. The Queensland tables prepared for this analysis reflect regional variation from the national tables as at 2006. As such, the tables do not reflect any intensification or deterioration in regional competitive advantage in specific industry sector that may have occurred since 2005-06.
- The assumption that the economy is in equilibrium at given prices and that the economy is not subject to other external influences.
- The additivity assumption suggests the total effect of carrying on several types of production is the sum of the separate effects, which is not a true reflection of economic systems.”

[313] By highlighting those acknowledged shortcomings CCAQ relied upon the report of Mr Campbell to contend that a full-blown cost benefit analysis should have been conducted.¹²²

[314] Subsequently Mr Brown sought to clarify his use of the term “impacts” because, he said, “within economics we have an impact assessment sort of approach and then there is an evaluative approach so impacts should... be taken of and in themselves. So an impact may not necessarily be a positive or a negative, or it may be interpreted as a positive or negative, depending on circumstances.”¹²³

[315] In their joint report Mr Campbell described cost benefit analysis in the following terms, which were not disagreed with by Mr Brown:¹²⁴

¹²¹ Ex 52.21, pages 1488 to 1489.

¹²² CCAQ Closing Submissions, page 42, para 142.

¹²³ T 7-6, lines 15 to 23.

¹²⁴ Ex 43, pages 3 to 4.

“Cost benefit analysis is the main economic tool for assessing whether a project is in the economic best interest of the public. Without it, it is difficult for decision makers to assess whether the benefits of the project – in this case mainly royalty revenue – outweigh the costs for the project – in this case environmental damage and proposed public subsidies through infrastructure provision and or royalty waivers.

Royalties and subsidies are important to consider if decision makers are interested in whether the project is in the interests of Queensland. This is clear from Queensland cost benefit analysis guidelines.

Infrastructure provision at taxpayer expense and royalty waivers are, or have been, Queensland government policy regarding Galilee Basin coal projects.”

[316] Mr Brown described his disagreement with the need to conduct a cost benefit analysis in the following terms:¹²⁵

“The Queensland Government has formulated an assessment framework for the exploitation of energy and mineral resources developed over many years and by successive government administrations in consultation with the community. This framework allows for the extraction of energy and mineral resources subject to acceptable mitigation of impacts and the payment of Queensland Government mining royalties. The assessment framework is in effect a large multi-criteria assessment of proposed projects, included in which is economic assessment. As such, the EIS as a whole is the basis for decision making in relation to an approval.

While the Terms of Reference do not preclude (or prevent) the preparation of a cost benefit analysis, a cost benefit analysis would not address the requirements of the Terms of Reference.”

[317] The economics experts were able to reach sensible agreement about the differences between them and the status of cost benefit analysis within the requirements of the EIS terms of reference. They wrote:¹²⁶

“We agree that cost benefit analysis is not commonly employed to assess mining projects as part of the EIS process in Queensland, although it is required in New South Wales. We agree that the economic impact assessment submitted as part of the Environmental Impact Statement generally fulfils the requirements of the EIS Terms of Reference, although the Terms of Reference do not preclude a cost benefit analysis.

We agree that common practice in assessing mining projects as part of the EIS process in Queensland is the use of input-output models.”

[318] While the subject proposal represents an investment of many millions of dollars the two economic experts were able to put that into context when they pointed out in their joint agreement that, “We agree that in the context of the state economy, the project

¹²⁵ Ibid.

¹²⁶ Ibid, page 4.

represents only a fraction of a percent of economic output or employment. As such, an increase in input demand that's generated by the Project represents a marginal change to the Queensland and Australian economy."¹²⁷

[319] That agreement between the two economic experts makes clear that while the subject proposal itself involves very significant amounts of investment placed in the proper context of the Australian and of the Queensland economy it is only a marginal factor in the overall economic environment.

[320] In that section of their joint report they were also able to agree that, if as projected, the mine is able to produce at 30 million tonnes per year it would, in the absence of any royalty waiver, be liable for royalties of between \$145 million dollars and \$168 million dollars per annum based on long term coal prices.¹²⁸

[321] Those royalty payments would constitute a significant contribution to the state coffers.

[322] In his individual report¹²⁹ Mr Campbell pointed out that in his view much of the information which might have been required for a cost benefit analysis was included in the EIS economic assessment and little more data would be required to be able to perform cost benefit analysis to a decent level.¹³⁰

[323] Mr Campbell also expressed concern at the size of the Kevin's Corner Project which, in conjunction with other Galilee Basin projects, has the potential to increase the supply of thermal coal to seaborne markets by almost 20% which could have the consequence of depressing coal prices and could result in the closure of other mines, with many likely to be in Australia. This seems to me to be entirely speculative.

[324] Mr Campbell also, it seems, wished to raise the issue of the viability of coal projects in the Galilee Basin generally notwithstanding it was agreed between him and Mr Brown that the EIS terms of reference did not require an assessment of the financial viability of the project.¹³¹

¹²⁷ Ibid, page 11.

¹²⁸ Ibid.

¹²⁹ Ex 60.

¹³⁰ Ex 60, page 3, para 12.

¹³¹ Ex 43, page 5.

[325] In his report Mr Campbell concluded, “In my opinion the economic assessment of the Kevin’s Corner EIS is not suitable for decision making purposes. It contains no attempt to weigh the costs and benefits of the project and assess whether the project is in the best interests of Queensland.”¹³²

[326] He went on to say:¹³³

“The economic assessment is based on input-output modelling which is not a decision making tool as does not weigh the costs and benefits of the project to the community. Furthermore, it is almost certain to overstate the impacts of the project due to its lack of capacity constraints and other shortcomings.”

[327] In his supplementary report he says:¹³⁴

“In my opinion, decision makers should be provided with economic assessment that assesses if the project is in the economic interests of Queensland. From an economic perspective, I think that the first consideration of any proposal to exploit the states coal resources should be whether doing so is in the best interest of Queenslanders. Other factors that may also be of consideration include the interest of other parties, such as the Federal Government and coal companies, and the impacts of climate change. Decision makers may want to take these wider interests into consideration, but their first consideration should be whether the project makes Queenslanders better off. Mr Brown and I agree that the economic assessment does not provide this information.”

[328] Having considered, as I hope I have demonstrated above, the arguments of the two economic experts I am satisfied that, so far as is required by the terms of the EIS and the relevant sections of the *Mineral Resources Act 1989*, this project is likely to have positive economic outcomes such as to warrant recommendation of the granting of the mining lease.

[329] I am not convinced that any of the negative economic consequences constitute anything other than inevitable structural change in a modern economy.

[330] That view becomes more important in the context of the agreement between the two economic experts referred to above wherein they observed that the project itself constitutes only a very marginal change to the Queensland and to the Australian economy.

¹³² Ex 60, page 24, para 103.

¹³³ Ibid, para 104.

¹³⁴ Ex 61, page 2, para 10.

[331] My reservations with respect to the weight to be given to the views of Mr Campbell are really most effectively summarised by the opening submissions made by Dr McGrath where he said:¹³⁵

“DR McGRATH: So he’s not done a full cost-benefit analysis, but he’s pointing out that there are material issues that aren’t addressed in the approach taken by the applicant, and if you took those things into account then there are significant negatives economically with this project as well in terms of weighing up – for instance, one of key questions your Honour has to consider and the ministers have to consider is whether the project is in the public interest, which inherently involves a weighing up of the pros and cons. So he says that they are material issues that would lower the perceived economic outcomes without having done a full cost-benefit analysis which, effectively, would need to be done by the applicant to properly do it with the assumptions about – that really only the applicant knows about the project and the – beyond just what’s stated in the EIS in terms of the employment, those sorts of things.

It’s not within my client’s capacity to know all the aspects of the project to be able to do it, and it’s also really not my – my client’s point was economics, is simply they’re overstated, and if you take into account the negatives, the overall economic benefit or disbenefit of the mine is much lower than – or the overall economic benefit of the mine is much lower at least than what’s said by the applicant.”

