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Kevin's Corner Project Environmental Impact Statement









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Appendix X Cumulative Impacts

X.1 Executive Summary

The cumulative impacts are considered at a local and regional level, accumulating over time and to the exacerbation of impacts in intensity or scale, frequency or duration, and in either isolation or combination with other known existing or planned impacts.

The cumulative impact assessment was carried out for each environmental value using the methodology outline in Section X.3. The results of the cumulative impact assessment are summarised in Table X-1.

A number of the cumulative impacts identified were low, and this was mainly due to the location and geographical separation between projects assessment and environmental management strategies proposed to be implemented by the Kevin's Corner Coal Mine Project (the Project). For a number of the environmental values the cumulative impacts assessed were medium and high. These can be managed by the application of strict mitigation measures and targeted monitoring programs.

Environmental Value	Cumulative Impact Assessment
Land	Medium
Land Use	Medium
Landscape Character	Low
Nature Conservation	Low
Surface Water	High
Groundwater	Medium
Air Quality	Medium
Greenhouse Gas	Medium
Noise and Vibration	Low
Solid Waste	Low
Traffic and Transport	Medium
Non Indigenous Cultural Heritage	Medium
Indigenous Cultural Heritage	Medium
Social and Community	High
Hazard and Risk	*
Economics	High

Table X-1: Summary of Cumulative Impacts - Kevin's Corner Project

* Not assessed as all of the hazard and risk issues were contained on site and not applicable to a cumulative impacts assessment.



X.2 Introduction

The Terms of Reference (TOR) for the Project Environmental Impact Statement (EIS) requires that direct, indirect and cumulative impacts be identified and assessed with respect to environmental values and potential extent of impacts.

The potential environmental, social and economic impacts of the mine components of the Kevin's Corner Project (the Project) are assessed in Volume 1 of the Project EIS. Where possible, adverse impacts are avoided or mitigated via implementation of sound environmental protection and management criteria.

Cumulative effects may occur due to the compounding and synergistic interactions arising from other developments, occurring in the same area or over similar time frames to the project being assessed. Environmental values may be impacted as a result of a geographic overlap of project areas, scheduling overlap or using the same infrastructure, services and resources. Many of the cumulative effects associated with the Project are derived on a broader scale from transport, economic and social interactions between the Project and other existing or proposed projects within the project vicinity. Closer to the Project site cumulative effects associated with the Project sets associated with the Project may include air quality (dust), groundwater, surface water, noise etc.

This cumulative impact report assesses the cumulative impacts of the development of the proposed Project and is based on the best information publicly available when this EIS was prepared, which was limited to the development stages of other projects.

X.3 Objective

The objective of the cumulative impact assessment is to present clear and concise information on the cumulative impacts on specific environmental values that could occur as a consequence of the Project operating in conjunction with any other existing or proposed developments.

The cumulative impacts are to be considered at a local, regional and state/national level, accumulating over time and to the exacerbation of impacts in intensity or scale, frequency or duration, and in either isolation or combination with other known existing or planned impacts.

The requirements of relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and other strategies and regulations are addressed in assessing the cumulative impacts of the Project on the existing environment.

X.4 Methodology

The methodology used to assess the Project's cumulative impacts consisted of the following tasks:

- Identify appropriate geographic boundaries for the analysis of cumulative impacts. Where
 potentially interacting projects are not located close enough for the relevant impacts to overlap,
 cumulative impacts are less likely. The extent of the assessment boundaries will vary according to
 the nature of the impact being assessed. The impacts identified within the EIS have fallen within
 three identified geographical areas of influence:
 - Local: includes the area surrounding the Project and adjacent projects;



- **Regional**: where the impacts extend beyond the immediate local project area, and include the local township of Alpha, and extend out to around 100 km from the Project; and
- State/National: provides for more extensive impacts on the Queensland or Commonwealth.
- identify the impacts of the Project in isolation using existing baseline conditions, which include the impacts from existing projects and activities in the relevant geographic areas. These impacts have been described in detail in the relevant sections of the Volume 1 of the EIS;
- identify relevant projects within the areas of influence of the Project that are either proposed or approved but not yet operational that could generate impacts that could potentially interact with similar impacts from the Project;
- identify appropriate temporal boundaries for the analysis of cumulative impacts. Where the schedules of potentially interacting projects do not overlap (primarily for construction activities), cumulative impacts are less likely; and
- assess the significance of the cumulative impacts with respect to beneficial or detrimental effects.

In assessing the significance of potential cumulative impacts, the extent of compliance with established standards or guidelines was used where the impacts could be expressed quantitatively.

Where the impacts were expressed qualitatively, the probability, duration, and magnitude/intensity of the impacts were considered as well as the sensitivity and value of the receiving environmental conditions.

The significance of each impact was then determined for each geographical area according to the assessment matrix given in Table X-2.

Aspect	Relevance Factors										
Environmental Value	Nil	Low	Medium	High							
Probability of impact	0	1	2	3							
Duration of impact	0	1	2	3							
Magnitude / Intensity of impact	0	1	2	3							
Sensitivity of receiving environment	0	1	2	3							

Table X-2: Assessment Matrix

It should be noted that the numerical output from the Assessment Matrix has not been presented in this document, but was used purely as a means of including or excluding further assessment within an geographic area.

Using the methodology outlined above, the cumulative impact assessment was completed for each environmental value relevant to the development of the Project.

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X.5 Relevant Projects

X.5.1 Selection Criteria

The TOR (DIP, 2009) requires this assessment to consider cumulative impacts both in isolation and in combination with other known, existing or proposed projects (where details of such projects are publicly announced or communicated to the Proponent by DEEDI (previously called DIP).

Projects relevant to the cumulative impact assessment were identified on the basis of the following criteria.

- Projects listed on the DEEDI website and currently being assessed under the State Development and Public Works Organisation Act 1971 (SDPWO Act) for which an Initial Advice Statement (IAS) or an EIS are available.
- Projects listed on the Queensland Department of Environment and Resource Management (DERM) website and currently being assessed under the SDPWO Act for which an IAS or an EIS are available.
- Other projects in the region and state identified online/communicated by DEEDI.

The existing and proposed (and discounted) projects considered are described in Section X.5.2, below.

X.5.2 Relevant Projects

Based on the criteria listed in Section X.4.1, the existing projects included in the cumulative impact assessment for the Project are listed in the tables below. As can be seen, there are no local existing projects, with Regional Projects listed in Table X-3 and State/National projects listed in Table X-4. The locations of these existing projects are shown on Figure X-1.

