

Olive Downs project

Coordinator-General's evaluation report on the environmental impact statement

May 2019

The Department of State Development, Manufacturing, Infrastructure and Planning

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Synopsis

This report is my evaluation of the Olive Downs project (the project). It has been prepared pursuant to section 34D of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act).

Pembroke Olive Downs Pty Ltd (the proponent) proposes to develop a metallurgical coal mine and associated infrastructure in the Bowen Basin. The project would be located within the Isaac Regional Council (IRC) local government area (LGA), approximately 40 kilometres (km) south-east of Moranbah.

The project includes the staged development and operation of an open cut metallurgical coal mine, comprising two mining domains—the Olive Downs South (ODS) and Willunga domains.

The project would also include the:

- installation of a raw water supply pipeline connecting the project to the existing Eungella pipeline network
- construction of a 66 kilovolt electricity transmission line (ETL) from the existing Broadlea Substation to the ODS domain and an on-site switching/substation within the ODS domain
- construction of a new rail loop and 18 km rail spur connecting to the Norwich Park Branch Railway and rail loadout facility, including product coal stockpiles at the ODS domain for rail transport
- construction of an access road from Annandale Road to the ODS domain (which includes a crossing of the Isaac River) and a second access road from the Fitzroy Developmental Road to the Willunga infrastructure area
- wastewater and sewage treatment plants.

Part of the water pipeline and ETL would be located outside of the proposed mining leases for the project.

The proposed mining lease applications for the project include mining lease area (MLA) 700032, MLA 700033, MLA 700034, MLA 700035 and MLA 700036, consisting of three mining leases and two specific purpose mining leases. The project's lease applications total an area of approximately 25,300 hectares (ha).

The project is located immediately south of the approved but not yet constructed Moorsvale South Mine and within six km of the existing Peak Downs and Saraji mines to the east. Other mines within a 30 km radius of the site include the Moorsvale, Dauniah, Poitrel, Millennium, Eagle Downs and Lake Vermont mines. There are 25 operating coal mines in the region.

The approximate extent of the open cut mining area and associated waste rock emplacements and infrastructure areas would be 16,300 ha. Around 10,600 ha of the project area has already been cleared or disturbed for past agricultural practices.

The project maximises the use of existing road, rail and port infrastructure in Queensland's most established coal region. Proposed infrastructure has been co-located wherever possible to minimise potential environmental impacts.

The mine is expected to produce up to 15 million tonnes (Mt) of product coal per annum for overseas export over an anticipated operational life of 79 years. The coal resource would be mined by conventional open cut mining methods, with product coal intended to be transported by rail to the Dalrymple Bay Coal Terminal located 38 km south of Mackay.

The project would result in an estimated capital expenditure of \$1 billion and generate the following benefits:

- 500 direct full time equivalent (FTE) jobs during the construction period
- 1000 ongoing direct FTE jobs during operations
- significant social benefits for the local communities in the IRC LGA through local employment and training, business and increasing the population with new residents
- a contribution of \$8 billion to the local economy
- a contribution of \$10 billion to the gross state product of Queensland including \$1.1 billion in royalties
- net social benefits of approximately \$2 billion.

The first phase of construction activities, including early works, would commence as soon as the relevant planning approvals, environmental authority (EA) and mining lease tenements are granted.

In undertaking my evaluation, I have considered information including the EIS and advice I have received from relevant state and local government agencies.

The following provides an overview of the main issues arising from my evaluation.

Land use and rehabilitation

Current and final land use

Land within the project site is currently used for cattle grazing and has been largely cleared or disturbed through agricultural practices. There are areas of remnant vegetation near the Isaac River and on poorer quality soils.

Mining activities would progressively disturb approximately 16,300 ha of land over the project's 79-year life. The proposed rail spur, water pipeline, ETL and mine infrastructure area for ODS domain would be established during the initial construction phase of the project and would be expanded after approximately 10 years. Mine infrastructure in the Willunga domain would also be developed at around year 10 of the project. Mining would progress in seven operational stages of between 10-13 years duration each.

In proposing a final land use, the proponent considered a number of alternative mining methods, mine plans, mining rates and backfilling options to minimise final voids and ensure a stable, safe and self-sustaining final land use.

The EIS states that approximately 65 per cent of the project area would be returned to grazing uses, 25 per cent would be restored to woodland habitat and around 10 per cent of the site would be occupied by final void lakes and surrounding slopes and batters. I consider the return of 90 per cent of the areas disturbed by mining to either grazing or native vegetation to be an acceptable final land use outcome.

Progressive rehabilitation and final voids

To create stable final landforms, the proponent has adopted designs which would generally result in gently sloped (15 per cent) and well drained surfaces which are amenable to rehabilitation. The EIS demonstrates sufficient topsoil would be available for rehabilitation.

Following the establishment of a protective vegetation cover (i.e. cover crop), vegetation would be established as soon as practicable to prevent slope face degradation. Native vegetation would be established surrounding final voids and near watercourses, including the proposed Ripstone Creek diversion. Species to be included are typical of the pre-disturbance ecosystems present within the project area.

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act) commenced on 1 April 2019. I acknowledge the importance of the MERFP legislation in improving how mines are rehabilitated. The Act's transitional provisions apply to the Olive Downs project because Pembroke Resources lodged a site-specific application for an EA under the EP Act in May 2018, before the MERFP Act was passed. The transitional provisions mean that the project must be assessed against the pre-amended EP Act.

The project would create 13 mining pits over the course of mining and 10 of these would be completely backfilled. The project would leave three final voids covering around 10 per cent of the project site. The proponent has analysed the feasibility of backfilling the final voids to ground level and considers that the financial cost of backfilling these pits (in the order of \$3 billion) would make the project economically unviable.

I have taken into account the transitional provisions that allow the project to leave final voids on floodplains if they achieve rehabilitation objectives established by the regulatory framework. Final voids must be rehabilitated to a safe and stable landform that does not cause environmental harm and can sustain a post-mining land use.

I note the proponent's intention to establish permanent high wall emplacements which would prevent flood waters from entering final voids. This measure would ensure that there is no uncontrolled release of water from the final voids to the Isaac River floodplain.

The EIS includes goals, objectives, performance indicators and completion criteria for all rehabilitation areas. I have stated conditions for the EA which ensure the proposed final voids would meet the goals of being safe, stable and non-polluting and would be isolated from the Isaac River floodplain. The voids would also sustain an ongoing use as fauna habitat. I consider the proposed final voids to represent a manageable and relatively low risk to environmental values.

Taking into account the overall benefits of the project for the region and the state, I have decided to approve the three final voids on the floodplain with strict conditions for the EA which specify the location of final voids and include other relevant conditions. Information requirements for a progressive rehabilitation plan have also been included as stated conditions for the EA.

Impacts on existing land users

I have considered the potential impacts of the project on surrounding land uses including cumulative flooding impacts, potential sterilisation of coal resources, impacts on current agricultural activities and impacts on groundwater users. I note that the proponent has

worked closely with surrounding landholders to resolve these issues and I am satisfied that these impacts would be appropriately managed.

Groundwater and surface water

Groundwater

The project would directly intercept groundwater from the alluvial and sub-artesian aquifers and require an allocation of 623 million litres (ML) per year for the alluvium and 1,199 ML per year for sub-artesian aquifers. This would reduce to 146 ML per year for the alluvium and 183 ML per year for sub-artesian aquifers following mine closure.

Based on modelling predictions there is expected to be a groundwater drawdown of 2 to 5 m in the riparian areas along the Isaac River and its tributaries. As these systems rely on groundwater for some of their water requirements they may be impacted by groundwater drawdown. My stated conditions require the proponent to prepare a groundwater dependent ecosystem (GDE) and wetland monitoring program. The program must monitor groundwater levels and assess the condition of each affected GDE or wetland and corrective actions must be taken to rectify any impact identified.

My stated conditions also require the proponent to develop and implement a groundwater monitoring program. The program must be able to detect a change in groundwater quality values and levels and ensure that all potential groundwater impacts due to the activity are identified, monitored and mitigated.

Surface water

The project proposes the release of water into the Isaac River from five mine affected water dams. Being an ephemeral system, the proponent would only be able to release when flows rates in the Isaac River are sufficient to limit contaminant concentrations in the receiving environment.

The EIS indicates that the proposed controlled release strategy would achieve the water quality objectives for the Isaac River sub-basin. My stated conditions include release limits for mine affected waters which would ensure that proposed water releases do not adversely impact on the Isaac River.

I have also stated a condition that requires the proponent to establish background water quality monitoring sites upstream and downstream of the proposed controlled release points on the Isaac River and prepare a receiving environment monitoring plan to detect and respond to any potential impacts on receiving waters.

Collectively, my conditions would ensure that the release of mine affected waters is undertaken in a manner that protects the environmental values of the receiving environment. In addition, corrective action must be implemented should water quality impacts on the Isaac River and waterways downstream of the release points be detected.

Matters of state environmental significance

The project site supports matters of state environmental significance (MSES) including regulated vegetation, connectivity areas, wetlands and habitat for threatened species. The project has avoided impacts on these features by maintaining a minimum 200 metre buffer

to the Isaac River, reducing the width of infrastructure corridors, co-locating access roads with existing roads, co-locating the proposed water pipeline and rail line and utilising an existing easement for the ETL.

The proponent was required to complete comprehensive field surveys to confirm the occurrence of MSES including threatened species. I note that agencies with an interest in biodiversity (including DES) generally agreed that the survey effort undertaken by the proponent for listed threatened species was adequate.

Regulated vegetation

The project would result in direct unavoidable disturbance to the following areas of regulated vegetation:

- 140.5 ha of 'endangered' regional ecosystems
- 864.5 ha of 'of concern' regional ecosystems
- 4,341 ha of essential habitat for the ornamental snake
- 18 ha of essential habitat for the common death adder
- 4,827 ha of essential habitat for the koala
- 49 ha of remnant vegetation which coincides with mapped wetlands
- 126 ha of remnant vegetation which occurs within the defined distance of a watercourse (watercourse vegetation).

Measures to reduce the impacts of vegetation clearing include progressive vegetation clearing, with the area of native remnant vegetation cleared at any time generally being no greater than that required to accommodate projected mining activities for the next 12 months.

The EIS demonstrates that native vegetation communities and fauna habitats to be disturbed during the life of the project all occur extensively in the surrounding landscape and subregions. Clearance associated with the mine site and access road representing approximately 0.4% of the remaining remnant vegetation in the Northern Bowen Basin and Isaac-Comet Downs biodiversity sub-regions.

The EIS concludes that despite avoidance and mitigation the project could have a significant residual impact on endangered and of concern regional ecosystems, habitat for the ornamental snake and koala, wetlands and watercourse vegetation. Therefore, environmental offsets are needed.

Regulated vegetation which would be cleared on the project site is either habitat for threatened species or representative of a threatened ecological community (TEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act). As such, the offset requirements for the impact to regulated vegetation as MSES would be compensated for through the required offsets for the loss of habitat for species listed under the EPBC Act, where these matters overlap.

Connectivity areas

The project could adversely impact connectivity areas, particularly in the short term by removing 830.5 ha of vegetation which contributes to connectivity. Impacts on connectivity would be reduced by the proponent's commitment to rehabilitate and maintain a 200-metre

buffer between mining pits and the Isaac River. The project would also regenerate around 1,135 ha of regrowth woodland to the east of the Isaac River.

I consider that project would ultimately restore connectivity values once the final landform is established, rehabilitation is complete and required offsets are delivered.

Wetlands

The project would disturb 120 ha of wetlands. The EIS assessment focuses on potential impacts on ten wetlands considered to be of high ecological significance (HES) within the project area. The project would remove 61 ha of HES wetlands.

Seven HES wetlands would be retained within or adjacent to the project footprint. The retained wetlands cover an area of 94 ha. The EIS provides a comprehensive assessment of indirect impacts on the wetlands which would not be disturbed. I am satisfied that impacts on the retained wetlands would be avoided or appropriately managed.

Despite avoiding and managing impacts on seven of the ten HES wetlands in the project area, I consider the disturbance of 61 ha of HES wetlands to be a significant residual impact for which offsets are required.

I note that the 61 ha of MSES wetlands to be removed for the project are of the palustrine (marshy) wetland habitat type. Based on the information in the EIS, the proponent's wider landholdings covering approximately 34,000 ha contain four HES wetlands of the palustrine wetland habitat type, including their buffers, totalling approximately 128.5 ha. The EIS concludes that there are sufficient areas of land supporting palustrine wetlands within those landholdings to provide an offset for the significant residual impact to MSES wetlands and I accept this conclusion. In addition, I note that the HES wetlands are considered habitat for the painted snipe, a bird species listed under the EPBC Act. Impacts on these wetlands will therefore be considered by the Commonwealth environment Minister as MNES.

Habitat for threatened species

A number of species considered to be threatened or of special significance under the *Nature Conservation Act 1992* were recorded at the project site which are not MNES and for which impacts require separate consideration.

Suitable habitat for the common death adder and short-beaked echidna is present within the project area and would be removed as a result of the project. The EIS appropriately considered potential impacts on these species and concluded that there would not be a significant residual impact on these matters and I accept this conclusion.

Air quality

Seven homesteads were identified as sensitive receptors for the project. The EIS found that with the implementation of mitigation measures, air quality values at each sensitive receptor location would be within the objectives specified in the Environmental Protection (Air) Policy 2008. To ensure air quality objectives are met, I have stated conditions which set limits for dust and particulate matter in the EA which must be complied with.

Measures to minimise coal dust emissions on the project's rail infrastructure include the automated loading of trains to prevent overloading, a veneering system which would spray

a sealant on top of the coal to prevent dust generation during transportation and water sprays at the train load-out facility. All mitigation measures would be consistent with the Aurizon Coal Dust Management Plan.

The EIS also assessed the potential cumulative air quality impacts from the project and surrounding mines and found that with the implementation of the proposed mitigation and management measures, the cumulative emissions would not exceed the air quality objectives at sensitive receptors.

I am satisfied that my stated EA conditions and the implementation of the proponent's commitments would ensure that the project's potential air quality impacts are appropriately managed.

Noise and vibration

The EIS considered the potential impacts of noise and vibration at the seven homesteads identified as sensitive receptors. The EIS found that noise levels from mining activity are predicted to meet guideline criteria and Environmental Protection (Noise) Policy 2008 (EPP(Noise)) limits during the day, evening and night time under normal weather conditions at all sensitive receptors.

I am satisfied that the EIS has adequately identified potential impacts from noise and vibration from mining activity, rail and road traffic. Noise and vibration levels are generally predicted to be lower than allowed by relevant policy and guidelines at all sensitive receptors during construction and operation. Where potential exceedances are predicted the proponent would implement additional noise mitigation measures or modify blasting techniques to ensure compliance with the EPP (Noise) and the EA conditions.

I am satisfied that my stated EA conditions and the implementation of the proponent's commitments would ensure that the project's potential noise and vibration impacts are appropriately managed.

Transport

The project would result in some increased traffic on local roads (Daunia and Annandale roads) and state-controlled roads, minor increases in the volume of rail traffic on the existing rail network and impacts on level crossings. To mitigate these impacts, the proponent will:

- work with the Department of Transport and Main Roads (DTMR) to determine whether monetary contributions for upgrades or other compensation would be required to offset the pavement impacts generated by the project
- implement an infrastructure agreement with the IRC to define the extent of local road infrastructure upgrades, timing and associated cost
- upgrade the intersection of Annandale Road and Peak Downs Highway prior to construction
- upgrade the intersection of Peak Downs Highway and Daunia Road to accommodate project traffic originating from Mackay by 2027.

The level crossing located on Daunia Road, approximately 6 km south of the Peak Downs Highway would be impacted by construction traffic. The proponent has committed to liaise

directly with Aurizon to determine upgrade requirements. This process will ensure the safety and efficiency of level crossings affected by the project.

I have recommended that the proponent provide an updated traffic impact assessment and a final road-use management plan six months prior to the commencement of construction for approval by DTMR to ensure that the impacts identified during the detailed design phase are known and can be suitably managed.

Hazard and risk

The EIS includes a risk assessment which considers potential risks to public safety, people and property that may be associated with the project. Key risks include flooding, leaks and spills, generation of additional traffic and management of worker fatigue.

The risk assessment found that, with appropriate controls, residual risk was generally low or reduced to as low as reasonably possible. I accept this conclusion.

The interaction of the project with emergency services is an important consideration and I note that the proponent has committed to working with the Queensland Ambulance Service in the development of emergency response procedures.

Waste

The proponent has identified the expected volumes of each potential waste stream for the project, developed management strategies and identified expected disposal locations in a draft waste management plan. The proponent has committed to manage the waste produced by the project in accordance with the waste and resource management hierarchy stipulated in the *Waste Reduction and Recycling Act 2011* and where waste must be disposed of, to do so in a way that prevents or minimises adverse effects on the environment.

Mining activities would result in stockpiles of waste rock and spoil which have the potential to release contaminants to the surrounding environment. I have stated a condition for the EA which requires the proponent to prepare a mineral waste management plan which establishes a framework for the management of waste rock and spoil, including regular sampling of waste materials and monitoring of surface water runoff.

I note the project would generate large volumes of general waste that may exceed the capacity of local waste facilities and that the proponent has committed to transporting waste outside the IRC if required. I expect the proponent commitments to be fully implemented.

The project would dispose of treated sewage to land. I have stated conditions for the EA to ensure there are adequate irrigation areas for the disposal of effluent and that the quality and quantity of water released to land is strictly controlled and environmental impacts are minimised.

Compliance with my stated conditions for the EA and implementation of the proponent's waste management plan and other commitments will ensure that the waste impacts of the project are appropriately managed.

Cultural heritage

The EIS described both non-indigenous cultural heritage values and Aboriginal cultural heritage values within the project area.

The EIS found fifteen sites of interest which were assessed for potential non-indigenous cultural heritage value. None of the identified sites were found to be significant. There is one grave site in the project area and the EIS includes recommendations for management which I consider to be appropriate.

The proponent has formed an Indigenous Land Use Agreement and a Cultural Heritage Management Plan (CHMP) with the Barada Barna People to manage the risk of harm to Aboriginal cultural heritage from project activities. The CHMP provides for the engagement of the Barada Barna Aboriginal Party prior to the commencement of any ground disturbance works, which allows for an assessment of the cultural heritage values within the proposed area of disturbance, and for the development of appropriate management strategies.

I am satisfied that the proposed management measures would ensure potential impacts on cultural heritage values are appropriately managed.

Economics

The project would have a positive contribution to the local, regional and state economies as a result of capital expenditure, royalties and increased employment. The impacts of the project on the local, regional and state economies from 2018-2050 were predicted using computable general equilibrium (CGE) modelling. The modelling found that by 2050, the project would contribute:

- \$8.0 billion to the local economy in the IRC LGA
- \$10.1 billion to the gross state product of Queensland, including \$1,117 million in royalties.
- Net production benefits of \$2,169 million
- Net social benefits of \$2,239 million

The project would generate substantial employment and is expected to have a peak operational workforce of approximately 1,300 onsite personnel from 2034 when peak coal output is reached. An average of 500 direct full-time equivalent jobs would be created during each year of construction.

I am satisfied that the EIS has adequately assessed the economic impacts of the project. I note the substantial benefits to the local, regional and state economies, particularly the creation of new jobs and the capital investment predicted to occur as a result of the project.

Social impact assessment

The project is likely to have impacts and provide opportunities for the nearby regional communities of Coppabella, Dysart, Middlemount, Moranbah and Nebo. These communities are within the IRC LGA, which provides key services and personnel to construct and operate mines in the Bowen Basin.

The project would require a substantial construction and operational workforce and has the potential to impact the local housing market and the provision of community facilities, social

services and infrastructure. The project also presents opportunities for local suppliers and local employment including increased workforce participation of people from traditionally underrepresented groups in the mining industry, including Indigenous people and women.

I have considered the scale and duration of the project's construction phase and the capacity of the local communities to provide workers for the project's construction workforce and determined that the project presents an opportunity for local employment during construction. The social impact assessment identified that there would be workers living locally with relevant skills who could be employed during construction. Therefore, I have decided that the 100 per cent FIFO prohibition and anti-discrimination provisions of the *Strong and Sustainable Resource Communities Act 2017* shall apply to the project's construction workforce.

I consider that the project presents opportunities for social benefits for the local communities in the IRC LGA through local employment and training, business and new residents.

I have set conditions in this report that seek to maximise social benefits by ensuring that:

- training and development programs enhance opportunities for Indigenous people and women to participate in the workforce
- ensure enough housing is available for construction and operation workers who wish to move to the IRC LGA with their families
- provide social services and facilities including childcare, schools and healthcare have enough capacity to cater for additional demand from new locals.

I note that potential impacts on housing affordability and availability and local healthcare services could occur when the ODS domain is still under construction and operation commences. To ensure that these are avoided, minimised or at least mitigated to acceptable levels, I have stated a condition requiring the proponent to prepare a social impact management plan (SIMP) for the construction and operational phases of the project to be submitted to me for approval two months before construction commences.

I note that there would be approximately nine years between the commencement of construction of ODS and Willunga domains. I require the proponent to prepare a social impact assessment, including an updated social impact management plan which specifically considers the construction of the Willunga domain.

I require the proponent to report to the Coordinator-General on the implementation and effectiveness of the SIMP annually during construction and for the first five years of operations for both the ODS and Willunga domains.

Matters of national environmental significance

The project is made up of four separate controlled actions, each requiring separate approval under the EPBC Act. The following subsections summarise my assessment of each action against the relevant controlling provisions.

The proponent was required to complete comprehensive field surveys to confirm the occurrence of MNES including threatened species. I note that agencies with an interest in biodiversity (including DEE) generally agreed that the survey effort undertaken by the proponent for listed threatened species was adequate.

Mine site and access road

Listed threatened species

A primary consideration of the mine design has been the minimisation of impacts on the Isaac River and a minimum buffer zone of 200 metres between the proposed mine pits and Isaac River has been adopted. This land would not be disturbed by mining activities and would be fenced and rehabilitated.

The mine access road would be co-located with existing public and private roads where practicable to reduce impacts on native vegetation. The access road would be restricted to 40 metres at the crossing point to reduce the impact on the riparian habitat.

The mine site and access road would result in the disturbance of 5,573 ha of remnant vegetation and 10,514 ha of land which has been previously cleared or disturbed but which continues to support habitat for species and communities listed under the EPBC Act.

I accept the EIS findings that the proposed clearing, which would be staged over the life of the project is not unacceptable given the extent of areas on the proposed mining leases which would remain undisturbed (around 9000 ha), and the commitment to maintain and rehabilitate vegetation in the riparian zone of the Isaac River, which supports the most intact areas of vegetation.

The proposed mine site and access road would however result in residual significant impacts on the Brigalow TEC (13 ha), koala (5,583 ha), greater glider (5,583 ha), squatter pigeon (5,610 ha), Australian painted snipe (120 ha) and ornamental snake (7,667 ha). Offsets will be required to compensate for these impacts.

The proponent is proposing a staged approach to the delivery of offsets and the EIS details the offsets for stage one of the project which would be delivered on a 6,065 ha parcel of land owned by the proponent to the east of the Isaac River. The offset requirements for future stages would be confirmed prior to clearing commencing for the relevant stage and I have recommended conditions for the Commonwealth Minister for the Environment to ensure that this occurs.

Migratory species

Listed migratory species are a controlling provision for the mine site and access road only. The EIS appropriately considered the impacts of the mine site and access road on migratory species and concluded that there would not be a residual significant impact on any migratory species. I accept this conclusion, noting that broader rehabilitation of areas disturbed by mining and the provision of offsets would benefit those migratory species that were found on the project site.

I am satisfied that the EIS has adequately identified the potential impacts that the proposed mine site and access road could have on listed migratory species. I am also satisfied that the potential impacts of the proposed mine site and access road on these matters are not unacceptable.

Water resources

My evaluation of potential impacts on a water resource as MNES includes surface water, ground water, watercourses and wetlands as well as the components and ecosystems that contribute to environmental values.

On 27 August 2018, I submitted to the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) a joint request for advice with the Department of the Environment and Energy on water matters for the project. The IESC provided its advice on 9 October 2018.

My conclusions in this section are based on an analysis of the EIS technical reports, IESC advice, advice from Australian and Queensland state government agency experts and key issues raised in public submissions.

Surface water

Release of mine affected water

The Isaac River is the main watercourse that crosses the project area. The primary tributaries of the Isaac River in the vicinity of the project area include North, Ripstone, Boomerang and Phillips Creeks. North, Boomerang and Phillips Creeks do not pass through the mine site.

Ripstone Creek, which runs west to east, intersects a proposed pit to the south-west of the main ODS pits and would be diverted to allow mining to proceed in this area. The proponent would construct a permanent stream diversion which replicates the hydrology of the existing creek.

Controlled releases from the project's water management system would occur to the Isaac River only when water quality and river flows meet the proposed release trigger levels. The EIS indicates that the proposed controlled release strategy would achieve the water quality objectives for the Isaac River sub-basin.

My stated conditions include release limits for mine affected waters including a requirement that waters released to the Isaac River do not exceed release limits for electrical conductivity, pH, turbidity and sulfate.

I have also stated a condition that requires the proponent to establish background water quality monitoring sites upstream and downstream of the proposed controlled release points on the Isaac River and prepare a receiving environment monitoring plan to monitor the condition of and potential impacts on receiving waters.

Collectively, my conditions would ensure that the release of mine affected waters is undertaken in a manner that protects the environmental values of the receiving environment. In addition, corrective action must be implemented should water quality impacts on the Isaac River and waterways downstream of the release points be detected.

Final voids

The final landform of the project would be designed to prevent flood waters from entering any of the final voids in events up to and including the probable maximum flood (PMF), including the construction of permanent highwall emplacements around final voids to ensure they are completely isolated from flood waters. To ensure adequate flood immunity,

I have stated a condition for the EA requiring that all final voids must be protected from flooding from nearby watercourses.

I accept the EIS findings that water from the final voids would not escape to the surrounding environment.

Groundwater

Impacts on groundwater

There are limited groundwater resources in the project area. Groundwater occurs within the alluvium at depths of around 10 to 20 metres below ground level. Water in sub-artesian aquifers is typically encountered at 10-17 metres below ground level in close proximity to the Isaac River and creeks, but outside these areas there is limited groundwater available.

The project would directly intercept groundwater from the Quaternary alluvium and sub-artesian aquifers and require an allocation of 623 million litres (ML) per year for the alluvium and 1,199 ML per year for sub-artesian aquifers. This would reduce to 146 ML per year for the alluvium and 183 ML per year for sub-artesian aquifers following mine closure primarily as a result of evaporation of the lakes that would form in the final voids.

My stated conditions require the proponent to develop and implement a groundwater monitoring program prior to the commencement of stage one mining operations. The program must be able to detect a change in groundwater quality values consistent with the current suitability of the groundwater for agricultural use. The proponent must develop and implement a groundwater monitoring program for stage two and later mining operations at least twelve months prior to the commencement of operations at the Willunga domain.

My conditions require that groundwater fluctuations of greater than two metres per year and exceedances of groundwater contaminant trigger levels for pH, electrical conductivity and metals are promptly investigated by the proponent and reported to the administering authority.

Impacts on groundwater users

The project could result in groundwater drawdown of greater than one metre at five privately owned bores, three of which are not in use. Of the two bores currently used, one would not be affected to the extent that it could not be used and the other, which the proponent has committed to deepen via a make-good agreement with the landholder, would recover to near pre-mining levels during the life of the project. I accept that the project would have limited impacts on groundwater users.

Groundwater dependent ecosystems

The EIS assessed the presence of potential groundwater dependent ecosystems (GDEs) within and surrounding the project area. I note that flora species that may use groundwater on a seasonal basis exist in the riparian corridors of the Isaac River and its tributaries. Stygofauna—invertebrates which live part or all of their lives in groundwater systems—were not recorded at the project site however may occur in areas adjacent to the Isaac River.

To ensure that any potential risks to GDEs are identified and managed, I have recommended a condition to the Commonwealth Minister for the Environment requiring the proponent to prepare and implement a GDE and wetland monitoring program which would

allow for the proponent to detect any potential adverse impacts on GDEs and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts. The recommended conditions require the Commonwealth Minister for the Environment to sign off on the program before stage one operations can commence.

Wetlands

There are no wetlands of national or international importance identified within the project area and broader locality. The project would disturb 120 ha of wetlands. The EIS focuses on potential impacts on ten wetlands considered to be HES within the project area.

Three HES wetlands would be removed by the project (with an area of 61 ha) and seven would remain either within areas of the proposed mining leases which are not disturbed by mining or are located outside the proposed lease areas. The retained wetlands cover an area of 94 ha. The EIS provides a comprehensive assessment of indirect impacts on the wetlands which would not be disturbed. I am satisfied that impacts on the retained wetlands would be avoided or appropriately managed.

I note that the proponent would be required to provide wetland habitat as an offset for residual significant impacts on the painted snipe. Offsets for the painted snipe, once delivered, would increase the areas of wetland habitat managed for conservation purposes in the locality and effectively ensure that there would be no net loss of wetlands in the locality.

To ensure that any potential risks to wetland health are managed, I have recommended a condition to the Commonwealth Minister for the Environment requiring the proponent to prepare and implement a GDE and wetland monitoring program which would allow for the proponent to detect and rectify potential adverse impacts GDEs and wetlands.

Flooding

The construction of temporary flood levees is required to provide immunity for mining infrastructure and operations to flood levels for a 0.1 per cent annual exceedance probability (AEP) flood event.

The EIS found that generally, flood characteristics would remain unchanged under the final landform compared to existing conditions. Flood modelling for the operation of the project for the 50 per cent, 2 per cent, 1 per cent, 0.1 per cent AEP flood events indicates that most peak flows in the Isaac River are likely to be unchanged by the project.

The establishment of permanent highwall emplacements would generally increase flow velocity in Isaac River. The proponent has committed to monitoring which includes topographic survey of Isaac River channel and floodplain, repeated every year for three years, and then either every five years, or after every flood event exceeding the 20 per cent AEP. This would enable intervention where adverse changes have been identified, for example, if erosion risks have increased.

Water pipeline

The water pipeline has been co-located within the rail corridor as far as possible (for a distance of 15 km from the mine site to the existing Norwich Park Branch to reduce native

vegetation clearance. All patches of TEC have been avoided and impacts on vegetation and habitat minimised by minimising the corridor for the water pipeline to 20 metres.

The EIS concluded that the proposed water pipeline would result in a residual significant impact on the koala and I consider that the clearing would also result in a significant impact on the ornamental snake. The EIS also found that the proposed water pipeline, in isolation, would not contribute to a residual significant impact on the greater glider, squatter pigeon or Australian painted snipe. I accept this conclusion.

To compensate for loss of habitat for all stages of the project, the proponent would provide offsets for impacts on the habitat of the greater glider, squatter pigeon, Australian painted snipe or ornamental snake which accounts for the habitat clearing on the water pipeline.

I am satisfied that the EIS has adequately identified the potential impacts that the proposed water pipeline could have on listed threatened species and communities. I am also satisfied that the potential impacts of the proposed water pipeline on these matters are not unacceptable.

Electricity transmission line

The proposed ETL would be located in an existing easement between the sub-station on Peak Downs Highway and the Norwich Park Branch rail, then follows Daunia Road and Annandale Road before heading south for 13 km across predominately cleared land to the MLA. The ETL would be restricted to a construction corridor of 10 metres.

The EIS concluded that the proposed ETL would result in a residual significant impact on the koala and I consider that the clearing would also result in a significant impact on the ornamental snake. The EIS also found that the proposed ETL, in isolation, would not contribute to a residual significant impact on the greater glider, squatter pigeon or Australian painted snipe. I accept this conclusion.

To address the cumulative impacts of all stages of the project, the proponent will provide offsets for impacts on the habitat of the greater glider, squatter pigeon, Australian painted snipe or ornamental snake which accounts for the habitat clearing on the ETL.

I am satisfied that the EIS has adequately identified the potential impacts that the proposed ETL could have on listed threatened species and communities. I am also satisfied that the potential impacts of the proposed ETL on these matters are not unacceptable.

Rail spur and loop

The final location of the rail spur would maintain a buffer zone of approximately 85 metres from the bank of the Isaac River at its closest point (affecting 1.5 km of the rail alignment). It has avoided all areas of TEC.

The EIS concluded that the proposed rail spur would result in a residual significant impact on the koala and I consider that the clearing would also result in a significant impact on the ornamental snake. The EIS also found that the proposed rail spur, in isolation, would not contribute to a residual significant impact on the greater glider, squatter pigeon or Australian painted snipe. I accept this conclusion.

To address the cumulative impacts of all stages of the project, the proponent will provide offsets for impacts on the habitat of the greater glider, squatter pigeon, Australian painted snipe or ornamental snake which accounts for the habitat clearing on the rail spur.

I note that, in relation to the project's potential impacts on a water resource my stated conditions for the project's EA are an important consideration for the Commonwealth Minister for the Environment. Although established under the Queensland regulatory framework, the relevant conditions relate to the monitoring and management of surface water, groundwater and associated ecological values and these are discussed in the following sections where relevant.

I am satisfied that the EIS has adequately identified the potential impacts that the rail spur and loop could have and listed threatened species and communities. I am also satisfied that the impacts of the rail spur and loop on these matters are not unacceptable.

Offsets for MNES

The proponent has proposed a biodiversity offset strategy for the project, which identifies three proponent-owned properties located on the eastern side of the Isaac River as biodiversity offset sites for the project. The land includes the Twenty Mile, Iffley and Deverill properties, with a total combined area of approximately 34,000 ha. The proposed offset properties occur within the same subregion and catchment as the project and would provide suitable habitat for offsets.

The proponent is proposing a staged approach to the delivery of offsets and the EIS details the offsets for stage one of the project which would be delivered on a 6,065 ha parcel of land owned by the proponent to the east of the Isaac River.

The offset requirements for future stages would be confirmed prior to clearing commencing for the relevant stage and I have recommended conditions for the Commonwealth Minister for the Environment to ensure that this occurs.

I am satisfied that the offsets proposed by the proponent for stage one of the project, which includes the construction of the water pipeline, ETL, rail spur and loop and approximately the first five years of the mine site and access road development would compensate for the residual adverse impacts of the proposed actions. I am also satisfied that offsets for future stages of the project could be accommodated by the proponent's landholdings in the locality.

Coordinator-General's conclusion

This report has evaluated the EIS documentation, agency advice, and other material relevant to the project.

I consider that the EIS requirements of the SDPWO and SSRC Acts for the project have been met and that sufficient information has been provided to enable an evaluation of the impacts of the project.

I conclude that there are significant local, regional and state benefits to be derived from the Olive Downs project, and that any negative environmental effects can be adequately avoided, minimised, mitigated or offset as required through the implementation of the measures outlined in the EIS documentation. The conditions I have specified in this report

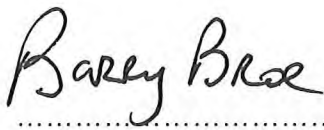
have been formulated to ensure all potential impacts associated with the project can be adequately managed. I also require the proponent's commitments to be fully implemented.

Accordingly, I approve the project, subject to conditions included in this report.

This report will lapse 4 years after the day this report is publicly notified.

A copy of this report will be provided to the proponent and relevant state government agencies and will also be made publicly available at:

www.dsdmip.qld.gov.au/olivedowns.



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Barry Broe
Coordinator-General

13 May 2019

1. Introduction

This report has been prepared pursuant to section 34D of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the environmental impact statement (EIS) for the Olive Downs project (the project).

This report does not record all the matters that were identified and subsequently addressed during the assessment. Rather, it concentrates on the substantive issues identified during the EIS process and the measures and conditions required to address the impacts. The report:

- summarises the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional state and national levels
- presents an evaluation of the project, based on information contained in the EIS, submissions made on the draft EIS as well as information and advice from advisory agencies and other relevant authorities
- and states conditions and makes recommendations under which the project may proceed
- documents the proponent's commitments.

2. About the project

2.1 The proponent

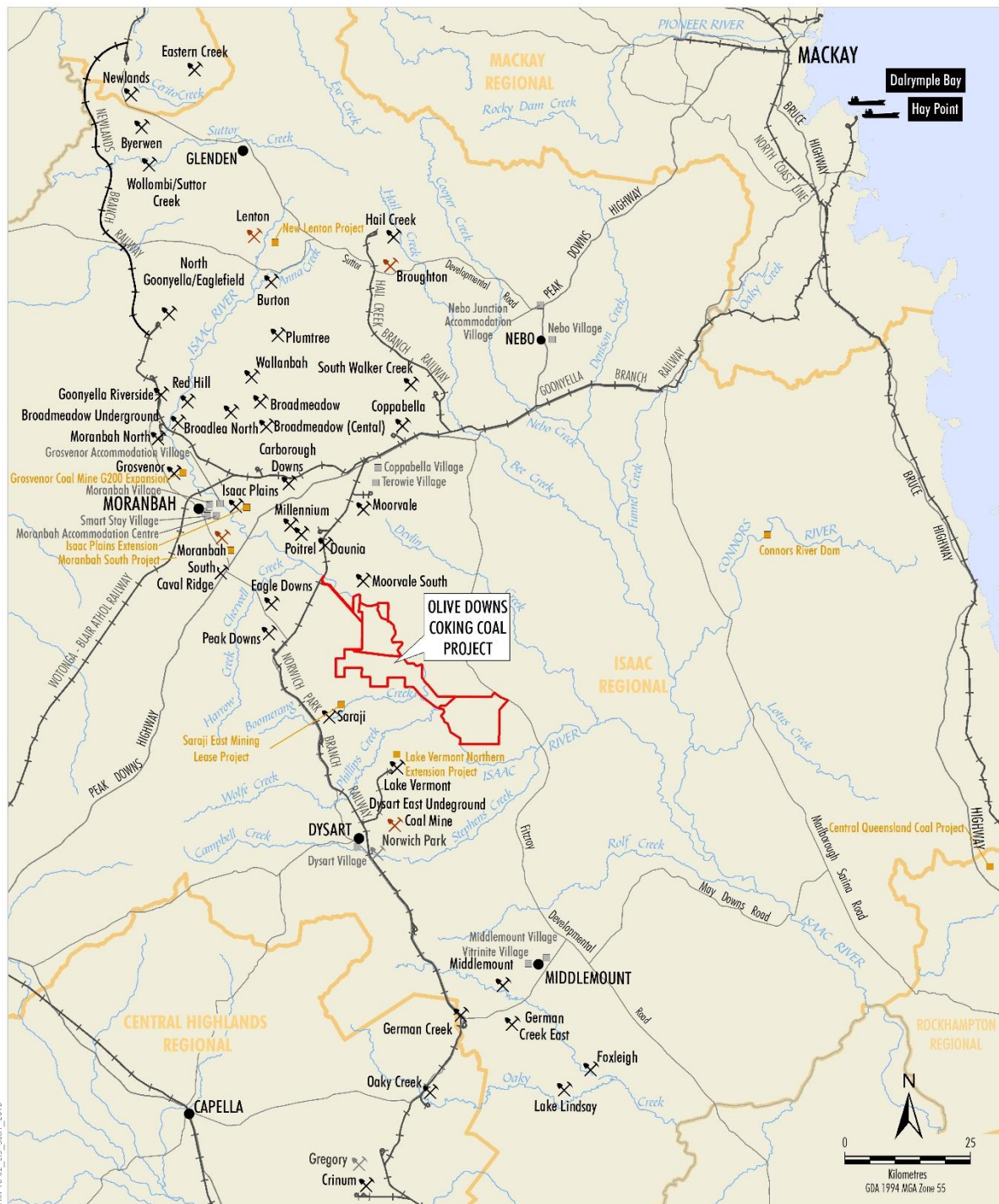
The proponent for the project is Pembroke Olive Downs Pty Ltd (the proponent) (ABN 53 611 674 376), as a wholly owned subsidiary of Pembroke Resources Nominee Pty Ltd (Pembroke).

Pembroke is a private Australian-based company, focused on the acquisition and development of high quality metallurgical coal assets. Pembroke is backed by leading resources and energy-focused global private equity firm Denham Capital.

2.2 Project location

The project is located approximately 40 kilometres (km) south-east of Moranbah, within the Isaac Regional Council (IRC) local government area. The EIS confirms the project to be located on a 16,300 hectare (ha) site in the Bowen Basin, within mining lease application (MLA) areas held by the proponent (MLA 700032, MLA 700033, MLA 300034, MLA 700035 and MLA 700036) and pipeline and electricity transmission line (ETL) corridors location outside of the project MLA area (Figure 2.1).

The Isaac River is the main watercourse traversing the project, flowing in a north-west to south-east direction and bisecting the Olive Downs South (ODS) and Willunga mining domains, with the ODS domain located to the west/south of the Isaac River, and the Willunga domain on the east.

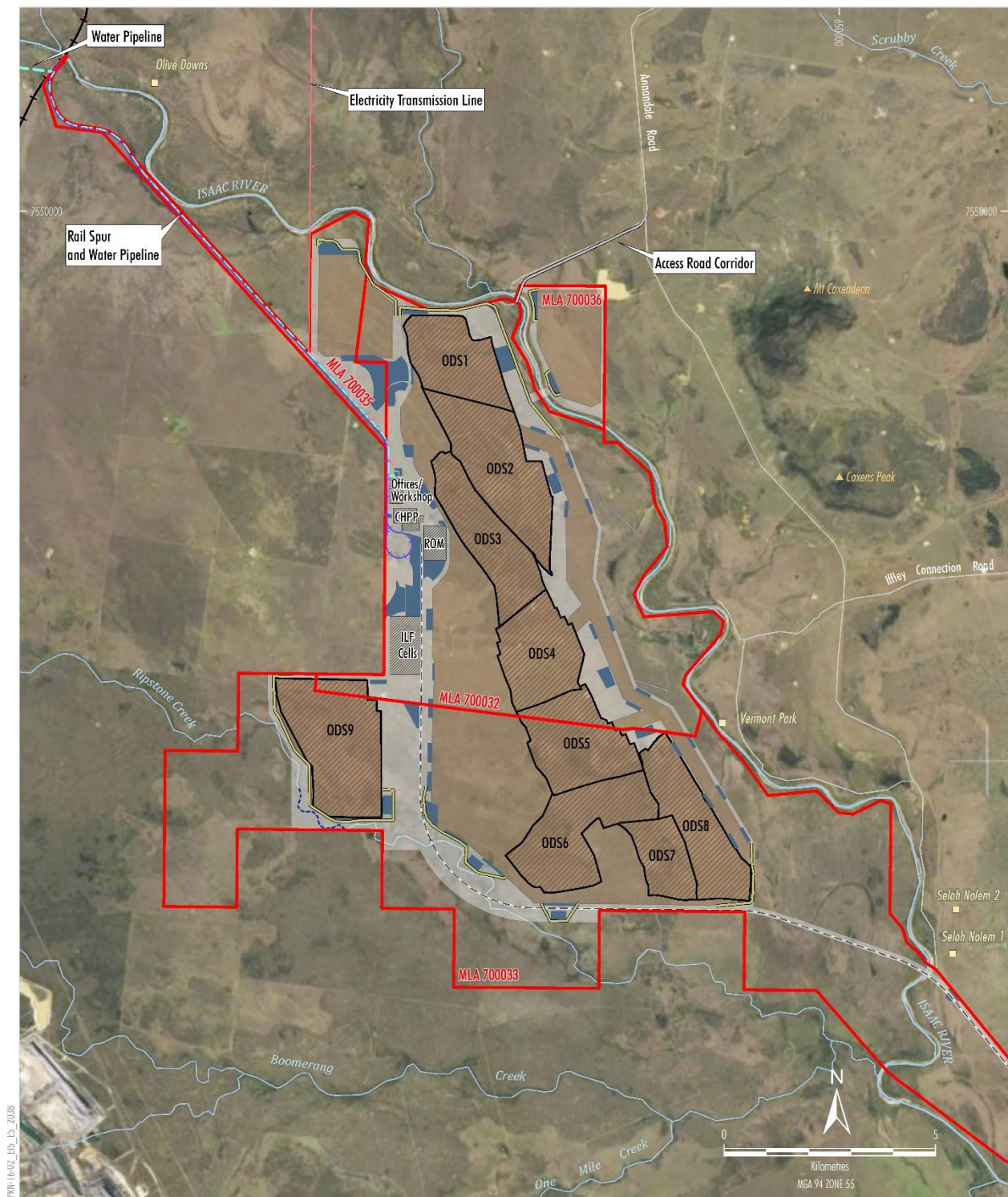


- LEGEND**
- Mining Lease Application Boundary
 - Local Government Area
 - Major Road
 - Railway
 - Port
 - Approved/Operating Coal Mine
 - Proposed Coal Mine
 - Under Care and Maintenance
 - Workforce Accommodation Facility
 - Coordinated, Major and Other Relevant Project

Source: Geoscience Australia - Topographical Data 250K (2006);
Department of Natural Resources and Mines (2016)



OLIVE DOWNS COKING COAL PROJECT Regional Location



PMB-10472_15_2018

- LEGEND**
- Mining Lease Application Boundary
 - Railway
 - Dwelling
 - Proposed Access Road
 - Proposed Electricity Transmission Line
 - Proposed Rail Spur and Loop
 - Proposed Water Pipeline
 - Proposed Creek Diversion
 - Open Cut Pit Extent (and Pit Numbering)
 - Out-of-Pit and In-Pit Waste Rock Emplacement
 - Infrastructure Area

- Key Infrastructure Component
- Water Storage
- Temporary Levee
- Overland Conveyor

Source: Geoscience Australia - Topographical Data 250K (2006)
Department of Natural Resources and Mines (2016)
Orthophotography: Google Image (2016)



OLIVE DOWNS COKING COAL PROJECT
General Arrangement -
Olive Downs South Domain

Figure 2.2 Olive Downs South domain development stages and general arrangement

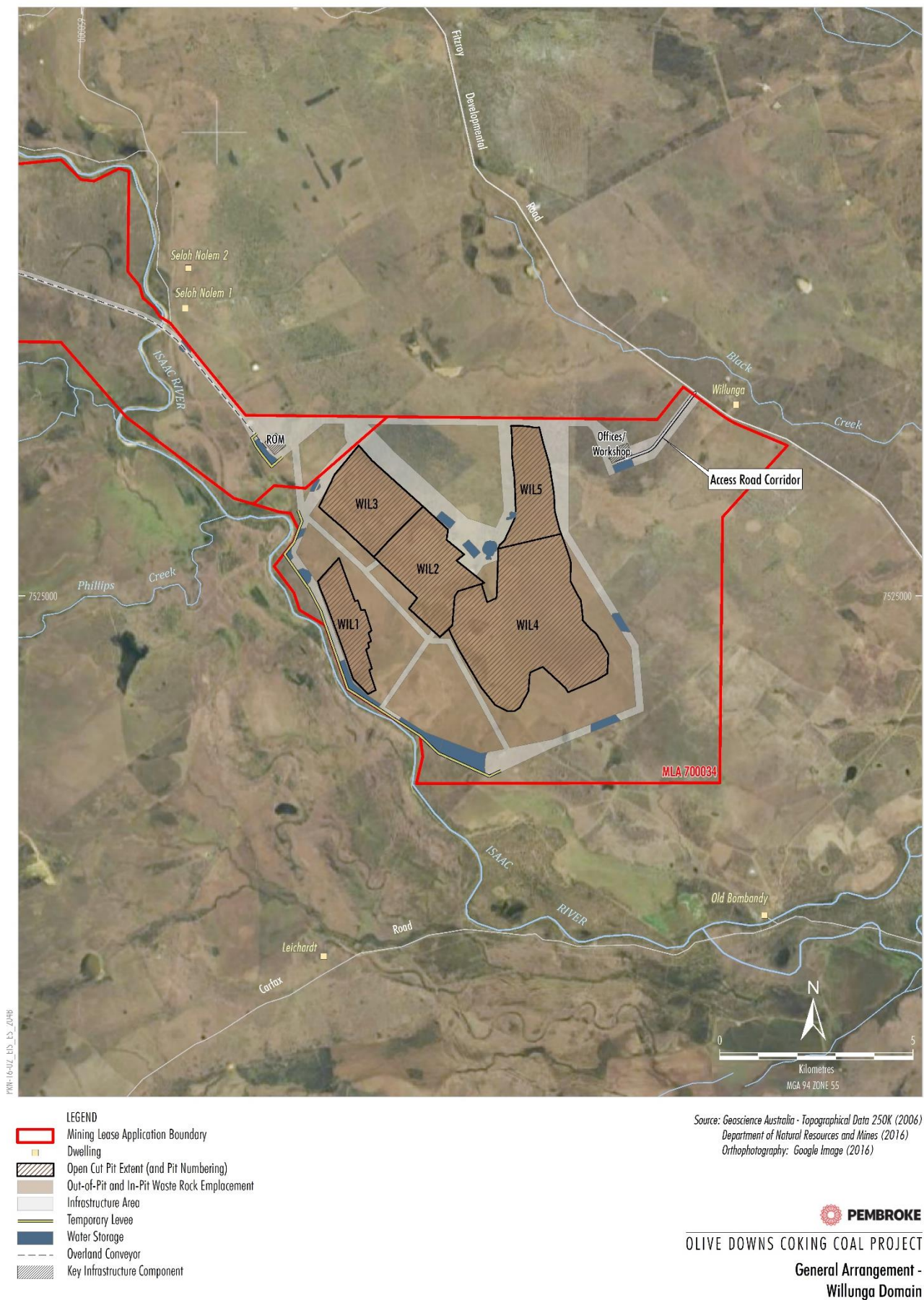


Figure 2.3 Willunga domain development stages and general arrangement

2.3 Project description

The project includes the staged development and operation of an open cut metallurgical coal mine, comprising two mining domains; namely the Olive Downs South (ODS) domain and Willunga domain.

The project would also include:

- installation of a raw water supply pipeline connecting the project to the existing Eungella pipeline network. Part of the water pipeline would be located outside of the mining lease applications for the project.
- construction of a 66 kilovolt (kV) ETL from the existing Broadlea Substation to the ODS domain; and an on-site switching/substation within the ODS domain
- construction of a new rail loop and 19 km rail spur connecting to the Norwich Park Branch Railway and rail loadout facility, including product coal stockpiles at the ODS domain for rail transport
- construction of a 3.5 km access road from Annandale Road to the ODS domain (which includes a crossing of the Isaac River) and a second access road from the Fitzroy Developmental Road to the Willunga infrastructure area
- wastewater and sewage treatment plants.

The proposed mining lease applications for the project include mining lease area (MLA) 700032, MLA 700033, MLA 700034, MLA 700035 and MLA 700036, consisting of three mining leases and two specific purpose mining leases. The project's lease applications total an area of approximately 250 km², representing approximately 1 per cent and 0.2 per cent of the Isaac-Connors and Fitzroy River catchment areas respectively.

The approximate extent of the open cut mining area and associated waste rock emplacements and infrastructure areas would be 16,300 ha. The mine is expected to deliver up to 15 million tonnes (Mt) of product coal per annum for overseas export over an anticipated operational life of 79 years. The coal resource would be mined by conventional open cut mining methods, with product coal intended to be transported by rail to the Dalrymple Bay Coal Terminal located 38 km south of Mackay.

2.3.1 Development stages

Construction

The proposed timeframes identified in the EIS for each stage of the project are summarised in Table 2.1.

Table 2.1 Stages 1 to 4 disturbance extent

Stage	Approximate years	Approximate disturbance extent (ha)	Percentage of overall project impact
Stage 1	2019 – 2024	1755	11 per cent
Stage 2	2025 – 2030	4250	26 per cent

Stage	Approximate years	Approximate disturbance extent (ha)	Percentage of overall project impact
Stage 3	2031 – 2050	7435	45 per cent
Stage 4	2051 – end of mine	2860	18 per cent

The first phase of construction activities, including early works, are anticipated to commence approximately 18 months to two years prior to operations. Construction works are proposed to commence as soon as the relevant planning and environmental approvals, environmental authority (EA) and mining lease tenements are granted.

Early works would focus on establishing operations at the ODS domain and would include the construction of the:

- raw water pipeline connecting to the Eungella network
- rail spur and loop
- ETL and switching/ substation
- ODS mine infrastructure area (MIA)
- access road from Annandale Road to the MIA and facilities (including a crossing of the Isaac River) and associated car parking and site security
- explosives magazine
- temporary flood protection levees
- coal handling and processing plant (CHPP) and associated coal handling infrastructure
- dry weather road crossing of the Isaac River to provide access to the eastern out-of-pit waste rock emplacement area
- initial rejects storing facilities and in-line flocculation (ILF) cells for storage and disposal of CHPP rejects
- rail loadout facility including product coal stockpile areas
- water management infrastructure (including up-catchment diversions, sediment dams and water storage dams)
- widening and upgrading Daunia Road and Annandale Road.

The dry weather haul road crossing to the eastern waste rock emplacement area would only be used when there is no flow in the Isaac River; when there is flow in the Isaac River, waste rock would be placed on the western side. The dry weather haul road would be decommissioned and rehabilitated following completion of construction and rehabilitation of the waste rock emplacement on the eastern side of the Isaac River.

The second phase of construction activities would occur after approximately 10 years to allow the full development rate at the ODS domain to be achieved. This would involve expansion of the CHPP, workshops and the ILF cells.

The third phase of construction activities would be undertaken within the Willunga domain approximately 12 months in advance of the planned commencement of operations. This would follow the establishment of operations at the full development rate at the ODS domain, and this would include the construction of:

- the access road from the Fitzroy Developmental Road to the Willunga domain MIA and associated car parking and security
- the Willunga MIA
- overland conveyor to transfer crushed run of mine (ROM) coal to the ODS domain CHPP
- explosive magazine
- temporary flood protection levees
- on-site ROM coal handling and crushing facilities
- expansion of the ODS domain coal processing facilities to process Willunga ROM coal
- crossings of the Isaac River between the ODS and Willunga domains for direct vehicular access and ancillary infrastructure (water pipeline, electricity supply, communications, overland conveyor)
- progressive construction of water management infrastructure (including up-catchment diversions, sediment dams and water storage dams).

At the completion of Stage 3 construction program, the project infrastructure would be capable of delivery of up to 20 Mt per annum (Mtpa) of run-of-mine coal, and up to 15 Mtpa of product coal.

Operations

The proposed operations schedule for the project would occur over approximately seven stages, as summarised in Table 2.2.

Table 2.2 Indicative mine operation schedule

Stage	Approximate years	Product coal (Mtpa)
Stage 1	2020 – 2030	0.8 – 4.5
Stage 2	2031 – 2040	7.8 – 15
Stage 3	2041 – 2050	10.2 – 15
Stage 4	2051 – 2060	4.9 – 8.4
Stage 5	2061 – 2072	0.7 – 5.3
Stage 6	2073 – 2085	1.2 – 2.6
Stage 7	2086 – 2098	0.3 – 1.4

Decommissioning

The EIS indicates that, following the completion of mining activities, all project infrastructure would be assessed on an individual basis for removal or to be retained for future land owners. Both the water pipeline and ETL would be decommissioned and rehabilitated within two years of the completion of mining operations, if it is determined that they are not to be retained.

Rehabilitation

Following disturbance, the proponent would progressively rehabilitate disturbed areas, including the proposed levees and waste rock emplacement areas. Over 90 per cent of the project site would be restored to support grazing or native vegetation. Three final voids are proposed to remain within the landscape, with all other voids to be progressively backfilled as mining progresses. Vegetation would be established as soon as practicable over disturbed areas.

A rehabilitation strategy for the project has been prepared as part of the EIS, detailing the rehabilitation goals, objectives, performance criteria and completion criteria for the project. The overarching rehabilitation goal for the project is to create a post-mining landform that is safe, non-polluting, stable and able to sustain a post-mining land use. The EIS has indicated that the preferred post-mining land use for the project is to reinstate land that would be suitable for cattle grazing and fauna habitat, which is consistent with the current land use of the project site.

Key features of the proposed final landform include permanent highwall emplacements, formed from waste rock material removed during the mining process. The permanent highwall emplacements would be developed progressively during the mine life and would generally be 300 metres to 400 metres wide and approximately 25 metres high. The highwall emplacements would isolate the mining operation from the Isaac River floodplain and provide immunity to flood levels up to a probable maximum flood event, which is estimated to be approximately 6 metres high in the vicinity of the proposed permanent highwall emplacements.

2.3.2 Project components

Mine site and access road

The main mining activities include open cut mining operations using conventional mining equipment including excavators, dozers, front end loaders and trucks. Over the life of the mine, the ODS domain would include nine active mining areas, while the Willunga domain would include five.

Mining operations would generally occur 24 hours per day, seven days per week, however mining operations in the ODS7 and ODS8 pits would be conducted during daytime hours only to minimise air quality and noise impacts at nearby sensitive receptors, the closest of which include Seloh Nolem 1 (0.7 km north-east from closest project component), Vermont Park (0.8 km east) and Seloh Nolem 2 (1.2 km north-east). The remaining homesteads are located between 3.4 km and 6 km from the project.

Drilling and blasting activities are proposed for fragmentation of waste rock. Commercial products would be used, with the principal blasting agent being ammonium nitrate fuel oil, only to be conducted during the daytime.

The mine infrastructure area at the ODS domain would include:

- administration buildings, a covered muster area and bathhouse
- CHPP
- ILF cells facilities
- rail loadout facility and rail loop
- maintenance facilities, fenced store yard, heavy vehicle wash down bay, fuel and lubricant facility
- potable water treatment plant
- sewage treatments plant and effluent disposal areas.

The mine infrastructure area at the Willunga domain would include:

- administration buildings
- maintenance facilities
- potable water treatment plant
- sewage treatment plant and effluent disposal areas.

The mine would target the Leichardt and Vermont seams of the Rangel Coal Measures as the principal economic coal resources in the ODS and Willunga domain. The EIS anticipates that the ODS coal seams would deliver a high rank, low volatile coking coal product with a Joint Ore Reserve Committee (JORC) resource of 460 Mt. The Willunga domain is expected deliver a low volatile pulverised coal injection product with a JORC resource of 353 Mt.

A 3.5 km long access road from Annandale Road to the ODS domain infrastructure area is also proposed, which would be co-located with existing public and private roads as much as possible to reduce impacts on native vegetation. The EIS indicates that the access road would be limited to a 40-metre-wide corridor where it would cross the Isaac River to reduce impacts on riparian vegetation. A local access road from the Fitzroy Developmental Road to the Willunga domain infrastructure facilities would also be provided, although would not cross the Isaac River.

The mine site and access road would also include the construction of a 14 km long overland conveyor (in place of a haul road) over the Isaac River to connect the Willunga domain to the CHPP located within the ODS domain. A conveyor is proposed within a 180-metre-wide corridor. The width of the corridor will be limited to 45 metres within 200 metres of the Isaac River to reduce impacts on riparian vegetation. However, based on mapping provided in the EIS, the conveyor itself would span approximately 3 metres; the actual clearance for the conveyor and any associated access tracks is likely to be a fraction of the total 180 metre corridor.

A water pipeline would also be installed between the ODS domain MIA and the ROM coal handling and crushing facilities at the Willunga domain for provision of makeup water supply, where demands for dust suppression water are unable to be met locally by on-site recycled water collected within the mine water management system.

A haul road crossing providing access to the waste emplacement at Deverill (located on the eastern side of the Isaac River) from the ODS domain would be located approximately 2 km south-south east of the Annandale Road access road where it crosses the Isaac River. The haul road crossing would be restricted to a corridor of 60 metres, although the haul road itself is likely to require clearing of a fraction of the total corridor width.

The establishment of the proposed ODS9 pit and associated flood levees would impact on approximately 1.375 km of the existing Ripstone Creek waterway, necessitating a waterway diversion of 1.88 km in length.

Water pipeline

A raw (external supply) water pipeline would be constructed during Stage 1 of the project to supply up to 500 megalitres of raw water each year over the construction period, and the initial establishment of operations. The pipeline would connect the project to the existing southern extension of the Eungella water pipeline network, which runs generally north-south approximately 15 km west of the project between Moranbah and Dysart.

The water pipeline would be approximately 23 km long, with a total disturbance footprint of approximately 57 ha. The pipeline would be located underground, where during construction the pipeline trench would be progressively excavated ahead of the pipe laying activities.

Approximately 15 km of the pipeline would be co-located with the rail spur and loop, meaning that the remaining 8 km section of the pipeline would require additional vegetation clearance. All patches of brigalow TEC located within the pipeline corridor have been avoided and impacts on 'Endangered' and 'Of Concern' REs have been reduced where possible by minimising the water pipeline corridor to 20 metres.

The water pipeline would require two crossings of palustrine wetlands associated with the Isaac River. As the water pipeline alignment would avoid crossing the Isaac River, no riparian vegetation associated with the Isaac River would be removed. Based on the mapping provided in the EIS, the section of the water pipeline that would be constructed outside of the mining lease application area boundary would require one crossing of Cherwell Creek.

To avoid impacts on Cherwell Creek, the pipeline crossing would be constructed using horizontal directional drilling, rather than excavating a trench and laying the pipeline through the watercourse itself. Where crossings of drainage lines are required for the water pipeline, crossings would be achieved by excavating below the invert of the drainage line to lay the pipeline at least 0.8 metres below the base of the drainage line.

Until such time as pipeline is commissioned, water demands for construction and the initial establishment of operations may be met by:

- capture of incident rainfall and runoff within the mine water management system (stormwater and mine affected water)
- capture of overland flow (up-catchment water) in dams once constructed.

The water pipeline would remain operational for the life of the project, though may not necessarily be required, and would be decommissioned and rehabilitated within two years of the completion of mining operations.

Electricity transmission line

A 66-kV electricity transmission line (ETL) and switching/substation would be constructed to connect the project to the existing regional power network at the Broadlea Substation located to the north of the project.

The ETL would be constructed during Stage 1 of the project, and would be approximately 42 km long, restricted to a construction corridor of 10 metres. The total disturbance area for the ETL would be 42 ha and would consist of towers spaced approximately 200 metres apart.

The disturbance for the ETL would predominantly include slashing of groundcover and trimming woody vegetation, where required. Based on the mapping provided in the EIS, the ETL would require one crossing of the Isaac River and two crossings of North Creek.

During operations, the estimated operational electricity load for the ETL is 38 megawatts (MW). Power supply would be required by the MIA facilities, CHPP and associated coal handling facilities and the rail loadout facilities.

The ETL would remain operational for the life of the project. Should it be determined that the ETL is not to be retained onsite, it would be decommissioned, and the associated land rehabilitated within two years of the completion of mining operations.

Rail spur and loop

The proposed rail spur and loop would be constructed during Stage 1 of the project from the western boundary of the ODS domain, connecting to the existing Norwich Park Branch Railway which connects to the main line between the Red Mountain (down-line and Winchester (up-line) railway stops. The proposed rail spur and loop would be approximately 19 km in length, with a construction corridor of approximately 20 metres and a total disturbance footprint of approximately 103.5 ha. New culvert crossings would be installed along the rail spur to the ODS domain.

Although the final location of the rail spur and loop is subject to detailed design, the rail loop would be constructed adjacent to the proposed rail-loadout facility at the ODS domain. This would avoid existing mining lease areas and voids to the south and would be designed for two train capacity.

The track and formation levels would be designed to achieve a 1 per cent AEP flood immunity (or 1 in 100 chance of being exceeded in any year), or otherwise match the existing main line level of immunity. Diversion channels and supplemental earthworks would be undertaken, if required, to protect the alignment and control flood behaviour.

The rail spur and loop would be wholly located within the mining lease application areas for the project. It has been co-located with the water pipeline to minimise impacts on native vegetation, and the final location of the rail spur would maintain a buffer of approximately 85 metres to the bank of the Isaac River at its closest point. The rail spur has avoided all areas of the brigalow TEC and would avoid most 'endangered' REs, with the exception of waterway crossings. The rail spur and loop would also require two crossings of palustrine wetlands associated with the Isaac River, however would not require any waterway crossings within the mining lease application area boundary.

Product coal would be transported via rail to the Dalrymple Bay Coal Terminal located south-east of Mackay. The EIS estimates that up to approximately 15 Mt per annum

(Mtpa) of product coal would be transported by rail to the port for export. The rail spur and loop would remain operational for the duration of the project. Should the rail spur and loop not be retained onsite, the infrastructure would be decommissioned, and the associated land rehabilitated within 2 years of the completion of mining operations.

2.3.3 Dependencies and relationships with other projects

The development of the project may assist the future development of adjacent coal resources by improving accessibility to services and infrastructure (e.g. through the development of the project rail spur, water pipeline and ETL). Further, development of the project would also improve access to the currently undeveloped coal resources between the Lake Vermont mine and the project site. Development of the project would not sterilise any coal resources that would otherwise be accessed by other mining operations.

3. Environmental impact statement assessment process

In undertaking this evaluation, I have considered information including:

- the initial advice statement (IAS)
- the environmental impact statement (EIS) and technical reports
- issues raised in submissions on the draft EIS
- revised draft EIS and technical reports
- issues raised in submissions on the revised draft EIS (amended EIS (AEIS))
- advice from the proponent
- advisory agency advice throughout the EIS process from:
 - Commonwealth Department of the Environment and Energy (DEE)
 - Department of Environment and Science (DES)
 - Department of Natural Resources, Mines and Energy (DNRME)
 - Department of Transport and Main Roads (DTMR)
 - Department of Agriculture and Fisheries (DAF)
 - Queensland Health
 - Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP)
 - Queensland Ambulance Service (QAS)
- advice from Isaac Regional Council (IRC)
- advice from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC).

The steps taken in the project's EIS process are documented on the project's webpage at www.dsdmip.qld.gov.au/olivedowns

3.1 Coordinated project declaration

On 17 February 2017, I declared this project to be a 'coordinated project' under section 26(1)(a) of the SDPWO Act. This declaration initiated the statutory environmental impact evaluation procedure of Part 4 of the SDPWO Act, which required the proponent to prepare an EIS for the project.

3.2 Commonwealth assessment

On 3 March 2017, the then Commonwealth Minister for the Environment determined that the project is a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The relevant controlling provisions for the project under the EPBC Act are:

- EPBC 2017/7867 – mine site and access road
 - listed threatened species and communities (sections 18 and 18A)
 - listed migratory species (sections 20 and 20A)
 - a water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
- EPBC 2017/7868 – water pipeline
 - listed threatened species and communities (sections 18 and 18A)
- EPBC 2017/7869 – electricity transmission line
 - listed threatened species and communities (sections 18 and 18A)
- EPBC 2017/7870 – rail spur
 - listed threatened species and communities (sections 18 and 18A)

The then Commonwealth Minister for Environment also determined that the project should be assessed under the Queensland Assessment Bilateral Agreement (the agreement). Under the agreement (made under section 45 of the EPBC Act), if a controlled action is a 'coordinated project for which an EIS is required' under the SDPWO Act, certain types of projects do not require assessment under Part 8 of the EPBC Act. The agreement enables the EIS to meet the impact assessment requirements of both Commonwealth and Queensland legislation.

In section 7, matters of national environmental significance (MNES), of this evaluation report lists each controlling provision under the EPBC Act and explains the extent to which the relevant Queensland Government's EIS process addresses the actual or likely impacts of the project on the matters covered by each controlling provision.

After a copy of my evaluation report is provided to the Australian Government, a decision on the controlled action under section 133 of the EPBC Act will be made by the Commonwealth Minister for Environment or the delegate. The Minister will use the information in section 7—MNES to decide whether the project should proceed, and if so, whether any additional conditions, beyond those I have recommended in this report, will be applied to manage the impacts on MNES.

3.3 Terms of reference

The draft terms of reference (TOR) for the EIS for the project were released for public and advisory agency comment from 8 April to 12 May 2017. Comments were received from 15 submitters, comprised of 13 advisory agencies, one local government and one from the proponent.

The final TOR, having regard to comments received, were issued to the proponent on 28 June 2017.

3.4 Referral to the Independent Expert Scientific Committee

Queensland is a signatory to the Council of Australian Governments (COAG) National Partnership Agreement (NPA) on Coal Seam Gas and Large Coal Mining Development. The NPA requires coal seam gas or large coal mining development proposals undergoing environmental impact assessment and that are likely to have a significant impact on water resources to be referred to the IESC.

In accordance with section 131AB of the EPBC Act, on 27 August 2018, I submitted to the IESC a joint request for advice with DEE on water matters for the project. The IESC provided its advice on 9 October 2018.

The IESC advice has informed my evaluation of the project and is discussed in section 7 of this report.

3.5 Review of the draft EIS

The draft EIS, prepared by the proponent, was released for public and agency comment from 10 September to 10 October 2018. A total of 37 submissions were received, including a submission from DEE. Of these, 15 were from private individuals, 12 were from organisations and 10 were from local, state or Commonwealth advisory agencies. No submissions were received from environmental or other community interest groups. Twenty-four submissions were received in favour of the project.

The most prominent issues raised in submissions on the draft EIS included:

- the project's compliance with the Queensland Government's Mined Land Rehabilitation Policy, particularly in relation to the rehabilitation of mining areas to a safe and stable post-mining land use
- potential impacts on groundwater and surface water resources, including potential impacts on the Isaac River, wetlands, groundwater dependent ecosystems (GDEs) and cumulative hydrological impacts
- a requirement for further information describing the environmental values of the Isaac River to allow the development of site-specific water quality objectives and release limits for the project's environmental authority
- clarification of impacts on species listed under the EPBC Act including the quantification of significant residual impacts

- the adequacy of the proponent's proposed offset strategy, particularly as it relates to offset requirements beyond Stage 1 of project
- potential impacts to nearby sensitive receptors from activity generating noise, vibration and air emissions
- two mining companies with neighbouring mines raised concerns around project impacts including land tenure conflicts and cumulative impacts such as impacts on flood behaviour
- potential social impacts including impacts on the local housing market and impacts on local childcare and healthcare services and accommodation
- a requirement for further information describing the proposed housing strategy
- the adequacy of proposed training and employment targets for Aboriginal and Torres Strait Islander peoples
- potential impacts on the capacity of local government waste facilities
- potential impacts on local roads and traffic.

3.6 Additional information to the EIS

On 12 December 2018, in accordance with section 34B of the SDPWO Act, I requested the proponent submit additional information responding to submissions received on the draft EIS. On 21 March 2019, the proponent lodged the final revised draft EIS containing additional information to address the matters raised in submissions on the draft EIS and the additional information I requested. This included detailed responses to specific issues raised in submissions.

The revised draft EIS included:

- a response on the project's compliance with the Queensland Government's Mined Land Rehabilitation Policy and more detail on the proposed mine rehabilitation strategy, including progressive rehabilitation requirements
- a more integrated assessment of the project's impacts on GDEs
- more detail on the project's impacts and proposed measures to address impacts on matters of national environmental significance and matters of state environmental significance including more information to support the draft Biodiversity Offset Strategy for the project
- amendments to the proponents proposed draft environmental authority conditions including specific water quality release limits for mine water discharges
- further assessment of potential project impacts on neighbouring mines and properties, including land tenure conflicts and cumulative impacts such as flooding
- more detail relating to the proposed diversion of Ripstone Creek including justification for the diversion
- potential social impacts of the project, including impacts on local housing and accommodation and health and wellbeing
- the project's impacts on local roads and traffic and waste disposal arrangements
- further justification for the proposed siting of linear infrastructure for the project
- an updated list of proponent commitments.

The revised draft EIS also includes a stand-alone response to the IESC advice which was received on 9 October 2018. The stand-alone response includes additional information on the project's potential impacts on groundwater and surface water resources, including potential impacts on the Isaac River, wetlands, GDEs and cumulative hydrological impacts.

3.7 Review of the revised draft EIS

On 9 April 2019, I approved the release of the revised draft EIS for consultation with agencies and landholders until 10 May 2019. A total of 9 submissions were received including 8 from local, state and Commonwealth advisory agencies and 1 from private individuals. I have considered all submissions made on the draft EIS and the revised draft EIS in my evaluation report.

3.8 Large resource project under the *Strong and Sustainable Resource Communities Act 2017*

The intention of the *Strong and Sustainable Resource Communities Act 2017* (SSRC Act) is to ensure that residents of communities in the vicinity of large resource projects benefit from the construction and operation of the projects. The Olive Downs project is a large resource project under the SSRC Act as it is a resource project that requires an EIS under the SDPWO Act.

Under the SSRC Act, large resource projects that are published on the list of large resource projects on the Department of State Development, Manufacturing, Infrastructure and Planning's (DSDMIP) website are prohibited from hiring a 100 per cent fly-in, fly-out (FIFO) workforce and from discriminating against locals when recruiting workers for the operation phase.

During my evaluation of an EIS for a resource project, I am required to decide whether to nominate the project as a large resource project for which the 100 per cent FIFO prohibition and the anti-discrimination provisions of the SSRC Act also apply to the project's construction workforce. On 13 May 2019, I decided that the 100 per cent FIFO and anti-discrimination provisions apply to the construction workforce for the project.

I have published details of the project and its nearby regional communities on the list of large resource projects on the DSDMIP website.

4. Project approvals

4.1 Commonwealth

4.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The project comprises four separate controlled actions, each requiring approval under the under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- EPBC 2017/7867 for the mine site and access road;
- EPBC 2017/7868 for the water pipeline;
- EPBC 2017/7869 for the electricity transmission line (ETL); and
- EPBC 2017/7870 for the rail spur.

The proposed actions have been evaluated under the assessment bilateral agreement between the Commonwealth government and the State of Queensland (Bilateral Agreement). Under the Bilateral Agreement the SDPWO Act has been has been accredited as an assessment process to meet the requirements of the EPBC Act.

In December 2017, Pembroke lodged an application to vary the proposed actions to incorporate the latest project layout designs for the Olive Downs Project Mine Site and Access Road (EPBC 2017/7867) and the Olive Downs Project Water Pipeline (EPBC 2017/7868). These variations were accepted by the DEE on 17 April 2018.

4.1.2 *Native Title Act 1993*

Pembroke has developed an Indigenous Land Use Agreement (ILUA) with the determined Native Title holders (the Barada Barna People). An ILUA is a voluntary agreement between a Native Title group and others about the use of land and waters.

On 13 June 2018, Pembroke announced that an ILUA has been executed over the land on which the Olive Downs project will be developed.

The ILUA between Pembroke and the Barada Barna Aboriginal Corporation provides for sustainable employment and economic opportunities for Indigenous communities and the protection of Aboriginal cultural heritage through a Cultural Heritage Management Plan.

4.2 Queensland

4.2.1 *Environmental Protection Act 1994*

The proponent lodged an application for a site-specific EA for a resource activity and ancillary activities on 17 May 2018. The environmentally relevant activities (ERA) applied for are:

- ERA 13 – mining black coal
- ERA 8 – chemical storage
- ERA 31 – mineral processing

- ERA 63 – sewage treatment

DES will make a decision on issuing a draft EA for the project. The draft EA must include any stated conditions included in this report.

4.2.2 *Mineral Resources Act 1989*

Mining Leases (MLs) and Specific Purpose MLs are required under the *Mineral Resources Act 1989* (MR Act) for the operational land within Mineral Development Lease (MDL) 3012, MDL 3013, MDL 3014, MDL 3025, Exploration Permit Coal (EPC) 676, EPC 649, EPC 1949 and EPC 1951. Parts of the Specific Purpose MLs would also cross land where mining tenements are not currently held by the proponent.

Under Part 3, section 4A of the MR Act, development authorised under the MR Act is not subject to the provisions of the *Planning Act 2016* (Planning Act), with the exception of building work which is not accepted development under the *Building Act 1975* and development on heritage land under the *Queensland Heritage Act 1992*.

4.2.3 *Planning Act 2016*

The Planning Act regulates certain development activities off the mining lease and Specific Purpose MLs. Project components located outside a mining lease or Specific Purpose mining lease include the western part of the pipeline (from where it exits MLA 700035 to where it joins the existing Eungella Pipeline Network), the ETL and the intersection between the Fitzroy Development Road and the Willunga domain access road.

Under the Broadsound Planning Scheme 2005, the land use of the development of the pipeline is considered to be 'utility (local)'. Development of land for a 'utility (local)' use in a 'rural preferred use' area (within which the pipeline would be located) is exempt development, meaning that a development approval is not required for a material change in use.

Under the Belyando Planning Scheme 2009, development involving water cycle management infrastructure, including infrastructure for water supply, is exempt development. Accordingly, the western part of the water pipeline, where it is located within the Belyando Planning Scheme 2009, would not require a development approval.

Any approvals under the Planning Act for the ETL would be obtained by Energy Queensland and are not sought through the EIS process.

A development application for the new vehicular access to the Fitzroy Development Road (a State Controlled Road) would be made prior to commencement of construction of the Willunga domain (anticipated to be in 2027). This application would be taken to be an application for vehicular access to a State Controlled Road under section 62 of the *Transport Infrastructure Act 1994* (TI Act). Approval for this project component is not being sought through the EIS.

A development approval will be required for clearing of 30.5 ha of native vegetation required for the pipeline (from where it exits MLA 700035 to where it joins the existing Eungella Pipeline Network). The application would be made to State Assessment Referral Agency (SARA) for operational works vegetation clearing. Prior to making the application to SARA the proponent would be required to make a separate application to DNRME seeking a

relevant purpose determination under Section 22A of the *Vegetation Management Act 1999*. Conditions for this approval were sought via the EIS process and are included in this report.

4.2.4 *Water Act 2000*

The project site is located within the Water Plan (Fitzroy Basin) 2011 area. Section 110 of the Water Plan (Fitzroy Basin) 2011 regulates the taking of overland flow water from within the Fitzroy Basin.

Section 97(1) of the *Water Act 2000* (Water Act) provides a general statutory authorisation for a person to take overland flow water that is not more than the volume necessary to satisfy the requirements of an environmental authority if:

- the impacts of the take or interference were assessed as part of a grant of an EA
- the EA was granted with a condition about the take of interference with water.

The proponent will therefore be authorised to take the volume of overland flow water that is required for their operations as approved under the EA.

In relation to groundwater resources, section 334ZP of the MR Act gives resource operators the right to take 'associated water' as a necessary activity in the process of extracting the resource. The volume of any 'associated water' taken must be measured and reported, with the Chief Executive of the DNRME notified within three months of the initial water take.

In addition to executing their underground water rights, Pembroke has also applied for two licences for the take of 65 megalitres (ML) of unallocated general reserve water from the Isaac River. If successful in obtaining these licences, it is anticipated that this water would be used for construction activities and to supplement the operational water supply, if required.

4.2.5 *Subsequent approvals*

Following the release of this evaluation report the proponent will need to obtain approvals from state agencies for certain aspects of the project for which conditions have not been sought via the EIS process.

These approvals would be subject to separate applications and assessment and are detailed by the proponent in the EIS. The proponent acknowledges that further information may be required to support lodgement of applications for subsequent approvals with the relevant assessment managers.

Additional approvals that may be required for the project to proceed are identified in Table 4.1. These approvals would not require public notification.

Table 4.1 **Subsequent approvals**

Project component	Permit/approval	Legislation	Assessment manager/s
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State Approvals

Operational works vegetation clearing for water pipeline (off lease)	Development permit for operational works native vegetation clearing	<i>Vegetation Management Act 1999</i>	SARA
	Relevant purpose determination		DNRME
Clearing protected plants	Protected Plant Clearing Permit	<i>Nature Conservation Act 1992</i>	DES
Temporary closure of a road to allow pipeline construction	Application to close a road	<i>Land Act 1994</i>	DNRME
Construction of an intersection on the Fitzroy Development Road (a State Controlled Road)	Interference with a State Controlled Road	<i>Transport Infrastructure Act</i>	DTMR
Species Management Program for disturbing animal breeding places	Species Management Program	<i>Nature Conservation Act 1992</i>	DES

Subsequent approvals required for the project, subject to separate applications and assessment processes, are detailed by the proponent in the EIS. The proponent acknowledges that further information will be required to support lodgement of applications for these subsequent approvals with the relevant assessment managers.