[332] I accept that Mr Campbell holds reservations about the utility of input output analysis (some of which are shared by Mr Brown) and that he seems to be something of an evangelist for cost benefit analysis as a tool for decision making.

[333] Notwithstanding that, I am satisfied that the analysis done by Mr Brown demonstrates economic benefits accruing to the Queensland economy including, but not limited to, the potential generation of substantial revenue in the form of royalties.

[334] Accordingly, so far as the matter of economics is concerned, I am of the view that on balance the evidence justified recommending granting of the lease and I am further satisfied that no proper basis has been demonstrated for refusing to grant the lease premised upon a demonstrable lack of economic benefit.

Section 269 of the MRA

[335] Section 269(4) of the MRA provides that the Land Court, in making a recommendation to the Minister that an application for a mining lease shall be granted

¹³⁵ T 2-37, lines 24 to 41.

either in whole or in part, must take into account and consider a number of specified matters.

[336] Each of the matters required to be considered pursuant to s 269(4) of the MRA are discussed below.

[337] In considering each of those matters I have, of course, had regard to the material filed by the applicant miner, by the statutory party and by the various objectors.

[338] It should be noted that the majority of the matters set out in s 269 of the MRA have not been the subject of any criticism by any of the objectors and the initial report of the Mining Registrar took no exception to them as well.

Section 269(4)(a) – Whether the provisions of the Act have been complied with?

[339] The application for a mining lease was accepted by the Mining Registrar at Emerald and in the material delivered to me by the Mining Registrar there has been no suggestion that any of the requirements of the MRA had not been complied with; in addition, the material was accompanied by a certificate of application for mining lease ML 70425 together with a copy of the certificate of public notice.

[340] The application by the miner attracted a number of objections and accordingly I am satisfied that, in particular, the public notice requirements have all been complied with.

[341] In all of the circumstances I am satisfied that s 269(4)(a) has been complied with.

Section 269(4)(b) – Whether the land applied for is mineralised or the other purposes for which the lease is sought are appropriate?

[342] In its application the applicant describes the intention of the application being to make economic recovery of coal resources at Kevin's Corner Coal Mine and, as observed above, the proposed mine is in close proximity to a number of other operating coal mines.

[343] The evidence placed before the Court satisfies me that the land applied for is mineralised as that term is used in the MRA.

[344] All the investigations which lie in the background to the lease application identify the existence of coal seams and indeed in the accompaniment – proposed mining program – the proponents identified 1.5 billion tonnes of coal as being available on the site.

[345] Accordingly I am satisfied that the area of the lease is likely to be mineralised and thus the requirements for s 269(4)(b) have been satisfied.

Section 269(4)(c) – If the land applied for is mineralised, whether there be an acceptable level of development and utilisation for the mineral resources within the area applied for?

[346] Having heard all the evidence and having had an opportunity to read the material accompanying both the application for a mining lease and for an environmental authority, the EIS and its supplements, I am left in no doubt that Hancock proposes a very large scale development and utilisation of the coal resources in the area applied for.

[347] This is a large scale development and the associated infrastructure necessary to facilitate extraction and utilisation of the mineral resources is of an appropriate level.

Section 269(4)(d) – Whether the land and the surface area of that land are of an appropriate size and shape?

[348] None of the objectors raised any issue with respect to the size and shape of the land which is sought to be utilised for extraction of the mineral resource save that, as discussed in the section on groundwater in this decision, there were concerns about the extent to which there might be drawdown of groundwater extending outside the area of the mining lease.

[349] The size and shape of the proposed mine area is appropriate to enable exploitation of the identified coal seams and accordingly I am satisfied that the land sought to be utilised and the surface area of that land are of an appropriate size and shape.

Section 269(4)(e) – Whether the term sought is appropriate?

[350] The application for a mining lease at s 3 identifies the term applied for as being 40 years. The Coordinator-General has declared the project a project of state significance pursuant to the *State Development and Public Works Organisation Act*.

[351] Given that the proposed investment involves an estimated capital cost of approximately \$4 billion.¹³⁶ I am satisfied that the term of 40 years sought by the applicant is an appropriate term given the magnitude of the proposed development.

Section 269(4)(f) – Whether the applicant has the necessary financial and technical capabilities to carry on mining operations under the proposed mining lease?

[352] The applicant included with its application a concise summary of Hancock Prospecting Pty Limited financial statements relating to previous operating years.

[353] Its financial and technical resource material included the following observation:¹³⁷

“Hancock Prospecting Pty Limited (Hancock Prospecting) is a leading privately owned, Australian mining company with interests in iron, coal, manganese, uranium, diamonds and copper/gold. The company was established by Lang Hancock who discovered and drove the initial development of the Pilbara region of Western Australia into the world’s premier iron ore mining region. Hancock Prospecting, which is chaired by Mrs. Gina Rinehart, has interests in a number of operating iron ore mines, a manganese mine and is currently reviewing development options for Roy Hill iron ore, Alpha Coal and Kevin’s Corner coal projects.”

[354] The extracts from the company accounting records provided with the mining lease showed total assets of \$1,151,924,000 in 2008 and liabilities of \$120,297,000. The summary shows a total equity of the company in the sum of \$410,855,000. I am satisfied that s 269(4)(f) of the MRA has been satisfied.

Section 269(4)(g) – Whether the past performance of the applicant has been satisfactory?

[355] The DNRM reports supplied to the Court indicates that there was no suggestion that either the company or its directors have ever had a notice to rectify non-compliance or damage, notice to show cause, tenure cancelled, penalty imposed, or conviction. Accordingly there is no evidence before me of any unsatisfactory past performance by the applicant and accordingly I am satisfied that the past performance of the applicant has been satisfactory.

¹³⁶ Ex 52.36, page 4237.

¹³⁷ See Attachment 3 to the referral (application for mining lease).

Section 269(4)(h) – Whether any disadvantage will result to the holders of existing exploration permits or mineral development licences or to existing applicants for exploration permits or mineral development licences?

[356] In its application the applicant identified itself as holding a prospecting permit No. 73569 over the area as well as a mineral development license No. 333 over the subject area.

[357] The application also identified that the land applied for was within an area of an exploration permit for coal of which they were not the holder. They identified that exploration permit as 1210 with an expiry date of the 17 December 2014.

[358] Attached to the application was correspondence from Hancock Prospecting Pty Limited to the Mining Registrar which said, inter alia:¹³⁸

“Hancock Prospecting Pty Limited (**Hancock Prospecting**) is the 100% owner and consolidating parent entity of Hancock Galilee Pty Limited, Hancock Coal Pty Limited and Hancock Kevin’s corner Pty Limited.

Hancock Kevin’s Corner Pty Limited (**Hancock Kevin’s Corner**) is the holder of EPC 1210, Hancock Galilee Pty Limited, (**Hancock Galilee**) is the holder of MDL 333 and Hancock Coal Pty Limited (**Hancock Coal**) is the holder of MDL 285.

Hancock Kevin’s Corner understands that Hancock Coal is seeking to apply for a mining lease that will cover the southern part of EPC 1210 whilst Hancock Galilee is seeking to apply for a mining lease that will cover the northern part of EPC 1210.

Hancock Galilee Pty Limited understands that Hancock Coal is seeking to apply for a mining lease that will cover the south eastern part of MDL333.

Hancock Kevin’s Corner consents to the proposed mining lease from Hancock Coal covering the southern part of EPC 1210, as contemplated by the accompanying mining lease application.

Hancock Kevin’s Corner consents to the proposed mining lease from Hancock Galilee covering the northern part of EPC 1210, as contemplated by the accompanying mining lease application.

Hancock Galilee consents to the proposed mining lease from Hancock Coal covering the south east part of MDL333, as contemplated by the accompanying mining lease application.”

[359] On the evidence before me there are no holders or applicants for any tenures nor applicants for any tenures who would be disadvantaged by the grant.