Project	Area	Location	Description	Project Status
Clermont, Rio Tinto Coal Australia Ltd	Regional	Clermont	Open cut coal mine operation producing 12 Mtpa with 360 employees	7 year mine life remaining
Blair Athol, Rio Tinto Coal Australia Ltd	Regional	Clermont	Open cut coal mine operation producing 11 Mtpa with 290 employees.	5 year mine life remaining

Table X-3: Existing Regional projects relevant to the Kevin's Corner Project



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Table X-4: Existing State/National projects relevant to the Kevin's Corner Project

Project	Area	Location	Description	Project Status
Blackwater, BMA	State/ National	Blackwater	Open cut coal mining operation producing 11 Million tonnes per annum (Mtpa) and employing 1,570 personnel	30 year mine life remaining
Cook, Caledon Resources PLC	State/ National	Blackwater	Underground coal mine operation producing 12 Mtpa with 360 employees	At least 10 year mine life remaining
Crinum, BMA	State/ National	Tieri	Underground coal mine operation producing 4 Mtpa with 420 employees (live in Emerald)	15 year mine life remaining
Curragh, Wesfarmers Ltd	State/ National	Blackwater	Open cut coal mine producing 7 Mtpa	Curragh operations employ 1,530 staff, in total
Curragh North, Wesfarmers Ltd	State/ National	Blackwater	Open cut coal mine producing 3 Mtpa	(suspended in December 2010 due to flooding)
Ensham, Ensham Resources Ltd	State/ National	Emerald	Open cut coal mine producing 7 Mtpa with 600 employees	At least 20 year mine life remaining
Gregory, BMA	State/ National	Tieri	Open cut coal mine producing 2 Mtpa with 225 employees (live in Emerald)	Only two years of mining remaining
Jellinbah East, Jellinbah Resources Ltd	State/ National	Blackwater	Open cut coal mine producing 4 Mtpa with 380 employees.	At least 10 years of mine life remaining
Kestrel, Rio Tinto Coal Australia Ltd	State/ National	Tieri	Underground coal mine producing 4 Mtpa with 515 employees (live in Emerald)	At least 20 year mine life remaining
Yarrabee, Yancoal Australia Ltd	State/ National	Blackwater	Open cut coal mine producing 2 Mtpa with 220 employees	15 year mine life remaining

Additional, using the criteria listed in Section X.4.1, the proposed projects included in the cumulative impact assessment for the Project are listed in Table X-5. The locations of these projects are shown on Figure X-1.

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		and to assessing our		
Project	Area	Location	Description	Project Status
Alpha Coal Project, Hancock Coal Pty Ltd	Local	Alpha, 50 km north- west.	Open cut coal mine producing 30 Mtpa. Maximum personnel – 2,300	SEIS completed
Galilee Basin Power Station, Galilee Power Pty Ltd (fully owned subsidiary of Waratah Coal Pty Ltd)	Regional	Alpha, 30 km north- west, immediately to the east of Waratah Galilee Coal Mine.	Coal-fired power station producing 900 MW (net). Maximum personnel – 1,000	IAS completed
Waratah Galilee Coal Mine, Waratah Coal Inc. (China First)	Local	Alpha, 13 km west and 35 km north.	Open cut mine with export capacity of 25 Mtpa and capability to expand to more than 50 Mtpa. Maximum personnel – 2,200	EIS advertised
South Galilee Coal Project (SGCP), joint venture of AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd.	Regional	Alpha, immediately south-west.	15-20 Mtpa open cut and underground mining operation and associated infrastructure. Maximum personnel – 1,500	IAS completed
Ensham Underground 1 and 2, Ensham Resources	State/ National	Emerald	Underground mine expansion. Maximum personnel – 1200	Supplement EIS submitted
Carmichael Coal Mine and Rail Project	State/ National	Clermont	Open cut and underground mine and rail infrastructure, up to 60 Mtpa. Maximum personnel – not known	IAS completed
Powerlink power transmission line	Regional	-	Transmission lines from Lilyvale substation to a new Galilee Hub substation (during construction phase). Maximum personnel – 500	EIS advertised
SunWater raw water line	Regional	-	Water pipeline from Moranbah to a raw water dam within Alpha Coal Project MLA (during construction phase). Maximum personnel – 500	-

Table X-5: Proposed projects relevant to assessing cumulative impacts of Kevin's Corner Project



A number of projects were identified but were discounted on the basis of location or lack of available information. The identified existing projects were discounted due to their distance from the Project site. These discounted projects are identified in Table X-6.

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Project	Location	Project Status
Minerva, Yancoal Australia Ltd	Springsure	Existing
Oaky Creek, Xstrata Coal Qld	Tieri	Existing
Rolleston, Xstrata Coal Queensland	Rolleston	Existing
Arcadia, Bandanna Energy Ltd	Rolleston	Resource delineation
Arcturus, Bandanna Energy Ltd	Rolleston	Scoping Study
Athena, Yancoal Aust. Ltd	Springsure	Resource delineation
Humboldt, DJ Mining Ltd	Rolleston	Resource delineation
Kennedy-Blackwater South, BMA	Rolleston	Scoping Study
Rocklands, Rocklands Richfield Ltd	Rolleston	MDL application, Resource delineation
North Alpha, Vale Australia Ltd	Alpha	Scoping Study
Springsure Creek, Bandanna Energy Ltd	Springsure	Resource delineation
Taroborah, Shinelia Holdings	Emerald	Resource delineation
Togara North, Xstrata Coal Queensland	Comet	NTA pending, On-hold
Togara South, BHP Billiton	Rolleston	Pre-feasibility, On-hold
Valeria, Rio Tinto Coal Australia Ltd	Capella	Idle
Washpool, Aquila Resources Ltd	Blackwater	Feasibility Study in progress
West Rolleston, Macarthur Coal	Rolleston	Resource delineation
Yamala, Northern Energy Corp. Ltd	Comet	MDL application, pre-feasibility in progress
Avoca Zeolite, N/A	Near Alpha	N/A
Alpha Shale Oil, N/A	Southeast of Alpha	N/A

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X.6 Cumulative Impacts of the Project

X.6.1 Overview

The Project is a proposed open cut and underground coal mine with capacity of 30 Mtpa located within a well known thermal coal deposit in the Galilee Basin, Queensland. Water and power supply infrastructure to service the mine are necessary components of the proposed development.

Cumulative impacts that may impact on specific environmental values are identified in Table X-7. It should be noted that the matrix in Table X-7 does not identify which environmental values are affected by each project in isolation, but rather identifies the impacts on the environmental values in combination with the Kevin's Corner Project. So, as an example, cumulative impacts on surface water will not be affected by the Cook Colliery (in the Bowen Basin), whereas it will impact GHG.

The projects in Table X-9 are grouped into classifications of predominantly local impacts and predominantly regional impacts. The projects classed as local are those in close proximity to the Project with the remainder being classed as regional.

The proposed projects located adjacent to the Project that have the potential to have a significant cumulative impact particularly on social and environmental values in the local area include:

- Alpha Coal Mine Project (Alpha), a proposed 30 Mtpa open cut coal mine located on mining lease application (MLA) 70425, immediately south and adjoining the Alpha MLA;
- Waratah Galilee Coal Mine (Waratah), which is a proposed 25 Mtpa open cut coal mine adjoining Alpha MLA to the south;
- Galilee Basin Power Station, a proposed coal-fired power station producing 900 MW (net) immediately to the south of the Alpha MLA;
- Powerlink power transmission line, a proposed transmission lines from Lilyvale substation to a new Galilee Hub substation (during construction phase) to supply power to the Project; and
- SunWater raw water line, a proposed water pipeline from Moranbah to a raw water dam within Alpha Coal Project MLA.