5. Evaluation of environmental impacts

This section discusses the major environmental effects identified in the EIS. I consider some potential impacts of the project to have been adequately addressed in the EIS. For these matters, I have determined that the proponent's mitigation measures are appropriate. For the remaining matters evaluated below, I have included conditions to manage and mitigate adverse impacts.

5.1 Land use and rehabilitation

Land within the project site is currently used for cattle grazing and has been largely cleared or disturbed through past agricultural practices (10,600 ha). There are areas of remnant vegetation near the Isaac River and on poorer quality soils (5,661.5 ha). There is no good quality agricultural land or strategic cropping land within the project site.

Mining activities would progressively disturb approximately 16,300 ha of land over the project's 79-year life.

In proposing a final land use, the proponent considered a number of alternative mining methods (dragline and terrace), mine plans (multiple arrangements), mining rates and

backfilling options to minimise final voids and ensure a stable, safe and self-sustaining final land use.

This section provides an overview of the proponent's proposed approach to progressive rehabilitation of the mine site, including commitments which would achieve sustainable post-mining land uses.

5.1.1 Relevant policy and legislation

Mineral and Energy Resources (Financial Provisioning) Act 2018

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act) introduces two major reforms for the resources industry in Queensland:

- (1) replacement of the current financial assurance regime with a new financial provisioning scheme for all resource authorities
- (2) amendment of the EP Act to introduce new requirements for the progressive rehabilitation and closure of mined land, including the requirement for a progressive rehabilitation and closure plan (PRC plan).

I acknowledge the importance of the MERFP legislation in improving how mines are rehabilitated and the general preference that no voids are left in a floodplain post-mining.

The project was declared a coordinated project in March 2017, commencing the EIS process. Transitional provisions apply to the project because the proponent applied for a site-specific EA prior to the commencement of the progressive rehabilitation requirements of the MERFP Act. The transitional provisions have the effect that the EA application must be assessed against the pre-amended EP Act. A PRC plan is therefore not required to support the project's EA application and is not a consideration for my assessment.

Mined land rehabilitation policy

The mined land rehabilitation policy (MLR policy) was released in August 2017 and provided direction to the drafting of the MERFP Act. The MLR policy committed to the prohibition of final voids on floodplains and this issue was raised by submitters in relation to the project. The prohibition is to apply to all new site-specific EA applications for mining activities. In practice, for new projects the administering authority cannot approve a PRC plan which includes final voids on floodplains. However, the project would not be required to produce a PRC plan for the reasons given above.

I have taken into account the transitional provisions that allow the project to leave final voids on floodplains if they achieve rehabilitation objectives established by the current regulatory framework. Final voids must be safe to humans and wildlife, non-polluting, stable and able to sustain an appropriate land use after rehabilitation.

While I have discretionary power under the SDPWO Act regarding what weight I give to relevant policy matters, my office has conducted an objective, merit-based assessment of the potential impacts of the proposed final land use. The relevant matters underpinning the policy have therefore been considered in the comprehensive assessment of potential impacts to environmental values.

5.1.2 Land use impacts

Flooding impacts on surrounding properties

Two mining companies who are landholders adjacent to the project site made submissions on the EIS expressing concern about potential flooding impacts on their landholdings. The proponent has worked closely with both companies to resolve these concerns.

In relation to cumulative flooding impacts on existing mining operations upstream of the project, I note that the proponent has worked with existing operators to share flood modelling and jointly refine the design of flood levees and final landform.

One submitter raised concerns around the increased impacts of flooding due to impoundment caused by the proposed rail loop. The proponent has incorporated additional underpasses and culverts to ensure that this risk is mitigated, and I am satisfied that the proposed measures would be effective.

Impacts on existing groundwater users

One submitter raised concerns around the potential cumulative impacts of the project to “Bore 8” (a privately-owned bore, located on the Isaac River between the project and the Moorvale South project). Bore 8 intersects the Isaac River alluvium, is equipped with a submersible pump and is used for stock water supply.

I note that the proponent would enter into a make-good agreement through consultation with the owner of this bore (e.g. resetting the pump set at an appropriate depth for water supply, accounting for the predicted groundwater drawdown), which would be detailed in the water management plan for the project.

Potential resource sterilisation

The holders of MDL 183 to the west of the project expressed concerns relating to resource sterilisation due to construction of the proposed rail corridor. I am satisfied that the proposed rail corridor for the project is located outside the MDL 183 boundary on the eastern side of the Norwich Park Branch Railway and as such would not impact on the recovery of resources in this area.

Impacts on land uses on Wynette Station

Wynette Station is located to the east of the project and is currently used primarily for cattle grazing. One submitter raised concerns around the projects impacts on the ongoing use of Wynette Station.

I note that the rail spur and pipeline have been designed to incorporate cattle underpasses and level crossings at various locations to enable cattle and vehicles to move below/across the infrastructure corridor and access the Isaac River. Cattle grids and stock gates would be constructed at all existing access tracks to allow for continued access.

The project would result in the construction of a waste rock emplacement on a portion of Wynette Station. In this regard, I note that all landholders directly impacted by the proposed project would be compensated for direct impacts on their landholdings in accordance with the MR Act.

5.1.3 Proposed rehabilitation strategy

Post-mining land use

The proposed post-mining land use across most of the project site is low intensity cattle grazing. The project would also establish woodland vegetation in areas which would benefit from enhanced stability effects including watercourses, drainage lines and areas surrounding final voids. More than 90 per cent of the site would be restored to grazing land uses or native vegetation which is consistent with current uses. The balance of the site would include dams, final voids (approximately 10 per cent of the site) or areas not disturbed by mining activities. Figure 5.1 and Figure 5.2 illustrate the proposed post-mining land use of the ODS and Willunga domains.

The EIS states that the post-mining land use for final voids would be fauna habitat. The void waterbodies and surrounding vegetation would provide fauna habitat over the long-term. The low walls of final voids would be revegetated and would provide fauna habitat. The high walls of final voids will be revegetated where slopes are shallow and are also likely to support fauna communities. The EIS notes that steep or cliff habitat on the high walls may support nesting birds such as Peregrine Falcons and cites supporting literature which supports this contention. I accept that the proposed low walls and high walls of final voids would provide fauna habitat.

In relation to void waterbodies, the EIS notes that the air space above final void waterbodies is likely to be used by foraging insectivorous bats. The WIL5, ODS7/8 and ODS3 waterbodies are predicted to remain below 4,000 mg/L TDS for approximately 420, 280 and 140 years respectively. I accept that during this period the void waterbodies are likely to be used by a wide range of fauna.

Beyond 600 years, the ongoing use of void waterbodies by native flora and fauna is less clear. I do accept however, that there are fauna groups which are adept at exploiting highly saline environments (such as ducks) and many plant species can flourish in such conditions. As such, it is reasonable to conclude that the void waterbodies would continue to be used by wildlife once they become hypersaline.

Over 90 per cent of the project site would be returned to post mining land uses which are consistent with current uses. I consider this an acceptable outcome from a land use.

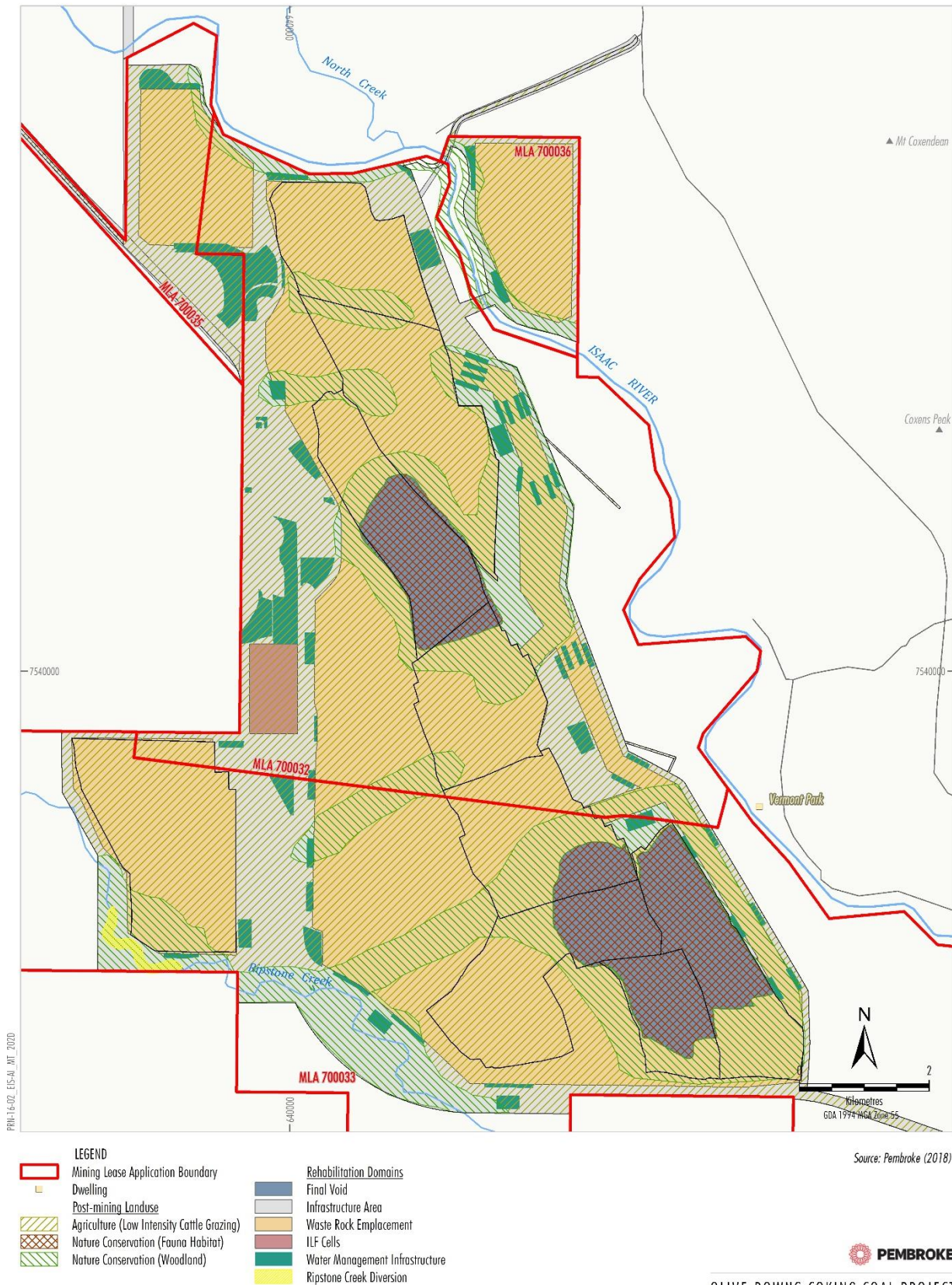


Figure 5.1 Proposed post-mining land use for the Olive Downs South domain

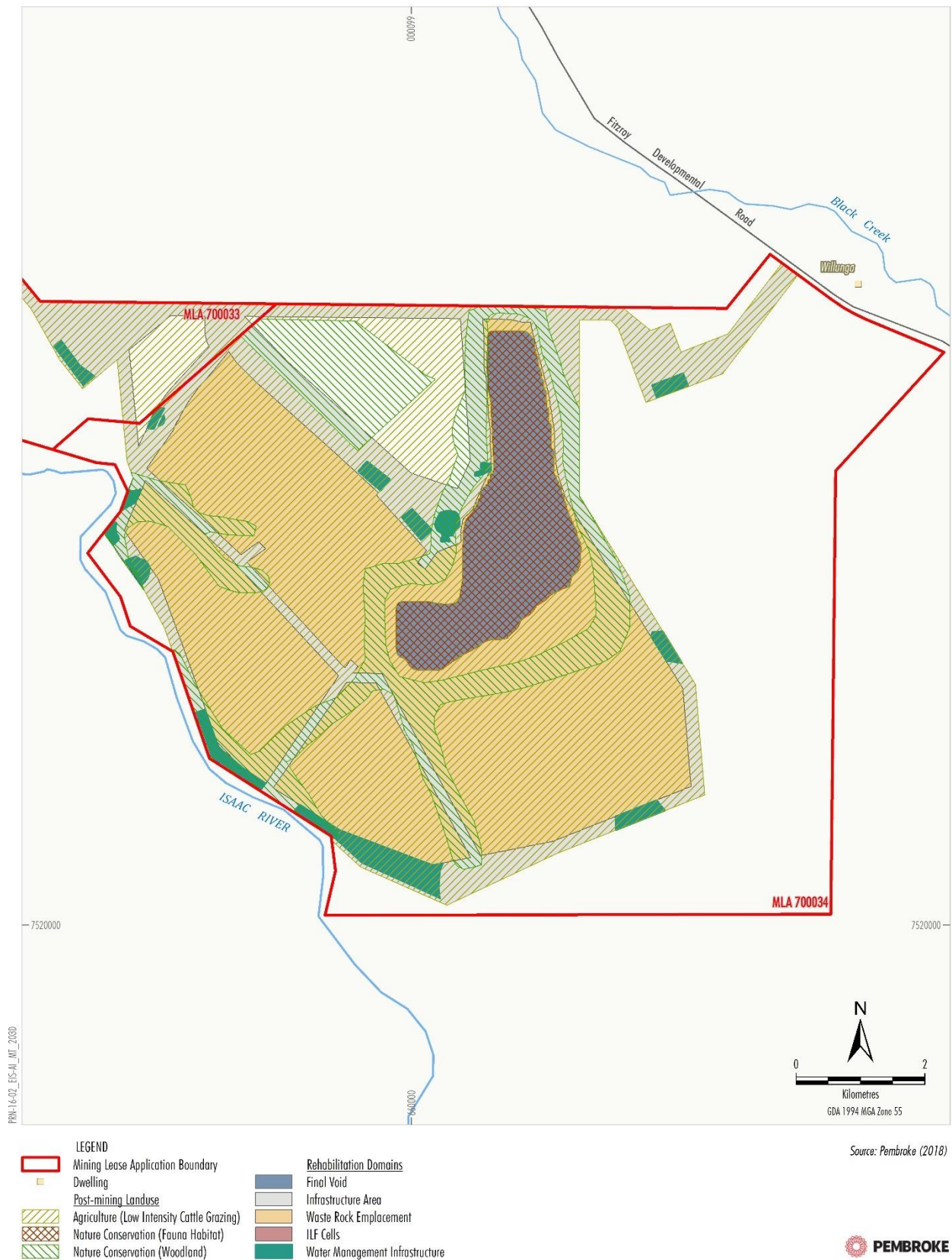


Figure 5.2 Proposed post-mining land use for the Willunga domain

Rehabilitation domains

Post-mining land forms with similar physical characteristics and landform are referred to as rehabilitation domains. There are six rehabilitation domains in the project area:

- waste rock emplacements – would be initially developed adjacent to the open cut pits, until space is available within the mined-out voids of the open cuts to be progressively backfilled with waste rock material
- final voids – final landform would include two final voids in the ODS domain and one final void in the Willunga domain
- infrastructure areas – areas containing mine infrastructure such as offices, coal washing facilities and workshops
- water management infrastructure areas – includes drains, flood levees, sediment and runoff dams, water storage dams, mine water affected dams and raw water dams
- ILF cells – these temporarily contain fine rejects prior to returning these to mining pits as mining activities cease
- Ripstone Creek diversion – an engineered creek diversion 1.8 km long which seeks to replicate the natural hydraulic behaviour of Ripstone Creek.

Waste rock emplacements would be the largest rehabilitation domain, covering an area of just under 10,000 ha. Infrastructure areas would occupy approximately 4,000 ha, final voids 1,100 ha, water management infrastructure 570 ha and ILF cells 145 ha. These domains are identified in Figure 5.1 and Figure 5.2.

The EIS includes rehabilitation goals, objectives, performance indicators and completion criteria for each domain. The long-term objectives of rehabilitation of the project site include:

- provision of self-maintaining, geotechnically stable and safe landforms that complement existing surrounding landforms in terms of slope, geomorphological characteristics, vegetation and land use
- remediating safety hazards at the mine infrastructure areas and any potentially contaminated sites to remove safety risks to people and animals
- rehabilitating the mine infrastructure areas and mine landforms with either groundcover (i.e. grass species) and scattered trees that would return these areas to land suitable for grazing or native woodland/forest
- establishing woodland vegetation in areas of the rehabilitated final landform which would benefit from enhanced stability effects
- constructing waste rock emplacements ensuring rainfall runoff drains in a natural, stable manner
- creating final voids that do not impact the receiving surface waters surrounding the project
- isolating the final voids from the Isaac River floodplain through the development of a permanent highwall waste rock emplacement and minimise the final void catchment areas with up-catchment diversions.

I consider the long-term rehabilitation goals described in the EIS for each domain to be appropriate.

Stability of final landform

To create stable final landforms, the proponent has adopted designs which would generally result in gently sloped and well drained surfaces. The proposed landform also protects the environment from potential releases of mine affected water or final void waterbodies during flood events. Beneficial design elements include:

- the out-of-pit waste rock emplacements have been designed with slope angles of approximately 15 per cent to improve landform stability and improve rehabilitation outcomes. Waste rock emplacements cover around 10,000 ha of land as such this is a significant outcome because the majority of the site would be returned to a landform which is likely to be successfully rehabilitated
- waste rock emplacements have been located, or set back, an adequate distance from open cut pits to avoid potential interactions
- final void highwalls would be fenced to prevent access and designed to remain stable in the long-term, based on site specific geological data and geotechnical modelling
- permanent waste rock emplacements would surround the final voids and isolate them from all flood events, up to and including a probable maximum flood (PMF) event
- final landforms have been designed to minimise changes to flood characteristics (i.e. stream velocity, extent, timing and duration)
- final voids would act as groundwater sinks into perpetuity, preventing the migration of potentially saline pit water into adjacent aquifers and watercourses
- final void waterbodies would equilibrate well below the point at which they would spill to the surrounding environment.

I accept the proponent's commitment to the establishment of post-mining landforms which are amenable to rehabilitation, protecting environmental values and the ability to sustain ongoing land uses.

Progressive rehabilitation

Submitters noted that the EIS should include:

- a detailed progressive rehabilitation schedule including maps at suitable scales showing the location of disturbance areas, relevant ERA infrastructure and associated disturbance areas
- the sequence of mining and progressive rehabilitation (i.e. the method and timing of restoration of areas disturbed during construction)
- the proposed schedule of site decommissioning and submission of closure plans.

Rehabilitation can only progress as the final landform is established within each domain. The proposed rehabilitation schedule would commence in 2027 with the rehabilitation of 625 ha of waste rock emplacements. This is the first domain available for rehabilitation following the first 45 years of operation. By the year 2065, 7,300 ha of waste rock emplacements would be rehabilitated. There would be no residual voids requiring rehabilitation until 2072 (155 ha) and infrastructure would not be decommissioned and rehabilitated until 2098 (430 ha). Table 5.1 outlines the final rehabilitation areas for each domain in 2100 (final decommissioning year).

Table 5.1 Progressive rehabilitation schedule

Year	Rehabilitation domain (ha)					
	Waste Rock Emplacements	Final voids	Infrastructure Areas	Water management infrastructure	ILF Cells	Ripstone Creek Diversion
2100	9955	1105	4120	570	145	26

As previously discussed, the EIS included progressive rehabilitation mapping and scheduling at five-year intervals for the life of the mine. I have stated conditions which would ensure that the proponent adheres to the rehabilitation schedule as presented in the EIS.

The EIS reflects the proponent's commitment to progressive rehabilitation of areas disturbed by mining. My conditions would seek additional information demonstrating that the proposed final landform is the most appropriate landform for the Isaac River floodplain and can be progressively delivered.

Revegetation program

Successful rehabilitation of disturbed areas is dependent on the careful stockpiling and management of topsoil and the timely establishment and maintenance of cover crops and native vegetation.

The EIS demonstrates sufficient topsoil would be available for rehabilitation, using an application depth of 0.2 metres. Where the final landform has the capacity to support more productive grazing (e.g. in flatter areas adjacent to existing grazing areas), additional topsoil would be applied (e.g. up to 0.3 metres depth) to improve the final land use outcome.

Following establishment of a protective vegetation cover (i.e. cover crop), vegetation would be established as soon as practicable to prevent slope face degradation. Consistent with the vegetation currently present on-site, the areas of the final landform that are proposed to be revegetated to grazing land would comprise a combination of grass species including Buffel Grass (*Cenchrus ciliaris*), Wiregrass (*Aristida sp.*) and Kangaroo Grass (*Themeda triandra*).

Native vegetation would be established along highwall emplacements, surrounding final voids and near watercourses, including the proposed Ripstone Creek diversion. Species to be included are typical of the pre-disturbance ecosystems present within the project area.

The proponent has committed to the exclusion of grazing and active restoration of land between the Isaac River and proposed mining activities. This has the potential to significantly enhance biodiversity values on the site and protect the environmental values of the Isaac River and expect the proponent to deliver on this commitment.

I am satisfied that the EIS appropriately considers the availability of topsoil and proposes an approach to revegetation which would provide successful rehabilitation outcomes.

Final voids

I am satisfied that the proponent has developed a mining schedule which maximises the opportunity for progressive backfilling of open cut pits. The project has been developed as a 'terrace mining' operation, using excavators and haul trucks to mine the waste rock and coal resource. The terrace mining method allows discrete areas (individual open cut pits) to be mined to their full extent and then backfilled as mining moves into the adjacent areas. Although a 50% higher production rate could be achieved with a strip-mining operation, terrace mining increases the extent of backfilling which can be undertaken and decreases the size of the final voids. This has improved final land use outcomes when compared to other mines in the region.

The project would create 13 mining pits over life of the mine, 10 of which would be completely backfilled, leaving only three final voids:

- two final voids in the ODS domain (ODS3 and ODS7/ODS8)
- one final void proposed in the Willunga domain (WIL5).

In proposing a final land use incorporating the final voids, the proponent considered a number of alternative mining methods (dragline and terrace), mine plans (multiple arrangements), mining rates and backfilling options to minimise final voids and ensure a stable, safe and self-sustaining final land use.

The proponent has analysed the feasibility of backfilling these final voids to ground level. The proponent considers that the financial cost of backfilling (in the order of \$3 billion) these pits would make the project economically unviable. I accept that the backfilling of all voids would adversely impact the economic viability of the project.

The project would maintain a buffer of at least 200 metres between the Isaac River and I accept that creation of permanent levees around final voids would prevent the voids from filling during flood events and would protect the riverine environment from uncontrolled release of mine affected water.

The catchment area of the voids would be minimised through the construction of upslope drains or bunds to direct runoff around the voids to the surrounding landscape. However, the final voids would have a catchment of around 49 km², reducing the catchment area of the Isaac River. The EIS concludes that this represents less than one per cent of the total catchment area of the Isaac River and the impact is therefore not significant. I accept that the impact is not significant at the catchment scale.

To improve water quality within the final void waterbodies by reducing salinity levels, the proponent has committed to removing basement coal from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining. As a result, the salinity of the ODS7/8 and WIL5 final void waterbodies are predicted to remain brackish (i.e. less than 5,000 mg/L TDS) for approximately 300 to 550 years. The ODS3 final void waterbody is predicted to remain brackish for approximately 150 to 200 years. The final void waterbodies are not predicted to reach hypersaline conditions (i.e. greater than 35,000 mg/L TDS) for at least 600 years.

I accept the EIS findings that this water would not escape to the surrounding environment, and the final voids will act as groundwater sinks. This is a common outcome for final voids in areas of high evaporation and low rainfall noting that groundwater is limited in quantity and is generally of poor quality (very saline) within the project site.

I have considered the proponents proposal to leave final voids against the current guideline – Rehabilitation requirements for mining resource activities¹. The guideline identifies strategies to achieve rehabilitation goals for various domains, including final voids. In relation to the rehabilitation goals of establishing safe, non-polluting, stable landforms with an agreed land use, the guideline states the following:

- a structurally sound (safe to people and animals) final void is generally acceptable and meets the safety goals – this may include a requirement to restrict access
- a void with low risk of groundwater contamination is generally acceptable against the goal of being non-polluting
- a void with battered slopes and vegetation cover is generally acceptable and meets the stable landform goal
- an unused void with low risk may be acceptable in relation to the goal of sustaining an agreed land use.

The proposed final voids would meet the goals of being safe, stable and non-polluting. On the balance, I consider the proposed final voids to represent a manageable and relatively low risk to environmental values of the Isaac River flood plain.

5.1.4 Coordinator-General's conclusion: land use and rehabilitation

The EIS adequately assesses the potential impacts of the project on surrounding land uses including cumulative flooding impacts, potential sterilisation of coal resources, impacts on current agricultural activities and impacts on groundwater users. I am satisfied that these impacts would be appropriately managed.

The proponent intends to progressively rehabilitate areas disturbed by mining and approximately 65 per cent of the project area would be returned to grazing uses, 25 per cent would be restored to woodland habitat and around 10 per cent of the site would be occupied by final voids. I consider the return of 90 per cent of the areas disturbed by mining to either grazing or native vegetation to be an acceptable final land use outcome.

The MERFP Act and Mined Land Policy are not relevant considerations in my evaluation as the project is subject to transitional provisions which mean that the project must be assessed under the pre-amended EP Act.

I have conducted an objective, merits based assessment of the project against the requirements of the pre-amended EP Act. I have taken into account the transitional provisions that allow the project to leave final voids on floodplains if they achieve rehabilitation objectives established by the regulatory framework. Final voids must be rehabilitated to a safe and stable landform that does not cause environmental harm and can sustain a post-mining land use.

I conclude that the proposed final voids would meet the goals of being safe, stable and non-polluting. On the balance, I consider the proposed final voids to represent a manageable and relatively low risk to environmental values of the Isaac River flood plain.

¹ Rehabilitation requirements for mining resource activities, Department of Environment and Science, <https://environment.des.qld.gov.au/assets/documents/regulation/rs-gl-rehabilitation-requirements-mining.pdf>

Taking into account the overall benefits of the project for the region and the state represented by \$10.1 billion including \$1.1 billion in royalties, I have decided to approve the three final voids on the floodplain with strict conditions for the EA which specify the location of final voids and include other relevant conditions (e.g. rehabilitation requirements).

While I approve the proposed final landform, I require the proponent to develop and provide a progressive mine landform and rehabilitation plan that shows how and where mining (and other related ERAs) will be carried out on land in a way that minimises impacts on the floodplain and maximises the progressive rehabilitation of land to be safe, stable and self-sustaining. The plan must also provide for the condition and land use suitability to which land must be rehabilitated, before the EA can be surrendered.

5.2 Matters of state environmental significance

This section addresses the potential impacts of the project on MSES. Impacts on MSES that are also listed as matters of national environmental significance (MNES) under the EPBC Act are addressed in section 7.

The MSES relevant to the project defined by the Environmental Offsets Regulation 2014 (EO Regulation) include:

- regulated vegetation, including:
 - ‘endangered’ and ‘of concern’ regional ecosystems (REs)
 - REs that intersect with an area shown as a wetland on the vegetation management wetlands map (to the extent of the intersection)
 - REs that are located within a defined distance from the defining banks of a relevant watercourse
 - an area of essential habitat on the essential habitat map for an animal or plant that is endangered wildlife or vulnerable wildlife
- connectivity areas
- a wetland in a wetland protection area or a wetland of high ecological significance shown on the map of referable wetlands
- a wetland or watercourse in high ecological value waters
- protected wildlife habitat (protected plants and animals)
- any part of a waterway providing for passage of fish, only if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.

There is considerable overlap between the MNES and MSES of relevance to the project. Rather than duplicating key aspects of my evaluation which relate to impacts on overlapping matters a more detailed assessment of the project’s MSES which are also MNES is provided in section 7 of this report.

Table 5.2 Overlap between MSES and MNES values

MSES value	Overlapping MNES value
Regulated vegetation	
'Endangered' regional ecosystems (REs 11.3.1, 11.4.8, 11.4.9, 11.5.17)	REs 11.3.1, 11.4.8, 11.4.9, 11.5.17 as ecosystems which provide important habitat for the ornamental snake and habitat for the Australian painted snipe
'Of concern' regional ecosystems (REs 11.3.2, 11.3.3, 11.3.4)	REs 11.3.2, 11.3.3, 11.3.4 as ecosystems which provide critical habitat for the koala and habitat for the greater glider
Essential habitat for the ornamental snake	Important habitat for the ornamental snake
Essential habitat for the koala	Critical habitat for the koala
Remnant vegetation which coincides with mapped wetlands (RE 11.3.27)	Habitat for the Australian painted snipe which includes RE 11.3.27
Remnant vegetation which occurs within the defined distance of a watercourse (REs 11.3.1, 11.4.8, 11.4.9, 11.3.25, 11.5.3)	REs 11.3.1, 11.4.8, 11.4.9, 11.3.25, 11.5.3 as ecosystems which provide critical habitat for the koala and habitat for the greater glider
Connectivity areas (All remnant vegetation on the project site contributes to connectivity)	All remnant vegetation on the project site as habitat for a range of EPBC listed species, including connectivity values
Wetlands of high ecological significance	Wetlands as 'water resources' under the EPBC Act

All components of the project have been determined to be controlled actions under the EPBC Act. Accordingly, an offset would be provided for residual significant impacts on MNES. This negates the need for the Queensland government to impose an offset condition on MSES where it overlaps with MNES matters (i.e. RE 11.4.9 where it represents the brigalow threatened ecological community (TEC)). Where offsets are required for a species that is designated as both MSES and MNES, one offset is required.

The proponent was required to complete comprehensive field surveys to confirm the occurrence of MSES including threatened species. I note that agencies with an interest in biodiversity (including DES) generally agreed that the survey effort undertaken by the proponent was adequate.

5.2.1 Regulated vegetation

Background

The project has avoided impacts on regulated vegetation by maintaining a minimum 200 metre buffer from the Isaac River, reducing the width of infrastructure corridors, co-locating access roads with existing roads, co-locating the proposed water pipeline and rail line and utilising an existing easement for the ETL.

The EO Regulation defines specific categories of remnant vegetation as prescribed regional ecosystems and MSES.

Remnant vegetation considered to be a prescribed RE (and MSES) includes the following:

- 'endangered' or 'of concern' RE's, as defined under the *Vegetation Management Act 1999*
- essential habitat for wildlife declared endangered or vulnerable under NC Act, as defined by the EO Regulation
- remnant vegetation which intersects with an area shown on the vegetation management wetland map, as defined under the VM Act
- remnant vegetation which is located within the defined distance from the defining banks of a watercourse identified on the vegetation management watercourse map, as defined under the VM Act.

The project site supports a total of 5,661.5 ha of remnant vegetation considered to be MSES.

Impacts and mitigation

Measures proposed in the EIS to reduce the impacts of vegetation clearing include progressive vegetation clearing, with the area of native remnant vegetation cleared at any time generally being no greater than that required to accommodate projected development activities for the next 12 months.

The EIS demonstrates that native vegetation communities and fauna habitats to be disturbed during the life of the project all occur extensively in the surrounding landscape and subregions.

The project would however require disturbance of 5,661.5 ha of remnant vegetation. The EIS considers that all areas of remnant vegetation to be disturbed are MSES due to the presence of one or more values.

The project would result in direct disturbance to the following areas of regulated vegetation considered to be MSES:

- 140.5 ha of 'endangered' regional ecosystems
- 864.5 ha of 'of concern' regional ecosystems
- 4,341 ha of essential habitat for the ornamental snake
- 18 ha of essential habitat for the common death adder
- 4,827 ha of essential habitat for the koala
- 49 ha of remnant vegetation which coincides with mapped wetlands
- 126 ha of remnant vegetation which occurs within the defined distance of a watercourse (watercourse vegetation).

I note that these regulated vegetation disturbances overlap.

The EIS concludes that the project will have a significant residual impact on all MSES associated with regulated vegetation, other than habitat for the common death adder, given its broad habitat requirements and wide distribution. The EIS also indicates that the proposed offset requirements for the ornamental snake would also compensate for the loss of common death adder essential habitat, given the similarity in species habitat requirements. I agree with this conclusion.

Indirect impacts on regulated vegetation are also discussed at length in the EIS, particularly in relation to possible groundwater drawdown and reduction in the catchment area for wetlands and riparian vegetation. The EIS found that there is limited interaction between regulated vegetation and groundwater and therefore minimal impacts are expected because of groundwater drawdown. While I accept this conclusion, there is potential interaction between riparian vegetation and some high value wetlands with groundwater.

I have stated a condition in the EA requiring the proponent to implement a Groundwater Dependent Ecosystem (GDE) and Wetland Management Plan (GDEWMP), to detect potential impacts on GDEs and MSES wetlands associated with the project; specifically, those not proposed to be directly disturbed by the project (e.g. high ecological significance (HES)2, HES3, HES5, HES7, HES8).

Vegetation clearing for the proposed water pipeline and ETL

The total disturbance footprint for the proposed water pipeline would be approximately 57 ha. Based on the information in the EIS, an 8 km section of the 23 km long water pipeline would be located outside of the mining lease area (where it is not co-located with the rail spur and loop). The vegetation to be cleared for the water pipeline in its entirety would include habitat for the EPBC listed koala, greater glider, squatter pigeon, Australian painted snipe and the ornamental snake. The vegetation would consist of approximately 2 ha of 'endangered' REs and 9 ha of 'of concern' REs.

The proposed vegetation clearance for the section of the water pipeline that would be located outside of the mining lease would be subject to approval for operational work and would be required to demonstrate compliance with the State Development Assessment Provisions (SDAP) for native vegetation clearing. I am satisfied that the proponent would be able to demonstrate compliance with the SDAP provisions for native vegetation clearing. I have stated a condition for SARA for the operational works vegetation clearing approval which set out the extent of clearing required for the water pipeline.

Any approvals required under the Planning Act for the ETL would be obtained by the infrastructure provider and are not sought through the EIS, therefore no further discussion is provided as part of my assessment.

Significant residual impacts and offsets

Based on the information provided in the EIS all disturbance to regulated vegetation represents a significant residual impact to MSES, other than the disturbance of 18 ha of mapped essential habitat for the common death adder and 13 ha of REs where they represent the brigalow TEC.

The project would impact on mapped essential habitat for the koala and the ornamental snake. The project's impacts on the koala and ornamental snake have been considered as impacts on these species as MNES. The EIS concludes that there will be a residual significant impact on these species requiring offsets under the EPBC Act and I agree with this conclusion.

For the common death adder, although a significant residual impact is not likely, I note that the offset requirements for the residual significant impact to the ornamental snake

would likely compensate for the loss of common death adder essential habitat, given the similarity in species habitat requirements.

While the EIS does not clearly articulate overlapping MNES and MSES values, all the regulated vegetation which would be cleared on the project site is either habitat for threatened species or representative of a TEC under the EPBC Act. As such, the offset requirements for the impact to regulated vegetation as MSES would be provided through the proposed offsets for the loss of habitat for species listed under the EPBC Act.

As offsets would be imposed for these matters as MNES, the state cannot impose offset conditions for the same matters. I note that submitters raised issues regarding the project's potential impacts on regulated vegetation. However, I am satisfied that the proposed offsets for these species as EPBC Act listed species habitat are appropriate.

Impacts on these matters will be considered by DEE in their assessment of the project. This precludes the Coordinator-General from stating conditions relating to offsets of significant residual impacts on MSES, where those matters are the same (or substantially the same) as those considered by the Commonwealth and the impacts assessed are also the same as those considered in my evaluation.

While I cannot consider conditioning of offsets for MSES which overlap with MNES, I have considered the adequacy of the proponents offset strategy in meeting the offset obligations of the project in terms of impacts on MSES.

The EIS provides details of the offsets proposed for Stage 1 of the project, which includes construction of the project's three infrastructure corridors, mine infrastructure areas, flood levees and the commencement of mining activities over the first five years of the project. The EIS concludes that appropriate offsets for all disturbance to regulated vegetation during Stage 1 of the project can be provided in a proposed offset area which covers 6,065 ha of land which the proponent owns east of the Isaac River. I accept this conclusion.

For Stages 2 to 4 of the project, a biodiversity offset would be provided before the commencement of each stage. The proponent expects that suitable offsets are available across their 34,000 ha of land holdings to accommodate offsets for future project stages. I accept this conclusion and have recommended conditions for the Commonwealth Minister for the Environment which would ensure that future stages of the project would not proceed until the proponent provides an updated offset management plan which meets DEE's requirements.

Coordinator-General's conclusion: regulated vegetation

The project would require disturbance to 5,661.5 ha of remnant vegetation considered to be MSES due to the presence of one or more prescribed regional ecosystems. The EIS concludes that the project would have a significant residual impact on MSES, including endangered and of concern regional ecosystems, connectivity areas, wetland and watercourse vegetation and protected wildlife habitat.

The surface disturbance required by above ground mining activities means that avoidance of impacts on regulated vegetation within mining areas is generally not achievable. The EIS concludes that there would be a significant residual impact on MSES because of the construction and operation of the project.

The proponent owns approximately 34,000 ha of land near the project which it intends to use to meet offset obligations. The EIS contends that significant residual impacts on regulated vegetation can be offset on these landholdings and I accept this conclusion.

The project has the potential to result in indirect impacts on regulated vegetation including MSES wetland and watercourse vegetation. I have stated a condition for the EA requiring the proponent to implement a GDEWMP which includes monitoring of riparian vegetation associated with the Isaac River, Ripstone Creek, North Creek and Cherwell Creek. I have stated conditions (Appendix 1) to ensure that this occurs.

I am satisfied that the proponent's commitments, my stated conditions for the project's EA and my recommended conditions for the Commonwealth Minister for the Environment would ensure that acceptable outcomes are achieved for impacts on regulated vegetation MSES within the project area.

5.2.2 Connectivity areas

Background

Under the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline*, connectivity areas are defined as areas of remnant vegetation outside urban areas containing prescribed REs that are required for ecosystem functioning.

The EIS considers that the Isaac River and North Creek and associated floodplain vegetation connect areas of habitat north (Burton Range and Lake Elphinstone) to north-west (Harrow Range) of the project area to the south-east (Junnee National Park and State Forest). Given the prevalence of species records of the koala and greater glider within the riparian zone of the Isaac River, the EIS considers it likely that this vegetation would support connectivity between suitable habitat for these species and others.

Impacts and mitigation

Based on the information provide in the EIS, all vegetation to be removed as a result of the project (5,661.5 ha) would provide for connectivity to surrounding vegetated areas.

To reduce impacts on vegetation located along the Isaac River in the riparian zone, which would provide for fauna movement, the proponent has limited the construction corridor for the access road from Annandale Road to the ODS domain to 40 metres in the vicinity of and where it crosses the Isaac River. The proposed overland conveyor would also be limited to a 180-metre corridor, further limited to 45 metres within 200 metres of the Isaac River bank, to reduce impacts on riparian vegetation. This would also minimise impacts on landscape connectivity.

Significant residual impacts and offsets

I consider that the removal of 5,661.5 ha of vegetation providing for connectivity would result in a significant residual impact, as it would fragment vegetation that would act as an important wildlife corridor.

As stated above, all regulated vegetation which would be cleared on the project site is either habitat for threatened species or representative of a TEC under the EPBC Act. As such, the offset requirements for the impact to regulated vegetation as MSES and connectivity areas would be provided through the proposed offsets for the loss of habitat

for species listed under the EPBC Act. The restoration of landscape connectivity requires separate consideration because the configuration of offset areas may or may not be favourable from a landscape connectivity perspective.

In this regard I note that the proponent has committed to the exclusion of grazing and active restoration of land between the Isaac River and proposed mining activities. This has the potential to significantly enhance landscape connectivity values on the site and protect the environmental values of the Isaac River. To ensure that this commitment is fulfilled, I have stated conditions for the EA requiring fencing and restoration of areas on the Isaac River floodplain which are not disturbed by mining activities.

The proponent has committed to ongoing monitoring and management to return the regrowth vegetation located within the Stage 1 offset area to remnant woodland within 20 years. This would significantly improve connectivity values on the Stage 1 offset area and at a landscape level. I expect that the proponent to fulfil this commitment.

The EIS includes a conceptual post-mining land use plan which indicates that native woodland would be retained or restored adjacent to the Isaac River, on Ripstone Creek and across the site from east to west in a number of locations (refer to Figure 5.1 and Figure 5.2). I am satisfied that over the long term, landscape connectivity would be restored in the vicinity of the project site.

Coordinator-General's conclusion: connectivity areas

The project would adversely impact connectivity areas, particularly in the short term. I consider that the rehabilitation strategy proposed for the project would ultimately restore connectivity values, provided that the proponent's commitments and proposed avoidance and mitigation measures are undertaken, in addition to the conditions I have stated and recommended in this report. I note that the proponent may co-locate offsets for regulated vegetation, protected wildlife habitat and connectivity areas where possible to consolidate offset obligations. I am satisfied that the significant residual impact to connectivity areas would be compensated for through the proposed offsets for the loss of habitat for species listed under the EPBC Act.

I am satisfied that the proponents' commitments, my stated conditions for the project's environmental authority and my recommended conditions for the Commonwealth Minister for the Environment will ensure that acceptable outcomes are achieved for impacts on connectivity areas.

5.2.3 Wetlands

Background

The EO Regulation defines MSES wetlands as a wetland in a wetland protection area or a wetland of high ecological significance (HES) shown on the map of referable wetlands, or a wetland in high ecological value waters.

Based on the information provide in the EIS, there are 11 MSES wetlands of HES and their wetland protection area (WPA) buffers within the project area. All other wetlands within the project area are considered wetlands of general ecological significance (e.g. pools of standing water in the Isaac River and associated tributaries). I am satisfied that there are no wetlands in high ecological value waters within the project area.

Impacts and mitigation

The project would result in the removal or modification of seven HES wetlands and their WPA buffers totalling approximately 61 ha. The HES wetlands within the project area include a paleochannel lake, ox-bow lakes and flood channel wetlands on the Isaac River floodplain, as well as modified vegetated swamps. Based on the information provided in the EIS, all HES wetlands to be removed would consist of the palustrine wetland habitat type.

The impacts on HES wetlands across the four stages of the project, would be:

- 9.5 ha–Stage 1
- 6 ha–Stage 2
- 23 ha–Stage 3
- 22 ha–Stage 4.

I note that submitters raised concern about the potential direct and indirect impacts on wetlands. The EIS indicates that seven HES, covering an area of 94 ha, would remain either within areas of the proposed mining leases which are not disturbed by mining or are located outside the proposed lease areas.

The EIS discusses in detail the potential indirect impacts on wetlands and watercourses. This includes potential surface water quantity impacts due to catchment excision and potential surface water quality impacts resulting from mine affected water releases and waste rock emplacement run-off. The EIS considers that the wetlands would continue to be inundated following rainfall and flood events and any potential hydrological changes to the wetlands would be minimal. The EIS also predicted that the majority of the catchments for the wetlands would be reinstated in the final landform. Further to this, the project is unlikely to result in leaks/spills that would result in serious environmental harm to watercourses and or wetlands surrounding the project area. Potential impacts would be managed through the implementation of a water management plan and erosion and sediment control plan. Further discussion of the project's potential impacts on wetlands is discussed in section **Error! Reference source not found.**

I am satisfied that the proponent has adequately assessed both the potential direct and indirect impacts on wetlands.

The proponent has committed to undertaking further investigation and monitoring through the installation of shallow piezometers within the wetlands that would remain within the project areas to confirm that the proposed reduction in catchment would not result in adverse impacts on the ecological values of the wetlands. I have stated a condition for the EA requiring the proponent to implement a GDEWMP will be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project; specifically, those not proposed to be cleared by the project (e.g. HES2, HES3, HES5, HES7, HES8).

Significant residual impacts and offsets

Based on the information provided in the EIS, it is considered that the removal of 61 ha of HES wetlands would result in a significant residual impact to MSES wetlands.

I note that the 61 ha of MSES wetlands to be removed for the project are of the palustrine wetland habitat type. Based on the information in the EIS, the proponent's wider landholdings covering approximately 34,000 ha contain four HES wetlands of the

palustrine (marsh type) wetland habitat type, including their WPA buffers, totalling approximately 128.5 ha. The EIS concludes that there are sufficient areas of land supporting palustrine wetlands within those landholdings, to ultimately provide an offset for the significant residual impact to MSES wetlands, subject to rehabilitation and management.

I accept this conclusion and have recommended conditions for the Commonwealth Minister for the Environment which would ensure that future stages of the project would not proceed until the proponent provides an updated offset management plan which addresses how the significant residual impact on wetlands would be offset for the project.

The Queensland Environmental Offsets Policy states that for wetlands, the offset site must be within the same wetland habitat type as the impacted wetland and within the same bioregion. I consider that suitable MSES wetlands are present within the landholdings held by the proponent and would provide a 'like for like' offset for the project significant residual impact to HES wetland MSES.

Coordinator-General's conclusion: wetlands

Based on the information provided in the EIS, the project would result in a significant residual impact to MSES wetlands covering an area of 61 ha. The EIS provides a comprehensive assessment of indirect impacts on the wetlands which would not be disturbed. I am satisfied that impacts on the retained wetlands would be avoided or appropriately managed.

I am satisfied that the significant residual impact to wetlands would be compensated for through the proposed offsets to be located in the Stage 1 offset area for the project, which includes palustrine wetlands.

I am satisfied that the proposed offsets for wetlands are appropriate and will achieve an appropriate conservation outcome for the removal and/or modification of wetlands resulting from the project.

5.2.4 Protected wildlife habitat – protected plants

Background

The EPBC protected matter search tool identified several species of plants listed under the EPBC Act and NC Act as likely or have potential to occur within the study area. Targeted surveys were undertaken during November 2016 and throughout 2017 where only *Bertya pedicellata* a near threatened species under the NC Act, was detected during onsite in the north-west section of the ETL corridor. No other conservation significant plant species listed under the NC Act or EPBC Act have been recorded in the study area, despite targeted surveys.

Flora trigger survey mapping for the site indicates that there are no 'high risk' areas within the project area that would be subject to disturbance from mining activities.

Impacts and mitigation

As *Bertya pedicellata* is listed as 'near threatened' under the NC Act, a significant impact assessment is not required. Despite this, the proponent has nominated a number of avoidance and mitigation measures for potential impacts on the *Bertya pedicellata*

population present within the proposed ETL corridor, including placement of the ETL towers and maintenance track to avoid populations of the species, and demarcation of exclusion zones to ensure areas of vegetation to be retained are clearly identified.

Coordinator-General's conclusion: protected wildlife habitat – protected plants

I am satisfied that the EIS has identified and assessed the project's potential impacts on protected plants. The project would not result in the disturbance of any areas classified as 'high risk' on the protected plants flora survey trigger map.

The only threatened flora species identified onsite, *Bertya pedicellata*, is listed as 'near threatened' under the NC Act and as such does not require a significant impact assessment. I note the proponent has nominated mitigation measures to address potential impacts on the species regardless of its classification.

I note the proponent's commitment to undertake pre-clearance surveys and implement mitigation measures to protect any identified protected plants. I expect the proponent to fulfil this commitment.

I consider that the project is unlikely to have an unacceptable impact on protected plants, provided the proposed avoidance and mitigation measures and proponent commitments are implemented.

5.2.5 Protected wildlife habitat – protected fauna

Background

The EO Regulation defines 'protected wildlife habitat' as a habitat for an animal that is endangered wildlife or vulnerable wildlife or a special least concern animal.

Under the NC Act, special least concern includes least concern birds which are listed under international agreements such as the Japan–Australia Migratory Bird Agreement (JAMBA), China–Australia Migratory Bird Agreement (CAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and the Bonn Convention.

The EIS identified eight fauna species listed under the NC Act that are 'likely' or 'having potential' to occur in the project area. Of the species identified, the common death adder ('Vulnerable' – NC Act), short-beaked echidna ('Special Least Concern' – NC Act) and glossy black cockatoo ('Vulnerable' – NC Act) are listed only under the NC Act. The remainder of those identified are also listed under the EPBC Act and have been considered in section 7.

Scats of the short-beaked echidna were found onsite during surveys, while the common death adder and glossy black cockatoo were not identified during surveys, nor was evidence of their presence.

Seventeen species of fish were recorded during surveys, however no species listed under the EPBC Act or NC Act were recorded during surveys. No conservation significant endangered, vulnerable and near threatened (EVNT) turtles were detected within the study area, nor was suitable habitat for conservation significant turtles encountered.

No platypus, or evidence of their breeding (i.e. burrows) was encountered during the surveys, and due to the seasonal nature of most palustrine waterbodies in the project

area, any potential habitat present onsite is not likely to be conducive to supporting a population of platypus.

Impacts and mitigation

Suitable habitat for the common death adder, short-beaked echidna and glossy-black cockatoo is present within the project area. However, the proponent considers that the glossy black cockatoo is unlikely to occur as there are no records within the project area. The EIS indicates that 5,688.5 ha and 16,294 ha of potential habitat would be removed as a result of the project for the death adder and short-beaked echidna respectively.

The EIS discussed indirect impacts on listed threatened species, including noise and vibration, artificial lighting, increased risk of bushfire and edge effect impacts, concluding that indirect impacts on listed species were not likely to result in significant impacts.

Despite the proposed clearance of suitable habitat for the species, I agree with the conclusion in the EIS that significant residual impacts on each species as a result of the project is not likely. Both the echidna and common death adder have broad habitat requirements and relatively extensive distributions. Given the nature of the species records onsite for the common death adder and short-beaked echidna, the habitat onsite is unlikely to support important populations of each species. There is also abundant habitat likely to be of similar or better quality for each species available elsewhere within the surrounding landscape.

The proponent has committed to prepare and implement a weed and pest management plan which would ensure common pest species are managed onsite to reduce impacts on threatened species and their habitat.

Significant residual impacts and offsets

I consider that the project would have a significant residual impact on the ornamental snake (7,666 ha), Australian painted snipe (120 ha), squatter pigeon (5,610 ha), koala and greater glider (5,583 ha). However, these species are listed under both the NC Act and EPBC Act. Impacts on these matters will be considered by DEE in their assessment of the project. This precludes me from stating conditions relating to offsets of significant residual impacts on MSES, where those matters are the same (or substantially the same) as those considered by the Commonwealth and the impacts assessed are also the same as those considered in my evaluation. For further discussion regarding the impacts and offsets required for project's impacts on the ornamental snake, Australian painted snipe, squatter pigeon, koala and greater glider, refer to section 7. I am satisfied that proposed offsets for these species as MNES will meet the offset obligations which would otherwise be required under the State's environmental offsets framework.

I consider that the project is not likely to have a significant residual impact on the common death adder or short-beaked echidna. I note that submitters raised issues relating to the disturbance of habitat for endangered and vulnerable wildlife. I am satisfied with the justification provided as part of the assessment in the EIS, and I agree with the EIS assessment. Despite this, I note that the proposed Stage 1 offset area would provide offsets for the loss of habitat for EPBC listed species, including the ornamental snake. I note the similarity in habitat requirements between the ornamental snake and common death adder. Further, all regulated vegetation which would be cleared on the project site is either habitat for threatened species or representative of a TEC under the EPBC Act.

Although I consider that the project would not result in a significant residual impact to protected fauna habitat, I consider that the removal of protected fauna habitat for the project would be compensated for through the proposed offsets for regulated vegetation and habitat for species listed under the EPBC Act.

Coordinator-General's conclusion: protected wildlife habitat – protected fauna

I am satisfied that the impacts on protected fauna habitat would be compensated for through the proposed offsets for regulated vegetation and habitat for species listed under the EPBC Act.

I consider that the project is unlikely to have an unacceptable impact on protected fauna, provided the proposed avoidance and mitigation measures and commitments are implemented. I am satisfied my recommended conditions for the Commonwealth Minister for the Environment will ensure that acceptable outcomes are achieved for impacts on protected fauna habitat within the project area.

5.2.6 Waterways providing for fish passage

Background

The EO Regulation states that any part of a waterway providing for passage of fish is a MSES only if the construction, installation or modification of waterway barrier works carried out under an authority will limit the passage of fish along the waterway.

The DAF Queensland Waterways for Waterway Barrier Works mapping indicates that the Isaac River is at major risk of adverse impact from waterway barrier works on fish movement and is considered a regional conduit for fish passage. Ripstone Creek is identified as being at high risk of adverse impact and is considered a local conduit for fish passage. All other mapped waterways that intersect or are within study area are identified as being of low to moderate risk of adverse impact from waterway barrier works on fish movement, due to being highly ephemeral or terminating within the project area at their upstream extent.

The project is proposing to construct culverts and bed-level crossings, which may act to affect fish passage for mapped waterways within the project area. The proponent is also proposing the permanent diversion of a section of Ripstone Creek. For further assessment of the potential impacts associated with the permanent diversion, see section 7.

All waterway crossings that would be located within the mining lease area would be accepted development in accordance with the Planning Act. There would be only one waterway crossing located outside the mining lease area for the project; the crossing of Cherwell Creek for the water pipeline.

Impacts and mitigation

The EIS indicates that watercourse crossings for the project would include low flow culverts to enable fish passage and would be designed in consultation with DAF. Watercourse crossings may include artificial daytime lighting to negate the behavioural barrier of a dark tunnel effect on fish passage. Each crossing would be designed to be inundated during moderate to high flow events (which may negate the need for baffling), allowing fish passage above and around the structure.

The EIS also considers that the project is not likely to result in a significant reduction to the extent, frequency or duration of flows within waterways around the project area; accordingly, the project is not expected to impact fish passage via reduction of flows. The project is also not expected to alter surface water hydrology so as to cue movement in local fish species, as any water releases required by the project would be managed in accordance with EA conditions. The volume, depth, timing, duration and frequency of flows would continue to reflect the ephemeral and variable flow nature of the waterways around the project area.

I note that submitters raised issues regarding the potential impacts on waterways which provide for fish passage. I note that the proponent has committed to ensuring that waterway crossings for the project are constructed with consideration of the *Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works* and consulting with DAF in the design of the Isaac River crossing.

The waterway crossing required for the water pipeline would be constructed via directional drilling, rather than excavating a trench and laying the pipeline through the watercourse itself. A drill rig would be used to drill a hole beneath the watercourse and the pipeline would be fed through the hole. The EIS considers that this would avoid direct impacts on Cherwell Creek and the provision of fish passage within the creek.

Accordingly, I am satisfied that the project would not result in a significant residual impact to waterways providing for fish passage provided that the proponent fulfils their commitment.

Significant residual impacts and offsets

As the proponent has committed to ensuring that waterway crossings for the project are constructed with consideration to the *Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works*, and the Isaac River crossing would be designed in consultation with DAF so as not to create a barrier to fish movement, I consider that a significant residual impact on fish passage is unlikely.

The proponent indicates that any waterway barrier works required for the ETL and western part of the water pipeline (off-lease) would be designed in accordance with DAF's requirements and subject to separate approval outside of the EIS process.

I expect that the proponent fulfils their commitment to construct all waterway crossings for the project in accordance with the *Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works*.

Coordinator-General's conclusion: waterways providing for fish passage

Provided that the proponent fulfils their commitment to construct waterway crossings with consideration to the *Accepted Development Requirements for Operational Work that is Constructing or Raising Waterway Barrier Works*, I am satisfied that the project would not have a significant residual impact to waterways providing for fish passage.

5.2.7 Coordinator-General's conclusion: MSES

I am satisfied that the proponent has identified the potential impact of the project on MSES including regulated vegetation, connectivity areas, wetlands and watercourses, protected plants and animals and waterways providing for fish passage.

I am satisfied that the proposed offsets for impacts on MNES species habitat under the EPBC Act would substantially provide offsets for all impacts on MSES values, as summarised in Table 5.3.

Table 5.3 Overlap between MSES and MNES values and proposed offsets

MSES value with significant residual impact	Total project significant residual impact (ha)	MNES residual significant impact substantially the same	Proposed MNES offset (ha)	MSES offset requirement addressed
Regulated vegetation				
'Endangered' REs (RE 11.3.1, 11.4.8, 11.4.9, 11.5.17)	140.5	REs 11.3.1, 11.4.8, 11.4.9, 11.5.17 as ecosystems which provide important habitat for the ornamental snake and habitat for the Australian painted snipe	7,666	Yes
'Of concern' REs (RE 11.3.2, 11.3.3, 11.3.4)	864.5	REs 11.3.2, 11.3.3, 11.3.4 as ecosystems which provide critical habitat for the koala and habitat for the greater glider	5,583.5	Yes
Essential habitat for the ornamental snake	4,341	Important habitat for the ornamental snake	7,666	Yes
Essential habitat for the koala	4,827	Critical habitat for the koala	5,583.5	Yes
Remnant vegetation which coincides with mapped wetlands (RE 11.3.27)	49	Habitat for the Australian painted snipe which includes RE 11.3.27	86	Yes
Remnant vegetation which occurs within the defined distance of a watercourse (RE 11.3.1, 11.4.8, 11.4.9, 11.3.25, 11.5.3)	126	REs 11.3.1, 11.4.8, 11.4.9, 11.3.25, 11.5.3 as ecosystems which provide critical habitat for the koala and habitat for the greater glider	5,583.5	Yes

Connectivity areas	5661.5	All remnant vegetation on the project site as habitat for a range of EPBC listed species, including connectivity values	34,000 (all remnant and regrowth vegetation providing habitat for EPBC listed species within the proposed offset properties owned by Pembroke)	Yes
Wetlands of high ecological significance	61	Wetlands as 'water resources' under the EPBC Act	86 (with an additional 128.5 ha available within the proposed offset properties)	Yes

I have recommended conditions for consideration by the Commonwealth Minister for the Environment requiring the proponent to provide a biodiversity offsets strategy to compensate for the loss of MNES under the EPBC Act. I am satisfied that the offset obligations for MNES matters would address the offset obligations for MSES matters relating to regulated vegetation, connectivity areas, wetlands and protected wildlife habitat.

5.3 Economics

The project would have a positive contribution to the local, regional and state economies as a result of capital expenditure, royalties and increased employment. The project could also impact the cost of housing and wages and these issues are addressed more fully in the assessment of social impacts in section 6 of this evaluation report.

5.3.1 Impacts

The EIS reported that the project would result in an estimated capital expenditure of \$1,009 million over the life of the project. The development costs include project infrastructure costs, funds for biodiversity offsets, agreements with impacted landholders, road infrastructure and impact management and monitoring.

The economic impact assessment was undertaken in accordance with my Economic Impact Assessment Guideline (2017) and included a regional impact analysis and a cost-benefit analysis (CBA) of the project. Key assumptions were detailed in the assessment relating to factors such as labour supply, coal prices, exchange rates, the mining rate, coal production rates, life of mine, workforce, capital expenditure, average operating costs and royalties.

Regional impacts

Gross product

The impacts of the project on the local, regional and state economies from 2018-2050 were predicted using computable general equilibrium (CGE) modelling. The modelling found that by 2050, the project would contribute:

- \$8.0 billion to the local economy in the IRC LGA

- \$212 million to the gross regional product of the Mackay Regional Council (MRC) and Whitsunday Regional Council areas
- \$10.1 billion to the gross state product of Queensland.

The contribution to the Queensland economy includes estimated average annual royalties of 8.3 per cent of the project's revenue.

Employment

The EIS reported the project would result in an annual average of 500 construction jobs and 1,000 operational jobs over the 79-year mine life. The project would have a peak operational workforce of approximately 1,300 onsite personnel from 2,034 when the mining rate reaches 15 Mtpa.

Potential impacts on housing and labour force demand

The project has the potential to increase demand for housing and labour in the local economy and as a consequence, increase the cost of housing and wages. The potential for the project to drive up local and regional factor prices and reduce economic activity in other sectors was considered in the CGE modelling. Measures to manage these impacts and the impacts of the project on local business and industry are addressed in section 6 of this report.

Cost-benefit analysis

The results of the CBA indicated that the net social benefits to Australia would be \$2,239 million. The assessment considered project development costs, operating costs and rehabilitation and decommissioning costs as well as the potential costs of environmental, social and cultural impacts of the project after mitigation, offsetting and compensation. The key benefits attributed to the project resulted from the value of the product coal, wage benefits from employment and the residual value of capital equipment and land at the end of the project life. The assessment calculated the net present value of these costs and benefits and included sensitivity testing using 4 per cent, 7 per cent and 10 per cent discount rates.

The CBA apportioned \$1,400 million of the net social benefits of the project to Queensland, calculated at present value with a 7 per cent discount rate, including \$1,117 million in royalties and \$211 million company tax. This value was determined on the basis that all royalties and potential wage benefits would be attributable to Queensland, that 20 per cent of the estimated company tax benefits and greenhouse gas costs would be attributable to Queensland based on the state's share of the Australian population and that all other potential environmental, social and cultural impacts would accrue to Queensland households.

The CBA noted that while the key environmental, cultural and social impacts have been quantified and included in the analysis, any other residual environmental, cultural or social impacts that remain unquantified would need to be valued at greater than between \$2,239 million for the project to be questionable from an Australian economic efficiency perspective.

I am satisfied that the matters considered in the CBA were appropriate and that the assessment clearly demonstrates the net economic benefits of the project.

5.3.2 Coordinator-General's conclusion: economics

I am satisfied that the EIS has adequately assessed the economic impacts of the project. I note the substantial benefits to the local, regional and state economies, particularly the creation of new jobs and the capital investment predicted to occur as a result of the project.

I am satisfied that the assumptions underpinning the economic impact assessment are appropriate for a project at this stage of development and that the findings of the CBA indicate net social benefits which justify the project from an economic efficiency perspective.

5.4 Air quality and greenhouse gas

The EIS identified key project activities that would generate particulate and dust emissions including waste rock removal, ROM coal extraction, truck haulage, wind erosion from exposed areas and on-site CHPP operations. These activities have the potential to impact sensitive receptors.

The proponent undertook modelling to identify potential impacts on sensitive receptors using data collected by DES and for other impact assessments. The proponent identified seven homesteads in proximity to the project as sensitive receptors to project activities. Table 5.4 summarises the location of the sensitive receptors. Distances between the project site and the nearest homesteads range from 0.7 km to 6 km.

Description	Distance and direction from project
Leichardt	6 km south
Old Bombandy	6 km south-east
Willunga	3.4 km east
Seloh Nolem 1	0.7 km north-east
Seloh Nolem 2	1.2 km north-east
Vermont Park	0.8 km east
Olive Downs	5.7 km north-west

Table 5.4 Sensitive receptors: homesteads in the vicinity of the project site

5.4.1 Impacts and mitigation

Construction and operation

The proponent completed site-specific modelling to predict the impacts of dust emissions generated from the project. The potential air quality impacts were assessed over a range of scenarios, with results in the year 2043 representing the highest concentration of dust generation from the project. This scenario year represents peak coal production.

The EIS modelling results demonstrated that at all sensitive receptors (Table 5.4), the dust emissions from the mine during the highest generation period, including background concentrations, are predicted to be within the objective levels specified in the Environmental Protection (Air) Policy 2008 (EPP (Air)) when standard and proposed

proactive mitigation measures are implemented. Specifically, levels of pollutants PM_{2.5}, PM₁₀, total suspended particles (TSP) and dust are predicted to be below the limit criteria at all sensitive receptors when all proposed mitigation measures are implemented. Therefore, there are no impacts on human health or wellbeing.

The proponent proposes a range of control and mitigation measures to manage dust emissions on the project site. Table 5.5 outlines the proposed standard dust control measures to be implemented during construction and operation and the predicted reduction of emissions.

Table 5.5 Standard control and mitigation measures for dust management

Activity	Control measures	Reduction (percentage)
Wheel-generated dust and grading	Chemical suppressant	95
Drilling	Dust collectors/watering	70
Wind erosion	Rehabilitated areas	40
Wind erosion from ROM coal and rejects stockpiles	Water sprays	50
Product stockpile – dozers, wind erosion and stacking and reclaiming	Material is wet due to processing	50
CHPP processing	Water application	50
Train loadout	Water application	50

In addition, the proponent proposes to implement further measures during periods of increased risk of potential impacts on sensitive receptors. Continual monitoring of dust emission levels, weather forecasting and meteorological conditions will allow operational activities to be modified to achieve air quality objectives and compliance with EPP (Air) standards for PM_{2.5}, PM₁₀ and TSP emissions at all sensitive receptors.

An Air Quality Management Plan would be prepared prior to construction to include management measures, monitoring of air impacts and when modifications to project activity would occur during periods of higher risk of potential impacts. To ensure ongoing protection of sensitive receptors, the proponent would apply additional or increase intensity of dust controls and move or reduce the intensity of operations or cease certain operational activities.

The EIS states that during the years predicted to exceed air quality objectives for PM₁₀ emissions, the implementation of both standard and additional mitigation measures would ensure impacts would not occur at any sensitive receptors. The proponent also proposes to modify waste haulage operations at night to further prevent dust emission impacts on nearby homesteads.

As part of the proposed environmental management plan, the proponent would establish a complaint handling procedure to respond to concerns regarding air quality impacts.

Rail operation emissions

Dust emissions from the project coal train operations would be generated from: the exposed coal surface and leakage from loaded wagons, wind erosion and the loading and

unloading of coal from wagons. The EIS concluded that impacts from coal trains are localised and short term.

The proponent proposes measures to minimise coal dust emissions from the rail facility, equipment and during transportation by implementing mitigation activities consistent with the Aurizon Coal Dust Management Plan. Mitigation measures would include, but are not limited to, the use of automated loading of trains wagons to prevent overloading, veneering system to prevent dust generation during transit to port, and water sprays on the train load out to minimise dust generation.

I am satisfied that the proponent commitment to implement a Coal Dust Management Plan and mitigation measures in accordance with Aurizon's industry standards, would reduce the coal dust emissions at the rail facility and during transportation.

Cumulative impacts

The proponent undertook a review of the National Pollutant Inventory database and identified a number of existing sources of dust emissions in the surrounding 50 kms of the project site. The primary industry in the surrounding area is mining, resulting in a high cumulative volume of PM_{2.5} and PM₁₀ emissions generated per year. The proponent identified 19 facilities in the vicinity and the volume of PM_{2.5} and PM₁₀ tonnes per year produced by each facility (as per Appendix G, Table 4 of the EIS).

The modelling presented in the EIS assessed the cumulative potential air impacts from the project and the surrounding facilities. With the implementation of the proposed mitigation and management measures, the cumulative emissions would not exceed the air quality objective for PM_{2.5}, PM₁₀ and TSP emissions.

Therefore, the EIS concludes that potential impacts from cumulative dust emissions would not occur at the sensitive receptors and I accept this conclusion. Cumulative impacts of the project would be managed by the implementation of the proposed mitigation measures for particulates and dust emissions on the project site.

Greenhouse gas emissions

In accordance with the Australian regulatory framework for greenhouse gas emissions, the proponent is required to comply with the requirements of the National Greenhouse and Energy Reporting and the Safeguard Mechanism.

A greenhouse gas assessment was undertaken for the project to identify scope 1 and 2 emissions to quantify the projects contribution of carbon dioxide equivalent (CO₂-e). The project activities that would contribute to GHG emissions (direct and in-direct) include on-site fuel use, emissions of methane from exposed coal seams, emissions generated from explosives and consumption of electricity.

The EIS states that during construction and operation, the project is predicted to contribute an estimated annual average of 910 kilotonnes of CO₂-e of scope 1 and 2 emissions. The EIS concluded that the projects GHG emissions contribution represents approximately 0.4 per cent to the annual Australian GHG emissions and approximately 2.2 per cent of Queensland's annual GHG emissions.

The proponent is required to meet annual assessment and reporting obligations in compliance with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). The proponent proposes to manage GHG emissions through general identification and

reduction of construction and operational activities producing GHG emissions and maintaining and reducing the consumption of diesel for equipment.

5.4.2 Coordinator-General's conclusion: air quality and greenhouse gas

For my evaluation of the air quality impacts of the project, I have considered the EIS and each submission on the draft EIS.

I have stated draft EA conditions for the mine site (Appendix 1), which specify that dust and particulate matter limit criteria are not to be exceeded at sensitive receptor locations. I have also set monitoring and reporting requirements to be implemented by the proponent in accordance with the appropriate regulatory standards.

I am satisfied that by implementing the proponent's proposed standard and additional mitigation measures and the draft EA conditions stated in Appendix 1, as well as complying with relevant legislative requirements, the project's potential air quality impacts on sensitive receptors can be appropriately managed within acceptable limits.

I note the proponent's commitments in Appendix 4 to prepare an Air Quality Management Plan, continually manage and monitor dust generated from mining activity and implement a Coal Dust Management Plan to manage potential coal dust impacts from the railway.

I am satisfied that the proponent would undertake annual assessment and reporting of GHG emissions in accordance with compliance obligations of the NGER Act and implement management measures to reduce the generation of GHG emissions during all phases of the project.

5.5 Noise and vibration

The EIS identified that noise and vibration would be generated during the project's construction and operation from activities including earthworks, machinery and equipment use, blasting of overburden and interburden, operation of the CHPP and vehicle movements including rail.

5.5.1 Impacts and mitigation

Construction and operation

Potential noise and vibration impacts from construction and operational activities at the mine and infrastructure areas were modelled in the EIS using a number of scenarios to identify potential impacts on sensitive receptors (Table 5.4) over the life of the mine.

Noise

The assessment of potential noise and vibration impacts in the EIS focuses on the predicted worse case scenarios which would occur during operation. The EIS modelled operation scenarios in years 2027, 2043, 2066 and 2085 to determine if the noise generated from the project exceeded noise limits in the Environmental Protection Policy (Noise) 2008 (EPP (Noise)). These years were selected to represent all operational stages during the life of the mine, including peak coal production. Modelling was completed during normal weather conditions and adverse weather conditions. Adverse

weather conditions such as periods of increased temperatures and heighten wind speed have the potential to increase noise levels by up to 7 dBA.

The modelling results presented in the EIS included the implementation of proposed mitigation measures. With the incorporation of the proposed mitigation measures, noise levels generated during operations in years 2027, 2043 and 2066 are predicted to meet DES Model Mining Conditions (MMC) guideline criteria and EPP (Noise) limits of 35 dBA $L_{eq, adj\ 15\ mins}$ during the day, evening and night time under normal weather conditions at most sensitive receptors. Noise impacts from the CHPP are not predicted to occur as the CCHP is located 12 km from the nearest sensitive receptor.

The EIS identifies that noise levels from the overland conveyor would impact on the Seloh Nolem 1 and Seloh Nolem 2 homesteads under all weather conditions. To comply with EPP (Noise) and the MMC guideline limits, the proponent proposes to enclose a section of the conveyor and use low noise idlers during adverse weather conditions. With the implementation of mitigation measures, the EIS concludes that noise levels would be below 35 dBA $L_{eq, adj\ 15\ mins}$ at the Seloh Nolem 1 and Seloh Nolem 2 homesteads.

In the modelled year 2085 and under normal weather conditions, mobile plant equipment would require additional sound suppression measures to ensure no noise impacts occur at Vermont Park homestead, located 2 km from the project site. The proponent would attenuate the fleet in accordance with industry standards at relevant stages to ensure there are no noise impacts at Vermont Park homestead.

The EIS states that in modelled years 2066 and 2085, during adverse weather conditions, noise from mobile plant operations would require additional mitigation to ensure compliance with EPP (Noise) and MMC guidelines at the Vermont Park homestead. During the stages of the project that coincide with the modelled activity, operational activities would be restricted to daytime only.

The EIS includes a cumulative assessment of the noise generated from the project and existing background noise levels. It was concluded that the predicted cumulative noise levels at sensitive receptors would comply with the EPP (Noise) and MMC guideline limits and impact from cumulative noise would be insignificant. I accept the findings of the EIS in relation to this issue.

Road and rail

The EIS states that noise from operational vehicles along Annandale Road and Fitzroy Development Road would comply with DTMRs Transport Noise Management Code of Practice (2013). The EIS concluded, based on predicted numbers of workforce and heavy vehicle traffic generated over the life of the project, noise levels are not expected exceed DTMRs noise limit of 68 dBA $L_{10\ (18\ hours)}$. As predicted transport noise levels meet the requirements of DTMR's code of practice I am satisfied that impacts on sensitive receptors have been appropriately considered.

Noise generated from railway activities are predicted to comply with EPP (Noise) limits of 65 dBA $L_{Aeq, 24\ hours}$ for train movement during peak rail traffic and the Single Event Maximum of 87 dBA $maxL_p$ at all sensitive receptors including at Olive Downs homestead, located 1.5 km from the rail spur.

With the proposed mitigation measures, the noise impact assessment provided by the proponent predicts that noise levels during construction and operation are expected to be

below the relevant criteria under all weather conditions. The mitigation measures include the use of low noise idlers and sound suppressors for mobile plant machinery and to enclose a section of the proposed overland conveyor. The EIS notes that under adverse weather conditions in modelled year 2085, operation activities would be restricted to daytime only. These operational activities include those required during the mining of Pits ODS7 and ODS8. The proponent also proposes to implement a reactive and proactive strategy to monitor changes in meteorological conditions and determine when changes in operational activities are required to comply with noise level standards.

Vibration

The EIS identifies drilling and blasting of overburden and interburden during operation as the primary source of vibration which could impact sensitive receptors.

The MMC guideline includes blasting noise and vibration objectives. The blasting vibration objective is 5 mm per second peak particle velocity (PPV) and the airblast overpressure objective is 115 dBZ. PPV is a measurement of maximum ground particle movement speed. A dBZ flat frequency measurement is typically used to measure explosive sounds.

The EIS includes an assessment of the Maximum Instantaneous Charge (MIC) (effective charge mass per delay) which would be allowable at a range of distances from the blasting activity.

Proposed blasting would comply with the relevant limits at all sensitive receptors and for all blasting activities with the exception of one potential exceedance during establishment of the ODS8 Pit.

The modelling of proposed blasting identified the potential for vibration levels to exceed limits at Vermont Park during blasting in the ODS8 Pit, proposed to be undertake during the years 2073-2085. The proponent proposes to adjust the blasting design in accordance with results from site-specific blasting monitoring to ensure compliance with the blasting noise and vibration objectives.

All other modelled blasting scenarios predicted that typical explosive charge sizes and practices would comply with the MMC guideline vibration objectives for PPV and airblast overpressure at all sensitive receptors.

5.5.2 Coordinator-General's conclusion: noise and vibration

For my evaluation of the noise and vibration impacts of the project, I have considered the EIS and each submission on the EIS.

I note the proponent's commitments to implement mitigation measures required to ensure compliance with EPP (Noise) and the MMC guideline levels including proactive and reactive measures throughout the life of the mine.

I have stated draft EA conditions for noise generated by the mining activities, including blasting, which specify compliance to noise limits at all sensitive receptors. I have also set noise monitoring and recording requirements to be implemented by the proponent to ensure noise generation is in compliance with EPP (Noise) and the MMC guideline.

The proponent has proposed stringent noise limits at sensitive receptors of 35 dBA $L_{eq, adj \ 15 \ mins}$ during daytime, evening and night time. I have stated conditions which would ensure that these limits are included on the project's EA.

To ensure no impacts from vibration occurs at the sensitive receptors, I have stated conditions for the EA specifying blasting noise limits for airblast overpressure and ground vibration. I am satisfied that vibration from the project would not cause impacts on nearby sensitive receptors. I also require the proponent to prepare a blast monitoring program in compliance with blasting noise limits as presented in Appendix 1.

I am satisfied that the EIS has adequately identified potential impacts from noise and vibration from mining activity, rail and road traffic. Noise and vibration levels are predicted to be lower than the adopted guidelines at the sensitive receptors when mitigation measures are in place during construction and operational stages.

5.6 Transport

The project would result in increased traffic on local and state-controlled roads, minor increases in the volume of rail traffic and impacts on level crossings. The existing local transport network is identified in Figure 5.3.

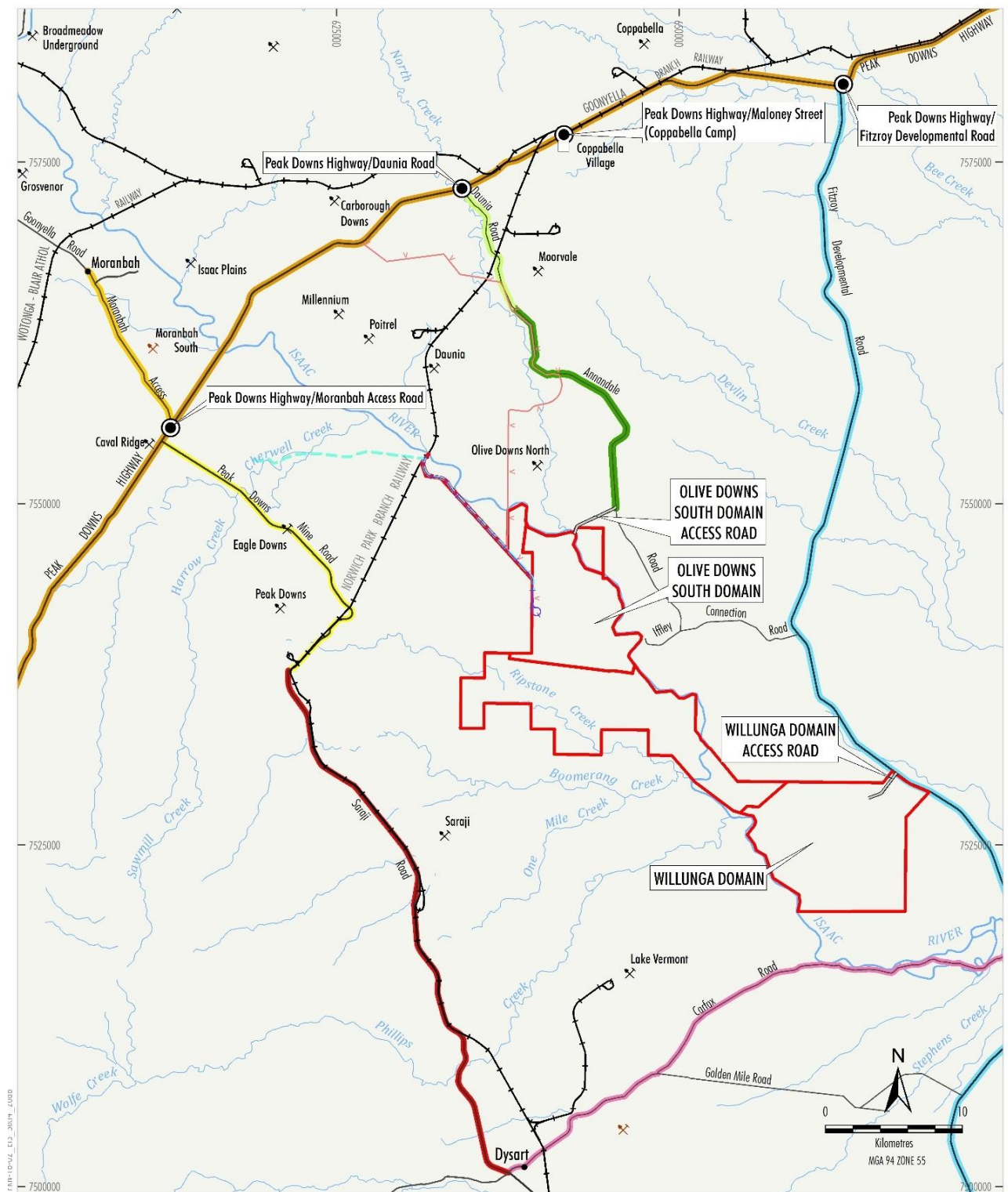


Figure 5.3 Existing transport network

5.6.1 Impacts and mitigation

Construction

State-controlled roads

The impacts of project traffic on state-controlled roads were modelled in accordance with the DTMR's Guide to Traffic Impact Assessment (GTIA). The road transport assessment found that during construction:

- the level of service on all state-controlled road links would remain at an acceptable level
- an increase in traffic volumes greater than five per cent would occur on sections of the Peak Downs Highway and Fitzroy Developmental Road the two state-controlled roads in immediate proximity to the project. These impacts were predicted to occur in 2020 during the construction of the ODS domain and in 2027 during the construction period for the Willunga domain.