¹³⁸ See Attachment 3 to the referral (application for mining lease).

[360] In all of the circumstances I am satisfied that no disadvantage will result to the holders of any existing exploration permits or mineral development licences or any existing applicants for exploration permits or mineral development licences.

Section 269(4)(i) – Whether the operations to be carried on under the authority of the mining lease conform with sound land use management?

[361] The only issues before me in the hearing of this application were objections about groundwater and environmental issues as well as economics. For the reasons explained earlier in this decision I have concluded that there is no basis upon which I should recommend refusal of the grant of the mining lease, notwithstanding that it will convert otherwise useful grazing land into a coal mine.

Section 269(4)(j) – Whether there will be any adverse environmental impact caused by those operations and, if so, the extent thereof?

[362] The potential environmental impacts which have been in issue in this hearing have been subject of detailed evidence referred to above.

[363] While it is clear, as with any mineral resource project, that there will be some inevitable environmental impacts I have reached the conclusion that the conditions imposed under both the EPA by the relevant State Government Department and the Commonwealth approval pursuant to the EPBC are adequate to deal with the environmental impacts caused by the proposed mining operations.

Section 269(4)(k) – Whether the public right and interest will be prejudiced?

[364] There are two particular aspects of the public right and interest which have been ventilated in this case.

[365] The first of those is the interest landholders hold in the properties in which they are the registered proprietors and or lessees and the appurtenant rights they enjoy with respect to things such as access to groundwater.

[366] The second area of public interest is clearly the environment.

[367] As indicated above I am satisfied that the environmental considerations are addressed by the relevant permits.

[368] With respect to private interests those matters have to be balanced against the public interest in resource development and the advantages which that brings to the community at large.

[369] The MRA contains provisions for compensation to land owners and in the instant case requirements to enter into make good agreements with affected landholders.

[370] The conclusion with respect to this section of the MRA requires a balancing of advantages and disadvantages and I have come to the view that the disadvantages are not sufficient to outweigh the advantages of developing this mineral resource and accordingly, while I am bound to come to the view that public rights and interests will be affected I do not reach the conclusion that the public interest will be unreasonably prejudiced by the proposed mining operation.

Section 269(4)(l) – Where there is any good reason shown for a refusal to grant the mining lease?

[371] My conclusions set out above including an assessment of the objections which have been raised lead me to form the opinion that subject to the anticipated compliance with the conditions of the environmental permit there is no good reason to refuse the grant of the mining lease.

Section 269(4)(m) – Whether the proposed mining operation is an appropriate land use, taking into consideration the current and prospective uses of that land?

[372] Having regard to my finding in respect of criteria (i), (j), (k) and (l) as set out above, I come to the view that the proposed activity is an appropriate land use taking into consideration the current and prospective uses of the land and, in particular, the extent of the resource which lies beneath it.

[373] For the reasons which I have set out above my decision in this matter is to recommend to the Honourable the Minister for Mines and Energy that Mining Lease No. 704425 be granted over the application area.

Section 191 of the Environmental Protection Act 1994

[374] As indicated earlier in this decision s 191 of the EPA requires this Court to give consideration to certain matters in making an objections decision.

[375] I have, in my view, considered those matters where relevant in the course of analysing the evidence adduced in this case. (See, in particular, my observations regarding the evidence of Dr Dique).

[376] I have set out in the body of this decision my conclusions particularly with respect to the matters of groundwater and economic impact. I do not propose to repeat those conclusions in detail, save to observe that I have concluded that concerns with respect to impact on the groundwater are appropriately dealt with and managed by the conditions imposed by both the State Department of Environment and Heritage Protection in the draft Environmental Authority and by the Federal Government approval granted pursuant to the EPBCA.

[377] I think it unnecessary to recommend insertion of any additional conditions into the draft EA in order to protect the groundwater resources as I believe the requirements for ongoing study and reporting imposed by both the State and Federal Governments are adequate.

[378] Inevitably, as other members of this Court have pointed out, mining projects of this magnitude will have negative impacts and undesired consequences on the environment, particularly in the immediate vicinity of the mine. However I have come to the view that those consequences are outweighed by the benefits that will flow from the development of the mine.

Conclusion

[379] Having considered the evidence in this case in considerable detail and, having, hopefully, set out my view with respect to the relevant parts of the evidence, I have come to the conclusion that:

- (a) I should recommend that the mining lease application be granted; and
- (b) the Environmental Authority application be approved subject to the conditions set out in the draft Environmental Authority.

Orders

- 1. Pursuant to s 269(1) of the *Mineral Resources Act 1989* I recommend to the Honourable Minister administering the *Mineral Resources Act 1989* that**

mining lease MLA 70425 be granted over the application area for the period sought.

2. Pursuant to s 190(1)(a)(ii) of the *Environmental Protection Act 1994* I recommend to the administering authority that the Environmental Authority be issued in the terms of the draft Environmental Authority issues on 5 July 2013.

**WL COCHRANE
MEMBER OF THE LAND COURT**

Annexure A

Conditions of Approval

1. The **Minister** may determine that a plan, strategy or program approved by the Queensland Government satisfies a plan, strategy or program required under these conditions.

Project area

2. The **project area** is:
 - a) The area depicted at Attachment A (mine footprint) and is contained within the mine lease application (MLA) 70245 with an area of 37,380 ha. This area includes the following leases (as they are at the date of the decision to which these conditions are attached):
 - i. Exploration Permit Coal 1210/ MLA 70425; and
 - ii. Mineral development lease (MDL) 333.
 - b) The off-lease road and rail spur as depicted in Maps 1 and 2 at Attachment B.
3. For the purpose of the action, the **approval holder** must not clear outside the **project area**.
4. Within 12 months from the date of approval and each 12 months thereafter, the **approval holder** must publish maps verifying compliance with Condition 2 on their website until the expiry date of approval.
5. The **approval holder** must notify the **department** of the information being published on their website, and provide the **department** with a copy of this information, within 1 week of the information being placed on their website.

Disturbance Limits

6. Where habitat for an **EPBC Act listed species or community** not previously identified and reported to the **department** is found in the **project area**, the **approval holder** must notify the **department** in writing within five business days of finding this habitat, and within 20 business days of finding this habitat outlining in writing how these conditions of approval will still be met.
7. The maximum disturbance limits in Table 1 apply to authorised **impacts** on **EPBC listed species** as a result of exploration, construction, operation and decommissioning of the mine, associated infrastructure and off-lease road and rail within the **project area** (i.e. they are 'whole of project' disturbance limits) for the duration of project approval.

Table 1: Maximum Disturbance limits for EPBC listed species

	Mine disturbance: High value Habitat	
Black-throated Finch	730 hectares	270 hectares
Squatter Pigeon	882 hectares	276 hectares
Red Goshawk	917 hectares	284 hectares
Threatened species - reptile species		
Yakka Skink	1410 hectares	
Ornamental Snake	802 hectares	242 hectares

	Mine disturbance: High value Habitat	Subsidence disturbance: High value Habitat
Migratory species		
Eastern Great Egret	619 hectares	143 hectares
Cattle Egret	619 hectares	143 hectares
Rainbow Bee-eater	344 hectares	n/a

Note 1: Table 1 is derived from information provided in the SEIS (AMEC 2012), and the Coordinator-General's assessment report (Qld Government 2013) with rounding to the nearest hectare applied.