Project	Envir	Environmental Value												
	Land	Land Use	Landscape Character	Nature Conservation	Surface Water	Groundwater	Air Quality	Greenhouse Gas	Noise	Waste	Traffic and Transport	Cultural Heritage	Social and Community	Economics
Local														
Alpha	•	•	•	•	•	•	•	•	•		•	•	•	•

Table X-7: Potential Cumulative Impacts - Kevin's Corner Project

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Project	Envir	Environmental Value												
	Land	Land Use	Landscape Character	Nature Conservation	Surface Water	Groundwater	Air Quality	Greenhouse Gas	Noise	Waste	Traffic and Transport	Cultural Heritage	Social and Community	Economics
Waratah Galilee Coal Mine (China First)	•	•	•	•	•	•	•	•	•		•	•	•	•
Regional														
South Galilee Coal Project			•				•	•					•	•
Galilee Basin Power Station			•		•		•	•	•		•		•	•
Blair Athol Mine								•					•	•
Clermont Mine								•					•	•
Powerlink transmission line								•			•		•	•
SunWater raw water line								•			•		•	•
State/National														
Ensham Underground 1 & 2								•					•	•
Blackwater Mine								•					•	•
Cook Colliery								•					•	•
Crinum Mine								•					•	•
Curragh Mine								•					•	•
Curragh North Mine								•					•	•
Ensham Mine								•					•	•

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Project	Envir	Environmental Value												
	Land	Land Use	Landscape Character	Nature Conservation	Surface Water	Groundwater	Air Quality	Greenhouse Gas	Noise	Waste	Traffic and Transport	Cultural Heritage	Social and Community	Economics
Gregory Mine								•					•	•
Jellinbah East Mine								•					•	•
Kestrel Mine								•					•	•
Yarrabee Mine								•					•	•

A conservative approach to the cumulative impact assessment was taken by assuming simultaneous construction of all projects. However, this is unlikely 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. The assessment of the significance of the impact is based on the methodology described in Section X.3.

X.6.2 Cumulative Impacts on Environmental Values

X.6.2.1 Land

The Project is a combined open cut and underground thermal coal mine consisting of two open cut pits and an underground operation consisting of three individual retreating longwall mines. The Project will also require associated coal handling facilities, mining and light industry, road, rail and air transport infrastructure and an accommodation village.

For the proposed open cut mine and over the life of the open cut operation, land within Project site will be subject to impacts associated with open cut mining and include processes of site preparation (vegetation clearing, topsoil and overburden removal and stockpiling), open cut mining extraction and transportation and proposed remediation works (that include void refilling, site rehabilitation and revegetation). The cumulative impacts associated with these processes included loss of flora and fauna over the cleared parts of the site and the potential impacts of dust and soil erosion, and potential degradation of air quality and downstream water bodies. Any approvals to proceed will include conditions intended to minimise potential impacts and preserve qualities of the land and receiving environments.

For most of the remainder of the site, mining will occur underground and potential land surface impacts will not be widespread as is required for open cut mining. For these parts of the site, surface



clearing will occur but will be limited to those areas required for surface structures, access roads and associated activities. This will have the effect of reducing the level of soil erosion that may otherwise occur with reduced flow-on effects to receiving environments, principally air and water environments.

Impacts will however include the effects of controlled mining subsidence, the planned collapse of the longwall operation after the ore has been removed. This is likely to impact on current local hydrology of surface waters and have very limited impact on flora and fauna values.

In addition to the Project the two adjacent proposed projects (Alpha and Waratah) have the potential to have a cumulative impact on the environmental value - Land. All three of these coal mining projects will have a potentially large disturbance area associated with their construction and operational activities. It is understood that the Alpha project will be open cut operations only and the Waratah project will be a combination of open cut and underground mining. The open cut mining operation has the highest potential to result in increased erosion rates post disturbance, however subsidence as a result of underground mining could also impact on the erosion rates of the surface soils, over small areas.

Each of the proposed mining projects (Alpha, Waratah and Kevin's Corner), will have to be approved through the EIS and subsequent approval processes prior to commencement. Included in the anticipated approvals for these projects will be requirements for adequate planning of mining sequence and progressive rehabilitation via management plans to control and limit the potential for erosion of disturbed soils on the project site.

It is expected that the other mine development projects will include some or all of the proposed mitigation measures in relation to land impacts proposed for the Kevin's Corner Project. By utilising these mitigation measures, it is anticipated that there will be a minimal cumulative impact on the surrounding environment.

Based on the assessment methodology outlined in Section X.3, the significance of the overall cumulative impact on land is assessed as medium.

X.6.2.2 Land Use

Within the local area of the Project site, low density, low intensity cattle grazing is the predominant land use. While cropping, including irrigated and dryland cropping, occurs around more fertile areas within the region, there is no cropping undertaken on the Project site or known to occur within the immediate surrounds.

The proposed mine will impact on the existing land use to the extent of the Project area. For legal, safety and operational reasons, land within the mining lease (ML) area will need to be given over to the mining operation for the life of the mine. As a result, existing agricultural uses within the site will cease for the duration of the mine operation.

This impact on land use will also apply to other mining projects that proceed in the area, Alpha and Waratah projects. Given the low density, low intensity character of cattle grazing in the area, it is not anticipated that the cumulative impact of loss of grazing land across proposed coal projects in the area will result in long term changes to the cattle industry in the area. The total head of cattle in an area varies across seasons with cattle numbers increased when conditions allow and cattle being sold off when conditions warrant.



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As part of the rehabilitation strategy being developed for this Project and probably the other muine projects, the proponents will be aiming to, wherever possible, return the site at the end of the project life to the same land use that existed prior to development. For the Project site this is expected to be a mixture of cattle grazing and bushland. It is expected that this temporary interruption to the land use will similarly occur at all mine sites in the local and regional vicinity of the Project site. Considering this, it is reasonable to say that in the short term there will be a high impact on a localised level to the land use at these sites, however if properly managed and rehabilitated, the long terms impacts are expected to be low.

Barcaldine Regional Council's mapping of good quality agricultural land (GQAL) identifies no Class A or B GQAL within the Project, Alpha and Waratah mine sites. Considering this, it is expected that a percentage of the Class C1 and C2 GQAL in each project area will be affected by the proposed developments. However, the extent and impact of this cannot be quantified until the project footprints and extent of GQAL have been assessed.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on land use is assessed as medium.

X.6.2.3 Landscape Character

Cumulative landscape and visual impacts may result from changes to the landscape or visual amenity caused by the Project in conjunction with similar existing or proposed mine developments. The degree of intervisibility between different projects depends upon intervening topography, distance and the influence of screening vegetation as well as the nature of direct and indirect impacts.

'Direct' cumulative visual impacts may occur where two or more mines, or power station, have been constructed within the same locality, and may be viewed from the same sensitive view location either simultaneously, or within the same overall viewshed.

'Indirect' cumulative visual impacts may also arise as a result of multiple mines being observed at different locations during the course of a journey (e.g. from a vehicle travelling along a highway or from a network of local roads), which may form an impression of greater magnitude within the construct of short term memory.

There are no existing operational mines within the immediate viewshed of the Project. Therefore, there are unlikely to be any 'direct' cumulative impacts that result from views toward multiple mine projects from the sensitive view locations identified in the EIS visual assessment.

The Blair Athol and Clermont mines are the nearest existing open cut mines located approximately 100 km north-east of the Project. The distances between these existing mines and the Project, and the generally indirect road connections indicate that there are unlikely to be any significant 'indirect' cumulative impacts.

The closest proposed open cut mines are Alpha Coal Project, immediately to the south and Waratah, to the south of the Alpha Coal Project. These proposed mines would extend the visibility of mining activities within the immediate vicinity of the Project; however given the very low level of visual impact associated with the Project, the 'direct' and 'indirect' cumulative impact of the three mines on surrounding sensitive view locations is likely to remain low.

Based on the assessment methodology outlined in Section X.3, the significance of the overall cumulative impact on landscape character is assessed as low.



X.6.3 Natural Conservation

X.6.3.1 Terrestrial Ecology

The Project EIS identified that the following significant natural values are present on the Project site:

- The Cudmore Resources Reserve located within the north-eastern section of the Project area.
- The Endangered (Biodiversity Status) Regional Ecosystem (RE) 10.9.3 (Acacia harpophylla and/or Eucalyptus cambageana open woodland to woodland on Mesozoic sediments) is present in small, patches in the southwest portion of the site.
- Nine Of Concern (Biodiversity Status) REs are present on the site.
- One Vulnerable EPBC-listed fauna species, the squatter pigeon (southern) (Geophaps scripta scripta) was identified on the site.