The GTIA requires an assessment of pavement impacts on sections of state-controlled roads where traffic is expected to exceed five per cent of the base case to determine the implications of project traffic on road pavements. The proponent has committed to engage a pavement design specialist to determine the existing capacity of the pavement on affected links of the Peak Downs Highway and Fitzroy Developmental Road. The proponent has also committed to liaise with DTMR, to determine whether monetary contributions or other compensation would be required to offset the pavement impacts generated by the project. I have also recommended in 0 that the proponent update the transport assessment in accordance with the GTIA six months prior to the commencement of significant construction works, or as otherwise agreed between the proponent and TMR. The updated assessment must include final impact mitigation proposals, such as roadworks, contributions to road works or maintenance or road-use management strategies.

I am satisfied that through the implementation of the proponent commitments and my recommendations, which I require the proponent to undertake, that impacts will be appropriately identified and managed.

Local roads

The two local roads proposed to be heavily used by project traffic are Daunia Road which leads south from the Peak Downs Highway, and Annandale Road which connects from Daunia Road south towards the project's new access road for the ODS domain. Daunia and Annandale roads are managed by the IRC and are currently five-metre-wide gravel roads which the proponent has committed to upgrading to ten-metre-wide sealed roads with a pavement life of 20 years, design speed of 110 km per hour and flood immunity of one per cent AEP. The roads would also be fully fenced to keep stock from entering and the proponent has committed to installing permanent floodlighting at the intersection of Annandale Road and the project access road and street lighting along the extent of Annandale Road that will be used by project traffic.

A new access road would also be constructed from the Fitzroy Developmental Road to the Willunga domain.

An infrastructure agreement is currently being developed between the proponent and IRC to define the extent of local road infrastructure upgrades, timing and associated costs. I am satisfied that the infrastructure agreement would adequately define the scope and responsibilities for the costs of required local road upgrades and result in local road upgrades that would safely and efficiently accommodate project traffic.

Intersections

The EIS road transport assessment identified that the intersection of the Peak Downs Highway and Daunia Road would require upgrading to accommodate project traffic originating from Mackay. The proponent has committed to upgrade the intersection from a short auxiliary lane to a full-length auxiliary lane by 2027.

The project would also require the construction of two new three-way intersections where the mine access roads for ODS and Willunga domain intersect with Annandale and Fitzroy Developmental Roads, respectively. The proponent has committed to constructing the intersection with the Fitzroy Developmental Road in accordance with DTMR's (2014) Road Planning and Design Manual (Edition 2) – Volume 3: Supplement to Austroads Guide to Road Design Part 4A. I have recommended that the designs for all intersections that require upgrading be included in the updated traffic impact assessment and approved by DTMR no later than six months prior to the commencement of significant construction works for each stage of the project. I am satisfied that the approval of the intersection designs by DTMR would ensure the safety and efficiency of these two intersections.

Annandale Road intersects with a proposed haul road located on ML 70355 which has been designated for the transport of product coal north from the proposed Moorvale South Mine to the existing Moorvale Mine. The impacts of increased project traffic on Annandale Road would have implications for safety and efficiency at this intersection, particularly during peak times such as shift changes, and therefore the proponent has committed to upgrade the intersection, in consultation with IRC and the haul road owner to accommodate vehicle movements for both projects.

Railway level crossings

The level crossing located on Daunia Road, approximately 6 km south of the Peak Downs Highway would be impacted by construction traffic, with two-way vehicle numbers potentially increasing from 17 vehicles to up to 937 vehicles in a one-hour period (a conservative estimate for shift change traffic during peak construction in 2020). Given the increase in traffic volume, including heavy vehicles, Aurizon has advised that it is likely an active crossing would be required. The proponent intends to lodge an *Application for Use (or Change of Use) of an Aurizon Network Private Level Crossing* with Aurizon which would trigger an Australian Level Crossing Assessment Model (ALCAM) assessment process and has committed to upgrading the crossing to the design required by Aurizon based on this assessment.

I am satisfied that the proponent's commitment to engage with Aurizon and upgrade impacted level crossings in accordance with the ALCAM assessment process would adequately ensure the safety and efficiency of level crossings with the project.

Operation

State-controlled roads

The road transport assessment identified that the project would not increase traffic volumes more than five per cent on any sections of the Peak Downs Highway or Fitzroy Developmental Road during operation.

To minimise potential road safety impacts on all public roads carrying project traffic, I have recommended in 0 that the proponent prepare a road-use management plan (RMP) in accordance with DTMR's Guide to Preparing a Road-use Management Plan (2018). The RMP must be developed with a view to optimising project traffic and minimising road-based trips on state and local roads, detail the non-infrastructure impact mitigation strategies proposed, such as designated heavy vehicle haulage routes to minimise road safety and pavement impacts and include a table of RMP mitigation commitments.

I am satisfied that the EIS has adequately assessed the potential impacts of operational traffic on the level of service and pavements of state-controlled roads and expect the proponent's commitments and my recommendations to be fully implemented.

Local roads

IRC raised concerns that drive-in, drive-out traffic from Dysart and Middlemount may use alternative routes to access the project site which were not assessed in the EIS to reduce driving distance by approximately 80 km. This could potentially impact the condition of the southern portion of Annandale Road and Carfax and Iffley Connection Roads which are unsealed roads south of the project site. The proponent has committed to conducting ongoing monitoring of the usage of these roads and determining whether upgrades would be required in consultation with IRC. Any contributions to upgrades would be in accordance with the proponent's infrastructure agreement with the council. The proponent has also committed to instructing all employees and contractors to not access the ODS domain via the southern portion of Annandale Road. I am satisfied that the infrastructure agreement between the proponent and IRC would be sufficient to adequately manage any potential impacts on these roads.

Due to low existing usage, project traffic would cause an increase of traffic of more than five per cent on the Moranbah Access Road over the life of the project. The proponent has committed to engage a pavement design specialist to determine the existing capacity of the pavement on Moranbah Access Road in consultation with IRC to determine whether monetary contributions or other compensation is required to offset the pavement impacts generated by the project.

Rail network

The project would increase the number of trains travelling along the Goonyella Branch Railway by up to eight product coal trains per day, representing 12.5 per cent of the current coal throughput on the network. The proponent has advised that sufficient capacity has been secured at the DBCT, as well as the associated rail capacity on the rail network, for the first ten years of the project and that as part of its Network Development Plan 2016-2017 Aurizon has identified a range of growth scenarios to increase the capacity of the Goonyella Branch Railway from 84.2 Mtpa to 220 Mtpa by 2027, including the construction of new loops, additional signalling and duplication of track.

I accept that the project would use existing rail network capacity and I note that further interest in capacity at DBCT may result in the port's expansion, supported, where required, by aligned rail network expansions. I am satisfied that existing network capacity would be secured for further stages of the project.

Level crossings

The project is not expected to have a significant impact on rail level crossings located along the Goonyella Branch Railway between the project and the port. The project would add up to eight trains per day to a system which currently accommodates approximately 240 one-way train movements per day. I am satisfied that the number of additional coal trains associated with the project would be minimal in comparison to the large number of trains that travel along this network per day.

5.6.2 Coordinator-General's conclusion: transport

I am satisfied that the EIS has adequately investigated and assessed the potential impacts of the project on transport matters.

I have recommended that the proponent provide an updated traffic impact assessment and a final road-use management plan six months prior to the commencement of construction for approval by DTMR to ensure that the impacts identified during the detailed design phase are known and can be suitably managed.

I have recommended that the proponent provide an updated traffic impact assessment to analyse and mitigate the impacts of project traffic on the safety, efficiency and condition of state-controlled and local roads in accordance with the GTIA. I note the proposed infrastructure agreement being developed between the proponent and the IRC to ensure the obligations of each party with respect to local road upgrades are certain and expect the proponent's commitment to finalise the infrastructure agreement to be fully implemented.

I am satisfied that through the implementation of the proponent's commitments and my recommendations that potential impacts on the road and rail network would be appropriately managed.

5.7 Hazard and risk

The EIS presented an assessment of potential hazards and risks for the project including the use and storage of hazardous substances, bushfire, flooding and other potential environmental and safety issues.

5.7.1 Impacts and mitigation

Potential impacts of environmental and safety hazards

Potential hazards and risks were assessed using a modified hazard and operability analysis which identified and assessed a range of scenarios relating to personnel, community, site and environmental safety and the potential occurrence of natural hazards. Risks were ranked by identifying the probability and the maximum reasonable consequence of the risk occurring to determine if risks were tolerable, as low as reasonably practical, or intolerable. No scenarios were identified that had an intolerable risk level.

Matters that the EIS addressed included:

- the use and storage of hazardous substances such as hydrocarbons, chemicals and explosives
- natural events including bushfires, floods and wildlife hazards such as snake bite
- the potential for the project to cause off-site hazards, through the alteration of water quality, flood characteristics and the natural bushfire regime.

The project's management plans for air quality, blasting, cultural heritage, social impacts, water management and rehabilitation would contribute to the management and reduction of hazard and risk. Furthermore, the proponent commitments in Appendix 4 specify measures related to the management, storage and disposal of hazardous substances, training of equipment operators, storage of explosives and engagement with emergency service providers.

I accept the proponent's assessment of the potential hazards and risks of the project and the mitigation measures proposed to manage them.

Flooding from linear infrastructure

One submitter on the draft EIS raised the concern that the project's rail infrastructure could result increase the likelihood and duration of flooding on their property by impounding floodwaters from the Isaac River.

In the additional information to the EIS, the proponent advised that rail infrastructure has been designed to meet Aurizon's flood and design criteria and that culverts and a bridge structure have been incorporated into the design to allow Isaac River flood waters to pass under the rail spur and then drain back to the Isaac River as a flood event recedes. The culverts and bridge structure would also allow the existing local catchments to the south of the rail spur to drain to the Isaac River via the existing drainage paths.

Using the proposed culvert and bridge design for the project's rail infrastructure, flood modelling was undertaken which determine that there would be no material impact on peak flood levels and peak velocities – that peak flood levels would not be greater than

0.1 metre and peak velocities would be less than 0.1 metre per second. The modelling concluded that the impacts of the rail spur on the existing flooding regime would be negligible.

I am satisfied that the risk of flooding to adjacent landholders from linear infrastructure has been adequately mitigated in the design of the project's rail infrastructure. Further information on flooding associated with the levees around the project's mining areas can be found in section 7.

Consultation with emergency services

The proponent has committed to prepare an emergency response procedure in consultation with emergency service agencies. The emergency response procedure would be implemented in the event of an incident to maintain the well-being of personnel, contractors and the public and would describe the actions that would be implemented in the event of injury or illness, fire, unintended initiation of explosives, loss of containment of hazardous substance, natural event (e.g. flooding, bushfire, cyclone), vehicle accident or unapproved discharge off-site. The emergency response procedure would include information such as:

- contact details for key stakeholders in case of any emergency
- emergency and evacuation planning, maps and response procedures
- a description of the proposed communication mechanisms and required infrastructure
- treatment plans for injured workers due to chemical process used on site, including proposed consultation
- description of notification requirements for planned exercises
- fatigue management policy.

I am satisfied with the proponent's commitment to liaise with Queensland emergency service agencies in developing and implementing the emergency response procedure and I require this to occur.

5.7.2 Coordinator-General's conclusion: hazard and risk

I am satisfied that the proponent has undertaken an appropriate assessment of potential hazards and risks of the project. I note the proponent's commitments to develop management plans, engage with emergency services and ensure the construction of linear infrastructure does not increase flooding risks to adjacent properties. I am satisfied that through the implementation of these plans and commitments that hazard and risks would be suitably identified and managed.

5.8 Waste

The project would generate mining waste such as overburden, interburden, waste rock and coarse and fine rejects which would be managed on site. The project would also generate substantial streams of both regulated waste such as oils, grease, sewage, paints, chemicals and tyres and unregulated waste including general waste, recyclables, green waste, scrap metals and wastewater which would be disposed of off-site at appropriately licensed facilities.

5.8.1 Impacts and mitigation

Construction and operation

The proponent has identified the expected volumes of each potential waste stream for the project, developed management strategies and identified expected disposal locations in a draft Waste Management Plan. The proponent has committed to manage the waste produced at the project in accordance with the waste and resource management hierarchy stipulated in the *Waste Reduction and Recycling Act 2011* and where waste must be disposed of, to do so in a way that prevents or minimises adverse effects on environmental values.

Volumes of both non-regulated and regulated waste, along with the proposed location for disposing of each waste stream are provided in Table 5.6 below.

Table 5.6 Estimated maximum wastes produced by the project per annum

Waste category	Quantity – construction	Quantity - operation	Proposed disposal location
Non-regulated waste			
Excavated waste	N/A	12 – 300 million bank cubic metres	Onsite within the MLA
Coarse and fine coal rejects	N/A	0.1 – 5.5 Mt	Onsite within the MLA
General waste	1,500 m ³	2,500 m ³	At an approved landfill within IRC or Mackay Regional Council (MRC) LGAs (excluding Dysart).
Recyclable waste	430 m ³	1,200 m ³	At an approved recycling facility outside the IRC LGA.
Refurbishable items	Less than 15 tonnes	Less than 40 tonnes	Items unable to be refurbished would be disposed at an approved waste facility.
Green waste	210 ha	210 ha	Onsite within the MLA.
Scrap metal	150 m ³	200 m ³	Disposed at an approved recycling facility.
Personal protective equipment and other small items	Less than 60 kg	Less than 120 kg	At an approved landfill within IRC or MRC LGA (excluding Dysart).
Air filters	Less than 2 tonnes	Less than 2 tonnes	At an approved landfill within IRC or MRC LGA (excluding Dysart).
Timber/wooden pallets	Less than 2 tonnes	Less than 2 tonnes	At an approved landfill within IRC or MRC LGA (excluding Dysart).

Regulated waste			
Waste oils	400 kilolitres (kL)	1,400 kL	Recycled by a licenced regulated waste contractor.
Engine oil/fuel filters	4,000	12,000	Recycled by a licenced regulated waste contractor.
Waste grease	Less than 100 kL	Less than 200 kL	Recycled by a licenced regulated waste contractor.
Sewage	Less than 100 kL	Less than 120 kL	Transported off-site to a licenced facility during construction. Treated and disposed in designated effluent irrigation areas onsite during operation.
Empty waste oil containers	Less than 4 tonnes	Less than 10 tonnes	Recycled by a licenced regulated waste contractor.
Paints	Less than 1 tonne	Less than 1 tonne	Recycled by a licenced regulated waste contractor.
Hydrocarbon contaminated material	Less than 4 tonnes	Less than 12 tonnes	Offsite at an approved licenced facility.
Miscellaneous chemicals	20 kL	50 kL	Offsite at an approved licenced facility.
Batteries	Less than 1 tonne	Less than 1 tonne	Offsite at an approved licenced facility.
Ozone depleting substance	200 kg	800 kg	Recycled by a licenced regulated waste contractor.
Tyres	180	280	Onsite within the ML.

Waste disposal

During consultation on the draft EIS, the IRC raised concerns that the proposed locations for various waste stream disposal in the LGA may not have the capacity to accommodate the proposed volume of waste requiring disposal for the project. The proponent has committed to continue to engage with IRC regarding waste disposal options, anticipating that waste generated by the project that requires off-site disposal would either be transferred to the Dysart, Moranbah or Clermont resource recovery centres. If capacity at these facilities were unavailable or an agreement with IRC for waste disposal could not be reached, the proponent has committed to disposing waste from the project within landfill sites operated by the MRC.

In relation to the disposal of regulated waste, the project would rely on licensed contractors who are closely regulated under the EP Act. I consider the existing regulatory framework around regulated waste disposal adequate to ensure that such wastes generated by the project would be appropriately managed.

Sewerage treatment plant capacity and disposal of wastewater

A submission on the draft EIS raised the concern that the capacity of the proposed sewage treatment plant would be insufficient for the proposed workforce and also that inadequate irrigation areas had been proposed for the disposal of treated effluent. The proponent undertook additional modelling using the Model for Effluent Disposal using Land Irrigation (MEDLI) which confirmed that the irrigation areas would need to be increased to a total of 5.5 ha between the two mining domains to cater for the maximum expected irrigation volume when the project workforce reaches its maximum.

I have stated a condition for the EA which requires that a minimum area of 5.5 ha of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial reuse of treated sewage effluent, consistent with the MEDLI modelling outcome. I also note that the proponent has also committed to engaging an appropriately qualified person to operate the sewage treatment plant. My stated conditions also place limits on the quality and volume of wastewater which can be disposed of to land.

Waste rock and coal rejects management

Waste rock and coarse and fine reject produced during the operational phase of the project would be reused as part of the progressive rehabilitation of the site, to backfill open cut pits. Further detail about progressive rehabilitation can be found in section 5.1. Management of these waste streams is a routine part of coal mine operation and I consider that the project's EA would ensure that on site waste management practices are appropriate.

5.8.2 Coordinator-General's conclusion: waste

I am satisfied that the EIS has adequately assessed the impacts of the project associated with waste generation during construction and operation.

I note the project would generate large volumes of general waste that may exceed the capacity of local waste facilities and that the proponent has committed to transporting waste outside the IRC area, if required. I expect the proponent commitments to be fully implemented.

I have stated conditions for the EA to ensure there are adequate irrigation areas for the disposal of effluent and that the quality and quantity of water released to land is strictly controlled.

With the implementation of the proponent's waste management plan, the conditions in the EA and the proponent commitments, I am satisfied that the waste impacts of the project would be adequately managed.

5.9 Cultural heritage

The EIS assessed the potential impacts of the project on Indigenous and non-Indigenous cultural heritage values of the project site.

Under the *Aboriginal Cultural Heritage Act 2003* (Qld) (ACH Act) a 'duty of care' is imposed on all persons undertaking development activities to ensure 'all reasonable and

practicable' measures are made to ensure that their activities do not harm matters of Aboriginal and Torres Strait Islander peoples' cultural heritage.

Non-Indigenous places of cultural heritage significant to Queensland are protected under the *Queensland Heritage Act 1992* and are entered in the Queensland Heritage Register.

5.9.1 Indigenous cultural heritage

The Barada Barna People are the determined Native Title holders of the land within and surrounding the project site. According to the EIS, Native Title was determined to exist in small parts of the project area, along the rail spur, water pipeline corridor and along the Isaac River. A Native Title trust for the Barada Barna People is held by the Barada Barna Aboriginal Corporation Registered Native Title Body Corporate, who are also the Aboriginal Party for the area of the project under the ACH Act.

The proponent entered into a Cultural Heritage Management Plan (CHMP) with the Barada Barna Aboriginal Corporation in mid-June 2018. Pursuant to section 107 of the ACH Act, the management plan has been submitted for approval to the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP).

The EIS assessment determined that it was highly unlikely that the project will have a detrimental impact to Indigenous cultural heritage.

5.9.2 Non-Indigenous cultural heritage

The EIS identified 15 sites of potential non-Indigenous cultural heritage (NICH) value within the project site. The type of sites identified characterise the pastoral history of the area. The locations of these sites are listed in Table 5.7. Three of the sites were within the project disturbance area. None of the sites identified are considered to have cultural significance. The grave site retains some significance, though it is was identified as not a historical grave and would require specific management measures.

Table 5.7 NICH sites and values occurring within the project area

Site name	Potential impact
1. Cattle ramp	Located within disturbance area
2. Cattle yards	No impact – outside of proposed works area
3. Graves	Located within disturbance area
4. Water infrastructure 1	No impact – outside of proposed works area
5. Water infrastructure 2	No impact – outside of proposed works area
6. Steam boilers	Located within disturbance area
7. Water infrastructure – Pump 1	No impact – outside of proposed works area
8. Water infrastructure – Pump 2	No impact – outside of proposed works area
9. Cattle loading ramp 2	No impact – outside of proposed works area
10. Fence post 1	No impact – outside of proposed works area
11. Fence post 2	No impact – outside of proposed works area
12. Fence post 3	No impact – outside of proposed works area
13. Fence post 4	No impact – outside of proposed works area

14. Water infrastructure 3	No impact – outside of proposed works area
15. Wire tree	No impact – outside of proposed works area

Based on the results, the EIS states there may be potential for further NICH sites to be identified in the project site. The types of sites include additional grave site/s, evidence of former homestead site/s, tanks, bores, dams, stockyard and/or dip sites, historic fence lines and evidence of early mining. The EIS concludes that due to highly obtrusive nature of visible heritage evidence, these additional sites are unlikely to be encountered during the life of the project.

5.9.3 Impacts and mitigation

Indigenous cultural heritage

No Aboriginal cultural heritage sites within the project footprint are recorded on the DATSIP Aboriginal and Torres Strait Islander Cultural Heritage Register. I note the proponent has already entered into an Indigenous Land Use Agreement (ILUA) and a CHMP with the Barada Barna People to manage the risk of harm to Aboriginal cultural heritage by activities associated with the project.

Non-Indigenous cultural heritage

The project found no sites that would have a significant impact on NICH. The only site that would require specific management are the modern graves. The proponent has committed to consult with the family members and have the grave relocated to a nearby cemetery or location of their choosing.

I have made a recommendation requiring the proponent to prepare and document measures and incidental finds procedures for identifying and managing impacts on any potential NICH. This is to be included in the Environmental Management Plan for the construction and operations stages of the project. Additionally, it is recommended that diligence be practiced during works conducted within the project site. To facilitate this diligence, the proponent recommended that a NICH Induction Booklet be developed once all approvals for the project are in place but prior to ground disturbing activities, which can be incorporated into the General Site Induction.

5.9.4 Coordinator-General's conclusion: cultural heritage

I am satisfied that the EIS has adequately investigated and assessed the potential impacts on cultural heritage from the project.

I am satisfied that impacts on NICH would be appropriately managed throughout the life of the project. I recommend the project be constructed and operated in accordance with the CHMP provisions.

6. Social impact assessment

6.1 Introduction

This section provides an evaluation of the project's social impact assessment (SIA), which was undertaken as part of the EIS. The SIA in the EIS details the project's potential social impacts and proposed management measures. The SIA was completed under the SSRC Act and is generally in accordance with the SIA Guideline (2018)².

Under the SSRC Act, large resource projects undergoing an EIS process under the SDPWO Act are required to complete an SIA in accordance with the SIA Guideline (2018).

The SIA is required to address the details provided in the SIA Guideline (2018) for the following five key matters:

- community and stakeholder engagement
- workforce management
- housing and accommodation
- local business and industry procurement
- health and community wellbeing.

The SIA is also required to demonstrate that the project's workforce recruitment hierarchy prioritises workers from local and regional communities, followed by workers who would live in regional communities.

The SSRC Act ensures that residents of communities near large resource projects benefit from the operation of the project by requiring owners of large resource projects to employ people from nearby regional communities. The SSRC Act prohibits operational large resource projects from having a 100 per cent fly-in, fly-out (FIFO) workforce and from discriminating against locals when employing for the workforce.

As part of evaluating the EIS, the Coordinator-General is required under the SSRC Act to decide whether the 100 per cent FIFO prohibition and anti-discrimination provisions should also apply to the project's construction workforce. In making this decision, the Coordinator-General would consider the scale and duration of the construction phase and the capacity of local communities to support local employment. These matters are addressed in my evaluation below.

6.2 SIA process

The SIA identified, analysed and assessed both positive and negative potential social impacts of the project.

The scoping process of the SIA was generally consistent with the SIA Guideline (2018) and included describing the project, determining the regulatory context, identifying and

² Social Impact Assessment Guideline, Department of State Development, Manufacturing, Infrastructure and Planning, <https://www.statedevelopment.qld.gov.au/resources/cg/social-impact-assessment-guideline.pdf>

profiling affected communities, identifying stakeholders, identifying relevant social indicators, and conducting a preliminary review of potential social impacts and benefits. The SIA study area includes the affected communities, which are described in Section 6.2.1 below.

Social baseline data was collected for each potentially affected community through desktop studies and consultation. The data described in the SIA includes:

- the demographic profile of potentially affected communities, including potentially impacted local government areas (LGA)
- an analysis of community characteristics including community history, community wellbeing, utilisation of natural resources
- an overview of land use and key industries in the region, including a profile of businesses offering goods and services relevant to the project
- the capacity of infrastructure, facilities and services including education, health and emergency services
- an analysis of the existing housing and accommodation market, including availability, capacity and affordability
- a profile of the local and regional labour market, including an assessment of the likely availability of personnel with skills relevant to the project.

The SIA was informed by consultation with stakeholders. Potential impacts were categorised as either positive or negative changes to indicators of the social environment, for example the cost of housing. Changes to demography, housing, employment and social infrastructure capacity were assessed by quantitative modelling. Changes to directly-affected landholders were assessed through qualitative assessment relying on stakeholder feedback and the SIA consultant's professional experience.

The likelihood and severity of identified potential impacts were evaluated and compared with recommended mitigation measures. Residual impacts were then identified and rated with additional measures proposed as necessary.

Management measures, stakeholder engagement commitments and monitoring approaches were collated into social impact management strategies for each of the five key SIA and presented in the SIA.

6.2.1 SIA study area

The SIA study area targets five potentially affected communities: Coppabella, Dysart, Middlemount, Moranbah and Nebo, as seen in Figure 6.1. These communities meet the SSRC Act's criteria for a nearby regional community and are within a one-hour drive of the project. All the towns, except for Coppabella, are listed under the SSRC Act as nearby regional communities for other large resource projects.

All of these communities are within the IRC LGA, which provides key services and personnel to construct and operate mines in the Bowen Basin. Mackay Regional Council (MRC) LGA also provides key services and personnel to the mining industry and was considered in the SIA as a potential source of labour and goods and services for the project.

Potentially affected communities



- LEGEND
- Mining Lease Application Boundary
 - Major Road
 - Railway
 - Port

Source: Geoscience Australia - Topographical Data 250K (2006)



OLIVE DOWNS COKING COAL PROJECT
Social Impact Assessment Study Area

Non-residents typically stay in workforce accommodation villages. The SIA listed 29 workforce accommodation villages in the IRC LGA. Some workforce accommodation villages are mine-specific, meaning that only workers of a particular mine stay there. Other workforce accommodation villages are non-mine specific and open to workers from any mine, including the Coppabella Village.

6.3 Community and stakeholder engagement

The SIA included a profile of the potentially affected communities and an analysis of key stakeholders and a description of engagement undertaken for the SIA. Stakeholder input into the baseline analysis, impact assessment and development of management measures is described throughout the SIA.

6.3.1 Engagement undertaken for the SIA and EIS

The consultation program included community information sessions, meetings, workshops, briefings, interviews, presentations, phone calls, letters, advertising, and site tours.

The consultation program involved engagement with IRC, local landholders, Barada Barna Traditional Owners, state government agencies and infrastructure providers, local businesses and supply chains, and community stakeholders.

Key issues raised by stakeholders during the consultation program include:

- impacts on community facilities and social services
- impacts on community values
- impacts on properties, land use and ownership
- local employment and training needs
- local supply opportunities
- opportunities for Indigenous employment and Indigenous-owned businesses
- road safety
- workforce accommodation and housing impacts
- workforce recruitment and management
- workforce wellbeing including fatigue management and mental health.

I am satisfied that stakeholder feedback was transparent and inclusive and informed the SIA through identifying potential social impacts and opportunities and developing measures to mitigate impacts and enhance benefits.

6.3.2 Ongoing community and stakeholder engagement

The proponent prepared a community and stakeholder engagement management strategy as part of the SIA. A detailed plan and program for ongoing community and stakeholder engagement would be developed prior to construction, and it would be reviewed and updated before operations commence.

The strategy prepared as part of the SIA describes ongoing engagement with IRC, landholders, local communities, businesses and industry groups, Traditional Owners and other Indigenous stakeholders, government agencies and social infrastructure providers.

Ongoing engagement would focus on:

- gathering further information to update assessments of the local housing market and the capacity of local infrastructure and social services
- developing mitigation measures for potential social impacts and monitoring their effectiveness
- reporting the number of incoming new local workers and FIFO workers
- developing appropriate monitoring plans.

Specific issues to be addressed with relevant stakeholders are discussed under the relevant key matters below.

Community reference groups

The community and stakeholder engagement management strategy in the SIA proposes that the proponent would establish community reference groups for the local communities. A Moranbah community reference group is proposed for the first year of construction, to be followed by a Dysart/Middlemount community reference group prior to commencement of operations. The community reference groups would be made up of representatives from IRC, Barada Barna Traditional Owners, emergency service providers, schools, associations, youth and seniors.

The community reference groups would discuss the project's progress, social impact management, community investment, social monitoring and opportunities for training, employment and supply of goods and services for the mine.

Isaac Regional Council

Key issues to be addressed with IRC through ongoing consultation include workforce accommodation and housing, social housing, childcare and healthcare services capacity, infrastructure capacity, traffic and local roads and projected workforce numbers.

Directly-affected landholders

Key issues to be addressed with directly-affected landholders through ongoing consultation include make-good agreements for impacts on groundwater, compensation for impacts on properties, potential noise and air quality impacts associated with the Willunga domain, and advanced notice of works. Section 6.7.3 details the project's potential impacts on directly-affected landholders and measures to manage those impacts.

Community stakeholders and business and industry groups

Key issues to be addressed with stakeholders in the local communities through ongoing consultation include SIA findings, the social impact management plan (SIMP) and opportunities for local supply and tender readiness.

Key issues to be addressed with business and industry groups in the IRC LGA and Mackay-Isaac-Whitsunday region through ongoing consultation include supplier market

analysis, tendering requirements, promoting capability development and building a local, regional and Indigenous businesses register.

Barada Barna Traditional Owners and other Indigenous stakeholders

Key issues to be addressed with Barada Barna Traditional Owners and other Indigenous stakeholders through ongoing consultation include finalising Indigenous participation strategies, promoting opportunities for employment and local supply, training and employment programs, community development and investment.

Government agencies and social infrastructure providers

Key issues to be addressed with government agencies and social infrastructure providers (for example healthcare, childcare, education and social housing providers) through ongoing consultation include identifying skills shortages and training opportunities, advance notice of the project schedule and workforce build-up, monitoring social impacts on social infrastructure services, and developing and implementing partnership initiatives.

In addition to these issues, the proponent must engage with emergency service providers to develop an emergency response procedure prior to construction commencing. The proponent must also engage with social infrastructure providers about potential additional demand for healthcare and childcare services.

Complaints management process

The community and stakeholder engagement management strategy prepared as part of the SIA describes a complaints management process that includes providing and promoting a community contact number for the project to all directly-affected and nearby landholders, IRC, managers of licensed venues, the general public and police officers in Moranbah, Dysart and Middlemount.

6.3.3 Coordinator-General's conclusion: community and stakeholder engagement

I am satisfied that the community and stakeholder engagement management strategy prepared as part of the SIA provides a strategic approach for the proponent's ongoing engagement. To ensure that ongoing community and stakeholder engagement is undertaken and informs the proactive management and monitoring of potential social impacts during the construction and operations phases of the project, I have stated conditions (Appendix 1) requiring the proponent to prepare a community and stakeholder engagement plan as part of the SIMP to be submitted to me for approval at least three months before construction commences.

6.4 Workforce management

The SIA included a summary workforce profile for the construction and operation phases of the project and estimated the maximum proportion of FIFO workers. The SIA also included:

- an analysis of the local and regional labour market and an assessment of potential impacts, including employment opportunities, training and development opportunities, and possible labour shortages
- an assessment of opportunities for local workers to commute to and from work where safe and practical.

The proponent's workforce recruitment strategy prioritises workers who are existing IRC LGA residents, and then workers from other regions who would move to local towns in the IRC LGA, and finally workers from areas of high unemployment and socio-economic disadvantage. This is consistent with the recruitment hierarchy requirements for large resource projects detailed in the SSRC Act.

The SIA considered FIFO workers were workers who live farther than one-hour driving distance from the mine. They would be required to commute to work for their roster. For the purpose of my evaluation, FIFO workers include those who would FIFO, bus-in, bus-out (BIBO) or drive-in, drive-out (DIDO) to work.

6.4.1 Construction

The project needs 500-700 construction workers between 2019 and 2021 to construct the Olive Downs South domain. A further 300-500 construction workers are needed from 2027 to construct the Willunga domain. Construction workers are anticipated to work shifts up to 12-hours long, with rosters likely to be 21 days on and seven days off. Section 6.5 details where construction workers would reside.

Construction activities require workers with skills in:

- operating earthmoving plant equipment
- structural steel and welding
- geology, engineering, environmental science, management and safety
- painting, plumbing and electrical trades
- concreting.

The SIA identified that the IRC and MRC LGAs have significant strengths in construction for the mining industry and could be a key source for the project's construction workforce. In 2016 there were 346 construction jobs in IRC LGA and 3,922 in MRC LGA. The number of construction workers required for the project exceeds IRC LGA's current capacity. The IRC LGA's capacity to provide skilled workers for the project's construction workforce would be reviewed once the principal contractor for the mine is appointed. This would inform the number of construction workers expected to be able to be sourced locally.

Based on the current capacity of IRC LGA to provide skilled construction workers for the project, it was assumed in the SIA that approximately 20 per cent could be sourced from existing IRC LGA residents, approximately five per cent would move to local towns in the IRC LGA (new locals), and approximately 75 per cent would be sourced from outside IRC LGA (FIFO workers).

This means that for the ODS domain:

- up to 140 construction workers would be existing IRC LGA residents
- up to 35 construction workers would be new locals

- up to 525 construction workers would be FIFO workers, and for the Willunga domain:
- up to 80 construction workers would be existing IRC LGA residents
- up to 20 construction workers would be new locals
- up to 300 construction workers would be FIFO workers.

6.4.2 Operation

The project needs 480 workers when the ODS operations commence in 2020, increasing to 960 workers in 2021 and 1300 workers from 2033 when both domains are operational. Shift times for the operation workforce are expected to be the same for local and FIFO workers, with mining operators working a 12.5-hour shift cycle roster, seven days on and seven days off. Section 6.5 details where operation workers would reside.

Mining operations require workers with skills in:

- operating machinery
- driving trucks
- trades including diesel fitting, boiler making, electrical, plumbing, gasfitting and painting
- engineering, surveying and geology
- health, safety, human resources and mine management
- administration.

The SIA identified that Moranbah's capacity to provide workers for the operation workforce is approximately equal to the combined capacity of Dysart, Middlemount and Nebo. There is currently low capacity because most local mining workers are already employed. However, there may be local people who are underemployed (part-time workers) and the SIA found that several mining workers had taken redundancies between 2011 and 2016. The SIA anticipated that workers for the operation workforce could come from other local mines or would relocate to the local LGA from other regions.

The SIA modelled three scenarios for the operation workforce. The best-case scenario modelled for new local workers was up to 50 per cent of the operation workforce, with the remainder split evenly between existing IRC LGA residents and FIFO workers. This means that in the first year of operations:

- 240 operation workers would be new locals
- 120 operation workers would be existing IRC LGA residents
- 120 operation workers would be FIFO.

The number of operation workers would double in 2021 and from 2033 when there would be 1300 workers:

- 650 operation workers would be new locals
- 325 operation workers would be existing IRC LGA residents
- 325 operation workers would be FIFO.

6.4.3 Potential impacts and management measures

The project's potential positive and negative impacts would be greatest in 2020 when the construction workforce peaks at 700 and operation commences with 480 workers. The

project would increase the IRC LGA population by a total of 1,180 people that year. The next peak in project activities is expected to occur in 2027 when the Willunga domain commences construction, while operations continue at ODS.

Increasing the number of people in the IRC LGA would increase demand on local services and social infrastructure, which is discussed further in Section 6.7.

My evaluation focusses on the potential social impacts of constructing and operating the ODS domain because it is proposed to commence first. Further, the social baseline (existing environment) considered in the SIA is likely to change as a result of the project and other activities in the LGA by the time the Willunga domain commences construction. Therefore, I have stated a condition (Appendix 1) requiring the proponent to submit an updated SIA and SIMP for approval twelve months prior to commencing construction of the Willunga domain.

Training and recruitment

The project would provide significant local job opportunities, potentially increasing the number of local residents through encouraging existing residents to stay in IRC LGA and attracting new residents who move to the LGA to work at the mine.

The potential impacts of recruiting local workers include increased competition for workers with relevant skills and possible labour draw (people leaving their jobs to work at the project) from other mining construction activities. The SIA indicates that construction workers with specific skills are typically highly mobile and operate on short-term contracts so significant labour competition and labour draw impacts are not expected during construction.

To support the proposed recruitment strategy, increase the proportion of local operation workers and reduce potential labour draw impacts, the proponent would develop a training and workforce development plan with Jobs Queensland, Department of Education and Training (Qld), Department of Employment (Cwlth) and the Queensland Resources Council. The training programs would focus on young people. This would increase local capacity of skilled workers to service the operation phase of the project.

Workforce participation

The project presents an opportunity to increase workforce participation of people from traditionally underrepresented groups in the mining industry, including Indigenous people and women.

The proponent has committed in the Indigenous Land Use Agreement (ILUA) with the Barada Barna Aboriginal Corporation (BBAC) to increase Indigenous participation in the operation workforce by developing and implementing a participation policy statement and an Indigenous employment strategy. The employment goals agreed with BBAC are for nine Indigenous employees during the first ten years of operation, increasing up to 30 Indigenous employees in the sixteenth year of operation. Submissions on the draft EIS raised concerns that the goals for Indigenous employment are insufficient. I note that the SIA acknowledges that the goals for Indigenous employment could be exceeded subject to the availability of Indigenous workers. I expect the proponent to deliver appropriate training and development programs, in accordance with the ILUA, to maximise job opportunities at the project for Indigenous people.

The proponent has expressed their support for increasing the participation of women in the mining industry. They aim for 20 per cent of the operation workforce to be women. However, the SIA identified that there are no overnight childcare services available in the IRC LGA and current long day care hours are not adequate to meet the needs of workers on 12-hour shifts. This limits the opportunities for working parents, and in particular working mothers, to participate in shift work. To support working mothers, the proponent has committed to work with IRC and the Department of Communities, Child Safety and Disability Services to discuss local childcare capacity and develop collaborative responses to increase services and capacity, if required. Section 6.7 provides further details on the project's impacts on childcare services and measures to manage those impacts.

Worker safety and wellbeing

During consultation for the SIA, stakeholders raised concerns about managing workforce behaviour and specifically fatigue management. The Department of Natural Resources and Mines' Guidance Note for Fatigue Risk Management (available online) notes that commute times of one hour with a shift longer than 12-hours can influence the opportunity for sleep and completing other daily activities.

The workforce management strategy prepared as part of the SIA identifies only workers who live within a one-hour drive of the mine would be able to DIDO to work daily. All other workers would be required to stay in a workforce accommodation village or local rental accommodation while on shift. Section 6.5 further details on workforce housing and accommodation. The workforce management strategy also identifies that a fatigue management policy would be developed. The policy would include measures to reduce traffic safety risks such as using buses to transport workers to and from the worksite and encouraging car-pooling.

Stakeholders consulted during development of the SIA raised concerns about the mental health impacts associated with FIFO working arrangements. The SIA referenced a report by the Minerals Council of Australia on the mental health and wellbeing of workers in the minerals industry. The report identified that while the mental health needs of mining industry workers are similar to those of the general Australian community, the risks of developing a mental illness are compounded by living alone, a lack of local networks, and high physical demands. Working long shifts and high compression rosters (for example four weeks on/one week off) are also associated with an increased risk of depression and anxiety. FIFO working arrangements can enhance these stress factors on workers.

To manage worker safety and wellbeing, the workforce management strategy prepared as part of the SIA identifies that the proponent would establish a healthy workforce policy, develop personnel's skills to identify and respond to mental ill-health in the workplace and contract an Employee Assistance Program provider.

Workforce behaviour

Potential impacts of recruiting FIFO workers include a change to the social character of local communities. The SIA considered that changes to the social character of local communities are unlikely because FIFO workers would stay in an existing workforce accommodation village at Coppabella and spend most of their time at work or at the village. The SIA indicates that there is minimal interaction between workers staying at the workforce accommodation village and the local community.

To minimise potential impacts on social character, the proponent would develop a Code of Conduct prior to commencing construction, which would outline positive behavioural outcomes and prohibit negative behaviours. All workers would be required to comply with the Code of Conduct or risk termination of their employment.

6.4.4 Coordinator-General's conclusion: workforce management

I am satisfied that the proponent's recruitment strategy and workforce management practices would reduce the proportion of workers engaged in FIFO arrangements. I am also satisfied that the scale and duration of the project's construction phase presents an opportunity for employment for skilled workers who live locally.

To ensure that the proponent's workforce management practices also support the health and wellbeing of the project's workforce, I have stated a condition (Appendix 1) requiring the proponent to prepare a workforce management plan as part of the SIMP for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences. The workforce management plan must include details of training and development programs to be delivered to enhance participation of Indigenous people and women.

6.5 Housing and accommodation

The SIA detailed:

- the proposed workforce accommodation arrangements during construction and the first five years of operation
- projected population changes attributable to the project, including an estimate of workers and their households who may move to the local communities
- an analysis of the local and regional housing and accommodation market, and an assessment of potential social impacts on housing affordability and availability.

6.5.1 Construction

It was assumed in the SIA that construction workers who were existing IRC LGA residents would not need new accommodation to work at the mine, and that new locals and FIFO workers would need new accommodation.

New locals working on the construction of the ODS domain would need approximately 25-35 rental properties, and new locals working on the construction of the Willunga domain would need approximately 20 rental properties.

The proponent has chosen to accommodate FIFO workers at Coppabella Village – an existing non-mine specific workforce accommodation village. An average of 500 beds would be needed during construction of the ODS domain and an average of 300 beds would be needed during construction of the Willunga domain.

6.5.2 Operation

The SIA assumed that of the operation workers that would move to the IRC LGA (new locals), half would purchase housing and the other half would rent. This means that in the

first year of operation, 120 workers would purchase housing and 120 would rent; and from the second year of operation, 240 workers would purchase housing and 240 would rent.

All 120 FIFO operational workers at the mine would be accommodated in an existing workforce accommodation village at Coppabella. Existing IRC LGA residents who live farther than a one-hour drive from the mine would also need to stay at the workforce accommodation village while on shift. At least 120 workforce accommodation village beds would be needed during operation. The final number of new locals and the number of workers needing to stay at the workforce accommodation village would be determined during recruitment.

6.5.3 Potential impacts and management measures

Construction and operation workers who move to the IRC LGA would increase demand for rental properties and housing for sale. Local property and rental prices could become inflated, excluding lower income residents from the market and potentially increasing pressure on social housing.

Housing affordability and availability

In January 2019 there were a total of 172 properties for sale in the IRC LGA, 120 of them were in Moranbah.

The availability of rental properties in the IRC LGA has generally declined since the draft EIS was prepared, and the cost of rent has increased. For example, in July 2018 there were 131 properties available for rent in the IRC LGA and in January 2019 there were only 116; median weekly rent in Moranbah was \$290 in July 2018 and had increased to \$340 by January 2019.

The SIA found that in 2016 there were more than 1,000 unoccupied properties in Moranbah and more than 500 in Dysart. These properties were not on the market for sale or rent. The SIA did not assess whether the unoccupied properties were potentially habitable – that is whether they were in a good condition to live in straight away. It is likely that many of these unoccupied properties are owned by other mining companies to house their workers.

Construction

If all new local construction workers rented accommodation in Moranbah, which currently has a constrained rental market, the demand for 25-35 rental properties would lead to rental shortages and potentially increase rental prices. This would be a significant impact on housing availability and affordability.

To ensure enough housing is available for new local construction workers and to minimise potential impacts on housing availability and affordability, the proponent has proposed to require its construction contractor to:

- identify and report to the proponent every three months the number of construction workers intending to move to the IRC LGA
- where required, rent or lease housing which is not currently in the rental market at July 2019, by arrangement with private owners of vacant properties (including other mining companies) and maintain a housing register and make it available to workers wishing to move to the IRC LGA

- monitor the availability of housing in all local towns during the construction phase, and either:
 - discourage construction workers from renting housing in towns with a rental vacancy rate below three per cent, or
 - encourage workers with families to live in towns with higher rental vacancy rates.

Given that construction is proposed to commence later this year (2019), I have stated a condition (Appendix 1) requiring the proponent to prepare a SIMP that includes a workforce housing and accommodation plan for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences. I expect the workforce housing and accommodation plan includes details of housing and accommodation that the proponent can provide to construction workers who wish to move to the IRC LGA. The plan should demonstrate that the project would not contribute to significant affordability and availability impacts on housing and accommodation in local communities. Construction of the project cannot commence until I have approved the workforce housing and accommodation plan as a component of the SIMP.

Operation

To encourage workers to move to the IRC LGA, the proponent would develop a 'live local' policy supported by the following actions:

- promoting incentives for local settlement to non-local recruits, and explaining the range of housing options (availability, type and cost of housing for purchase and rental) in local towns
- facilitating access to housing at or below market rent for 12-24 months
- providing a one-off incentive payment to assist employees to pay rental bonds, relocate their families and/or purchase housing
- rental subsidies to encourage personnel to rent in the private market (subject to a commitment to stay at least three years).

To ensure that there is adequate housing available for new local operation workers, the proponent acknowledges the need to purchase or lease up to 20 properties in Moranbah and/or Dysart during the first five years of operation. The workforce housing and accommodation plan prepared as part of the SIA identifies the following measures that the proponent would use to secure enough housing for their workers:

- contractual arrangements to support private housing development to meet project needs
- purchase of properties for leasing and/or on-sale to workers
- long term leases on properties to be sub-let to workers
- lease or purchase and refurbishment of houses owned by other mining companies.

The proponent has indicated their preference to use unoccupied properties in the potentially affected communities to house their workers, rather than develop new housing. This would offer opportunity for new locals to integrate with the local communities and provide relief to landlords who experienced financial stress when housing prices fell between 2011 and 2016. This approach could also minimise potential impacts on the

availability and affordability of housing currently on the market and avoid placing an excessive burden on existing infrastructure.

Submissions on the EIS raised concerns about the likelihood of unoccupied properties becoming available for the project's workers to rent or purchase because, as the SIA notes, a high proportion of properties in Moranbah, Dysart and Middlemount are owned by other mining companies to accommodate their workers. These properties are unlikely to be made available to other stakeholders.

To address these concerns, the workforce housing and accommodation plan prepared as part of the SIA identifies that the proponent would engage with stakeholders when finalising the workforce housing and accommodation plan to determine the likelihood that housing owned by other mining companies can be purchased or leased by the proponent.

As part of finalising the workforce housing and accommodation management plan, the proponent would confirm:

- the workforce profile to inform the number of properties needed for the project's new locals
- the availability of current and planned housing stock (residential developments) locally
- the project's housing needs compared to the available housing options
- the specific measures the proponent would take to partner with other stakeholders to ensure that enough housing is available for new locals and that impacts on housing availability are avoided,

and complete the following actions:

- confirmation of workforce size and origin
- engagement with IRC to discuss the scope of the workforce housing and accommodation management plan
- engagement with other stakeholders to obtain information to support the workforce housing and accommodation management plan, including IRC, Department of Housing and Public Works, Economic Development Queensland, emergency and long-term accommodation Moranbah (ELAM) and Isaac Affordable Housing Trust (IAHT), real estate agents, other mining companies, housing developers in Moranbah, and the IRC land and housing advisory committee
- housing demand analysis
- housing and accommodation supply analysis
- revision of assumptions made in the plan prepared as part of the SIA
- engagement with key stakeholders to develop housing strategies.

Social housing

Moranbah's ELAM and the IAHT are the key social housing providers in the IRC LGA. The SIA indicated that affordable and social housing in IRC LGA has experienced increased demand over the past year and is currently almost at capacity.

Demand for social housing increases when the rental market tightens and rental prices become unaffordable for low income households. Submissions on the EIS recommended that the proponent consult with IRC, ELAM and IAHT prior to construction commencing regarding the need for social housing. Submissions also recommended that the proponent

partner with IRC, ELAM and IAHT to ensure an adequate level of social housing is maintained.

The proponent has consulted with IAHT and ELAM to update social housing and homelessness data and would also consult with the social housing providers when monitoring demand for social housing.

Accommodation for FIFO workers

FIFO workers would stay at Coppabella Village. The village has capacity to accommodate the project's workforce from late 2019 until at least 2025. The village offers a purpose built, modern facility that meets industry standards and compared with other workforce accommodation villages it is located nearest to the project site, thereby minimising daily travel times.

The proponent proposes to secure enough beds to cater for 100 per cent of construction workers and 65 per cent of operation workers for the first five years (until 2025). The number of beds needed would be re-evaluated in 2024 in order to renew the Coppabella Village contract or seek alternative arrangements with another workforce accommodation village in Moranbah or Dysart.

Accommodating FIFO workers and existing IRC LGA residents who live more than a one-hour drive from the mine at an existing workforce accommodation village avoids potential impacts from these operation workers on the housing market.

6.5.4 Coordinator-General's conclusion: housing and accommodation

I am satisfied that the proponent has proposed housing and accommodation arrangements for the FIFO construction and operation workforces that are well-planned, enhance worker wellbeing and do not place an excessive burden on existing infrastructure, facilities and services used by local and regional communities.

To ensure that the project's housing and accommodation arrangements for new locals do not contribute to significant affordability and availability impacts on housing and accommodation in local communities, I have stated a condition (Appendix 1) requiring the proponent to prepare a workforce housing and accommodation plan as part of the SIMP for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences. Construction of the project cannot commence until I have approved the workforce housing and accommodation plan as a component of the SIMP. The workforce housing and accommodation plan must include:

- an updated assessment of housing availability in the local towns including consideration of the likelihood of unoccupied housing becoming available for workers to rent or purchase
- details of housing and accommodation that the proponent can provide to construction workers who wish to move to the IRC LGA
- detailed strategies developed in consultation with IRC to ensure that enough housing is available for operation workers.

6.6 Local business and industry procurement

The SIA included a profile of the skills and services needed for the project, an analysis of local and regional supplier capability and capacity relevant to the project, and an assessment of potential social impacts on local and regional suppliers.

Skills needed for the project are listed in Section 6.4.

During construction the project would need the following services:

- earth moving, drilling and construction
- supply of construction materials, equipment and labour
- specialist trades, e.g. electrical, ventilation, gas fitting and plumbing
- transport and logistics services for equipment, consumables and workers
- safety, security, training and human resources services
- workforce accommodation,

and during operation the following services would be needed:

- mechanical and engineering services and trades
- Registered Training Organisations and employee assistance providers
- labour hire, recruitment and human resource management providers
- catering, cleaning and hospitality services
- business support services including stationary, printing and professional services
- transport and logistics.

6.6.1 Potential impacts and management measures

Potential impacts on local and regional businesses include labour draw and wage inflation. Measures to manage potential impacts of labour draw and wage inflation are discussed in Section 6.4.

Potential benefits for local and regional businesses include opportunities to supply goods and services. Local businesses including grocers, homewares purveyors, restaurants, cafes and service stations would benefit from increased expenditure by new locals and their households.

Service and supply opportunities

The SIA found that there were 183 construction businesses registered in the IRC LGA in 2016. A search of businesses registered on the Industry Capability Network (ICN) Gateway found only one construction business based in the IRC LGA.

The SIA found that there were 20 mining businesses registered in the IRC LGA in 2016. Most of them were small businesses that may have capacity to support the project and potentially grow. Three of them were larger businesses that may have significant capacity to supply the project. Five mining businesses based in the IRC LGA are registered on the ICN Gateway.

The SIA also found six businesses in the IRC LGA listed on the Black Business Finder (directory of Aboriginal-owned businesses in Queensland), and 16 in the Mackay LGA.

They include training, civil infrastructure, transport, management and workforce management businesses.

The SIA reported that the construction and mining industry-related businesses in the study area are well-established and well-positioned to meet the project's demand.

To promote the project's service and supply opportunities to these businesses the proponent has proposed to establish an ICN Gateway Portal and hold briefings with local construction and mining industry-related businesses. Briefings would also be held with businesses that would need to develop greater capacity to meet growing population needs (hospitality and retail).

The proponent would work with DSDMIP and IRC to quantify and locate specific business capacities relevant to the project's supply chain.

The proponent would also work with DSDMIP and seek cooperation with the Resource Industry Network (RIN) (a not-for-profit organisation representing the resource sector and allied industries within the Mackay region), local traders' groups and others, to convene follow-up workshops to communicate tendering requirements and promote access to capability development programs.

The local business and industry content management strategy prepared as part of the SIA describes that a Local Content Strategy would be developed for construction and operation. The strategy includes:

- complying with the *Queensland Resources and Energy Sector Code of Practice for Local Content* (2013)
- maintaining the project's local, regional and Indigenous businesses register for internal use and distribution to all major contractors
- embedding local content requirements into contract schedules for major tenders, and requiring principal and major contractors to report on their local content performance quarterly
- liaison with DSDMIP to identify and potentially co-deliver local supplier development activities
- sending expression of interest alerts to the ICN Gateway Resource Industry Network, Moranbah Traders, Black Business Finder, Dysart Community Support Group, Nebo Community Development Group and Middlemount Community representatives.

6.6.2 Coordinator-General's conclusion: local business and industry procurement

To ensure that the project's procurement practices maximise opportunities for competitive and capable local businesses to provide goods and services to the project, I have stated a condition (Appendix 1) requiring the proponent to prepare a local business and industry procurement plan as part of the SIMP for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences.

6.7 Health and community wellbeing

The SIA included an analysis of the availability, accessibility and capacity of, and an assessment of the project's potential impacts on, existing social services, facilities and infrastructure including:

- childcare services
- local schools
- hospital and health services
- police and emergency services
- community and civic services
- recreation and cultural facilities.

The SIA also included an analysis of the health and wellbeing of potentially affected communities and assessed the project's potential impacts on population and social change, community health and safety, and community values.

6.7.1 Construction

It was assumed in the SIA that during construction:

- up to 100 people in total (up to 35 workers and their families) would move to the IRC LGA, primarily to Moranbah
- approximately 340 FTE FIFO workers would be on shift at any one time.

This means that an additional 440 FTE people would be in the IRC LGA during construction – a possible two per cent increase of the current population.

6.7.2 Operation

It was assumed in the SIA that during the first year of operations (2020) the new local workers and their families would add 324-587 people to IRC LGA's FTE population. This would be the equivalent of an approximately 1.3 per cent to 2.3 per cent increase of the current population.

In the second year (2021) there could be an additional 648-1296 people, which would be the equivalent of an approximately 2.5 per cent to 5 per cent increase of the current population.

Of the new locals it was assumed in the SIA that half would move to Moranbah, 25 per cent would move to Dysart, 15 per cent to Middlemount and 10 per cent to Nebo.

The SIA notes that migration of new local workers and their families to the IRC LGA during operations is more likely to occur over several years rather than all at once. Further, the SIA considers that the higher estimate of new local operation workers is unlikely to happen. Therefore, the assessment predicted the worst-case in terms of potential impacts on local social services and infrastructure from new locals moving to the IRC LGA for the project's operation phase.

The SIA also assumed that during the first year of operations (2020) there would be 20-240 FIFO workers, increasing to 240-480 FIFO workers in the second year (2021). All FIFO workers would be accommodated at the existing Coppabella Village.

6.7.3 Potential impacts and management measures

Workers who move to the IRC LGA with their families (new locals) would increase demand for local social services, facilities and infrastructure. New local residents would eventually lead to additional government funding provision to ensure those services have sufficient capacity.

While FIFO workers would stay at the camp while on shift, it is recognised that they could also increase demand for local social services such as a local general practitioner (GP) and emergency services.

Potential impacts on local social services, facilities and infrastructure would occur during construction and through operation. As discussed previously, the project's greatest potential positive and negative impacts would occur in 2020 when construction and operation of the ODS domain overlap, and again in 2027 when the Willunga domain commences construction while operations continue at ODS.

Childcare services

Moranbah, Dysart and Middlemount have limited vacancies at their childcare centres and for families in Nebo, the nearest childcare service is a 30-minute drive away at Valkyrie. Submissions on the EIS raised concerns about the capacity of local childcare services to cater for the project's potential demand. Section 6.4 discusses the limitations of a lack of overnight childcare and inadequate long day care hours on workforce participation.

New locals predicted to migrate to the IRC LGA may need access to childcare services. The SIA did not predict whether childcare would be required during construction but assessed the potential impacts of approximately 5-21 children between the ages of 0-4 years old needing access to childcare during the operation phase of the project. The SIA found that current capacity could cater for five children, but 21 children would strain capacity.

The health and community wellbeing plan prepared as part of the SIA indicates that the proponent would consult with childcare providers and IRC when finalising the health and community wellbeing plan to investigate the current and planned capacity of local childcare services. If demands from other developments in the IRC LGA are expected to exceed childcare capacity, collaborative consideration of options to meet demands would be required. The proponent would also:

- notify childcare services of the workforce ramp-up numbers to assist with planning for future demand
- consult with all recruits when they are offered employment to identify any childcare needs, and refer them to local services
- monitor the availability of childcare places during the first five years of operation.

Community services and facilities

Community services and facilities in the local communities are supported by IRC, state government funding and community management. Local settlement and neighbourhood programs are run by Moranbah District Support Services and the Dysart Community Support Group. Other community and civic services available to the local community

include a rural family support program and financial counselling. Social housing in IRC LGA is addressed in Section 6.5.

New locals moving to the IRC LGA during operations could result in additional demand on community services and facilities. New locals may seek support from the Moranbah District Support Services and Dysart Community Support Group upon moving to the LGA.

The health and community wellbeing management plan prepared as part of the SIA indicates that the proponent would establish partnerships with the Moranbah District Support Services and the Dysart Community Support Group to enable extension of their service to new local workers and their families. The scope of the partnerships could include settlement programs and neighbourhood development, for example playgroups, community gardens and sheds, and interest groups.

The proponent also proposes to establish a community development fund to support community projects and programs in the IRC LGA. Funding requirements would be assessed on a case-by-case basis and could include:

- community events and activities that promote active and healthy lifestyles
- health promotion
- strengthening the local volunteer base, for example enabling volunteers to gain qualifications relevant to their volunteer work
- cultural diversity and inclusion, for example programs to connect culturally diverse communities and individuals
- initiatives that enable strong, creative and resilient young people
- programs that enable vulnerable and marginalised community members to participate in community life.

Directly-affected landholders and residents

Eight properties would be directly impacted by the construction and operation of the mine and associated linear infrastructure. Two of the properties are owned by the proponent and one is owned by another mining company. The remaining five properties are privately owned by four separate landholders. The properties are largely used for cattle grazing. Each property has a homestead that is occupied by either the landholder or the property manager and staff.

Construction and operation of the mine and associated infrastructure would potentially impact on the health and wellbeing of the residents at the homesteads. The project would also impact on cattle grazing operations, which could impact on the landholder's livelihood and job security of any staff. Land use impacts are addressed in section 5.1.

Potential project impacts on amenity including air quality and noise are addressed at sections 5.4 and 5.5, and potential impacts on groundwater are addressed at section 7. The SIA and EIS note that objectives for air quality and noise limits would be met at the privately-owned homesteads, and that the proponent would enter into make-good agreements with the owners of the two groundwater bores predicted to experience drawdown because of the project.

The proponent has commenced negotiations with all of the directly-affected landholders regarding compensation for impacts to their properties. Where possible, the proponent is

also negotiating options with landholders that would allow their cattle grazing operations to continue.

Education services

Enrolments at schools in Moranbah, Dysart and Middlemount are currently less than peak in recent years, indicating a capacity to cater for new students. Enrolments at the Nebo State School are currently at their highest, however the SIA indicates that there would be capacity to cater for a small number of new enrolments.

The SIA identified that Moranbah has capacity to cater for the 30 children of new local workers who would move to the IRC LGA for construction.

The SIA identified that the children of new locals during operation would demand 30 enrolments at Moranbah, 15 enrolments at Dysart, eight at Middlemount and six at Nebo. The SIA indicated that the local schools would be able to cater for the additional demand and that advanced notice of new locals arriving is important to ensuring less stress on schools.

The health and community wellbeing management strategy prepared as part of the SIA indicates that the proponent would monitor demand for school enrolments by requesting personnel to identify their families' needs as part of the employment offer process. The proponent would also provide advance notice of the workforce ramp-up to the Department of Education to assist with planning for increased enrolments. This advice would be updated on a six-month basis during the first three years of operations.

Healthcare and hospitals

Consultation with Queensland Health and community services during preparation of the SIA noted increasing demands for local primary healthcare and mental healthcare services and support. There are eight GPs and a hospital in Moranbah, which the SIA considers is adequate to service the local resident population. However, the SIA indicated that waiting times and demand for mental health services and clinical nursing staff has increased due to FIFO workers using local healthcare services. Nebo has a modern medical centre but no resident doctor and there is one doctor in Dysart, which is insufficient to service the needs of residents and FIFO workers. There is also a hospital in Dysart. There is one doctor in Middlemount and nurse-led service at the Middlemount Community Health Centre. The SIA also indicated a decline in resourcing for outreach services and needs for increased mental health, domestic violence, and youth health services locally. Residents requiring treatment beyond basic services attend hospitals outside the region, the nearest is in Mackay.

The SIA considers that there is some capacity in Moranbah to cater for the additional demand during construction from 100 new locals. FIFO construction workers would access their primary health care at home but may also make use of local GP services and the Moranbah Hospital while on shift. The SIA states that this additional demand would exceed current capacity.

The SIA determined that if the upper limit of 587 new locals were to move to the IRC LGA during the first year of operation, an additional GP would be required to maintain basic healthcare service levels. Additional healthcare service capacity would be required as the IRC LGA population grows.

The health and community wellbeing management plan prepared as part of the SIA indicates that the proponent would consult with local GPs, the North Queensland Primary Health Network, local hospitals and the Mackay District Health and Hospital Service to:

- establish a foundation for communication about health service access and health promotion
- ensure health services are aware of the project's schedule, social impacts, and relevant health and community wellbeing strategies
- inform the proponent's planning for workforce access to health and emergency services and health promotion strategies.

To reduce demands on local services during construction, the proponent would:

- employ or require its contractor to employ an on-site paramedic to manage minor health issues and participate in the development of health and wellbeing programs focused on physical and mental health
- develop a contract with a medical service provider to provide workplace health services including health promotion programs and access to a GP for employees staying at the Coppabella Village
- ensure personnel have access to an Employee Assistance Program for support with mental health issues.

During the first three years of operation, the proponent would also:

- provide advice on workforce numbers, project timeframes and on-site/workforce accommodation village-based service provisions to the Mackay Hospital and Health Services, and Moranbah and Dysart Hospitals
- ensure the contractor makes arrangements with GP clinics to ensure that all operational personnel have health assessments in compliance with the Coal Mine Workers' Health Scheme, which requires health assessments when personnel enter the industry and then at least every five years while employed in the industry
- seek participation from Moranbah and Dysart Hospital on the project's community reference groups to collectively monitor project impacts on local health services, including mental health and alcohol and other drug support services, and identify any additional mitigations required for impediments to local service access.

Submissions on the EIS noted support for the proponent's proposed strategies to engage with healthcare providers before construction commences and recommended that Queensland Health and local GP clinics be included in the pre-construction consultation. The health and community wellbeing plan prepared as part of the SIA includes early and ongoing engagement with Queensland Health as a performance indicator of managing impacts from increased demand for hospital and GP services.

Police and emergency services

Queensland Police resources locally are currently constrained. During construction, more traffic and a larger population (new locals and FIFO workers) would increase demand on local police services. Also, police services would be needed for over-size vehicle escorts. The SIA noted that current demands for police to attend on workforce accommodation villages is low because of behavioural protocols in place for mining workforces. The proponent proposes to develop a workforce code of conduct for their workers to assist with managing worker behaviour at the workforce accommodation village.

There are currently stable resources and adequate capacity for the Fire and Rescue Service and Queensland Ambulance Service. However, the SIA noted that mine site emergency demands on ambulance services can occupy services for five to six hours, taking them out of the local community. The quality of radio network coverage at the project site was not confirmed in the SIA. Good quality coverage would be required to allow communications with emergency services. Submissions on the EIS raised concerns about the level of detail provided in the EIS around emergency planning and response.

The impacts on local police and emergency services during operation would be similar to construction, with slightly greater demand for services due to the larger resident population. A larger population requires more police and emergency services resources than is currently available.

The health and community wellbeing plan prepared as part of the SIA indicates that the proponent would develop a strategy in cooperation with the Queensland Police Service (QPS), Queensland Ambulance Service (QAS) and the Queensland Fire and Emergency Services (QFES) prior to construction commencing. The strategy would include:

- consulting with QAS to identify whether QAS' radio communication network requires updating to service the project and roads used by the project and make adjustments accordingly
- liaising with police, ambulance, fire and emergency services representative and Queensland Health and the Northern Queensland public health network with respect to workforce numbers and project timeframes
- ensuring selected staff have access to Queensland Mine Rescue Services' open cut emergency response team training, and that trained staff are on site at all times
- offering site orientation days for QPS, QAS and QFES
- developing a protocol and procedure for wide-load escort duties
- seeking QPS, QAS and QFES participation on the project's community reference group, to collectively monitor local impacts on services, and in relation to potential community safety concerns
- cooperation in joint exercise and reviewing agreed protocols with QPS, QAS and QFES annually during construction and the first three years of operation.

The proponent would also prepare an emergency response procedure prior to construction commencing in consultation with QPS, QFES, Queensland Chemical Hazards and Emergency Management Unit, QAS, Queensland Health and IRC LGA's local disaster management committee.

Traffic safety

The Peak Downs Highway experiences high volumes of traffic from mining projects in the IRC LGA. The SIA notes that the highway has a poor safety record. Access to the ODS domain and the Willunga Domain would be via private roads from Annandale Road and the Fitzroy Development Road, respectively. These roads would be upgraded to accommodate construction traffic for the project.

The project's greatest impacts on traffic along these roads would occur during shift change times around 6am and 6pm. Potential impacts include an increased risk of traffic accidents. Measures to manage safety impacts would be outlined in the road-use

management plan the proponent is developing in consultation with TMR (Appendix 3). Other measures proposed to manage potential project impacts on traffic are addressed in section 5.6.

Valkyrie State School is located along Fitzroy Development Road, however it is unlikely to be impacted by project traffic due to peak workforce travel times occurring outside of the school and school buses' operating hours. The health and community wellbeing plan prepared as part of the SIA indicates that the proponent would consult with the Department of Education prior to construction of the Willunga domain to identify the need for and, if required, develop specific measures to manage the interface between project traffic and the school.

To further manage potential impacts on traffic safety, the proponent would provide buses to transport FIFO workers to and from the Coppabella Village and the mine and encourage local workers to car pool to work.

Utilities infrastructure

Isaac Regional Council relies on agreements with the mining companies who hold water allocations for Moranbah, Dysart and Middlemount to supply water to the towns. Waste management facilities in the IRC LGA have limited capacity and are a high priority for IRC to expand.

The project would add pressure to current and planned capacity for water and waste services in the IRC LGA. A larger population would require greater water and waste services capacity than is currently available. The project's waste management is addressed in section 5.8.

The proponent has reduced the potential additional demand on local utilities by choosing to accommodate FIFO workers at the Coppabella Village and preferring to use existing housing for new locals.

The proponent would need to consult with IRC prior to construction commencing regarding water security for the towns.

6.7.4 Coordinator-General's conclusion: health and community wellbeing

I am satisfied that the proponent has considered measures to avoid or mitigate negative social impacts and capitalise on opportunities to improve the health and wellbeing of local and regional communities.

To ensure that the project does not adversely impact on the level of service to local and regional communities from existing social services, facilities and infrastructure, I have stated a condition (Appendix 1) requiring the proponent to prepare a health and community wellbeing plan as part of the SIMP for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences.

6.8 Coordinator-General's conclusion: social impacts

I am satisfied that the SIA was prepared generally in accordance with the SIA Guideline (2018) and that the strategies prepared as part of the SIA demonstrate that the proponent is committed to ensuring that the project does not significantly impact on and enhances opportunities for the local communities.

I have considered the scale and duration of the project's construction phase and the capacity of the local communities to provide workers for the project's construction phase and determined that the project presents an opportunity for local employment during construction. While the project's workforce needs exceed current capacity of local communities to provide workers, it is likely that there would be workers living locally with relevant skills. Therefore, I have decided to nominate the project as a large resource project for which the 100 per cent FIFO prohibition and anti-discrimination provisions of the SSRC Act apply to the project's construction workforce.

Overall, I consider that the project presents opportunities for social benefits for the local communities in the IRC LGA through local employment and training, business and new residents.

I have stated conditions in this report that seek to further enhance social benefits by ensuring that:

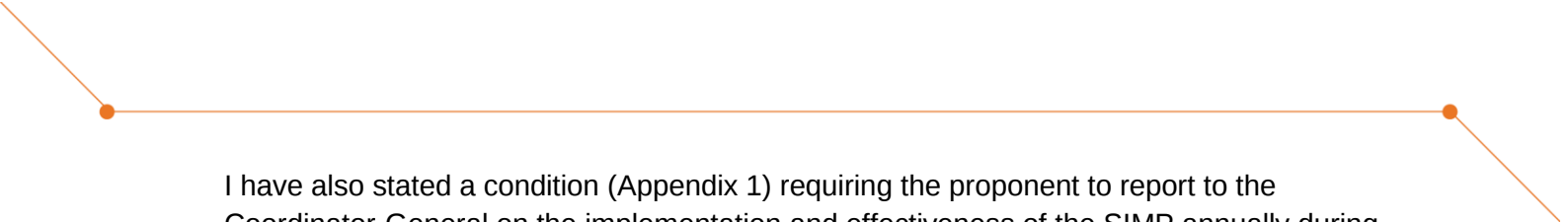
- training and development programs enhance opportunities for Aboriginal and Torres Strait Islander people and women to participate in the workforce
- enough housing is available for construction and operation workers who wish to move to the IRC LGA with their families and potential impacts on housing affordability and availability in the IRC LGA are managed
- social services and facilities including childcare, schools and healthcare have enough capacity to cater for additional demand from new locals.

I note that potentially significant impacts could occur in 2020 when the ODS domain is still under construction and operation commences, and again in 2027 when construction commences at the Willunga domain while operations continue at the ODS domain.

To ensure that potentially significant impacts are avoided, minimised or at least mitigated, I have stated a condition (Appendix 1) requiring the proponent to prepare a social impact management plan (SIMP) for the construction and operational phases of the project to be submitted to me for approval at least three months before construction commences. The SIMP must include:

- community and stakeholder engagement plan
- workforce management plan
- workforce housing and accommodation plan
- local business and industry procurement plan
- health and community wellbeing plan.

I have also stated a condition (Appendix 1) requiring the proponent to submit an updated SIA and SIMP for approval at least six months before construction commences at the Willunga domain.



I have also stated a condition (Appendix 1) requiring the proponent to report to the Coordinator-General on the implementation and effectiveness of the SIMP annually during construction and for the first five years of operation for each domain.

7. Matters of national environmental significance

7.1 Introduction

This section addresses the potential impact of the proposed Olive Downs project on matters of national environmental significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

On 24 January 2017, the proponent lodged referrals under the EPBC Act for each of the four project components; the mine site and access road, the water pipeline, the electricity transmission line and the rail spur and loop.

On 3 March 2017 the four project components were determined to be 'controlled actions' requiring assessment and approval under the EPBC Act. The following controlling provisions apply for each proposed action under the EPBC Act:

- mine site and access road (EPBC 2017/7867):
 - listed threatened species and communities (sections 18 and 18A)
 - listed migratory species (sections 20 and 20A)
 - a water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).
- water pipeline (EPBC 2017/7868):
 - listed threatened species and communities (sections 18 and 18A).
- electricity transmission line (EPBC 2017/7869):
 - listed threatened species and communities (sections 18 and 18A).
- rail spur and loop (EPBC 2017/7870):
 - listed threatened species and communities (sections 18 and 18A).

The following subsections summarise the Queensland Government's assessment of each referral against the relevant controlling provision/s.

7.2 Project description

Pembroke Olive Downs Pty Ltd (the proponent) proposes to develop the Olive Downs project (the project), a coal mine and associated infrastructure in the Bowen Basin. The project would be located within the Isaac Regional Council local government area, approximately 40 kilometres (km) south-east of Moranbah.

The project includes the staged development and operation of an open cut metallurgical coal mine, comprising two mining domains; namely the Olive Downs South (ODS) domain and Willunga domain.

The project would also include:

- installation of a raw water supply pipeline connecting the project to the existing Eungella pipeline network. Part of the water pipeline would be located outside of the mining lease applications for the project.

- construction of a 66-kilovolt electricity transmission line (ETL) from the existing Broadlea Substation to the ODS domain; and an on-site switching/substation within the ODS domain
- construction of a new rail loop and 19 km rail spur connecting to the Norwich Park Branch Railway and rail loadout facility, including product coal stockpiles at the ODS domain for rail transport
- construction of a 3.5 km access road from Annandale Road to the ODS domain (which includes a crossing of the Isaac River) and a second access road from the Fitzroy Developmental Road to the Willunga infrastructure area
- wastewater and sewage treatment plants.

The proposed mining lease applications for the project include mining lease area (MLA) 700032, MLA 700033, MLA 700034, MLA 700035 and MLA 700036, consisting of three mining leases and two specific purpose mining leases. The project's lease applications total an area of approximately 250 km², representing approximately 1 per cent and 0.2 per cent of the Isaac-Connors and Fitzroy River catchment areas respectively.

The approximate extent of the open cut mining area and associated waste rock emplacements and infrastructure areas would be 16,300 ha. The mine is expected to deliver up to 15 million tonnes (Mt) of product coal per annum for overseas export over an anticipated operational life of 79 years. The coal resource would be mined by conventional open cut mining methods, with product coal intended to be transported by rail to the Dalrymple Bay Coal Terminal located 38 km south of Mackay.

7.2.1 Project staging

Construction

The proposed timeframes identified in the EIS for each stage of the project are summarised in Table 7.1.

Table 7.1 Stages 1 to 4 disturbance extent

Stage	Approximate years	Approximate disturbance extent (ha)	Percentage of overall project impact
Stage 1	2019 – 2024	1755	11 per cent
Stage 2	2025 – 2030	4250	26 per cent
Stage 3	2031 – 2050	7435	45 per cent
Stage 4	2051 – end of mine	2860	18 per cent

The first phase of construction activities, including early works, are anticipated to commence approximately 18 months to two years prior to operations. Construction works are proposed to commence as soon as the relevant planning and environmental approvals, environmental authority (EA) and mining lease tenements are granted.

Early works would focus on establishing operations at the ODS domain and would include the construction of the:

- raw water pipeline connecting to the Eungella network
- rail spur and loop
- ETL and switching/ substation
- ODS mine infrastructure area (MIA)
- access road from Annandale Road to the MIA and facilities (including a crossing of the Isaac River) and associated car parking and site security
- explosives magazine
- temporary flood protection levees
- coal handling and processing plant (CHPP) and associated coal handling infrastructure
- dry weather road crossing of the Isaac River to provide access to the eastern out-of-pit waste rock emplacement area
- initial rejects storing facilities and in-line flocculation (ILF) cells for storage and disposal of CHPP coal rejects
- rail loadout facility including product coal stockpile areas
- water management infrastructure (including up-catchment diversions, sediment dams and water storage dams)
- upgrades Daunia Road and Annandale Road.

The dry weather haul road crossing to the eastern waste rock emplacement area would only be used when there is no flow in the Isaac River. When there is flow in the Isaac River, waste rock would be placed on the western side. The dry weather haul road would be decommissioned and rehabilitated following completion of construction and rehabilitation of the waste rock emplacement on the eastern side of the Isaac River.

The second phase of construction activities would occur after approximately 10 years to allow the full development rate at the ODS domain to be achieved. This would involve expansion of the CHPP, workshops and the ILF cells.

The third phase of construction activities would be undertaken within the Willunga domain approximately 12 months in advance of the planned commencement of operations. This would follow the establishment of operations at the full development rate at the ODS domain, and would include the construction of the:

- access road from the Fitzroy Developmental Road to the Willunga domain MIA and associated car parking and security
- Willunga MIA
- overland conveyor to transfer crushed run-of-mine coal (ROM) coal to the ODS domain CHPP
- explosive magazine (storage facility)
- temporary flood protection levees
- on-site ROM coal handling and crushing facilities
- expansion of the ODS domain coal processing facilities to process Willunga run of mine (ROM) coal
- crossings of the Isaac River between the ODS and Willunga domains for direct vehicular access and ancillary infrastructure (water pipeline, electricity supply, communications, overland conveyor)

- water management infrastructure (including up-catchment diversions, sediment dams and water storage dams).

At the completion of phase 3 of the construction program, the project infrastructure would be capable of delivery of up to 20 Mt per annum (Mtpa) of ROM coal, and up to 15 Mtpa of product coal.

Operations

The proposed operations schedule for the project would occur over approximately seven stages, as summarised in Table 7.2

Table 7.2 Indicative mine operation schedule

Stage	Approximate years	Product coal (Mtpa)
Stage 1	2020 – 2030	0.8 – 4.5
Stage 2	2031 – 2040	7.8 – 15
Stage 3	2041 – 2050	10.2 – 15
Stage 4	2051 – 2060	4.9 – 8.4
Stage 5	2061 – 2072	0.7 – 5.3
Stage 6	2073 – 2085	1.2 – 2.6
Stage 7	2086 – 2098	0.3 – 1.4

Decommissioning

The EIS indicates that, following the completion of mining activities, all project infrastructure would be assessed on an individual basis for removal or to be retained for future land owners. Both the water pipeline and ETL would be decommissioned and rehabilitated within two years of the completion of mining operations, if it is determined that they are not to be retained. The proponent has indicated that a rehabilitation and mine closure plan would be prepared for the project and will include detailed rehabilitation goals, objectives, indicators and completion criteria. A rehabilitation monitoring program would be submitted with the plan of operations to measure the rehabilitation progress on an annual basis.

At the completion of mining and decommissioning activities, the proponent would also be required to surrender the EA for the project. Surrender applications for EAs that contain rehabilitation conditions must include a final rehabilitation report. The final rehabilitation report would include enough information to allow the administering authority to decide whether the proponent has complied with the conditions of the EA and satisfactorily rehabilitated or suitably managed the land on which each relevant activity for the EA was carried out.

7.2.2 Project location

The project is located within the headwaters of the Isaac River sub-catchment of the Fitzroy Basin. The major rivers and tributaries of the Fitzroy catchment include the Fitzroy, Dawson, Nogoa, Comet, Isaac and Mackenzie Rivers.

The Isaac River is the main watercourse traversing the ODS domain flowing in a north-west to south-east direction, passing the township of Moranbah and the Millennium, Poitrel and Daunia coal mines before entering the ODS domain. The Isaac River bisects the ODS and Willunga mining domains, with the ODS domain located to the west/south of the Isaac River, and the Willunga domain on the east.

The project lies within the Brigalow Belt Bioregion (Northern Bowen Basin and Isaac – Comet Downs subregions) within the Bowen Basin mining area, an area predominantly subject to disturbance from agricultural activities (including cattle grazing) and coal mining.