King Blue-grass (*Dichanthium queenslandicum*)

8. The **approval holder** must not adversely **impact** more than 59 hectares of **suitable habitat for King Blue-grass**.
9. The **approval holder** must undertake pre-clearance surveys for **King Blue-grass** within the **project area** prior to commencement of **Project Stage 2**.
10. The **approval holder** must present a methodology for pre-clearance surveys for **King Blue-grass**, including justification for this methodology by a **suitably qualified ecologist** approved by the **department** in writing, to the **Minister** for approval before undertaking pre-clearance surveys.
11. The **approval holder** must provide the pre-clearance surveys, and a summary of the results of pre-clearance surveys, to the **department** in writing within 30 calendar days of completing the pre-clearance surveys.
12. If **King Blue-grass** is found during pre-clearance surveys the **approval holder** must:
 - a) include management measures for **King Blue-grass** in the **MNES Management Plan**;
 - b) submit proposed offsets for **impacts to King Blue-grass** in accordance with the **EPBC Act Offsets Policy**, including a timetable to implement these offsets;
 - c) meet the conditions of this approval relating to offsets; and
 - d) not **commence** the action prior to the **Minister** approving in writing the quantity of the offset required for **impacts on King Blue-grass** and a timetable to implement offsets.

Disturbance to habitat

13. If disturbance limits for **EPBC listed species and communities** set in Table 1 are exceeded, or predicted to be exceeded, the **approval holder** must:
 - a) contact the **department** in writing before reaching the disturbance limit in Table 1 and provide the actual amount of disturbance in hectares for each species;
 - b) provide a new offset requirement for each species;
 - c) offsets must be in accordance with the **EPBC Act Offsets Policy**;
 - d) offsets must be provided and approved by the **Minister** in writing before the **approval holder** reaches the disturbance limit in Table 1; and
 - e) a timeframe for implementing these offsets must be approved by the **Minister** in writing before the **approval holder** reaches the disturbance limit in Table 1.
14. If disturbance limits set in Table 1 are exceeded the **Minister** may require additional direct or indirect offsets for any additional disturbance to habitat for **EPBC listed threatened species or communities**.

MNES Management Plan

15. The **holder** must submit a **MNES Management Plan (MMP)** approval of

Minister which maximises the ongoing protection and long term conservation of **EPBC listed species and communities** within the **project area**.

16. The MMP must include:

- a) a description of the habitat (including **High Value Habitat**) to be impacted, including size in hectares, habitat quality and features, and maps of habitat, for each species listed in Table 1;
- b) a summary of the results of any pre-clearance surveys and **ecological equivalence surveys** and how these have been used to determine the distribution and extent of species and their habitat, including any changes to predicted **impacts**;
- c) details of the specific potential **impacts** to **MNES** and their habitat resulting from each **Project Stage**, including **impacts** from:
 - i. vegetation clearing;
 - ii. **subsidence** from underground mining;
 - iii. mine dewatering **impacts** on perched aquifers;
 - iv. ecological function changes to habitat, including habitat connectivity, species' function and behaviour, composition and size of populations, and death or injury to individuals;
 - v. hydrological changes due to stream diversions, and flood levees; and
 - vi. weeds and pests.
- d) measures that will be undertaken to avoid, mitigate and manage **impacts** resulting from the action. These measures must include:
 - i. the implementation of those measures contained in relevant guidelines, policies and plans (such as recovery plans) to determine measures specific for each species affected by the proposed action;
 - ii. the use of fauna spotters prior to and during all clearing activities to ensure **impacts** on **EPBC listed species and communities** are minimised (**EPBC listed fauna species** must be removed and relocated to adjacent suitable habitat unless this is not possible due to stress or injury);
 - iii. measures to prevent stress, injury and mortality of **EPBC listed fauna species** during **Project Stages**;
 - iv. measures to protect **EPBC listed species and communities** and their habitat located in the **project area**, including adjacent to cleared areas;
 - v. buffer zones for trees identified as nesting sites for the Red Goshawk which are endorsed in writing by a **suitably qualified expert**;
 - vi. measures to rehabilitate all areas of **MNES** habitat disturbed during **Project Stages**; and
 - vii. measures to allow fauna to escape from pits or trenches;
 - viii. measures to determine whether **EPBC listed fauna species** that are injured or stressed should be rehabilitated or euthanised, and if a species dies, measures to determine whether and how their bodies should be made available for scientific research;
 - ix. measures to report on the occurrence, circumstances and outcomes for casualties that are **EPBC listed fauna species**;
- e) details of how the MMP will be updated to incorporate and address outcomes from research undertaken for **EPBC listed threatened species** under this approval;
- f) a monitoring program to determine the success of mitigation and management

- measures. The monitoring program must;
- i. clearly set out performance indicators or criteria for assessing the success of management measures;
 - ii. measure the success of the management measures against stated performance criteria as applied to the **project area**;
 - iii. include monitoring parameters, frequencies, triggers, corrective actions, timing and scope for the duration of project approval; and
- g) outline how milestones and compliance will be reported on.
17. Where **EPBC listed species** share similar habitat and management requirements, such as migratory shorebird species, the requirements of these **EPBC listed species** may be addressed together as a component of the MMP.
 18. The **approval holder** cannot commence **Project Stage 2** of the action until the MMP is approved by the **Minister** in writing.
 19. The **approval holder** must publish the MMP on their website within 10 business days from the day of receiving the **Minister's** approval of the MMP in writing.

Biodiversity Offset Strategy

20. To compensate for any authorised unavoidable **impacts** on **MNES** (see Table 1) a Biodiversity Offset Strategy must be submitted for approval by the **Minister**.
21. The **approval holder** cannot commence **Project Stage 2** until the Biodiversity Offset Strategy is approved by the **Minister** in writing.
22. The Biodiversity Offset Strategy must identify land within the Galilee Basin region that is identified by the **approval holder** for acquisition and will be managed for environmental gain and protected by covenant until 2073.
23. The Biodiversity Offset Strategy must provide details of the offset areas including maps and site descriptions, environmental values relevant to **MNES**, amounts of **high value habitat** for each **MNES** (in hectares), connectivity with other habitats and biodiversity corridors, a rehabilitation program, and conservation and management measures for long term protection.
24. The following table specifies the minimum offsets which must be secured for unavoidable authorised disturbance to **EPBC listed threatened species** in respect of **impacts** estimated in Table 1:

Table 2: Offsets required for EPBC listed threatened fauna species

Species	Required offset: High Value Habitat
Black-throated Finch	3170 hectares
Yakka Skink	3400 hectares
Red Goshawk	2802 hectares
Ornamental Snake	3606 hectares

25. An offset must be secured for unavoidable authorised disturbance to the **Squatter Pigeon** (see Table 1). The **approval holder** must propose an offset for impacts to **Squatter Pigeon** in the Biodiversity Offset Strategy.

Note 4: Offsets for some species may be accommodated within ecological communities or overlap State approval requirements or other species habitat requirements, as long as they meet the requirements of these conditions of approval in respect of each individual species being offset.