No essential habitat or other environmentally sensitive areas have been confirmed as present on the project site. The regional integrity of the Endangered RE 10.9.3 located in small pockets to the south-west of the site should remain due to the minimal surface disturbance to this community. However, as workings will occur underground, some associated surface land subsidence might occur including modifications to water flows and the water table. The same disturbance exists within the Cudmore Resources Reserve in the north-west of the Project site where similar subterranean mining activities are proposed. These impacts are expected to be minimal given the low degree of projected subsidence.

Approximately 22 ha of the Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin TEC (based on the presence of RE 11.8.11) may be impacted by the development of the proposed transport corridor (mine access road). RE 11.8.11 is protected within the Albinia National Park, Peak Range National Park, Carnarvon National Park, Albinia Conservation Park, Albinia Resource Reserve and Minerva Hills National Park. In December 2006, remnant extent was greater than 10,000 ha and 10-30% of the pre-clearing area remained.

Through further desktop studies the potential habitat of potentially occurring EPBC-listed species was identified. As a result of this study the total direct impact to 'high value potential habitat' is 2,800 ha (0.42% of habitat extent in the regional landscape defined as 137 km x 163 km region with the Project MLA as a centroid) and the total indirect impact to 'high value potential habitat' is 12,013 ha (1.79% of habitat extent in the regional landscape). This impact, when compared to habitat availability in the regional landscape, and in combination with the proposed management and mitigation measures, is not likely to significantly impact MNES. Further detail relating to this can be found in Volume 2, Appendix H of this EIS.

The squatter pigeon is widely distributed throughout central Queensland and it is unlikely that existing and future developments in the region will impact upon the distribution and abundance of this species.

Although impacts to the identified values are minimal in the context of the wider region, it is possible that projects located within the local and regional area may result in a cumulative impact. This impact will, however, be in isolation to the Project. Nonetheless, it is likely that the Project will result in the clearing of vegetation and a reduction in fauna habitat during the life of the operation, and is is expected that this will also occur at the adjacent proposed mines and so could result in an impact to the existing habitat corridors in the local area. While the extent of the habitat corridors on the site and



in the surrounding area are already heavily impacted by clearing and associated grazing activities, the Project's commitment to progressive rehabilitation of disturbed areas (including bushland) potentially enhance the habitat corridors on the site.

During the EIS assessment weed and pest species were identified on the Project site. The prevalence of these species is expected to be similar on surrounding tenements. As part of the EIS the Proponent has committed to the effective control and management of pest and weed species. It is expected that projects in the local and regional area will have or already have similar commitments which would be expected to limit any increase in potential negative cumulative impact.

The overall cumulative impact on terrestrial ecology is considered low.

X.6.3.2 Aquatic Ecology

Overall, the aquatic environment located on the Project site was considered to possess reduced environmental value. This assessment was based on the observation of existing conditions including moderate grazing pressure, associated bank erosion, in-stream benthic degradation and the presence of a basic habitat structure that offered limited resources for aquatic inhabitants.

Furthermore, water quality within the watercourses exceeded the trigger values provided in the ANZECC (2000) Aquatic Ecosystems Guidelines at one or more monitored sites for a number of parameters. These exceedances are possibly due to runoff associated with upstream pastoral land-use.

Sandy Creek which is a tributary of the Belyando River, is the main watercourse traversing the Project site, and like all waterways in this area is ephemeral. The Belyando River flows approximately 200 km to join the Suttor River and eventually flows into the Burdekin River at Lake Dalrymple (Burdekin Falls Dam). Belyando/Suttor catchment produces unreliable stream flow, contributing comparatively less to the overall discharge from the Burdekin Basin than the other sub-catchments in the basin. The proposed Alpha and Waratah projects are located upstream within the Sandy Creek catchment and it is possible that cumulative impacts on the aquatic ecosystem could arise from all projects.

If the Kevin's Corner Project proceeds it is expected to have strict surface water quality release commitments and license conditions, although no controlled releases are proposed from the Project. Similarly strict conditions of discharge would be expected for both Alpha and Waratah projects, although controlled releases may be required for these other projects. Any water releases are likely to be during period of high flows and floods.

Potential impact to the local aquatic ecology is possible from changes in stream flows and the disturbance of the stream environment as a result of stream diversions resulting from mining activities. The immediate impacts to the aquatic ecology as a result of stream diversion activities are expected to be short term as the diversions would be expected to mimic the existing ephemeral stream environment on each of the Project sites.

The overall cumulative impact on aquatic ecology is considered low.

X.6.4 Surface Water

The Project construction and operational activities have the potential to impact downstream water quality, flood levels and stream flows which will be managed through appropriate mitigation and control strategies. The alteration of the stream geomorphology primarily through creek diversions will



cause some alteration to the baseline flooding profile of the area and the responsible capture and reuse of the dirty water generated in the Project disturbed areas will cause a reduction in the effective catchment area draining to the receiving watercourses.

The proposed Alpha and Waratah projects mining projects are located to the south of the Project, and all three are located within the Sandy Creek catchment, forming the south-westerly portion of the Belyando River system, which is part of the Burdekin Basin. At a local level the cumulative impact of these three proposed projects will affect the Sandy Creek catchment. The degree of cumulative impact from these projects will be dependent on the following:

- the extent of the catchment contained within each mine water management system;
- dirty water management techniques and the quality of any discharges from the mining operations; and
- number and/or size of diversions and levees that will alter the floodplain and so change peak flood flows and flooding extents.

At a regional level, mining activities will have certain cumulative impacts on the Belyando and Burdekin River systems; however this impact is not in isolation and would be expected to be less than the impact from other land uses in the catchments, in particular agriculture.

As part of this EIS the Proponent has committed to numerous mitigation and control strategies to promote the diversion of clean water around the Project's disturbance areas, control and manage dirty water and engineer appropriate diversions. It is expected that the other proposed local mining projects within the Sandy Creek catchment will be required to implement similar control and mitigation measures. However, it will not be possible to determine the actual geomorphological and associated flooding cumulative impacts until the other projects have progressed. As the Alpha Coal Project is expected to be the first of these mines to commence it is suggested that subsequent mines in the catchment consider the Alpha Coal Project in their surface water management designs.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on surface water is assessed as high.

X.6.5 Groundwater

In addition to the Project there are two adjacent proposed projects (Alpha and Waratah) that have the potential to impact groundwater and thus have a cumulative impact in the local area.

The Proponent has constructed and calibrated a groundwater model to simulate the combined impact of the Project and Alpha Project as part of the Kevin's Corner EIS process.

- This modelling aimed at assessing mining impacts specific to the Project which included:
- Estimates of groundwater inflow to the underground workings over the mine life;
- A predicted zone of influence of dewatering and the level of drawdown away from the mine;
- The identification of potential risk where groundwater impact mitigation / control measures may be necessary; and
- Prediction of the impact of mine dewatering on groundwater discharges and other groundwater users.

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The regional modelling indicated that the cumulative cone of depressurisation above the D coal seam (limit of 5 m drawdown contour) extends ~ 15 km beyond the northern Project MLA boundary. The extent of drawdown is more significant to the north of the Project MLA due to the greater drawdown requirements of the Project's underground operations.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on groundwater is assessed as medium.

X.6.6 Air

X.6.6.1 Air Quality

The activities associated with open cut mining have a high potential to generate dust particles that can potentially impact on the sensitive receptors in close proximity to the Project.