The properties associated with the project are owned by the proponent (Iffley and Deverill), other mining companies (Wynette) and private landholders (Vermont Park, Willunga, Seloh Nolem, Old Bombandy and Winchester South). Land surrounding the project is owned predominantly by other mining companies.

The project is located immediately south of the approved, but not yet constructed) Moorvale South mine and is located within 6 km of the existing Peak Downs and Saraji mines to the west. There are 25 other operating mines within the region; those within a 30 km radius of the project include the Moorvale, Daunia, Poitrel, Millennium, Eagle Downs and Lake Vermont mines. Existing petroleum tenements in the region, including those for the approved Bowen Gas Project, overlap with the proposed project area.

As a result of the current and historical land uses, the majority of the project area comprises agricultural grasslands with patches of highly fragmented regulated vegetation, with the exception of the riparian zone along the Isaac River. Cattle grazing and associated agricultural practices have influenced the type and condition of vegetation across the project area to varying extents, ranging from negligible to heavy.

7.2.3 Avoidance, rehabilitation and offsets

Impact avoidance measures

The EIS indicates that in the Bowen Basin, coal reserves are typically mined through either underground or open cut methods. Underground methods are usually employed in the presence of thick, contiguous coal seams. However, underground mining is not efficient or safe where multiple thin seams are present, particularly in the presence of geological faults, as is the case with the coal resource to be targeted for the project.

Further, the nature of dipping coal seams, which is the case with the coal resource to be targeted for the project, dictates that an open cut pit targets the shallowest coal first and then moves to deeper coal. The coal seams in the ODS domain generally dip from west to east towards the Isaac River.

Open cut mining methods also require the development of out-of-pit waste rock emplacements, particularly during the initial stages of excavation before sufficient space is

available behind the advancing open cut for waste rock to be placed within the mined open cut pit.

Scheduling the mine plan to develop final voids in the shallower areas was determined to be unfeasible, as it would prevent the mine from operating at the optimum production rate by increasing the volume of waste rock material that would need to be removed and material handling costs.

The project's mine schedule has been optimised to minimise the number and extent of final voids, particularly the creation of final voids in close proximity to the Isaac River and Ripstone Creek. The proponent has proposed a 200 metre to 300 metre buffer between the mine site and the Isaac River to minimise encroachment on and changes to the flooding characteristics of the Isaac River and its floodplain.

At the completion of mining, three final voids would remain within Pit ODS3, Pits ODS7/ODS8 and WIL5. The volume of all the final voids is estimated to be approximately 1,750 million bank cubic metres. The proponent has analysed the feasibility of backfilling the final voids to ground level, finding that the cost of rehandling waste rock from the proposed out-of-pit emplacements would be in the order of \$5 billion. This would render the project unfeasible.

The EIS assessed the impact of foregoing mining the coal resources where the proposed final voids would be located on the Isaac River floodplain and could not feasibly be backfilled. The EIS estimated that foregoing the coal resources would result in the sterilisation of approximately 55 Mt of ROM coal, with estimated royalties of \$590 million. The EIS indicates that the chosen location for the mine has resulted in less coal resource able to be extracted for the project but would result in improved environmental outcomes.

The establishment of the proposed ODS9 pit and associated flood levees would require diversion of 1.88 km of Ripstone Creek. The proponent has indicated that without diverting Ripstone Creek, approximately three million tonnes of coal would be left in-situ. The proponent considers that the economic benefit of mining the coal in that location outweighs the environmental impacts. Mining this area (including the cost of the diversion) would have net benefit of \$11 million. Reducing the extent of the ODS9 pit is also not considered a suitable option, as this would result in a reduction in available space for active mining in the area and reduce the rate of production in this pit.

The proposed alignments and configuration of the water pipeline, ETL and rail spur and loop were selected to minimise impacts on other tenement holders, existing land uses and private landholdings through being located within existing easements and road corridors, where practicable.

The EIS investigated a number of options for transporting raw coal from the Willunga to ODS domain including slurry pipeline, vehicle road haulage and a high-speed overland conveyor. The overland conveyor was selected as the best option in terms of cost and environmental impacts. The EIS indicates that the selected overland conveyor corridor was constrained by the location of the proposed open cut pits and extent of flood prone areas. The proposed corridor has tried to avoid sensitive environmental areas (i.e. wetlands and riparian vegetation) as much as practical. Engineering limitations mean that the conveyor cannot be easily re-aligned and would impact wetlands regardless of the alignment option taken.

The footprint of the overland conveyor would be limited to a 180-metre-wide corridor, further limited to 45 metres within 200 metres of the Isaac River to reduce impacts to riparian vegetation. The full extent of the conveyor including where it traverses wetlands would be covered to reduce potential coal dust emissions.

Rehabilitation

Following disturbance, the proponent would progressively rehabilitate disturbed areas, including the proposed levees and waste rock emplacement areas. Over 90 per cent of the project site would be restored to support grazing or native vegetation. Three final voids are proposed to remain within the landscape, with all other voids to be progressively backfilled as mining progresses. Vegetation would be established as soon as practicable over disturbed areas.

A rehabilitation strategy for the project was prepared as part of the EIS, detailing the rehabilitation goals, objectives, performance criteria and completion criteria for the project. The overarching rehabilitation goal for the project is to create a post-mining landform that is safe, non-polluting, stable and able to sustain a post-mining land use. The EIS indicates that the preferred post-mining land use for the project would be to reinstate land suitable for cattle grazing and fauna habitat, which is consistent with the current use of the project site.

Key features of the proposed final landform include permanent highwall emplacements, formed from waste rock material removed during the mining process. The permanent highwall emplacements would be developed progressively during the mine life and would generally be 300 metres to 400 metres wide and approximately 25 metres high. The highwall emplacements would isolate the mining operation from the Isaac River floodplain and provide immunity to flood levels up to a probable maximum flood (PMF) event, which is estimated to be approximately six metres high in the vicinity of the proposed permanent highwall emplacements.

Biodiversity offset strategy

The proponent has prepared a draft biodiversity offset strategy (BOS) for the project, which identifies three proponent-owned properties located on the eastern side of the Isaac River as potential biodiversity offset sites for the project. The land includes the Twenty Mile, Iffley and Deverill properties, with a total combined area of approximately 34,000 ha. The proposed offset properties occur within the same subregion and catchment as the project.

The proponent is proposing a staged offset approach in light of the staged land clearance for the project, which is proposed to occur across four stages. The offset requirements for each stage of clearance would be provided prior to clearing commencing for the relevant stage.

The proponent has indicated that the proposed Stage 1 offset area would cover a total area of approximately 6,065 ha within the three proponent-owned properties and is expected to compensate for the impacts associated with the construction of the water pipeline, ETL, rail spur and loop and approximately the first five years of the mine site and access road development within the ODS domain.

The proponent has indicated that it would seek to secure the proposed Stage 1 offset area as a nature refuge under the Queensland *Nature Conservation Act 1992* within two years of the commencement of the project. Any areas within the proposed Stage 1 offset area not required to form that Stage 1 offset have been set aside for future offsets.

For Stages 2 to 4 of the project, the proponent has indicated that approximately 10,000 ha of potential habitat for fauna listed under the EPBC Act is available within the three proponent-owned properties and could be considered for future offset requirements.

7.3 Ecologically sustainable development – whole of project

As defined in Part 1, section 3A of the EPBC Act, the principles of ecologically sustainable development are:

- the integration principle: decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- the precautionary principle: if 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
- the intergenerational principle: the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- the biodiversity principle: the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making
- the valuation principle: improved valuation, pricing and incentive mechanisms should be promoted.

I have considered the above principles in the evaluation of project impacts.

This report is the culmination of an environmental impact assessment process addressing economic, environmental, social and equitable considerations which included a public consultation process and the consideration of submissions lodged by the public and government agencies.

All long and short-term MNES impacts for the mine would be managed through my recommended condition set for the Commonwealth Minister for the Environment and the future EA that would be administered by the Queensland Department of Environment and Science (DES). I have adopted a precautionary approach and support for the biodiversity principle by including a condition requiring offsets for MNES which would supplement the proponent's management and impact mitigation measures.

A public comment period enabled the submitters to raise issues about the project in a fair and equitable manner. I have considered these issues in my evaluation of the project to ensure the interests of all stakeholders were considered and the intergenerational principle was applied.

I consider that my comprehensive condition set for the mine would allow for the project to be constructed, operated, rehabilitated and decommissioned in a sustainable manner,

having regard to potential environmental risks to protect MNES and the environment for future generations.

I am satisfied that potential impacts of the project would be suitably compensated through the provision of offset areas in respect of areas disturbed by the project and the valuation principle was applied.

7.4 Mine site and access road (EPBC 2017/7867)

The referral includes works to be undertaken within the proposed mine site, and the private sections of the access road. The construction program for the mine site and access road is anticipated to span 13 years. Construction activities would be undertaken generally during daytime hours up to seven days per week.

The main mining activities include open cut mining operations using conventional mining equipment including excavators, dozers, front end loaders and trucks. Over the life of the mine, the ODS domain would include nine active mining areas/voids, while the Willunga domain would include five.

Mining operations would generally occur 24 hours per day, seven days per week, however mining operations in the ODS7 and ODS8 pits would be conducted during daytime hours (7am to 6 pm) only to minimise air quality and noise impacts at nearby sensitive receptors, the closest of which include Seloh Nolem 1 (0.7 km north-east from closest project component), Vermont Park (0.8 km east) and Seloh Nolem 2 (1.2 km north-east). The remaining homesteads are located between 3.4 km and 6 km from the project.

Drilling and blasting activities are proposed for fragmentation of waste rock. Commercial products would be used, with the principal blasting agent being ammonium nitrate fuel oil, only to be conducted during the daytime.

The mine infrastructure area at the ODS domain would include:

- administration buildings, covered muster area and bathhouse
- CHPP
- ILF cells
- rail loadout facility and rail loop
- maintenance facilities, fenced store yard, heavy vehicle wash down bay, fuel and lubricant facility
- potable water treatment plant
- sewage treatments plant and effluent disposal areas.

The mine infrastructure area at the Willunga domain would include:

- administration buildings
- maintenance facilities
- potable water treatment plant
- sewage treatment plant and effluent disposal areas.

The mine would target the Leichardt and Vermont seams of the Rangel Coal Measures as the principal economic coal resources in the ODS and Willunga domain. The EIS anticipates that the ODS coal seams would deliver a high rank, low volatile coking coal

product with a Joint Ore Reserve Committee (JORC) resource of 460 Mt. The Willunga domain is expected to deliver a low volatile pulverised coal injection product with a JORC resource of 353 Mt.

A 3.5 km long access road from Annandale Road to the ODS domain infrastructure area is also proposed, which would be co-located with existing public and private roads (where practicable) to reduce impacts to native vegetation. The EIS indicates that the access road would be limited to a 40-metre-wide corridor where it would cross the Isaac River to reduce impacts to riparian vegetation. A local access road from the Fitzroy Developmental Road to the Willunga domain infrastructure facilities would also be constructed, although it would not cross the Isaac River.

The mine site and access road would also include the construction of a 14 km long overland conveyor (in place of a haul road) over the Isaac River to connect the Willunga domain to the CHPP located within the ODS domain. The conveyor would be limited to a 180-metre-wide corridor, further limited to 45 metres within 200 metres of the Isaac River to reduce impacts to riparian vegetation.

A water pipeline would also be installed between the ODS domain MIA and the ROM coal handling and crushing facilities at the Willunga domain as a backup water supply, where demands for dust suppression water are unable to be met locally by on-site recycled water collected within the mine water management system.

A haul road crossing providing access to the waste emplacement at Deverill (located on the eastern side of the Isaac River) from the ODS domain would be located approximately 2 km south-south east of the Annandale Road access road where it crosses the Isaac River. The haul road crossing would be restricted to a corridor of 60 m, although the haul road itself is likely to require clearing of a fraction of the total corridor width.

The establishment of the proposed ODS9 pit and associated flood levees would impact on approximately 1.375 km of the existing Ripstone Creek waterway, necessitating a waterway diversion of 1.88 km in length.

The proponent has committed to the preparation of Ripstone Creek diversion design plan which will include a revegetation and vegetation management plan to ensure the diversion is self-sustaining.

The mine site and access road would result in a total disturbance area of 16,087 ha, which includes potential habitat for a number of species and vegetation communities listed under the EPBC Act and *Nature Conservation Act 1992* (NC Act). The vegetation to be removed comprises 5,573 ha of remnant vegetation and 10,514 ha of 'agricultural grasslands dominated by Buffel grass (*Cenchrus ciliaris*) with gilgai', including 13 ha of the brigalow threatened ecological community (TEC). The mine site and access road would also remove riverine, palustrine and lacustrine wetlands, including the removal or modification of seven HES wetlands. Both the overland conveyor and Annandale Road access road would traverse wetland habitat.

7.4.1 Listed threatened species and communities

In deciding whether or not to approve the proposal for the purposes of a subsection of section 18 or section 18A of the EPBC Act, and what conditions (if any) to attach to such

an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the:

- Convention on Biological Diversity
- Convention on Conservation of Nature in the South Pacific (Apia Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan or threat abatement plan (TAP).

The Minister must also, in deciding whether to approve the taking of the action, have regard to any approved conservation advice for the threatened species or ecological community that are likely to be or would be significantly impacted by the project.

This section assesses the project against the objectives and priority actions of conservation advices, recovery plans and TAPs for the relevant threatened species and communities. The residual significant impacts of the project on threatened fauna and TECs are also considered in this section.

For the EIS assessment, a search of the EPBC protected matters search tool (PMST) was utilised to provide an indication of the threatened species and communities which may occur within and surrounding the project. This was then ground-truthed during surveys undertaken for the EIS assessment. The adequacy of the surveys undertaken for each species was checked against relevant EPBC survey guidelines.

The proponent was required to complete comprehensive field surveys to confirm the occurrence of MNES including threatened species. I note that agencies with an interest in biodiversity (including DEE) generally agreed that the survey effort undertaken by the proponent for listed threatened species was adequate.

Threatened flora

I note that although the assessment identified that potential habitat for some of the threatened flora species is present within the mine site and access road, and would be removed for the project, none of the listed threatened flora species were identified onsite during surveys. The lack of records onsite for many of the species identified in the Protected Matters Search Tool (PMST), combined with the survey effort undertaken by the proponent, indicate that the mine site and access road do not support populations of the majority of the threatened flora species identified.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions drawn in the EIS regarding the likelihood of presence for the threatened species identified in the PMST. I note that the proponent has committed to undertaking pre-clearance surveys to identify the presence of any threatened species in areas to be cleared. I am satisfied with the conclusions in the EIS that residual significant impacts for those species are unlikely to occur; accordingly, potential impact to threatened flora are not discussed further as part of my assessment.

Threatened ecological communities

An ecological community is a naturally occurring group of plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and

distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability. An ecological community becomes threatened when it is at risk of extinction.

A search of the PMST identified four TECs listed as endangered under the EPBC Act with the potential to occur within and surrounding the project area:

- brigalow (*Acacia harpophylla* dominant and co-dominant)
- natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin
- semi-evergreen vine thickets of the brigalow belt (North and Southern) and Nandewar Bioregions
- weeping myall woodlands.

The proponent applied the condition thresholds outlined in the relevant Commonwealth listing advice for each vegetation community identified onsite to determine whether they met threatened ecological community status. Based on the assessment provided in the EIS, the brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community is the only TEC that occurs within the study area.

Based on the information provided in the EIS, the mine site and access road is the only project component considered to have the potential to impact the brigalow TEC.

Brigalow (*Acacia harpophylla* dominant and co-dominant)

Background

The brigalow TEC is listed as 'endangered' under the EPBC Act. In Queensland, areas of brigalow TEC include vegetation that meet the description of 16 regional ecosystems (REs), all of which are listed as 'endangered' under the Queensland *Vegetation Management Act 1999*.

The EIS indicates that approximately 804,264 ha of the brigalow TEC remains within Queensland and New South Wales (comprising 661,314 ha in Queensland and 142,905 ha in New South Wales). In Queensland, the brigalow TEC has been extensively cleared for cropping and grazing and is now highly fragmented across most of its range.

The regional ecosystems associated with the brigalow TEC that occur in the mine site and access road area include:

- one patch of RE 11.3.1 '*Acacia harpophylla* and/or *Casuarina cristata* on alluvial plains'
- one patch of RE 11.4.8 'Open forest of *Eucalyptus cambageana* with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains
- two patches of RE 11.4.9 '*Acacia harpophylla* shrubby open forest with *Terminalia oblongata* on Cainozoic clay plains', both within the mine site and access road.

The EIS considers the patches of brigalow TEC present within the mine site and access road to be degraded by edge effects and highly fragmented.

Three patches of brigalow TEC have been mapped within the ODS domain, however one patch falls outside the proposed surface disturbance extent (refer to Figure 3-3 of Section 3 of the draft EIS). From the information provided in the EIS, there is no brigalow TEC located within the Willunga domain.

Recovery plans, conservation advice and threat abatement

There is currently no recovery plan under the EPBC Act relevant to the brigalow TEC.

There is an approved conservation advice for the brigalow TEC: *Approved Conservation Advice for the Brigalow (Acacia harpophylla dominant and co-dominant) ecological community*.³ Key threats to the brigalow TEC identified in its conservation advice relevant to the project include:

- clearing and habitat fragmentation
- increased and hotter fires
- introduced plant and animal pest species (including goats, cane toads, cats and foxes which impact native fauna associated with the community)
- impacts from inappropriate grazing activities.

Relevant priority recovery and threat abatement actions listed in the conservation advice include:

- protecting and conserving remnant and regrowth areas
- managing areas of the TEC to reduce threats, including fire management and targeted weed and feral animal control with a particular focus on exotic grasses (particularly Buffel grass) and feral pigs
- mitigating the severity of impacts where further clearance is unavoidable and providing offsets which consider the location and emulate qualities of affected patches
- balancing primary production and native flora and fauna conservation within and close to the TEC.

There is one TAP relevant to the brigalow TEC: *Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads*.⁴ Lethal toxic ingestion of cane toads by native fauna species that inhabit the brigalow TEC, such as ornamental snake, is identified as a key matter for management.

Impacts – direct clearance

The EIS indicates that two patches (7 ha and 6 ha) of the brigalow TEC represented by RE 1.4.9 totalling 13 ha are located within the surface disturbance extent of the mine site and would be cleared. This would result in a reduction in the total existing extent of brigalow present across Queensland, estimated in the EIS to total approximately 661,314 ha, by 0.002 per cent.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to the preparation and implementation of a vegetation management plan, which would include measures to ensure that clearing is undertaken

³ Commonwealth of Australia, *Approved Conservation advice for the Brigalow (Acacia harpophylla dominant and codominant) ecological community*, Department of the Environment, Canberra, 2013, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/communities/pubs/028-conservation-advice.pdf>

⁴ Commonwealth of Australia, *Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads*, Department of the Environment and Energy, Canberra, 2011, February 2019, viewed February 2019, <http://www.environment.gov.au/system/files/resources/2dab3eb9-8b44-45e5-b249-651096ce31f4/files/tap-canetoads.pdf>

progressively and areas of vegetation to be retained within the mine site and access road are clearly identified.

This would include the patch of brigalow TEC that occurs within the MLA but outside the surface disturbance extent for the project and the patch that would be avoided by the rail spur and loop.

Impacts – increased fire risk

According to the 2016 CSIRO *Priority Threat Management for Imperilled Species of the Queensland Brigalow Belt*⁵, the most cost-effective strategies for improving the overall persistence of imperilled species in the region is the management of fire regimes and invasive plants.

Fire poses a serious threat to areas of brigalow TEC which are more infested with exotic grass species, particularly Buffel grass, which is known to increase the risk of bushfire. The brigalow conservation advice indicates that the most appropriate fire regime for the brigalow TEC is fire-exclusion.

Fire could start as a result of sparks from machinery, accidents (collision) and scheduled burns getting out of control, which would then cause fires to expand into the surrounding area, including areas containing the brigalow TEC.

The EIS indicated that following clearance for the mine site and access road, there would be two patches of brigalow TEC remaining in the immediate vicinity of the project; one patch located approximately 1 km from the disturbance extent of the mine site and access road within the MLA, and one patch that would be avoided by the rail spur.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent is proposing to implement an emergency response procedure for the project, which would include measures to address the risk and intensity of bushfires. The proponent would undertake measures to exclude fire from the mine site and access road, including fire breaks and appropriate storage and handling of flammable chemicals and materials.

Impacts – increased occurrence of weeds and pests

The *Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads* is relevant to the project; specifically, the fauna species that inhabit the TEC including the ornamental snake that has been identified in the project area. Cane toads and Buffel grass (*Cenchrus ciliaris*) were identified onsite during surveys. As discussed above Buffel grass infestations pose a threat to the brigalow TEC, by increasing the potential risk and intensity of the bushfires.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. The EIS indicates that the procedure for controlling and monitoring weeds would be

⁵ CSIRO, *Priority threat management for imperilled species of the Queensland Brigalow belt*, CSIRO, Brisbane, 2016, viewed February 2019, <https://publications.csiro.au/rpr/download?pid=csiro:EP154521&dsid=DS5>

implemented every six months (or at times when rainfall conditions are favourable to weed outbreaks) as determined by the proponent.

I am satisfied that given the nature of the proposed action, the mine site and access road is unlikely to facilitate the spread of cane toads and is therefore not inconsistent with the TAP.

I would expect the weed and pest management plan to include measures to address the spread of cane toads and Buffel grass on the mine site and access road.

Indirect impacts – groundwater drawdown impacts to habitat

The EIS considers that the riparian vegetation associated with the Isaac River, North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek may be facultative groundwater dependent ecosystems (GDEs) that are intermittently dependent on subsurface expression of groundwater; that is, access groundwater only following prolonged rainfall or flood events. These vegetation communities would access groundwater only when groundwater is replenished to levels at which the roots of the riparian vegetation can access. All other vegetation within the project area is not considered to be groundwater dependent, given the depth of the groundwater table across the project site, the quality of the groundwater (highly saline) and the known rooting depths of the species present.

The EIS considers that any indirect impacts arising from the project to the patches of brigalow TEC that would remain in the vicinity of the project would not result in a substantial change in the species composition of the brigalow TEC.

I note that the patches of brigalow TEC that would remain within the mine site and access road area may be located in areas of groundwater dependence. However, brigalow is considered to be largely surface water dependent with an extensive lateral root system. The EIS indicates that groundwater within the mine site and access road area is at depths of 10 to 20 metres below ground level (mbgl), which is likely to be too deep for the tree species that characterise the brigalow TEC (including *Acacia harpophylla*) to access.

Indirect impacts– edge effects

Edge effects can include:

- establishment of weeds
- immigration of pest fauna species
- colonisation of aggressive native species
- exclusion of more sensitive native species
- greater light intensity and wind penetration
- lower humidity
- greater fire susceptibility.

The EIS indicates that the majority of the vegetation within and surrounding the project would already be impacted by edge effects due to the historical clearance of native vegetation, leaving several disconnected patches throughout the landscape.

There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to intact patches. These areas include

the southern boundary and the north-western boundary of the ODS MLA close to Vermont Park where large areas of Eucalypt woodland are present.

However, the EIS considers that given the current level of fragmentation present, edge effects are likely to have already manifested. No additional alterations to microclimate or species assemblages within or immediately surrounding the project area, which would include patches of brigalow TEC, are expected to occur as a result of the project.

Residual significant impacts and offsets

The approved conservation advice for the brigalow TEC states that all patches of brigalow TEC that meet the key characteristics and condition thresholds for the ecological community are critical to its survival. Further, the *Matters of National Environmental Significance; Significant Impact Guidelines 1.1*⁶ states that for critically endangered and endangered ecological communities, a significant impact is likely if there is a real chance or possibility that it will adversely affect habitat critical to the survival of an ecological community.

Based on the assessment in the EIS, I consider that the clearance of 13 ha of brigalow TEC would result in a residual significant impact. The EIS indicates that clearance of 13 ha of the brigalow TEC would not occur until Stage 3 of clearance for the project, which is expected to occur between 2031 and 2050. The proponent's proposed offset strategy is to provide the relevant offsets for the project's staged impacts prior to the commencement of the relevant stage.

The EIS estimates that there is approximately 91.5 ha of brigalow TEC within the 34,000 ha of landholdings owned by the proponent, which include two patches of RE 11.3.1, three patches of 11.4.8 and six patches of RE 11.4.9.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum brigalow TEC disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the brigalow TEC. The proponent would need to secure offsets for stages 2 to 4 of the project prior to the commencement of those stages
- a vegetation management plan for the brigalow TEC must be prepared. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP
- the proponent must monitor the condition of the two patches of brigalow TEC located outside the mining disturbance extent for the duration of mining activities, as part of a vegetation management plan for the brigalow TEC. If monitoring indicates the condition of the brigalow TEC has declined as a likely result of mining activities, the proponent must undertake measures to mitigate this impact and/or provide offsets for any residual significant impacts.

⁶ Commonwealth of Australia, *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment, Canberra, 2013, viewed February 2019, http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/neg-guidelines_1.pdf

Coordinator-General's conclusion – threatened ecological communities

I am satisfied that the EIS has considered the potential impacts that the proposed mine site and access road could have on the brigalow TEC.

The mine site and access road would result in a residual significant impact to 13 ha of brigalow TEC. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the brigalow TEC is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the brigalow TEC are not unacceptable.

Threatened fauna

The PMST identified a number of threatened fauna species with the potential to occur within the project area and surrounds. Surveys for listed threatened species were undertaken by the proponent in accordance with the relevant Commonwealth survey guidelines, including:

- EPBC Act *Survey Guidelines for Australia's Threatened Reptiles*
- EPBC Act *Survey Guidelines for Australia's Threatened Birds*
- EPBC Act *Survey Guidelines for Australia's Threatened Bats*
- EPBC Act *Survey Guidelines for Australia's Threatened Mammals*
- EPBC Act *Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles*
- EPBC Act *Referral Guidelines for the Vulnerable Koala*
- *Targeted Species Survey Guidelines – Yakka Skink*
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*

Of those species identified in the PMST, the proponent identified a number of those onsite during surveys, as summarised in Table 7.3. I am satisfied that the surveys undertaken for listed threatened species are adequate for the assessment.

Table 7.3 **Listed threatened species identified in the PMST and identified onsite**

Listed threatened species known or having potential to occur within the project area	Listed threatened species identified onsite during surveys
• red goshawk (<i>Erythrotriorchis radiatus</i>) – vulnerable • Australian painted snipe (<i>Rostratula australis</i>) – endangered • curlew sandpiper (<i>Calidris ferruginea</i>) – critically endangered • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable • painted honeyeater (<i>Grantiella picta</i>) – vulnerable	• koala (<i>Phascolarctos cinereus</i>) (combined populations of Queensland, NSW and the ACT) • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) • Australian painted snipe (<i>Rostratula australis</i>)

- star finch (eastern) (*Neochmia ruficauda ruficauda*) – endangered
 - black-throated finch (southern) (*Poephila cincta cincta*) – endangered
 - northern quoll (*Dasyurus hallucatus*) – endangered
 - koala (combined populations of Queensland, New South Wales (NSW) and the Australian Capital Territory (ACT)) (*Phascolarctos cinereus* (combined populations of Queensland, NSW and the ACT)) –vulnerable
 - greater glider (*Petauroides volans*) – vulnerable;
 - grey-headed flying-fox (*Pteropus poliocephalus*) – vulnerable
 - ghost bat (*Macroderma gigas*) – vulnerable
 - Corben's long-eared Bat (*Nyctophilus corbeni*) – vulnerable
 - southern snapping turtle (*Elseya albagula*) – critically endangered
 - Fitzroy River turtle (*Rheodytes leukops*) – vulnerable
 - Yakka Skink (*Egernia rugosa*) – vulnerable
 - Allan's Lerista (*Lerista allanae*) – endangered
 - Ornamental Snake (*Denisonia maculata*) – vulnerable
 - greater glider (*Petauroides volans*)
 - ornamental snake (*Denisonia maculata*).
- Dunmall's Snake (*Furina dunmalli*) – vulnerable

I note that many of the identified threatened species may occur onsite, however I am satisfied with the conclusions in the EIS that residual significant impacts for those species that were not identified onsite during surveys. The lack of historical species records on site for many identified in the PMST, combined with the survey effort undertaken by the proponent, indicate that the mine site and access road is unlikely to support populations of most of the threatened species identified as potentially occurring.

The surveys undertaken were in accordance with the relevant EPBC survey guidelines, indicating that even if the species are present onsite, their occurrence is sporadic and significant populations are not present. The proponent has provided detailed justifications for these conclusions in the draft EIS and revised draft EIS.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions regarding the likelihood of presence for the threatened species identified in the PMST.

For the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake, potential habitat exists within the mine site and access road footprint and the species were either identified onsite or in the immediate vicinity of the project.

Accordingly, my assessment of impacts to EPBC Act listed threatened species focusses on these species.

Koala

Background

Koala habitat is considered within any forest, woodland or shrubland that contains species that are known koala food trees. The EIS considers that potential koala habitat within the project area is located within the areas mapped as Eucalypt open forests to woodlands on floodplains (REs 11.3.3, 11.3.4, 11.3.7, 11.3.25), Eucalypt dry woodlands on inland depositional plains (REs 11.3.2, 11.5.3, 11.5.8c, 11.5.9, 11.5.9b and 11.9.2) and the vegetation surrounding and within the lacustrine and palustrine wetlands (REs 11.3.27f, 11.3.27i, 11.3.3c and 11.5.17). Potential habitat also includes the movement corridors and refuge habitat provided along waterways including the Isaac River and Ripstone Creek.

Koalas were recorded during EIS field surveys on numerous occasions along the Isaac River and associated tributaries.

Recovery plans, conservation advice and threat abatement

There is currently no 'recovery plan' or TAP under the EPBC Act relevant to the koala.

There is an approved 'conservation advice' for the koala: *Approved Conservation Advice for Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)*⁷. Key threats to the koala identified in the conservation advice relevant to the project include:

- loss, fragmentation and degradation of habitat
- mortality due to disease, vehicle strike and dog attacks
- the predicted increase in the frequency and severity of droughts, periods of extremely high temperatures and increased fire.

Relevant priority recovery and threat abatement actions in the koala conservation advice include:

- developing and implementing planning protocols to prevent the loss of 'important habitat', koala populations or connectivity areas
- developing and implementing plans to mitigate the risk of vehicle strike and dog predation
- investigating formal conservation arrangements, management agreements and covenants on private land
- developing and implementing options for vegetation recovery and re-connection in regions containing fragmented koala populations.

⁷ Commonwealth of Australia, *Approved Conservation Advice for Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)*, Department of the Environment, Canberra, 2012, viewed February 2019, <http://www.environment.gov.au/system/files/resources/dc2ae592-ff25-4e2c-ada3-843e4dea1dae/files/koala-referral-guidelines.pdf>

Impacts – direct clearance of habitat

Habitat destruction is recognised as the primary adverse effect on habitat critical to the survival of the koala. The EPBC significant impact guidelines considers that an action that is likely to have a real chance or possibility of adversely affecting habitat critical to the survival of a species is likely to have a significant impact. Further, the loss of 20 ha or more of high-quality habitat critical to the survival of the koala (habitat quality score of 8 or more) is considered highly likely to have a significant impact for the purposes of the EPBC Act.

The proponent conducted an assessment of the potential habitat located within the project footprint in accordance with the koala habitat assessment tool provided in the *EPBC Act referral guidelines for the vulnerable koala*⁸, which found that the habitat within the mine site and access road scored an 8. The EIS estimates that the mine site and access road would result in the clearance of 5,500 ha of habitat critical to the survival of the species.

The EIS concluded that the areas of non-remnant vegetation in the project area do not contain koala feed trees of an adequate size to support koala, and subsequently did not include these areas in the koala impact calculations. I do not agree with this conclusion as *EPBC Act Referral Guidelines for the vulnerable koala* defines koala habitat as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees which includes remnant and non-remnant vegetation.

As the proponent has not included areas of non-remnant vegetation which may support koala, I have recommended a condition that the proponent provide an updated BOS to the Department which provides updated impact figures and offset calculations to determine the offset obligation would need to be updated to reflect this additional habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The EIS states that the mine site and access road has been positioned to minimise disturbance of better quality riparian vegetation, where the majority of koala records exist.

The proponent has committed to the preparation and implementation of a vegetation management plan, which would include measures to ensure clearing is undertaken progressively and any areas of vegetation to be retained onsite, including habitat for the koala, are clearly identified.

The proponent has also committed to the preparation and implementation of a fauna species management plan (SMP) for the species to be impacted by the project. The SMP would include measures to limit construction activities to avoid breeding seasons of threatened species, relocate individuals identified during pre-clearance surveys by qualified fauna spotter-catchers, install fauna exclusion fencing and enforce speed limits onsite.

⁸ Commonwealth of Australia, *EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*, Department of the Environment, Canberra, 2014, viewed February 2019, <http://www.environment.gov.au/system/files/resources/dc2ae592-ff25-4e2c-ada3-843e4dea1dae/files/koala-referral-guidelines.pdf>

Impacts – fragmentation of habitat/ barriers to movement and increased risk of vehicle strike

The following proposed actions could act to fragment koala habitat and present a barrier to koala movement:

- the access road from Annandale Road to the ODS domain, which would be limited to a 40-metre corridor where it crosses the Isaac River to reduce impacts to riparian vegetation
- the overland conveyor, which would be limited to a 45-metre corridor within 200 metres of the Isaac River bank to reduce impacts to riparian vegetation
- the third crossing of the Isaac River to provide vehicular access from the north-east of the ODS domain to the eastern waste rock emplacement area.

The EIS considers that the mine site and access road would not result in fragmentation of the koala population into two or more populations, given the abundance of the species within the wider landscape.

Although the access road, conveyor and eastern waste rock emplacement access road crossing have been designed to have minimised construction corridors in the vicinity of the Isaac River, the infrastructure would potentially impact the dispersal ability of koala through previously contiguous riparian vegetation. Koalas are also known to be susceptible to vehicle strike when crossing road corridors located between areas of habitat. Koalas that remain within any suitable habitat left within the mine site and access road would be at risk of increased risk of vehicle strike, where any infrastructure constructed for the project passes through those areas.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to, where applicable, maintain fencing and fauna crossings to ensure safe fauna movement. An on-site speed limit of 60 km/hr, which is consistent with the recommendations in the *EPBC Act referral guidelines for the vulnerable koala*, would also be enforced to address the increased risk of vehicle strike to fauna including the koala.

Impacts – increased fire risk

The EPBC Act referral guidelines for the vulnerable koala identify that a new action (such as a new mine development next to or within koala habitat) that increases the risk of high-intensity fire in koala habitat may have a significant impact. However, the referral guidelines indicate this risk could be mitigated by the adoption of a fire prevention plan for the life of the action.

Fire could start as a result of sparks from machinery, accidents (collision) and scheduled burns getting out of control, which would then cause fires to expand into the surrounding area, including areas of koala habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent is proposing to implement an emergency response procedure for the project, which would include measures to address the risk of bushfire. The proponent would undertake measures to exclude fire from the site, including fire breaks and appropriate storage and handling of flammable chemicals and materials.

Impacts – spread of disease

Koalas are threatened primarily by diseases such as chlamydia and koala retrovirus. The EIS considers that given the prevalence of both diseases in koala populations in Queensland, it is likely that the diseases already occur in the koala populations found on and around the mine site and access road. The EIS further considers that the project would not include activities likely to result in the spread of a disease that may cause the species to decline. However, any koalas identified during pre-clearance surveys that are subsequently translocated could act to spread disease.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has also committed to the preparation and implementation of a SMP for the species to be impacted by the project. I require that the koala management measures include provisions to address the spread of diseases relevant to the koala.

Impacts – increased risk of dog attack

Mortality in koalas due to dog attack is identified as one of the key threats to the species. Feral dogs were identified within the project area during surveys. Despite this, the EIS considers that the project would not result in increased levels of threat of dog attack for the koala.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. I would expect the weed and pest management plan to include measures to reduce the risk of dog attack.

Indirect impacts – groundwater drawdown impacts to riparian vegetation/ habitat

The *EPBC Act referral guidelines for the vulnerable koala* identifies that one of a number of impacts likely to substantially interfere with the recovery of the koala may include changing hydrology which degrades habitat for the koala to the extent that the carrying capacity of the habitat is reduced. Groundwater drawdown could indirectly affect the koala and other arboreal species through reducing the ecological viability of habitat.

The EIS predicted that groundwater drawdown resulting from the project would be greatest in or closely around the mining area, reducing with distance from the mine site. Groundwater drawdown predictions anticipate that drawdown in the alluvium would reach/ extend past the Isaac River in an approximate 4 km stretch of the Isaac River at the very northern extent of the project area and approximately 2.5 km stretch of the Isaac River adjacent to the Willunga Domain.

The drawdown within and surrounding the Isaac River is not expected to exceed 2 m, while drawdown in the downstream reaches of Ripstone Creek may reach up to 5 m. The predicted drawdown of approximately 2 to 5 m would occur in areas where vegetation has the potential to be dependent on subsurface expression of groundwater and are likely to be GDEs.

The EIS considers that the riparian vegetation which would provide koala habitat associated with the Isaac River, North Creek, Cherwell Creek and the downstream

reaches of Ripstone Creek may be facultative GDEs that are intermittently dependent on subsurface expression of groundwater; that is, access groundwater only following prolonged rainfall or flood events. These vegetation communities would access groundwater only when groundwater is replenished to levels at which the roots can access. Therefore, the EIS considers that the riparian vegetation located along the watercourses would not constantly rely on groundwater for survival. The EIS further considers that vegetation would rely more on the replenishment of moisture in the soil following rainfall, rather than direct access to the groundwater system.

Terrestrial riparian vegetation associated with North Creek and Cherwell Creek also has the potential to be facultative GDEs, however the EIS considers that these vegetation communities are unlikely to be impacted by the project as they occur outside the predicted extent of groundwater drawdown for the project. All other vegetation within the project area is not considered to be groundwater dependent, given the depth of the groundwater table across the project site, the quality of the groundwater (highly saline) and the known rooting depths of the species present.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

I have stated a condition for the EA, requiring the proponent implement a Groundwater Dependent Ecosystems and Wetland Monitoring Program (GDEWMP), which will be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project.

The GDEWP will detail:

- the current condition of the GDE or wetland and its ecological values
- the location of the GDE or wetland, environmental quality indicators
- analysis methodologies and impact thresholds and triggers
- corrective actions and timing to address impacts, if detected
- sampling and analysis reporting.

Indirect impacts – noise and vibration

The EIS considers that the construction and operation of the mine would cause ongoing and localised increases in noise and vibration disturbance in habitats adjacent to the project. Nocturnal animals including the koala would be more susceptible to noise and vibration disturbance, due to their sensitivity to noise.

The EIS predicted that any potential noise-related impact to fauna within surrounding habitat would be localised and minor, occurring in intervals (blasting), where fauna would habituate to continuous noise. Therefore, despite the proposed duration of the mine site and access road once operational, significant impacts to fauna resulting from noise and vibration impacts for the duration of mining activities are not expected to occur.

I have stated a condition for inclusion in the EA which provide limits for noise generated by the mining activities and requirements for monitoring to ensure noise generation complies with the Queensland Environmental Protection (Noise) Policy 2008 (EPP (noise)). These requirements would be expected to assist in reducing potential noise impacts on fauna including the koala.

Indirect impacts – artificial lighting

Impacts to fauna associated with artificial lighting include changed behaviours to avoid lit areas and disturbance to activity levels (particularly for birds and amphibians). Some species, such as insectivorous bats, may be attracted to lit areas due to insects congregating around the light at night.

The EIS predicted that any potential impact associated with the additional lighting required for the project to protected fauna would be minor, provided that lights are operated in accordance with relevant Australian Standards.

Indirect impacts – edge effects

As discussed for the brigalow TEC the EIS indicates that the majority of the vegetation within and surrounding the project would already be impacted by edge effects due to the historical clearance of native vegetation, leaving several disconnected patches throughout the landscape.

There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to intact patches. These areas include the southern boundary and the north-western boundary of the Olive Downs South MLA close to Vermont Park where there are large areas of Eucalypt woodland.

However, the EIS considers that, given the current level of fragmentation present, edge effects are likely to have already manifested. No additional alterations to microclimate or species assemblages within or immediately surrounding the project area, including koala habitat, are expected to occur as a result of the project.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the removal of 5,500 ha of habitat critical to the survival of the koala would result in a residual significant impact.

A summary of the amount of koala habitat to be cleared for the project and the amount of habitat available in the proposed Stage 1 offset area is provided in Table 7.4.

Table 7.4 Mine site and access road habitat clearance totals for the koala

Total Stage 1 clearance (ha)	Total Stage 2 clearance (ha)	Total Stage 3 clearance (ha)	Total Stage 4 clearance (ha)	Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
743	1,762	2,261	734	5,500	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing habitat critical to the survival of the koala and 1,135 ha of regrowth habitat for the koala. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the koala and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Act Environmental Offsets Policy*.

I have recommended the following conditions (Appendix 2) to the Commonwealth Minister for the Environment:

- maximum habitat disturbance limits and a requirement for the proponent to provide an offset management plan to address the project's residual significant impact on the koala. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the koala. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP. The SMP also includes a requirement for the proponent to:
 - provide fauna underpasses at suitable intervals for any infrastructure that passes through areas of suitable koala habitat that would remain within the mine site and access road area
 - incorporate koala proof fencing into the design of the haul and access roads, to exclude koalas and prevent the risk of vehicle strike
 - ensure that a 60 km/h speed limit is enforced within the project area on the haul and access roads
 - ensure that any koalas being translocated are kept separate from other koalas and must undergo a standardised and thorough veterinary health examination to detect any clinical evidence of communicable disease or infection

I have also stated a condition for the EA, requiring the proponent to implement a GDEWMP, which would include monitoring the condition of riparian vegetation associated with the Isaac River, Ripstone Creek, North Creek and Cherwell Creek which also provides potential habitat for the greater glider. If monitoring indicates the condition this vegetation (including greater glider habitat) has declined as a likely result of the project from groundwater drawdown attributable to the project, the proponent must undertake measures to mitigate this impact or provide offsets. This would be expected to address potential loss of greater glider habitat associated with any groundwater drawdown.

Coordinator-General's conclusion – koala

I am satisfied that the EIS has generally considered the potential impacts that the project could have on the koala. However, I am not satisfied that the project has provided enough information on how much habitat would be removed by the project. To address this, I have recommended a condition to the Commonwealth Minister requiring the proponent to provide an updated BOS to the Department of Environment which addresses this requirement.

The mine site and access road would result in a residual significant impact to the koala. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the koala is delivered.

I have also recommended a number of other conditions to address the project's impacts on the koala.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the koala are not unacceptable.

Greater glider

Background

The greater glider's distribution is restricted to eastern Australia, from north Queensland to central Victoria.

The EIS states that greater glider habitat within the project area is located within the areas mapped as Eucalypt open forests to woodlands on floodplains (REs 11.3.3, 11.3.4, 11.3.7, 11.3.25), Eucalypt dry woodlands on inland depositional plains (REs 11.3.2, 11.5.3, 11.5.8c, 11.5.9, 11.5.9b and 11.9.2) and the vegetation surrounding and within the lacustrine and palustrine wetlands (REs 11.3.27f, 11.3.27i, 11.3.3c and 11.5.17). These habitat types are considered to contain greater glider food trees (*Eucalyptus* spp.), denning trees (large trees containing suitable hollows) and includes the movement corridors and refuge habitat provided along waterways including the Isaac River and Ripstone Creek.

During surveys the greater glider was recorded on numerous occasions along the Isaac River and associated tributaries and around wetland habitats within the mine site and access road. Such areas coincide with the highest density of large hollow bearing trees and hollow prolific species such as Queensland blue gum (*Eucalyptus tereticornis*).

Recovery plans, conservation advice and threat abatement

There is currently no 'recovery plan' or TAP under the EPBC Act relevant to the greater glider.

There is an approved 'conservation advice' for the species: *Conservation Advice Petauroides volans greater glider*⁹. Key threats listed in the conservation advice which are relevant to the project include:

- habitat loss and fragmentation
- inappropriate fire regimes
- climate change.

Primary conservation and management actions outlined in the conservation advice include:

- reduce the frequency and intensity of prescribed burns
- identify appropriate levels of patch retention and maintain or restore wildlife corridors between patches
- protect and retain hollow-bearing trees, suitable habitat and habitat connectivity
- protect land containing high value attributes for the species.

Impacts – direct clearance of habitat

The EIS estimates that the mine site and access road would result in the clearance of approximately 5,500 ha of potential greater glider breeding, foraging and dispersal habitat. The EIS considers that the habitat within the mine site and access road does not meet the

⁹ Commonwealth of Australia, *Conservation Advice Petauroides volans greater glider*, Department of the Environment, Canberra, 2016, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/species/pubs/254-conservation-advice-20160525.pdf>

definition of important or critical habitat, due to the level of fragmentation. This area of clearance overlaps with the area of koala habitat being cleared by the project as they occupy similar habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The EIS indicated that progressive vegetation clearing would be undertaken, and retention of hollow-bearing trees would be provided where possible, to reduce the impact to the species.

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala, that would include measures that address the project's impacts on the greater glider.

Impacts – fragmentation of habitat/ barriers to movement

As described in the assessment for the koala, the proposed access road, conveyor and eastern waste rock emplacement access road crossing would potentially impact the dispersal ability of greater glider through previously contiguous riparian vegetation. The EIS considers that the project would not act to fragment the population of greater glider onsite.

The greater glider conservation advice recommends that proponents implement rope ladder crossings over transport corridors to mitigate potential impacts to the dispersal ability of the species.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to the implementation of fauna crossings to ensure safe fauna movement across disturbed areas.

As the conservation advice recommends that proponents implement rope ladder crossings over transport corridors to mitigate potential impacts to the dispersal ability of the species, I have recommended that the SMP requires the proponent to construct rope ladder crossings across all infrastructure corridors that pass between areas of greater glider habitat to address potential impacts on the dispersal ability of the species.

Impacts – increased fire risk

Fire could start as a result of sparks from machinery, accidents (collision) and scheduled burns getting out of control, which would then cause fires to expand into the surrounding area, including areas of greater glider habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent is proposing to implement an emergency response procedure for the project, which would include measures to address the risk of bushfire. The proponent would undertake measures to exclude fire from the site, including fire breaks and appropriate storage and handling of flammable chemicals and materials.

Indirect impacts – groundwater drawdown impacts to riparian vegetation/ habitat

The potential groundwater drawdown impacts to riparian vegetation/ habitat for the greater glider would be consistent with the assessment provided for the koala.

The EIS considers that the riparian vegetation associated with the Isaac River, North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek may be facultative GDEs that are intermittently dependent on subsurface expression of groundwater. However, the EIS considers that the vegetation would not constantly rely on groundwater for survival.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

I have stated a condition for the EA, requiring the proponent to implement a GDEWMP, which will be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project.

Indirect impacts – noise and vibration, artificial lighting and edge effects

Being a nocturnal species the greater glider would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

I have stated a condition for inclusion in the EA which provide limits for noise generated by the mining activities and requirements for monitoring to ensure noise generation complies with the Queensland EPP (Noise). These requirements would be expected to assist in reducing potential noise impacts on fauna including the greater glider.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of approximately 5,500 ha of potential greater glider habitat would result in a residual significant impact to the greater glider.

A summary of the amount of greater glider habitat to be cleared for the project and the amount of habitat available in the proposed Stage 1 offset area is provided in Table 7.5.

Table 7.5 Mine site and access road habitat clearance totals for the greater glider

Total Stage 1 clearance (ha)	Total Stage 2 clearance (ha)	Total Stage 3 clearance (ha)	Total Stage 4 clearance (ha)	Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
743	1,762	2,261	734	5,500	826.5	2,736

The EIS estimates that there is a total of approximately 2,736 ha of habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing potential breeding, foraging and dispersal habitat and 1,135 ha of regrowth vegetation providing habitat for the greater glider. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the greater glider and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment:

- maximum greater glider habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the greater glider. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the greater glider. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP. The SMP also includes a requirement for the proponent to incorporate rope ladder crossings across all infrastructure corridors that pass between areas of greater glider habitat to address potential impacts on the dispersal ability of the species.

A four-year case study undertaken by Lindenmayer et al. in 2017¹⁰ found that the use of nest boxes by squirrel gliders (*Petaurua norfolcensis*) within an offset area was between 0-2.1 per cent of the accessible nest boxes used during the survey period. The study found that the low levels of use of the nest boxes by target species suggested the offset program would not have counterbalanced the loss of hollow bearing trees.

I note that the draft BOS outlines that the proponent would undertake quarterly inspections of nest boxes installed within the Stage 1 offset during the first year. Following this, monitoring will occur annually in spring. I expect the proponent to fulfil this commitment as outlined in the draft BOS and provide the results as part of reporting required for any offset sites for the project.

Accordingly, I have recommended a condition to the Commonwealth Minister for the Environment that if monitoring of the offset area indicates that greater gliders are not utilising the nest boxes, I require that the proponent investigates and implements additional measures to improve the availability of breeding/denning habitat for the species within the proposed Stage 1 offset area.

I have also stated a condition for the EA, requiring the proponent to implement a GDEWMP, which would include monitoring the condition of riparian vegetation associated with the Isaac River, Ripstone Creek, North Creek and Cherwell Creek which also provides potential habitat for the greater glider. If monitoring indicates the condition this vegetation (including greater glider habitat) has declined as a likely result of the project from groundwater drawdown attributable to the project, the proponent must undertake measures to mitigate this impact or provide offsets. This would be expected to address potential loss of greater glider habitat associated with any groundwater drawdown.

Coordinator-General's conclusion – greater glider

I am satisfied that the EIS has considered the potential impacts that the project could have on the greater glider.

The mine site and access road would result in a residual significant impact to the greater glider. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the greater glider is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this

¹⁰ Lindenmayer et al. 2017, The anatomy of a failed offset, Biological Conservation, Volume 210, Part A, 2017, pp.286-292, <https://www.sciencedirect.com/science/article/abs/pii/S000632071730349X>

species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the greater glider are not unacceptable.

Squatter pigeon (southern)

Background

The known distribution of the squatter pigeon extends south from the Burdekin-Lynd divide in the southern region of the Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville in Queensland.

The squatter pigeon was identified on 10 occasions within Eucalypt dry woodlands on depositional plains during surveys. The EIS considers all areas of Eucalypt dry woodlands on inland depositional plains and Eucalypt open forests to woodlands on floodplains as potential habitat for the species. Breeding and foraging habitat within the project area is considered to occur within RE's and more advanced regrowth vegetation on land zones 3, 4, 5, 7 and 10, where within 1 to 3 km of a suitable water body. All areas of remnant vegetation and areas of lower quality regrowth vegetation between areas of breeding/foraging habitat are considered dispersal habitat for the squatter pigeon.

Recovery plans, conservation advice and threat abatement

There is no recovery plan relevant to the squatter pigeon.

There is a conservation advice for this species: *Approved Conservation Advice for Geophaps scripta (Squatter Pigeon (southern))*¹¹. Key threats to this species identified in the conservation advice relevant to the project include:

- ongoing clearance of habitat for farming or development
- grazing of habitat by livestock and feral herbivores, and habitat destruction by domestic stock
- habitat degradation by invasive weeds including Buffel grass (*Cenchrus ciliaris*)
- inappropriate fire regimes
- predation from feral cats and foxes.

Key priority recovery and threat abatement actions include:

- managing threats to areas of vegetation that support important populations
- developing and implementing management plans for the control and eradication of feral herbivores (including grazing stock) in areas inhabited by the squatter pigeon
- implementing appropriate recommendations outlined in the TAPs.

The following TAPs are relevant to the species:

- *Threat abatement plan for predation by feral cats*¹²

¹¹ Commonwealth of Australia, Approved Conservation Advice for *Geophaps scripta scripta* (Squatter Pigeon (southern)), Department of the Environment, Canberra, 2015, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/species/pubs/64440-conservation-advice-31102015.pdf>

¹² Commonwealth of Australia, Threat abatement plan for predation by feral cats, Department of the Environment, Canberra, 2015, viewed February 2019, <http://www.environment.gov.au/system/files/resources/78f3dea5-c278-4273-8923-fa0de27aacf8/files/tap-predation-feral-cats-2015.pdf>

- *Threat abatement plan for competition and land degradation by rabbits*¹³
- *Threat abatement plan for predation by the European red fox*¹⁴.

Impacts – direct clearance of habitat

The EIS estimates that the mine site and access road would result in the clearance of approximately 5,530 ha of potential breeding, foraging and dispersal habitat for the squatter pigeon.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala, that would include measures that address the project's impacts on the squatter pigeon.

Impacts – increased fire risk

Fire could start as a result of sparks from machinery, accidents (collision) and scheduled burns getting out of control, which would then cause fires to expand into the surrounding area, including areas of squatter pigeon habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent is proposing to implement an emergency response procedure for the project, which would include measures to address the risk of bushfire. The proponent would undertake measures to exclude fire from the site, including fire breaks and appropriate storage and handling of flammable chemicals and materials.

Impacts – increased occurrence of weeds and pests

Feral cats and foxes are key predators for the squatter pigeon, while rabbits pose a threat through competition for food resources and through contributing to the degradation of habitat for the squatter pigeon. Rabbits also support elevated populations of pest predators including foxes and feral cats. Buffel grass is known to contribute to squatter pigeon habitat degradation through the competing with grass species providing food for the squatter pigeon and reducing vegetative cover.

In Queensland, the European red fox and the rabbit are Category 3, 4, 5 and 6 restricted matters and the feral cat is a Category 3, 4, and 6 restricted matter under the *Queensland Biosecurity Act 2014*. Under this Act, landowners have a 'general biosecurity obligation' to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals on a person's land.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified

¹³ Commonwealth of Australia, Threat abatement plan for competition and land degradation by rabbits, Department of the Environment and Energy, Canberra, 2016, viewed February 2019, <http://www.environment.gov.au/system/files/resources/78f3dea5-c278-4273-8923-fa0de27aacfb/files/tap-predation-feral-cats-2015.pdf>

¹⁴ Commonwealth of Australia, Threat abatement plan for predation by the European red fox, Department of the Environment, Water, Heritage and the Arts, Canberra, 2008, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/publications/tap/predation-european-red-fox>

within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. The EIS indicates that the procedure for controlling and monitoring weeds would be implemented every six months (or at times when rainfall conditions are favourable to weed outbreaks) as determined by the proponent. I acknowledge that the weed and pest management plan would include measures to address the spread of foxes, feral cats, rabbits and Buffel grass on the mine site and access road.

I am satisfied that given the nature of the proposed action, the mine site and access road is unlikely to facilitate the spread of feral cats, foxes and rabbits and is therefore not inconsistent with the relevant TAPs.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

I have stated a condition for inclusion in the EA which provides limits for noise generated by mining activities and requirements for monitoring to ensure noise generation complies with the Queensland EPP (Noise). These requirements would be expected to assist in reducing potential noise impacts on fauna including the squatter pigeon.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 5,530 ha of potential squatter pigeon habitat would result in a residual significant impact to the species.

A summary of the amount of squatter pigeon habitat to be cleared for the project and the amount of habitat available in the proposed Stage 1 offset area is provided in Table 7.6.

Table 7.6 Mine site and access road habitat clearance totals for the squatter pigeon

Total Stage 1 clearance (ha)	Total Stage 2 clearance (ha)	Total Stage 3 clearance (ha)	Total Stage 4 clearance (ha)	Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
743	1,757	2,284	746	5,530	823	3,561

The EIS estimates that there is approximately 3,561 ha of habitat within the proposed Stage 1 offset area comprising 1,811 ha of breeding habitat, 1,452.5 ha of foraging habitat and 297.5 ha of dispersal habitat for the squatter pigeon. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the squatter pigeon and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Act Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment:

- maximum squatter pigeon habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the squatter pigeon.

The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

- the proponent must prepare a SMP for the squatter pigeon. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

I note that the EIS indicated that controlled grazing may be undertaken on the proposed Stage 1 offset area. As the conservation advice for the squatter pigeon identifies the control and eradication of feral herbivores (including grazing stock) in areas inhabited by the squatter pigeon as a management priority, I have recommended a condition to the Commonwealth Minister for the Environment requiring the proponent to implement a sustainable livestock grazing plan prior to commencement of grazing on the proposed Stage 1 offset area. The plan would encourage natural regeneration of vegetation and prevent further degradation of the habitat onsite, as well reduce the risk of injury to individual birds from cattle trampling. The plan must include provisions to ensure that suitable squatter pigeon habitat is excluded from grazing areas to prevent trampling of habitat. The plan must be submitted as part of the offset management plan for stage 1.

Coordinator-General's conclusion – squatter pigeon

I am satisfied that the EIS has considered the potential impacts that the project could have on the squatter pigeon.

The mine site and access road would result in a residual significant impact to the squatter pigeon. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the squatter pigeon is delivered.

I have also recommended a number of other conditions to address the project's impacts on the squatter pigeon.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the squatter pigeon are not unacceptable.

Australian painted snipe

Background

The Australian painted snipe is widespread and is not considered to have a limited geographic distribution and it has been recorded at wetlands in all states of Australia, however is most common in eastern Australia. The Fitzroy Basin is considered to be an important area for the species.

During field surveys, a single Australian painted snipe was observed in wetted gilgai within agricultural grasslands in the Willunga domain. All areas of wetlands (lacustrine or palustrine), including wetland REs 11.3.3, 11.3.27 and 11.5.17 are considered potential habitat for the species.

Recovery plans, conservation advice and threat abatement

There is no recovery plan or TAP relevant for the species.

There is an approved conservation advice for this species: *Approved Conservation Advice for Rostratula australis (Australian painted snipe)*¹⁵. Key threats to this species identified in the conservation advice relevant to the project include:

- loss and degradation of wetlands
- trampling of habitat by cattle
- predation by foxes and feral cats
- replacement of native wetland vegetation by invasive weeds.

Key priority recovery and threat abatement actions include:

- ensuring there is no disturbance in known habitat areas, particularly where the species is known to breed
- managing livestock grazing to avoid Australian painted snipe habitat, or implement exclusion fencing or other barriers to reduce pressures at important breeding sites
- managing any changes to hydrology that may cause changes to water table levels, run-off, salinity, algal blooms, sedimentation or pollution
- managing any other known, potential or emerging threats including inappropriate fire regimes and infrastructure development, weeds and predation from foxes and feral cats.

Impacts – direct removal of habitat

The EIS indicates that the habitat within the mine site and access road area is not critical habitat for the species, and that there are no areas of 'important habitat' or important populations within the mine site and access road area.

The EIS estimates that the mine site and access road would result in the removal of approximately 113 ha of potential Australian painted snipe breeding habitat comprising palustrine and lacustrine wetlands. I also consider these wetlands to provide foraging habitat for this species.

It is considered that the species may use the wetted gilgai areas within the mine site and access road area for occasional foraging following rainfall. The EIS concludes that the species would only use these areas for short periods after rainfall and a lack of dense cover around these areas would also prohibit foraging; and are therefore unlikely to sustain any important populations.

I am not satisfied with this conclusion, as I consider that these areas would still provide habitat for the species and the loss of these areas would need to be compensated. This species was recorded in a small wetted gilgai on the Willunga site during field surveys and is known to occasionally forage over mudflats and open areas such as grasslands. I therefore consider that the gilgai areas on the site provide foraging habitat for this species. Based on the information in the EIS, the project is expected to remove 7,261.5 ha of gilgai habitat for the mine site and access road, which I consider provide potential foraging habitat for the Australian painted snipe.

¹⁵ Commonwealth of Australia, *Approved Conservation Advice for Rostratula australis (Australian painted snipe)*, Department of Sustainability, Environment, Water, Population and Communities, Canberra, 2013, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/species/pubs/77037-conservation-advice.pdf>

The proponent has committed to the preparation and implementation of a SMP, as detailed for the koala, which includes measures that would also apply to the Australian painted snipe.

Indirect impacts – reduced surface water quantity impacts to habitat

The Australian painted snipe conservation advice highlights the reduced incidence of flooding as a key issue contributing to the loss and degradation of wetlands/ habitat for the species. During operations, the project's mine water management system would capture runoff from areas that previously flowed to receiving waters, acting to capture overland flows that potentially contributed to the recharge of wetlands within the mine site and access road footprint.

As a result of the project, the catchment draining to Ripstone Creek would decrease by less than 7 per cent of the total catchment area, while the catchment draining to the Isaac River would reduce by less than 1 per cent of the total catchment area.

The EIS predicted that there would be a temporary reduction in catchment to each of the wetlands that would remain within the project area and broader locality. The predicted reductions in the catchment draining to the wetlands, and the estimated size of their catchment in the final landform is summarised in Table 7.7.

Table 7.7 Estimated reduction in catchment area available to wetlands

Wetland	Size of wetland (ha)	Size of existing catchment (ha)	Temporary reduction in catchment during operations (ha)	Size of catchment during operations (ha)	Size of catchment in final landform (ha)
HES1	17	169	102	67	169
HES2	2.5	1,820	1,418	402	1,096
HES3	2	2,600	2,182	418	2,193
HES5	24	1,056	30	1,026	1,056
HES6	16	350	24	326	350
HES7	14	261	67	194	261
HES8	18	603	114	489	603

The EIS considers that despite the proposed excision of catchment for the HES wetlands, the size of the remaining catchment would still be large relative to the size of the wetlands themselves, and the majority of the catchments for the wetlands would be reinstated following the completion of mining activities. This would include the entire catchment for HES1, HES 5, HES 6, HES 7 and HES 8. The EIS considers that during mining activities

the wetlands would continue to be inundated following rainfall and flood events, and any potential hydrological changes to the wetlands would be minimal.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to undertaking further investigation and monitoring through the installation of shallow piezometers within the wetlands to confirm that the proposed reduction in catchment would not result in adverse impacts to the ecological values of the wetlands and I expect this commitment to be delivered.

Indirect impacts – reduced surface water quality impacts to habitat

The EIS considers that the final landform is unlikely to lead to an increase in sediment transport downstream of the project. Sediment runoff is proposed to be managed through progressive rehabilitation and the capture of surface runoff from the waste rock emplacements to dedicated sediment dams, where water would be allowed to settle before being discharged to the environment.

Any releases from the project during mining operations would be required to meet water quality targets for sediment and contaminants prior to release. The EIS anticipates that through the proposed mine water management system, there would be no uncontrolled spills of mine-affected water from the worked water dams under normal operating conditions; therefore, there would be no measurable impact on surface water quality and therefore no adverse impacts to surrounding habitats.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

A water management plan would be prepared for the project, which would detail measures to manage and prevent saline drainage and sodality and acid rock drainage from waste rock emplacements, and corrective actions and contingency procedures for emergencies. Surface water monitoring both within and external to the mine site will be undertaken upstream, onsite and downstream.

The proponent will also prepare a receiving environment monitoring plan (REMP) which will include measures to monitor the condition of, and potential impacts to, receiving waters.

Indirect impacts – groundwater drawdown impacts to habitat

The conservation advice for the Australian painted snipe identifies managing any changes to hydrology that may result in changes to water table levels, run-off, salinity, algal blooms, sedimentation or pollution as a key priority for the species. Groundwater drawdown could indirectly affect the Australian painted snipe through reducing the ecological viability of habitat.

The EIS considers that the terrestrial vegetation and aquatic habitat associated with the palustrine wetlands surrounding the ODS and Willunga domains are unlikely to be GDEs, given the depth of groundwater in these locations (in excess of 10 metres below ground level). However, perched water tables are evident where waterbodies, including the palustrine wetlands, continue to hold water throughout the dry period. It is likely that the wetlands located within the project area rely on the slow percolation of surface water after rainfall events to sustain their health, rather than direct access to the groundwater system.

Accordingly, the EIS considers that the project would not result in an adverse impact to wetland communities through any impacts to the groundwater system.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

I have stated a condition for the EA, requiring the proponent to implement a GDEWMP, which will be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project; specifically, those not proposed to be cleared by the project (e.g. HES2, HES3, HES5, HES7, HES8). The program would include monitoring of:

- groundwater depth and quality
- health of the terrestrial vegetation
- surface water quantity and quality.

The GDEWP would detail:

- the current condition of the GDE or wetland and its ecological values
- the location of the GDE or wetland, environmental quality indicators
- analysis methodologies and impact thresholds and triggers
- corrective actions and timing to address impacts, if detected
- sampling and analysis reporting.

Impacts – increased occurrence of weeds and pests

Foxes and feral cats have been identified as threats to the Australian painted snipe. Feral cats were identified onsite during surveys. Buffel grass is prevalent within the mine site and access road and could contribute to the degradation of wetland habitat.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. The EIS indicates that the procedure for controlling and monitoring weeds would be implemented every six months (or at times when rainfall conditions are favourable to weed outbreaks) as determined by the proponent.

I acknowledge that the weed and pest management plan includes measures to address the spread of weeds and pests relevant to the Australian painted snipe on the mine site and access road. I am satisfied that given the nature of the proposed action, the mine site and access road is unlikely to facilitate the spread of feral cats and foxes and is therefore not inconsistent with the relevant TAPs.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

I have stated a condition for inclusion in the EA which provide limits for noise generated by the mining activities and requirements for monitoring to ensure noise generation

complies with the Queensland EPP (Noise). These requirements would be expected to assist in reducing potential noise impacts on fauna including the Australian painted snipe.

Residual significant impacts and offsets

Based on the information presented in the EIS, I consider that the removal of 113 ha of Australian painted snipe habitat associated with the loss of wetland habitat, totalled with the loss of 7,261.5 ha of gilgai habitat for the mine site and access road would result in a residual significant impact.

Based on the information in the EIS I note that the areas of the gilgai habitat also provide habitat for the ornamental snake, and that the offsets proposed for the ornamental snake would compensate some of this impact.

A summary of the amount of Australian painted snipe habitat to be cleared for the project and the amount of habitat available in the proposed Stage 1 offset area which was provided in the EIS is provided in Table 7.8. I note that the proponent has not included the gilgai areas in the impact calculation for the Australian painted snipe.

Table 7.8 Mine site and access road habitat clearance totals for the Australian painted snipe

Total Stage 1 clearance (ha)	Total Stage 2 clearance (ha)	Total Stage 3 clearance (ha)	Total Stage 4 clearance (ha)	Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
14	24	50	25	113	21	86

The EIS considers that the proposed Stage 1 offset area contains 86 ha of potential breeding and foraging habitat for the Australian painted snipe.

As the proponent has not included areas of gilgai habitat which are likely to provide foraging habitat for the Australian painted snipe, I have recommended a condition that the proponent provide an updated BOS to the Department of Environment and Energy for approval which provides updated impact figures and offset calculations to determine the offset obligation would need to be updated to reflect this additional habitat.

In addition I have also recommended the following conditions to the Commonwealth Minister for the Environment:

- a requirement for the proponent to provide an offsets management plan for each stage of the project to compensate for the residual significant impact on the Australian painted snipe. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- the proponent must prepare a SMP for the Australian painted snipe. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP.

I note that the EIS indicated that controlled grazing may be undertaken on the proposed Stage 1 offset area. As the conservation advice for the Australian painted snipe identifies the control and eradication of feral herbivores (including grazing stock) in areas inhabited

by the Australian painted snipe as a management priority, I have recommended a condition to the Commonwealth Minister for the Environment requiring that the proponent to implement a sustainable livestock grazing plan prior to commencement of grazing on the proposed Stage 1 offset area. The plan would encourage natural regeneration of vegetation and prevent further degradation of the habitat onsite, as well reduce the risk of injury to individual birds from trampling cattle. The plan must include provisions to ensure that suitable Australian painted snipe habitat is excluded from grazing areas.

I have also stated a condition for the EA, requiring the proponent to implement a GDEWMP, which would include monitoring the condition of remaining wetlands within the vicinity of the project footprint which also provides potential habitat for the Australian painted snipe. If monitoring indicates the condition this vegetation (including Australian painted snipe habitat) has declined as a likely result of the project from groundwater drawdown attributable to the project, the proponent must undertake measures to mitigate this impact or provide offsets. This would be expected to address potential loss of Australian painted snipe habitat associated with any groundwater drawdown.

Coordinator-General's conclusion – Australian painted snipe

I am satisfied that the EIS has generally considered the potential impacts that the project could have on the Australian painted snipe. However, I am not satisfied that the project has provided enough information on how much habitat would be removed by the project. To address this, I have recommended a condition to the Commonwealth Minister requiring the proponent to provide an updated BOS to the Department of Environment which addresses this requirement.

The mine site and access road would result in a residual significant impact to the Australian painted snipe. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the Australian painted snipe is delivered.

I have also recommended a number of other conditions to address the project's impacts on the Australian painted snipe.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the Australian painted snipe are not unacceptable.

Ornamental snake

Background

The ornamental snake is known only to occur in the Brigalow Belt Bioregion and drainage systems of the Fitzroy and Dawson River catchments in Queensland. The species is known to occur within the Moranbah, Dysart and Coppabella localities.

The species is identified as a 'high priority species for conservation' within the *Fitzroy Natural Resource Management Region Back on Track Actions for Biodiversity*¹⁶.

¹⁶ Queensland Government, *Fitzroy Natural Resource Management Region Back on Track Actions for Biodiversity*, Department of Environment and Resource Management, Brisbane, 2010, viewed February 2019, <https://environment.des.qld.gov.au/wildlife/prioritisation-framework/bot-biodiversity-documents.html>

Four ornamental snakes were recorded at three locations within the ODS domain and a further five locations within the Willunga domain. The species was recorded within agricultural grasslands on cracking clays, around palustrine wetlands, within Acacia dominated open forests, woodland and shrublands, and also one record within Eucalypt dry woodlands on inland depositional plains (expected to be a transient individual).

The EIS considers that ground-truthed soils mapping produced for EIS across the study area identified areas of gilgai relief, which are the most accurate reflection of potential habitat for this species. The EIS considers that all areas of brigalow TEC and mapped gilgai, as well as wetland REs 11.3.3, 11.3.27 and 11.5.17, represent potential 'known important habitat' as the species was recorded within those habitat types. These areas contain woody debris and pools of water in low-lying areas which support frog habitat following rainfall, which provide a food source for the species. Areas of suitable habitat also occur in a significant portion of agricultural grasslands that once supported brigalow habitat.

Recovery plans, conservation advice and threat abatement

There is no specific recovery plan for this species, however the *Draft referral guidelines for the nationally listed Brigalow Belt reptiles*¹⁷ is relevant.

There is an approved conservation advice for this species: approved conservation advice for the species: *Approved Conservation Advice for Denisonia maculata (Ornamental Snake)*¹⁸.

Key threats to the species listed in the conservation advice relevant to the project include:

- habitat loss and fragmentation through clearing
- habitat degradation through overgrazing by stock, especially cattle, or grazing of gilgais during the wet season leading to soil compaction and compromised soil structure
- alteration of landscape hydrology and water quality in and around gilgai environments
- poisoning through cane toad ingestion
- predation by feral animals
- invasive weeds.

Relevant priority recovery and threat abatement actions listed in the conservation advice and draft referral guidelines include:

- avoiding habitat clearance
- maximising the establishment of reserves to protect suitable habitat and landscape connectivity, or implementation of buffer zones to protect areas of suitable habitat
- implementing habitat management and monitoring plans specific to the species
- identifying populations of high conservation priority and minimising adverse impacts from land use at known sites

¹⁷ Commonwealth of Australia, Draft Referral guidelines for the nationally listed Brigalow Belt reptiles, Department of Sustainability, Environment, Water, Population and Communities, Canberra, 2011, viewed February 2019, <http://www.environment.gov.au/system/files/resources/570964ac-15bf-4e07-80da-848fead7b0cd/files/draft-referral-guidelines-comment-brigalow-reptiles.pdf>

¹⁸ Commonwealth of Australia, Approved Conservation Advice for Denisonia maculata (Ornamental Snake), Department of the Environment, Canberra, 2014, viewed February 2019, <http://www.environment.gov.au/biodiversity/threatened/species/pubs/1193-conservation-advice.pdf>

- controlling key threats (such as introduced pests including pigs and cane toads) to manage threats at known sites and implement pest management plans
- implementing measures to exclude cattle from suitable habitats e.g. gilgai during the wet season
- monitoring construction works to check for trapped reptiles every three days
- implementing water management plans.

The ornamental snake is listed as a species that may be adversely affected by pest animal species in the following TAPs:

- *Threat Abatement Plan for the biological effects, including lethal toxic ingestion, caused by cane toads*
- *Threat Abatement Plan for predation by Feral Cats*
- *Threat Abatement Plan for predation by the European Red Fox*
- *Threat Abatement Plan for Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs¹⁹.*

Impacts – direct clearance of habitat

The draft *Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles* states that clearance of 2 ha or more of 'important habitat' for the ornamental snake is considered to have a high risk of significant impact. 'Important habitat' for the ornamental snake is considered:

- habitat where the species has been identified during a survey
- near the limit of the species' known range
- large patches of contiguous, suitable habitat and viable landscape corridors (necessary for the purposes of breeding, dispersal or maintaining the genetic diversity of the species over successive generations)
- a habitat type where the species is identified during a survey, but which was previously thought not to support the species.

As the species was identified onsite during surveys, the habitat provided within the mine site and access road is considered 'important habitat'. The EIS estimates that the mine site and access road would remove approximately 7,621.5 ha of 'important habitat'.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala, that would include measures that address the project's impacts on the ornamental snake.

Indirect impacts – surface water quantity impacts (hydrological impacts on gilgai)

During operations, the project's mine water management system would capture runoff from areas that previously flowed to receiving waters, acting to capture overland flows that

¹⁹ Commonwealth of Australia, Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*), Department of the Environment and Energy, Canberra, 2017, <http://www.environment.gov.au/system/files/resources/b022ba00-ceb9-4d0b-9b9a-54f9700e7ec9/files/tap-feral-pigs-2017.pdf>

potentially contributed to the recharge of wetlands and gilgai areas within the mine site and access road footprint.

The project would result in a reduction in the total catchment area draining to Ripstone Creek by less than 7 per cent, while the catchment draining to the Isaac River would reduce by less than 1 per cent of the total catchment area.

The EIS predicted that there would be no measurable impacts on surface water quantity as a result of the project and there would be no impacts to surrounding habitats (which would include habitat suitable for the species), despite the identified reductions in catchments areas for Ripstone Creek and the Isaac River. The EIS considers that once the rehabilitated landform is established, the majority of the catchments would be reinstated. With regards to wetlands, which also provide habitat for the ornamental snake, the EIS considers that during mining activities the wetlands would continue to be inundated following rainfall and flood events, and any potential hydrological changes to the wetlands would be minimal.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

I have stated a condition for the EA, requiring the proponent to implement a GDEWMP to detect and manage any potential impacts on GDEs and wetlands associated with the project. As part of implementing this plan the proponent would undertake further investigations and monitoring of wetlands including habitat for the ornamental snake. This would allow the early detection and management of any potential adverse impacts to the ecological values of the wetlands, attributable the project.

Indirect impacts – surface water quality impacts (hydrological impacts on gilgai)

The EIS considers that the final landform is unlikely to lead to an increase in sediment transport downstream of the project. Sediment runoff is proposed to be managed through progressive rehabilitation and capture of surface runoff from the waste rock emplacements to dedicated sediment dams, where water would be allowed to settle before being discharged to the environment.

Any releases from the project would be required to meet water quality targets for sediment and contaminants prior to release. The EIS anticipates that through the mine water management system, there would be no uncontrolled spills of mine-affected water from the worked water dams under normal operating conditions; therefore, there would be no measurable impact on surface water quality and therefore no adverse impacts to surrounding habitats.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The EIS concludes that the proposed water management system has been designed to avoid any interactions with any wetlands areas adjacent to the project and that the proponent has made a commitment that no controlled releases would occur within any wetland protection areas. The project is therefore unlikely to have any direct water quality impacts wetlands in the project area, including wetlands that provide habitat for the ornamental snake.

I accept the proponent's conclusion that the project is unlikely to have direct water quality impacts on remaining wetlands in the project area provided that the controlled releases are undertaken in accordance with the conditions I have stated for inclusion in the EA. My

stated conditions stipulate the location of the release points and limits for the controlled releases from the mine water management system which would ensure that there are no controlled releases to any adjacent wetland areas.

I have also stated a condition for the EA which requires the proponent to prepare a water management plan for the project. The plan would detail measures to manage and prevent saline drainage and sodality and acid rock drainage, and corrective actions and contingency procedures for emergencies. These measures would reduce the potential for adverse water quality impacts on the receiving environment and potential ornamental snake habitat. I have also stated a condition of the EA requiring the proponent to prepare a REMP which would include measures to monitor the condition of and impacts to receiving waters. This would allow the early detection and management of any potential adverse impacts on environmental values including habitats which support the ornamental snake.

Impacts – increased occurrence of weeds and pests

During surveys, feral cats, foxes and feral pigs were identified within the mine site and access road area. These species are known threats to the ornamental snake. Cane toads, which pose a threat through toxic ingestion and mortality, were also identified in the mine site and access road area.

AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. The EIS indicates that the procedure for controlling and monitoring weeds would be implemented every six months (or at times when rainfall conditions are favourable to weed outbreaks) as determined by the proponent.

I am satisfied that given the nature of the proposed action, the mine site and access road is unlikely to facilitate the spread of cane toads, feral cats, foxes and feral pigs and is therefore not inconsistent with the relevant TAPs. I would expect the weed and pest management plan to include measures to address the spread of cane toads, feral cats, foxes and feral pigs on the mine site and access road.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 7,621.5 ha of 'important' ornamental snake habitat would result in a significant impact.

A summary of the amount of ornamental snake habitat to be cleared for the project and the amount of habitat available in the proposed Stage 1 offset area is provided in Table 7.9.

Table 7.9 Mine site and access road habitat clearance totals for the ornamental snake

Total Stage 1 clearance (ha)	Total Stage 2 clearance (ha)	Total Stage 3 clearance (ha)	Total Stage 4 clearance (ha)	Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
461.5	1,596	3,916	1,648	7,261.5	506	854

The EIS considers that the proposed Stage 1 offset area contains 854 ha of 'important habitat' for the ornamental snake, including suitable soil types, gilgai and woody debris and frog habitat.

As the proponent has not included areas connecting gilgais and other important habitat which are likely to be important for the ornamental snake, I have recommended a condition that the proponent provide an updated BOS to the Department of Environment and Energy for approval which provides updated impact figures and offset calculations to determine the offset obligation would need to be updated to reflect this additional habitat.

In addition, I have also recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- a requirement for the proponent to provide an offsets management plan for each stage of the project to compensate for the residual significant impact on the ornamental snake. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage
- a SMP must be prepared for the ornamental snake. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP.

The *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles* highlight cattle grazing activities resulting in degradation of microhabitat features within 'important habitat' patches as having a high risk of significant impact.

As the conservation advice for the ornamental snake identified overgrazing and trampling of habitat by cattle as a key threat to the species, I have recommended a condition to the Commonwealth Minister for the Environment requiring that the proponent must prepare a sustainable livestock grazing plan prior to commencement of grazing on the proposed Stage 1 offset area. The plan would encourage natural regeneration of vegetation and prevent further degradation of the habitat onsite, as well reduce the risk of injury to individual snakes from trampling cattle. The plan must include provisions to ensure that suitable ornamental snake habitat is excluded from grazing areas.

Coordinator-General's conclusion – ornamental snake

I am satisfied that the EIS has generally considered the potential impacts that the project could have on the ornamental snake. However, I am not satisfied that the project has provided enough information on how much habitat would be removed by the project. To address this, I have recommended a condition to the Commonwealth Minister requiring the proponent to provide an updated BOS to the Department of Environment which addresses this requirement.