Biodiversity Offset Funding and Administration

26. In addition to the Biodiversity Offset Strategy requirements of these conditions of approval, the **approval holder** must establish or contribute to a pool of funds and administrative arrangements established for the better protection and long term conservation of **EPBC listed threatened species** in the Galilee Basin as listed in Table 1.
27. The mechanism to establish or contribute to a pool of funds, including terms of reference to support a regional approach, funding mechanisms and an initial work plan, must be agreed by the **Minister** in writing and may be in the form of a trust fund, or other mechanisms as agreed by the **Minister** in writing.
28. The **approval holder** must contribute \$100,000 per annum from the commencement of **Project Stage 2** (GST exclusive) for 10 consecutive years to the pool of funds.
29. These funds must facilitate the development and implementation of research programs identified as a priority to manage development **impacts on EPBC listed threatened species** in the Galilee Basin and which are consistent with, and take into consideration, any **Recovery Plans, Threat Abatement Plans and/or Conservation Advices for relevant EPBC listed threatened species**. Research programs must include:
 - a) methodologies for a baseline survey that will report on each species' movement patterns, habitat requirements and population dynamics. Survey methodologies must be in accordance with the **department's survey guidelines** or alternative best practice methodologies and endorsed by a **suitably qualified ecologist**;
 - b) an ongoing monitoring program (developed from the baseline monitoring) for each species, to continue for the duration of the project approval, with annual reporting to the **department**;
 - c) commitments, including financial commitments and associated timeframes, that will be implemented by the **approval holder** to support the undertaking of research;
 - d) the time frames for undertaking each research component;
 - e) timing and methods of reporting research outcomes to the **Minister**, the scientific community and the public; and
 - f) outcomes of consultation with the **department** on how the proposed Research Plans align with other studies for **EPBC listed threatened species**.
30. Research programs must be approved by the **Minister** in writing prior to research commencing.
31. To ensure funding is adequate, a review of funding contributions must be undertaken 5 years after the establishment of the pool of funds or as otherwise agreed by the **Minister** in writing. This review must take into account progress of the research programs and any subsequent onground actions, as well as the involvement of other approval holders in funding and administrative arrangements.
32. The **approval holder** must establish the pool of funds and administrative arrangements for the pool of funds prior to commencement of **Project Stage 2**, and provide notice of the establishment of the pool of funds and the administrative arrangements to the **department** in writing within 30 calendar days of establishment.
33. Identification of priority actions for funding must be decided by representatives including: the **approval holder, Queensland Department of Environment and Heritage Protection**, members of relevant **Recovery Teams**, and the **department**. Priority actions must make reference to, and be consistent with, relevant **Recovery Plans, Threat Abatement Plans and Conservation Advices**.
34. Documentary evidence must be provided to the **department** showing that the annual financial contributions to the fund have been provided within 30 calendar days of each payment.

Offset Management Plan

35. The **approval holder** must submit an Offset Management Plan to the **Minister** for approval. The Offset Management Plan must include:

- a) a detailed survey and description of the condition of the offset area prior to any management activities, including existing **MNES** habitat and vegetation which has the potential to be restored or improved (the baseline condition). This must be accompanied with the offset attributes and maps in electronic Geographic Information System (GIS) format;
 - b) a description of the potential risks to the successful implementation of the Offset Management Plan, and include a description of the contingency measures that would be implemented to mitigate against these risks;
 - c) management measures for **MNES** and **MNES** habitat identified within the Biodiversity Offset Strategy with written evidence of input from a **suitably qualified expert** who has relevant expertise in the management of native vegetation of the Galilee Basin;
 - d) a monitoring program for the offset site/s. The monitoring program must:
 - i. clearly set out performance indicators;
 - ii. measure the success of the management measures against stated performance criteria;
 - iii. include monitoring parameters, frequencies, triggers, corrective actions, timing and scope for the duration of project approval;
 - e) details of how the plan will be updated to incorporate and address outcomes from research undertaken for **EPBC listed threatened species** under this approval;
 - f) an outline of how milestones and compliance will be reported on; and
 - g) details of who would be undertaking monitoring, reviewing, and implementing the Offset Management Plan (if this person is not the **approval holder**).
36. The Offset Management Plan must include, in writing, commitments from the **approval holder** that demonstrate that the offset areas required in Table 2 will be met.
37. The Offset Management Plan must be approved by the **Minister** in writing within 12 months from the commencement of **Project Stage 2**.
38. Offsets detailed in the Offset Management Plan must be secured within three years of commencement of **Project Stage 2** or as required under relevant Queensland legislation, whichever is earlier.

Rehabilitation Management Plan

39. The **approval holder** must submit a Rehabilitation Management Plan (RMP) to the **Minister** for approval for the entire **project area**. The RMP will be based upon the *Updated Rehabilitation Management Plan, May 2013 (Post-SEIS Supplementary Documents to CG)* and must include:
- maps of habitat for **EPBC listed species** resulting from any pre-clearance surveys and **ecological equivalence surveys**;
 - b) rehabilitation measures for impacted **EPBC listed species and communities** and their habitat (including from **subsidence**). These measures must follow best practice restoration techniques (e.g. as outlined by the Society for Ecological Restoration), and include reference sites for informing rehabilitation activities and measuring success;
 - c) management measures for **MNES** habitat endorsed by a **suitably qualified expert/s**;
 - d) a monitoring program that:
 - i. measures the success of the management measures against stated performance criteria;
 - ii. includes monitoring parameters, frequencies, triggers, corrective timing and for the duration of project approval;
 - iii. outlines how milestones and compliance will be reported on; and
- clear performance indicators such as goals, objectives and targets, including that disturbed areas are rehabilitated to the same structural integrity complexity that prior to disturbance.
- approved Rehabilitation Management Plan implemented.

Rewan Formation Connectivity Research Plan

41. The **approval holder** must submit for the approval of the **Minister** a **Rewan Formation Connectivity Research Plan** ('Research Plan') that characterises the Rewan Formation within the area **impacted** by the mine, for the **Minister's** approval. The Research Plan must include but is not limited to the following:
- a) research aims;
 - b) personnel responsible for conducting research and their qualifications;
 - c) timeframes for research and reporting;
 - d) methods, including seismic surveys to determine the type, extent and location of faulting and fracturing and an examination of the hydraulic properties of the Rewan Formation, to better characterise the Rewan Formation and the contribution of fractures and faults to connectivity;
 - e) research to inform the future **Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin**; and
 - f) outputs to inform the **Water Monitoring and Management Plan**.
42. The Research Plan must be peer reviewed by a **suitably qualified expert** approved by the **Minister** in writing. The peer review and the Research Plan must be submitted together to the **Minister** for approval.
43. The findings of the research outputs of the **Rewan Formation Connectivity Research Plan** must be published on the **approval holder's** website and submitted to the department in accordance with the timeframes approved by the **Minister** for reporting.
44. **Project Stage 2** cannot commence until the **Rewan Formation Connectivity Research Plan** has been approved by the **Minister** in writing.
45. The approved **Rewan Formation Connectivity Research Plan** must be implemented.

Water Monitoring and Management Plan

Baseline monitoring network

46. The approval holder must submit a **Water Monitoring and Management Plan (WMMP)** for the **Minister's** approval.
47. The **WMMP** must:
- a) include details of a best practice baseline monitoring network that will enable the identification of spatial and temporal changes, as a result of project activities, to:
 - i. surface water;
 - ii. groundwater;
 - iii. cumulative impacts; and
 - iv. **subsidence**.
 - b) include a rationale for the suitability of the proposed monitoring network; and
 - c) use the findings of the conceptual and numerical groundwater model for the project where relevant.

Note 5: To ensure efficiency the approval holder may prepare and align the WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Note 6: Information about cumulative impacts must include publicly available information and other related project information available to the proponent.

48. The **WMMP** must include parameters and a sampling regime to establish baseline data for:
- a) water quality and quantity for surface water;
 - b) water quality, water levels and/or pressures for groundwater;
 - c) connectivity between surface and groundwater; and

- d) connectivity between the following formations: Alluvial deposits; Tertiary deposits; Bandanna Formation; Colinlea Sandstone; Joe Joe Formation; and the Clematis Sandstone and Rewan Formation of the Great Artesian Basin.
49. The **WMMP** must include timeframes for construction of the monitoring network.
50. The **WMMP** must be peer reviewed by a **suitably qualified expert** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** at the same time the **WMMP** is submitted to the **Minister** for approval.
51. **Project Stage 2** cannot commence until the **WMMP** has been approved by the **Minister** in writing.
52. The approved **WMMP** must be implemented.

Numerical Groundwater Model

53. To predict impacts to water resources so they can be avoided or minimised, the **approval holder** must develop a **numerical groundwater model**. The **approval holder** must:
- a) review and update the **numerical groundwater model** over the life of the project within timeframes specified by the **Minister** in writing. The **Minister** may consider the requirements to update the **numerical groundwater model** under Queensland Government regulations in specifying timeframes; and
 - b) use the outcomes of the **numerical groundwater model** in reviewing and revising the **WMMP** in accordance with these conditions.