Based on the geographic location of the sensitive receptors and proposed mining operations including the Kevin's Corner Coal Mine Project, Waratah Coal Project and Alpha Project, possible cumulative impacts on the 24-hour average concentration of PM_{10} at current sensitive receptor locations may include (but may not be limited to) the following:

- impacts from dust generating activities located within a similar band of wind directions will be additive. Thus when the wind is from the south (for example), dust sources to the south of a receptor will be additive.
- impacts from activities located within different bands of wind directions will not be additive. Thus when the wind is from the west (for example), dust sources to the south of a receptor are not likely to have a significant impact on dust levels at that location.
- even if worst-case impacts from two or more dust emissions sources are not additive at a particular sensitive receptor location, as mining increases within the airshed, the frequency of elevated levels of PM10 is likely to increase.

Thus, worst-case 24-hour average concentrations of PM_{10} due to dust-generating activities from emission sources in the region are not additive during any given 24-hour period as worst-case meteorological conditions for each significant emission source (such as wind speed and wind direction) differ depending on the geographic location of the significant dust emission source(s) to the receptor.

With respect to the annual average of $PM_{2.5}$, TSP, and monthly dust deposition, impacts will be cumulative.

Dispersion modelling of the Project included cumulative impacts from the proposed Alpha Project. It is suggested that subsequent projects in the local area utilise the Project air dispersion modelling information when undertaking their own cumulative assessments.

Results from the PM_{10} dispersion modelling were aligned with the expectations above, with the following findings:



- emissions from both projects will seldom be received by a sensitive receptor at the same time due to the alignment of sources with sensitive receptors. Hence if the Project Goal is not being exceeded by either project, cumulatively it is also unlikely to occur.
- due to the predominant wind directions the Project is unlikely to impact on receptors other than receptor 1 to the north, and receptors 8 and 9 to the south:
 - when the wind direction aligns from the north, the wind will pick up the particulates as the wind passes over the pits of the Project and cumulatively with the pits of the Alpha Project before it impacts on Receptor 9;
 - accordingly, when the wind aligns from the south, Receptor 1 will also be impacted by particulates from the pits of both mines;
 - when the wind direction is from the north-northeast, Receptor 8 will be impacted by emissions from some of Alpha's pits, and potentially the Project's pits; and
 - for each of the other receptors, and under easterly and westerly wind conditions for receptors 1, 8 and 9, the receptors do not align with the major source contributors from both the Alpha and Kevin's Corner projects.

Generally, the activity of mining, particularly open cut mining will add particulates to the regional airshed. It should be noted that the receptors modelled as having the highest potential dust impacts from the Project are located within the expected footprint of the proposed projects and so if those projects went ahead they would be expected to be removed or relocated.

As part of the Project a system of dust control and mitigation measures as well as monitoring is proposed. These measures are designed to reduce as much as practicable the dust emission sources, monitor the effectiveness of the system, and undertake continuous improvement as appropriate. It is expected that any new projects in the local area will implement similar control and monitoring measures so reducing the potential cumulative impacts on the local sensitive receptors.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on air quality is assessed as medium.

X.6.6.2 Greenhouse Gas

The major sources of Scope 1 and 2 greenhouse gases (GHG) from the Project include the following:

- fugitive emissions of coal seam gas (CSG) from the open-cut mining of coal (Scope 1);
- fugitive emissions of coal seam gas (CSG) from the underground mining of coal (Scope 1);
- diesel combustion in vehicles (Scope 1);
- diesel combustion for stationary energy (i.e. pumps) (Scope 1);
- diesel combustion for explosives (Scope 1); and
- electricity consumption (Scope 2).

Similar sources can be expected from the other coal mining projects within the local and regional area of the Project site.

When viewed in an Australian context the Scope 1 and 2 emissions from the Project are considered materially relevant given the Project emissions are 3.36% of the 2008 Australian mining sector at the peak emission rate (Volume 1, Section 14). This GHG emission percentage is calculated as a baseline



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of the mining projects currently in operation and does not take into account the commencement of new projects such as those listed in Table X-5. If any or all of the projects listed in Table X-5 commence it will be likely (due to their size) that the Project percentage contribution to the Australian GHG emission will decrease significantly. However, there will still be a cumulative increase of GHG released to the atmosphere. Due to the lack of available data from other projects this increase has not been quantified.

Preliminary assessment of borehole data for the Project indicates that the fugitive emissions from the Project are likely to be approximately one-third of the results presented in this report. The available Project data alone was not considered sufficient to adequately quantify the fugitive emissions from this mine, however further testing is being undertaken with results expected to be available for the Supplementary phase of the EIS process.

The Proponent has committed an energy conservation and GHG management plan with the objectives of: reducing Project GHG emissions; incorporating energy efficiency initiatives into Project phases: integration of GHG management and energy efficiency initiatives into business decision-making; and providing consistent and accurate reports on GHG emission levels in compliance with relevant legislation.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on GHG is assessed as medium.

X.6.7 Noise and Vibration

Noise levels generated by the proposed Kevin's Corner Project construction and operation are predicted to be within the established noise limits at all existing receptor locations outside the Project site boundary under all meteorological conditions.

Full compliance with the nominated rail noise and vibration and aircraft noise criteria is predicted at all receptor locations. Similarly, full compliance with the Department of Main Roads' Road Traffic Noise Management code of practice criteria, is predicted for all construction and operational stages. However, due to the relative increase in vehicle volumes, noticeably increased noise levels are likely to be perceived by the most affected receptors. It is likely with the development of the Alpha and Waratah projects in the close vicinity of the Project site this noise level will increase with the increase in traffic volumes.

The sensitive receptors (homesteads) to the north and west of the Project site would not be expected to experience increased noise impacts due to the cumulative operation of the additional mine sites, whilst marginally increased noise levels may occur at the homesteads situated to the east.

Based on the assessment methodology given in Section 15.4, the significance of the overall cumulative impact on noise and vibration is assessed as low.

X.6.8 Solid Waste

The Project will generate a variety of solid wastes, many of which will be reused or recycled. However, there will also be selected wastes that will be disposed of in the on-site landfill or local licensed waste management facilities. It is understood that the proposed Alpha and Waratah Projects are proposing a similar approach to solid waste management.

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The increase in mining activity within the region is expected to result in an increase in the demand for recycling services for items such as waste oil, oil filters, tyres etc. This increase in demand is expected to be met by an increase in services as a factor of market forces. All mining projects have the potential to generate large quantities of green waste as a result of land clearing, much of which is expected to be reused on site for rehabilitation.

The other Project waste stream (generated as a by product of coal mining and processing) will be overburden and coal rejects and tailings. On the Project site these waste materials will be characterised and monitored through the life of the Project to enable the implementation of appropriate management techniques. Through the appropriate management of this waste material the potential for impacts on the environment will be minimised. It should be noted that while a large amount of geochemical characterisation of the minimig waste streams has been undertaken for the Project, coal mining is yet to commence in earnest in the Galilee Basin. As a result the geochemical nature of the material across the resource area and across the proposed projects is not as well understood as historical coal mining areas such as the nearby Bowen Basin.

While it is expected that the other locally proposed mining projects will have similar management and monitoring techniques to the Project it is possible, that if the mining waste is not appropriately handled there could be cumulative impacts on the surface water and groundwater environments in particular.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on solid waste is assessed as low.

X.6.9 Traffic and Transport

As part of the Project EIS a traffic impact assessment was undertaken on the surrounding road network to determine whether the traffic generated by the development (only) will have a significant impact on the performance of the existing road network (Volume 1, Section 17).