The mine site and access road would result in a residual significant impact to the ornamental snake. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the ornamental snake is delivered.

I have also recommended a number of other conditions to address the project's impacts on the ornamental snake.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the ornamental snake are not unacceptable.

7.4.2 Listed migratory species

Background

Migratory species identified within the PMST that have the potential to occur within the project area and surrounds include:

- glossy ibis (*Plegadis falcinellus*)
- caspian tern (*Hydroprogne caspia*)
- fork-tailed swift (*Apus pacificus*)
- oriental cuckoo (*Cuculus optatus*)
- white-throated needletail (*Hirundapus caudacutus*)
- black-faced monarch (*Monarcha melanopsis*)
- yellow wagtail (*Motacilla flava*)
- satin flycatcher (*Myiagra cyanoleuca*)
- curlew sandpiper (*Calidris ferruginea*)
- Latham's snipe (*Gallinago hardwickii*)
- osprey (*Pandion haliaetus*)
- common greenshank (*Tringa nebularia*).

Impacts

Of the migratory species identified above, only the glossy ibis, caspian tern, satin flycatcher and Latham's snipe were recorded within the mine site and access road area during surveys. According to mapping provided in the EIS, the most frequently observed migratory species onsite was the glossy ibis, which was sighted on three separate occasions during surveys.

I consider that, although suitable habitat may be present onsite and would be removed by the project for some of the migratory species identified, there are a lack of records to indicate that the project area contains an ecologically significant proportion of any of the species. Based on the information provided in the EIS, for the above listed migratory species the project would not:

- adversely impact populations
- adversely impact habitat critical to their survival

- modify, destroy, remove or decrease the availability or quality of habitat to the extent that any of the species is likely to decline.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a VMP and a SMP, as detailed for the koala in Section 7.4.1 of this report, which would include measures that would address impacts on migratory species.

GDEWMP, which will be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project which would provide suitable habitat for a number of the migratory species identified in the PMST.

Residual significant impacts and offsets

From the identification of the habitat onsite and in consideration of the number of species identified onsite during surveys, the habitat of is not likely to be of critical importance, is not at the limit of the species range or in an area where the species is declining. Given the nature of the species as defined in SPRAT (large home ranges, foraging requirements etc.), I am satisfied with the conclusion in the EIS that the project would not result in a residual significant impact to the threatened migratory species listed above.

A BOS has been prepared for the project, which would ensure that suitable habitat for is provided as offsets for the residual significant impacts to EPBC listed threatened species including the koala, greater glider, squatter pigeon, ornamental snake and Australian painted snipe. The habitat identified within the Stage 1 offset area and the proponent's 34,000 ha of landholdings would overlap with suitable habitat for the listed migratory species identified in the PMST. Although a residual significant impact to listed migratory species is not likely, I am satisfied that the project's potential impacts to listed migratory species habitat would be compensated for through EPBC Act listed threatened species offset requirements.

Coordinator-General's conclusion – listed migratory species

I consider that my recommended conditions requiring the proponent to undertake compensatory measures to address the residual significant impact to listed threatened species and the projects impacts to water resources would be applicable to managing potential impacts on migratory species. The revegetation and regenerative works proposed by the proponent would involve the creation of similar habitat to that being impacted.

In light of the proposed avoidance and mitigation measures and conditions in this report, I consider the impacts on migratory species would not be unacceptable and the proposed management actions would not be inconsistent with Australia's obligations under the Bonn Convention, CAMBA, JAMBA and ROKAMBA and relevant TAPs.

7.4.3 Water resource in relation to coal seam gas (CSG) and large coal mining (the water trigger).

The proponent proposes to take an action which involves a large coal mine development which is likely to have a significant impact on water resources.

Under the EPBC Act (section 528) a 'large coal mining development' is defined as:

- any coal mining activity that has, or is likely to have, a significant impact on water resources (including any impacts of associated salt production and/or salinity):
 - in its own right; or
 - when considered with other developments, whether past, present or reasonably foreseeable developments.

In accordance with section 131AB of the EPBC Act, advice was sought from the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC).

On 27 August 2018, I submitted to the IESC a joint request for advice with the Department of the Environment and Energy (DEE) on water matters for the project. The IESC provided its advice on 9 October 2018.

The IESC advice identified key areas which required additional information to the support the draft EIS. The advice indicated that the proponent should:

- undertake additional baseline ecology surveys
- update the numerical groundwater modelling once additional data has been collected
- provide additional information on the predict the quality of untreated discharge water and associated impacts

My conclusions in this section are based on an analysis of the EIS technical reports, IESC advice, advice from Australian and Queensland state government agency experts and key issues raised in public submissions.

Surface water resources

Background

The Olive Downs project is located within the headwaters of the Isaac River sub-catchment of the Fitzroy Basin.

The Isaac River is the main watercourse that crosses the project area flowing in a north-west to south-east direction, passing the township of Moranbah and the Millenium, Poitrel and Daunia coal mines before entering the Olive Downs site.

The Isaac River bisects the Olive Downs South (ODS) and Willunga mining domains, with ODS located to the west/south of the Isaac River, and Willunga on the east.

The primary tributaries of the Isaac River near the project area include North, Ripstone, Boomerang and Phillips Creeks. North, Boomerang and Phillips Creeks do not pass through the mine site. Ripstone Creek runs west to east, south of the proposed ODS pits, and intersects the satellite pit to the south west of the main ODS pits.

The Isaac River and its tributaries are ephemeral, typically experiencing flow only after sustained or intense rainfall and runoff in the catchment. As result stream flows are highly variable throughout the year ranging from full flowing systems to dry channels. Some surface water remains as small pools in some sections of the watercourses and floodplains even during the dry season in areas that are underlain by clay-rich sediments. The underlying clays essentially create a temporary perched water table by slowing the downward seepage of water into the underlying sediments. These pools are likely to provide refuge habitat for aquatic fauna during periods of low rainfall.

The EIS indicates that a large proportion of the site (around 13,000 ha) is mapped as containing brown vertosol soils which are clay-rich soils (more than 35 percent clay) which typically exhibit 'gilgai' microrelief. The gilgai are essentially small, ephemeral lakes which form from a depression in the soil surface as result of the expanding and shrinking clay soils following wet and dry periods. These soils provide a water source for vegetation with soils remaining saturated in the upper 0.5 m for up to three months²⁰, following rainfall. Gilgais also provide important habitat for aquatic and terrestrial fauna including frogs, and the EPBC Act-listed ornamental snake.

The project area supports a range of other surface water resources including lacustrine and palustrine wetlands. The EIS identified eight lacustrine (lake type) wetlands in the project area including dams on the Willunga, Vermont Park, Iffley and Deverill properties. These dams provide a water source for livestock, aquatic and terrestrial fauna; and provide foraging and breeding habitat for a range of the fauna species including frogs, waterbirds and turtles.

The EIS indicates that there 60 palustrine (marsh type) wetlands mapped in the project area including 11 wetlands of high ecological significance and 49 wetlands of general ecological significance (GES). Sixteen additional GES wetlands were identified during field surveys. The GES wetlands include the riparian wetlands of the Isaac River, flood plain and non-floodplain wetlands. The HES wetlands include a paleochannel lake at Vermont Park, ox-bow lakes, flood channel wetlands in the Isaac River floodplain and vegetated swamps beyond the river floodplain.

There are surface water users of the Isaac River both upstream and downstream of the project with a total of 12 surface water licenses identified. Most of these licences are for agricultural related activities (e.g. irrigation and stock watering).

The EIS indicates that water quality of the Isaac River for the most part meets the water quality objectives to protect its environmental values. Assessment of the regional water quality of the lower (based on sampling at the Deverill gauging station) and upper (based on sampling as part of the Red Hill mining lease EIS) Isaac River indicates that the Isaac River has generally good quality with some exceedances for metals (i.e. aluminium, zinc, TSS and turbidity) for water quality objectives for aquatic ecosystems.

The Isaac River is already subject to releases from at least 10 mines which have permits to release water upstream of the project, and occasionally experiences exceedances of water quality objectives due to combined releases from these mines. Assessment of baseline datasets (inclusive of data collected for the surrounding mines) show that the water quality in the Isaac River during and after significant flow events has exceeded the Isaac River WQOs (for electrical conductivity) for short periods due to releases from operating coal mines upstream.

²⁰ The Australian Soil Classification 2016, CSIRO, viewed 17 April 2019, http://www.clw.csiro.au/aclep/asc_re_on_line_V2/ve/vertosols.htm

Impacts and mitigation–Quantity

Impacts on the Isaac River

The project would involve activities which have the potential to impact on availability surface water resources within the Isaac River catchment including:

- construction of water management infrastructure and systems that redirect and/or capture overland surface water flows, potentially reducing the amount of surface water runoff in the catchment and availability of surface water to the receiving waterways, wetlands and flora and fauna
- the take of water from the Isaac River to meet additional raw water demands for the project, potentially reducing the volume and duration of river flows
- construction of high wall emplacements adjacent to the open pits to manage flood risks, reducing the catchment area of the Isaac River floodplain and altered flood dynamics in the catchment.

The EIS indicates that a significant proportion of mine site water requirements would be sourced from water collected and stored in mine affected water dams (i.e. water from surface water runoff and groundwater inflows) which would be recycled and reused within the mine water management system.

Under section 97 of the *Queensland Water Act 2000* the proponent would be authorised to take overland flow for use within the site water management system as assessed in the EIS, provided that the EA includes conditions limiting the take of overland flow. The take of overland flow for the project must not be more than the volume necessary to satisfy the requirements of the EA.

Raw water for the project is proposed to be sourced from the existing Eungella water pipeline network which is operated by Sunwater Limited. An annual water allocation of 2,250 ML is being sought by the proponent. Based on modelling undertaken for the EIS, there is a 90 per cent probability that this allocation would meet water demands for the site. This water source may also be supplemented by adjusting site water demands and implementing onsite harvesting measures.

Two up-stream clean water storages: North Western Water Dam (NWWD) and Central Water Dam (CWD) with a modelled capacity of 438ML and 311 ML respectively are proposed in the ODS domain to capture and segregate up-catchment runoff from the mine affected water management system. Clean water drains connected to NWWD and CWD would allow rainfall runoff from undisturbed areas to continue to be conveyed to the Isaac River and Ripstone Creek respectively. The NWWD would also be used to store water from the Eungella pipeline prior to use. No harvesting of water is proposed from the CWD.

Additional water licences may also be sought, if additional external water is required to meet raw water needs. The proponent has applied for two licences for the take of 65 ML/annum of unallocated general reserve water from the Isaac River, should additional water be required for the project.

The EIS indicates that proposed water management system during mining operations would capture runoff from areas that would have previously flowed to the Isaac River and Ripstone Creek.

Modelling undertaken for the EIS indicates that the project would be expected to capture less than 1 percent (51 km² of 7,782 km²) of surface water runoff from the Isaac River catchment downstream of the project. The EIS concludes that this reduction would have a negligible impact on the duration and extent of instream flows in the Isaac River immediately adjacent to the project. At the completion of mining, surface runoff from rehabilitated out-of-pit waste rock emplacement areas would be released from the site. An area of approximately 49 km² would continue to drain to the mine final voids.

Modelling also indicates that the catchment draining to Ripstone Creek would be expected to reduce by around 19 km² (compared to pre-mining conditions), which represents a decrease of less than 7 per cent. The instream flows in the lower reaches of Ripstone Creek immediately adjacent to the project is not expected to be greatly influenced by the project as up to 87 to 93 per cent of catchment runoff to Ripstone Creek would remain unchanged. Surface water runoff would also continue to be conveyed to Ripstone Creek via an up-catchment water drain connected to the CWD clean water storage which is proposed upstream.

I accept the conclusion that the project's impact on the Isaac River and Ripstone creek catchments is not significant at the catchment scale and it not expected to limit availability of surface water resources to the ecosystems remaining in these catchments.

The EIS indicates that the project is also expected to impact on baseflows of the Isaac River as result of groundwater drawdown from the pits. Modelling predicts that there would be increased loss of water from Isaac River to the alluvium by up to 2.6 ML/day during mining operation and 1.9 ML/day post mining. The increased seepage from the Isaac River to the alluvium during mining operations represents a potential 0.5 per cent reduction in flow under a mean flow event.

The EIS concludes that the reduction in flows is considered to be small and not expected to have an adverse impact on the long-term hydrological regime (i.e. volume and timing of flows) of the Isaac River and therefore the aquatic and riparian values of the Isaac River. This estimate is also expected to be conservative as the model does not account for the unsaturated zone that can form between the bed of the river and the underlying groundwater unit, which can limit the movement of water into the alluvium.

To ensure that potential impacts on riparian values of the Isaac River and its tributaries are adequately managed I have recommended a condition to the Commonwealth Minister requiring the proponent to prepare and implement a GDE and wetland monitoring program which would allow for the proponent to detect and potential adverse impacts GDEs (including riparian vegetation) and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts. The GDEWMP would need to be submitted to the administering authority at least three months prior to the commencement of mining operations.

Impacts on Ripstone Creek and other watercourses

The only 'watercourses' that would be directly impacted by the Project are the Isaac River and Ripstone Creek. The catchments and channels of Boomerang Creek, and Phillips Creek do not pass through the mine site and are unlikely to be directly impacted by the project. However, the floodplain areas of the lower reaches of these creeks may be affected by the altered flood hydraulics of the Isaac River. The potential flood impacts of the project are discussed in the following sections.

The project would have a direct impact on 8 km of the lower Ripstone Creek catchment. Ripstone Creek is located in the south-western corner of the Ripstone Open cut pit (ODS9). Approximately 1.375 km of Ripstone Creek is proposed to be diverted to allow for a levee around the pit. The EIS concluded that it would not be financially viable for the project to reduce the size of or avoid mining ODS9 pit. The diversion is therefore considered necessary for the project.

To ensure the habitat values of the creek are maintained the proponent has committed to constructing a diversion with similar geomorphic, hydraulic and ecological characteristics as the section of Ripstone Creek that is being replaced.

The diversion would be undertaken in accordance with a creek diversion design plan which would include details on revegetation and rehabilitation works that would be undertaken to reinstate habitat features that reflect the existing habitat.

I have stated conditions for the EA requiring the proponent to prepare and submit a certified design plan for the Ripstone Creek diversion prior to the commencing construction of the diversion. The design plan must be generally in accordance with the functional design presented in the EIS.

The proponent has also committed to preparing an operation and monitoring plan as part of the design plan which outlines ongoing monitoring and management measures to address any issues which impact on the performance and integrity of the Ripstone Creek diversion and/or adjoining watercourses.

Water resource for wetlands

As the palustrine wetlands in the project area are considered to rely on soil stored moisture to satisfy their water requirements, they are potentially vulnerable to changes in the availability water resources associated with the development of the project. The project would be expected to excise a portion of the total catchment area available for the wetlands which would remain in the project area and therefore reduce the volume of overland flow received by these wetlands. The EIS assessment indicates that some of the catchments supporting these wetlands could be reduced as much as 83 per cent as result of the project. However, the EIS concludes that the wetlands are unlikely to be adversely affected given their size compared to the overall size of the catchment and would continue to be inundated following rainfall and flooding events. It is also considered that these wetlands would be less susceptible to a reduction on water availability, given that they are already adapted to wetting and drying cycles and the underlying geology allows for perched water tables to persist for extended periods following rainfall. The same conclusion has been made for gilgai habitat which is also subject to wetting and drying cycles.

While the EIS concludes that these wetlands are unlikely to be adversely affected by the reduction in catchment area, the proponent has proposed to install shallow piezometers within these wetlands to monitor and identify any adverse impacts on these wetlands as result of the project.

To ensure that any potential risks to wetland health are managed, I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts to wetlands outside the direct disturbance footprint (e.g. HES2, HES3, HES5, HES7 and HES8). The monitoring

program would also outline corrective actions and timings to address any detected impacts.

Coordinator-General's conclusion: surface water resources-quantity

I am satisfied that the project is unlikely to have a significant impact on surface water resources in the project area as the project is only expected to capture small proportion of surface water runoff from Isaac River catchment.

Impacts and mitigation–water quality

The project would involve activities which have the potential to increase the risk of contaminants (i.e. sediments, nutrients, metals etc.) in surface water runoff entering the receiving environment including:

- land disturbances associated with the extraction of coal including the removal of waste rock material and the construction of haul and access roads
- placement and stockpiling waste rock material, backfilling voids and the storage and disposal of coal rejects from the coal handling and preparation plant (CHPP)
- controlled releases from water management system infrastructure (i.e. sediment and mine dams)
- uncontrolled releases (overflow) from sediment and mine dams, and final voids
- land based irrigation of the treated effluent.

The EIS indicates that the water quality of surface water resources would be managed through implementation of the mine water management system which would control the flow and storage of surface water across the site.

The management system would be designed to protect the environmental values of local and regional surface water resources. This would include implementing best practice sediment and erosion control measures and measures to ensure mine affected water is contained and separated from other water streams and to prevent uncontrolled discharges of mine affected water to the receiving environment. The proposed mine water management system would include the following measures:

- diverting runoff from undisturbed areas via a series of the up-catchment water drains around the areas proposed to be disturbed by mining to prevent potential contact with potential water quality contaminants generated by the project
- directing sediment laden runoff (sediment water) from the areas proposed to be disturbed by vegetation clearing, haulage roads and general usage areas, and out-of-pit waste rock emplacement areas to sediment dams for treatment prior to being discharged to the receiving environment
- progressively rehabilitating waste rock emplacements and other disturbed areas to reduce sediment transport to downstream wetlands and watercourses. Rehabilitation works include constructing graded and/or diversion banks and establishing vegetative groundcover. The proponent has committed to retaining the sediment dams until the waste rock emplacements are revegetated and stable; and the runoff water quality matches the quality of runoff from undisturbed areas.
- storing mine affected water from the open cut pits, tailings dams, groundwater from mine dewatering activities; CHPP and in-pit reject containment facilities; and runoff from coal stockpile areas in mine dams for treatment before being discharged to the

receiving environment. These dams would be designed and operated to achieve zero uncontrolled releases to the receiving environment.

- Undertaking controlled releases from the water management system to the receiving environment in accordance with a controlled release strategy which aligns with the relevant water quality objectives for the Isaac River.

I have stated a condition in the EA requiring that the proposed water management infrastructure is installed and operated in accordance with a water management plan, which ensures that uncontaminated stormwater does not become mine affected water.

Water quality impacts—sediment dams

Surface water runoff from waste rock emplacements and other disturbed areas not impacted by mining operations would be directed to dedicated sediment dams to ensure it does not become mine affected water..

The sediment dams would be designed in accordance with the *Best Practice Erosion and Sediment Control Guideline*. Runoff from the disturbed areas entering the sediment dams may contain high sediment loads which would be managed by allowing the sediments to settle before water is discharged to the receiving environment.

The EIS indicates that overtopping (water spills) of the sediment dams is unlikely to occur for rainfall events under the design standard. However, the adopted design standard does not provide 100 per cent containment for runoff from disturbed areas and modelling indicates there would be overflows between 0 and 1,340 ML/year during dry climatic conditions..

For rainfall events during wet periods that are greater than the design standard, a larger volume of water would be expected to overtop the sediment dams. Based on modelling overflows between 1,730 ML/year and 12,960 ML/year during wet climatic conditions .

These overtopping events would be defined as uncontrolled spillway discharges.

While there is potential for overtopping, the water being directed to sediment dams is not expected to become in contact with coal or other carbonaceous material and is therefore not expected to contain elevated levels of water quality parameters that would be seen with mine affected water (e.g. electrical conductivity, pH, metals, metalloids, non-metals such as hydrocarbons). Geochemical assessment of potential waste rock material also indicates that the waste rock is expected to mostly non-acid forming with low salinity and soluble metal concentrations. Additionally, any localised acid, saline or metalliferous drainage would be expected to be buffered by the presence of alkaline soils.

Based on this analysis the EIS concludes that the water from the sediment dams is unlikely to have a measurable impact on the receiving environment. In addition, it is considered that water quality in the catchment would already be impacted by increased surface water runoff from surrounding areas.

To protect the environmental values of local and regional water resources the proponent has committed to monitor water quality of the sediment dams on a regular (monthly basis) to ensure the quality of stored water is consistent with the relevant operating parameters for water releases specified in the EA.

The proponent has also committed to develop and implement a surface water monitoring program to ensure water management system meets its objectives and to allow for early detection of any impacts. This would involve monitoring of upstream, onsite and downstream water quality.

Based on the conclusions in the EIS I accept that waste rock material poses a generally low risk of environmental harm and that controlled releases from the sediment dams are unlikely to have an adverse impact on the receiving environment. I have stated conditions for inclusion in the EA provide specific limits on controlled releases to the receiving environment.

I have also stated a condition requiring the proponent to develop and implement a REMP which will include measures to monitor the condition of, and potential impacts to, receiving waters and corrective actions where exceedance of WQOs are observed.

Controlled releases—mine affected water

The EIS indicates that the controlled release of water from the water management system would occur via five mine affected water dams (P9, P20, P33, P46 and WROM, referred to as controlled release point dams, hereafter) directly to the Isaac River through a gravity pipe system. No controlled release points are proposed to drain to Ripstone Creek.

The proposed system involves releasing water from the controlled release point dams via outlet pipes to open drains which report to existing drainage lines or overland flows paths to the Isaac River. This gravity discharge arrangement would allow for greater discharge capacity, which would compensate for the short discharge opportunities allowed by the Isaac River flow regime. Being an ephemeral system, the proponent would only be able to release when flows rates in the Isaac River are high enough for adequate dilution of contaminants. A pump system to supplement the gravity flow system may be considered during detailed design.

There would be four controlled release points at ODS domain and one at the Willunga domain. As the mining would be undertaken in stages from north to south, only two of the four dams would be likely to operate simultaneously.

I have stated conditions for the EA authorising controlled releases from two of the proposed controlled release point dams for the ODS domain (P9 and P20) for Stage 1 mining operations. The proponent would need to amend the EA prior to commencing Stage 2 operations to authorise the controlled releases from the other controlled release point dams (P33, P46 and WROM). To ensure that the management system meets its objectives, I have stated conditions for the EA which require that the release of mine affected water during Stage 1 operations only occurs from the release points specified in the EA and is of a quality that does not exceed the release limits specified in the EA.

Based on modelling, the EIS indicates there could be a small increase in electrical conductivity (up to 50 $\mu\text{S}/\text{cm}$) as result of controlled releases to Isaac River from the mine water management system. However, this would be below the receiving water contaminant trigger level of 700 $\mu\text{S}/\text{cm}$.

To ensure that the management system meets its objectives, the proponent has committed to undertake dam/end-of-pipe monitoring at all release points. This includes all controlled release dams (P9, P20, P33, P46, WROM) as well as any dams which can

potentially overflow mine affected water to the receiving environment (P44, WROM and WMIA).

I have also stated conditions for the EA that require the proponent to develop and implement a REMP for the Isaac River and connected or surrounding waterways within 1km of the release points. This would be used to monitor, identify and describe any adverse impacts on water quality and flows from releases from the mine site. The conditions also include contaminant trigger levels to ensure corrective actions are implemented, should water quality impacts on the receiving environment (i.e. Isaac River and waterways downstream of the release points) be detected. The REMP must be approved by the administering authority prior to the commencement of operations. I have also stated a condition for the EA requiring the proponent to prepare a water management plan which includes a trigger action response plan that includes measures for addressing exceedances in trigger values.

To ensure controlled releases do not cause erosion and increase sedimentation in the Isaac River, the proponent has proposed to incorporate measures to reduce water velocities to minimise the potential for erosion including gabion rock structures below the outlet pipes where they connect to the open drains. To prevent or minimise environmental harm, I have stated a condition for inclusion in the EA, requiring that controlled releases are undertaken so not to cause erosion of the bed and banks of receiving waters (i.e. the Isaac River).

The EIS concludes that the proposed water management system has been designed to avoid any interactions with any wetlands areas adjacent to the project and that the proponent has made a commitment that no controlled releases would occur within any wetland protection areas. The project is therefore unlikely to have any direct water quality impacts on wetlands in the project area.

I accept the proponent's conclusion that the project is unlikely to have direct water quality impacts on remaining wetlands in the project area provided that the controlled releases are undertaken in accordance with the conditions I have stated for inclusion in the EA. My stated conditions stipulate the location of the release points and limits for the controlled releases from the mine water management system which would ensure that there are no controlled releases to any adjacent wetland areas.

Uncontrolled releases—mine affected water

Under the current model assumptions, the EIS indicates that there is nil risk of uncontrolled spills of mine affected water from the pits to the receiving environment during operations. The use of the out-of-pit storage (i.e. mine dams) would allow for pits to be dewatered to levels which prevent uncontrolled spills. Based on modelling results the EIS concludes that the proposed water management system would provide sufficient out-of-pit-storage, to store mine affected water onsite under median climatic conditions.

It is proposed that excess water generated under wet climatic conditions could be stored temporarily in active pits until sufficient out-of-pit storage becomes available. Alternatively, excess water could be stored in additional pit water dams that are constructed ahead of mining operations. The EIS also indicates that additional storage of 555 GL would become available within pits 1, 2 and 3 by Stage 3 of the project when mining in these pits is completed. Depending on climatic conditions the final voids may be used to temporarily store excess mine affected water to assist in preventing uncontrolled spills.

The EIS indicates there are three mine affected water dams that have the potential for overflow where rainfall exceed the storage design criteria. This includes P44 which would overflow to Ripstone Creek and WROM and WMIA that would overflow to the Isaac River. While there is potential for overtopping, uncontrolled spills of mine affected water to the receiving environment are predicted over the life of the mine under the current model assumptions. Mine affected water dams would be designed and operated to achieve zero uncontrolled releases. I note that the proponent has committed to ensure the release of mine affected water to internal water management infrastructure is undertaken in accordance with an approved water management plan.

I have stated a condition in the EA requiring the proponent to develop and implement a water management plan for mining operations, prior to Stage 1.

I consider that the proposed water management system would adequately manage potential water quality risks for rainfall events below the design standard.

Water quality impacts associated with the final voids

The EIS indicates that three of the 13 mining pits would remain as final voids including:

- two final voids in the Olive Downs South domain (ODS3 and ODS7/ODS8)
- one final void proposed in the Willunga domain (WIL5).

The accumulation of salts and minerals introduced through rainfall, surface run-off and groundwater inflows to the final voids would be expected to become concentrated over time as the water inflows evaporate. This would result in the accumulation of salts which would be expected to eventually create hypersaline conditions (i.e. >35,000 mg/L TDS). These conditions would pose a significant risk to receiving environment (i.e. Isaac River catchment) should they overtop and spill.

The EIS concludes that the voids are unlikely to experience overtopping and spilling into the surrounding catchment. Rates of evaporation are expected to much greater than inflows from rainfall, surface runoff and groundwater, resulting in lower water levels. The final void configuration would also be designed to reduce the size of the final catchment draining to the voids, reducing the volume of surface water entering the voids. Based on modelling of long-term predicted water levels in the final voids indicate maximum water levels are predicted to be well below the overflow levels that would reach the receiving environment (i.e. more than 100 m for ODS3, ODS7/8 and more than 90 m for WIL5).

The mine design includes buffer of at least 200 m between the Isaac River and mine site and the construction of permanent levees around final voids minimise encroachment on the Isaac River and minimise changes to the flooding characteristics of the Isaac River and its floodplain. This would be expected to provide some protection the riverine environment from uncontrolled release of mine affected water, should it occur.

While the voids are expected to eventually become hypersaline, they are not expected to reach these conditions for at least 600 years. The proponent has also committed to removing basement coal from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining, to assist in reducing future salinity levels. As result WIL5, ODS7/8 and ODS3 water bodies are predicted to remain below 4,000 mg/L TDS for approximately 420, 280 and 140 years respectively. It is expected that the final voids would provide habitat for range of more salt tolerant fauna (i.e. ducks) and plant species until the void lakes become hypersaline.

The final landform would be designed to prevent flood waters from entering any of the final voids in events up to and including the PMF, including the construction permanent highwall emplacements around final voids to ensure they are completely isolated from flood waters. To ensure adequate flood immunity, I have stated a condition for the EA requiring that all final voids must be protected from PMFs from nearby watercourses such that the protection is sustainable for the foreseeable future.

I accept the EIS findings that water from the final voids would not escape to the surrounding environment. However, I have also stated conditions for the EA to ensure that acceptable residual void outcomes are achieved, including:

- a requirement that final voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer
- all final voids must be protected from PMFs from nearby watercourses such that the protection is sustainable for the foreseeable future
- a requirement for the proponent to complete and submit to the administering authority a final void water quality management study.

Sewage treatment

Two sewage treatment plants would be located on-site within the ODS and Willunga domain mine infrastructure areas to treat all sewage produced at the project. Treated effluent generated by the project would be disposed of via land-based irrigation.

Model for Effluent Disposal Using Land Irrigation (MEDLI) modelling of the proposed irrigation of treated effluent to land indicates an area of approximately 4 ha and 2 ha for ODS and Willunga respectively would be required to accommodate effluent generated by the proposed workforce.

Prior to commencing mining operations in the Willunga domain, additional soil sampling and testing would need to be conducted for the designated effluent disposal area, and separate MEDLI modelling will need to be conducted based on soil data specific to the proposed effluent disposal area.

The proponent has committed to engaging an appropriately qualified person to operate the sewage treatment plant and would need to comply with the conditions in the EA which place limits on the quality and volume of wastewater which can be disposed of to land.

I have stated conditions for the EA to ensure there are adequate irrigation areas for the disposal of effluent and that the quality and quantity of water released to land is strictly controlled. The conditions require that a minimum area of 5.5 ha of land is used for the irrigation and/or beneficial reuse of treated sewage effluent. The conditions also stipulate release limits for sewage effluent discharges to land.

Coordinator-General's conclusion: surface water resources-water quality

Based on the information presented in the EIS, I consider that the measures proposed for managing potential water quality impacts on the receiving environment from mining activities are adequate.

The proposed water management system would be designed to protect the environmental values of local and regional surface water resources. This would include measures to

ensure mine affected water is contained and separated from other water streams and to prevent uncontrolled discharges of mine affected water to the receiving environment.

Controlled releases would only occur in accordance with the proposed controlled release strategy and need to meet the release limits stipulated in the EA.

I have stated a range of conditions for the EA to ensure that acceptable water quality outcomes for the receiving environment are achieved. The conditions include specific water quality objectives, release limits, and trigger levels which would require further investigation and management action if exceeded.

Groundwater resources

Background

The project site lies within the Isaac Connors Groundwater Management Area–GMA – Zone 34) of the Fitzroy Basin.

The project would target the Leichhardt and Vermont seams of the Rangal Coal measures across two mine domains within the Bowen Basin.

The stratigraphic profile within the project area comprises the following hydrogeological units:

Cainozoic sediments:

- Quaternary alluvium – unconfined aquifer localised along Isaac River and its tributaries
 - Regolith – unconfined and largely unsaturated unit bordering alluvium
 - Triassic Rewan Group – underlies Vermont Park and southern Iffley areas of ODS domain. Limited to the north-western corner of the Willunga Domain. This unit is considered to be an aquitard.
- Permian coal measures with:
 - Coal sequences that exhibit secondary porosity through cracks and fissures
 - Hydrogeologically ‘tight’ inter-burden units.

The hydrogeological units that are most relevant to the project in terms of impacting on water resources are the alluvium and the Permian coal measures which support ecological systems and provide water for landholders.

There are two bores which intersect the Isaac River alluvium (one in ODS domain and one in Willunga domain) that have the potential to be impacted by the project. These bores are used for stock watering.

There are three bores that intersect the Permian coal measures that have the potential to be impacted by the project. These bores have historically been used for stock water supply.

The EIS indicates that no bores intersect the regolith material within 4 km of the project. The regolith is largely unsaturated and quality of the groundwater in this layer is a poorer quality than the alluvium. Groundwater is typically hypersaline and is unsuitable for stock, irrigation, drinking water, and aquatic ecosystems.

Alluvium

The EIS indicates that the alluvium occurs in the project area along the northern and eastern edges of the ODS domain and the western edge of the Willunga Domain; and throughout the broader locality.

Groundwater levels within the alluvium range between 10 to 20 mbgl, with higher elevations recorded for bores positioned closest to the Isaac River. The alluvium is saturated between 2 and 12 m along the Isaac River and North, Cherwell and Ripstone Creeks where they join the Isaac River.

Due to catchment topography, water from the Isaac River typically drains into the local groundwater system through the alluvial sediments. The alluvial sediments are also recharged through direct infiltration of the rainfall where there are no substantial clay barriers in the shallow sub-surface.

Alluvial groundwater is naturally lost to the atmosphere under via evaporation and riparian vegetation which use groundwater. Groundwater also discharge into the Isaac River as baseflow following significant rainfall and flooding events when the hydraulic gradient is reversed.

Groundwater monitoring for the EIS indicates the groundwater within the alluvium is fresh to moderately saline with salinity (total dissolved solids (TDS)) ranging between 201 mg/L and 3,430 mg/L. This generally exceeds the water quality guidelines for drinking water and freshwater aquatic ecosystems.

Permian coal measures

The Permian coal measures (coal-bearing sediments) form the main economic resource of the numerous mines in the study area. This unit underlies the Rewan Group and outcrops along the ridgelines to the east and west of the project area.

Groundwater within this unit is largely restricted to the more permeable coal seams, with groundwater elevations around 170 m AHD to the north of the ODS domain and 130 m AHD at the Willunga domain to the south-east. Groundwater largely flows horizontally due to the low permeability of the inter-burden material and follows the downstream gradient of the Isaac River in a south-east direction.

Groundwater monitoring for the EIS indicates the groundwater within this unit is generally saline within the coal seams, and brackish to moderately saline within the inter-burden units. The water quality is not considered a suitable groundwater resource for irrigation, drinking water or ecological systems, however is generally suitable for stock water supply.

Impacts and mitigation–Quantity

Groundwater drawdown on existing bores

A net loss of groundwater to the underlying rock strata, is expected over the entire extent of the alluvium as result of exercising the underground water rights for the project. Modelling undertaken for the EIS indicates there would be an average loss of 0.2 ML/day and a maximum loss of 1.2 ML/day. This largely relates to increased leakage of groundwater to the underlying Permian coal measures that are depressurised as the overburden, coal and inter-burden are removed. This is distinct from the direct interceptions of alluvial groundwater that would occur within the proposed mining pits.

Modelling indicates that a groundwater drawdown within the alluvium could extend approximately 4 km north and 5 km south-east of ODS domain and approximately 3 km of the proposed pit in Willunga domain.

Two registered bores intersecting the alluvium are predicted to experience groundwater drawdown at a point in time over the life of the project. The EIS indicates that two bores within the alluvium will experience a drawdown of more than 1 metre (3.6 metres Bore 8 in the ODS domain; and 1.6 m RN97181 in Willunga domain).

Drawdown on bore 8 would be associated with mining in Pit 1 of the ODS domain. A drawdown of 3.6m (Bore 8) would have the potential to impact on groundwater supply from the bore. It is expected groundwater levels at Bore 8 would recover to 50 per cent pre-mining levels.

Groundwater drawdown from the pits would increase leakage from the Isaac River to the underlying alluvium by up to 2.6 ML/day. The EIS states that this would be expected to reduce to 1.9 ML/day post closure.

Groundwater drawdown in the Permian coal measures could extend up to 11 km to the west to the south-west of the ODS domain and 5 km north to the south-west of the Willunga domain.

Three registered bores intersecting the Permian coal measures are predicted to experience groundwater drawdown of more than 10 metres (14.4 metres for the Swamp Bore and 11.5 m for the two RN122458 bores) at a point in time over the life of the project. Drawdown on the three bores in the Permian coal measures would be associated with mining at Pit 6, 7 and 8 in the ODS domain which would be commenced in the year 2030.

The level of groundwater drawdown is not expected to impact on the landholder's ability to use the bore. Groundwater levels would be expected to recover slightly at the end of mining (11 mbgl swamp bore and 18 mbgl RN122458 bores).

The EIS indicates that groundwater drawdown of the alluvium in the Willunga domain would be less than 5 m and be restricted to small portion of the alluvium associated with the Isaac River.

Subject to accessibility, the proponent has committed to monitor the groundwater quality of the potentially impacted private landholder bores on a quarterly basis. The proponent has also committed to make good arrangements with affected landholders to ensure they have access to a similar quantity and quality of water for the bores authorised purpose. This may include works to increase bore pumping capacity, constructing a new bore, providing an alternative water source or financial compensation.

I have stated a condition for the EA which requires the proponent to develop and implement a groundwater monitoring program for Stage 1 mining operations prior to commencing operations. Expansion of the project Stage 1 would require revision of the groundwater monitoring program.

If additional monitoring bores show after two years following installation, a significant deviation from the EIS model predictions, the proponent has committed to rerun groundwater models and to undertake additional consultation to adjust control measures.

Groundwater drawdown on groundwater dependent ecosystems

The EIS identifies the presence of potential GDEs within and surrounding the project area including:

- Stygofauna (invertebrates which live part or all of their lives in groundwater systems including the saturated zones of river alluviums, groundwater aquifers and rock fractures.
- facultative GDEs (flora species not solely dependent on sub-surface presence of groundwater to meet water requirements, that may use groundwater on a seasonal basis) in the riparian corridors of the Isaac River and its tributaries.

There are no Great Artesian Basin springs in the project area.

The EIS states the terrestrial vegetation and aquatic habitats associated with the palustrine wetlands surrounding the ODS and Willunga domains are unlikely to be groundwater dependent. While the vegetation in these areas include flora species, which are known to use sub-surface groundwater intermittently (*E. tereticornis* and River red gum (*Eucalyptus camaldulensis*)) in some locations, groundwater sampling for the EIS indicates that groundwater levels are more than 10 mbgl.

Based on the depth of groundwater and the local hydrogeology, the EIS concludes that these wetlands are more likely to be using soil stored moisture and localised perched water tables which have formed as result on the underlying clay-rich substrates. These perched water tables can remain for extended periods providing a source of water to vegetation when rainfall is low.

This conclusion is further supported by the flora species present in the areas. Studies indicate that there is a decreased importance of groundwater for *Eucalyptus* species where depths to groundwater exceed 10 m²¹. River red gum typically occurs in riparian areas and where perched shallow aquifers are present. While this species is known to use groundwater, the species is known to generally more dependent on flooding as primary water source. The flora species is known to have extensive root systems, which allow them to maximise water uptake from soils. For example, mature river red gums can have root systems extend which extend at least 20 m horizontally and more than 10 m vertically. The species is also known to allocate resources to increase root density in the top meter of soil to maximise water uptake following flood events²².

While the proponent considers that the wetlands in the project area are unlikely to be dependent on groundwater, this conclusion has been made with limited groundwater monitoring data. As part of the a GDE and wetland monitoring program, the proponent has committed to monitor the riparian vegetation and HES wetlands not proposed to be cleared by the project.

To ensure that any potential risks to wetland health are managed, I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs and wetlands. The monitoring program would also outline corrective actions and timings to address any

²¹ Zolfhager, S (2013) Comparative ecophysiology of *Eucalyptus* woodlands along a depth-to groundwater gradient. PhD Thesis, University of Technology, Sydney.
<https://opus.lib.uts.edu.au/bitstream/10453/24201/2/02whole.pdf>

²² Doody TM, Colloff MJ, Davies M, Koul V, Benyon RG, Nagler PL (2015) Quantifying water requirements of riparian river red gum (*Eucalyptus camaldulensis*) in the Murray–Darling Basin, Australia—implications for the management of environmental flows. *Ecohydrology* 8, 1471–1487.

detected impacts. The GDEWMP would need to be submitted to the administering authority at least three months prior to the commencement of mining operations.

Stygofauna

Nine groundwater bores were assessed to determine suitability for stygofauna habitat in October 2017. An additional 132 bores were investigated as potentially suitable stygofauna sampling however most of these bores were not accessible due to landholder access constraints or no data available. However only 2 bores close to the Isaac River (1 in ODS domain and 1 in Willunga domain) were considered suitable for sampling. The other seven bores provided unsuitable conditions to support stygofauna (i.e. dry or hypersaline).

While no stygofauna were identified during groundwater monitoring surveys, the EIS states that stygofauna may occur in the saturated alluvium associated with the Isaac River and the lower reaches of its tributaries where they join the Isaac River.

Stygofauna are considered unlikely to occur in the superficial alluvium associated with the upper reaches of the tributaries of the Isaac River which is typically dry throughout most of the year.

Stygofauna are also considered unlikely to occur in the Regolith material,) which generally provides unsuitable conditions to support stygofauna (i.e. largely unsaturated and hypersaline) in the lower elevation areas along the Isaac River and its tributaries.

Based on the results on groundwater drawdown modelling, the project may have local impact on potential stygofauna habitat along the Isaac River where groundwater drawdown of 5 m is expected. The EIS concludes that groundwater levels in impacted areas would be restored following rainfall events, as such stygofauna are unlikely to be adversely affected, as these areas would remain saturated.

I note that IESC raised concern during the EIS process about the limited survey effort to identify the presence of stygofauna. To account for limited stygofauna sampling during the EIS, I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs (including stygofauna) and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts. The GDEWMP would need to be submitted to the administering authority at least three months prior to the commencement of mining operations

Facultative GDEs—riparian vegetation

The EIS indicates that the terrestrial riparian vegetation along the Isaac River, North Creek, Cherwell Creek and the downstream reaches of Ripstone Creek are highly likely to rely the subsurface expression of groundwater on an intermittent basis, following periods of heavy rainfall, when the alluvium becomes more saturated. The riparian vegetation along these waterways is predominantly comprised of Queensland blue gum (*E. tereticornis*) and river she-oak (*Casuarina cunninghamiana*) which are species known to be facultative GDEs (may opportunistically use groundwater) in some locations. At other times, water requirements may be met by rainfall and soil stored moisture). Most GDEs other than stygofauna require groundwater tables to be found at rooting depth at or within 1 to 5 m of the land surface.

Based on modelling predictions there is expected to a groundwater drawdown of 2 to 5 m in the riparian areas along the Isaac River and its tributaries. As these systems rely on groundwater for some of their water requirements, a significant level of groundwater drawdown may create a situation in which some vegetation communities are likely to need to adjust to changes in soil moisture availability in the soil profile. It is difficult to predict whether these changes would impact tree condition particularly if drawdown occurs in drought years when trees are more reliant on groundwater with the limited data available.

Such impacts may be short-term, if trees can respond and grow roots further into the soil profile to access water deeper in the soil profile. Trees closer to creek and river lines may be less affected than trees which are further away.

The IESC requested that the likelihood of groundwater-dependence for the paleochannel wetland (site P2, Appendix B) and the palustrine wetlands surrounding the ODS and Willunga domains is revised prior to the commencement of construction. The IESC advice is of the view that the communities in this wetland are likely to have moderate to high likelihood of groundwater dependence due to the presence of commonly groundwater dependent, deep-rooted species. The proponent has proposed to undertake a GDE and wetland monitoring program to identify any potential impacts on wetland and GDEs in the project area. I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs (including stygofauna) and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts. The GDEWMP would need to be submitted to the administering authority at least three months prior to the commencement of mining operations.

Groundwater loss from final voids

Evaporation of the lakes that would form in the final voids would result in a loss of groundwater. The proponent would need a groundwater allocation of the 146 ML/yr for groundwater unit 1 and 183 ML/yr for groundwater unit 2.

The proponent has committed to preparing an underground water impact report in accordance with the Qld Water Act 2000 prior to the commencement of mining.

Coordinator-General's conclusion: groundwater-quantity

I consider that the conclusions drawn in the EIS about groundwater drawdown impacts to be constrained by limited data. I acknowledge that the proponent has proposed to continue sampling the existing network of bores to provide longer-term baseline data and to detect any changes in groundwater quality during and post-mining. I also acknowledge that the proponent has proposed to undertake further modelling, once the additional baseline data has been collected.

I note that the proponent has also committed employing a suitably qualified person to undertake an annual review of groundwater quality trends to determine any deviations in groundwater quality of the year compared to the historical baseline tends and predicted quality.

I also acknowledge that the proponent has committed to preparing an underground water impact report in accordance with the *Queensland Water Act 2000* prior to the commencement of mining.

To ensure that potential impacts on GDEs and wetlands are adequately managed I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs (including stygofauna) and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts.

Impacts and mitigation–water quality

Water quality impacts associated with the loss of wetlands and other depressions

IESC noted that the EIS does not discuss potential water quality impacts on downstream water resources associated with the loss wetlands.

It is also considered the removal of wetlands may also impact on water levels and quality in the groundwater systems by reducing the potential for enhanced recharge or groundwater interaction associated with wetlands.

Impacts on groundwater quality-out-of-pit-emplacements

The EIS indicates that it is unlikely for seepage to occur from the base of out-of-pit waste rock emplacements to the underlying alluvium and regolith in areas underlain by clay-rich sediments. Groundwater monitoring for the EIS indicates that groundwater levels below these areas are not recharged during rainfall events due to the presence impermeable clay layers which prevent the downward movement of water.

The geochemical assessment undertaken for the EIS indicate that the inter-burden and overburden (waste rock) and coal reject material is likely to be mostly non-acid forming and would be expected to generate seepage which has low sulfur, salinity and soluble metal concentrations. Additionally, any localised acid, saline or metalliferous drainage would be expected to be buffered by the presence of alkaline soils.

I note that the proponent has made a commitment to implement a water management plan, which would detail measures to manage and prevent potential saline and acid rock drainage from waste rock emplacements.

I have stated conditions in the EA requiring the proponent to undertaken groundwater monitoring, to identify and address any potential groundwater quality impacts associated with the seepage of waste water. The proponent would need to be undertaken measure to address any water quality impacts, should they be detected.

Impacts on groundwater quality-in-pit-emplacements

The EIS indicates that that the ROM coal (raw material) would be processed at an onsite CHPP facility (washing plant) and tailings (i.e. coal reject materials) would be emplaced (deposited) on site. The CHPP system would wash the coal of soil and rock, and then crush the washed coal into graded sized pieces, before being stockpiled and transported to market. The CHPP facility would be primarily supplied with mine affected water from the ODS MIA dam and raw water from the ODS raw water tank as a backup when mine affected reserves are low.

To ensure the mine affected water from the CHPP does not interact with the rest of the water management system, the water is proposed to be contained within a CHPP/rejects cells/ODS MIA Dam water circuit where water would be recovered and reused in the

system. This includes any moisture retained within the fine coal rejects (waste material) generated through the washing process.

The EIS indicates that coal reject materials would require specific management until the in-pit disposal areas become available. Coarse coal rejects would be initially disposed of at out-of-pit placements buried by at least 10 m of waste rock; and covered with a capping layer (e.g. covered with an impermeable clay layer) and rehabilitated. Moisture in the coarse reject material is expected to be lost when the material is emplaced.

Fine rejects are proposed to be initially pumped to purpose built solar drying ponds and mixed with flocculants (i.e. in-line flocculation (ILF) cells) before being dewatered until dry. Water recovered (up to 70 percent) through this process would be reused in the CHPP.

Once the in-pit placements become available coarse and dewatered and dried fine rejects would be placed in the pits below the expected final groundwater levels and buried by at least a 5 m layer of the waste rock. The EIS concludes that water from the base of in-pit waste rock emplacements is unlikely to migrate into alluvial groundwater as groundwater levels in these areas would be below the alluvium.

The proponent has committed to augment the existing groundwater monitoring network with additional monitoring locations around the pit footprint and proposed coal reject emplacements/ILF cells.

I accept that the proposed process for managing coal reject material would be expected to reduce the potential for water quality impacts on surface and groundwater. To ensure potential groundwater impacts are adequately managed, I have stated a condition for the EA which requires the proponent to develop and implement a groundwater monitoring program for Stage 1 mining operations prior to commencing operations.

Groundwater quality impacts from final voids

The project would create 13 mining pits over the course of mining operations. Ten of these pits would be completely backfilled, and the three remaining pits would remain as final voids. This would include:

- two final voids in the Olive Downs South domain (ODS3 and ODS7/ODS8)
- one final void proposed in the Willunga domain (WIL5).

The proponent considers that the financial cost of backfilling (in the order of \$5 billion) these pits would make the project economically unviable. Based on the information presented in the EIS I accept that the backfilling of all voids would adversely impact the economic viability of the project.

Due to the semi-arid climate of the area, evaporation rates in the final voids would be expected to exceed water influx rates (i.e. rainfall and groundwater inflows). Under these conditions the voids would become a permanent groundwater sink (i.e. groundwater continuously flowing to the void), with water levels in the pit remaining below surrounding groundwater levels. The EIS indicates that recovered water levels within the voids would be expected to be 65 m (ODS3) and 140 m (ODS7/ODS8) below the pre-mining water levels. It is expected that it would take 100 to 200 years for the final void lakes to reach equilibrium level.

The accumulation of salts and minerals introduced through groundwater inflows, surface catchment run-off and direct rainfall to the developing lake's surface are expected to

become concentrated over time as the water inflows evaporate. This would result in the accumulation of salts which would be expected to eventually create hypersaline conditions (i.e. >35,000 mg/L TDS).

To improve water quality within the final void water bodies by reducing salinity levels, the proponent has committed to removing basement coal from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining. As a result, the salinity of the ODS7/8 and WIL5 final void water bodies are predicted to remain brackish (i.e. <5,000 mg/L TDS) for approximately 300 to 550 years.

The ODS3 final void water body is predicted to remain brackish for approximately 150 to 200 years. The final void water bodies are not predicted to reach hypersaline conditions (i.e. >35,000 mg/L TDS) for at least 600 years.

The WIL5, ODS7/8 and ODS3 water bodies are predicted to remain below 4,000 mg/L TDS for approximately 420, 280 and 140 years respectively. The EIS states that the post mining land use for final voids would be fauna habitat.

Beyond 600 years the ongoing use of void waterbodies by native flora and fauna is less clear. I do accept however, that there are fauna groups which are adept at exploiting highly saline environments (such as ducks) and many plant species can flourish in such conditions. As such, it is reasonable to conclude that the void lakes will continue to be exploited by wildlife once they become hypersaline.

I accept the EIS findings that this water will not escape to the surrounding environment, and the final voids will act as groundwater sinks.

I have, however, stated a range of conditions for the EA to ensure that acceptable residual void outcomes are achieved, including:

- a requirement that final voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer
- all final voids must be protected from PMFs from nearby watercourses such that the protection is sustainable for the foreseeable future
- a requirement for the proponent to complete and submit to the administering authority a final void water quality management study.

Coordinator-General's conclusion: groundwater-water quality

I am satisfied that EIS has appropriately assessed the potential groundwater quality risks associated with the final voids that would be included in the final landform design. I accept the EIS findings that this water will not escape to the surrounding environment, and the final voids will act as groundwater sinks.

To ensure that acceptable residual void outcomes are achieved I stated a range of conditions for the EA including:

- a requirement that final voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer
- all final voids must be protected from PMFs from nearby watercourses such that the protection is sustainable for the foreseeable future
- a requirement for the proponent to complete and submit to the administering authority a final void water quality management study.

Flooding

Background

The project lies within lowland area with an elevation range of 150m to 208 m AHD. The geomorphology assessment indicates that the terrain in the mining lease area is overall gently sloping (i.e. typically less than 10 degrees), with the exception of the moderately steep slopes forming the banks of Ripstone Creek.

The geomorphic character of Isaac River is considered to be relatively constant being wider in upper reaches and narrower in the lower reaches. The assessment indicates majority of the project area is considered to have moderately stable surface soils, with more concentrated areas of erodible soils occurring in Ripstone Creek catchment and corridor of Isaac River. Despite being composed of erodible clayey, silty, sand, the banks appear to be well maintained. This is due to the presence of a sufficient coverage of riparian vegetation and thick dense grass along the banks which reduce the potential for fluvial erosion.

The active Isaac River floodplain (including the 1 per cent AEP) forms a narrow band (between 150 and 500m wide) on one or both sides of the River channel. It is considered that the floodplain is likely to be more hydraulically connected to the channel in the lower reach.

Modelling of the base case for the 50 percent AEP indicates that the flood extent is generally contained within the Isaac River and Phillips Creek channels.

Modelling also indicates that during flood events two channels on the left and right side of the Isaac River from Deverill gauge station until Ripstone Creek joins the Isaac River approximately 20 km downstream of Deverill during the 20 per cent AEP flood events. These two channels grow wider for more infrequent flood events and eventually connect to form one large floodplain during 1 per cent AEP flood event.

Impacts and mitigation

Impacts on the Isaac River flooding regime

The construction of the temporary flood levees and highwall emplacement would be expected to reduce the Isaac River floodplain during operation, which has the potential to increase flood levels in areas of the floodplain adjacent to and potentially upstream of the project.

Flooding modelling for the operation of the project for the 50 per cent, 2 per cent, 1 per cent, 0.1 per cent AEP flood events indicate that most peak flows are likely to be unchanged by the project.

Based on the developed case model results, the EIS makes the following conclusions about the project's impacts on flooding in the Isaac River catchment:

- the flood extents remain unchanged generally for all modelled AEPs, however flood depths may increase by up to 3 m upstream of the proposed stockpile location and be reduced by between 0.1 m to 1 m to the east of Isaac River
- stream velocity generally remains unchanged with an increase and decrease between 0.1 m/s to 1.0 m/s on the west and east bank of the Isaac River, respectively.

- bed shear stress and stream power generally remain unchanged (i.e. shear stress is less than 100 newtons per square metre (N/m²) except for the west bank of Isaac River with a maximum increase of 50 N/m² and 250 N/m² for 2 per cent and x percent AEP, respectively. While this increase is not expected to increase bank scouring in areas which have good vegetation cover, areas with low vegetation cover would be expected to experience bank scouring
- the averages of maximum stream velocity values along Isaac River for 50 per cent, 2 per cent, 1 per cent and 0.1 per cent AEPs would be between 1.5 m/s to 2.2 m/s; and 2.3 m/s for the PMF. The changes in flow velocity up to and including the 0.1 per cent AEP event are therefore predicted to be relatively small in most areas adjacent the Project, with absolute flow velocities similar to areas downstream in the natural section of the stream.

Given the flood extents are expected to remain the same, the riparian vegetation along the Isaac River in particular, river red gum which are reliant on flooding events as a primary water source are unlikely to be adversely impacted by the project.

It is expected that potential flooding impacts would be reduced when the temporary flood levees are removed post-mining. The proponent has made a commitment to remove or reshape the temporary flood levees proposed in the north-east, once the open cut pits are backfilled and rehabilitated. The temporary flood levees would also be removed and reshaped once the open cut pit in the Willunga domain has been backfilled and the waste rock emplacements have been rehabilitated. This would be expected to provide additional flood storage areas adjacent to the Isaac River and reduce flood velocities and stream power.

Erosion impacts associated with altered flood regime

A submitter on the draft EIS raised concern about the potential instability of the waste rock emplacement proposed on the north-eastern corner of Wynette Station, directly adjacent to the southern banks of the Isaac River, during and following a flooding event. The EIS indicates that the proposed temporary flood levees would prevent flood waters from having contact with the waste rock emplacements during the operation of the mine. Based on modelling of the final landform design (i.e. after the temporary flood levees are removed), the stream velocities along the toe of the rehabilitated waste rock emplacement on north-eastern corner of Wynette Station, is predicted to be very low (<0.5 m/s) even during very large flood events (i.e. 0.1 per cent AEP year flood event).

Ripstone Creek and other waterways

Open cut mining would directly impact a portion of lower Ripstone Creek and therefore alter flood behaviour to some extent. The EIS indicates that the proposed Ripstone Creek Diversion would be designed to ensure consistency with the hydrology of the undisturbed watercourse.

While Boomerang and Phillips Creek do not cross the project site the EIS indicates there is potential for the floodplain areas of the lower reaches of Boomerang and Phillips creeks to be impacted by altered flood hydraulics of the Isaac River as a result of the project.

Flooding impacts on neighbouring properties

Based on the review of past flood studies for surrounding mines/projects, three existing or approved levees were identified in the region (i.e. Olive Downs North, Lake Vermont and Poitrel) however, only the approved Olive Downs North levees were located at/within the hydraulic model extent in the Flood Assessment.

Based on developed case modelling predicted afflux changes are generally contained within proponent-owned land (Deverill property boundary) or are in existing flood prone areas.

In terms of impacting on neighbouring mine infrastructure modelling indicates that the project could result in increased flood levels by up to 0.5 m, 0.7 m, and 1.6 m during 2 per cent AEP, 1 per cent AEP and 0.1 per cent AEP flood events respectively at the most southern section of the Olive Downs North levee. The EIS indicates that the temporary levees would be designed and operated as regulated structures to prevent flood waters into the operational areas of the mine up to a 0.1 per cent AEP flood event.

To ensure any regulated structures including the temporary levees and high wall emplacements are constructed and managed to prevent the ingress of floodwaters in the operational areas of the mine, I have stated a condition for the EA which requires the design, construction and monitoring of the levees to be in accordance with the *Environmental Protection Act 1994 Guideline—Structures which are dams and levees constructed as part of Environmentally Relevant Activities*²³.

The EIS indicates that the temporary flood levee in the north-east of the ODS domain would be removed or reshaped once the open cut is backfilled and rehabilitated in the northern areas to provide additional flood storage areas adjacent the Isaac River to reduce flood velocities and stream power. Similarly, the temporary flood levees in the south and south-west of the ODS domain adjacent Ripstone Creek would be removed or reshaped once the waste rock emplacements are rehabilitated.

Flood immunity for the final voids

The project's mine schedule has been optimised to minimise the number and extent of final voids, particularly the creation of final voids in close proximity to the Isaac River and Ripstone Creek.

The mine site and void extent has provided a buffer of between 200 m and 300 m from the Isaac River to minimise encroachment on the Isaac River floodplain and minimise changes to the flooding characteristics of the Isaac River and its floodplain.

Key features of the proposed final landform include permanent highwall emplacements, formed from waste rock material removed during the mining process. The permanent highwall emplacements would be developed progressively during the mine life and would generally be 300 m to 400 m wide and approximately 25 m high. The highwall emplacements would be designed to prevent floodwaters from entering any of the final voids in events up to and including the PMF.

²³ Environmental Protection Act 1994 Guideline—Structures which are dams and levees constructed as part of Environmentally Relevant Activities, viewed 29 April 2019
<https://environment.des.qld.gov.au/assets/documents/regulation/era-gl-structures-dams-levees-eras.pdf>

I have stated a condition for the EA requiring that all final voids must be protected from probable maximum floods (PMFs) from nearby watercourses such that the protection is sustainable for the foreseeable future.

Coordinator-General's conclusion: flooding

I am satisfied that the proponent has adequately assessed the potential flooding risks of the project and mine would include appropriately constructed structures to prevent the ingress of floodwaters in mining operation areas. I am also satisfied that these structures would also be designed to avoid adverse impacts on neighbouring properties and ecosystems within the project area.

To ensure any regulated structures including the temporary levees and high wall emplacements are constructed and managed to prevent the ingress of floodwaters in the operational areas of the mine, I have stated a condition for the EA which requires the design, construction and monitoring of the levees to be in accordance with relevant guidelines.

I have stated a condition for the EA requiring that all final voids must be protected from probable maximum floods (PMFs) from nearby watercourses such that the protection is sustainable for the foreseeable future.

Cumulative impacts

Surface water

Quantity

A comparison of the captured catchment areas of existing mining projects in the Isaac River catchment was undertaken in the EIS. The EIS concluded that controlled releases from the project site would make a positive contribution to the overall restoration of stream flow to the Isaac River when potential controlled release volumes from the operating mines are considered cumulatively.

Quality

The EIS indicates that there are numerous existing mines within the vicinity of the project that are authorised to release water to the Isaac River upstream of the project.

The EIS states that the proposed controlled release strategy has been developed in consideration of the *Model Mining Conditions for Coal Mines in the Fitzroy Basin* and accommodates the existing release conditions for nearby operating coal mines. Therefore, the EIS concludes that the conditions would account for any cumulative impacts of water releases mining activities.

Groundwater

The EIS indicated that there are six surrounding mines which in combination with the Olive Downs project have the potential to cause cumulative drawdown of the groundwater. An assessment of potential cumulative impacts from approved and proposed open cut and underground coal mines surrounding the project by conducted by including the six mines Poitrel, Daunia, Peak Downs, Lake Vermont, Eagle Downs and Saraji mines in the groundwater model.

Based on the results of the modelling the EIS concluded that the zone of depressurisation from surrounding mines would intercept the ODS domain zone of impact, with the maximum drawdown predicted to be greatest in close proximity to the ODS mining pits. The level of groundwater drawdown is expected to reduce with increasing distance from the ODS mining pits.

In terms of impacts on the alluvium along the Isaac River, a cumulative drawdown of 2 m is predicted at the northern extent of the ODS domain, due to groundwater drawdown from the project and the Moorvale South Mine. The EIS concludes that groundwater drawdown in this area is unlikely to impact on riparian vegetation as it is considered this vegetation does not solely rely on groundwater to meet its water requirements and has a greater reliance on soil moisture which is replenished following rainfall. It is also considered that groundwater drawdown would not be significant enough to prevent recovery of alluvial aquifer groundwater levels following rainfall.

Based on the results of the modelling the potential cumulative impact, the EIS concludes that the zone of depressurisation from the Willunga domain is not predicted to be affected by any surrounding mines.

I accept the conclusion that the cumulative groundwater drawdown impacts from project and surrounding mines is not expected to be significant, and unlikely to have an adverse impact on riparian vegetation along the Isaac River. However, to ensure that any potential impacts are identified early to avoid any adverse impacts I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs (including stygofauna) and wetlands. The monitoring program would also outline corrective actions and timings to address any detected impacts.

Flooding

The flood assessment presented in the EIS considered existing and proposed structures that may affect flood behaviour, as well as structures proposed as part of the mining development. The flood assessment concluded that there are no known projects in the planning or development phase that might result in additional structures on the floodplain in the vicinity of the Mine Site and Access Road. The flood assessment also concluded that cumulative impacts on flooding are not expected to lead to any adverse impacts on human populations, property or other environmental or social values.

7.4.4 Cumulative impacts

Existing environment

The mine site and access road is located within an existing mining precinct. Nearby existing or approved coal mining operations include:

- Olive Downs North (2 km north)
- Saraji (5 km south-west)
- Daunia (10 km north-west)
- Peak Downs (12 km west)
- Lake Vermont (12 km south)
- Poitrel (12 km north-west)

- Millennium (15 km north-west)
- Eagle Downs (15 km west)
- Moorvale (18 km north)
- Carborough Downs (20 km north-west)
- Isaac Plans (25 km north-west).

Cumulative biodiversity impacts

The Olive Downs project would clear a total of 5,661.5 ha of remnant vegetation, representing approximately 0.4 per cent of the remaining remnant vegetation in the Northern Bowen Basin and Isaac-Comet Downs biodiversity sub-regions. A total of 10,628 ha of non-remnant vegetation would also be cleared. The project's clearance totals are summarised in Table 7.10 and Table 7.11.

Table 7.10 Listed threatened species habitat clearance totals for the Olive Downs project

MNES	Approximate area of clearance (ha)										
	Mine site and access road					Water pipeline* (ha)	Project ETL* (ha)	Rail spur* (ha)	Total Stage 1 impact (ha)	Total project impact (ha)	Habitat available within the Stage 1 offset area (ha)
	Stage 1 (ha)	Stage 2 (ha)	Stage 3 (ha)	Stage 4 (ha)	Total impact (ha)						
Brigalow TEC	0	0	13	0	13	0	0	0	0	13	-
Ornamental Snake	461.5	1,596	3,916	1,648	7,621.5	7	10.5	27	506	7,666	854
Australian Painted Snipe	14	24	50	25	113	1	0	6	21	120	86
Squatter Pigeon	743	1,757	2,284	746	5,530	23	14	43	823	5,610	3,561
Koala	743	1,762	2,261	734	5,500	28.5	12	43	826.5	5,583.5	2,736
Greater Glider	743	1,762	2,261	734	5,500	28.5	12	43	826.5	5,583.5	2,736

Table 7.11 Listed threatened species habitat clearance totals and local, catchment and subregion habitat availability

Action	Habitat type	Habitat clearance (ha)					
		Brigalow TEC (ha)	Ornamental snake (ha)	Squatter pigeon (southern) (ha)	Australian painted snipe (ha)	Koala (ha)	Greater glider (ha)
	Remnant	13	144	5,530	113	5,500	5,500

Action	Habitat type	Habitat clearance (ha)					
		Brigalow TEC (ha)	Ornamental snake (ha)	Squatter pigeon (southern) (ha)	Australian painted snipe (ha)	Koala (ha)	Greater glider (ha)
Mine site and access road	Non-remnant	0	7,447.5	0	0	0	0
	Sub-total	13	7,621.5	5,530	113	5,500	5,500
Water pipeline	Remnant	0	0	23	1	27.5	27.5
	Non-remnant	0	7	0	0	0	0
	Sub-total	0	7	23	1	27.5	27.5
ETL	Remnant	0	0	14	0	12	12
	Non-remnant	0	10.5	0	0	0	0
	Sub-total	0	10.5	14	0	12	12
Rail spur and loop	Remnant	0	0	43	6	43	43
	Non-remnant	0	27	0	0	0	0
	Sub-total	0	27	43	6	43	43
Total		13	7,666	5,610	120	5,583.5	5,583.5
Approximate area of habitat within the broader locality (10 km from project boundary)		16,068	43,178	62,978	655	63,633	63,633
Approximate area of habitat within the Isaac River Catchment		41,621	57,657	598,855	271,100	883,471	883,471
Approximate area of habitat within the Isaac-Comet Downs subregion		81369	122842	524567	174573	413453	413453

The EIS estimates that the following area of wetland habitat for migratory species also exists within the broader locality, catchment and region as follows:

- 655 ha of wetland within 10 km of the project area
- 271,100 ha of wetlands within the Isaac River Catchment
- 174,573 ha of wetlands within the Isaac-Comet Downs subregion.

The EIS considers that the wetland habitat proposed to be removed for the project represents only a small portion of the wetland habitat available for use by migratory species at the local, regional and across the greater extent of Queensland.

I consider that the project's impacts to threatened species habitat is significant at the local scale; however, I am satisfied that these impacts can be offset in accordance with the proponent's BOS. I consider the projects impacts at the catchment and subregion scale to be not significant, given the abundance of suitable habitat within those areas.

7.4.5 Coordinator-General's conclusion: matters of national environmental significance

Threatened ecological communities

I am satisfied that the EIS has identified the potential impacts that the proposed action could have on the brigalow TEC. The project is expected to impact on a total of 13 ha of brigalow TEC. I am satisfied that the proponent's commitments to implement weed and pest management measures are appropriate for maintaining the brigalow TEC.

In light of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the brigalow TEC are not unacceptable.

Listed threatened species

I am satisfied that the EIS has identified the potential impacts that the proposed action could have on the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake.

I consider that the proposed offsets for Stage 1 of the project are sufficient to compensate for the project's Stage 1 impacts to listed threatened species. I am also satisfied that offsets for future stages of the project could be delivered on the proponent's substantial landholdings around the project site. I have however recommended conditions to the Commonwealth Minister for the Environment requiring that the details of offsets for future stages of the project are confirmed by the proponent and approved by the Minister prior to commencement.

In light of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for each species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake are not unacceptable.

Listed migratory species

I am satisfied that the EIS has identified the potential impacts that the project could have on listed migratory species. I am satisfied with the conclusion in the EIS that the project would not result in a residual significant impact to any of the threatened migratory species identified.

I also conclude that the project is unlikely to be inconsistent with any international conventions relevant to threatened species and communities, migratory species (Bonn Convention, JAMBA, CAMBA and ROKAMBA) and World Heritage properties and Ramsar areas.

Water resource in relation to coal seam gas (CSG) and large coal mining

Based on the information presented in the EIS, I consider that the measures proposed for managing potential water quality impacts on the receiving environment from mining activities are appropriate.

The proposed water management system would be designed to protect the environmental values of local and regional surface water resources. This would include measures to ensure mine affected water is contained and separated from other water streams and to prevent uncontrolled discharges of mine affected water to the receiving environment. Controlled releases would only occur in accordance with the proposed controlled release strategy and need to meet the release limits stipulated in the EA.

The project would result in the groundwater drawdown of greater than 1m at five privately owned bores, three of which are not in use. Of the two bores currently used, one would not be affected to the extent that it could not be used and the other would recover to near pre-mining levels during the life of the project. I accept that the project would have limited impacts on groundwater users.

The final landform of the project would be designed to prevent flood waters from entering any of the final voids in events up to and including the PMF, including the construction permanent highwall emplacements around final voids to ensure they are completely isolated from flood waters.

I accept the EIS findings that water from the final voids would not escape to the surrounding environment, including the groundwater environment. However, I have also stated conditions for the EA to ensure that acceptable residual void outcomes are achieved.

Some ecosystems on the project site may periodically rely on groundwater. To ensure that any potential risks to these ecosystems are identified and managed, I have stated a condition for the EA, requiring the proponent implement a GDEWMP, which would allow for the proponent to detect and potential adverse impacts GDEs and wetlands.

I consider that, with the implementation of my stated conditions, recommended conditions for the Commonwealth Minister and the proponent's commitments, the potential impacts of the project on a water resource would be appropriately reduced, managed or otherwise avoided.

7.5 Water pipeline (EPBC 2017/7868)

A raw (external supply) water pipeline would be constructed during Stage 1 of the project to supply up to 500 ML of raw water each year over the construction period, and the initial establishment of operations. The pipeline would connect the project to the existing southern extension of the Eungella water pipeline network, which runs generally north-south approximately 15 km west of the project between Moranbah and Dysart.

The water pipeline would be approximately 23 km long, with a total disturbance footprint of approximately 57 ha. The pipeline would be located underground, where during construction the pipeline trench would be progressively excavated ahead of the pipe laying activities.

Approximately 15 km of the pipeline would be co-located with the rail spur and loop, meaning that the remaining 8 km section of the pipeline would require additional vegetation clearance. All patches of brigalow TEC located within the pipeline corridor have been avoided, and impacts to 'Endangered' and 'Of Concern' REs have been reduced where possible by minimising the water pipeline corridor to 20 m.

The water pipeline would require two crossings of palustrine wetlands associated with the Isaac River. As the water pipeline alignment would avoid crossing the Isaac River, no riparian vegetation associated with the Isaac River would be removed. Based on the mapping provided in the EIS, the section of the water pipeline that would be constructed outside of the mining lease application area boundary would require one crossing of Cherwell Creek.

To avoid impacts to Cherwell Creek, the pipeline crossing would be constructed using horizontal directional drilling, rather than excavating a trench and laying the pipeline through the watercourse itself. Where crossings of drainage lines are required for the water pipeline, crossings would be achieved by excavating below the invert of the drainage line to lay the pipeline at least 0.8 m below the base of the drainage line.

Until such time as pipeline is commissioned, water demands for construction and the initial establishment of operations may be met by:

- capture of incident rainfall and runoff within the mine water management system (stormwater and mine affected water)
- capture of overland flow (up-catchment water) in dams once constructed.

The water pipeline would remain operational for the life of the project, though may not necessarily be required, and would be decommissioned and rehabilitated within two years of the completion of mining operations.

7.5.1 Listed threatened species and communities

In deciding whether or not to approve the proposal for the purposes of a subsection of section 18 or section 18A of the EPBC Act, and what conditions (if any) to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the:

- Convention on Biological Diversity
- Convention on Conservation of Nature in the South Pacific (Apia Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan or threat abatement plan (TAP).

The Minister must also, in deciding whether to approve the taking of the action, have regard to any approved conservation advice for the threatened species or ecological community that are likely to be or would be significantly impacted by the project.

This section assesses the project against the objectives and priority actions of conservation advices, recovery plans and TAPs for the relevant threatened species and communities. The residual significant impacts of the project on threatened fauna are also considered in this section.

For the EIS assessment, a search of the EPBC protected matters search tool (PMST) was utilised to provide an indication of the threatened species and communities which may occur within and surrounding the project. This was then ground-truthed during surveys undertaken for the EIS assessment. The adequacy of the surveys undertaken for each species was checked against relevant EPBC survey guidelines.

Threatened fauna

The PMST identified a number of threatened fauna species with the potential to occur within the project area and surrounds. Surveys for listed threatened species were undertaken by the proponent in accordance with the relevant Commonwealth survey guidelines, including:

- EPBC Act *Survey Guidelines for Australia's Threatened Reptiles*
- EPBC Act *Survey Guidelines for Australia's Threatened Birds*
- EPBC Act *Survey Guidelines for Australia's Threatened Bats*
- EPBC Act *Survey Guidelines for Australia's Threatened Mammals*
- EPBC Act *Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles*
- EPBC Act *Referral Guidelines for the Vulnerable Koala*
- *Targeted Species Survey Guidelines – Yakka Skink*
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*

Of those species identified in the PMST, the proponent identified a number of those onsite during surveys, as summarised in Table 7.12. I am satisfied that the surveys undertaken for listed threatened species are adequate for the assessment.

Table 7.12 Listed threatened species identified in the PMST and identified onsite

Listed threatened species known or having potential to occur within the project area	Listed threatened species identified within the water pipeline corridor during surveys
• red goshawk (<i>Erythrorhynchus radiatus</i>) – vulnerable • Australian painted snipe (<i>Rostratula australis</i>) – endangered • curlew sandpiper (<i>Calidris ferruginea</i>) – critically endangered • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable • Painted Honeyeater (<i>Grantiella picta</i>) – vulnerable • star finch (eastern) (<i>Neochmia ruficauda ruficauda</i>) – endangered • black-throated finch (southern) (<i>Poephila cincta cincta</i>) – endangered • northern quoll (<i>Dasyurus hallucatus</i>) – endangered • koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (<i>Phascolarctos cinereus</i> (combined	• koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) • greater glider (<i>Petauroides volans</i>)

- populations of Qld, NSW and the ACT)) – vulnerable
- greater glider (*Petauroides volans*) – vulnerable;
- grey-headed flying-fox (*Pteropus poliocephalus*) – vulnerable
- ghost bat (*Macroderma gigas*) – vulnerable
- Corben's long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- southern snapping turtle (*Elseya albagula*) – critically endangered
- Fitzroy River turtle (*Rheodytes leukops*) – vulnerable
- Yakka Skink (*Egernia rugosa*) – vulnerable
- Allan's Lerista (*Lerista allanae*) – endangered
- Ornamental Snake (*Denisonia maculata*) – vulnerable
- Dunmall's Snake (*Furina dunmalli*) – vulnerable

I note that many of the identified threatened species may occur onsite, however I am satisfied with the conclusions in the EIS that residual significant impacts for those species that were not identified onsite during surveys. The lack of historical species records on site for many identified in the PMST, combined with the survey effort undertaken by the proponent, indicate that the water pipeline corridor does not support populations of the majority of the threatened species identified.

The surveys undertaken were in accordance with the relevant EPBC survey guidelines, indicating that even if the species are present onsite, their occurrence is sporadic and significant populations are not present. The proponent has provided detailed justifications for these conclusions in the draft EIS and revised draft EIS.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions regarding the likelihood of presence for the threatened species identified in the PMST.

For the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake, potential habitat exists within the water pipeline corridor and the species were either identified onsite or in the immediate vicinity of the project. Accordingly, my assessment of impacts to EPBC Act listed threatened species focusses on these species.

Koala

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Koala, or evidence of koala presence, was recorded within the water pipeline corridor during surveys.

Impacts – direct clearance of habitat

The EIS estimates that approximately 28.5 ha of habitat critical to the survival of the koala, as defined in the *EPBC Act Referral Guidelines for the Vulnerable Koala*, would be cleared for the water pipeline.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan, which would include measures to ensure clearing is undertaken progressively and any areas of vegetation to be retained onsite, including habitat for the koala, are clearly identified.

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the EPBC Act listed threatened species to be impacted by the project. The SMP would include measures to limit construction activities to avoid breeding seasons of threatened species, relocate individuals identified during pre-clearance surveys by qualified fauna spotter-catchers, install fauna exclusion fencing and enforce speed limits onsite.

I require in my recommended conditions to the Commonwealth Minister that the SMP include measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and communities and their habitat during construction, operation and decommissioning of the pipeline. This measures to prevent entrapment and mortality of EPBC Act listed species within areas that are excavated including pipeline trenches during the construction of the pipeline. Such measure may include minimising the time for trenches to remain open, particularly in known fauna habitat areas, providing exit ramps for fauna, using branches, ropes, ramped gangplanks to create ladders to enable fauna to exit excavations.

Impacts – spread of disease

Koalas are threatened primarily by diseases such as chlamydia and koala retrovirus. The EIS considers that given the prevalence of both diseases in koala populations in Queensland, it is likely that the diseases already occur in the populations found on and around the mine site and access road. The EIS considers that the water pipeline would not include activities likely to result in the spread of a disease that may cause the species to decline. However, any koalas identified during pre-clearance surveys that are subsequently translocated could act to spread disease.

Avoidance, mitigation and management measures

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the species to be impacted by the project. I require that the koala management measures include provisions to address the spread of diseases relevant to the koala.

Impacts – increased risk of dog attack

Mortality in koalas due to dog attack is one of the key threats to the species. Feral dogs were identified within the project area during surveys. Despite this, the EIS considers that the project would not result in increased levels of threat of dog attack for the koala.

Avoidance, mitigation and management measures

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. I would expect the weed and pest management plan to include measures such as trapping and removing any feral dogs identified onsite to reduce the risk of dog attack.

Indirect impacts – noise and vibration

The EIS considers that the construction and operation of the mine would cause ongoing and localised increases in noise and vibration disturbance in habitats adjacent to the project. Nocturnal animals would be more susceptible to noise and vibration disturbance, due to their sensitivity to noise.

The EIS predicted that any potential noise-related impact to fauna within surrounding habitat would be localised and minor, where fauna would habituate to continuous noise. Therefore, significant impacts to fauna resulting from noise and vibration impacts resulting from the construction and operation of the water pipeline are not expected to occur.

Indirect impacts – artificial lighting

Impacts to fauna associated with artificial lighting include changed behaviours to avoid lit areas and disturbance to activity levels (particularly for birds and amphibians). Some species, such as insectivorous bats, may be attracted to lit areas due to insects congregating around the light at night.

The EIS predicted that any potential impact associated with the additional lighting required for the project to protected fauna would be minor, provided that lights are operated in accordance with relevant Australian Standards.

Indirect impacts – edge effects

Edge effects can include:

- establishment of weeds
- immigration of pest fauna species
- colonisation of aggressive native species
- exclusion of more sensitive native species
- greater light intensity and wind penetration
- lower humidity
- greater fire susceptibility.

The EIS indicates that the majority of the vegetation within and surrounding the project would already be impacted by edge effects due to the historical clearance of native vegetation, leaving several disconnected patches throughout the landscape.

There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to intact patches. These areas include the southern boundary and the north-western boundary of the Olive Downs South MLA close to Vermont Park where there are large areas of Eucalypt woodland.

However, the EIS considers that, given the current level of fragmentation present, edge effects are likely to have already manifested. No additional alterations to microclimate or species assemblages within or immediately surrounding the project area, including koala habitat, are expected to occur as a result of the project.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider the clearance of approximately 28.5 ha of habitat critical to the survival of the koala would result in a significant impact to the species.

A summary of the amount of koala habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.13.