Note 8: To ensure efficiency the approval holder may prepare and align the numerical model required under these conditions with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Monitoring Network

54. The **WMMP** must:
- a) review and update the monitoring network described in the **WMMP** to reflect changes in understanding of impacts to water resources from:
 - i. the results of baseline monitoring;
 - ii. the research from the **Rewan Formation Connectivity Research Plan**; and
 - iii. changes to the **conceptual groundwater model** and **numerical groundwater model** and outputs; and
 - b) provide details of an ongoing monitoring program that addresses potential surface water impacts, groundwater impacts, cumulative impacts and **subsidence**, spanning all project activities including construction, operation and decommissioning/closure of the mine; and also including monitoring of downstream impacts resulting from the release of mine-affected water and pit/void water. The **WMMP** must include a rationale for the suitability of the proposed ongoing monitoring network.

Threshold and exceedance limits

55. The **WMMP** must identify, provide a rationale for, and implement, thresholds and limits in respect of the project's **impact** on surface water and groundwater. This includes but is not limited to:
- i. in relation to **impacts** on surface water - thresholds and limits for water quantity and availability; stressors and contaminants; annual loads of salinity; and sediment; and
 - ii. in relation to **impacts** on groundwater – thresholds and limits for water quality and drawdown.

Note 8: Threshold values identified in the plan and during the life of the approval and related conditions may be varied by the Minister on advice from an expert panel to reflect the best available data and scientific information.

56. Limits in the approved **WMMP** must not be exceeded.

Management and response actions

57. The **approval holder** must develop a risk based exceedance response that details the actions the **approval holder** will take and the timeframes in which those actions will be undertaken if:
- threshold values contained in the **WMMP** are exceeded;
 - subsidence** or surface deformation occurs which substantially impacts on surface or groundwater hydrology; and / or
 - there are any unforeseen emergency discharges.
58. The approval holder must:
- report exceedances to the department within 10 business days of the monitored exceedance; and
 - provide written advice to the department, within 90 calendar days of the occurrence of the monitored exceedance, stating the direct cause of, and the actions taken in response to, the exceedance and management responses.
59. The Minister may by written request, require the **WMMP** be reviewed by a **suitably qualified expert**. Within 6 months of the review, the **approval holder** must revise and update the **WMMP** for the **Minister's approval**.

Final Void Water Monitoring and Management Plan

60. The **approval holder** must develop a **Final Void Water Monitoring and Management Plan**, which must include:
- an environmental risk assessment of both open final void and backfilling options; and
 - justification for the preferred option that demonstrates there will be no unacceptable impacts on **MNES**.
61. The **Final Void Water Monitoring and Management Plan** must be peer reviewed by a **suitably qualified expert**. The peer review must be submitted to the **Minister** for approval at the same time the **Final Void Water Monitoring and Management Plan** is submitted to the Minister for approval.
62. The **approval holder** must not commence **Project Stage 4** until the **Minister** has approved the **Final Void Water Monitoring and Management Plan** in writing.
63. The approved **Final Void Water Monitoring and Management Plan** must be implemented.

Note 9: The Minister may throughout the project life seek advice from experts, or an expert panel. As a consequence specific matters identified through such advice may need to be addressed in the Plan. Where such advice is sought the approval holder would be provided with opportunity to submit information and respond to the specific matters identified, in order to ensure the Plan is based on the best available information. Review requirements will facilitate adaptive management, alignment with Queensland Government approval requirements, and account for potential cumulative impacts as new scientific information becomes available over the life of the project.

Date of commencement

64. Within 30 calendar days after the **commencement** of the action, the **approval holder** must advise the **department** in writing of the actual date of **commencement**.

General

65. The **approval holder** must notify the department in writing of non-compliance with any condition of this approval as soon as practical and within no later than two business days of becoming aware of the non-compliance.

The notice provided to the Department under this condition must specify:

- the condition which the **approval holder** has potentially breached;
- the nature of the non-compliance;
- when and how the **approval holder** became aware of the non-compliance;
- how the non-compliance will affect the approved action;

- v. how the non-compliance will affect the anticipated impacts of the approved action, in particular how the non-compliance will affect the impacts on the MNES;
 - vi. the measures the **approval holder** will take to address the impacts of the non-compliance on the MNES and rectify the non-compliance; and
 - vii. the time by when the **approval holder** will rectify the non-compliance.
66. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the plans, strategies or programs required by this approval, and make them available upon request to the **department**. Such records may be subject to audit by the **department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **department's** website. The results of audits may also be publicised through the general media.
67. Within three months of every 12 month anniversary of the **commencement** of the action, the **approval holder** must publish a report on its website addressing compliance with each of the conditions of this approval, including implementation of any plans, strategies or programs as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **department** at the same time as the compliance report is published.
68. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
69. If the **approval holder** wishes to carry out any activity otherwise than in accordance with a plan, strategy or program as specified in the conditions, the **approval holder** must submit to the **department** for the **Minister's** written approval a revised version of that plan, strategy or program. The varied activity shall not **commence** until the **Minister** has approved the varied plan, strategy or program in writing. The **Minister** will not approve a varied plan, strategy or program unless the revised plan, strategy or program would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised plan, strategy or program, that plan, strategy or program must be implemented in place of the plan, strategy or program originally approved.
70. If the **Minister** believes that it is necessary or convenient for the better protection of **EPBC listed species or communities** or a water resource to do so, the **Minister** may request that the **approval holder** make specified revisions to a plan, strategy or program specified in the conditions and submit the revised plan, strategy or program for the **Minister's** written approval. The **approval holder** must comply with any such request. The revised approved plan, strategy or program must be implemented. Unless the **Minister** has approved the revised plan, strategy or program, then the **approval holder** must continue to implement the plan, strategy or program originally approved, as specified in the conditions.
71. If, at any time after five years from the date of this approval, the **approval holder** has not **substantially commenced Project Stage 1**, then the **approval holder** must not **substantially commence** the action without the written agreement of the **Minister**.
72. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all plans, strategies or programs referred to in these conditions of approval on their website. Each plan, strategy or program must be published on the website within 1 month of being approved (unless otherwise specified in these conditions) and remain on the website for the duration of project approval.

DEFINITIONS

Approval holder: means the person to whom the approval is granted.

Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin: will be conducted in conjunction with relevant state and territory government agencies and natural resource management bodies and entails a scientific analysis of the ecology, hydrology and geology for the purpose of assessing the potential risks to water resources in the area as a result of the direct and indirect impacts of coal seam gas development or large coal mining development.

Black-throated Finch: means the Black-throated Finch (Southern), *Poephila cincta cincta*, listed as endangered under the EPBC Act.

Cattle Egret: means the Cattle Egret, *Ardea ibis*, listed as a migratory species under the EPBC Act.

Commence/Commencement/Commencing: means any physical disturbance including clearing of vegetation that is an EPBC listed species or community or that is habitat for a EPBC listed species or community or new road works, new rail works, new camps, development of mining associated infrastructure and mining operations. Commencement does not include:

- a. minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or associated with the mobilisation of the plant, equipment, materials, machinery and personnel prior to the start of railway and road development or construction; or
- b. activities that are critical to commencement that are associated with mobilisation of plant and equipment, materials, machinery and personnel prior to the start of railway or road development or construction only if such activities will have no adverse impact on MNES, and only if the approval holder has notified the department in writing before an activity is undertaken.

Conceptual groundwater model: must include, but not be limited to; the identification the physical geology, water balance, connectivity between surface water and groundwater systems and movement of water through the system

Department: means the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.

Eastern Great Egret: means the Eastern Great Egret, *Ardea modesta*, listed as a migratory Species under the EPBC Act.

Ecological equivalence survey/s: means surveys undertaken by the approval holder as part of its Ecological Equivalence Assessment required by the Queensland Government Environmental Authority for this project.

EPBC/ EPBC Act: means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC listed fauna species: means a threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Act Offsets Policy: means the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (October 2012).

EPBC Act listed species or community/ies: means a threatened species or community, or a migratory species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Final Void Water Monitoring and Management Plan as specified within these conditions.