There is however a number of other regional significant developments previously identified in this document, currently operating, or are proposed of which their operations may coincide with the construction and/or operational phase of the Project. As such, the interaction between the vehicles generated by these other developments with the Project has been assessed to determine the performance of the road network under this 'cumulative impact' scenario. Tables X-4 and X-5 provide a summary of the existing and proposed developments within the Galilee Basin region and have been considered as part of the traffic and transport cumulative impact assessment.

The existing condition of the surrounding road network in the traffic impact assessment has been based on traffic count data collected in 2009 and 2010. Therefore it is assumed that all 'Existing Developments' outlined in Table X-3 have been included in that assessment given they were in a construction or operational phase at the time the traffic counts were performed. Consequently, it is only the proposed developments that are to be analysed in determining the cumulative impact on the performance of the road network.

The assumed vehicle routes for the proposed development are also incorporated into the cumulative impact assessment as these values are aggregated for that particular road length or intersection to determine if suitable road network performance is being maintained. The number of vehicle movements in many of the proposed developments is yet to be finalised. Instead, the relative size of each proposed development when compared to the Project is utilised in estimating these traffic

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movements. A summary of the assumed vehicle routes for construction vehicles and personnel are provided in Volume 1, Section 17. As a reference, the peak vehicle generation rate for the Kevin's Corner Coal Mine Project is in 2014 during the construction phase and 2017 during the operational phase. These two scenario years have an Annual average daily traffic (AADT) of 130 (42% commercial vehicles) and 122 vehicles (32% commercial vehicles) per day respectively. Table X-8 below shows assumed vehicle routes for proposed developments in the Galilee Basin Region.

Project	Relative Size to Kevin's Corner Project (%)	Vehicle Generation	Assumed Vehicle Route
Galilee Basin Power Station	42%	62	Identical to Kevin's Corner Coal Project
Waratah Galilee Coal Mine	164%	242	Identical to Kevin's Corner Coal Project
Alpha Coal Mine	100%	147	Identical to Kevin's Corner Coal Project
South Galilee Coal Project	67%	99	13.6% of vehicle origin West of site 86.4% of vehicle origin East of site
Powerlink and Sunwater Powerline and Pipeline Installation	21%	31	13.6% of vehicle origin West of site 86.4% of vehicle origin East of site
Ensham Underground	27%	40	100% of vehicle origin West of site

Table X-8: Assumed Vehicle Routes for Proposed Developments in Galilee Basin Region - 2017

Table X-6 identifies that the proposed developments will be utilising similar intersection and road sections as those proposed for this Project. In particular, the Capricorn Highway (between Barcaldine and Emerald), the Peak Downs and Gregory Highways (between Emerald and Mackay) and roads surrounding the Site will experience a cumulative impact from these developments. It also demonstrates that the Project is not the only significant proposed development in the Galilee Basin region.

X.6.9.1 Cumulative Impacts on Road Lengths

Given the significant increase in vehicles generated by this Project (when compared to existing conditions), the inclusion of additional projects along Degulla Road and Clermont-Alpha Road will impact on the modelled level of service (LOS) in 2014 and 2017 when the Project is in its peak construction and operational phases. This is to be expected given that the current road configuration is unsealed and designed for local residential access only. Developing three coal mines of similar size (as well as a power station) will significantly change the number and class-type of vehicles than those experienced without any development occurring. It is therefore concluded that the cumulative impact of any of the proposed projects will require appropriate upgrades to Degulla Road and Clermont-Alpha Road.

All other roads (such as the Capricorn Highway, Peak Downs Highway and Gregory Highways) have sufficient capacity in their LOS to accommodate the cumulative impacts of these proposed developments without the need of significant infrastructure upgrade.

Whilst the Project has been shown to have negligible impact on the pavement maintenance requirements of these roads as a stand alone project, there may be some cumulative impact due to the additional projects increasing the existing traffic by greater than 5%. Exact details of the impact



can not be determined at this stage due to insufficient information of the other projects' commercial vehicle generation. Additionally, any maintenance impacts will be associated with the timing of delivery of projects which is unknown at this stage. Detailed discussions will need to be held with DTMR regarding any maintenance impacts.

Table X-9 and Table X-10 provide an indication of the extent that the cumulative impact will have on the surrounding road network in 2014 and 2017 respectively. It should be noted that although the LOS for Degulla Road and Clermont-Alpha Road deteriorate below a LOS 'A', they are all still at LOS 'C' or above which is considered to be an acceptable minimum level of performance for each road length under the Guidelines for Assessment of Road Impacts of Development (Queensland Department of Main Roads, 2006).

Road Segment		2014 Base Case (without project)	2014 With Project	2014 With Project and Proposed Projects (level / rolling terrain)
Degulla Rd	AADT	22	87	909
(Clermont-Alpha Rd – site)	LOS	Α	А	B / C
Clermont-Alpha Rd	AADT	99	224	1,046
(Alpha – Hobartville Rd)	LOS	A	А	C / C
Clermont-Alpha Rd	AADT	24	28	848
(Hobartville Rd – Mistake Creek)	LOS	А	А	B / C
Clermont-Alpha Rd	AADT	91	95	917
(Mistake Creek – Clermont)	LOS	A	А	B / C
Capricorn Highway	AADT	587	646	1,638
(Alpha – Gemfields)	LOS	A	A	А

Table X-9: Summary of Cumulative Impact on Road Lengths – 2014

Table X-10: Summary of Cumulative Impact on Road Lengths – 2017

	5	1	5	
Road Segment		2017 Base Case (without project)	2017 With Project	2017 With Project and Proposed Projects (level / rolling terrain)
Degulla Rd	AADT	25	86	908
(Clermont-Alpha Rd – site)	LOS	А	А	B / C
Clermont-Alpha Rd (Alpha – Hobartville Rd)	AADT	109	226	1,048
	LOS	А	А	C / C
Clermont-Alpha Rd (Hobartville Rd – Mistake Creek)	AADT	26	31	853
	LOS	А	А	B / C
Clermont-Alpha Rd	AADT	100	105	927
(Mistake Creek – Clermont)	LOS	A	А	B / C
Capricorn Highway (Alpha – Gemfields)	AADT	647	691	1,683
	LOS	A	А	Α



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X.6.9.2 Cumulative Impact on Intersections

Capricorn Highway / Gregory Highway Intersection - Emerald

The Capricorn Highway / Gregory Highway intersection analysis identified that there is very little, if any, incremental impact between the 'no development' and 'with development' scenarios for the Project in 2014 and 2017. It should be noted though that the intersection performance is at or above capacity in 2017; however this is the case with or without any development occurring (i.e. background traffic growth to 2017 will result in the reduced intersection performance). As such, the proposed developments outlined in Table X-8 will have no cumulative impact on the existing configuration of this intersection as it will have already reached capacity prior to 2017 due to the background growth in the existing traffic volumes.

Capricorn Highway / Clermont-Alpha Road Intersection – Alpha

The analysis of the Capricorn Highway / Clermont-Alpha Road intersection indicated that there is negligible Degree of Saturation (DOS) and queue lengths for all scenarios modelled in 2014 and 2017 (i.e. DOS<0.1). The addition of the vehicles generated by the proposed developments outlined in Table X-8 will have little impact on the performance on this intersection.

Other Intersections

The remainder of intersections along the vehicle routes are operating in a similar capacity to the Capricorn Highway / Clermont-Alpha Road intersection. As such it is expected that there will be no cumulative impact at these intersections based on the vehicles generated by the proposed developments.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on traffic and transport is assessed as medium.