Table 7.13 Water pipeline habitat clearance totals for the koala

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
28.5	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of koala habitat within the proposed Stage 1 offset area, comprising 1,601 ha of remnant vegetation providing habitat critical to the survival of the koala and 1,135 ha of potential regrowth habitat for the koala. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the koala and exceeds the minimum 90 per cent direct offset requirement required in accordance with *the EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum koala habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact the koala
- a Species Management Plan must be prepared for the koala. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP
- all koalas to be translocated must initially be kept separate from others and must undergo a standardised and thorough veterinary health examination to detect any clinical evidence of communicable disease or infection
- the proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

Coordinator-General's conclusion – koala

I am satisfied that the EIS has considered the potential impacts that the water pipeline could have on the koala.

The water pipeline would result in a residual significant impact to the koala. I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for the koala is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this

species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the koala are not unacceptable.

Greater glider

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The greater glider, or evidence of its presence, was recorded within the water pipeline corridor during surveys.

Impacts – direct clearance of habitat

The EIS estimates that the water pipeline would result in the clearance of approximately 28.5 ha of breeding, foraging and dispersal habitat for the greater glider. The EIS considers that the water pipeline area does not contain any important or critical habitat for the species.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 28.5 ha of breeding and foraging habitat for the greater glider for the water pipeline would not result in a residual significant impact to the greater glider. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of greater glider habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of greater glider habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.14.

Table 7.14 Water pipeline habitat clearance totals for the greater glider

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
28.5	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing potential

breeding, foraging and dispersal habitat and 1,135 ha of regrowth vegetation providing habitat for the greater glider. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the greater glider and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum greater glider habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the greater glider
- a Species Management Plan must be prepared for the greater glider. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP
- the proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

Coordinator-General's conclusion – greater glider

I am satisfied that the EIS has considered the potential impacts that the water pipeline could have on the greater glider.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the koala is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the greater glider are not unacceptable.

Squatter pigeon

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The squatter pigeon was not identified within the water pipeline corridor during surveys, however was observed within the surrounding landscape. Potential habitat is present within the water pipeline corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 23 ha of potential breeding, foraging and dispersal squatter pigeon habitat would be removed as a result of the water pipeline.

The EIS considers that the habitat within the water pipeline area is not likely to support an important population of the species, is not critical habitat for the species, is of sub-optimal quality (due to high occurrence of Buffel grass) and is not of regional importance for the species.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I would expect the weed and pest management plan to include measures to address the spread of foxes, feral cats, rabbits and buffel grass on the water pipeline corridor.

I am satisfied that given the nature of the proposed action, the water pipeline is unlikely to facilitate the spread of feral cats, foxes and rabbits and is therefore not inconsistent with the relevant TAPs.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. Further discussion is provided as part of the assessment for the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 23 ha of potential habitat would not result in a significant impact to the squatter pigeon. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of squatter pigeon habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of squatter pigeon habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.15.

Table 7.15 Water pipeline habitat clearance totals for the squatter pigeon

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
23	823	3,561

The EIS estimates that there is approximately 3,561 ha of squatter pigeon habitat within the proposed Stage 1 offset area comprising 1,811 ha of breeding habitat, 1,452.5 ha of foraging habitat and 297.5 ha dispersal habitat. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the squatter pigeon and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum squatter pigeon habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the squatter pigeon.

The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage. A Species Management Plan must be prepared for the squatter pigeon. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – squatter pigeon

I am satisfied that the EIS has considered the potential impacts that the water pipeline could have on the squatter pigeon.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the squatter pigeon is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the squatter pigeon are not unacceptable.

Australian painted snipe

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Australian painted snipe were not recorded within the water pipeline corridor during surveys, although potential habitat is present within the water pipeline corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 1 ha of potential breeding and foraging habitat for the Australian painted snipe would be cleared for the water pipeline. The EIS considers that the potential habitat within the water pipeline area is not critical habitat and it is unlikely that it supports a population of the species.

I note that monitoring construction works to check for trapped reptiles regularly is a key management action for Brigalow Belt reptiles.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. of this report details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I would expect the weed and pest management plan to include measures to address the spread of weeds and pests relevant to the Australian painted snipe on the water pipeline corridor.

I am satisfied that given the nature of the proposed action, the mine site and access road is unlikely to facilitate the spread of feral cats and foxes and is therefore not inconsistent with the relevant TAPs.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 1 ha of breeding habitat for the water pipeline would not have a residual significant impact on the Australian painted snipe. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of Australian painted snipe habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of Australian painted snipe habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.16.

Table 7.16 Water pipeline habitat clearance totals for the Australian painted snipe

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Area available within the proposed Stage 1 offset area (ha)
1	21	86

The EIS estimates that there is approximately 86 ha of Australian painted snipe breeding and foraging habitat within the proposed Stage 1 offset area; this would provide a 100 per cent land-based offset for the residual significant impact to the Australian painted snipe and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum Australian painted snipe habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the Australian painted snipe. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the Australian painted snipe. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – Australian painted snipe

I am satisfied that the EIS has considered the potential impacts that the water pipeline could have on the Australian painted snipe.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the Australian painted snipe is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the Australian painted snipe are not unacceptable.

Ornamental snake

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The species was not identified within the water pipeline corridor during surveys, although potential habitat is present within the water pipeline corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 7 ha of 'important habitat' for the ornamental snake would be cleared for the water pipeline.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. of this report details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and Pest management plan.

I am satisfied that given the nature of the proposed action, the water pipeline is unlikely to facilitate the spread of cane toads, feral cats, foxes and feral pigs and is therefore not inconsistent with the TAP as identified in SPRAT.

I would expect the weed and pest management plan to include measures to address the spread of feral cats, foxes, feral pigs and cane toads on the water pipeline corridor.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, the proponent considers the clearance of approximately 7 ha of 'important habitat' habitat for the water pipeline would not result in a significant impact to the species, nor is it likely to lead to a localised decrease in the local population.

The *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles* states that clearing of 2 ha or more of 'important habitat' is considered to have a high risk of significant impact to the ornamental snake. I note that the revised draft EIS indicates that all ornamental snake habitat within the project area meets the 'important habitat' (which includes suitable habitat and dispersal habitat) as per the definition in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I do not accept the conclusion in the draft EIS that the clearance of approximately 7 ha of potential ornamental snake habitat for the water pipeline would not result in a significant impact to the species, given the 'important habitat' clearance limits provided in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I note that despite the conclusion that a residual significant impact is unlikely to occur as a result of the water pipeline, the proponent is proposing to provide an offset for the clearance of ornamental snake habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of ornamental snake habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.17.

Table 7.17 Water pipeline habitat clearance totals for the ornamental snake

Water pipeline (ha)	Total Stage 1 whole of project impact (ha)	Area available within the proposed Stage 1 offset area (ha)
7	506	854

The EIS estimates that there is approximately 854 ha of 'important habitat' for the ornamental snake within the proposed Stage 1 offset area, where suitable soil types, gilgai and woody debris are present and the land is low-lying. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the ornamental snake and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum ornamental snake habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the ornamental snake. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the ornamental snake. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – ornamental snake

I am satisfied that the EIS has considered the potential impacts that the water pipeline could have on the ornamental snake.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the ornamental snake is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the ornamental snake are not unacceptable.

7.5.2 Coordinator-General's conclusion: matters of national environmental significance

Listed threatened species

I am satisfied that the EIS has adequately identified the potential impacts that the water pipeline could have on the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake.

I note the proponent has proposed to provide an offset for the removal of greater glider, squatter pigeon, Australian painted snipe and ornamental snake habitat, despite the assessment finding that a residual significant impact to the species was not likely. I consider that the proposed offsets for Stage 1 of the project would compensate for the project's Stage 1 impacts to listed threatened species. I have recommended conditions to the Commonwealth Minister for the Environment requiring the proponent to obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

I consider the impacts on listed threatened species are not unacceptable. I also consider that the proposed mitigation measures including weed and pest management are not inconsistent with the relevant TAPs.

7.6 Electricity transmission line (EPBC 2017/7869)

A 66-kilovolt electricity transmission line (ETL) and switching/substation would be constructed to connect the project to the existing regional power network at the Broadlea Substation located to the north of the project.

The ETL would be constructed during Stage 1 of the project, and would be approximately 42 km long, restricted to a construction corridor of 10 m. The total disturbance area for the ETL would be 42 ha and would consist of towers spaced approximately 200 m apart.

The disturbance for the ETL would predominantly include slashing of groundcover and trimming woody vegetation, where required. Based on the mapping provided in the EIS, the ETL would require one crossing of the Isaac River and two crossings of North Creek.

During operations, the estimated operational electricity load for the ETL is 38 megawatts (MW). Power supply would be required by the MIA facilities, CHPP and associated coal handling facilities and the rail loadout facilities.

The ETL would remain operational for the life of the project. Should it be determined that the ETL is not to be retained onsite, it would be decommissioned, and the associated land rehabilitated within two years of the completion of mining operations.

7.6.1 Listed threatened species and communities

In deciding whether or not to approve the proposal for the purposes of a subsection of section 18 or section 18A of the EPBC Act, and what conditions (if any) to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the:

- Convention on Biological Diversity
- Convention on Conservation of Nature in the South Pacific (Apia Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan or threat abatement plan (TAP).

The Minister must also, in deciding whether to approve the taking of the action, have regard to any approved conservation advice for the threatened species or ecological community that are likely to be or would be significantly impacted by the project.

This section assesses the project against the objectives and priority actions of conservation advices, recovery plans and TAPs for the relevant threatened species and communities. The residual significant impacts of the project on threatened fauna are also considered in this section.

For the EIS assessment, a search of the EPBC protected matters search tool (PMST) was utilised to provide an indication of the threatened species and communities which may occur within and surrounding the project. This was then ground-truthed during surveys undertaken for the EIS assessment. The adequacy of the surveys undertaken for each species was checked against relevant EPBC survey guidelines.

Threatened flora

I note that although the assessment identified that potential habitat for some of the threatened flora species is present within the mine site and access road, and would be removed for the project, none of the listed threatened flora species were identified onsite during surveys. The lack of records onsite for many of the species identified in the PMST, combined with the survey effort undertaken provided by the proponent, indicate that the mine site and access road does not support populations of the majority of the threatened flora species identified.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions drawn in the EIS regarding the likelihood of presence for the threatened species identified in the PMST. I note that the proponent has committed to undertaking pre-clearance surveys to identify the presence of any threatened species in areas to be cleared. I am satisfied with the conclusions in the EIS that residual significant impacts for those species are unlikely to occur; accordingly, potential impact to threatened flora are not discussed further as part of my assessment.

Threatened fauna

The PMST identified a number of threatened fauna species with the potential to occur within the project area and surrounds. Surveys for listed threatened species were

undertaken by the proponent in accordance with the relevant Commonwealth survey guidelines, including:

- EPBC Act *Survey Guidelines for Australia's Threatened Reptiles*
- EPBC Act *Survey Guidelines for Australia's Threatened Birds*
- EPBC Act *Survey Guidelines for Australia's Threatened Bats*
- EPBC Act *Survey Guidelines for Australia's Threatened Mammals*
- EPBC Act *Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles*
- EPBC Act *Referral Guidelines for the Vulnerable Koala*
- *Targeted Species Survey Guidelines – Yakka Skink*
- *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*

Of those species identified in the PMST, the proponent identified a number of those onsite during surveys, as summarised in Table 7.18. I am satisfied that the surveys undertaken for listed threatened species are adequate for the assessment.

Table 7.18 Listed threatened species identified in the PMST and identified onsite

Listed threatened species known or having potential to occur within the project area	Listed threatened species identified within the ETL corridor during surveys
• red goshawk (<i>Erythrorhynchus radiatus</i>) – vulnerable • Australian painted snipe (<i>Rostratula australis</i>) – endangered • curlew sandpiper (<i>Calidris ferruginea</i>) – critically endangered • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable • Painted Honeyeater (<i>Grantiella picta</i>) – vulnerable • star finch (eastern) (<i>Neochmia ruficauda ruficauda</i>) – endangered • black-throated finch (southern) (<i>Poephila cincta cincta</i>) – endangered • northern quoll (<i>Dasyurus hallucatus</i>) – endangered • koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)) – vulnerable • greater glider (<i>Petauroides volans</i>) – vulnerable;	• koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) • greater glider (<i>Petauroides volans</i>) • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable

- grey-headed flying-fox (*Pteropus poliocephalus*) – vulnerable
- ghost bat (*Macroderma gigas*) – vulnerable
- Corben's long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- southern snapping turtle (*Elseya albagula*) – critically endangered
- Fitzroy River turtle (*Rheodytes leukops*) – vulnerable
- Yakka Skink (*Egernia rugosa*) – vulnerable
- Allan's Lerista (*Lerista allanae*) – endangered
- Ornamental Snake (*Denisonia maculata*) – vulnerable
- Dunmall's Snake (*Furina dunmalli*) – vulnerable

I note that many of the identified threatened species may occur onsite, however I am satisfied with the conclusions in the EIS that residual significant impacts for those species that were not identified onsite during surveys. The lack of historical species records on site for many identified in the PMST, combined with the survey effort undertaken by the proponent, indicate that the ETL corridor does not support populations of the majority of the threatened species identified.

The surveys undertaken were in accordance with the relevant EPBC survey guidelines, indicating that even if the species are present onsite, their occurrence is sporadic and significant populations are not present. The proponent has provided detailed justifications for these conclusions in the draft EIS and revised draft EIS.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions regarding the likelihood of presence for the threatened species identified in the PMST.

For the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake, potential habitat exists within the ETL corridor and the species were either identified onsite or in the immediate vicinity of the project. Accordingly, my assessment of impacts to EPBC Act listed threatened species focusses on these species.

Koala

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Koala, or evidence of koala presence, was recorded within the ETL corridor.

Impacts – direct clearance of habitat

The EIS estimates that the ETL would result in the clearance of approximately 12 ha of habitat critical to the survival of the koala, as defined in the *EPBC Act referral guidelines for the vulnerable Koala*.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a Vegetation Management Plan, which would include measures to ensure clearing is undertaken progressively and any areas of vegetation to be retained onsite, including habitat for the koala, are clearly identified.

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the EPBC listed threatened species to be impacted by the project. The SMP would include measures to limit construction activities to avoid breeding seasons of threatened species, relocate individuals identified during pre-clearance surveys by qualified fauna spotter-catchers, install fauna exclusion fencing and enforce speed limits onsite.

Impacts – spread of disease

Koala are threatened primarily by diseases such as chlamydia and koala retrovirus. The EIS considers that given the prevalence of both diseases in koala populations in Queensland, it is likely that the diseases already occur in the populations found on and around the mine site and access road. The EIS considers that the ETL would not include activities likely to result in the spread of a disease that may cause the species to decline. However, any koalas identified during pre-clearance surveys that are subsequently translocated could act to spread disease.

Avoidance, mitigation and management measures

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the EPBC listed threatened species to be impacted by the project. I require that the koala management measures include provisions to address the spread of diseases relevant to the koala.

Impacts – increased risk of dog attack

Mortality in koalas due to dog attack is one of the key threats to the species. Feral dogs were identified within the project area during surveys. Despite this, the EIS considers that the project would not result in increased levels of threat of dog attack for the koala.

Avoidance, mitigation and management measures

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. I would expect the weed and pest management plan to include measures to reduce the risk of dog attack.

Indirect impacts – noise and vibration

The EIS considers that the construction and operation of the mine would cause ongoing and localised increases in noise and vibration disturbance in habitats adjacent to the project. Nocturnal animals would be more susceptible to noise and vibration disturbance, due to their sensitivity to noise.

The EIS predicted that any potential noise-related impact to fauna within surrounding habitat would be localised and minor, where fauna would habituate to continuous noise.

Therefore, significant impacts to fauna resulting from noise and vibration impacts resulting from the construction and operation of the ETL are not expected to occur.

Indirect impacts – artificial lighting

Impacts to fauna associated with artificial lighting include changed behaviours to avoid lit areas and disturbance to activity levels (particularly for birds and amphibians). Some species, such as insectivorous bats, may be attracted to lit areas due to insects congregating around the light at night.

The EIS predicted that any potential impact associated with the additional lighting required for the project to protected fauna would be minor, provided that lights are operated in accordance with relevant Australian Standards.

Indirect impacts – edge effects

Edge effects can include:

- establishment of weeds
- immigration of pest fauna species
- colonisation of aggressive native species
- exclusion of more sensitive native species
- greater light intensity and wind penetration
- lower humidity
- greater fire susceptibility.

The EIS indicates that the majority of the vegetation within and surrounding the project would already be impacted by edge effects due to the historical clearance of native vegetation, leaving several disconnected patches throughout the landscape.

There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to intact patches. These areas include the southern boundary and the north-western boundary of the Olive Downs South MLA close to Vermont Park where there are large areas of Eucalypt woodland.

However, the EIS considers that, given the current level of fragmentation present, edge effects are likely to have already manifested. No additional alterations to microclimate or species assemblages within or immediately surrounding the project area, including koala habitat, are expected to occur as a result of the project.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 12 ha of habitat critical to the survival of the koala would result in a residual significant impact to the koala.

A summary of the amount of koala habitat to be cleared for the ETL and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.19.

Table 7.19 ETL habitat clearance totals for the koala

ETL (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
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The EIS estimates that there is approximately 2,736 ha of habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing habitat critical to the survival of the koala and 1,135 ha of potential regrowth habitat for the koala. regrowth habitat.

This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the koala and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum koala habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the koala. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the koala. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP.

Coordinator-General's conclusion – koala

I am satisfied that the EIS has considered the potential impacts that the ETL could have on the koala.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the koala is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the koala are not unacceptable.

Greater glider

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The greater glider, or evidence of its presence, was recorded within the ETL corridor.

Impacts – direct clearance of habitat

The EIS estimates that the ETL would result in the clearance of approximately 12 ha of potential breeding, foraging and dispersal habitat for the greater glider. The EIS considers that the ETL area does not contain any important or critical habitat for the species.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 12 ha of potential breeding and foraging habitat for the ETL would not result in a residual significant impact to the species. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of greater glider habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of greater glider habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.20.

Table 7.20 ETL habitat clearance totals for the greater glider

ETL (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
12	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing potential breeding, foraging and dispersal habitat and 1,135 ha of regrowth vegetation providing habitat for the greater glider. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the greater glider and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum greater glider habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the greater glider. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the greater glider. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – greater glider

I am satisfied that the EIS has considered the potential impacts that the ETL could have on the greater glider.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the greater glider is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the greater glider are not unacceptable.

Squatter pigeon

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Squatter pigeon were identified within the ETL corridor during surveys.

Impacts – direct clearance of habitat

The EIS estimates that approximately 14 ha of potential squatter pigeon breeding, foraging and dispersal habitat would be removed for the ETL. I note that the EIS indicated that the disturbance associated with the ETL would be predominantly slashing of groundcover and trimming of woody vegetation, where required.

The EIS considers that the habitat within the ETL area is not likely to support an important population of the species, is not critical habitat for the species, is of sub-optimal quality (due to high occurrence of buffel grass) and is not of regional importance.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I would expect the weed and pest management plan to include measures to address the spread of foxes, feral cats, rabbits and buffel grass on the ETL corridor.

I am satisfied that given the nature of the proposed action, the ETL is unlikely to facilitate the spread of foxes, feral cats and rabbits and is therefore not inconsistent with the relevant TAPs.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information in the EIS, I consider that the clearance of 14 ha of potential habitat would not result in a significant impact to the squatter pigeon. Despite the EIS also concluding a residual significant impact would not occur the proponent is proposing to

provide an offset for the clearance of squatter pigeon habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of squatter pigeon habitat to be cleared for the ETL and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.21.

Table 7.21 ETL habitat clearance totals for the squatter pigeon

Habitat clearance total (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
14	823	3,561

The EIS estimates that there is approximately 3,561 ha of greater glider habitat within the proposed Stage 1 offset area comprising 1,811 ha of breeding habitat, 1,452.5 ha of foraging habitat and 297.5 ha of dispersal habitat. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the squatter pigeon and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum squatter pigeon habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the squatter pigeon. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the squatter pigeon. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – squatter pigeon

I am satisfied that the EIS has considered the potential impacts that the ETL could have on the squatter pigeon.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the squatter pigeon is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the squatter pigeon are not unacceptable.

Australian painted snipe

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Australian painted snipe were not recorded within the ETL corridor during surveys.

Impacts

The EIS states that the ETL would avoid all patches of Australian painted snipe habitat mapped within its proposed footprint; accordingly, I consider that a residual significant impact to the Australian painted snipe resulting from the ETL is unlikely.

Coordinator-General's conclusion – Australian painted snipe

I am satisfied that the EIS has considered the potential impacts that the ETL could have on the Australian painted snipe, noting that the ETL would not result in a significant impact to the species as the project would not result in the clearance of suitable species habitat.

Ornamental snake

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The species was not identified within the ETL corridor during surveys, although potential habitat is present within the ETL corridor.

Impacts – direct clearance of habitat

The EIS estimates that the ETL would result in clearance of approximately 10.5 ha of 'important habitat' for the ornamental snake. I note that the EIS indicated that the disturbance associated with the ETL would be predominantly slashing of groundcover and trimming of woody vegetation, where required.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. of this report details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I am satisfied that given the nature of the proposed action, the ETL is unlikely to facilitate the spread of cane toads, feral cats, foxes and feral pigs and is therefore not inconsistent with the TAP as identified in SPRAT.

I would expect the weed and pest management plan to include measures to address the spread of cane toads, feral cats, foxes and feral pigs on the ETL corridor.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, the proponent considers the clearance of approximately 10.5 ha of 'important habitat' for the ornamental snake for the ETL would not result in a residual significant impact to the species.

The *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles* states that clearing of 2 ha or more of 'important habitat' is considered to have a high risk of significant impact to the ornamental snake. I note that the revised draft EIS indicates that all ornamental snake habitat within the project area meets the 'important habitat' (which includes suitable habitat and dispersal habitat) as per the definition in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I do not accept the conclusion in the draft EIS that the clearance of approximately 10.5 ha of potential ornamental snake habitat for the ETL would not result in a significant impact to the species, given the 'important habitat' clearance limits provided in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I note that despite the conclusion that a significant impact is unlikely to occur as a result of the ETL, the proponent is proposing to provide an offset for the clearance of ornamental snake habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of ornamental snake habitat to be cleared for the ETL and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.22.

Table 7.22 ETL habitat clearance totals for the ornamental snake

Habitat clearance total (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
10.5	506	854

The EIS estimates that there is approximately 854 ha of 'important habitat' for the ornamental snake within the proposed Stage 1 offset area, where suitable soil types, gilgai and woody debris are present and the land is low-lying. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the ornamental snake and exceeds the minimum 90 per cent direct offset requirement required in accordance with the *EPBC Environmental Offsets Policy*.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum ornamental snake habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the ornamental snake. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the ornamental snake. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – ornamental snake

I am satisfied that the EIS has considered the potential impacts that the ETL could have on the ornamental snake.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the ornamental snake is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the ornamental snake are not unacceptable.

7.6.2 Coordinator-General's conclusion: matters of national environmental significance

Listed threatened species

I am satisfied that the EIS has adequately identified the potential impacts that the ETL could have on the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake. The ETL would avoid all patches of Australian painted snipe habitat mapped within the ETL footprint; accordingly, I consider that a residual significant impact to the Australian painted snipe resulting from the ETL is unlikely.

I commend the proponent for proposing to provide an offset for the removal of greater glider, squatter pigeon and ornamental snake habitat despite the assessment finding that a residual significant impact to the species was not likely.

I consider that the proposed offsets for Stage 1 of the project are sufficient to compensate for the project's Stage 1 impacts to listed threatened species. I have recommended conditions to the Commonwealth Minister for the Environment requiring the proponent to obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

I consider the impacts on listed threatened species are not unacceptable. I also consider that the proposed mitigation measures including weed and pest management are not inconsistent with the relevant TAPs.

7.7 Rail spur and loop (EPBC 2017/7870)

The proposed rail spur and loop would be constructed during Stage 1 of the project from the western boundary of the ODS domain, connecting to the existing Norwich Park Branch Railway which connects to the main line between the Red Mountain (down-line and Winchester (up-line) railway stops. The proposed rail spur and loop would be approximately 19 km in length, with a construction corridor of approximately 20 m and a total disturbance footprint of approximately 103.5 ha. New culvert crossings would be installed along the rail spur to the ODS domain.

Although the final location of the rail spur and loop is subject to detailed design, the rail loop would be constructed adjacent to the proposed rail-loadout facility at the ODS domain, would avoid existing mining lease areas and voids to the south and would be designed for two train capacity.

The track and formation levels would be designed to achieve a 1 per cent AEP flood immunity, or otherwise match the existing main line level of immunity. Diversion channels

and supplemental earthworks would be undertaken, if required, to protect the alignment and control flood behaviour.

The rail spur and loop would be wholly located within the mining lease application areas for the project. It has been co-located with the water pipeline to minimise impacts to native vegetation, and the final location of the rail spur would maintain a buffer of approximately 85 m to the bank of the Isaac River at its closest point. The rail spur has avoided all areas of the brigalow TEC and would avoid most 'Endangered' REs, with the exception of waterway crossings. The rail spur and loop would also require two crossings of palustrine wetlands associated with the Isaac River, however would not require any waterway crossings within the mining lease application area boundary.

Product coal would be transported via rail to the Dalrymple Bay Coal Terminal located south-east of Mackay. The EIS estimates that up to approximately 15 Mt per annum (pa) of product coal would be transported by rail to the port for export. The rail spur and loop would remain operational for the duration of the project. Should the rail spur and loop not be retained onsite, the infrastructure would be decommissioned, and the associated land rehabilitated within 2 years of the completion of mining operations.

7.7.1 Listed threatened species and communities

In deciding whether or not to approve the proposal for the purposes of a subsection of section 18 or section 18A of the EPBC Act, and what conditions (if any) to attach to such an approval, the Commonwealth Minister for the Environment must not act inconsistently with Australia's obligations under the:

- Convention on Biological Diversity
- Convention on Conservation of Nature in the South Pacific (Apia Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- a recovery plan or threat abatement plan (TAP).

The Minister must also, in deciding whether to approve the taking of the action, have regard to any approved conservation advice for the threatened species or ecological community that are likely to be or would be significantly impacted by the project.

This section assesses the project against the objectives and priority actions of conservation advices, recovery plans and TAPs for the relevant threatened species and communities. The residual significant impacts of the project on threatened fauna are also considered in this section.

For the EIS assessment, a search of the EPBC protected matters search tool (PMST) was utilised to provide an indication of the threatened species and communities which may occur within and surrounding the project. This was then ground-truthed during surveys undertaken for the EIS assessment. The adequacy of the surveys undertaken for each species was checked against relevant EPBC survey guidelines.

The PMST identified a number of threatened fauna species with the potential to occur within the project area and surrounds. Surveys for listed threatened species were undertaken by the proponent in accordance with the relevant Commonwealth survey guidelines, including:

- EPBC Act Survey Guidelines for Australia's Threatened Reptiles
- EPBC Act Survey Guidelines for Australia's Threatened Birds
- EPBC Act Survey Guidelines for Australia's Threatened Bats
- EPBC Act Survey Guidelines for Australia's Threatened Mammals
- EPBC Act Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles
- EPBC Act Referral Guidelines for the Vulnerable Koala
- Targeted Species Survey Guidelines – Yakka Skink
- Terrestrial Vertebrate Fauna Survey Guidelines for Queensland

Of those species identified in the PMST, the proponent identified a number of those onsite during surveys, as summarised in Table 7.23. I am satisfied that the surveys undertaken for listed threatened species are adequate for the assessment.

Table 7.23 Listed threatened species identified in the PMST and identified onsite

Listed threatened species known or having potential to occur within the project area	Listed threatened species identified within rail spur and loop corridor during surveys
• red goshawk (<i>Erythrorhynchus radiatus</i>) – vulnerable • Australian painted snipe (<i>Rostratula australis</i>) – endangered • curlew sandpiper (<i>Calidris ferruginea</i>) – critically endangered • squatter pigeon (southern) (<i>Geophaps scripta scripta</i>) – vulnerable • Painted Honeyeater (<i>Grantiella picta</i>) – vulnerable • star finch (eastern) (<i>Neochmia ruficauda ruficauda</i>) – endangered • black-throated finch (southern) (<i>Poephila cincta cincta</i>) – endangered • northern quoll (<i>Dasyurus hallucatus</i>) – endangered • koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)) – vulnerable • greater glider (<i>Petauroides volans</i>) – vulnerable; • grey-headed flying-fox (<i>Pteropus poliocephalus</i>) – vulnerable • ghost bat (<i>Macroderma gigas</i>) – vulnerable	• koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) • greater glider (<i>Petauroides volans</i>)

- Corben's long-eared Bat (*Nyctophilus corbeni*) – vulnerable
- southern snapping turtle (*Elseya albagula*) – critically endangered
- Fitzroy River turtle (*Rheodytes leukops*) – vulnerable
- Yakka Skink (*Egernia rugosa*) – vulnerable
- Allan's Lerista (*Lerista allanae*) – endangered
- Ornamental Snake (*Denisonia maculata*) – vulnerable
- Dunmall's Snake (*Furina dunmalli*) – vulnerable

I note that many of the identified threatened species may occur onsite, however I am satisfied with the conclusions in the EIS that residual significant impacts for those species that were not identified onsite during surveys. The lack of historical species records on site for many identified in the PMST, combined with the survey effort undertaken by the proponent, indicate that the rail spur and loop corridor does not support populations of the majority of the threatened species identified.

The surveys undertaken were in accordance with the relevant EPBC survey guidelines, indicating that even if the species are present onsite, their occurrence is sporadic and significant populations are not present. The proponent has provided detailed justifications for these conclusions in the draft EIS and revised draft EIS.

Given the prevalence of development within the region, the biodiversity values present within the region are well known, and I am satisfied with the proponent's conclusions regarding the likelihood of presence for the threatened species identified in the PMST.

For the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake, potential habitat exists within the rail spur and loop corridor and the species were either identified onsite or in the immediate vicinity of the project. Accordingly, my assessment of impacts to EPBC Act listed threatened species focusses on these species.

Koala

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Koala, or evidence of koala presence, was recorded within the rail spur and loop corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 43 ha of habitat critical to the survival of the koala would be cleared for the rail spur and loop, as defined in the *EPBC Act referral guidelines for the vulnerable Koala*.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a Vegetation Management Plan, which would include measures to ensure clearing is undertaken progressively and any areas of vegetation to be retained onsite, including habitat for the koala, are clearly identified.

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the EPBC listed threatened species to be impacted by the project. The SMP would include measures to limit construction activities to avoid breeding seasons of threatened species, relocate individuals identified during pre-clearance surveys by qualified fauna spotter-catchers, install fauna exclusion fencing and enforce speed limits onsite.

Impacts – spread of disease

Koalas are threatened primarily by diseases such as chlamydia and koala retrovirus. The EIS considers that given the prevalence of both diseases in koala populations in Queensland, it is likely that the diseases already occur in the populations found on and around the mine site and access road. The EIS considers that the rail spur and loop would not include activities likely to result in the spread of a disease that may cause the species to decline. However, any koalas identified during pre-clearance surveys that are subsequently translocated could act to spread disease.

Avoidance, mitigation and management measures

The proponent has also committed to the preparation and implementation of a species management plan (SMP) for the EPBC listed threatened species to be impacted by the project. I require that the koala management measures include provisions to address the spread of diseases relevant to the koala.

Impacts – increased risk of dog attack

Mortality in koalas due to dog attack is one of the key threats to the species. Feral dogs were identified within the project area during surveys. Despite this, the EIS considers that the project would not result in increased levels of threat of dog attack for the koala.

Avoidance, mitigation and management measures

The proponent has committed to prepare and implement a weed and pest management plan, which would include specific measures to control individual pest species identified within the project area in accordance with the Queensland *Biosecurity Regulation*, 2016. I would expect the weed and pest management plan to include measures such as trapping and removing any feral dogs identified onsite to reduce the risk of dog attack.

Impacts – fragmentation of habitat/ barriers to movement and increased risk of vehicle strike

The rail spur and loop could act to fragment koala habitat through presenting a barrier to koala movement and would potentially impact the dispersal ability of koala through previously contiguous riparian vegetation. Koalas are also known to be susceptible to vehicle strike when crossing road corridors located between areas of habitat. Koalas that remain within any suitable habitat left within the mine site and access road would be at

increased risk of vehicle strike, where any infrastructure constructed for the project passes through those areas.

Avoidance, mitigation and management measures

The proponent has committed to, where applicable, maintain fencing and fauna crossings to ensure safe fauna movement. An on-site speed limit of 60 km/hr, which is consistent with the recommendations in the EPBC Act referral guidelines for the vulnerable koala, would also be enforced to address the increased risk of vehicle strike to fauna including the koala.

Indirect impacts – noise and vibration

The EIS considers that the construction and operation of the mine would cause ongoing and localised increases in noise and vibration disturbance in habitats adjacent to the project. Nocturnal animals would be more susceptible to noise and vibration disturbance, due to their sensitivity to noise.

The EIS predicted that any potential noise-related impact to fauna within surrounding habitat would be localised and minor, where fauna would habituate to continuous noise. Therefore, significant impacts to fauna resulting from noise and vibration impacts resulting from the construction and operation of the rail spur and loop are not expected to occur.

Indirect impacts – artificial lighting

Impacts to fauna associated with artificial lighting include changed behaviours to avoid lit areas and disturbance to activity levels (particularly for birds and amphibians). Some species, such as insectivorous bats, may be attracted to lit areas due to insects congregating around the light at night.

The EIS predicted that any potential impact associated with the additional lighting required for the project to protected fauna would be minor, provided that lights are operated in accordance with relevant Australian Standards.

Indirect impacts – edge effects

Edge effects can include:

- establishment of weeds
- immigration of pest fauna species
- colonisation of aggressive native species
- exclusion of more sensitive native species
- greater light intensity and wind penetration
- lower humidity
- greater fire susceptibility.

The EIS indicates that the majority of the vegetation within and surrounding the project would already be impacted by edge effects due to the historical clearance of native vegetation, leaving several disconnected patches throughout the landscape.

There are several areas where a new edge through remnant vegetation would be formed and could result in the introduction of edge effects to intact patches. These areas include

the southern boundary and the north-western boundary of the Olive Downs South MLA close to Vermont Park where there are large areas of Eucalypt woodland.

However, the EIS considers that, given the current level of fragmentation present, edge effects are likely to have already manifested. No additional alterations to microclimate or species assemblages within or immediately surrounding the project area, including koala habitat, are expected to occur as a result of the project.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of approximately 43 ha of habitat critical to the survival of the koala would result in a residual significant impact.

A summary of the amount of koala habitat to be cleared for the rail spur and loop and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.24.

Table 7.24 Rail spur and loop habitat clearance totals for the koala

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
43	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of koala habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing habitat critical to the survival of the koala and 1,135 ha of potential regrowth habitat for the koala. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the koala and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum koala habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the koala. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the koala. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP. The SMP includes the following measures to mitigate impacts on the koala:
- all koalas to be translocated must initially be kept separate from others and must undergo a standardised and thorough veterinary health examination to detect any clinical evidence of communicable disease or infection
- the proponent must incorporate koala proof fencing into the design of the rail spur and loop, to exclude koalas and prevent the risk of strike
- the proponent must ensure that a 60 km/h speed limit is enforced within the project area
- the proponent must provide fauna underpasses where the rail spur and loop passes through areas of suitable koala habitat

Coordinator-General's conclusion – koala

I am satisfied that the EIS has considered the potential impacts that the rail spur and loop could have on the koala.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the koala is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the koala are not unacceptable.

Greater glider

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The greater glider, or evidence of its presence, was recorded within the rail spur and loop corridor during surveys.

Impacts – direct clearance of habitat

The EIS estimates that approximately 43 ha of potential breeding, foraging and dispersal habitat for the greater glider would be cleared for the rail spur and loop. Based on the mapping provided in the EIS, the rail spur and loop would not require crossings of the Isaac River. However, in some areas, the corridor passes in close proximity to the Isaac River and associated riparian vegetation.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – fragmentation of habitat/ barriers to movement

As described in the assessment for the koala, the rail spur and loop could potentially impact the dispersal ability of greater glider through previously contiguous riparian vegetation. The EIS considers that the project would not act to fragment the population of greater glider onsite.

The greater glider conservation advice recommends that proponents implement rope ladder crossings over transport corridors to mitigate potential impacts to the dispersal ability of the species.

Avoidance, mitigation and management measures

The proponent has committed to the implementation of fauna crossings to ensure safe fauna movement across disturbed areas.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 43 ha of potential breeding, foraging and dispersal habitat for the greater glider is unlikely to result in a significant impact to the species. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of greater glider habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of greater glider habitat to be cleared for the rail spur and loop and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.25.

Table 7.25 Rail spur and loop habitat clearance totals for the greater glider

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area (ha)
43	826.5	2,736

The EIS estimates that there is approximately 2,736 ha of greater glider habitat within the proposed Stage 1 offset area comprising 1,601 ha of remnant vegetation providing potential breeding, foraging and dispersal habitat and 1,135 ha of regrowth vegetation providing habitat for the greater glider. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the greater glider and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum greater glider habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the greater glider. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the greater glider. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP. The SMP includes the following measures to mitigate impacts on the greater glider:
- the proponent must incorporate rope ladder crossings where practicable where the rail spur and loop passes through suitable greater glider habitat.

Coordinator-General's conclusion – greater glider

I am satisfied that the EIS has considered the potential impacts that the rail spur and loop could have on the greater glider.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the greater glider is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the greater glider are not unacceptable.

Squatter pigeon

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Squatter pigeon were not identified within the rail spur and loop disturbance area during surveys, but was observed in the surrounding landscape. Potential habitat is present within the corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 43 ha of potential breeding, foraging and dispersal habitat for the squatter pigeon would be cleared for the rail spur and loop.

The EIS considers that the habitat within the rail spur and loop area is not likely to support an important population of the species, is not critical habitat for the species, is of sub-optimal quality (due to high occurrence of Buffel Grass) and is not of regional importance.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I would expect the weed and pest management plan to include measures to address the spread of foxes, feral cats, rabbits and buffel grass on the rail spur and loop corridor.

I am satisfied that given the nature of the proposed action, the rail spur and loop is unlikely to facilitate the spread of foxes, feral cats and rabbits and is therefore not inconsistent with the relevant TAPs as identified in SPRAT.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 43 ha of potential habitat would not result in a significant impact to the species. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of squatter pigeon habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of squatter pigeon habitat to be cleared for the rail spur and loop and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.26.

Table 7.26 Rail spur and loop habitat clearance totals for the squatter pigeon

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
43	823	3,561

The EIS estimates that there is approximately 3,561 ha of squatter pigeon habitat within the proposed Stage 1 offset area comprising 1,811 ha of breeding habitat, 1,452.5 ha of foraging habitat and 297.5 ha of dispersal habitat; this would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the squatter pigeon and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum squatter pigeon habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the squatter pigeon
- a SMP must be prepared for the squatter pigeon. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP
- the proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

Coordinator-General's conclusion – squatter pigeon

I am satisfied that the EIS has considered the potential impacts that the rail spur and loop could have on the squatter pigeon.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the squatter pigeon is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the squatter pigeon are not unacceptable.

Australian painted snipe

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

Australian painted snipe were not identified within the rail spur and loop corridor during surveys, although potential habitat is present within the corridor.

Impacts – direct clearance of habitat

The EIS estimates that approximately 6 ha of potential Australian painted snipe breeding and foraging habitat would be cleared for the rail spur and loop. The EIS indicates that the habitat within the rail spur and loop area is not critical habitat and it is unlikely to support a population of the species.

Avoidance, mitigation and management measures

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. of this report details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I would expect the weed and pest management plan to include measures to address the spread of weeds and pests relevant to the Australian painted snipe on the rail spur and loop corridor.

I am satisfied that given the nature of the proposed action, the rail spur and loop is unlikely to facilitate the spread of feral cats and foxes and is therefore not inconsistent with the relevant TAPs as identified in SPRAT.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, I consider that the clearance of 6 ha of potential Australian painted snipe breeding habitat would not result in a residual significant impact. Despite the EIS also concluding a residual significant impact would not occur, the proponent is proposing to provide an offset for the clearance of Australian painted snipe habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of Australian painted snipe habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.27.

Table 7.27 Rail spur and loop habitat clearance totals for the Australian painted snipe

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
6	21	86

The EIS estimates that there is approximately 86 ha of Australian painted snipe breeding and foraging habitat within the proposed Stage 1 offset area; this would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the Australian painted snipe and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum Australian painted snipe habitat disturbance limits and requirements for the proponent to provide offsets for the residual significant impact on the Australian painted snipe. The proponent must obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the Australian painted snipe. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – Australian painted snipe

I am satisfied that the EIS has considered the potential impacts that the rail spur and loop could have on the Australian painted snipe.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the Australian painted snipe is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the Australian painted snipe are not unacceptable.

Ornamental snake

Background, recovery plans, conservation advice and threat abatement

Refer to Section 7.4.1 of this report for information relating to the distribution and ecology of the species, including information from relevant recovery plans, conservation advice and TAPs.

The species was not identified within the rail spur and loop corridor during surveys, although potential habitat is present within the corridor.

Impacts – direct clearance of habitat

The EIS estimates that the rail spur and loop would require the clearance of 27 ha 'important habitat' for the ornamental snake.

The proponent has committed to the preparation and implementation of a vegetation management plan and a SMP, as detailed for the koala.

Impacts – increased occurrence of weeds and pests

Section 7.4.1. of this report details TAPs (where relevant) and key weed and/ or pest species relevant to the species, and the proponent's commitment to the preparation and implementation of weed and pest management plan.

I am satisfied that given the nature of the proposed action, the rail spur and loop is unlikely to facilitate the spread of feral cats, foxes, feral pigs and cane toads and is therefore not inconsistent with the relevant TAPs as identified in SPRAT.

I would expect the weed and pest management plan to include measures to address the spread of feral cats, foxes, feral pigs and cane toads on the rail spur and loop corridor.

Indirect impacts – noise and vibration, artificial lighting and edge effects

The species would also be susceptible to additional indirect impacts including noise and vibration, artificial lighting impacts and edge effects. As the potential impacts would be similar for all species, further discussion is provided in the assessment of impacts to the koala.

Residual significant impacts and offsets

Based on the information provided in the EIS, the proponent considers the clearance of approximately 27 ha of 'important habitat' for the ornamental snake for the rail spur and loop is not expected to result in a residual significant impact to the species.

The *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles* states that clearance of 2 ha or more of 'important habitat' is considered to have a high risk of significant impact to the ornamental snake. I note that the revised draft EIS indicates that all ornamental snake habitat within the project area meets the 'important habitat' (which includes suitable habitat and dispersal habitat) as per the definition in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I do not accept the conclusion in the draft EIS that the clearance of approximately 27 ha of potential ornamental snake habitat for the rail spur and loop would not result in a significant impact to the species, given the 'important habitat' clearance limits provided in the *draft Referral guidelines for the Nationally Listed Brigalow Belt Reptiles*.

I note that despite the conclusion that a significant impact is unlikely to occur as a result of the water pipeline, the proponent is proposing to provide an offset for the clearance of ornamental snake habitat. The proponent is proposing offsets for the project's residual significant impacts cumulatively, rather than for the impacts of each EPBC referral in isolation.

A summary of the amount of ornamental snake habitat to be cleared for the water pipeline and the amount of habitat available within the proposed Stage 1 offset area is provided in Table 7.28.

Table 7.28 Rail spur and loop habitat clearance totals for the ornamental snake

Total habitat clearance (ha)	Total Stage 1 whole of project impact (ha)	Habitat available within the proposed Stage 1 offset area
27	506	854

The EIS estimates that there is approximately 854 ha of 'important habitat' for the ornamental snake within the proposed Stage 1 offset area, where suitable soil types, gilgai and woody debris are present and the land is low-lying. This would provide a 100 per cent land-based offset for the Stage 1 residual significant impact to the ornamental snake and exceeds the minimum 90 per cent direct offset requirement required in accordance with the EPBC Environmental Offsets Policy.

I have recommended the following conditions to the Commonwealth Minister for the Environment (Appendix 2):

- maximum ornamental snake habitat disturbance limits
- requirements for the proponent to provide offsets for the residual significant impact on the ornamental snake. The proponent must obtain written approval from the Minister on the offset management plan for each stage of the project prior to commencing each stage.
- a SMP must be prepared for the ornamental snake. The plan must align with the EPBC Act requirements, recovery plan, conservation advice and any relevant TAP

Coordinator-General's conclusion – ornamental snake

I am satisfied that the EIS has considered the potential impacts that the rail spur and loop could have on the ornamental snake.

I have recommended conditions to the Commonwealth Minister for the Environment that would ensure that an appropriate offset for project's impacts to the Australian painted snipe is delivered.

In consideration of the proposed mitigation and offset measures and conditions recommended in this report, I conclude that the approved conservation advice for this species has been considered; the proposed management actions are not inconsistent with the relevant TAPs; and the impacts on the ornamental snake are not unacceptable.

7.7.2 Coordinator-General's conclusion: matters of national environmental significance

Listed threatened species

I am satisfied that the EIS has adequately identified the potential impacts that the rail spur and loop could have on the koala, greater glider, squatter pigeon, Australian painted snipe and ornamental snake.

I commend the proponent for proposing to provide an offset for the removal of greater glider, squatter pigeon, Australian painted snipe and ornamental snake habitat despite the assessment finding that a residual significant impact to the species was not likely.

I consider that the proposed offsets for Stage 1 of the project are sufficient to compensate for the project's Stage 1 impacts to listed threatened species. I have recommended conditions to the Commonwealth Minister for the Environment requiring the proponent to obtain written approval from the Minister on an offset management plan for each stage of the project prior to commencing each stage.

I consider the impacts on listed threatened species are not unacceptable. I also consider that the proposed mitigation measures including weed and pest management are not inconsistent with the relevant TAPs.

8. Conclusion

In undertaking my evaluation, I have considered the EIS and AEIS, submissions on the EIS and AEIS and agency advice.

I am satisfied that the requirements of the SDPWO Act have been met and that sufficient information has been provided to enable the evaluation of potential impacts, and development of mitigation strategies and conditions of approval. I consider that the mitigation measures, all commitments and the conditions stated in this report would result in acceptable overall outcomes.

Based on the information provided by the proponent and outlined in Section 5.6 and Figure 6.1, I conclude that there are significant local, regional and state benefits to be derived from the Olive Downs project, and that environmental effects can be adequately avoided, minimised, mitigated or offset as required through the implementation of the measures outlined in the EIS documentation. The conditions I have specified in this report have been formulated to further manage all potential impacts associated with the construction and operation of the project.

I am satisfied that the SIA is generally in accordance with the SIA Guideline (2018) and that the strategies prepared as part of the SIA demonstrate that the proponent is committed to ensuring that the project does not adversely impact on and enhances opportunities for the local communities. I have decided that the 100 per cent FIFO prohibition and anti-discrimination provisions of the SSRC Act apply to the project's construction workforce. Accordingly, I approve the Olive Downs project, subject to the conditions in Appendix 1, the recommendations in Appendix 2 and 3 and the proponent commitments in Appendix 4. In addition, it is expected that the proponent's commitments will be fully implemented as presented in the EIS documentation and summarised in Appendix 4 of this report.

To proceed further, the proponent will be required to obtain the following key approvals prior to project commencement:

- EPBC Act approval
- an EA with relevant ERAs under the EP Act
- mining leases and special purposes mining leases under the MR Act

If there are any inconsistencies between the project (as described in the EIS documentation) and the conditions in this report, the conditions shall prevail. The proponent must implement all the conditions of this report.

Section 7 of this report describes the extent to which the material supplied by the proponent addresses the actual or likely impacts on MNES of each controlled action for the project.

Copies of this report will be issued to:

- DEE

- DES
- DNRME
- DAF
- Isaac Regional Council

A copy of this report will also be available on the Department of State Development, Manufacturing, Infrastructure and Planning's website at **www.dsdmip.qld.gov.au/cg**

This report will generally lapse four years from the date it is published on the department's website, or when an approval application is decided for the project, unless a later time is subsequently decided by the Coordinator-General.

Appendix 1. Stated conditions

Part 1. Conditions stated under the *Environmental Protection Act 1994* for an environmental authority

This schedule includes the Coordinator-General's stated conditions for an environmental authority for a resource activity 13 – mining black coal and ancillary activities, namely environmentally relevant activity (ERA) 8 – chemical storage, ERA 31 – mineral processing and ERA 63 – sewage treatment under the *Environmental Protection Act 1994*, stated under section 47C of the *State Development and Public Works Organisation Act 1971*. The entity with jurisdiction for conditions in this schedule is the Department of Environment and Science.

Schedule A: General

Condition number	Condition
A1	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
A2	The holder of this environmental authority is approved for an extraction rate of up to 20Mtpa (million tonnes per annum) of ROM (run-of-mine) coal.
A3	In carrying out the mining activities authorised by this environmental authority, disturbance: 1. can only occur in the areas marked 'A'; and 2. must not occur in the areas marked 'B' in the map that is Figure 1 – Disturbance footprint (to be provided by proponent) to this environmental authority.
A4	The holder of this environmental authority must: 1. install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority 2. maintain such measures, plant and equipment in a proper and efficient condition 3. operate such measures, plant and equipment in a proper and efficient manner 4. ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.
A5	Monitoring Except where specified otherwise in another condition of this authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than five years and provided upon request to the administering authority, in the format requested.
A6	Risk management The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO 31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, prior to the commencement of mining activities.
A7	Notification of emergencies, incidents and exceptions The holder of this environmental authority must notify the administering authority by written notification within twenty four hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority.

A8	Within ten business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: 1. results and interpretation of any samples taken and analysed 2. outcomes of actions taken at the time to prevent or minimise unlawful environmental harm 3. proposed actions to prevent a recurrence of the emergency or incident.
A9	Complaints The holder of this environmental authority must record all environmental complaints received about the mining activities including: 1. name, address and contact number of the complainant 2. time and date of complaint 3. reasons for the complaint 4. investigations undertaken 5. conclusions formed 6. actions taken to resolve the complaint 7. any abatement measures implemented 8. person responsible for resolving the complaint.
A10	The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within ten business days of completion of the investigation, or no later than ten business days after the end of the timeframe nominated by the administering authority to undertake the investigation.
A11	Third-party reporting The holder of this environmental authority must: 1. within one year of the commencement of this authority, obtain from a suitably qualified and experienced third party a report on compliance with the conditions of this environmental authority 2. obtain further such reports at regular intervals not exceeding three years from the completion of the report referred to above 3. provide each report to the administering authority within ninety days of its completion.
A12	Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority the holder of this environmental authority must: 1. comply with the amended or changed standard, policy or guideline within two years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures referred to in Condition J26 the time specified in that condition 2. until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

Schedule B: Air

Condition number	Condition
B1	Dust nuisance

	The holder of this environmental authority must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place: 1. Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with the most recent version of <i>Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter – Gravimetric method</i> 2. A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of either: a) <i>Australian Standard AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet – Gravimetric method</i>, or b) <i>Australian Standard AS3580.9.9 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 low volume sampler—Gravimetric method</i>. 3. A concentration of particulate matter with an aerodynamic diameter of less than 2.5 micrometres (PM_{2.5}) suspended in the atmosphere of 25 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with the most recent version of <i>AS/NZS3580.9.10 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM (sub) 2.5/(sub) low volume sampler—Gravimetric method</i> 4. A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of <i>AS/NZS3580.9.3:2003 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method</i>.
B2	When requested by the administering authority or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer), dust and particulate monitoring (including dust deposition, total suspended particles (TSP), PM₁₀ and PM_{2.5}) must be undertaken, and the results thereof notified to the administering authority within fourteen days following completion of monitoring. This includes providing interim reports if the monitoring lasts for more than one month. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place. Monitoring must be conducted in accordance with the appropriate standards.
B3	If the monitoring which is carried out in accordance with Condition B2 indicates an exceedance of the relevant limits in Condition B1, then the holder of this environmental authority must investigate whether the exceedance is due to emissions from the activity. If the mining activity is found to be the cause of the exceedance then the holder of this environmental authority must: 1. address the complaint including the use of appropriate dispute resolution if required; and 2. immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.
B4	The holder of this environmental authority must notify the administering authority within seven days of an exceedance of the relevant limits in Condition B1.
B5	Dust Management Plan

	A Dust Management Plan must be developed and implemented by an appropriately qualified person prior to the commencement of mining activities. The Dust Management Plan must be submitted to the administering authority at least three months prior to mining.
B6	The Dust Management Plan required by Condition B5 must include: 1. a preventative management system for dust control 2. a Trigger Action Response Program 3. site background (contextual information) 4. proposed works and potential impacts & impact analysis 5. site risk assessment 6. design of an internal operational monitoring program including objectives, separate from 7. any compliance monitoring or limits/levels required by Condition B2 8. performance criteria and monitoring methods 9. number and location of monitoring sites 10. quality assurance/quality control (QA/QC) requirements 11. stakeholder consultation 12. roles and responsibilities; 13. reporting.
B7	The holder of this environmental authority must monitor air quality for the activity, which must include, but not be limited to: 1. continuous monitoring of PM₁₀ at one location and dust deposition at four locations (representative of the worst affected receptors) during the operation of the activity 2. meteorological monitoring (including at least temperature, wind speed and direction) at a single location representative of the approved place 3. the monitoring locations must comply with the Australian Standard AS/NZS 3580.1.1:2016 "<i>Methods for siting and analysis of ambient air. Part 1.1: Guide to siting air monitoring equipment</i>" 4. regular reporting of the measured dust deposition rates and PM₁₀ concentrations to a publicly available web site 5. investigation of all measured exceedances to determine the influence of emissions from the mining site 6. should an alternative sampling method (other than as discussed in Condition B1) is required; the holder of this environmental authority may seek approval from administering authority to exclude this requirement. In seeking such exclusion, the reasons for the exclusion must be provided and be fully justified.
B8	To ensure that the air quality monitoring program remains effective and well-targeted through the life of the project, the monitoring locations must be reviewed periodically. The periodic review should consider: 1. the frequency and cause of any exceedances of air quality objectives measured by the monitoring program over period of at least two years 2. dust complaints 3. future progression of the mining activities 4. locations of sensitive receptors relative to the mining activities 5. mining activity modes.

Schedule C: Waste management

Condition number	Condition
C1	Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.
C2	The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.
C3	Tailings Management Plan A Tailings Management Plan must be developed by a suitably qualified and experienced person and implemented prior to the commencement of mining activities.
C4	All tailings must be managed in accordance with procedures contained within the Tailings Management Plan. This plan must include details of: 1. the containment of tailings 2. the management of seepage and leachates both during operation and the foreseeable future 3. the control of fugitive emissions to air 4. a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings 5. maintaining records of the relative locations of any other waste stored within the tailings 6. monitoring to verify methods for tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover are effective.
C5	The holder of this environmental authority must treat and manage acid sulphate soils in accordance with the latest edition of the <i>Queensland Acid Sulfate Soil Technical Manual</i> .
C6	Waste Rock, Spoil and Coal Reject Management Plan A Waste Rock, Spoil and Coal Reject Management Plan must be developed by a suitably qualified and experienced person and implemented prior to the commencement of mining activities.
C7	The Waste Rock, Spoil and Coal Reject Management Plan required by Condition C6 must include at least: 1. effective characterisation of the waste rock, spoil and coal rejects to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances 2. a program of progressive sampling and characterisation to identify dispersive and non-dispersive spoil and the salinity, acid and alkali producing potential and metal concentrations of waste rock 3. a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock, and coal rejects will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage or contaminated leachate 4. where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming waste rock and coal rejects

	5. how often the performance of the plan will be assessed 6. the indicators or other criteria on which the performance of the plan will be assessed.
C8	Waste Management Plan A Waste Management Plan, in accordance with the <i>Waste Reduction and Recycling Act 2011</i>, must be developed and implemented and must include a description on: 1. a program for safe recycling or disposal of all wastes;- reusing and recycling where possible 2. how the project will recognise and apply the waste and resource management hierarchy 3. waste streams from the project 4. the waste management control strategies must consider: a) the type of wastes b) segregation of the wastes c) storage of the wastes d) transport of the wastes e) monitoring and reporting matters concerning the waste f) emergency response planning g) disposal, reused and recycling options 5. hazardous characteristics of the waste generated (if any) 6. disposal procedure for hazardous wastes 7. the process to be implemented to allow for continuous improvement of the waste management systems 8. responsible staff (positions) for implementing, managing and reporting the Waste Management Plan and 9. staff awareness and induction program that encourages re-use and recycling.
C9	Regulated waste records must be kept for five years, and must include the following information: 1. date of pickup of waste 2. description of waste 3. cross reference to relevant waste transport documentation 4. quantity of waste 5. origin of the waste 6. destination of the waste; and 7. intended fate of the waste, for example, type of waste treatment, reprocessing or disposal. Note: Records of documents maintained in compliance with a waste tracking system established under the <i>Environmental Protection Act 1994</i> or any other law for regulated waste will be deemed to satisfy this condition.
C10	Records of trade and regulated wastes or material leaving the mining lease for recycling or disposal, including the final destination and method of treatment, must be in accordance with the <i>Waste Reduction and Recycling Act 2011</i>.
C11	All regulated waste removed from the site must be transported by a person who holds a current authority to transport such waste under the provisions of the <i>Environmental Protection Act 1994</i>.

C12	Except as otherwise provided by the conditions of this authority, all waste removed from the site must be taken to a facility that is lawfully allowed to accept such waste under the provisions of the <i>Environmental Protection Act 1994</i> .
C13	Storage of tyres Tyres stored awaiting disposal or transport for take-back and, recycling, must be stockpiled in volumes less than 3m in height and 200 square metres in area and at least 10m from any other tyre storage area.
C14	All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.

Schedule D: Noise

Condition number	Condition
D1	Noise resulting from the mining activities must not cause an environmental nuisance at any sensitive or commercial place.
D2	When requested by the administering authority, or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) noise monitoring must be undertaken and the results must be notified within fourteen days to the administering authority following completion of monitoring. Monitoring must be carried out at a place or places relevant to the potentially affected noise sensitive place as agreed upon with the administering authority.
D3	All noise monitoring which is conducted as per Condition D2 must be completed in accordance with the following noise monitoring requirements: 1. all noise monitoring must be conducted in accordance with the administering authority's most recent version of the <i>Noise Measurement Manual</i> 2. source noise levels must be expressed as component noise levels for the purposes of comparison with noise limits 3. all noise monitoring devices must be calibrated in accordance with AS IEC 61672.1-2004.
D4	If the administering authority request for noise monitoring is in relation to a complaint and results exceed the limits in Table D1 - Noise limits, then the holder of this environmental authority must: 1. address the complaint including the use of appropriate dispute resolution if required 2. implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.
D5	Low frequency noise Noise emissions from the activity, when including substantial low frequency noise, must not cause an overall sound pressure level at a noise sensitive place exceeding 55 dB(Z). NOTE: "Substantial low frequency noise" means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurements, with a predominant component located within the frequency range 10 to 200 Hz.

Table D1: Noise Limits

Noise level dB(A) measured as:	Noise measured at a nuisance sensitive or commercial place					
	Monday to Saturday			Sunday and Public Holidays		
	7am – 6pm	6pm – 10pm	10pm – 7am	9am – 6pm	6pm – 10pm	10pm – 9am
L_{Aeq} adj, 15 mins	35	35	35	35	35	35
LA1 adj, 15 mins	40	40	40	40	40	40

Notes:

1. “**L_{Aeq} adj, 15 mins**” means the equivalent continuous A-weighted sound pressure level, adjusted for noise character, measured in the presence of the noise under investigation over a time period of fifteen minutes, using Fast response.
2. “**LA1 adj, 15 mins**” means the A-weighted sound pressure level, adjusted for noise character, measured in the presence of the noise under investigation and exceeded for one per cent of the time period of fifteen minutes, using Fast response.

D6	The holder of this environmental authority must develop and implement a blast monitoring program to monitor compliance with Table D2 – Blasting noise limits for: 1. at least 50% of all blasts undertaken on this site in each month at the nearest sensitive place; and 2. all blasts conducted during any time period specified by the administering authority at the nearest and most affected sensitive place(s) or commercial place(s) or another such place to investigate an allegation of environmental nuisance caused by blasting.
D7	The holder of this environmental authority must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in Table D2: Blasting noise limits to be exceeded at a sensitive place or commercial place.

Table D2: Blasting Noise Limits

Blasting noise limits	Sensitive or commercial place blasting noise limits	
	7am to 6pm	6pm to 7am
Airblast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time	No blasting is allowed during these times
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	No blasting is allowed during these times

Schedule E: Groundwater

Condition number	Condition
E1	The holder of this environmental authority must not release contaminants to groundwater.
E2	Groundwater monitoring and analysis must be performed by an appropriately qualified person.
E3	The holder of this environmental authority must develop and implement a groundwater monitoring program for at least twelve months prior to the commencement of relevant mining activities, unless otherwise agreed in writing with the administering authority in writing.
E4	The groundwater monitoring program must: 1. identify potential sources of contamination to groundwater from the activity 2. ensure that all potential groundwater impacts due to the activity are identified, monitored and mitigated 3. document sampling and monitoring methodology 4. ensure that adequate groundwater monitoring and data analysis is undertaken to achieve the following objectives: a) detect any impacts to groundwater levels due to the activity b) detect any impacts to groundwater quality due to the activity c) determine trends in groundwater quality 5. include an appropriate quality assurance and quality control program 6. include a conceptual groundwater model 7. include a review process improve the program.
E5	Groundwater quality Groundwater quality must be monitored at the locations and frequencies defined in Table E1 – Groundwater monitoring locations and frequency and shown in Figure 2- Groundwater Bore Monitoring Locations (to be provided by proponent), for quality characteristics identified in Table E2 – Groundwater Quality Limits.
E6	Bores referred to in Table E1 - Groundwater Monitoring Locations and Frequency must be installed and monitored for at least twelve months prior to the commencement of relevant mining activities, unless otherwise agreed in writing with the administering authority.
E7	Groundwater quality measured at monitoring bores identified in Table E1 - Groundwater monitoring locations and frequency must not exceed: 1. <u>Limit A</u> for each quality characteristic specified in Table E2 - Groundwater quality limits on any five consecutive sampling occasions. 2. <u>Limit B</u> for each quality characteristic specified in Table E2 - Groundwater quality limits on any three consecutive sampling occasions. If groundwater quality measured at any monitoring bore exceeds the corresponding limit A and/or limit B specified in Table E2 - Groundwater quality limits on any single sampling occasion, the environmental authority holder must resample the underground water within the monitoring bore for the parameter exceeded, within ten business days of receipt of the results. Whether the results of the resampling event exceeds for the same parameter or not, a further resample is not required for that sampling occasion

E8	In the event that groundwater quality exceedance results are confirmed by resampling, as specified in Condition E7, the holder of this environmental authority must: 1. notify the administering authority via WaTERS within fourteen days of receiving the resampling result 2. within three months of receiving the result, complete, and submit via WaTERS, an investigation undertaken by a suitably qualified person outlining a) details of the investigations carried out b) whether the result is directly associated with mining activities, and, if so c) whether environmental harm has occurred d) any action required to mitigate environmental harm.
E9	Groundwater levels Groundwater levels when measured at the monitoring locations and frequency specified in Table E3 - Groundwater Level Monitoring must not exceed the groundwater level trigger change thresholds specified in Table E3 - Groundwater Level Monitoring, unless otherwise agreed in writing with the administering authority.
E10	In the event that groundwater fluctuations in excess of groundwater level trigger change thresholds specified in Table E3 - Groundwater Level are detected, the holder of this environmental authority must 1. notify the administering authority via WaTERS within twenty four hours 2. undertake an investigation within fourteen days of detection to determine the cause of fluctuations.
E11	In the event that groundwater fluctuations are deemed to have been influenced by mining activities the holder of this environmental authority must meet the notification requirement of Condition A13 of this environmental authority.
E12	The exceedance investigation under Condition E10 must be completed and submitted to the administering authority via WaTERS within three months of notifying the administering authority.
E13	The baseline datasets, as referred to in Schedule E of this environmental authority, are to consist of at least eight values collected over a minimum of at least twelve months prior to commencement of mining activities.
E14	Results of groundwater quality and level monitoring must be submitted to the administering authority via WaTERS by 1 August each calendar year.
E15	The groundwater monitoring program must be reviewed on an annual basis by an appropriately qualified person to determine if it continues to meet the requirements stated in Condition E4.
E16	The construction, maintenance, management and decommissioning of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate and reliable data collection.
E17	Where the removal of a bore will result as a direct result of the mining activity, the impact on the monitoring program must be evaluated and a replacement bore constructed prior to its removal, for continuity and to ensure that groundwater monitoring continues to meet the requirements in Condition E4

E18	Groundwater Dependent Ecosystems and Wetland Monitoring Program The proponent must develop and implement a Groundwater Dependent Ecosystems and Wetland Monitoring Program (GDEWMP) to detail the management of threats to defined environmental values and to report results and corrective actions for each GDE and wetland over the full period of mining activities and for a period of five years post mining rehabilitation.
E19	The GDEWMP must be submitted to the administering authority at least three months prior to the commencement of mining activities.
E20	The GDEWMP must include detailed information of: 1. the nature and ecological values of each affected GDE and wetland 2. the nature and ecological values of GDEs and wetlands of comparable reference sites that are not affected by project activities or the drawdown from groundwater 3. a field validation survey and baseline description of the current condition of affected GDEs and wetlands as well as reference sites, including wet and dry conditions, to record pre-impact ecosystem health 4. a map and coordinates of the location of the GDEs and wetlands subject to the monitoring program, including justification for the selected locations 5. sampling and reporting frequency 6. sampling, analysis and quality assurance methodologies for detecting impacts associated with the project including information on how cumulative impacts will be managed and monitored 7. indicators that would be monitored to assess the health and integrity of the wetlands and GDEs being monitored and that can show the success of proposed mitigation measures 8. impact thresholds and triggers for groundwater quality and ecological values of GDEs and wetlands that are able to provide an indication of potential and actual impacts within a relevant timescale 9. corrective actions and timing to address impacts associated with mining activities, including cumulative impacts. Notes: 'Reference sites' means sites that must: (a) have a similar hydrology regime (b) be from the same bio-geographic region (c) have similar biodiversity, soil types and topography (d) not be so close to the affected sites that any disturbance to monitoring sites also results in a change at the reference site.
E21	A report of the findings of the GDEWMP, including all monitoring results and interpretations, must be prepared annually and made available on request to the administering authority. The report must include: 1. an assessment of background reference groundwater levels (see Condition E14) 2. the condition of each GDE and wetland compared with previous monitoring results; 3. any exceedances of impact thresholds and triggers for groundwater quality and ecological values 4. the suitability of current groundwater trigger thresholds (as defined in Condition E9) 5. detail on the effectiveness of avoidance, mitigation and management actions in curtailing adverse impacts on GDE ecosystems 6. a description of any adaptive management initiatives implemented 7. any offsets required for residual impacts.

Table E1
Groundwater Monitoring Locations and Frequency

Monitoring point ¹	Location		Surface RL (m AHD) ²	Monitoring frequency	Screen depth (m)	Target aquifer
	Easting [#]	Northing [#]				
GW22	640193*	7547639*	182.00	Q	TBA	TBA
GW23	646895*	7537007*	169.09	D/Q	TBA	TBA
GW24	648450*	7533805*	166.00	D/Q	TBA	TBA
GW25	640345*	7540008*	185.97	D/Q	TBA	TBA
GW26	639307*	7538727*	192.71	D/Q	TBA	TBA
GW27	639465*	7535303*	178.00	D/Q	TBA	TBA
GW28	642729*	7533536*	172.01	D/Q	TBA	TBA
GW29	661474*	7529571*	TBA	TBA	TBA	TBA
GW31	656306*	7524283*	TBA	TBA	TBA	TBA
GW32	656588*	7528729*	TBA	TBA	TBA	TBA
RN158484	648152	7524058	160.00	D/Q	TBA	TBA
GW01s	642481	7547491	180.65	D/Q	TBA	TBA
GW02s	641152	7546517	179.11	D/Q	TBA	TBA
GW02d	641141	7546507	179.11	D/Q	TBA	TBA
GW04	643388	7544973	178.23	D/Q	TBA	TBA
GW06s	639329	7542005	191.77	D/Q	TBA	TBA
GW08s	645312	7539839	172.27	D/Q	TBA	TBA
GW12s	641504	7532788	175.84	D/Q	TBA	TBA
S11	642455	7545332	178.45	D/Q	TBA	TBA
S8	642340	7546343	177.84	D/Q	TBA	TBA
S4	641567	7546845	178.85	D/Q	TBA	TBA
S5	642239	7547332	179.26	D/Q	TBA	TBA
S2	641386	7547617	176.97	D/Q	TBA	TBA
GW01d (VWP1, VWP2, VWP3, VWP4)	642479	7547491	181.58	D	TBA	TBA
GW06d (VWP1, VWP2, VWP3, VWP4)	639334	7542008	192.86	D	TBA	TBA
GW08d (VWP1, VWP2, VWP3, VWP4)	645312	7539846	172.18	D	TBA	TBA
GW12d (VWP1, VWP2, VWP3, VWP4)	641495	7532795	176.89	D	TBA	TBA

Monitoring point ¹	Location		Surface RL (m AHD) ²	Monitoring frequency	Screen depth (m)	Target aquifer
	Easting [#]	Northing [#]				
GW21s	661590	7521656	162.07	D/Q	TBA	TBA
GW21d	661585	7521655	162.09	D/Q	TBA	TBA

Notes:

Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

* Approximate location only, to be confirmed and the environmental authority updated prior to commencement of mining activities. Bores must have guaranteed access. Alternative bores must be selected/constructed..

¹ Additional bores not included within Table E1 must be provided and the environmental authority updated within **two years** of granting this environmental authority, unless otherwise agreed in writing with the administering authority.

² RL must be measured to the nearest 5 cm from the top of the bore casing.

D = Daily monitoring frequency using automatic logger.

Q = Quarterly monitoring frequency (i.e. dipped and sampled).

D/Q = Daily monitoring frequency using automatic logger and manually dipped and sampled on a quarterly basis.

Table E2
Groundwater Quality Limits

Monito ring Bore	pH (ph units)		EC (µS/ cm)		Alumini um (mg/L)		Arsenic (mg/L)		Boron (mg/L)		Cadmiu m (mg/L)		Chromiu m (mg/L)		Copper (mg/L)		Mercury (mg/L)		Lead (mg/L)		Molybde num (mg/L)		Nickel (mg/L)		Seleniu m (mg/L)		Uranium (mg/L)		Zinc (mg/L)	
	20 ^{t_h} - 80 ^{t_h} %ile	5 th - 95 ^{t_h} %ile	80 th %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile	80 ^{t_h} %ile	95 ^{t_h} %ile		
	Li mi t A	Li mi t B	Lim it A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B	Li mi t A	Li mi t B
GW22																														
GW23																														
GW24																														
GW25																														
GW26																														
GW27																														
GW28																														
RN15 8484																														
GW01 s																														
GW02 s																														
GW02 d																														
GW04																														
GW06 s																														
GW08 s																														
GW12 s																														
S11																														
S8																														
S4																														
S5																														
S2																														
GW21 s																														
GW21 d																														

Monitoring Bore	pH (ph units)		EC (µS/cm)		Aluminium (mg/L)		Arsenic (mg/L)		Boron (mg/L)		Cadmium (mg/L)		Chromium (mg/L)		Copper (mg/L)		Mercury (mg/L)		Lead (mg/L)		Molybdenum (mg/L)		Nickel (mg/L)		Selenium (mg/L)		Uranium (mg/L)		Zinc (mg/L)	
	20 th - 80 th %ile	5 th - 95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile	80 th %ile	95 th %ile
	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B	Limit A	Limit B
GW01 d (VWP 1, VWP2, VWP3, VWP4)																														
GW06 d (VWP 1, VWP2, VWP3, VWP4)																														
GW12 d (VWP 1, VWP2, VWP3, VWP4)																														

Notes:

1. Limits need to be developed for each bore (or group of bores where relevant) two years from the date of granting of the environmental authority.

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2. Until sufficient baseline data is available, Fitzroy Plan Water Quality Objectives for Zone 34 (deep and shallow groundwater – 80th percentile values) will be used temporarily as trigger values where available (Department of Environment and Heritage Protection, 2011. *Isaac River Sub-basin Environmental Values and Water Quality Objectives Basin No. 130 (part), including all waters of the Isaac River Sub-basin (including Connors River)*)]
 3. Percentiles are to be derived according to approaches described in Department of Science, Information Technology and Innovation (2017) *Using monitoring data to assess groundwater quality and potential environmental impacts*. Version 1.
 4. All metals and metalloids must be measured as total (unfiltered) and dissolved (<0.45 µm filtered).
 5. Monitoring must also include all major ions for interpretative purposes.

Table E3
Groundwater Level Monitoring

Monitoring points	Location		Level trigger threshold ^{&}
	Easting [#]	Northing [#]	
GW22	640193*	7547639*	> 2 metres per year beyond baseline data ranges
GW23	646895*	7537007*	> 2 metres per year beyond baseline data ranges
GW24	648450*	7533805*	> 2 metres per year beyond baseline data ranges
GW26	639307*	7538727*	> 2 metres per year beyond baseline data ranges
GW27	639465*	7535303*	> 2 metres per year beyond baseline data ranges
GW29	661474*	7529571*	> 2 metres per year beyond baseline data ranges
GW31	656306*	7524283*	> 2 metres per year beyond baseline data ranges
GW32	656588*	7528729*	> 2 metres per year beyond baseline data ranges
GW01s	642481	7547491	> 2 metres per year beyond baseline data ranges
GW21s	661590	7521656	> 2 metres per year beyond baseline data ranges
GW21d	661585	7521655	> 2 metres per year beyond baseline data ranges
GW01d (VWP1, VWP2, VWP3, VWP4)	642479	7547491	> 2 metres per year beyond baseline data ranges
GW06d (VWP1, VWP2, VWP3, VWP4)	639334	7542008	> 2 metres per year beyond baseline data ranges
GW12d (VWP1, VWP2, VWP3, VWP4)	641495	7532795	> 2 metres per year beyond baseline data ranges

Notes:

Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

& Site specific trigger levels must be established once twelve to twenty four months of data has been collected from the site monitoring network.

* Approximate location only, to be confirmed and the environmental authority updated prior to the commencement of mining activities. Bores must have guaranteed access. Alternative bores must be selected/constructed.

Schedule F: Water

Condition number	Condition
F1	Contaminant release

	Contaminants must not be released directly or indirectly to any waters as a result of the mining activities, except as permitted under the conditions of this environmental authority.
F2	The release of mine affected water to waters must only occur from the release points specified in Table F1: Mine affected water release points, sources and receiving waters. The holder of this environmental authority must advise the administering authority of the location mine affected water release points, sources and receiving waters at least twelve months prior to the commencement of releasing mine affected water from locations other than those listed in Table F1: Mine affected water release points, sources and receiving waters.

Table F1
Mine Affected Water Release Points, Sources and Receiving Waters

Release point	Easting [#]	Northing [#]	Mine affected water source and location	Monitoring point	Receiving waters description
RP1	TBA	TBA	TBA	TBA	TBA
RP2	TBA	TBA	TBA	TBA	TBA
RP3	TBA	TBA	TBA	TBA	TBA
RP4 etc	TBA	TBA	TBA	TBA	TBA

Notes:

[#] Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

F3	The release of mine affected water to waters in accordance with Condition F2 must not exceed the release limits stated in Table F2: Mine affected water release limits when measured at the monitoring points specified in Table F1: Mine affected water release points, sources and receiving waters for each quality characteristic.
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**Table F2
Mine Affected Water Release Limits**

Quality characteristic	Release limits ¹	Monitoring frequency
Electrical conductivity (µS/cm)	Release limits specified in Table F4: Mine Affected Water Release during Flow Events during flow events for variable flow criteria.	Continuous (minimum hourly average); or daily manual sample when continuous monitoring systems are not available.
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within two hours of commencement of release).
Turbidity (NTU)	300 NTU or unless the upstream turbidity is higher ¹ .	Daily during release (first sample within two hours of commencement of release).
Sulfate (mg/L) ²	1,000	Daily during release (first sample within two hours of commencement of release).

Notes:

- For releases of mine affected water with turbidity levels above 300NTU the upstream turbidity must be monitored on a minimum frequency of daily to provide sufficient compliance evidence.
- The sulfate release limit is aligned with the ANZECC livestock drinking water limit until such time as the mine affected water quality on site has been characterised and appropriate variable flow criteria can be derived to achieve the downstream target level of 545mg/L (maximum) (for 95% species protection (source: Dunlop, J., Hobbs, D., Mann, R., Nanjappa, V., Smith, R., Vardy, S., and Vink, S. (2016). Considering background ionic proportions in the development of sulfate guidelines for the Fitzroy River basin. Australasian Bulletin of Ecotoxicology and Environmental Chemistry. Volume 3, Pages 1-10. <https://australasia.setac.org/wp-content/uploads/ABEEC-v3-p1.pdf>).

F4	The release of mine affected water to waters from the release points must be monitored at the locations specified in Table F1: Mine affected water release points, sources and receiving waters for each quality characteristics and at the frequency specified in Table F2: Mine affected water release limits and Table F3: Release contaminant trigger investigation levels. Note: The administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response, in the event Condition F4 is contravened due to a temporary lack of safe or practical access. The administering authority expects the holder of this environmental authority to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.
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**Table F3
Release Contaminant Trigger Investigation Levels, Potential Contaminants**

Quality characteristic ^{1,2}	Trigger levels (µg/L)	Comment on trigger level ^{3,4}	Monitoring frequency
Aluminium	55	For aquatic ecosystem protection, based on SMD ³ guideline	Commencement of release and thereafter weekly during release.
Arsenic (total)	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium (total)	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	1	For aquatic ecosystem protection, based on SMD guideline	
Copper	1.2	For aquatic ecosystem protection, based on LOR ⁴ for ICPMS	
Iron	700	For aquatic ecosystem protection, based on low reliability guideline	
Lead	4	For aquatic ecosystem protection, based on SMD guideline	
Mercury	0.2	For aquatic ecosystem protection, based on LOR for ICPMS	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	8	For aquatic ecosystem protection, based on SMD guideline	
Boron	830	For aquatic ecosystem protection, based on SMD guideline	
Cobalt	90	For aquatic ecosystem protection, based on low reliability guideline	
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline	
Molybdenum	34	For aquatic ecosystem protection, based on low reliability guideline	
Selenium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Silver	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Uranium	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Vanadium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Ammonia ⁵	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Petroleum Hydrocarbon (C ₆ – C ₉)	20	For aquatic ecosystem protection, based on LOR for GCMS ⁵	
Petroleum Hydrocarbon (C ₁₀ – C ₃₆)	100	For aquatic ecosystem protection, based on LOR for GCMS	

Quality characteristic ^{1,2}	Trigger levels (µg/L)	Comment on trigger level ^{3,4}	Monitoring frequency
Fluoride (total)	2000	Protection of livestock and short-term irrigation guideline	

Notes:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (<0.45 µm filtered). Contaminant limits for metals and metalloids are only considered to be exceeded if the results for dissolved metal or metalloid exceed the trigger level.
2. The quality characteristics required to be monitored as per **Table F3 - Release Contaminant Trigger Investigation Levels, Potential Contaminants** can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from **Table F3 - Release contaminant trigger investigation levels, potential contaminants** by amendment.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR (limit of reporting) – typical reporting for method stated. ICPMS/CV FIMS/Gas Chromatography Mass Spectrometry – analytical method required to achieve LOR.
5. The environmental authority must be updated to include the new ANZECC & ARMCANZ toxicant guidelines for copper and ammonia when these are published.