Black-throated Finch high value habitat

Black-throated Finch high value habitat means

- remnant vegetation coverage of >60% comprised of grassy woodland vegetation; and
- located within 3 km of a permanent water source; and
- containing suitable nesting sites within 400 m of a water source.

Squatter Pigeon high value habitat

Squatter Pigeon high value habitat means all remnant vegetation within QLD Regional Ecosystem's 10.3.12a, 10.3.13a, 10.3.14, 10.3.27a, 10.3.28a, 10.5.1c, 10.5.12, 10.5.5a, 10.9.3, 11.5.5b and 11.8.4:

- within 1km of permanent water; and
- with 10-80% cover of vegetation.

Squatter Pigeon High Value Habitat also means remnant vegetation within 1 km of permanent water with 10 – 80% cover of vegetation.

Yakka Skink high value habitat

Yakka Skink high value habitat means QLD Regional Ecosystem's 10.3.3a, 10.3.4, 10.3.12a, 10.3.13a, 10.3.27a, 10.3.28a, 10.4.5, 10.5.1c, 10.5.5a, 10.5.12, 10.7.3b, 10.7.5, 10.7.7, 10.7.11, 10.9.3, 10.10.1b, 10.10.4, 11.3.2, 11.5.5b and 11.8.4:

- with 10 – 80% cover of leaf litter and sticks; or
- large rocks (greater than 50cm) and/or abundant rock outcrops or crevices; or
- logs greater than 30cm in diameter with a high abundance (greater than 10 per 100 metres x 100 metres); or
- present and common burrows.

Ornamental Snake high value habitat

Ornamental Snake high value habitat means QLD Regional Ecosystem's 10.3.3a, 10.3.4, 10.3.14, 11.3.2, 11.8.11 or remnant vegetation on QLD Regional Ecosystem Land Zone 3, 4 and 8 with wetland or watercourses greater than Department of Environment and Heritage Protection mapped Stream Order 4 and:

- greater than 80% cover of leaf litter and sticks; or
- logs greater than 30cm in diameter and high abundance (greater than 10 per 100 metres x 100 metres).

Red Goshawk high value habitat

Red Goshawk high value habitat means QLD Regional Ecosystem's 10.3.12a, 10.3.13a, 10.3.14, 10.3.27a, 10.3.28a, 10.5.1c, 10.5.12, 10.5.5a, 10.9.3, 11.3.2, 11.5.5b and 11.8.4:

- within 1 km from permanent water; and
- within vegetation that has a patch size greater than 5 ha; and
- with moderate or high connectivity with 10 – 100% of the perimeter of patch adjoining adjacent remnant vegetation.

Eastern Great Egret high value habitat

Cattle Egret high value habitat means QLD Regional Ecosystem's 10.3.13a, 10.3.14, 10.3.27a, 10.3.28a, 11.3.2, 10.3.3a, 10.3.4 and 10.3.12a where there is moderate or

high connectivity with 10 – 100% of the perimeter of patch adjoining adjacent remnant vegetation.

Cattle Egret high value habitat

Cattle Egret high value habitat means QLD Regional Ecosystem's 10.3.14, 10.3.20, 20.3.27, 10.3.28 or remnant or regrowth vegetation in QLD Regional Ecosystem Land Zone 3 where there is moderate or high connectivity with 10 – 100% of the perimeter of patch adjoining adjacent remnant vegetation.

Rainbow Bee-eater high value habitat

Rainbow Bee-eater high value habitat means any area within 100 metres of a Queensland Department of Environment and Heritage Protection mapped Stream Order 5 or 6.

Impact/s/ed: has the definition assigned to it in section 527E of the EPBC Act.

King Blue-grass: means King Blue-grass, *Dichanthium queenslandicum*, listed as a threatened species under the EPBC Act.

Matters of National Environmental Significance/ MNES: means matters of national environmental significance, being the relevant matters protected under Part 3 of the EPBC Act.

MNES Management Plan: as specified within these conditions.

Minister: means the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Numerical groundwater model: means any computational method that represents an approximation of an underground water system that simulates hydraulic heads (and watertable elevations in the case of unconfined aquifers) and groundwater flow rates within and across the boundaries of the system under consideration.

Ornamental Snake: means the Ornamental Snake, *Denisonia maculata*, listed as a threatened species under the EPBC Act.

Project area: means the area identified in Attachment A.

Project Stage: means the stages as specified within this definition and its sub-parts:

Project Stage 1: Project activities prior to commencement of Ground Disturbance include:

Pre-construction surveying and technical assessment including geotechnical, establishment of site security arrangements (including, signs, fences, safety barriers, and temporary security personnel facilities) and maintenance of existing roads and tracks. Installation of facilities for the purpose of environmental monitoring compliance. Other works limited to the existing site facilities and access roads.

Project Stage 2: Ground disturbance up to commencement of coal washing:

Removal of existing structures; Site clearance; access road; initial temporary water supply and waste water management; potable water treatment and sewerage treatment plants; power supply; communications; and minor administration buildings.

Civil earthworks; installation of permanent and temporary drainage and water diversions; trenching and laying of reticulated services and any other underground pipelines and services; road construction, rail formation and airport construction; ramps and walls; hardstand construction; water storage infrastructure; underground box cuts and stockpiles.

Mine Infrastructure Area building and Coal Handling and Preparation Plant: building construction; gravel quarries sourced onsite; two mid-sized draglines for overburden removal; clean up of construction waste, equipment and plant.

Project Stage 3: Coal mining activities for years 1-7 after commencement of coal washing

Project Stage 4: Coal mining activities for years 8-14

Project Stage 5 onwards: Coal mining activities from years 15 to beyond 29.

Queensland Department of Environment and Heritage Protection: means the Queensland Department of Environment and Heritage Protection or any department that succeeds the Queensland Department of Environment and Heritage Protection that is responsible for administering environmental offsets in relation to the Galilee Basin.

Queensland Regional Groundwater and Surface Water Monitoring and Assessment Program: as per the Coordinator-General's conditions of 30 May 2013 Appendix 4 Recommendations 1, 2, and 3 and Appendix 4, Schedule 2, Part A, Recommendations 7 and 9.

Rainbow Bee-eater: means the Rainbow Bee-eater, *Merops ornatus*, listed as a migratory species under the EPBC Act.

Red Goshawk: means the Red Goshawk, *Erythrotriorchis radiatus*, listed as a threatened species under the EPBC Act.

Rewan Formation Connectivity Research Plan: as specified within these conditions.

Squatter Pigeon: means the Squatter Pigeon (Southern), *Geophaps scripta scripta*, listed as a threatened species under the EPBC Act.

Subsidence: means the totality of subsidence effects and subsidence impacts. Where 'subsidence effects': means deformation of the ground mass due to mining, including all mining-induced ground movements, such as vertical and horizontal displacement, tilt, strain and curvature; and 'subsidence impacts': means physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs.

Substantially commenced: means the commencement of **Project Stage 1**.

Suitable habitat for King Blue-grass: means Queensland Regional Ecosystems 11.3.21, 11.4.4, 11.4.11, 11.8.11, 11.9.3, 11.9.12 and 11.11.17.

Suitably Qualified Ecologist: means a person who has professional qualifications, training, skills or experience related to ecology and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relative protocols, standards, methods or literature.

Suitably Qualified Expert/s: means a person who has professional qualifications, training, skills or experiences related to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relative protocols, standards, methods or literature.

Survey Guidelines:

Matters of National Environmental Significance, Significant Impact Guidelines 1.1, *Environment Protection and Biodiversity Conservation Act 1999*
<http://www.environment.gov.au/epbc/publications/neg-guidelines.html>

Survey Guidelines for Australia's Threatened Frogs, Threatened Mammals, Threatened Reptiles and Threatened Bats:
<http://www.environment.gov.au/epbc/guidelines-policies.html>

Survey Guidelines for Australia's Threatened Birds
Survey Guidelines for Australia's Threatened Birds:
<http://www.environment.gov.au/epbc/publications/pubs/survey-guidelines-birds.pdf>

Monitoring and Management Plan as specified in these conditions.