X.6.10Cultural Heritage

X.6.10.1 Non Indigenous Cultural Heritage

The Kevin's Corner Project EIS has identified a number of non-Indigenous cultural heritage sites within the Project site. Cumulative impacts for such sites are unlikely as they will not be affected by projects separate from the site itself. The possible exception to this could be sites that cross large geographic areas such as the Cobb and Co. Coach Road and associate structures such as hotels. It is likely that this structure will be present on some of the neighbouring proposed project sites.

To mitigate the potential impacts on the identified non-Indigenous cultural heritage locations of significance, the Proponent will develop the Project site in accordance with the management procedures committed to in the EIS. This will include the appropriate level of survey of the coach road, where possible avoidance of the identified structures of significance and management of the identified locations in accordance with the site Cultural Heritage Management Plan (CHMP). It is expected that the projects adjoining the Project site will undertake similar assessments and introduce similar mitigation measures to minimise the potential cumulative impact on the areas with non-Indigenous cultural heritage values.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on non-Indigenous cultural heritage is assessed as medium.



X.6.10.2 Indigenous Cultural Heritage

Management of Indigenous cultural heritage significance and impacts for the Project will be by the CHMP process. The Project already has an agreed and signed CHMP for the Project area. Protection, management and mitigation measures of Indigenous cultural heritage finds will be agreed after cultural heritage surveys are complete, and will then be managed in accordance with the CHMP.

The CHMP allows for cultural heritage surveys and mitigation programs to be carried out on an 'as required' basis prior to disturbance throughout the Project duration as construction and mining activities progress.

Typically Indigenous cultural heritage finds are dealt with in relative isolation and managed accordingly. It is possible that across the Project site and the adjacent two proposed project sites (Alpha and Waratah) there may be a trend of types of cultural heritage finds that adds significance and the potential for a cumulative impact.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on Indigenous cultural heritage is assessed as medium.

X.6.11 Social and Community

The social impact assessment (SIA) for this Project is a cumulative assessment of the social impacts of the Kevin's Corner Project in addition to the social impacts that are deemed to be likely to have occurred as a result of the Alpha Coal Project. The rationale for this approach is that to be a viable project, the Kevin's Corner Coal Project is dependent on the rail infrastructure of the Alpha Coal Project. As such the scope of the SIA for the Kevin's Corner Project includes the Alpha Coal Project, and this SIA focuses on the successive, incremental and combined social impacts (Franks et al, 2010) that are likely to occur as a result of the Kevin's Corner project in addition to the Alpha Coal project.

More broadly, the cumulative impacts assessment for social and community is based on the projects identified within the Local and Regional areas (as identified in Section X4). Cumulative impacts for social and community are inherently difficult to identify or assess because they are based on assumptions of assumptions, many of which are unknown because they were developed by other projects. Therefore, the purpose of this social cumulative assessment is to identify potential key considerations in the Project regional and local study areas, and identify a mechanism for better identifying and planning for cumulative impacts. The regional study area includes Isaac Regional Council (with a focus on Clermont), and Central Highlands Regional Council (with a focus on Alpha. Table G-12 lists key considerations for each valued social component (VSC) assessed in the SIA.

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Valued Social Component	Key Considerations
History and Settlement	 Increased rate and scale of profile change; Increased rate and scale of settlement pattern shift to accommodation village style arrangements; Increased potential for in-migration to local and regional communities; and More rapid transition from a predominantly agricultural area to a mining area.

Table X-11: Key Considerations for the Study Areas Regarding Cumulative Impacts

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Valued Social Component	Key Considerations
Demographic	 Increased population to local and regional centres; Increased rate of population growth; Increased number of males aged 20 to 45; and Increased ratio of non-Indigenous to Indigenous.
Culture and Community Dynamics	 Increased ratio of non-Indigenous to Indigenous; Increased number of people from outside the region; Increased potential for volunteers; Increased disposable income; and Predominance of shift-style employment.
Housing and Accommodation	 Increased cost of housing: Increased demand; Decreased supply; and Increased speculation. Increased rents; Increased pressure for land availability; and Increased demand on short-term accommodation
Health, Wellbeing and Social Infrastructure	 Increased demand on local and regional emergency services providers; Potential for service providers to reach critical mass and acquire additional staffing/upgrades; Potential for service providers to be stretched to their limits (service delivery and staff fatigue); Potential for community to feel overwhelmed/helpless; Potential for local social infrastructure to fall further behind demand; and Potential for increased skills and services in the region. Increased health concerns relating to coal dust
Education and Training	 Increased training opportunities and skills development; Potential for local school to reach critical mass and receive additional staff; Potential for child care to reach limit; Potential for child care to acquire additional staff; and Potential for dedicated training to move to the region to service multiple mines.
Labour Market and Employment	 Increased employment opportunities; Increased competition for workers; Increased wages at mines; Increased potential for skills drainage from other industries; and Increased potential for FIFO reliance by all projects.
Industry and Business	 Increased competition for workers; Increased business opportunities in the region; Increased potential for development of an Alpha light industry precinct; and More rapid transition from a predominantly agricultural area to a mining area.
Income and Cost of Living	 Increased disposable income; Potential increase in goods and services in the area; Potential increase in cost of local goods from businesses increasing prices to capture mining incomes; and Potential increase in housing costs and rent.

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Valued Social Component	Key Considerations
Governance	 Increase in demand on councils; Increase in taxes and rates; Increased demand on services and infrastructure; and Increased profile with State and Federal governments.
Primary Infrastructure and Access	 Reduction in effect of limiting factors in Alpha from increased investment; Increased pressure on limiting factors in Alpha if not addressed effectively; Increased demand on/use of State roads; Increased traffic and safety issues; Increased maintenance required on roads; Potential expansion of Alpha aerodrome; and Potential to increase rail activity along Longreach to Rockhampton line.
Other - Access	 Potential for DTMR and councils to upgrade Alpha- Clermont Road from the Project to Clermont: Potential to increase impact on Mackay businesses and community; Reduce impacts (positive and negative) to BRC and CHRC; Potential to transfer more road transport to Mackay via IRC; Transfer of impacts from Alpha to Clermont; Potential to increase population in Clermont and subsequent spin-off impacts; and Potential for Alpha to receive minimal positive and negative impacts.
Other – consultation	 Consultation fatigue for councils; Consultation fatigue for communities; Confusion differentiating projects; and Issues overlooked or under considered by key stakeholders due to other commitments/distractions.

The cumulative effect of more than one project in the Galilee Basin will likely result in an amplification of the Project impacts assessed for the regional study area and local study area. Impacts are limited by several key factors for each area which would remain limiting factors, unless one of the other projects intends to remove one of those factors. As an example, a project providing Alpha with a secure source of electricity and water directly to the community would significantly impact on the potential for people to relocate to the region for all projects. An upgrade of the Alpha-Clermont Road to Clermont would significantly impact on the geographic location, frequency and magnitude of impacts of the Project. Most impacts would likely transition away from Alpha and towards Clermont. Clermont is a larger centre with more services and better access to other major centres.

Overall the cumulative social impacts due to more than one of the proposed projects going ahead in the Alpha area are likely to be fairly significant in both the regional and local study areas. In the regional study area (IRC and CHRC), the existing and other proposed projects in those regional councils will reduce the noticeable impact from the Alpha Project, and Alpha will essentially be an amplification of the other Projects. The Project will be a cumulative effect on the regional councils. This is because of the distance the Project is to those councils, and because the existing and other proposed projects (not in the Galilee Basin) are within those councils boundaries. The Project



therefore will be viewed more as a secondary concern for IRC and CHRC than a primary concern. As more projects develop in the Galilee Basin, the profile of the basin as a whole may increase for IRC and CHRC, making the basin a primary concern.