F5	If quality characteristics of the release exceed any of the trigger levels specified in Table F3: Release contaminant trigger investigation levels, the holder of this environmental authority must compare the downstream results in the receiving waters to the trigger values specified in Table F3: Release contaminant trigger investigation levels and: 1) where the trigger values are not exceeded then no action is to be taken; or 2) where the downstream results exceed the trigger values specified Table F3: Release contaminant trigger investigation levels for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and a) if the result is less than the background monitoring site data, then no action is to be taken; b) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining: i) details of the investigations carried out; ii) actions taken to prevent environmental harm. Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with Condition F5 (2)(b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.
F6	If an exceedance in accordance with Condition F5 (2)(b) is identified, the holder of this environmental authority must notify the administering authority via WaTERS within fourteen days of receiving the result.
F7	Mine affected water release events The holder of this environmental authority must ensure stream flow is determined at the locations specified in specified in Table F4: Mine affected water release during flow events prior to and during releases.
F8	The release of mine affected water to waters in accordance with Condition F2 must only take place during periods of natural flow events in accordance with the receiving water flow criteria for discharge specified in Table F4: Mine affected water release during flow events for the release point(s) specified in Table F1: Mine affected water release points, sources and receiving waters.
F9	The release of mine affected water to waters in accordance with Condition F2 must not exceed the electrical conductivity, sulfate release limits or the maximum release rate (for all combined release point flows) for each receiving water flow criteria for discharge specified in Table F4: Mine affected water release during flow events when measured at the monitoring points specified in Table F1: Mine affected water release points, sources and receiving waters.

Table F4
Mine Affected Water Release during Flow Events

Receiving water	Release points (RP) ¹	Gauging station	Gauging station easting [#]	Gauging station northing [#]	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m ³ /s)	Maximum release rate (for all combined RP flows)	Electrical conductivity release limits ²
Isaac River	RP1 RP2	130410A Isaac River at Deverill ³	639282 ³	7548368 ³	Continuous (minimum daily)	Medium Flow after natural flow events that exceed 4 m ³ /s	0.5 m ³ /s	1,000 µS/cm SO ₄ ²⁻ mg/L TBD ²
						Medium Flow after natural flow events that exceed 10 m ³ /s	1.0 m ³ /s	1,200 µS/cm SO ₄ ²⁻ mg/L TBD ²
						High Flow after natural flow events that exceed 50 m ³ /s	2.0 m ³ /s	4,000 µS/cm SO ₄ ²⁻ mg/L TBD ²
						High Flow after natural flow events that exceed 100 m ³ /s	3.0 m ³ /s	6,000 µS/cm SO ₄ ²⁻ mg/L TBD ²
						Very High Flow after natural flow events that exceed 300 m ³ /s	5.0 m ³ /s	10,000 µS/cm SO ₄ ²⁻ mg/L TBD ²

Notes:

Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

1. Release points for mine affected water locations P33, P46 and WROM must be included in **Table F4 Mine Affected Water Release during Flow Events** at least **twelve months** prior to release from those locations.
2. Limit to be submitted to the administering authority for approval and inclusion in the environmental authority at least **three months** prior to the commencement of releasing mine affected water from locations listed in **Table F1** Mine affected water release points, sources and receiving waters, based on achieving downstream target level of 770 mg/L (maximum) (for 95% species protection (source: Dunlop, J. Hobbs, D. Mann, R. Nanjappa, V., Smith, R. Vardy, S. and Vink S. (2011), *ACARP Report C18033 Development of Ecosystem Protection Trigger Values for Sodium Sulfate in Seasonally Flowing Streams of the Fitzroy River Basin.*)
3. In the event that the data from the 130410A Isaac River at Deverill is not available the holder of this environmental authority must ensure stream flow gauging station(s) is installed, operated and maintained to determine and record stream flows prior to and during releases.

F10	The daily quantity of mine affected water released from each release point must be measured and recorded.
F11	All continuous environmental monitoring systems required by this environmental authority must have an instrument availability of at least 80% except for the continuous monitoring of release points specified in Table F1: Mine affected water release points, sources and receiving waters which must have an instrument availability of at least 90%.
F12	Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.
F13	Notification of release event The holder of this environmental authority must notify the administering authority as soon as practicable and no later than twenty four hours, via WaTERS, after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information: 1. release commencement date/time 2. expected release cessation date/time 3. release point(s) 4. release volume (estimated) 5. receiving water(s) including the natural flow rate 6. any details (including available data) regarding likely impacts on the receiving water(s).
F14	The holder of this environmental authority must notify the administering authority, via WaTERS, as soon as practicable (and within twenty four hours) after cessation of a release notified under Condition F13. The cessation notification must include the following information: 1. release cessation date/time 2. release points 3. release rates 4. water quality of release 5. total volume of water released 6. natural flow rate in the receiving water 7. details regarding the compliance of the release with the conditions of this environmental authority. Note: Successive or intermittent releases occurring within twenty four hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with Conditions F13, F14 and F15, provided the relevant details of the release are included within the notification provided in accordance with Conditions F13, F14 and F15.
F15	The holder of this environmental authority must within twenty eight days after cessation of a release event notified under Condition F13 provide a report and supporting raw data to the administering authority via WaTERS, which must include the following information: 1. all continuous and in-situ water quality monitoring results (including laboratory analyses) 2. any further matters pertinent to the water release event.

F16	Notification of release event exceedance If the release limits defined in Table F2: Mine affected water release limits when measured at the monitoring points' are exceeded, the holder of this environmental authority must notify the administering authority, via WaTERS, within twenty four hours of receiving the results.
F17	The holder of this environmental authority must, within twenty eight days of a release that exceeds the conditions of this authority, provide a report to the administering authority, via WaTERS, detailing: 1. the reason for the release 2. the location of the release 3. all water quality monitoring results 4. any general observations 5. all calculations 6. any other matters pertinent to the water release event.
F18	Receiving environment monitoring and contaminant trigger levels The quality of the receiving waters must be monitored at the locations specified in Table F6 - Receiving Water Upstream Background Sites and Downstream Monitoring Points for each quality characteristic and at the monitoring frequency stated in Table F5 - Receiving Waters Contaminant Trigger Levels.

Table F5
Receiving Waters Contaminant Trigger Levels

Quality characteristic	Trigger level	Monitoring frequency
Electrical Conductivity ($\mu\text{S}/\text{cm}$)	2,000	Continuous (minimum hourly average); or daily manual sample when continuous monitoring systems are not available
Total Suspended Solids (mg/L)	TBA ¹	Daily manual sample during the release
Turbidity	TBA ¹	
Sulfate (SO_4^{2-}) (mg/L)	545 ²	

Notes:

1. Limit to be submitted to the administering authority for approval and inclusion in the environmental authority at least **three months** prior to the commencement of releasing mine affected water from locations listed in **Table F1: Mine affected water release points, sources and receiving waters**.
2. Dunlop, J., Hobbs, D., Mann, R., Nanjappa, V., Smith, R., Vardy, S., and Vink, S. (2016). Considering background ionic proportions in the development of sulfate guidelines for the Fitzroy River basin. *Australasian Bulletin of Ecotoxicology and Environmental Chemistry*. Volume 3, Pages 1-10.

Table F6
Receiving Water Upstream Background Sites and Downstream Monitoring Points

Monitoring points ¹	Receiving waters location description	Easting #	Northing [#]
Upstream background monitoring points			
Monitoring point at Gauge No. 130410A 'Deverill', Isaac River	Isaac River - upstream of RP1 and RP2.	642393	7547244
TBA ² alternative upstream monitoring point when there is no access to 130410A gauging station	Isaac River - upstream of RP1 and RP2.	TBA ²	TBA ²
Downstream monitoring points			
TBA ²	Isaac River - downstream of RP1 and RP2, upstream of Boomerang Creek confluence.	TBA	TBA
TBA ²	Isaac River upstream of Phillips Creek confluence.	TBA ²	TBA ²
TBA ²	Isaac River at Fitzroy Development Road	TBA ²	TBA ²

Notes:

Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

1. Receiving water upstream background sites and downstream monitoring points, for release points for mine affected water locations P33, P46 and WROM, will be included in **Table F6 Receiving Water Upstream Background Sites and Downstream Monitoring Points at least twelve months** prior to release from those locations.
2. Monitoring locations must be determined and added to **Table F6: Receiving Water Upstream Background Sites and Downstream Monitoring Points** and must be provided to the administering authority **at least twelve months** prior to the commencement of releasing mine affected water from locations listed in **Table F1: Mine affected water release points, sources and receiving waters**.

F19	If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table F5 - Receiving Waters Contaminant Trigger Levels during a release event the holder of this environmental authority must compare the downstream results to the upstream results in the receiving waters and: 1. where the downstream result is the same or a lower value than the upstream value for the quality characteristic, then no action is to be taken; or 2. where the downstream results exceed the upstream results, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining: a) details of the investigations carried out; and b) actions taken to prevent environmental harm. Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with Condition F19(2), no further reporting is required for subsequent trigger events for that quality characteristic.
F20	All determinations of water quality monitoring must be: 1. performed by suitably experienced and qualified person 2. made in accordance with the methods prescribed in the latest edition of the administering authority's Water Quality Sampling Manual 3. laboratory testing must be undertaken using a laboratory accredited for the method of analysis being used.
F21	Receiving environment monitoring program (REMP) The holder of this environmental authority must develop and implement a REMP to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site. For the purposes of the REMP, the receiving environment is the waters of the Isaac River and connected or surrounding waterways within 15 km downstream of the release points. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

F22	The REMP must: 1. assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality) 2. description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy 2009) 3. be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected 4. include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release (as a minimum, the locations specified in Table F6: Receiving Water Upstream Background Sites and Downstream Monitoring Points) 5. specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the Queensland Water Quality Guidelines 2009. This should include monitoring during periods of natural flow irrespective of mine or other discharges 6. include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in Table F2: Mine Affected Water Release Limits and Table F3: Release contaminant trigger investigation levels) 7. include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARM CANZ 2000, BATLEY and/or the most recent version of AS5667.1 Guidance on Sampling of Bottom Sediments) and include a comparison with trigger values determined in accordance with these methods 8. include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology and comparison with the EPP (Water) Fitzroy Basin macroinvertebrate water quality objective triggers (including taxa richness, PET taxa richness, SIGNAL index and % tolerant taxa); 9. apply procedures and/or guidelines from ANZECC and ARM CANZ 2000 and other relevant guideline documents 10. describe sampling and analysis methods and quality assurance and control 11. incorporate stream flow and hydrological information in the interpretations of water quality and biological data.
F23	A REMP Design Document that addresses each criterion presented in Conditions F21 and F22 must be prepared and submitted to the administering authority no later than three months after the date of issue of this environmental authority. Due consideration must be given to any comments made by the administering authority on the REMP Design Document and subsequent implementation of the program.

F24	A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with Conditions F21 and F22, must be prepared annually and submitted to the administering authority by 31 December for the previous year. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values. Where no releases are made from the release points in any given year (1 November to 31 October), a summary report of the findings of the REMP must be prepared and submitted to the administering authority. The summary report must include the following: 1. introduction 2. rainfall data 3. water course flow data 4. water course electrical conductivity.
F25	Water reuse Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the holder of this environmental authority or a third party (with the written consent of the third party).
F26	Annual water monitoring data submission The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority via WaTERS: 1. the date on which the sample was taken 2. the time at which the sample was taken 3. the monitoring point at which the sample was taken 4. the measured or estimated daily quantity of mine affected water released from all release points 5. the release flow rate at the time of sampling for each release point 6. the results of all monitoring and details of any exceedances of the conditions of this environmental authority.
F27	Temporary interference with waterways Destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining activities must be undertaken in accordance with the Department of Natural Resources, Mines and Energy's <i>Riverine protection permit exemptions requirements</i>.
F28	Water Management Plan A Water Management Plan must be developed by an appropriately qualified person and implemented prior to the commencement of mining activities.

F29	The Water Management Plan must: 1. provide for effective water management of actual and potential environmental impacts resulting from water management associated with the mining activities carried out under this environmental authority; and 2. be developed in accordance with the administering authority's most recent version of the guideline for 'Preparation of water management plans for mining activities' (EM324) or any updates that become available from time to time and must include at least the following components: a) study of the source on contaminants b) a water balance model for the site c) a water management system for the site d) measures to manage and prevent saline drainage e) measures to manage and prevent acid rock f) contingency procedures for incidents and emergencies g) a program for monitoring and review of the effectiveness of the water management plan.
F30	A revision of the Water Management Plan must be undertaken by 1 August each calendar year. The revision must: 1. include a statement that the Water Management Plan has been prepared by an appropriately qualified person 2. assess the plan against the requirements under Condition F29 3. include recommended actions to ensure actual and potential environmental impacts are effectively managed 4. provide details and timelines of the actions to be taken 5. identify any amendments made to the Water Management Plan.
F31	A copy of the Water Management Plan must be provided to the administering authority on request.
F32	Stormwater and water sediment controls An Erosion and Sediment Control Plan for mining activities must be developed by an appropriately qualified person and implemented prior to the commencement of mining activities, to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.
F33	The Erosion and Sediment Control (ESC) Plan must: 1. demonstrate how ESC control measures adequately minimise the release of sediment to receiving waters and must include at least the following: a) assessment of all catchment areas b) assessment of soil types, including sodic dispersive soils c) specify design criteria for ESC structures 2. detail the locations and descriptions of all ESC measures 3. provide an audit schedule to ensure ESC controls are being maintained.

F34	A revision of the Erosion and Sediment Control Plan must be undertaken by 1 August for each calendar year. The revision must: 1. include a statement that the Erosion and Sediment Control Plan has been prepared by an appropriately qualified person 2. assess the plan against the requirements under Condition F33 3. include recommended actions to ensure actual and potential environmental impacts are effectively managed 4. provide details and timelines of the actions to be taken 5. identify any amendments made to the Erosion and Sediment Control Plan.
F35	A copy of the Erosion and Sediment Control Plan must be provided to the administering authority on request.
F36	Stormwater, other than mine affected water, is permitted to be released to waters from: 1. erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by Conditions F33 to F34 2. water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with Conditions F28 to F31, for the purpose of ensuring water does not become mine affected water.
F37	Monitoring of Water Storage Quality Water storages must be monitored at the locations and frequency specified in Table F7 Water storage monitoring for the water quality characteristics specified in Table F2 Mine Affected Water Release Limits, and Table F3 Release Contaminant Trigger Investigation Levels, Potential Contaminants.

Table F7
Water Storage Monitoring

Water Storage Description ¹	Easting [#]	Northing [#]	Monitoring Location	Frequency of Monitoring
TBA	TBA	TBA	TBA	Quarterly

Note:

Co-ordinates are to be latitude longitude in decimal degrees to a minimum of six decimal places (GDA94 – Zone 55).

¹ Required information for **Table F7: Water storage monitoring** must be determined and submitted to the administering authority within two years of the grant of this environmental authority.

Schedule G: Sewage treatment

Condition number	Condition
G1	The only contaminant permitted to be released to land is treated sewage in compliance with the release limits stated in Table G1: Contaminant release limits to land and the following requirements:

	- the irrigation area and or areas of 5.5 ha must be in accordance with Figure 3 - monitoring must be in accordance with the administering authority's <i>Water Quality Sampling Manual</i> and all monitoring devices must be effectively calibrated and maintained - releases of treated sewage must not be outside of the treated sewage areas indicated on Figure 3 - monitoring must be undertaken when treated sewage is being irrigated, unless irrigation has ceased for longer than the relevant parameters specified minimum frequency - volume of release must be calculated based on the total irrigation area when irrigating the maximum volume or the worked out for the area of application based on the actual volume irrigated Note: Indicators for TN and TP should be sampled using the current best practice.
G2	Activities conducted under this environmental authority must not be conducted contrary to any of the following limitations: inflows to on-site sewage treatment plants must not exceed the peak design capacity of 3 times the Design Average Dry Weather Flow (DADWF) of 340 kL/day on any day unless the standard treatment processes of the plant are bypassed.

Table G1
Contaminant Release Limits to Land

Release point	Quality characteristic (units)	Minimum	Median	Maximum	Minimum frequency
RP1 ¹	Irrigation volume (ML)			40	Annually
RP1 ¹	Total nitrogen (mg/L as nitrogen)			50	Monthly
RP1 ¹	Total phosphorus (mg/L as phosphorus)			16	Monthly
RP1 ¹	pH (pH units)	6.0		9.0	Monthly
RP1 ¹	Electrical conductivity (dS/m)			1.6	Monthly
RP1 ¹	Total dissolved salts (mg/L)			1000	Monthly
RP1 ¹	<i>E.coli</i> (cfu/100 mL)		1000	1500	Monthly

1. Release Point 1 = sampling point being released from the enclosed wet weather storage

G3	Treated sewage may only be released to land in accordance with the conditions of this approval within the nominated area(s) identified in Figure 3 (sewage treatment plant and treated sewage disposal).
G4	Treated sewage released to land must be done in accordance with documentation as well as carried out in a manner which ensures: 1. drainage to groundwater is minimised and subsurface flows of contaminants to surface waters are prevented 2. the irrigation water must be distributed evenly across designated irrigation areas identified in Figure 3 3. surface pondage and run-off of treated sewage within or beyond the boundary of any designated irrigation area and or areas is prevented 4. degradation of soil structure is minimised 5. soil sodicity and the build-up of nutrients and heavy metals in the soil and subsoil are minimised 6. spray drift or overspray does not carry beyond treated sewage disposal area or areas 7. treated sewage disposal area and or areas are maintained with an appropriate crop in a viable state for transpiration and nutrient uptake 8. sufficient buffer zones are maintained between irrigation sites and sensitive environmental receptors.
G5	Potable water and or alternative irrigation water may be released to the designated irrigation area and or areas identified in Figure 3, provided it is treated in accordance with all other conditions of this environmental authority as if it were treated sewage.
G6	If areas irrigated with treated sewage are accessible to employees or the general public, prominent signage must be provided advising that treated sewage is present and care should be taken to avoid consuming or otherwise coming into unprotected contact with the treated sewage.
G7	All treated sewage released to land must be monitored at the frequency and for the parameters specified in Table G1: Contaminant release limits to land.
G8	The monthly volume of treated sewage release to land must be measured and records kept of the volumes of treated sewage released.
G9	The daily volume of sewage treated must be measured and records kept of the volume of sewage treated.
G10	When circumstances prevent the irrigation or beneficial reuse of treated sewage such as during or following rain events, waters must be directed to an enclosed wet weather storage or alternative measures must be taken to store/lawfully dispose of treated sewage.
G11	A minimum area of 5.5 ha of land, excluding any necessary buffer zones, must be utilised for the irrigation and/or beneficial reuse of treated sewage.
G12	The volume provided for the storage of treated sewage is to be not less than 340,000 litres via an enclosed wet weather storage tank or tanks.
G13	A receiving environment monitoring program must be designed and implemented by an appropriately qualified person to monitor the effects of the activity on soils within irrigation area and or areas.

G14	The receiving environment monitoring program required by Condition G13 must include, but not necessarily be limited to, the following: 1. soil and sub-soil analysis, including an assessment of the irrigation of treated sewage on the soils from representative locations, including type, structure, pH, phosphorus adsorption level and capacity, nutrient status, salinity and sodicity, and cation exchange capacity of the designated treated wastewater irrigation areas identified in Figure 3 2. determination of the quantity and quality of contaminants applied to the soils in the designated treated sewage irrigation area and or areas identified in Figure 3 3. an annual (minimum) assessment of the impact of the releases on the designated treated sewage irrigation area and or areas identified in Figure 3 by an appropriately qualified person 4. following each assessment undertaken as part of Condition G14, an assessment by an appropriately qualified person as to whether the impact(s) of the releases on the designated treated sewage irrigation area and or areas warrant MEDLI re-modelling 5. if MEDLI re-modelling is recommended as per Condition G14(4), a re-assessment including modelling of the water, nutrient and salt balances and irrigation rate and return period to ensure sustainable use of the designated treated sewage irrigation area and or areas identified in Figure 3 6. a report must be provided to the administering authority within 20 business days on completion of the revised MEDLI report referred to in Condition G14(5).
G15	The irrigated crop must be periodically harvested. Any biomass removed from plants growing on irrigated land must be transported and disposed of other than on the irrigated land.
G16	All treated sewage irrigation areas must be planted with kikuyu grass or similar pastures.
G17	All treated sewage irrigation areas must be fenced to prevent public access.
G18	A Treated Sewage Irrigation Management Plan must be developed and implemented upon commencement of the irrigation of treated sewage.
G19	The Treated Sewage Irrigation Management Plan referred to in Condition G18 must include, but not be limited to the following: 1. method of irrigation and details on how irrigation hardware is operated and maintained 2. irrigation scheduling - how irrigation is initiated and terminated 3. monitoring local climatic conditions for irrigation management 4. soil monitoring & management 5. crop monitoring, harvesting and management 6. contingency plan for unexpected events such as extreme weather conditions or irrigation hardware failures 7. wet weather storage overflow management plan.
G20	All analyses required under this environmental authority must be carried out by a laboratory that has National Association of Testing Authorities (NATA) certification, or an equivalent certification, for such analyses. The only exception to this condition is for in situ monitoring of pH and electrical conductivity.

G21	Treated sewage must only be supplied to another person or organisation that has a written plan detailing how the user of the treated sewage will comply with their general environmental duty under section 319 of the <i>Environmental Protection Act 1994</i> whilst using the treated sewage.
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Schedule H: Land and rehabilitation

Condition number	Condition
H1	Land disturbed by mining must be rehabilitated in accordance with: a) Table H1: Rehabilitation Requirements, attached to this environmental authority; b) Table H2: Rehabilitation Domains and Post-mining Land Use; and c) The progressive rehabilitation plan required by Condition H3.
H2	Only the residual voids shown in Schedule 1 – Figure 1 are permitted.

Table H2
Rehabilitation Domains and
Post-mining Land Use

Rehabilitation Domain	Post-mining Land Use		
	Agriculture (Low Intensity Cattle Grazing)	Native Vegetation (Woodland)	Fauna Habitat
Waste Rock Emplacements	✓	✓	
Residual voids			✓
Infrastructure Areas	✓	✓	
Water Management Infrastructure	✓	✓	
ILF Cells	✓		
Ripstone Creek Diversion		✓	

Department interest: Land and rehabilitation	
H3	Progressive rehabilitation plan The holder of this environmental authority must develop, implement and submit to the administering authority a progressive rehabilitation plan within three (3) years from the grant of the environmental authority. The progressive rehabilitation plan must: a) propose a rehabilitation programme in tabular format outlining the goals and timing of the progressive rehabilitation to achieve the agreed post mining land use and b) outline the information, investigations and assumptions used to develop the rehabilitation programme and derive the outcomes. In addressing b) above, the progressive rehabilitation plan must:

- a) Describe each resource tenure, including the area of each tenure.
- b) Describe the relevant activities to which the application relates, the likely duration of the relevant activities, and how and where the activities will be carried out (including maps).
- c) Identify what the final land use of all land within the resources tenures will be and how rehabilitation outcomes will be achieved progressively throughout the life of the mine.
- d) Detail the consultation undertaken by the proponent in developing the progressive rehabilitation plan and how the proponent will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.
- e) State how the post mining land uses identified by the plan are consistent with the outcome of consultation with the community and any strategies or plans for the land of a local government, the State or the Commonwealth.
- f) For each proposed post-mining land use for land, state the proposed methods or techniques for rehabilitating the land to be stable in a way that supports the rehabilitation milestones as proposed in the programme.
- g) Identify the risks of stable land described as a post mining land use not being achieved, and how the applicant intends to manage or minimise the risks.

The progressive rehabilitation plan must also:

- a) Demonstrate how the amount of land disturbed at any one time, and the residual loss of land and water bodies with ecological or productive value, will be minimised.
- b) Demonstrate that the final landform re-establishes a functional hydrologic system that prevents erosion, maximises connectivity, prevents upstream and downstream surface and groundwater contamination in the long term and is consistent with the surrounding natural topography and landscape. Include drawings, figures and maps to illustrate the final landform.
- c) Demonstrate that each post mining land use is appropriate for the region in which the land is located by stating that the use will be
 - i) compatible with the use of land in the surrounding region
 - ii) viable having regard to the use of land in the surrounding region and
 - iii) sustainable by not requiring significantly greater management in order to maintain the use in the long-term, compared to the management of land in the surrounding region.

Rehabilitation programme

The rehabilitation programme to be included in the rehabilitation plan must include the following:

- a) For each post mining land use area provide:
 - i) a description of the area (name, size in hectares, disturbance type (hardstand, stockpile, pit etc.), tenure, reference to associated map
 - ii) a map of the area
 - iii) the date land becomes available for rehabilitation or closure
 - iv) the milestones that will be required for rehabilitated areas to be stable
 - v) milestone criteria

	vi) completion dates for each milestone. b) For areas to be rehabilitated, a milestone must be developed for each significant event or step necessary to rehabilitate the land to be stable. c) Milestone criteria must demonstrate that the associated milestone has been successfully completed, and incorporate parameters that are measurable for achieving the milestone²⁴. Milestones must be written in a manner that delivers on 'SMART principles'²⁵. d) The final milestone for each rehabilitation or closure area must include milestone criteria for the area to either achieve a stable condition (for rehabilitated areas) or minimise the risks to the environmental values and ensure the area is enduring (for closure areas). e) Maps showing the final rehabilitation outcomes for each area must be provided as part of the rehabilitation programme.
H4	A Rehabilitation Monitoring Program must be developed and certified by an appropriately qualified person and submitted to the administering authority for consideration prior to commencement of significant construction work for Stage 1 mining operations. The Monitoring Program must contain a schedule for gathering baseline data from agreed reference sites and conducting rehabilitation trials to support the rehabilitation outcomes detailed in Table H1 – Rehabilitation Requirements. Baseline monitoring and rehabilitation trials under this plan must be undertaken at a suitable frequency to ensure that the holder of this Environmental Authority has a representative dataset to enable: a) Progressive certification of rehabilitation under chapter 5A of the Environmental Protection Act 1994. b) Surrender of the Environmental Authority under Chapter 5 of the Environmental Protection Act 1994. A copy of the Rehabilitation Monitoring Program must be made available to the administering authority upon request.
H5	Rehabilitation must commence progressively in accordance with the: a) Progressive rehabilitation plan; and b) the Plan of Operations (or subsequent document required under regulation).
H6	Residual Voids Residual voids must comply with the following outcomes: a) residual voids must not cause any serious environmental harm to land, surface waters or any recognised ground water aquifer, other than the environmental harm constituted by the existence of the residual void itself, and subject to any other condition within this environmental authority;

²⁴ Milestone criteria are necessary to ensure progressive rehabilitation and closure activities are completed, and are not the same as completion criteria (which demonstrate the expectations at relinquishment).

²⁵ SMART principles are:

- **Specific** – it is clear what must be done
- **Measurable** – it must be possible to know when it has been achieved
- **Achievable** – it is capable of being achieved
- **Reasonable/relevant** – there is a clear connection between the milestone and the desired outcomes. The requirement is reasonable
- **Time specific** – it is clear when the milestone must be completed by.

	b) be left as stable structures with the competency certified by an appropriately qualified third party (e.g. an engineer listed on the National Professional Engineers Register); c) be fenced or bunded appropriately to restrict human, stock and other fauna in areas representing a potential hazard d) residual voids must comply with Table H3 Residual void design e) The environmental authority holder must provide the administering authority a map that shows the aerial extent and topography of final landforms including residual voids. If amendments to the map are required then the environmental authority holder must provide the administering authority with the amended map. f) Five years prior to the establishment of a final void the holder of the Environmental Authority must submit a Final Void Geotechnical Report prepared by a suitably qualified and experienced professional to the administering authority that includes: (i) proposed slope criteria for pit walls with competent and incompetent rock; and (ii) proposed final surface area of the void. g) Three years prior to the establishment of residual voids the holder of the environment authority must submit to the administering authority a Final Void Water Quality Management Plan that includes: (iii) modelling and assessment of the quality of void water between cessation of mining and the post mining equilibrium level; (iv) modelling and assessment of practicable management measures (including flushing) to mitigate salinity increases; and (v) a monitoring program both during and after mining, to assess the performance of any management measures required. h) A report must be provided to the administering authority regarding the effect of the operation and the residual voids on groundwater every three (3) years until surrender of the mining tenure.
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**Table H3
Residual Void Design**

Void identification	Void volume (Mm ³)	Depth to water body (mbgl)	Overall highwall angle		Void maximum surface area (ha)
			Cenozoic overburden	Weathered/ fresh permian	
ODS3	360	100	20°	45°	317
ODS7/8	670	145	20°	45° to 55°	671
WIL5	720	90	20°	55°	660

H7	Contaminated land Before applying for surrender of a mining lease, the holder must (if applicable) provide to the administering authority a site investigation report under the <i>Environmental Protection Act 1994</i>, in relation to any part of the mining lease which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use.
H8	Before applying for progressive rehabilitation certification for an area, the holder must (if applicable) provide to the administering authority a site investigation report under the Act, in relation to any part of the area the subject of the application which has been used for notifiable activities or which the holder is aware is likely to be contaminated land, and also carry out any further work that is required as a result of that report to ensure that the land is suitable for its final land use under Condition H1.
H9	Minimise the potential for contamination of land by hazardous contaminants.
H10	Impacts to Prescribed Environmental Matters Significant residual impacts to prescribed environmental matters are not authorised under this environmental authority or the <i>Environmental Offsets Act 2014</i> unless the impact(s) is specified in Table H3 - Significant residual impacts to prescribed environmental matters.

Table H4
Significant Residual Impacts to Prescribed Environmental Matters

Prescribed environmental matter	Impact
Endangered regional ecosystem – insert RE ID	Mine site footprint, consisting of: • RE 11.3.1 - 14 ha • RE 11.4.8 – 4.5 ha • RE 11.4.9- 59 ha • RE 11.5.17 – 62 ha Total: 135 ha
Of concern regional ecosystem (not within an urban area)	• RE 11.3.2 – 859.5 ha • RE 11.3.3 – 5 ha • RE 11.3.4 – 1 ha Total: 851 ha
Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map	Mine site footprint Total: 238 ha
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map – insert RE ID and Broad Vegetation Group	• 11 km Ripstone Creek (SO3 = 50m buffer); RE 11.3.25 – 110 ha • 5.6 km unnamed (SO1 = 25m buffer); RE 11.5.3 – 28 ha • 5.5 km unnamed (SO1 = 25m buffer); RE 11.3.27b –28 ha • 0.5 km unnamed (SO1 = 25m buffer) RE 11.3.25 - 2.5 ha • 0.8 km unnamed (SO1 = 25m buffer) RE 11.3.25 – 4 ha

Prescribed environmental matter	Impact
	Total: 172.5 ha
Essential habitat (not in an urban area) for vulnerable wildlife	Essential habitat for the ornamental snake: - mine site footprint – 7,402 ha - rail spur buffer (45 m corridor) – 87 ha Total: 7,489 ha
Connectivity area that is a regional ecosystem (not in urban area)	Total: 5,661 ha
A wetland in a wetland protection area shown on the Map of referable wetlands (HES wetlands in GBR)	Mine site footprint: Total: 61 ha
Habitat for an animal that is vulnerable wildlife	Ornamental Snake*: - mine site - 14,985 ha - rail spur - 38 ha - water pipeline – 44 ha - ETL – 28 ha - access road – 13 ha Total: 15,108 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Koala* - mine site and axillary infrastructure – 5,500 ha - rail spur / water pipeline- 71.5 ha - ETL – 12 ha Total: 5,583.5 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Greater glider*: Total: 5,500 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Australian painted snipe* - mine site – 113 ha - rail spur / water pipeline – 7 ha Total: 120 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Squatter pigeon (southern)*: Total: 5,387 ha

^A 13 ha of this community is mapped as the Brigalow TEC under the EPBC Act

[#] This species is also listed under the EPBC Act.

^{*} The REs and species habitats overlap (i.e. the REs and habitats are not mutually exclusive).

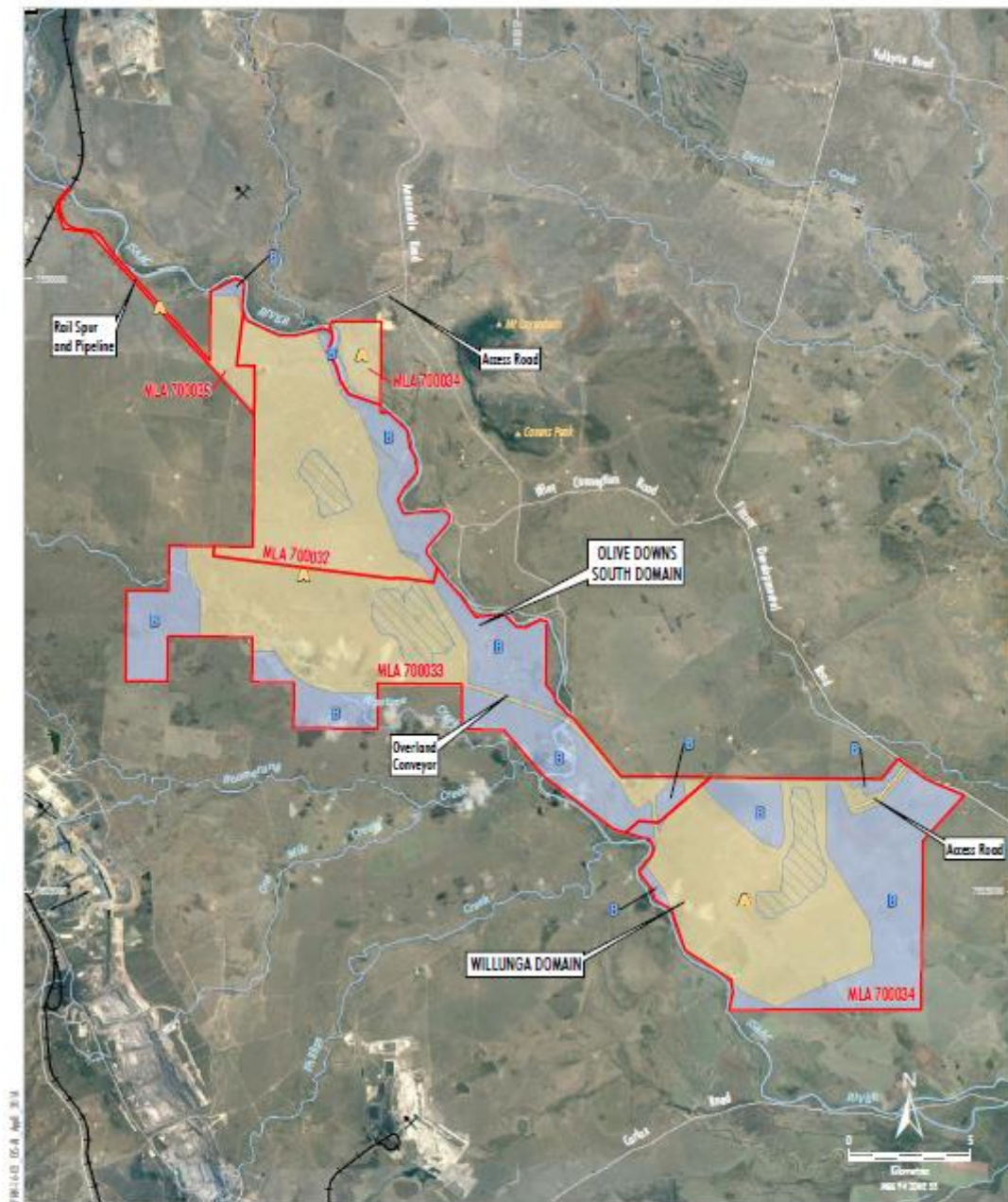
Department interest: Land and rehabilitation	
H11	Records demonstrating that each impact to a prescribed environmental matter not listed in Table H4 - Significant residual impacts to prescribed environmental matters did not, or is not likely to, result in a significant residual impact to that matter must be: a) completed by an appropriately qualified person; and

	b) kept for the life of the environmental authority.
H12	An environmental offset made in accordance with the <i>Environmental Offsets Act 2014</i> and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in Table H3 - Significant residual impacts to prescribed environmental matters , unless a lesser extent of the impact has been approved in accordance with condition H12 .
H13	a) The significant residual impacts to a prescribed environmental matter authorised in Condition H9 for which an environmental offset is required by Condition H11 may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.
H14	Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority: a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.
H15	The report required by Condition H13 must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
H16	A notice of election for the staged environmental offset referred to in Condition H14 , if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.
H17	Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority: b) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.

‘residual void’ means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

‘void’ means any man-made, open excavation in the ground.

Schedule H—Approved plans



LEGEND

- Mining Lease Application Boundary
- Norwich Park Branch Railway
- Proposed Access Road
- Land Disturbance May Occur
- Land Disturbance Must Not Occur
- Approximate Extent of Final Voids

Source: Geoscience Australia – Topographical Data 250K (2006)
 Queensland Department of Natural Resources and Mines
 (2016)
 Orthophotography: Google Image (2014)



OLIVE DOWNS COKING COAL PROJECT
Land Disturbance

Figure 1

Schedule H

Table H1 Rehabilitation Requirements

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Waste Rock Emplacements	Long-term safety	Waste rock emplacement final landforms are geotechnically stable and safe.	Geotechnical assessment of the waste rock emplacement final landforms (slope angle and length) prepared by a suitably qualified person. The geotechnical assessment would be reported and interpreted in the Final Rehabilitation Report.	Geotechnical assessments of final landforms are recommended by the <i>Planning for Integrated Min Closure: Toolkit</i> (International Council on Mining and Metals, 2008).	- The geotechnical assessment concludes: - Waste rock emplacement final landform slopes are approximately 7 degrees (1V:8H) or lower. - The toe of out-of-pit waste rock emplacements standoff the crest of the residual voids by at least 50 metres (m). - The geotechnical assessment concludes the waste rock emplacement final landforms are stable and safe.
		Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the domain site is suitable for the proposed post-mining land use.
		Other potential safety risks (e.g. falls from height) are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.
	Non-polluting	Runoff and seepage from waste rock emplacements are a low risk of causing	Surface and groundwater quality (e.g. sediment load, pH, heavy metal content, etc) monitoring data. Surface and groundwater quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface and groundwater quality criteria, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
		environmental harm.	Environmental risk assessment prepared by a suitably qualified team. The environmental risk assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 5, Part 10 of the EP Act.	The environmental risk assessment concludes that there is a low risk of environmental harm.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Waste Rock Emplacements (cont.)	Stable	Waste rock emplacement final landforms are geotechnically stable.	Geotechnical assessment of the waste rock emplacement final landforms (slope angle and length) prepared by a suitably qualified person. The geotechnical assessment would be reported and interpreted in the Final Rehabilitation Report.	Geotechnical assessments of final landforms are recommended by the <i>Planning for Integrated Mine Closure: Toolkit</i> (International Council on Mining and Metals, 2008).	- The geotechnical assessment concludes: - Waste rock emplacement final landform slopes are approximately 7 degrees (1V:8H) or lower. - The toe of out-of-pit waste rock emplacements standoff the crest of the residual voids by at least 50 m. - The waste rock emplacement final landforms are stable and safe.
		Landform achieves appropriate erosion rates.	Erosion (erosion rates and sheets, rills and gully formation) monitoring data. Erosion monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Erosion monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	- Erosion monitoring data demonstrates the following for two years post-mining: - No active gully erosion observed. - Erosion maintenance requirements are comparable to relevant rehabilitation monitoring reference sites.
			Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
		Self-sustaining vegetative cover established.	Landscape function analysis (LFA) (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	LFA is a Commonwealth Scientific and Industrial Research Organisation (CSIRO) developed method used to provide indicators of rehabilitation success and allows the assessment of landscape processes. LFA aims to measure the progression of rehabilitation towards a self-sustaining ecosystem through the assessment of landscape function.	LFA monitoring demonstrates that vegetation cover, types and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Waste Rock Emplacements (cont.)	Sustainable Land Use	Establish agriculture (low intensity cattle grazing) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Vegetation consistent with grass species suitable for grazing (e.g. including Buffel Grass (<i>Cenchrus ciliaris</i>), Wiregrass (<i>Aristida</i> sp) and Kangaroo Grass (<i>Themeda triandra</i>) comparable to relevant rehabilitation monitoring reference sites. - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of pasture grass species.
			Cattle stocking rate. Cattle stocking rate monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Agricultural productivity is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Cattle stocking rate monitoring demonstrates a stocking rate of 0.22 adult equivalents per hectare.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Waste Rock Emplacements (cont.)	Sustainable Land Use (cont.)	Establish self-sustaining nature conservation (woodland) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Woodland vegetation contains a species diversity comparable to relevant rehabilitation monitoring reference sites (e.g. Poplar Box [<i>Eucalyptus populnea</i>] +/- Silver-leaved Ironbark [<i>E. melanophloia</i>] +/- Clarkson's Bloodwood [<i>Corymbia clarksoniana</i>]). - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Generational succession of trees and shrubs. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of native plant species.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Residual voids	Long-term safety	Final void final landforms are geotechnically stable and safe.	Geotechnical assessment of the final void final landforms (slope angle and length) prepared by a suitably qualified person. The geotechnical assessment would be reported and interpreted in the Final Rehabilitation Report.	Geotechnical assessments of final landforms are recommended by the <i>Planning for Integrated Min Closure: Toolkit</i> (International Council on Mining and Metals, 2008).	- The geotechnical assessment concludes: - Final void highwalls slopes are 20° or lower where located within alluvium and tertiary clays (known as the Cenozoic overburden) to achieve a factor of safety of 1.5. - Final void highwall slopes are 45° or lower where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° is achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. - Low wall slopes are stable. - The toe of out-of-pit waste rock emplacements standoff the crest of the residual voids by at least 50 m. - Perimeter bunding formed and security fencing installed. - The final void final landforms are stable and safe.
		Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
		Other potential safety risks (e.g. falls from height) are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Residual voids (cont.)	Non-polluting	Residual voids are isolated from the Isaac River.	Flood assessment prepared by a suitably qualified person. The flood assessment would be reported and interpreted in the Final Rehabilitation Report.	Hydrological studies are recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The flood assessment concludes that the residual voids are isolated from all flood events, up to and including a PMF event.
		Residual voids are a low risk of causing environmental harm.	Groundwater assessment prepared by a suitably qualified person. The groundwater assessment would be reported and interpreted in the Final Rehabilitation Report.		The groundwater assessment concludes that the residual voids are acting as groundwater sinks, preventing the migration of potentially saline water into adjacent aquifers and watercourses.
			Final void balance prepared by a suitably qualified person. The final void balance would be reported and interpreted in the Final Rehabilitation Report.		The final void balance concludes that the final void water bodies would equilibrate well below the point at which they would spill to the surrounding environment.
			Surface and groundwater quality (e.g. pH, heavy metal content, etc) monitoring data. Surface and groundwater quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface and groundwater quality criteria, for a period of at least two years post-mining.
			Environmental risk assessment prepared by a suitably qualified team. The environmental risk assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 5, Part 10 of the EP Act.	The environmental risk assessment concludes that there is a low risk of environmental harm.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Residual voids (cont.)	Stable	Final void final landforms are geotechnically stable and safe.	Geotechnical assessment of the final void final landforms (slope angle and length) prepared by a suitably qualified person. The geotechnical assessment would be reported and interpreted in the Final Rehabilitation Report.	Geotechnical assessments of final landforms are recommended by the <i>Planning for Integrated Min Closure: Toolkit</i> (International Council on Mining and Metals, 2008).	- The geotechnical assessment concludes: - Final void highwalls slopes are 20° or lower where located within alluvium and tertiary clays (known as the Cenozoic overburden) to achieve a factor of safety of 1.5. - Final void highwall slopes are 45° or lower where located within a fault fractured zone, and 55° where they are located away from fault zones. An overall angle of 55° is achieved by 50 m high batters at 65° incorporating 10 m wide intermediate benches. - The toe of out-of-pit waste rock emplacements standoff the crest of the residual voids by at least 50 m. - Perimeter bunding formed and security fencing installed. - The final void final landforms are stable and safe.
	Sustainable Land Use	Establish self-sustaining (fauna habitat) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Sustainable fauna usage (e.g. Strip-faced Dunnart, Hoary Wattled Bat and Australian Grey Teal) of the residual voids. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Infrastructure Areas	Long-term safety	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
		Other potential safety risks (e.g. risks associated with retained infrastructure) are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.
	Non-polluting	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Infrastructure Areas (cont.)	Stable	Landform achieves appropriate erosion rates.	Erosion (erosion rates and sheets, rills and gully formation) monitoring data. Erosion monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Erosion monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	- Erosion monitoring data demonstrates the following for two years post-mining: - Limited erosion (presence of sheets, rills and gullies) observed. - Soil loss rates are comparable to relevant rehabilitation monitoring reference sites. - Erosion maintenance requirements are comparable to relevant rehabilitation monitoring reference sites.
			Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
		Self-sustaining vegetative cover established.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	LFA monitoring demonstrates that vegetation cover, types and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Infrastructure Areas (cont.)	Sustainable Land Use	Establish agriculture (low intensity cattle grazing) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Vegetation consistent with grass species suitable for grazing (e.g. including Buffel Grass (<i>Cenchrus ciliaris</i>), Wiregrass (<i>Aristida</i> sp) and Kangaroo Grass (<i>Themeda triandra</i>) comparable to relevant rehabilitation monitoring reference sites. - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of pasture grass species.
			Cattle stocking rate. Cattle stocking rate monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Agricultural productivity is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Cattle stocking rate monitoring demonstrates a stocking rate of 0.22 adult equivalents per hectare.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Infrastructure Areas (cont.)	Sustainable Land Use (cont.)	Establish self-sustaining nature conservation (woodland) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Woodland vegetation contains a species diversity comparable to relevant rehabilitation monitoring reference sites (e.g. Poplar Box [<i>Eucalyptus populnea</i>] +/- Silver-leaved Ironbark [<i>E. melanophloia</i>] +/- Clarkson's Bloodwood [<i>Corymbia clarksoniana</i>]). - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Generational succession of trees and shrubs. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of native plant species.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Water Management Infrastructure	Long-term safety	Retained management infrastructure is appropriately designed.	Geotechnical assessment of retained water infrastructure prepared by a suitably qualified person. The geotechnical assessment would be reported and interpreted in the Final Rehabilitation Report.	Geotechnical assessments of final landforms are recommended by the <i>Planning for Integrated Min Closure: Toolkit</i> (International Council on Mining and Metals, 2008).	A geotechnical assessment concludes that the retained water management infrastructure is stable and safe.
		Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
		Other potential safety risks (e.g. risks associated with retained infrastructure) are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.
	Non-polluting	Retained water infrastructure is a low risk of causing environmental harm.	Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
			Environmental risk assessment prepared by a suitably qualified team. The environmental risk assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 5, Part 10 of the EP Act.	The environmental risk assessment concludes that there is a low risk of environmental harm.
Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Water Management Infrastructure (cont.)	Non-polluting (cont.)	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
	Stable	Landform achieves appropriate erosion rates.	Erosion (erosion rates and sheets, rills and gully formation) monitoring data. Erosion monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Erosion monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	- Erosion monitoring data demonstrates the following for two years post-mining: - Limited erosion (presence of sheets, rills and gullies) observed. - Soil loss rates are comparable to relevant rehabilitation monitoring reference sites. - Erosion maintenance requirements are comparable to relevant rehabilitation monitoring reference sites.
			Surface water quality (e.g. sediment load, pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
		Self-sustaining vegetative cover established.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	LFA monitoring demonstrates that vegetation cover, types and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Water Management Infrastructure (cont.)	Sustainable Land Use	Establish agriculture (low intensity cattle grazing) land use.	Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
			LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Vegetation consistent with grass species suitable for grazing (e.g. including Buffel Grass (<i>Cenchrus ciliaris</i>), Wiregrass (<i>Aristida</i> sp) and Kangaroo Grass (<i>Themeda triandra</i>) comparable to relevant rehabilitation monitoring reference sites. - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of pasture grass species.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Water Management Infrastructure (cont.)	Sustainable Land Use (cont.)	Establish self-sustaining nature conservation (woodland) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Woodland vegetation contains a species diversity comparable to relevant rehabilitation monitoring reference sites (e.g. Poplar Box [<i>Eucalyptus populnea</i>] +/- Silver-leaved Ironbark [<i>E. melanophloia</i>] +/- Clarkson's Bloodwood [<i>Corymbia clarksoniana</i>]). - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Generational succession of trees and shrubs. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of native plant species.
In-line Flocculation Cells	Long-term safety	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
		Other potential safety risks are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
In-line Flocculation Cells (cont.)	Non-polluting	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
	Stable	Landform achieves appropriate erosion rates.	Erosion (erosion rates and sheets, rills and gully formation) monitoring data. Erosion monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Erosion monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	- Erosion monitoring data demonstrates the following for two years post-mining: - Limited erosion (presence of sheets, rills and gullies) observed. - Soil loss rates are comparable to relevant rehabilitation monitoring reference sites. - Erosion maintenance requirements are comparable to relevant rehabilitation monitoring reference sites.
			Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
		Self-sustaining vegetative cover established.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	LFA monitoring demonstrates that vegetation cover, types and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
In-line Flocculation Cells (cont.)	Sustainable Land Use	Establish agriculture (low intensity cattle grazing) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Vegetation consistent with grass species suitable for grazing (e.g. including Buffel Grass (<i>Cenchrus ciliaris</i>), Wiregrass (<i>Aristida</i> sp) and Kangaroo Grass (<i>Themeda triandra</i>) comparable to relevant rehabilitation monitoring reference sites. - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of pasture grass species.
			Cattle stocking rate. Cattle stocking rate monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Agricultural productivity is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Cattle stocking rate monitoring demonstrates a stocking rate of 0.22 adult equivalents per hectare.
Ripstone Creek Diversion	Long-term safety	Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Ripstone Creek Diversion (cont.)	Long-term safety (cont.)	Other potential safety risks are identified and appropriately addressed so the site is safe.	Safety assessment (including risk assessment) prepared by a suitably qualified person. The safety assessment would be reported and interpreted in the Final Rehabilitation Report.	Post-mining safety assessment is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	The safety assessment concludes that the risks associated with other potential safety risks are low.
	Non-polluting	Ripstone Creek diversion is a low risk of causing environmental harm.	Surface water quality (e.g. pH, heavy metal content, etc) monitoring data. Surface water quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
			Environmental risk assessment prepared by a suitably qualified team. The environmental risk assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 5, Part 10 of the EP Act.	The environmental risk assessment concludes that there is a low risk of environmental harm.
		Potentially contaminated areas are remediated and are safe.	Contaminated land assessment prepared in accordance with the <i>Queensland auditor handbook for contaminated land</i> (DES, 2018b) by a suitably qualified person. The contaminated land assessment would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the requirements of Chapter 7, Part 8 of the EP Act.	The contaminated land assessment concludes that the Project site is suitable for the proposed post-mining land use.
	Stable	Ripstone Creek diversion is appropriately designed and constructed.	Detailed Design Plan for the Ripstone Creek diversion prepared by a suitably qualified person. The Detailed Design Plan would be reported and interpreted in the Final Rehabilitation Report.	Consistent with the <i>Guideline: Works that Interfere with Water with Water in a Watercourse – Watercourse Diversions</i> (Department of Natural Resources and Mines, 2014).	The Ripstone Creek diversion has been constructed and rehabilitated in accordance with the Detailed Design Plan.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Ripstone Creek Diversion (cont.)	Stable (cont.)	Landform achieves appropriate erosion rates.	Erosion (erosion rates and sheets, rills and gully formation) monitoring data. Erosion monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Erosion monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	- Erosion monitoring data demonstrates the following for two years post-mining: - Limited erosion (presence of sheets, rills and gullies) observed. - Soil loss rates are comparable to relevant rehabilitation monitoring reference sites. - Erosion maintenance requirements are comparable to relevant rehabilitation monitoring reference sites.
			Surface and groundwater quality (e.g. sediment load, pH, heavy metal content, etc) monitoring data. Surface and groundwater quality monitoring data would be reported and interpreted in the Final Rehabilitation Report.	Water quality monitoring is recommended by <i>Rehabilitation Requirements for Mining Resource Activities Guideline</i> (DEHP, 2014).	Receiving water quality monitoring results comply with Environmental Authority surface water quality criteria, for a period of at least two years post-mining.
		Self-sustaining vegetative cover established.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	LFA monitoring demonstrates that vegetation cover, types and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining.

Domain	Goals	Objectives	Performance Indicators	Selection of Performance Indicator	Completion Criteria
Ripstone Creek Diversion (cont.)	Sustainable Land Use	Establish self-sustaining nature conservation (woodland) land use.	LFA (e.g. erosion, soil physical parameters, organic matter and nutrient content and cycling, vegetation dynamics, habitat complexity and habitat quality) monitoring. LFA monitoring data would be reported and interpreted in the Final Rehabilitation Report.	CSIRO.	- LFA monitoring demonstrates: - Physical, chemical and biological properties of the growth media are similar to relevant rehabilitation monitoring reference sites. - Woodland vegetation contains a species diversity comparable to relevant rehabilitation monitoring reference sites (e.g. Queensland Blue Gum or River Red Gum woodland fringing drainage lines). - Vegetation cover and densities are comparable to relevant rehabilitation monitoring reference sites, for a period of at least two years post-mining. - Generational succession of trees and shrubs. - Weed diversity and abundance is comparable to relevant rehabilitation monitoring reference sites. - Pests do not occur in substantial numbers or visibly affect the development of native plant species.

Schedule I: Water diversions

I1	Permanent watercourse diversions Permanent watercourse diversions must be designed and constructed to: 1) incorporate natural features (including geomorphic and vegetation) present at the location of the diversion 2) maintain the pre-existing hydrologic characteristics of surface water and groundwater systems for the area in which the watercourse diversion is located 3) maintain the hydraulic characteristics of the permanent watercourse diversion that are equivalent to other local watercourses and are suitable for the area in which the diversion is located without using artificial structures that require on-going maintenance 4) maintain sediment transport and water quality regimes that allow the diversion to be self-sustaining, while minimising any impacts to upstream and downstream water quality, geomorphology or vegetation 5) maintain equilibrium and functionality in all substrate conditions at the location of the diversion 6) allow the free passage of fish both upstream and downstream in a safe manner.
I2	Design plan – all diversions A certified Design Plan that achieves Condition I1 for permanent watercourse diversions must be submitted to the administering authority at least 10 business days before commencing construction of the diversion.
I3	The certified design plan for any temporary or permanent watercourse diversion must be consistent with the functional design/s that formed a part of the application documents for this authority.
I4	Construction and operation – all diversions A certified set of 'as constructed' drawings and specifications must be submitted to the administering authority within 60 business days from the completion of construction of the temporary or permanent watercourse diversion, or re-establishment of the pre-existing watercourse. These drawings and specifications must state: 1) that the 'as constructed' drawings and specifications meet the original intent of the design plan for the watercourse diversion 2) construction of the watercourse diversion is in accordance with the design plan.
I5	Register – all diversions The details of watercourse diversions planned and constructed under an environmental authority must be accurately recorded on the Register of Watercourse Diversions kept by the holder of this environmental authority. An electronic copy must be provided to the administering authority on request.

Schedule J: Regulated structures

Condition number	Condition
J1	Assessment of consequence category

	The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i>, at the following times: 1) prior to the design and construction of the structure, if it is not an existing structure 2) prior to any change in its purpose or the nature of its stored contents.
J2	A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
J3	Certification must be provided by the suitably experienced and qualified person who undertook the assessment, in the form set out in the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i> .
J4	Design and construction of a regulated structure All regulated structures must be designed by, and constructed under the supervision of, a suitably experienced and qualified person in accordance with the requirements of the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i>.
J5	Construction of a regulated structure is prohibited unless: 1) the holder of this environmental authority has submitted a consequence category assessment report and certification to the administering authority 2) certification for the design, design plan and the associated operating procedures has been certified by a suitably experienced and qualified person in compliance with the relevant condition of this authority.
J6	Certification must be provided by the suitably experienced and qualified person who oversees the preparation of the design plan in the form set out in the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i> , and must be recorded in the Register of Regulated Structures.
J7	Regulated structures must: 1) be designed and constructed in compliance with the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i> 2) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: a) floodwaters from entering the regulated dam from any watercourse or drainage line b) wall failure due to erosion by floodwaters arising from any watercourse or drainage line 3) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
J8	Certification by the suitably qualified experienced and qualified person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that: 1) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure 2) construction of the regulated structure is in accordance with the design plan.

J9	All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure: 1) for existing structures that are regulated structures, within ten business days of this condition taking effect 2) prior to the operation of the new regulated structure 3) if the emergency action plan is amended, within five business days of it being amended.
J10	Operation of a regulated structure Operation of a regulated structure, except for an existing structure, is prohibited unless the holder of this environmental authority has submitted to the administering authority in respect of regulated structure, all of the following: 1) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with Condition J4 2) a set of 'as constructed' drawings and specifications 3) certification of the 'as constructed drawings and specifications' in accordance with Condition J6 4) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan 5) the requirements of this authority relating to the construction of the regulated structure have been met 6) the holder of this environmental authority has entered the details required under this authority, into a Register of Regulated Structures 7) there is a current operational plan for the regulated structure.
J11	Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
J12	Mandatory reporting level Conditions J13 to J16 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
J13	The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
J14	The holder of this environmental authority must, as soon as practical and within forty-eight hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
J15	The holder of this environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
J16	The holder of this environmental authority must record any changes to the MRL in the Register of Regulated Structures.
J17	Design storage allowance The holder of this environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May

	period based on actual observations of the available storage in each regulated dam or linked containment system, taken prior to 1 July of each year.
J18	By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
J19	The holder of this environmental authority must, as soon as possible and within forty eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
J20	The holder of this environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
J21	Annual inspection report Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
J22	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably experienced and qualified person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.
J23	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the <i>Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)</i> .
J24	The holder of this environmental authority must within twenty business days of receipt of the annual inspection report, provide to the administering authority: 1) the recommendations section of the annual inspection report 2) if applicable, any actions being taken in response to those recommendations 3) if, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder of this environmental authority, provide this to the administering authority within ten business days of receipt of the request.
J25	The holder of this environmental authority must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.
J26	Register of regulated structures A Register of Regulated Structures must be established and maintained by the holder of this environmental authority for each regulated structure:
J27	The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority.

J28	The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Structures once compliance with Condition J10 has been achieved.
J29	The holder of this environmental authority must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
J30	All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this environmental authority, or their delegate, as being accurate and correct.
J31	The holder of this environmental authority must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

Definitions

Words and phrases used throughout this document are defined below. Where a definition for a term used in this document is not provided within this environmental authority, but is provided in the *Environmental Protection Act 1994* or subordinate legislation, the definition in the *Environmental Protection Act 1994* or subordinate legislation must be used.

‘acid mine drainage’ means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata are disturbed and exposed to oxygen and moisture.

‘administering authority’ is the agency or department that administers the environmental authority provisions under the *Environmental Protection Act 1994*.

‘affected person’ is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life can be put at risk due to dwellings or workplaces being in the path of a dam break flood.

‘airblast overpressure’ means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

‘annual exceedance probability or AEP’ the probability that at least one event in excess of a particular magnitude will occur in any given year.

‘annual inspection report’ means an assessment prepared by a ‘suitably qualified and experienced person’ containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

- 1) against recommendations contained in previous annual inspections reports;
- 2) against recognised dam safety deficiency indicators;
- 3) for changes in circumstances potentially leading to a change in consequence category;
- 4) for conformance with the conditions of this authority;
- 5) for conformance with the ‘as constructed’ drawings;
- 6) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);
- 7) for evidence of conformance with the current operational plan.

‘appropriately qualified person’ means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice

and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

‘assessed or assessment’ by a ‘suitably qualified and experienced person’ in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

- 1) exactly what has been assessed and the precise nature of that determination;
- 2) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- 3) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- 4) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

‘associated works’ in relation to a dam, means:

- 1) operations of any kind and all things constructed, erected or installed for that dam; and
- 2) any land used for those operations.

‘background’, with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

‘blasting’ means the use of explosive materials to fracture:

- 1) rock, coal and other minerals for later recovery; or
- 2) structural components or other items to facilitate removal from a site or for reuse.

‘certified’, with respect to watercourse diversions, means assessed and approved by a suitably qualified and experienced person. In relation to ‘as constructed’ drawings and specifications, the certification must be by the suitably qualified person who supervised the construction of the watercourse diversion, or re-establishment of the watercourse.

‘certification’ means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*, including design plans, ‘as constructed’ drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).

‘certification’, ‘certifying’ or ‘certified’ by an appropriately qualified and experienced person in relation to a design plan or an annual report regarding dams/structures, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- 1) exactly what is being certified and the precise nature of that certification;
- 2) the relevant legislative, regulatory and technical criteria on which the certification has been based;
- 3) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- 4) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

‘chemical’ means:

- 1) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth); or
- 2) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or

- 3) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997;
- 4) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the
- 5) Australian Health Ministers' Advisory Council and published by the Commonwealth; or
- 6) any substance used as, or intended for use as:
 - a. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or
 - b. a surface active agent, including, for example, soap or related detergent; or
 - c. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or
 - d. a fertiliser for agricultural, horticultural or garden use; or
 - e. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or
 - f. manufacture of plastic or synthetic rubber.

'commercial place' means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.

'consequence' in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.

'consequence category' means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)*.

'Consecutive sampling occasion' means consecutive sequential sampling occasions regardless of frequency.

'construction' or **'constructed'** in relation to a regulated structure includes building a new regulated structure and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.

'dam' means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.

'dam crest volume' means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).

'design plan' is a document smtting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

'design plan' in relation to a watercourse diversion is a document that contains the design, operation, monitoring and revegetation criteria of a watercourse diversion that addresses the outcomes stated in conditions on the environmental authority relating to the diversion. The document should include, but not be limited to:

- 1) required information under a functional design
- 2) the location, function and description of geomorphic and riparian vegetation features within the proposed watercourse diversion
- 3) results from hydrologic, hydraulic and sediment transportation modelling used in the design of the diversion
- 4) a revegetation and vegetation management plan (a revegetation plan) for the diversion
- 5) engineering drawings depicting the physical attributes and dimensions of the diversion

- 6) (if relevant) the staged development of a permanent watercourse diversion including the proposed use of temporary watercourse diversions with identified lifespans
- 7) all investigation and other reports relied on by the design
- 8) plans and specifications sufficient to complete construction and revegetation in accordance with the design.

‘design storage allowance or DSA’ means an available volume, estimated in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that manual.

‘designer’ for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam.

‘emergency action plan’ means documentation forming part of the operational plan held by the holder of this environmental authority or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to downstream communities and the implementation of protection measures. The plan must require dam owners to annually update contact information.

‘existing structure’ means a structure that prior to 18 September 2014 meets any or both of the following, a structure:

- 1) with a design that is in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* and that is considerably in progress;
- 2) that is under considerable construction or that is constructed.

‘extreme storm storage’ means a storm storage allowance determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority.

‘flowable substance’ means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

‘hazard category’ means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in ‘Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)’.

‘holder of this environmental authority’ means:

- 1) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or
- 2) where this document is a development approval, any person who is the registered operator for that development approval.

‘hydraulic performance’ means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*’.

‘infrastructure’ means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.

‘leachate’ means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

‘low consequence dam’ means any dam that is not a high or significant consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures*.

Median means the middle value, where half the data are smaller and half the data are larger. If the number of samples is even, the median is the arithmetic average of the two middle values.

‘m’ means metres.

‘mandatory reporting level or MRL’ means a warning and reporting level determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures* published by the administering authority.

‘manual’ means the *Manual for assessing consequence categories and hydraulic performance of structures* published by the administering authority.

‘measures’ includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

‘mine affected water’:

- 1) means the following types of water:
 - a) pit water, tailings dam water, processing plant water;
 - b) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity;
 - c) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
 - d) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
 - e) groundwater from the mine’s dewatering activities;
 - f) a mix of mine affected water (under any of paragraphs i)-v) and other water.
- 2) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:
 - a) land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or
 - b) land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
 - i) areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site;
 - ii) evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or \
 - iii) both.

‘mining waste’ means waste rock, spoil, overburden and interburden.

‘modification or modifying’ (see definition of ‘construction’).

‘NATA’ means National Association of Testing Authorities.

‘natural flow’ means the flow of water through waters caused by nature.

‘non polluting’ means having no adverse impacts upon the receiving environment.

‘operational plan’ includes:

- 1) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA);
- 2) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

‘peak particle velocity (ppv)’ means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s). **‘protected area’** means – a protected area under the *Nature Conservation Act 1992*; or

- 1) a marine park under the *Marine Parks Act 1992*; or
- 2) a World Heritage Area.

‘permanent watercourse diversion’ is a man-made structure that incorporates the geomorphologic, hydraulic, hydrologic and ecological components of a local watercourse and is designed, constructed, operated and maintained according to an engineering standard that ultimately achieves a self-sustaining watercourse able to function without features or characteristics that rely on ongoing maintenance or that impose a financial or other burden on the proponent, government or the community.

‘register of regulated structure’ includes:

- 1) date of entry in the register;
- 2) name of the structure, its purpose and intended/actual contents;
- 3) the consequence category of the dam as assessed using the *‘Manual for assessing consequence categories and hydraulic performance of structures’*;
- 4) dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
- 5) name and qualifications of the suitably qualified and experienced person who certified the design plan and ‘as constructed’ drawings;
- 6) for the regulated dam, other than in relation to any levees –
- 7) the dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
 - a) coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area;
 - b) dam crest volume (megalitres);
 - c) spillway crest level (metres AHD).
 - d) maximum operating level (metres AHD); vi) storage rating table of stored volume versus level (metres AHD);
 - e) design storage allowance (megalitres) and associated level of the dam (metres AHD);
 - f) mandatory reporting level (metres AHD);
- 8) the design plan title and reference relevant to the dam;
- 9) the date construction was certified as compliant with the design plan;
- 10) the name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
- 11) details of the composition and construction of any liner;
- 12) the system for the detection of any leakage through the floor and sides of the dam;
- 13) dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
- 14) dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
- 15) dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

‘receiving environment’ in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

- 1) a watercourse;
- 2) groundwater; and
- 3) an area of land that is not specified in this environmental authority.

The term does not include land that is specified in Authorised Activities of this environmental authority.

‘receiving waters’ means the waters into which this environmental authority authorises releases of mine affected water.

‘Receiving environment monitoring program’ means a monitoring program designed to monitor and assess the potential impacts of controlled and/or uncontrolled releases of contaminants to the environment from the activity.

‘regulated structure’ means any structure in the significant or high consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures* published by the administering authority. A regulated structure does not include:

- 1) a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container;
- 2) a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities;
- 3) a flare pit.

‘rehabilitation’ the process of reshaping and revegetating land to restore it to a stable landform.

‘release event’ means a surface water discharge from mine affected water storages or contaminated areas on the licensed place meaning the mining activities carried out at the mining tenements detailed in Figure 1 – Site map, domains and groundwater monitoring locations of this environmental authority.

‘resample’ means the resampling that is required to take place within 10 business days of the exceedance of a sampling occasion to verify the result.

‘residual drilling material’ means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

‘RL’ means reduced level, relative to mean sea level as distinct from depths to water.

‘representative’ means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

‘saline drainage’ The movement of waters, contaminated with salts, as a result of the mining activity

‘sampling occasion’ means the collection of a sample undertaken in accordance with the sampling frequency specified, and where an exceedance is recorded the sampling occasion together with the resample.’

‘self-sustaining’ means not requiring on-going intervention and maintenance to maintain functional riverine processes and characteristics

‘sensitive place’ means:

- 1) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- 2) a motel, hotel or hostel; or
- 3) an educational institution; or
- 4) a medical centre or hospital; or
- 5) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- 6) a public park or gardens.

Note: The definition of ‘sensitive place’ and ‘commercial place’ is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling; library; educational institution; childcare; kindergarten; school; playground; hospital, surgery or other medical institution; commercial and retail

activities; protected area or an area identified under a conservation plan under *Nature Conservation Act 1992* as a critical habitat or an area of major interest; marine park under *Marine Parks Act 2004*; park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.

A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.

A township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.

‘significant residual impact’ has the meaning in section 8 *Environmental Offsets Act 2014*.

‘spillway’ means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

‘strategic environmental areas’ has the meaning in section 11(1) of the *Regional Planning Interest Act 2014*.

‘structure’ means dam or levee.

‘substantial low frequency noise’ means a noise emission that has an unbalanced frequency spectrum shown in a one-third octave band measurements, with a predominant component located within the frequency range 10 to 200 Hz.

‘suitably qualified and experienced person’ in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience:

- 1) for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design.
- 2) for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.

‘system design plan’ means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

‘Total Dissolved Salts’ is to be determined using the “gravimetric” method of analysis.

‘Total Nitrogen (TN)’ means the sum of Organic Nitrogen, Ammonia Nitrogen, Nitrite plus Nitrate Nitrogen, expressed as mg/L as Nitrogen. This includes both the inorganic and organic fraction of nitrogen.

‘Total Phosphorus (TP)’ means the sum of the reactive phosphorus, acid-hydrolysable phosphorus and organic phosphorus, as mg/L of Phosphorus. This includes both the inorganic and organic fraction of phosphorus.

‘treated sewage’ means treated sewage released from sewage treatment plants.

‘µS/cm’ means micro siemens per centimetre.

‘void’ means an area of land to be excavated in the carrying out of a mining activity.

‘water’ is defined under Schedule 4 of the *Water Act 2000*.

‘watercourse’ has the same meaning given in the *Water Act 2000*.

‘water quality’ means the chemical, physical and biological condition of water.

‘water year’ means the 12-month period from 1 July to 30 June.

‘waters’ includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), storm water channel, storm water drain, and groundwater and any part thereof.

‘WaTERS’ means Water Tracking and Electronic Reporting System or subsequent updated system, used to submit monitoring data and notify the Queensland Government.[<https://waters.ehp.qld.gov.au/>] or psd.help@qld.gov.au.

‘wet season’ means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

Figures

Figure 1 – Land disturbance – to be provided

Figure 2 – Groundwater bore monitoring locations – to be provided

Figure 3 – Locations of sewage treatment disposal areas

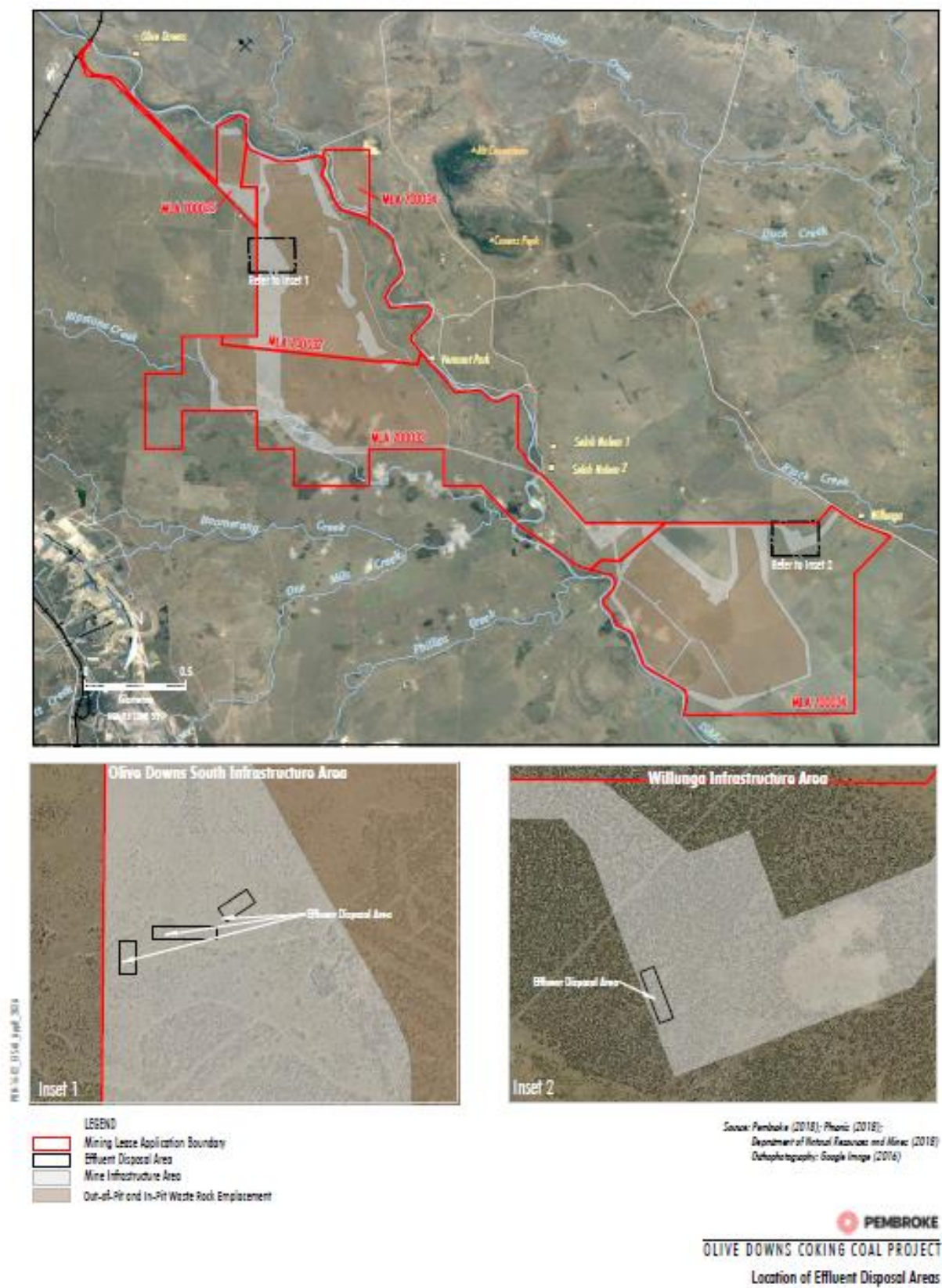


Figure 3

Figure 3 – Locations of sewage treatment disposal areas

Attachment 1:
DES assessment of proposed disturbance footprint on
matters of state environmental significance

Prescribed environmental matter	Proposed disturbance footprint (hectares; ha) derived from data provided in draft EIS
Regulated vegetation*	
Endangered regional ecosystem – insert RE ID	Mine site footprint, consisting of: - RE 11.3.1 - 12 ha - RE 11.4.8 – 3.5 ha - RE 11.4.9- 58 ha - RE 11.5.17 – 62 ha Total: 135.5 ha
Of concern regional ecosystem (not within an urban area)	- RE 11.3.2 – 846 ha - RE 11.3.3 – 5 ha - RE 11.3.4 – 0.3 ha Total: 851 ha
Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map	Mine site footprint Total: 238 ha
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map	11 km Ripstone Creek (SO3 = 50m buffer); RE 11.3.25 – 110 ha 5.6 km unnamed (SO1 = 25m buffer); RE 11.5.3 – 28 ha 5.5 km unnamed (SO1 = 25m buffer); RE 11.3.27b – 28 ha 0.5 km unnamed (SO1 = 25m buffer) RE 11.3.25 - 2.5 ha 0.8 km unnamed (SO1 = 25m buffer) RE 11.3.25 – 4 ha Total: 172.5 ha
Essential habitat (not in an urban area) for vulnerable wildlife	Essential habitat for the ornamental snake: - mine site footprint – 7,402 ha - rail spur buffer (45 m corridor) – 87 ha Total: 7,489 ha
Connectivity areas	
Connectivity area that is a regional ecosystem (not in urban area)	Total: 5,818 ha
Wetlands and watercourses*	
A wetland in a wetland protection area shown on the Map of referable wetlands (HES wetlands in GBR)	Mine site footprint: Total: 61 ha
Protected wildlife habitat*	
A non-juvenile koala habitat tree located in an area shown as a bushland habitat, high value rehabilitation habitat or medium value	Not assessed in draft EIS. Needs further assessment.

Prescribed environmental matter	Proposed disturbance footprint (hectares; ha) derived from data provided in draft EIS
rehabilitation habitat in the 'Map of Assessable Development Area Koala Habitat Values'	
Habitat for an animal that is vulnerable wildlife	Core habitat of ornamental snake consisting of: • mine site - 14,985 ha • rail spur - 38 ha • water pipeline – 44 ha • ETL – 28 ha • access road – 13 ha Total: 15,108 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Koala • mine site and axillary infrastructure – 5,500 ha • rail spur / water pipeline- 71.5 ha • ETL – 12 ha Total: 5,583.5 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Greater glider: Total: 5,500 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Australian painted snipe • mine site – 113 ha • rail spur / water pipeline – 7 ha Total: 120 ha
Habitat for an animal that is vulnerable wildlife – MDL footprint	Squatter pigeon (southern): Total: 5,387ha
Waterway providing for fish passage	
Fish passage (not in an urban area)	DAF to advise

Part 2. Conditions stated under the *Strong and Sustainable Resource Communities Act 2017* to manage the project's social impacts

This schedule includes conditions stated by the Coordinator-General under section 11(2) of the *Strong and Sustainable Resource Communities Act 2017* (SSRC Act). All the conditions in this schedule take effect from the date of this Coordinator-General's report.

The entity with jurisdiction for conditions in this schedule is the Coordinator-General.

Condition 1. General conditions – Olive Downs South domain

- (a) The proponent must advise the Coordinator-General in writing that construction of the Olive Downs South domain has commenced within seven (7) days of construction commencing.
- (b) The proponent must advise the Coordinator-General in writing that operation of the Olive Downs South domain has commenced within seven (7) days of operation commencing.

Condition 2. General conditions – Willunga domain

- (a) The proponent must advise the Coordinator-General in writing that construction of the Willunga domain has commenced within seven (7) days of construction commencing.
- (b) The proponent must advise the Coordinator-General in writing that operation of the Willunga domain has commenced within seven (7) days of operation commencing.

Condition 3. Social impact management plan

- (a) The proponent must develop and implement a detailed action plan to manage the potential social impacts of the project identified in the social impact assessment (SIA) and through ongoing community and stakeholder engagement.
- (b) The proponent must submit to the Coordinator-General for approval a social impact management plan at least three months prior to commencement of construction.
- (c) The social impact management plan must include the following action plans:
 - (i) community and stakeholder engagement plan in accordance with Condition 4
 - (ii) workforce management plan in accordance with Condition 5
 - (iii) workforce housing and accommodation plan in accordance with Condition 6
 - (iv) local business and industry procurement plan in accordance with Condition 7
 - (v) health and community wellbeing plan in accordance with Condition 8.
- (d) The social impact management plan must include a monitoring and evaluation strategy that ensures the social impact management plan is reviewed and updated at least annually.
- (e) The proponent must publish the social impact management plan on their website within one month of the Coordinator-General's approval of the plan. The proponent must notify the Coordinator-General within seven (7) days of the social impact management plan being made publicly available on proponent's website.