Yakka Skink: means the Yakka Skink, *Egernia rugosa*, listed as a threatened species under the EPBC Act.

Annexure B

Rewan Formation Connectivity Research Plan

41. The approval holder must submit for the approval of the **Minister a Rewan Formation Connectivity Research Plan** ('Research Plan') that characterises the Rewan Formation within the area **impacted** by the mine, for the **Minister's** approval. The Research Plan must include but is not limited to the following:
 - a) research aims;
 - b) personnel responsible for conducting research and their qualifications;
 - c) timeframes for research and reporting;
 - d) methods, including seismic surveys to determine the type, extent and location of faulting and fracturing and an examination of the hydraulic properties of the Rewan Formation, to better characterise the Rewan Formation and the contribution of fractures and faults to connectivity;
 - e) research to inform the future **Bioregional Assessment for the Galilee Basin sub-region and the Lake Eyre Basin**; and
 - f) outputs to inform the **Water Monitoring and Management Plan**.
42. The Research Plan must be peer reviewed by a **suitably qualified expert** approved by the **Minister** in writing. The peer review and the Research Plan must be submitted together to the **Minister** for approval.
43. The findings of the research outputs of the **Rewan Formation Connectivity Research Plan** must be published on the **approval holder's** website and submitted to the department in accordance with the timeframes approved by the **Minister** for reporting.
44. **Project Stage 2** cannot commence until the **Rewan Formation Connectivity Research Plan** has been approved by the **Minister** in writing.
45. The approved **Rewan Formation Connectivity Research Plan** must be implemented.

Water Monitoring and Management Plan

Baseline monitoring network

46. The approval holder must submit a **Water Monitoring and Management Plan (WMMP)** for the **Minister's** approval.
47. The **WMMP** must:
 - a) include details of a best practice baseline monitoring network that will enable the identification of spatial and temporal changes, as a result of project activities, to:
 - i. surface water;
 - ii. groundwater;
 - iii. cumulative impacts; and
 - iv. **subsidence**.
 - b) include a rationale for the suitability of the proposed monitoring network; and
 - c) use the findings of the conceptual and numerical groundwater model for the project where relevant.

Note 5: To ensure efficiency the approval holder may prepare and align the WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Note 6: Information about cumulative impacts must include publicly available. Information and other related project information available to the proponent.

48. The **WMMP** must include parameters and a sampling regime to establish baseline data for:
 - a) water quality and quantity for surface water;
 - b) water quality, water levels and/or pressures for groundwater;
 - c) connectivity between surface and groundwater; and
 - d) connectivity between the following formations: Alluvial deposits; Tertiary deposits; Bandanna Formation; Colinlea Sandstone; Joe Joe Formation; and the Clematis Sandstone and Rewan Formation of the Great Artesian Basin.
49. The **WMMP** must include timeframes for construction of the monitoring network.
50. The **WMMP** must be peer reviewed by a **suitably qualified expert** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** at the same time the **WMMP** is submitted to the Minister for approval.
51. **Project Stage 2** cannot commence until the **WMMP** has been approved by the **Minister** in writing.
52. The approved **WMMP** must be implemented.

Numerical Groundwater Model

53. To predict impacts to water resources so they can be avoided or minimised, the approval holder must develop a numerical groundwater model. The approval holder must:
 - a) Review and update the **numerical groundwater model** over the life of the project within timeframes specified by the **Minister** in writing. The **Minister** may consider the requirements to update the **numerical groundwater model** under Queensland Government regulations in specifying timeframes; and
 - b) use the outcomes of the **numerical groundwater model** in reviewing and revising the **WMMP** in accordance with these conditions.

Note 6: To ensure efficiency the approval holder may prepare and align the numerical model required under these conditions with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Monitoring Network

54. The **WMMP** must:
 - a) review and update the monitoring network described in the **WMMP** to reflect changes in understanding of impacts to water resources from:
 - i. the results of baseline monitoring;
 - ii. the research from the **Rewan Formation Connectivity Research Plan**; and
 - iii. changes to the **conceptual groundwater model** and **numerical groundwater model** and outputs; and
 - b) provide details of an ongoing monitoring program that addresses potential surface water impacts, groundwater impacts, cumulative impacts and **subsidence**,

spanning all project activities including construction, operation and decommissioning/closure of the mine; and also including monitoring of downstream impacts resulting from the release of mine affected water and pit/void water, The **WMMP** must include a rationale for the suitability of the proposed ongoing monitoring network.

Threshold and exceedance limits

55. The **WMMP** must identify, provide a rationale for, and implement, thresholds and limits in respect of the project's **impact** on surface water and groundwater. This includes but is not limited to:
- i. in relation to **impacts** on surface water - thresholds and limits for water quantity and availability; stressors and contaminants; annual loads of salinity; and sediment; and
 - ii. in relation to **impacts** on groundwater – thresholds and limits for water quality and drawdown.

Note 8: Threshold values identified in the plan and during the life of the approval and related conditions may be varied by the Minister on advice from an expert panel to reflect the best available data and scientific information.

56. Limits in the approved **WMMP** must not be exceeded.

Management and response actions

57. The **approval holder** must develop a risk based exceedance response that details the actions the **approval holder** will take and the timeframes in which those actions will be undertaken if:
- a) threshold values contained in the **WMMP** are exceeded;
 - b) **subsidence** or surface deformation occurs which substantially impacts on surface or groundwater hydrology; and / or
 - c) there are any unforeseen emergency discharges.
58. The approval holder must:
- a) report exceedances to the department within 10 business days of the monitored exceedance; and
 - b) provide written advice to the department, within 90 calendar days of the occurrence of the monitored exceedance, stating the direct cause of, and the actions taken in response to, the exceedance and management responses.
59. The Minister may by written request, require the **WMMP** be reviewed by a **suitably qualified expert**. Within 6 months of the review, the **approval holder** must revise and update the **WMMP** for the **Minister's approval**.

Final Void Water Monitoring and Management Plan

60. The **approval holder** must develop a **Final Void Water Monitoring and Management Plan**, which must include:
- a) an environmental risk assessment of both open final void and backfilling options; and
 - b) justification for the preferred option that demonstrates there will be no unacceptable impacts on **MNES**.

61. The **Final Void Water Monitoring and Management Plan** must be peer *reviewed* by a **suitably qualified expert**. The peer review must be submitted the **Minister** for approval at the same time the **Final Void Water Monitoring and Management Plan** is submitted to the Minister for approval.
62. The **approval holder** must not commence **Project Stage 4** until the **Minister** has approved the **Final Void Water Monitoring and Management Plan** in writing.
63. The approved **Final Void Water Monitoring and Management Plan** must be implemented.

Note 9: The Minister may throughout the project life seek advice from experts, or an expert panel. As a consequence specific matters identified through such advice may need to be addressed in the Plan. Where such advice is sought the approval holder would be provided with opportunity to submit information and respond to the specific matters identified, in order to ensure the Plan is based on the best available information. Review requirements will facilitate adaptive management, alignment with Queensland Government approval requirements, and account for potential cumulative impacts as new scientific information becomes available over the life of the project.

Date of commencement

64. Within 30 calendar days after the **commencement** of the action, the **approval holder** must *advise* the **department** in writing of the actual date of **commencement**.

General

65. The **approval holder** must notify the department in writing of non-compliance with any condition of this approval as soon as practical and within no later than two business days of becoming aware of the non-compliance.

The notice provided to the Department under this condition must specify:

- i. the condition which the approval holder has potentially breached;
- ii. the nature of the non-compliance;
- iii. when and how the approval holder became aware of the non-compliance;
- iv. how the non-compliance will affect the approved action;