In the local study area, the amplification effect from the other projects has the potential to create near limitless scenarios. The primary factor will be the policies and programs each project implements regarding workforce sourcing, transport and accommodation. If additional projects to the Kevin's Corner Coal Mine Project go ahead, local opportunities for mine employment should remain the same; however, the choice of which project to seek employment with will increase. The lure of many projects may attract newcomers and former residents back to the region. This will increase business profits and opportunities.

The key to managing cumulative impacts is to have various project proponents considering more than their own project in the development and implementation of their strategies, policies, and programs. This is best achieved through a high level, strategic forum which will enable key stakeholders to better understand the requirements and outcomes of multiple projects. There are several opportunities available to achieve this and the Proponent will explore opportunities for effective cumulative impacts management in consultation with the DEEDI SIA Unit.

The Kevin's Corner project will link with the Hancock Consultative Committee, already established as part of the Alpha Coal Project. This committee will be the mechanism for on-going examination of the cumulative impacts of these two projects, and will be open to the notion of other emerging projects linking in to consider cumulative impacts more broadly. Hancock would be interested in participating within an ongoing cumulative impacts forum to address these types of impacts as a result of these multiple emerging projects within the region, whether this is the HCC, or if one is organised by another body (such as the Galilee Basin Common Issues Forum).

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on social and community is assessed as high.

X.6.12Economics

In considering the cumulative impacts of the Project it is necessary to identify the range of existing, planned and potential projects that may contribute to regional impacts. Cumulative impacts refer to the impact of the cumulative stimulus to the regional economy.

A significant proportion of existing, planned and potential projects rely on accommodation villages to house imported labour throughout the construction and operating phase of the Project. These accommodation villages provide some mitigation to the further tightening of small and tight regional labour markets. However, a small proportion of the construction and operating work force of existing, planned and potential projections will choose to relocate to within the region resulting in a population effect.

The stimulus created by existing, planned and potential projects within the region is likely to impact on the local labour markets, namely the Barcaldine Regional Council area, comprising Aramac statistical local area (SLA), Jericho SLA and Barcaldine SLA, and the regional labour market, namely Central West statistical division.

The existing projects within the area of influence of the Project are located primarily at Clermont, Emerald, Tieri and Blackwater. The existing coal mines fall within a well established mining area, the



economy of which has had considerable time to adapt to changes in its economic base. The existing coal mines are located closer to the coast and have greater capacity to draw on large coastal communities, such as Rockhampton, Gladstone and Mackay for their labour or supply chain activities.

In terms of production, the largest existing project is Rio Tinto's Clermont Mine, which is closely followed by BMA's Blackwater Mine (11 Mtpa), and Rio Tinto's Blair Athol Mine (11 Mtpa). However, the Blair Athol mine is due for decommissioning in 2015.

The combined stimulus of the proposed projects will create significant demand for additional labour, physical inputs and housing. In particular, the combined labour demand of these projects would be for several thousand workers during the construction phase.

Table X-12: Proposed majo	r projects within	Local and Regiona	al areas of influence of	the Kevin's
Corner Project		-		

Project	Construction Workforce	Operation Workforce
Local		
Kevin's Corner	2,500	2,000
Alpha Coal Project	1,350	2,382
Waratah Galilee Coal Mine	2,200	760
Regional		
Galilee Basin Power Station	1,000	60
The South Galilee Coal Project	1,500	750
SunWater - water transmission project	-	-
Ensham Underground 1 & 2	600	390
Powerlink – electricity transmission project	500	N/A
Carmichael Coal Mine and Rail Project	-	-

Note 1: The 6,000 workers refers to total demand for labour throughout construction as opposed to a peak or annual employment. Hence, were construction to take three years, the annual employment would be in the order of 2,000 workers.

The ability of the local economy to respond to this stimulus will be limited to a large extent by the size of the local labour force and depth of the local economy. Increased local demand is anticipated to arise directly in the form of increased demand for labour and business / industrial services and indirectly in the form of demand for additional housing and community services.

The economic base of the Barcaldine Regional Council area and to a lesser extent the Central West statistical division is likely to be insufficient to meet increased demand resulting from the various planned projects.



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In response to the planned projects the local and regional economies would need to increase their capability both in terms of labour and business / industrial services. Such improvements to capability are likely to take time, indicating that the ability of local or regional economy to meet increased demand during the initial construction phases may be limited.

The labour force of the Central West region is estimated at less than 8,000 workers, with the Barcaldine Regional Council area hosting approximately 2,100 workers. The cumulative demand for labour during the construction phase of planned projects significantly exceeds the size of the region's labour force. Unemployment rates within the Central West region are less than 4% (below the state average), while labour force participation is over 80% (significantly above the state average).

Consequently, significant labour and business / industrial services would need to be imported from other regions, most likely coastal regions. Unemployment rates within Rockhampton are currently above the state average and labour force participation is below the state average, indicating some capacity in the Rockhampton labour market to meet labour demand within the Central West region.

The greatest local and regional development opportunities are likely to arise from meeting operational rather than construction needs. With project lives of approximately 30 years there is capacity for the local and regional economy to develop and diversify.

While the majority of future employment is likely to be imported and accommodated in an accommodation village, some workers will choose to relocate to the region. Also, as the economic base of nearby communities adapts to meet increased demand for business / industrial services, this will attract more workers to the region. Increased local employment would result in population growth. Similarly, economic activity stimulated by the major projects will also increase demand for short term accommodation.

Local and regional economic growth and the consequent population growth will increase demand for a range of additional infrastructure and facilities, including housing, accommodation, health care, child care, retail facilities and schooling.

The confluence of a number of major projects within the area is likely to result in a number of impacts, including:

- increased demand for labour;
- increased demand for business / industrial services;
- increased demand for housing; and
- increased demand for economic and social infrastructure.

The existing size of the local and regional economy suggests that the stimulus created by the early stages of construction would be largely addressed through importing of labour and business / industrial services.

The extent to which the above impacts are positive or negative will ultimately be determined by the policy response of the business community and local and state governments. Providing the above impacts are met with increases in supply, economic impacts particularly in terms of increasing regional and state wealth will be generally positive.

Based on the assessment methodology given in Section X.3, the significance of the overall cumulative impact on economics is assessed as high.



X.6.13 Mine Cumulative Impacts Summary

The cumulative impacts from the development of the Kevin's Corner Project are summarised in Table X-12. The main cumulative impacts associated with the development of the Project (high impact significance) relate to surface water, social and economic, with lesser impacts relating to land, groundwater, air quality, GHG, cultural heritage and transport.

Through the impact assessment process, the Proponent has been developing appropriate management strategies to reduce the potential cumulative impacts. This has included a community consultation program, road upgrades and implementation of a series of management plans and monitoring programs. Some of these activities have been aligned with the Alpha Project, and will assist in gaining the maximum benefit.

It should be noted that the minor-moderate impacts identified in this analysis are generally both short term and temporary, making many of the cumulative impacts negligible.

Environmental Value	Impact Significance
Land	Medium
Land Use	Medium
Landscape Character	Low
Nature Conservation	Low
Surface Water	High
Groundwater	Medium
Air Quality	Medium
Greenhouse Gas	Medium
Noise and Vibration	Low
Solid Waste	Low
Traffic and Transport	Medium

Table X-13: Summary of Cumulative Impacts

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Environmental Value	Impact Significance
Non Indigenous Cultural Heritage	Medium
Indigenous Cultural Heritage	Medium
Social and Community	High
Hazard and Risk	*
Economics	High

* Not assessed as all of the hazard and risk issues were contained on site and not applicable to a cumulative impacts assessment