Condition 4. Community and stakeholder engagement plan

- (a) The proponent must engage with all relevant stakeholders to ensure they are informed about the project and that identified potential social impact issues are effectively managed and monitored.
- (b) The proponent must prepare a community and stakeholder engagement plan that is to be submitted as part of the social impact management plan to the Coordinator-General for approval, in accordance with Condition 1 of this schedule.
- (c) The community and stakeholder engagement plan must address the construction and operational phases of the project, and include:

- (i) objectives and key performance indicators
- (ii) an analysis of key stakeholders and stakeholder issues
- (iii) action plans for ongoing engagement including details of proposed communication tools, timeframes for activities and roles and responsibilities for engagement
- (iv) processes for incorporating stakeholder feedback into the further development of project-specific management measures
- (v) details of any stakeholder agreements to be negotiated, including agreements with state and local government agencies
- (vi) a complaints management process
- (vii) monitoring and reporting protocols.
- (d) The community and stakeholder engagement plan must:
 - (i) be consistent with the community and stakeholder engagement management strategy at Section 6.3 of Appendix H for the Olive Downs Coking Coal Project draft EIS (September 2018)
 - (ii) incorporate the proponent's commitments listed in Appendix 4 of the Coordinator-General's evaluation report for the Olive Downs project.
- (e) The community and stakeholder engagement plan must provide details for:
 - (i) providing advanced notice to directly-affected landholders and residents of nearby homesteads of project works that may potentially impact on the amenity and activities of the properties
 - (ii) consulting with emergency service providers to develop an emergency response procedure for the mine
 - (iii) consulting with Isaac Regional Council, local service providers and relevant state agencies about potential project impacts on primary healthcare, childcare and social housing and measures to manage potential impacts.

Condition 5. Workforce management plan

- (a) The proponent must prioritise recruitment of workers from local and regional communities and those who would relocate to regional communities and minimise the proportion of fly-in, fly-out (FIFO) workers.
- (b) The proponent must support the health and wellbeing of the project workforce.
- (c) The proponent must prepare a workforce management plan that is to be submitted as part of the social impact management plan to the Coordinator-General for approval, in accordance with Condition 1 of this schedule.
- (d) The workforce management plan must address the construction and operational phases of the project, and include:
 - (i) objectives and key performance indicators
 - (ii) summary workforce profile, including the estimated proportions of new local and FIFO workers
 - (iii) roster arrangements for local and FIFO workers
 - (iv) measures that implement the recruitment strategy described at Section 6.4.3 of Appendix H for the Olive Downs Coking Coal Project draft EIS (September 2018)
 - (v) measures to enhance potential employment opportunities for local communities including Indigenous people, and mitigate potential negative social impacts
 - (vi) proposed training and development initiatives to improve local and regional skills including initiatives for traditionally underrepresented groups
 - (vii) programs to support the physical and mental health and wellbeing of workers

- (viii) the level of on-site health services to be provided for workers
- (ix) details of any workforce code of conduct to govern worker interactions with local communities
- (x) monitoring and reporting protocols.
- (e) The workforce management plan must:
 - (i) be consistent with the workforce management strategy at Section 6.4 of Appendix H for the Olive Downs Coking Coal Project draft EIS (September 2018)
 - (ii) incorporate the proponent's commitments listed in Appendix 4 of the Coordinator-General's evaluation report for the Olive Downs project.

Condition 6. Workforce housing and accommodation plan

- (a) The project must not result in adverse impacts on housing and accommodation affordability and availability in local and regional communities.
- (b) The proponent must prepare a workforce housing and accommodation plan that is to be submitted as part of the social impact management plan to the Coordinator-General for approval, in accordance with Condition 1 of this schedule.
- (c) The workforce housing and accommodation plan must address the construction and operational phases of the project, and include:
 - (i) objectives and key performance indicators
 - (ii) measures to enhance potential benefits for project workers and the community
 - (iii) measures to mitigate potential negative social impacts
 - (iv) policies regarding housing and accommodation support to be provided to project workers and their families who wish to move to the local communities
 - (v) monitoring and reporting protocols.
- (d) The workforce housing and accommodation plan must:
 - (i) be consistent with the preliminary workforce housing and accommodation plan at Appendix I for the Olive Downs Coking Coal Project revised draft EIS (March 2019)
 - (ii) incorporate the proponent's commitments listed in Appendix 4 of the Coordinator-General's evaluation report for the Olive Downs project.
- (e) The workforce housing and accommodation plan must be developed in consultation with Isaac Regional Council and provide:
 - (i) an updated assessment of local housing availability and demand
 - (ii) analysis of the likelihood of unoccupied housing becoming available for project workers to buy or rent
 - (iii) the housing register to be made available for construction workers and their families who wish to reside in the local communities.

Condition 7. Local business and industry procurement plan

- (a) The proponent must ensure that opportunities for local businesses to provide goods and services for the project are maximised during the construction and operational phases.
- (b) The proponent must prepare a local business and industry procurement plan that is to be submitted as part of the social impact management plan to the Coordinator-General for approval, in accordance with Condition 1 of this schedule.
- (c) The local business and industry procurement plan must address the construction and operational phases of the project, and include:
 - (i) objectives and key performance indicators

- (ii) procurement strategies and initiatives for local and regional suppliers, including Aboriginal and Torres Strait Islander owned businesses, and actions to facilitate participation
- (iii) proposed policies and programs to build local and regional capacity and capability, and reduce barriers to entry
- (iv) processes that embed the local business and industry procurement strategies into the contracting model for the project
- (v) measures to mitigate any potential negative social impacts on local industries
- (vi) details of any established industry guidelines or codes of practice which the proponent has committed to complying with
- (vii) monitoring and reporting protocols.
- (d) The local business and industry procurement plan must:
 - (i) be consistent with the local business and industry content management strategy at Section 6.7 of Appendix H to the draft EIS for the Olive Downs Coking Coal Project draft EIS (September 2018)
 - (ii) incorporate the proponent's commitments listed in Appendix 4 in the Coordinator-General's evaluation report for the Olive Downs project.

Condition 8. Health and community wellbeing plan

- (a) The proponent must avoid or mitigate negative social impacts and capitalise on opportunities to improve the health and wellbeing of local and regional communities.
- (b) The project must not result in adverse impacts on the level of service (social services, facilities and infrastructure) currently provided to local communities.
- (c) The proponent must prepare a health and community wellbeing plan that is to be submitted as part of the social impact management plan to the Coordinator-General for approval, in accordance with Condition 1 of this schedule.
- (d) The health and community wellbeing plan must address the construction and operational phases of the project, and include:
 - (i) objectives and key performance indicators
 - (ii) measures to ensure that the level of service provided to the local community by existing social services, facilities and infrastructure is not reduced
 - (iii) measures to mitigate potential health and wellbeing impacts on local communities, and enhance potential benefits
 - (iv) emergency response arrangements and management measures agreed with emergency service providers, for incidents both on and off the project site
 - (v) details of any community development programs to be implemented, and the outcomes to be achieved
 - (vi) monitoring and reporting protocol.
- (e) The health and community wellbeing plan must:
 - (i) be consistent with the preliminary health and community wellbeing plan at Appendix J for the Olive Downs Coking Coal Project revised draft EIS (March 2019)
 - (ii) incorporate the proponent's commitments listed in Appendix 4 in the Coordinator-General's evaluation report for the Olive Downs project.
- (f) The health and community wellbeing plan must provide details for the following matters:
 - (i) measures developed in consultation with Isaac Regional Council, local childcare providers and the Department of Communities, Child Safety and Disability Services

- that demonstrate the project would not adversely impact the level of childcare service provided to the local community
- (ii) measures developed in consultation with Isaac Regional Council, Queensland Health and primary healthcare providers, including local General Practitioners, that demonstrate the project would not reduce the level of primary healthcare service provided to the local community
- (iii) measures developed in consultation with Isaac Regional Council, Emergency and Long-term Accommodation Moranbah and Isaac Affordable Housing Trust that demonstrate the project would not reduce the level of social housing service provided to the local community.

Condition 9. Reporting on the implementation and effectiveness of social impact management measures

- (a) The proponent must report on the implementation and effectiveness of measures to manage the project's social impacts during construction, and the first five (5) years of operation, for each of the Olive Downs South and Willunga domains.
- (b) The proponent must prepare an annual social impact management report (SIMR) during construction of the Olive Downs South domain and for the first five (5) years of operation.
- (c) The proponent must prepare an annual SIMR during construction of the Willunga domain and for the first five (5) years of operation. The SIMR for the Willunga domain must also consider the social impacts associated with construction or operation of Olive Downs South domain occurring at that time.
- (d) The annual SIMR must be submitted to the Coordinator-General for approval within thirty (30) business days after the end of the relevant twelve (12) month period from the commencement of construction of each domain.
- (e) Using the monitoring protocol described in the social impact management plan, the annual SIMR must detail:
 - (i) an assessment of the actual social impacts of the whole project against the potential social impacts identified in the SIA including consideration of impacts of other proposed developments in the local communities
 - (ii) the progress and effectiveness of the social impact management measures detailed in the SIMP
 - (A) where monitoring indicates measures have not been effective, describe how those social impact management measures have been modified
 - (iii) the implementation of commitments relating to social impacts made by the proponent listed in Appendix 4 in the Coordinator-General's evaluation report for the Olive Downs project.
- (f) Each SIMR is to be made publicly available on the proponent's website within one month of the Coordinator-General's approval, during each year of the reporting period. The proponent must notify the Coordinator-General when the SIMR is made publicly available on proponent's website.

Condition 10. Social impact assessment for the Willunga domain

- (a) The proponent must prepare a social impact assessment (SIA) that addresses the social impacts of the construction and operation of the Willunga domain, and those associated with construction (if any) or operation of Olive Downs South domain occurring at that time.
- (b) The proponent must submit a SIA for the Willunga domain that addresses the SIA Guideline (current at the time the SIA is submitted) to the Coordinator-General for approval at least six (6) months prior to commencement of construction of the Willunga domain.

- (c) The SIA is to include:
- (i) project description including workforce profile
 - (ii) social baseline
 - (iii) outcomes of consultation with stakeholders
 - (iv) impact assessment including consideration of other proposed developments in the local communities
 - (v) measures to manage potential social impacts of the project
 - (vi) an updated social impact management plan that is in accordance with the SIA Guideline (current at the time).
- (d) The proponent must publish the updated social impact management plan on their website within one month of the Coordinator-General's approval of the plan. The proponent must notify the Coordinator-General when the social impact management plan is made publicly available on proponent's website.

DEFINITIONS

'commencement of construction' for the Olive Downs South domain it is the construction of the access road from the intersection with Annandale Road to the mine infrastructure area and facilities; for Willunga domain it is the construction of the new intersection and all-weather access road off the Fitzroy Developmental Road

'commencement of operation' for both domains is removal of coal from the ground

'FIFO worker' is a worker who does not live in one of the local communities and must commute to work (could be DIDO, BIBO or FIFO) and stay at the workforce accommodation village while on shift

'key stakeholder' is a stakeholder listed on page 181 of Appendix H of the Olive Downs Coking Coal Project draft EIS

'local community/ies' is any one of the five communities assessed in the SIA: Coppabella, Dysart, Middlemount, Moranbah or Nebo

'local worker' is a worker who lives in one of the local communities

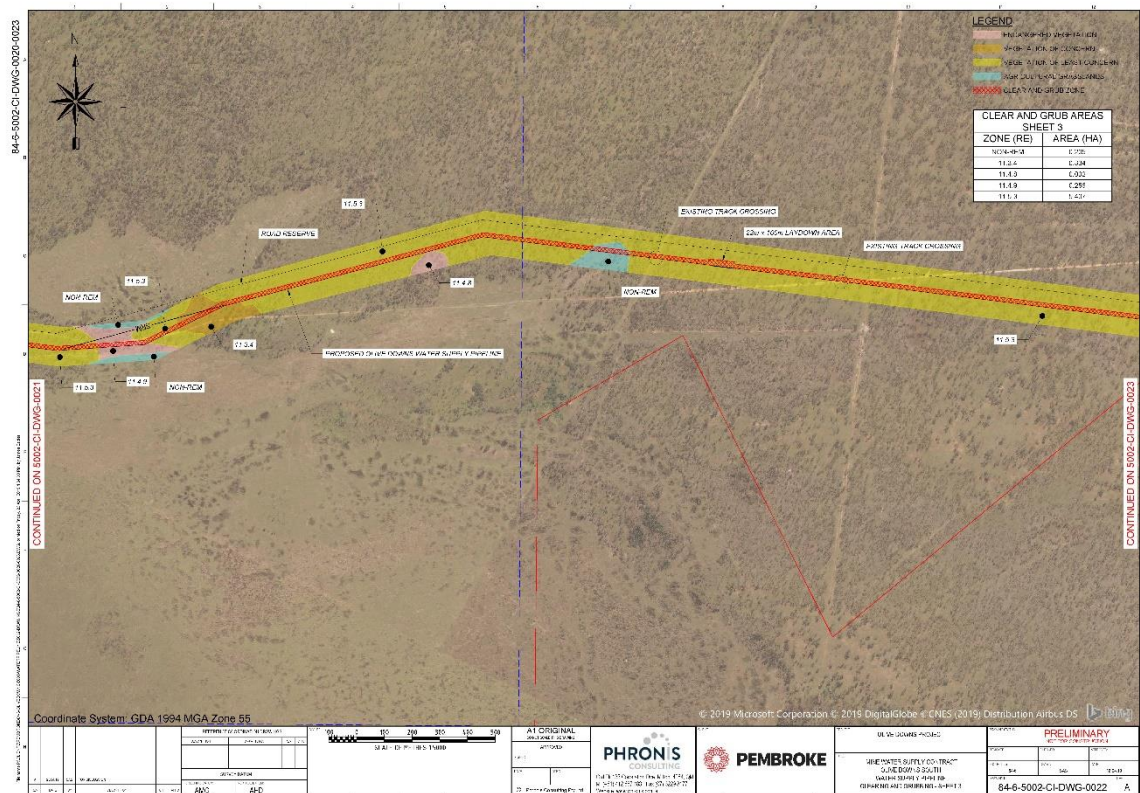
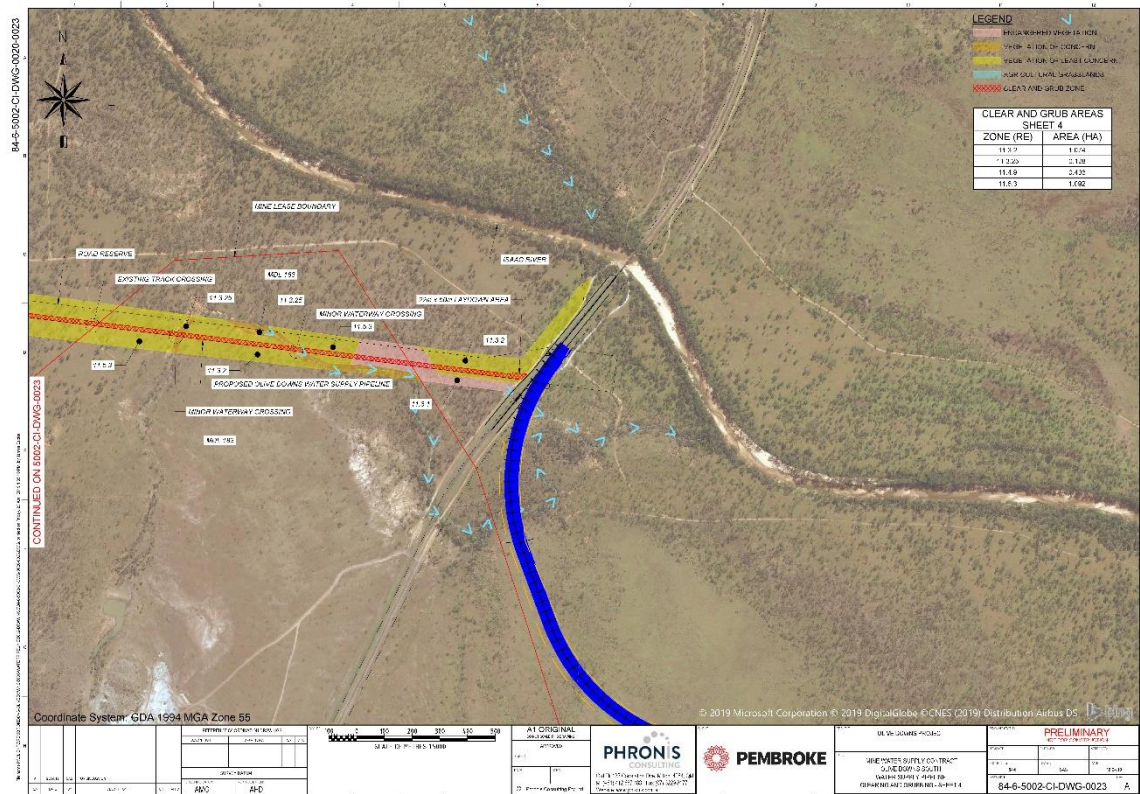
Part 3. Conditions stated under the Planning Act 2016

Condition 11. Development permit for Operational Works for matters regulated under the *Vegetation Management Act 1999*.

This schedule includes the Coordinator-General's stated conditions for operational works under the *Planning Act 2016*, stated under section 39 of the *State Development and Public Works Organisation Act 1971*. The entity with jurisdiction for conditions in this schedule is the Department of Natural Resources, Mines and Energy.

Condition Number	Condition	Timing
1	The clearing of vegetation under this approval is limited to the areas identified as clear and grub areas on the following plans: (a) Olive Downs Project, Mine Water Supply Pipeline Clearing and Grubbing – Sheet 1 (84-6-5002-CI-DWG-0220)	At all times

	(b) Olive Downs Project, Mine Water Supply Pipeline Clearing and Grubbing – Sheet 2 (84-6-5002-CI-DWG-0221) (c) Olive Downs Project, Mine Water Supply Pipeline Clearing and Grubbing – Sheet 3 (84-6-5002-CI-DWG-0222) (d) Olive Downs Project, Mine Water Supply Pipeline Clearing and Grubbing – Sheet 4 (84-6-5002-CI-DWG-0220)	
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Appendix 2. Recommended conditions for the Commonwealth Minister for the Environment

In accordance with section 87 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), this appendix recommends conditions for consideration by the Commonwealth Minister for the Environment in making an approval decision on the proposed action under of the EPBC Act.

Schedule 1. Mine site and access road (EPBC 2017/7867)

Part A. Listed threatened species and ecological communities

Condition 1. Maximum disturbance limits

The outcome sought by this condition is to ensure the approval holder does not impact on more than maximum disturbance limits for each listed threatened species

- (a) The approval holder must not impact more than amount of habitat for each listed threatened species or ecological communities specified in Table A1.
- (b) The approval holder is only authorised to impact on the listed threatened species habitat which are marked as 'TBA' in Table A1, once the revised biodiversity offset strategy (BOS) required by condition 2 has been approved by the department.

Table A1. Maximum disturbance limit–Mine site and access road

Listed threatened species or community	Stage 1 impact (ha)	Stage 2 impact (ha)	Stage 3 impact (ha)	Stage 4 impact (ha)	Total impact
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant) threatened ecological community (TEC)	0	0	13	0	13
Squatter pigeon (<i>Geophaps scripta scripta</i>)	743	1,757	2,284	746	5,530
Australian painted snipe (<i>Rostratula australis</i>)	TBA	TBA	TBA	TBA	TBA
Koala (<i>Phascolarctos cinereus</i>)	TBA	TBA	TBA	TBA	TBA
Greater glider (<i>Petauroides volans</i>)	743	1,762	2,261	734	5,500
Ornamental snake (<i>Denisonia maculata</i>)	TBA	TBA	TBA	TBA	TBA

Condition 2. Biodiversity offset strategy

The outcome sought by this condition is update the impact figures and offset obligations for the listed threatened species identified in Table A1, to authorise the impacts for the mine site and access road.

- (a) In consultation with the Department, update the BOS in the environmental impact statement to include:

- (b) updated impact figures which are marked as 'TBA' for the listed threatened species in Table A1 in condition 1, for each stage of the mine site and access road
- (c) information to support the updated impact figures in the BOS including:
 - (i) detailed justification for the updated impact figures, information which demonstrates that there is suitable available in the proposed offset areas to compensate the residual significant impact on the listed threatened species and ecological communities and/or details of additional offset areas (including maps in electronic Geographic Information System format)
 - (ii) updated EPBC Act assessment guide calculations and justifications, informed by the updated impact figures
 - (iii) any other information that the Department requires to accept and approve the BOS.

Condition 3. Offset Area Management Plan

The outcome sought by this condition to compensate for the residual significant impacts of the project on the listed threatened species identified in condition 1.

- (a) The approval holder must submit an offset area management plan for the written approval of the Minister 4 months prior to commencing each stage of the project.
- (b) The offset management plan must be informed by the updated BOS required by condition 2.
- (c) The offset management plan must:
 - (i) be prepared by a suitably qualified person in accordance with the Department's *Environmental Management Plan Guidelines*
 - (ii) include:
 - (A) details of offsets for residual significant impacts to the following:
 - (1) 13 ha brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community (TEC)*
 - (2) 5,530 ha of Squatter Pigeon (*Geophaps scripta scripta*) habitat
 - (3) Australian painted snipe (*Rostratula australis*) habitat[#]
 - (4) 5,500 ha of greater glider (*Petauroides volans*) habitat
 - (5) Koala (*Phascolarctos cinereus*) habitat[#]
 - (6) Ornamental snake (*Denisonia maculata*) habitat[#].
 - (B) details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act *Environmental Offsets Policy*
 - (C) a field validation survey and baseline description of the current condition (prior to any management activities) of the offset areas, including existing vegetation, and habitat for the koala (*Phascolarctos cinereus*) greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), ornamental snake (*Denisonia maculata*) and Australian painted snipe (*Rostratula australis*).
 - (D) a description and map (including shapefiles) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the offset attributes
 - (E) information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors
 - (F) a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s
 - (G) a discussion of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans

- (H) completion criteria and performance targets for evaluating the effectiveness of Offset Management Plan implementation, and criteria for triggering corrective actions
- (I) a program to monitor, report on and review the effectiveness of the offset management plan.
- (J) a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks
- (K) a sustainable livestock grazing plan to ensure the proposed offset areas squatter pigeon, Australian painted snipe and ornamental snake are not compromised. The sustainable livestock grazing plan must include provisions to ensure that suitable squatter pigeon, Australian painted snipe and ornamental snake habitat located within the proposed offset areas is excluded from grazing areas to prevent the destruction of habitat within the offset areas
- (L) details of additional measures that would be implemented to improve the availability of breeding/denning habitat for the greater glider within the offset areas, should the monitoring program show that greater gliders are not utilising the nest boxes that have been placed in the offset areas
- (M) details of timing and the mechanism to legally secure the environmental offsets.
- (d) The approval holder must legally secure the offsets 2 years prior commencing each stage of the project.
- (e) The approval holder must not impact on koala (*Phascolarctos cinereus*), greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), Australian painted snipe (*Rostratula australis*) and ornamental snake (*Denisonia maculata*) habitat until the Minister has approved the offset management plan.
- (f) The approved offset management plan must be implemented.

**An offset management plan for the brigalow TEC does not need to be provided to the Minister for written approval before the commencement of stage 1 and 2 of the project, but must be provided to the Minister for written approval prior to the commencement of stage 3.*

#The offset obligation for these species must be informed by the by the updated BOS required by condition 2.

Condition 4. Species management plan

- (a) The approval holder must submit a species management plan (SMP) for the written approval of the Minister 3 months prior to commencing each stage of the project.
- (b) The approval holder must not impact on koala (*Phascolarctos cinereus*), greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), Australian painted snipe (*Rostratula australis*) and ornamental snake (*Denisonia maculata*) habitat until the Minister has approved the SMP.
- (c) The SMP must:
- (d) Be generally in accordance with the fauna species management plan in the environmental impact statement (Section 12 of the additional information).
- (e) be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines
- (f) include:
 - (i) measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and communities and their habitat during vegetation clearance, construction, operation and decommissioning of the action

- (ii) a monitoring program to determine the success of management measures that informs adaptive implementation of the species management plan for the duration of this approval
 - (iii) details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.
- (g) For the koala (*Phascolarctos cinereus*) the SMP must incorporate the following measures to mitigate potential impacts to the koala, as a minimum:
- (i) a 60 km/h speed limit must be enforced within the project area
 - (ii) koala proof fencing must be incorporated into the design of any infrastructure constructed for the project where it passes through areas of critical koala habitat
 - (iii) fauna underpasses must be provided at suitable intervals for any infrastructure constructed for the project where it passes through areas of critical koala habitat
- (h) For the greater glider (*Petauroides Volans*) the SMP must incorporate the following measures to mitigate potential impacts to the greater glider, as a minimum:
- (i) rope ladder crossings must be provided at suitable intervals across all infrastructure constructed for the project where it passes through areas of greater glider habitat.
- (i) The approved SMP must be implemented.

Condition 5. Brigalow TEC management plan

- (a) The approval holder must submit a Brigalow TEC management plan for the written approval of the Minister 3 months prior to commencing each stage of the project.
- (b) The management plan must:
- (c) Be generally in accordance with the proposed management plan outlined in the environmental impact statement
- (d) be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines
- (e) include:
- (f) measures that will be implemented to avoid, mitigate and manage impacts to brigalow TEC and their habitat during construction, operation and decommissioning of the action
- (g) a monitoring program to determine the success of management measures that informs adaptive implementation of the management plan for the duration of this approval
- (h) details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.
- (i) The approved brigalow TEC management plan must be implemented.

Definitions

Approved conservation advice/s means a conservation advice approved by the Minister under section 266B(2) of the EPBC Act.

Commencement of the action/commence the action means the first instance of any specified activity associated with the action including clearance of vegetation and construction of any infrastructure. Commencement does not include minor physical disturbance necessary to:

- undertake pre-clearance surveys or monitoring programs
- install signage and/or temporary fencing to prevent unapproved use of the project site (as defined in the preliminary documentation)

- protect environmental and property assets from fire, weeds and pests, including erection or construction of fencing and signage, and maintenance or use of existing surface access tracks.

Condition of the habitat means the baseline condition of suitable habitat for listed threatened species determined from ecological surveys and with consideration of relevant Departmental documents including, but not limited to, EPBC Act referral guidelines, listing advices, approved conservation advices and recovery plans.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of fences and signage.

Department means the Australian Government agency responsible for administering the EPBC Act.

Environmental Management Plan Guidelines means the Environmental Management Plan Guidelines (2014), or subsequent revision.

Environmental Offsets Policy means the EPBC Act Environmental Offsets Policy (2012), or subsequent revision, including the Offset Assessment Guide.

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

Impact/s/ed means as defined in section 527E of the EPBC Act.

Independent audit/s means an audit conducted by an independent and suitably qualified person as detailed in the EPBC Act Independent Audit and Audit Report Guidelines (2015), or subsequent revision.

Listed threatened species and communities means a threatened fauna species and ecological communities listed under the EPBC Act for which this approval has effect, including the:

- brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community
- koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT);
- greater glider (*Petauroides volans*); and
- squatter pigeon (Southern) (*Geophaps scripta scripta*).
- Australian painted snipe (*Rostratula australis*)
- ornamental snake (*Denisonia maculata*)

Legally secure means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.

Minister means the Australian Government Minister administering the EPBC Act including any delegate thereof.

Offset attributes means an '.xls' file capturing relevant attributes of the offset area, including:

- EPBC Act reference number;
- physical address of the offset area;
- coordinates of the boundary points in decimal degrees;
- listed threatened species that the offset compensates for;
- any additional protected matters that are benefiting from the offset; and
- size of the offset in hectares.

Plan/s means any of the documents required to be prepared, approved by the Minister, and/or implemented by the approval holder and published on its website in accordance with these conditions (includes action management plans and the Spring Gully North-West and North-East Project Environmental Constraints Planning and Field Development Protocol);

Protected matter/s means a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect.

Recovery plans means a recovery plan made or adopted by the Minister under the EPBC Act.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Schedule 2. Water pipeline (EPBC 2017/7868)

Part A. Listed threatened species and ecological communities

Condition 1. Maximum disturbance limits

- (a) The outcome sought by this condition to limit the project's impact on the listed threatened species identified in the project area. The approval holder must not impact more than:
- (i) 23 ha of squatter pigeon (*Geophaps scripta scripta*) habitat
 - (ii) 1 ha of Australian painted snipe (*Rostratula australis*) habitat
 - (iii) 28.5 ha of koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (iv) 7 ha of ornamental snake (*Denisonia maculata*).

Condition 2. Offset area management plan

The outcome sought by this condition to compensate for the residual significant impacts of the project on the listed threatened species identified in condition 1.

- (a) The approval holder must submit an offset area management plan for the written approval of the Minister 4 months prior to commencing construction of the water pipeline.
- (b) The offset management plan must:
- (i) be prepared by a suitably qualified person in accordance with the Department's *Environmental Management Plan Guidelines*
 - (ii) include:
 - (A) details of offsets for residual significant impacts to the following:
 - (1) 23 ha of Squatter Pigeon (*Geophaps scripta scripta*) habitat
 - (2) 1 ha of Australian painted snipe (*Rostratula australis*) habitat
 - (3) 28.5 ha of Koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (4) 7 ha of Ornamental snake (*Denisonia maculata*) habitat.
 - (B) details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act *Environmental Offsets Policy*
 - (C) a field validation survey and baseline description of the current condition (prior to any management activities) of the offset areas, including existing vegetation, and habitat for the koala (*Phascolarctos cinereus*) greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), ornamental snake (*Denisonia maculata*) and Australian painted snipe (*Rostratula australis*).

- (D) a description and map (including shapefiles) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the offset attributes
- (E) information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors
- (F) a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s
- (G) a discussion of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans
- (H) completion criteria and performance targets for evaluating the effectiveness of Offset Management Plan implementation, and criteria for triggering corrective actions
- (I) a program to monitor, report on and review the effectiveness of the offset management plan.
- (J) a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks
- (K) a sustainable livestock grazing plan to ensure the proposed offset areas squatter pigeon, Australian painted snipe and ornamental snake are not compromised. The sustainable livestock grazing plan must include provisions to ensure that suitable squatter pigeon, Australian painted snipe and ornamental snake habitat located within the proposed offset areas is excluded from grazing areas to prevent the destruction of habitat within the offset areas.
- (L) details of additional measures that would be implemented to improve the availability of breeding/denning habitat for the greater glider within the offset areas, should the monitoring program show that greater gliders are not utilising the nest boxes that have been placed in the offset areas
- (M) details of the mechanism to legally secure the environmental offsets.
- (c) The approval holder must legally secure the offsets within 2 years of commencing each stage of the project.
- (d) The approval holder must not impact on koala (*Phascolarctos cinereus*), greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), Australian painted snipe (*Rostratula australis*) and ornamental snake (*Denisonia maculata*) habitat until the Minister has approved the offset management plan.
- (e) The approved offset management plan must be implemented.

Condition 3. Species management plan

- (a) The approval holder must submit a species management plan for the written approval of the Minister 3 months prior to commencing construction of the water pipeline.
- (b) The species management plan must:
- (c) be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines; and include:
- (d) measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and communities and their habitat during vegetation clearance, construction, operation and decommissioning of the pipeline. This must include measures to:
 - (i) to prevent entrapment and mortality of EPBC Act listed species within areas that are excavated including pipeline trenches during the construction of the pipeline
 - (ii) for surveying, monitoring and removing and relocating any trapped fauna identified

during monitoring. Surveys must be undertaken by a suitably accredited fauna spotter/catcher in areas prior to commencement of pipe laying and backfilling activities

- (e) a monitoring program to determine the success of management measures that informs adaptive implementation of the species management plan for the duration of this approval
- (f) details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.

Definitions

Approved conservation advice/s means a conservation advice approved by the Minister under section 266B(2) of the EPBC Act.

Commencement of the action/commence the action means the first instance of any specified activity associated with the action including clearance of vegetation and construction of any infrastructure. Commencement does not include minor physical disturbance necessary to:

- undertake pre-clearance surveys or monitoring programs
- install signage and/or temporary fencing to prevent unapproved use of the project site (as defined in the preliminary documentation)
- protect environmental and property assets from fire, weeds and pests, including erection or construction of fencing and signage, and maintenance or use of existing surface access tracks.

Condition of the habitat means the baseline condition of suitable habitat for listed threatened species determined from ecological surveys and with consideration of relevant Departmental documents including, but not limited to, EPBC Act referral guidelines, listing advices, approved conservation advices and recovery plans.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of fences and signage.

Department means the Australian Government agency responsible for administering the EPBC Act.

Environmental Management Plan Guidelines means the Environmental Management Plan Guidelines (2014), or subsequent revision.

Environmental Offsets Policy means the EPBC Act Environmental Offsets Policy (2012), or subsequent revision, including the Offset Assessment Guide.

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

Impact/s/ed means as defined in section 527E of the EPBC Act.

Independent audit/s means an audit conducted by an independent and suitably qualified person as detailed in the EPBC Act Independent Audit and Audit Report Guidelines (2015), or subsequent revision.

Listed threatened species and communities means a threatened fauna species and ecological communities listed under the EPBC Act for which this approval has effect, including the:

- brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community
- koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT);
- greater glider (*Petauroides volans*); and
- squatter pigeon (Southern) (*Geophaps scripta scripta*).

- Australian painted snipe (*Rostratula australis*)
- ornamental snake (*Denisonia maculata*)

Legally secure means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.

Minister means the Australian Government Minister administering the EPBC Act including any delegate thereof.

Offset attributes means an '.xls' file capturing relevant attributes of the offset area, including:

- EPBC Act reference number;
- physical address of the offset area;
- coordinates of the boundary points in decimal degrees;
- listed threatened species that the offset compensates for;
- any additional protected matters that are benefiting from the offset; and
- size of the offset in hectares.

Plan/s means any of the documents required to be prepared, approved by the Minister, and/or implemented by the approval holder and published on its website in accordance with these conditions (includes action management plans and the Spring Gully North-West and North-East Project Environmental Constraints Planning and Field Development Protocol);

Protected matter/s means a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect.

Recovery plans means a recovery plan made or adopted by the Minister under the EPBC Act.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Schedule 3. Electricity transmission line (EPBC 2017/7869)

Part A. Listed threatened species and ecological communities

Condition 1. Maximum disturbance limits

- (a) The approval holder must not impact more than:
- (i) 14 ha of squatter pigeon (*Geophaps scripta scripta*) habitat
 - (ii) 12 ha koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (iii) 10.5 ha of ornamental snake (*Denisonia maculata*) habitat.

Condition 2. Offset area management plan

The outcome sought by this condition to compensate for the residual significant impacts of the project on the listed threatened species identified in condition 1.

- (a) The approval holder must submit an offset area management plan for the written approval of the Minister 4 months prior to commencing construction of the electricity transmission line.
- (b) The offset management plan must:
- (i) be prepared by a suitably qualified person in accordance with the Department's *Environmental Management Plan Guidelines*
 - (ii) include:

- (A) details of offsets for residual significant impacts to the following:
 - (1) 12 ha of squatter pigeon (*Geophaps scripta scripta*) habitat koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (2) 10.5 ha of ornamental snake (*Denisonia maculata*) habitat.
- (B) details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act *Environmental Offsets Policy*
- (C) a field validation survey and baseline description of the current condition (prior to any management activities) of the offset areas, including existing vegetation, and habitat for the koala (*Phascolarctos cinereus*) greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), ornamental snake (*Denisonia maculata*) and Australian painted snipe (*Rostratula australis*).
- (D) a description and map (including shapefiles) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the offset attributes
- (E) information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors
- (F) a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s
- (G) a discussion of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans
- (H) completion criteria and performance targets for evaluating the effectiveness of offset management plan implementation, and criteria for triggering corrective actions
- (I) a program to monitor, report on and review the effectiveness of the offset management plan.
- (J) a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks
- (K) a sustainable livestock grazing plan to ensure the proposed offset areas squatter pigeon, Australian painted snipe and ornamental snake are not compromised. The sustainable livestock grazing plan must include provisions to ensure that suitable squatter pigeon, Australian painted snipe and ornamental snake habitat located within the proposed offset areas is excluded from grazing areas to prevent the destruction of habitat within the offset areas.
- (L) details of additional measures that would be implemented to improve the availability of breeding/denning habitat for the greater glider within the offset areas, should the monitoring program show that greater gliders are not utilising the nest boxes that have been placed in the offset areas
- (M) details of the mechanism to legally secure the environmental offsets.
- (c) The approval holder must legally secure the offsets within 2 years of commencing each stage of the project.
- (d) The approval holder must not impact on koala (*Phascolarctos cinereus*), greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), Australian painted snipe (*Rostratula australis*) and ornamental snake (*Denisonia maculata*) habitat until the Minister has approved the offset management plan.
- (e) The approved offset management plan must be implemented.

Condition 3. Species management plan

- (g) The approval holder must submit a species management plan for the written approval of the Minister 3 months prior to commencing construction of the electricity transmission line.
- (h) The species management plan must:
 - (i) be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines; and include:
 - (j) measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and communities and their habitat during vegetation clearance, construction, operation and decommissioning of the electricity transmission line.
 - (k) a monitoring program to determine the success of management measures that informs adaptive implementation of the species management plan for the duration of this approval
 - (l) details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.

Definitions

Approved conservation advice/s means a conservation advice approved by the Minister under section 266B(2) of the EPBC Act.

Commencement of the action/commence the action means the first instance of any specified activity associated with the action including clearance of vegetation and construction of any infrastructure. Commencement does not include minor physical disturbance necessary to:

- undertake pre-clearance surveys or monitoring programs
- install signage and/or temporary fencing to prevent unapproved use of the project site (as defined in the preliminary documentation)
- protect environmental and property assets from fire, weeds and pests, including erection or construction of fencing and signage, and maintenance or use of existing surface access tracks.

Condition of the habitat means the baseline condition of suitable habitat for listed threatened species determined from ecological surveys and with consideration of relevant Departmental documents including, but not limited to, EPBC Act referral guidelines, listing advices, approved conservation advices and recovery plans.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of fences and signage.

Department means the Australian Government agency responsible for administering the EPBC Act.

Environmental Management Plan Guidelines means the Environmental Management Plan Guidelines (2014), or subsequent revision.

Environmental Offsets Policy means the EPBC Act Environmental Offsets Policy (2012), or subsequent revision, including the Offset Assessment Guide.

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

Impact/s/ed means as defined in section 527E of the EPBC Act.

Independent audit/s means an audit conducted by an independent and suitably qualified person as detailed in the EPBC Act Independent Audit and Audit Report Guidelines (2015), or subsequent revision.

Appendix 2. Recommended conditions for the Commonwealth Minister for the Environment

Olive Downs project

Coordinator-General's evaluation report on the environmental impact statement

Listed threatened species and communities means a threatened fauna species and ecological communities listed under the EPBC Act for which this approval has effect, including the:

- brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community
- koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT);
- greater glider (*Petauroides volans*); and
- squatter pigeon (Southern) (*Geophaps scripta scripta*).
- Australian painted snipe (*Rostratula australis*)
- ornamental snake (*Denisonia maculata*)

Legally secure means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.

Minister means the Australian Government Minister administering the EPBC Act including any delegate thereof.

Offset attributes means an '.xls' file capturing relevant attributes of the offset area, including:

- EPBC Act reference number;
- physical address of the offset area;
- coordinates of the boundary points in decimal degrees;
- listed threatened species that the offset compensates for;
- any additional protected matters that are benefiting from the offset; and
- size of the offset in hectares.

Plan/s means any of the documents required to be prepared, approved by the Minister, and/or implemented by the approval holder and published on its website in accordance with these conditions (includes action management plans and the Spring Gully North-West and North-East Project Environmental Constraints Planning and Field Development Protocol);

Protected matter/s means a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect.

Recovery plans means a recovery plan made or adopted by the Minister under the EPBC Act.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Schedule 4. Rail spur and loop (EPBC 2017/7870)

Part A. Listed threatened species and ecological communities

Condition 1. Maximum disturbance limits

- (a) The approval holder must not impact more than:
- (i) 43 ha of squatter pigeon (*Geophaps scripta scripta*), koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (ii) 6 ha of Australian painted snipe (*Rostratula australis*) habitat
 - (iii) 27 ha of ornamental snake (*Denisonia maculata*) habitat.

Condition 2. Offset area management plan

The outcome sought by this condition to compensate for the residual significant impacts of the project on the listed threatened species identified in condition 1.

- (a) The approval holder must submit an offset area management plan for the written approval of the Minister 4 months prior to commencing construction of the water pipeline.
- (b) The offset management plan must:
 - (i) be prepared by a suitably qualified person in accordance with the Department's *Environmental Management Plan Guidelines*
 - (ii) include:
 - (A) details of offsets for residual significant impacts to the following:
 - (1) 43 ha of Squatter pigeon (*Geophaps scripta scripta*), koala (*Phascolarctos cinereus*) and greater glider (*Petauroides volans*) habitat
 - (2) 6 ha of Australian painted snipe (*Rostratula australis*) habitat
 - (3) 27 ha of ornamental snake (*Denisonia maculata*) habitat.
 - (B) details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act *Environmental Offsets Policy*
 - (C) a field validation survey and baseline description of the current condition (prior to any management activities) of the offset areas, including existing vegetation, and habitat for the koala (*Phascolarctos cinereus*) greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), ornamental snake (*Denisonia maculata*) and Australian painted snipe (*Rostratula australis*).
 - (D) a description and map (including shapefiles) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the offset attributes
 - (E) information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors
 - (F) a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s
 - (G) a discussion of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans
 - (H) completion criteria and performance targets for evaluating the effectiveness of offset management plan implementation, and criteria for triggering corrective actions
 - (I) a program to monitor, report on and review the effectiveness of the offset management plan.
 - (J) a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks
 - (K) a sustainable livestock grazing plan to ensure the proposed offset areas squatter pigeon, Australian painted snipe and ornamental snake are not compromised. The sustainable livestock grazing plan must include provisions to ensure that suitable squatter pigeon, Australian painted snipe and ornamental snake habitat located within the proposed offset areas is excluded from grazing areas to prevent the destruction of habitat within the offset areas.
 - (L) details of additional measures that would be implemented to improve the availability of breeding/denning habitat for the greater glider within the offset

areas, should the monitoring program show that greater gliders are not utilising the nest boxes that have been placed in the offset areas

(M) details of the mechanism to legally secure the environmental offsets.

- (c) The approval holder must legally secure the offsets within 2 years of commencing each stage of the project.
- (d) The approval holder must not impact on koala (*Phascolarctos cinereus*), greater glider (*Petauroides volans*), squatter pigeon (*Geophaps scripta scripta*), Australian painted snipe (*Rostratula australis*) and ornamental snake (*Denisonia maculata*) habitat until the Minister has approved the offset management plan.
- (e) The approved offset management plan must be implemented.

Condition 3. Species management plan

- (m) The approval holder must submit a species management plan for the written approval of the Minister 3 months prior to commencing construction of the rail spur and loop.
- (n) The species management plan must:
 - (o) be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines; and include:
 - (p) measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and communities and their habitat during vegetation clearance, construction, operation and decommissioning of the rail spur and loop.
 - (q) a monitoring program to determine the success of management measures that informs adaptive implementation of the species management plan for the duration of this approval
 - (r) details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.

Definitions

Approved conservation advice/s means a conservation advice approved by the Minister under section 266B(2) of the EPBC Act.

Commencement of the action/commence the action means the first instance of any specified activity associated with the action including clearance of vegetation and construction of any infrastructure. Commencement does not include minor physical disturbance necessary to:

- undertake pre-clearance surveys or monitoring programs
- install signage and/or temporary fencing to prevent unapproved use of the project site (as defined in the preliminary documentation)
- protect environmental and property assets from fire, weeds and pests, including erection or construction of fencing and signage, and maintenance or use of existing surface access tracks.

Condition of the habitat means the baseline condition of suitable habitat for listed threatened species determined from ecological surveys and with consideration of relevant Departmental documents including, but not limited to, EPBC Act referral guidelines, listing advices, approved conservation advices and recovery plans.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of fences and signage.

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Coordinator-General's evaluation report on the environmental impact statement

Environmental Management Plan Guidelines means the Environmental Management Plan Guidelines (2014), or subsequent revision.

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

Impact/s/ed means as defined in section 527E of the EPBC Act.

Independent audit/s means an audit conducted by an independent and suitably qualified person as detailed in the EPBC Act Independent Audit and Audit Report Guidelines (2015), or subsequent revision.

Listed threatened species and communities means a threatened fauna species and ecological communities listed under the EPBC Act for which this approval has effect, including the:

- brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community
- koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT);
- greater glider (*Petauroides volans*); and
- squatter pigeon (Southern) (*Geophaps scripta scripta*).
- Australian painted snipe (*Rostratula australis*)
- ornamental snake (*Denisonia maculata*)

Legally secure means to secure a legal agreement under relevant Queensland legislation, in relation to a site, to provide enduring protection for the site against development incompatible with conservation.

Minister means the Australian Government Minister administering the EPBC Act including any delegate thereof.

Offset attributes means an '.xls' file capturing relevant attributes of the offset area, including:

- EPBC Act reference number;
- physical address of the offset area;
- coordinates of the boundary points in decimal degrees;
- listed threatened species that the offset compensates for;
- any additional protected matters that are benefiting from the offset; and
- size of the offset in hectares.

Plan/s means any of the documents required to be prepared, approved by the Minister, and/or implemented by the approval holder and published on its website in accordance with these conditions (includes action management plans and the Spring Gully North-West and North-East Project Environmental Constraints Planning and Field Development Protocol);

Protected matter/s means a matter protected under a controlling provision in Part 3 of the EPBC Act for which this approval has effect.

Recovery plans means a recovery plan made or adopted by the Minister under the EPBC Act.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Appendix 3. Coordinator-General's recommendations

This appendix includes recommendations, made under section 43 or 52 of the SDPWO Act. The recommendations relate to the applications for development approvals for the project.

While the recommendations guide the assessment managers in assessing the development applications, they do not limit their ability to seek additional information nor power to impose conditions on any development approval required for the project.

Each recommendation nominates the entity to be consulted by the proponent.

Schedule 1. *Transport Infrastructure Act 1994*

This schedule is relevant to applications for which the *Transport Infrastructure Act 1994* is applicable, which is administered by the Department of Transport and Main Roads (DTMR).

Recommendation 1. Traffic impact assessment

- (a) Update the traffic impact assessment (TIA) which covers each stage of the project, assessing and mitigating impacts on the safety, efficiency and condition of state-controlled and local roads. The TIA must:
 - (i) be developed in accordance with the TMR Guide to Traffic Impact Assessment (GTIA)
 - (ii) demonstrate adequate community consultation has been conducted, especially for the proposed heavy vehicle haulage routes
 - (iii) be based on a TMR-endorsed traffic impact assessment scope and development profile
 - (iv) clearly document the assumptions and methodologies that have been previously agreed in writing with TMR and indicate where detailed estimates are not available
 - (v) assess the impacts on any rail level-crossings using the Australian Level Crossing Assessment Model (ALCAM), where relevant
 - (vi) include a completed TMR 'Transport Generation proforma' consolidating project-related traffic generation information or as otherwise agreed in writing with TMR
 - (vii) use TMR's Pavement Impact Assessment tools in accordance with the GTIA or such other method or tools as agreed in writing with TMR including providing estimates of any necessary pavement impact management contributions
 - (viii) detail the final impact mitigation proposals, whether these are road works/improvements, contributions to road works/maintenance or road-use management strategies
 - (ix) provide concept design drawings for all intersections and/or road links that require upgrading
 - (x) provide confirmation that all proposed mitigation works have been designed and will be undertaken in accordance with all relevant TMR standards, manuals and practices.
 - (xi) be approved in writing by TMR Mackay/Whitsunday District office no later than six months prior to the commencement of significant project traffic, unless otherwise agreed between the proponent and TMR.

Recommendation 2. Road-use management plan

- (a) Prepare a road-use management plan (RMP) that covers all stages of the project. The RMP must:

- (i) be developed in accordance with TMR's Guide to Preparing a Road-use Management Plan, with a focus on minimising increased road safety risks and impacts on road condition by project traffic on state-controlled and local roads used
- (ii) detail the low or no-cost, non-infrastructure impact mitigation strategies proposed, such as using designated heavy vehicle haulage routes to minimise road safety and pavement impacts
- (iii) include a table of RMP mitigation commitments, detailing responsibilities for actions along with protocols to ensure the mitigation commitments are complied with
- (iv) be finalised and approved in writing by TMR no later than three months prior to the commencement of significant project traffic, or as otherwise agreed between the proponent and TMR.

Recommendation 3. Required works

- (a) Complete any required roadworks and other impact mitigation strategies identified in the TIA prior to the commencement of any significant project traffic. Works may include the upgrade of any necessary intersection/ accesses to project sites or links in State-controlled road reserves, in accordance with the current TMR road planning and design policies, principles and manuals, unless otherwise agreed in writing with the TMR Mackay/ Whitsunday District Office.
- (b) Pay pavement maintenance contributions prior to commencement of significant project traffic unless otherwise agree to in writing by TMR.

Recommendation 4. Permits, approvals and traffic management plans

- (a) To ensure efficient processing of the project's required transport-related permits and approvals, the proponent should, no later than three months, or such other period agreed in writing with TMR, prior to the commencement of significant project traffic:
 - (i) submit detailed drawings of any works required to mitigate the impacts of project-related traffic for TMR to review and approve, ensuring sufficient time is allowed to construct required works prior to the commencement of project traffic
 - (ii) obtain all relevant licenses and permits required under the TI Act for works within the state-controlled road corridor (s33 for road works approval, s62 for approval of location of vehicular accesses to state roads and s50 for any structures or activities to be located or carried out in a state-controlled road corridor)
 - (iii) prepare a Heavy Vehicle Haulage Management Plan for any excess mass or over-dimensional loads for all phases of the project in consultation with TMR's Heavy Vehicles Road Operation Program Office, the Queensland Police Service
 - (iv) prepare Traffic Management Plan/s (TMP) as required by the TMR District Office if required. (The TMP must be prepared and implemented during the construction and commissioning of each site where road works are to be undertaken, including site access points, road intersections or other works undertaken in the state-controlled road corridor).

Appendix 4. Proponent commitments

Commitment number	Commitment
Rehabilitation	
1.	The project rehabilitation strategy would be implemented in accordance with the <i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i> .
2.	A Plan of Operations would be prepared for the project and would develop on the preliminary rehabilitation requirements described in Table H1 of the Proposed EA conditions (i.e. the rehabilitation goals, domains, objectives, performance indicators and completion criteria), in consultation with the Department of Environment and Science (DES), and based on more detailed mine planning and scheduling information.
3.	The project would be progressively rehabilitated to achieve the rehabilitation objectives established for each domain. The progress of the rehabilitation would be monitored against indicators, and ultimately against completion criteria to demonstrate successful rehabilitation of the project. The rehabilitation goal for the project requires rehabilitation of areas disturbed by mining to create a post-mining landform that is: • safe • non-polluting • stable • able to sustain a post-mining land use.
4.	A rehabilitation monitoring program would be prepared for the project which would be designed to track the progress of revegetation and to determine the requirement for intervention measures, such as alternate species or species mix, thinning to reduce the density of revegetated areas, or additional plantings in areas where vegetation establishment has been sub-optimal.
5.	The in-pit waste rock emplacement areas would be rehabilitated progressively as the mine develops. The mine plan includes fully backfilling Pits Olive Downs South (ODS)1 ODS2, ODS4, ODS5, ODS6 and ODS9, as well as partial backfilling areas of Pits ODS3 and ODS7/ODS8. Similarly, the mine plan for the Willunga domain includes fully backfilling Pits WIL1, WIL2, WIL3 and WIL4 and partially backfilling Pit WIL5.
6.	To improve water quality within the final void water bodies by reducing salinity levels basement coal would be removed from the floor of the ODS3, ODS7/8 and WIL5 open cut pits at the end of mining.
7.	Disturbance due to exploration activities in areas not scheduled or authorised to be mined within two years would be rehabilitated in accordance with provisions detailed in the <i>Code of Environmental Compliance for Exploration and Mineral Developments</i> (DEHP, 2013c).
8.	Permanent highwall emplacements would surround the final voids and isolate them from all flood events, up to and including a PMF event.
9.	Final voids would be designed to act as groundwater sinks into perpetuity, preventing the migration of potentially saline water into adjacent aquifers and watercourses.
10.	Final void highwalls would be fenced to prevent access and designed to remain stable in the long term, based on site specific geological data and geotechnical modelling.
11.	Final void water bodies would be designed to equilibrate well below the point at which they would spill to the surrounding environment.

12.	Post-mining, land used for the project would be reinstated to: • agriculture (low intensity cattle grazing) • native vegetation (woodland) • fauna habitat.
13.	Land between the Isaac River and proposed mining activities would be actively restored and excluded from grazing.
14.	Sediment dams would be retained until the revegetated surface of the waste rock emplacements are stable and runoff water quality reflects runoff water quality from similar undisturbed areas, at which time these controls would be removed and the areas would be free-draining.
15.	All infrastructure associated with the project would be assessed on an individual basis for possible removal or to be retained for future land owners. Where infrastructure is removed, the land would be re-contoured, topsoiled, ripped and seeded. All disturbed areas would be rehabilitated with an appropriate seed mix to enable revegetation.
16.	Remediation works would be undertaken to remove contaminated material, or rip, cap and topsoil inert areas. Areas would then be seeded with native grasses.
17.	The temporary flood levee in the north-east of the ODS domain would be removed or reshaped once the open cut pit is backfilled and rehabilitated in the northern areas to provide additional flood storage areas adjacent the Isaac River to reduce flood velocities and stream power. Similarly, the temporary flood levees in the south and south-west of the ODS domain adjacent Ripstone Creek would be removed or reshaped once the waste rock emplacements are rehabilitated.
18.	The temporary flood levee in the west of the Willunga domain would be removed or reshaped once the Pit WIL1 is backfilled and the waste rock emplacements rehabilitated.
Surface water management	

19.	The following key principles would be applied for the project to meet the water management objectives: • all temporary flood levees would be designed to provide flood ingress protection to a flood level of a 1:1000 annual exceedance probability (AEP) plus suitably designed freeboard • permanent highwall emplacements would be designed to be self-sustaining and long-term stable • all water storage dams, structures and facilities would be designed, constructed and managed in accordance with Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (DEHP, 2016) • water storage dams that manage mine affected water would be designed and operated to achieve zero uncontrolled release to the receiving environment • water for mine operating purposes would be preferentially sourced from dedicated on-site water storage dams • water collected in water storage dams, sediment dams and/or haul road runoff dams would be captured and retained for reuse • on-site and/or controlled release off-site to the receiving environment would be managed in accordance with Guideline: Resource Activity - Mining: Model Water Conditions for Coal Mines in the Fitzroy Basin (DEHP, 2013) • surface runoff from rehabilitated waste rock emplacements would be directed to dedicated sediment dams for settling and release to the receiving environment.
20.	Updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken during the life of the mine and results reported in the Water Management Plan.
21.	A groundwater dependent ecosystem (GDE) and Wetland Monitoring Program would be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project. This will include monitoring of: • groundwater depth and quality • health of the terrestrial vegetation • surface water quantity and quality.
22.	In order to confirm that this reduction in catchment does not result in an adverse impact to the ecological values of the wetlands, further investigation and monitoring would be undertaken through the installation of shallow piezometers within these wetlands and the development and implementation of the GDE and Wetland Monitoring Program.
23.	Mine affected water would be managed through a mine water management system which is designed to operate in accordance with typical EA conditions and the model water conditions. That is, it would have controlled release conditions and in-stream trigger levels aligned with the water quality objectives in the Environmental Protection (Water) Policy 2009.

24.	A Water Management Plan would be prepared cognisant of the DES guideline for the preparation of water management plans for mining activities. This would include, but not necessarily be limited to: • a description of the process that would be implemented should monitoring data indicate that groundwater resources have been affected and the remediation actions that would be implemented • a description of the protocol for mitigating the effect of hazardous substances on groundwater • details of the potential sources of contaminants that could impact on water quality • a description of the water management system for the project • measures to manage and prevent saline drainage and sodicity • measures to manage and prevent acid rock drainage • corrective actions and contingency procedures for emergencies • a program for monitoring and review of the effectiveness of the Water Management Plan.
25.	If, during operations, there was a risk that the licence allocation could be exceeded, the site water demands would be adjusted accordingly (e.g. reduce dust suppression demand) or alternative water harvesting measures on site would be implemented, to avoid and/or minimise any impacts on regional water availability.
26.	The mine would be operated such that water could be temporarily stored in the active open pits if required (e.g. as a result of exceedance of the design capacity of the water management system). Alternatively, additional pit water dams would be constructed ahead of mining in the ODS domain to temporarily store any excess mine affected water until there is sufficient out-of-pit storage available.
27.	A Receiving Environment Monitoring Program would be prepared for the project in accordance with the Receiving Environment Monitoring Program Guideline (DEHP, 2014b). This would include, but not necessarily be limited to: • the monitoring, identification and description of any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity • monitoring the effects of the mine on the receiving environment periodically *under natural flow conditions) and while mine affected water is being discharged from the site • encompassing any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.
28.	Controlled releases would not occur within Wetland Protection Areas located adjacent the project area.
29.	Surface runoff and seepage from run of mine and product coal stockpiles would be monitored for 'standard' water quality parameters including, but not limited to, pH, electrical conductivity, major anions (sulphate, chloride and alkalinity), major cations (sodium, calcium, magnesium and potassium), total dissolved solids, total suspended solids, turbidity and a broad suite of soluble metals/metalloids.

30.	Sediments dams would be designed in accordance with the Best Practice Erosion and Sediment Control guideline (IECA, 2008) and Soil Erosion and Sediment Control Engineering Guidelines for Queensland Construction Sites (Institute of Engineers Australia 1996). An Erosion and Sediment Control Plan would be developed and implemented throughout construction and operations. This would include, but not necessarily be limited to: • providing a detailed description of the management measures to be put in place across the project area, including in relation to the ILF cells • minimising the area of disturbance • applying local temporary erosion control measures • intercepting runoff from undisturbed areas and divert around disturbed areas. Where temporary measures are likely to be ineffective, runoff would be diverted from disturbed areas to sedimentation basins prior to release from the site.
31.	Potable water would be regularly tested to ensure it complies with the Australian Drinking Water Guidelines (NHMRC, 2011).
32.	Initially, sediment dam monitoring would occur on a regular (e.g. monthly) basis to demonstrate the water quality of stored waters is consistent with relevant operating parameters to allow releases from sediment dams to occur when required. Subject to demonstrating the water quality objectives can be met, the frequency of monitoring and suite of parameters for the sediment monitoring would be reviewed and updated accordingly (e.g. to occur only when releases occur).
33.	Mitigation and management measures would be implemented for the mine-affected water dams including: • operational measures that would allow for the practical limitations of being able to redistribute stored volumes across the containment system (including operability of equipment under extreme weather conditions) • annual inspections to assess the condition and adequacy of all components of the regulated structures • establishing and maintaining a register of regulated structures.
Watercourse Diversion	
34.	The Ripstone Creek Diversion would be constructed in consideration of the <i>Water Act 2000</i> (Water Act) and the <i>Environmental Protection Act 1994</i> (EP Act), and to, as far as possible, replicate the natural hydraulic behaviour of the Ripstone Creek waterway.
35.	Ripstone Creek Diversion would be constructed in accordance with DNRM's Guideline: <i>Works that interfere with water in a watercourse—watercourse diversions</i> .

36.	A certified “Design Plan” would be submitted for the Ripstone Creek Diversion to DES prior to construction of the diversion (consistent with environmental authority (EA) Conditions I1, I3 and I4). The Design Plan will include (but not be limited to): • engineering drawings depicting the physical attributes and dimensions of the watercourse diversion • the location, function and description of geomorphic and riparian vegetation features within the proposed watercourse diversion • a revegetation and vegetation management plan (a revegetation plan) • plans and specifications sufficient to complete construction and revegetation in accordance with the design.
37.	A monitoring strategy for the Ripstone Creek Diversion would be implemented that includes monitoring prior to construction, during operation and for relinquishment.
38.	The Ripstone Creek Diversion would closely replicate the natural waterway in profile, flow speeds and where possible shade and instream structure.
Groundwater management	
39.	An Underground Water Impact Report (UWIR) would be prepared prior to the commencement of mining in accordance with Chapter 3 of the Water Act.
40.	A make-good agreement would be entered into through consultation with the owner of ‘Bore 8’ (e.g. resetting the pump set at an appropriate depth for water supply, accounting for the predicted groundwater drawdown), which would be detailed in the Water Management Plan being prepared for the project.
41.	An appropriate monitoring network would be established to assess the potential cumulative impacts on groundwater from Moorvale South and the project.
42.	Recording of groundwater levels from existing monitoring bores and vibrating wire piezometers would be undertaken and would enable natural groundwater level fluctuations (such as responses to rainfall) to be distinguished from potential groundwater level impacts due to depressurisation resulting from proposed mining activities.
43.	Groundwater quality monitoring would be undertaken on a quarterly basis.
44.	Subject to accessibility, quarterly groundwater quality monitoring would be conducted on privately-owned landholder bores predicted to be impacted by drawdown associated with the mining operation.
45.	Groundwater quality triggers would be established for each groundwater unit potentially impacted by the project, including alluvium, regolith and the Permian coal measures
46.	Groundwater quality triggers would be established to monitor predicted impacts on both environmental values and predicted changes in groundwater quality and would be developed in line with the DSITI guideline on Using monitoring data to assess groundwater quality and potential environmental impacts (DSITI, 2017). Impact assessment criteria for the site would be documented within a Water Management Plan.
47.	Each year, an annual review of groundwater quality trends would be conducted by a suitably qualified person. The review would assess the change in groundwater quality over the year, compared to historical trends and impact assessment predictions.

48.	Every five years, the validity of the groundwater model predictions would be assessed and, if the data indicates significant divergence from the model predictions, the groundwater model would be updated for simulation of mining.
49.	Bores fitted with automatic loggers would record on a daily basis with others manually dipped on a quarterly basis. Subject to accessibility, quarterly groundwater level monitoring would also be conducted on privately-owned landholder bores predicted to be impacted by drawdown associated with the project.
50.	Changes in groundwater levels at the site bored would be compared to predicted groundwater trends to evaluate any deviations from the model predictions.
51.	Groundwater seepage would be collected and contained within mine water dams and utilised for processing and dust suppression on site.
52.	Installation of sumps and a pump/pipe system on a bench of the open cut would catch direct groundwater inflows from alluvium exposed in the highwall of the open cut for use in the mine water management system.
53.	The existing groundwater monitoring network would be consolidated to remove bores in close proximity to each other and augmented with additional proposed monitoring locations around the pit footprint and proposed coal reject emplacements/ILF cells.
Flood management	
54.	Permanent highwall emplacements would be constructed to the east and south-east of the proposed ODS domain open cut pits adjacent to the Isaac River floodplain would provide immunity to flood levels up to a PMF flood event.
55.	Temporary flood levees would be designed to protect the active open cut mining area from flood events up to a 0.1per cent AEP flood event.
56.	The flood management infrastructure would be inspected by a suitably qualified and experienced person once per year between the months of May and October (inclusive) (i.e. in advance of the wet season). In addition, a visual inspection of the flood management infrastructure would be carried out following major flood events (e.g. 10 per cent AEP or greater) to identify any potential issues with erosion, settlement or slumping.
57.	Geomorphic monitoring would include a topographic survey of the Isaac River channel and floodplain, repeated every year for three years, and then either every five years, or after every flood event exceeding the five-year ARI event (e.g. 20 per cent AEP or greater).
58.	The rating curve would be adjusted regularly in consultation with the Department of Natural Resources, Mines and Energy (DNRME) or otherwise relocated further upstream (i.e. five km upstream) to the next best confined flow path which is relatively free of influence.
59.	Consultation would continue to occur with adjacent landholders regarding flood modelling to ensure cumulative flood impacts are well understood.
Waste rock and rejects	
60.	Validation testwork of potential waste rock materials from the Willunga domain would be undertaken as the mine develops to enable appropriate waste rock management measures to be planned and implemented.

61.	Highly sodic and/or dispersive waste rock would not be placed in areas which report to final landform surfaces and would not be used in construction activities.
62.	It is expected that highly sodic and dispersive waste rock may not, in some cases, be able to be selectively handled and preferentially disposed of – although reasonable measures would be taken to identify and selectively place highly sodic and dispersive waste rock. In such cases, waste rock landforms would be constructed with short and low (shallow) slopes (indicatively slopes less than 15 per cent and less than 200 m long) and progressively rehabilitated to minimise erosion.
63.	Geotechnical testing of the backfilled parts of Pits ODS 7 and ODS 8 would be conducted to confirm (and validate as required) it is suitable as a foundation for the permanent highwall emplacement.
64.	Waste rock used for construction activities would be limited (as much as practical) to unweathered Permian sandstone materials, as these materials have been found to be more suitable for construction and for use as embankment covering on final landform surfaces.
65.	Regardless of the waste rock type, especially where engineering or geotechnical stability is required, testing would be undertaken during construction to determine the propensity of such materials to erode.
66.	A Mineral Waste Management Plan would be developed prior to the commencement of mining for the handling and disposal of fine reject and coarse reject material for the project.
67.	Validation testwork of actual coal reject materials from the Coal Handling and Processing Plant (CHPP) would be undertaken during development of the mine – particularly during the first two years of CHPP operation following commissioning and following commencement of mining and coal processing at the Willunga domain.
Biodiversity offsets	
68.	As described in the Biodiversity Offset Strategy, biodiversity offsets would be provided for the impacts associated with the project in accordance with the Queensland Environmental Offsets Policy (Version 1.6) (DEHP, 2017) and <i>Environment Protection and BIODIVERSITY Conservation Act 1999</i> (EPBC Act) Environmental Offsets Policy (SEWPaC, 2012a) (and supporting EPBC Act Offsets Assessment Guide [SEWPaC, 2012b]).
69.	Staged environmental offsets would be implemented in consideration of the staged land clearing. The Stage 1 Offset Area is comprised of three distinct areas located on the eastern side of the Isaac River owned by the proponent and there are no other relevant parties with registered interests under the <i>Qld Land Act 1994</i> or the <i>Qld Land Title Act 1994</i> .
70.	The Stage 1 Offset Area would be secured as a nature refuge, as requested by DNRME and DES during consultation regarding the project, within two years of project commencement.
71.	An offset would be provided for each stage of the project prior to works commencing for that stage.
Flora and fauna	
72.	Riparian vegetation along the Isaac River would be avoided (as much as reasonably practical) in the mine design and a minimum buffer zone of 200 m between the mine pits and Isaac River would be implemented.

73.	The conveyor would be restricted to a construction corridor of 180 m however this would be reduced when crossing the Isaac River; where, within 200 m of the defining bank, the construction corridor width would be limited to 45 m to reduce impact on the riparian habitat.
74.	The final location of the rail spur would maintain a buffer zone of approximately 85 m to the bank of the Isaac River at its closest point (affecting 1.5 km of the rail alignment).
75.	The proposed access road would be co-located with existing public and private roads as far as possible to reduce impacts to native vegetation and would be restricted to 40 m at the crossing point.
76.	The electricity transmission line (ETL) alignment has been designed to avoid construction within riparian areas and watercourses by restricting it to a construction corridor of 10 metres.
77.	The haul road crossing would provide access to the eastern waste emplacement from the Olive Downs South Domain and the haul road would be restricted to a construction corridor of 60 m.
78.	Vegetation clearance procedures would be developed as part of the project and would include the following measures: • Boundaries of areas to be cleared, and those not to be cleared, would be defined during construction and operation. • An internal Ground Disturbance Permit would be required prior to any clearing so that clearing activities are authorised prior to disturbance. • Clearing of native vegetation would be undertaken progressively over the life of the mine and only in areas required for mining activities within the following year. • Pre-clearance flora and fauna surveys would be undertaken by suitably experienced and qualified persons. • Native seeds would be collected from the project area for use in the rehabilitation program. • Fauna identified during clearing would be relocated to adjacent habitat and treated for injuries where necessary in accordance with the Fauna Species Management Plan • In consultation with DES, the time of construction would be limited to avoid breeding seasons for threatened species. • Selected trees (e.g. tree hollows) would be salvaged and reused for use as fauna habitat in rehabilitation areas (e.g. habitat logs). • Exclusion zones would be demarcated prior to clearing to protect areas of vegetation to be retained. • Hollow logs, rocks and large debris removed by construction would be salvaged for habitat enhancement in areas for rehabilitation. • Vegetation clearing/excavation would be subject to an internal permitting system.
79.	An appropriate speed limit would be implemented and enforced in the project area and vehicular traffic would generally be restricted to access tracks to minimise potential vehicle strikes on native fauna.

80.	To mitigate the reduction of threatened flora populations, including the Near Threatened <i>Nature Conservation Act 1992</i> (NC Act) <i>Bertya pedicellata</i>, the following measures would be adopted: • Pre-clearance surveys for <i>Bertya pedicellata</i> would be undertaken within habitat proposed to be cleared along the ETL alignment. • Poles and towers would be placed to avoid the <i>B. pedicellata</i> populations. • Maintenance track would be placed to avoid the <i>B. pedicellata</i> populations. • Exclusion zones would be demarcated prior to clearing to protect areas of vegetation to be retained. • A Protected Plant Clearing Permit would be required if impacts to this species are required as part of the ETL construction. If required, (to be determined following detailed design of the ETL), Yurika (a company associated with Energy Queensland) would apply for this permit.
81.	All waterway crossings proposed as part of the project would be constructed with consideration to the <i>Accepted Development Requirement for Operational Works that is Constructing or Raising Waterway Barrier Works</i> (DAF, 2017) so as not to create a barrier to fish movement and minimise impacts on aquatic ecology.
82.	Consultation would occur with DAF regarding the final design of the Isaac River Crossing to ensure adequate consideration of potential fish passage requirements.
83.	Any temporarily clearing of native vegetation, excavation, or placement of fill in a watercourse necessary for and associated with mining operations would be undertaken in accordance with DNRm's (2012) <i>Guideline – Activities in a Watercourse, Lake or Spring Associated with Mining Activities</i> .
84.	Aquatic weed infestations within the project area would be identified and treated.
85.	A Species Management Program would be prepared in accordance with NC Act requirements and section 332 of the <i>Nature Conservation [Wildlife Management] Regulation, 2006</i> .
86.	Site waste management measures would be implemented to reduce the potential to attract vermin and other fauna.
87.	Bridge structures would be designed to maximise vegetation retention and, where applicable, maintain fencing and fauna crossings to ensure safe fauna movement.
88.	Appropriately qualified persons would be engaged to undertake bi-annual pest animal monitoring in the project area. Feral animal control strategies (e.g. baiting and trapping) would be implemented in the project area in accordance with relevant standards, to maintain low abundance of feral animals.
89.	The presence of domestic pets would be restricted in the project area
90.	A Fauna Species Management Plan would be implemented for the project which would include the following management measures: • the open pipe being capped when work is not being undertaken and overnight • surveys by suitably qualified experts of the entire open trench prior to work activities to identify and remove (if necessary) individuals trapped in the trench • install appropriately designed fauna ramps, at appropriate intervals, to assist individuals to escape the open trench.
91.	

Social impacts

92.	The project's recruitment strategy would provide equitable access to employment opportunities and prioritise recruitment of people from the Isaac Regional Council (IRC) LGA in the first instance, before seeking candidates from other areas.
93.	The project would not construct or use additional accommodation facilities for the project's construction and operational workforce.
94.	The project would not use a 100 per cent fly-in fly-out workforce.
95.	Opportunities to employ Aboriginal and Torres Strait Islander people would be identified during future revisions of the Projects recruitment strategy.
96.	The provision of more apprenticeships/traineeships to a more experienced operational workforce, would be considered once the workforce is established and more experienced employees are working on the site.
97.	Candidates who reside within the Central Highlands LGA would be considered in the recruitment strategy.
98.	The feasibility of a local training bond and opportunities for recruitment of partners of mine workers would be investigated as part of the ongoing implementation of the Training and Workforce Development Strategy.
99.	Provide financial investment to one or more education and training providers. The management of this commitment will be detailed within the Health and Community Wellbeing Plan.
100.	A Social Impact Management Plan (SIMP) would be implemented and regularly updated, for the project.
101.	The project's Internal Coordination Committee would track implementation of the SIMP and review key performance measures quarterly, to facilitate continual improvement of strategies and practices. Data on social indicators would be tracked and reported to the Community Reference Group (CRG) and the IRC as available, including quarterly tracking of housing indicators.
102.	A Health & Community Wellbeing Plan would be implemented and regularly updated for the project.
103.	Proponent will consult with IRC and CRG in development and ongoing monitoring of the Health & Community Wellbeing Plan. Proponent will also consult with health service providers, including general practitioners, as well as the Isaac Affordable Housing Trust with respect to impacts on social housing, during development of the Health and Community Wellbeing Plan.
104.	Moranbah Schools and Department of Education will be notified regarding Project schedule.
105.	An Invitation to Moranbah Schools to participate in the CRG will be extended.
106.	Monitoring of the project's impact on demand for school enrolments will be implemented under the Health & Community Wellbeing Plan and reported to CRG.
107.	Proponent will seek participation from Moranbah and Dysart Hospital on the project's CRGs to collectively monitor project impacts on local health services, and identify any additional mitigations required to mitigate impediments to local service access.
108.	Collaborate with IRC, other mining companies and Department of Communities, Child Safety and Disability Services to identify and support possible partnership solutions for childcare capacity. These may include registered and supported 'shared care' options involving employee families, or overnight family or centre-based care options.

109.	Mitigate any impacts the Olive Downs Project may have associated with the child care needs within the local communities. Provide financial investment to one or more child care service providers. The management of this commitment would be detailed within the Health and Community Wellbeing Plan.
110.	Local and district police and emergency services officers would be made aware of the Project's workforce ramp-up and would support advocacy by IRC to the Queensland Government with respect to adequate police and emergency services capacity in local towns.
111.	Develop a contract with a medical service provider to provide workplace health services including health promotion programs and access to a GP for employees living in the Civeo Coppabella Village.
112.	Ensure project personnel and families have access to an Employee Assistance Program for support with mental health issues.
113.	Employ or require the construction and operations contractor to employ an on-site paramedic to manage minor health issues on site and develop health and wellbeing programs focused on physical and mental health.
114.	Liaise with Mackay Hospital and Health Services, and Moranbah and Dysart Hospitals to provide advice on workforce numbers, project timeframes, and on-site/ WAV-based service provision prior to the construction phase.
115.	Prior to operations, seek partnership from GP clinics to ensure that all operational personnel have health assessments in compliance with Coal Mine Workers' Health Scheme, which requires health assessments when personnel enter the industry and then at least every 5 years while employed in the industry.
116.	Local health services would be consulted to identify opportunities to provide health services and programs which both staff and other community members can benefit. This would include partnerships to increase the availability of e.g. men's health checks, skin cancer checks, breast screening or mental health promotion, and will be identified in liaison with local stakeholders during the first year of operation.
117.	Develop emergency response procedures in consultation with Qld Police Services, Qld Fire & Emergency Services, IRC, Qld Chemical Hazards and Emergency Management Unit, Qld Health.
118.	Access and evacuation maps would be provided to the Queensland Ambulance Service for the accommodation camps and villages to be used by the project workforce, if not already provided.
119.	Financial contributions would be made to IRC and the local community through rates and infrastructure contributions and ongoing support for community initiatives.
120.	A local business engagement strategy would be developed for the project. The Moranbah Traders Association, Clermont Business Group, Nebo Community Development Group and the Department of State Development's Regional Economic development team would be consulted during development of the local business engagement strategy.
121.	Ensure payment terms for local business does not exceed 30 days.
122.	Focus on identifying Indigenous businesses in the Isaac, Mackay and adjacent LGAs during the construction phase, engaging Indigenous businesses in the construction supply chain, and ensuring that the Principal Contractor addresses Pembroke's commitments to Indigenous employment.

123.	Best industry practices with respect to DIDO personnel would be investigated and implemented, including safe post-roster driving times and the potential for shared driving arrangements, to support employment of Isaac and Mackay LGA residents who live outside a safe daily driving distance.
124.	The following measures would be implemented to support the management of road safety: • use of buses to transport non-resident workers from Coppabella Village and the Project site • investigate use of buses to transport resident workers from Moranbah and the Project site • encouragement of car-pooling arrangements for personnel • confining the movement of wide loads to low-traffic periods (such as overnight), with the possible exception of 'emergency' deliveries required to maintain production • provision of flights from agreed airports for non-local workers • discussion with Department of Transport and Main Roads regarding intersection construction works on the Fitzroy Developmental Road.
125.	A Workforce Housing and Accommodation Plan would be prepared to reflect the anticipated local/non-local workforce scenario. The Workforce Housing and Accommodation Plan will be updated regularly to reflect changes to the workforce scenario over the life of the project.
126.	Provide financial investment in the housing and rental market within the IRC local government area as part of the mitigation approach. The implementation of this investment would be detailed and managed through the Workforce Housing and Accommodation Plan,
127.	Measures to manage impacts to the local rental market associated with the project workforce would be developed in consultation with the IRC as part of the project Workforce Housing and Accommodation Plan.
128.	Contractors must comply with the Code of Practice for Local Content, and compliance with the Code of Practice for Local Content would be monitored. Monitoring data would be reported to the Community Reference Groups on a regular basis. Where considered necessary, the Code of Practice for Local Content would be revised in response to feedback from the Community Reference Groups.
129.	Undertake all required reporting in compliance with the <i>Strong and Sustainable Resource Communities 2017</i> and any stated or imposed conditions from the Coordinator-General.
130.	Updated data on the Isaac LGA housing market would be incorporated in the development of the Workforce Housing and Accommodation Plan and would consider land development options available in the Isaac LGA.
131.	Table 6-5 of the SIA provided in the draft EIS would be updated during the preparation of the Workforce Housing and Accommodation Plan to include consideration of affordable housing availability.
132.	The Emergency Response Procedure would be reviewed annually during construction and annually during the first three years of operation.
133.	IRC's recommendations for funding arrangements would be considered in discussions with the Community Reference Groups, during preparation of the Community Development and Investment Strategy, to be prepared prior to construction.

134.	Implement a Community Develop Fund which would fund community programs including those associated addressing the needs of vulnerable groups such as the Moranbah Youth and Community Centre. The details of this fund and its management would be addressed in the Health and Community Wellbeing Plan.
135.	If monitoring data indicates the project is impacting on affordable housing, financial support would be provided to the Isaac Affordable Housing Trust and/or Emergency and Long-Term Accommodation Moranbah Inc.
136.	C-Res services would be used to target SMEs.
137.	The Local Content Report would be provided to IRC when it is developed.
138.	Negotiations with the IRC would continue regarding water allocations.
139.	Implement best practice management of any risks to workforce health which are identified as part of the Health Scheme's revision.
140.	All relevant environmental management standards are met with respect to air quality, noise and vibration so as to avoid health impacts and prevent amenity impacts.
Stakeholder engagement	
141.	Implement the community and stakeholder engagement plan would include engagement and opportunity for consultation with all affected and interested persons, and other relevant stakeholders identified during its implementation.
142.	The community and stakeholder engagement plan will include an analysis of key stakeholders and stakeholder issues, address proposed communication tools, provide process for incorporating stakeholder feedback into the project management plans, include a complaints management process and a monitoring and reporting protocol.
Noise	
143.	A Noise Management Plan would be implemented for the project.
144.	Proactive and reactive noise control measures would be implemented. These measures would include the use of weather forecasting and real-time measurement of meteorological conditions and noise levels to modify mining operations as required in order to achieve compliance with applicable noise limits at the nearest sensitive receptors.
145.	Mining operations in Pits ODS7 and ODS8 would be conducted during the daytime hours only, to minimise air quality and noise impacts at nearby privately-owned dwellings.
146.	Machinery would be maintained to ensure optimal operation and minimise unnecessary noise.
147.	To reduce noise emissions at the nearest sensitive receptors throughout the life of the project, a portion of the overland conveyor would be enclosed and low noise idlers would be utilised.
Air quality	
148.	An Air Quality Management Plan would be implemented for the project.

149.	Management measures to minimise the generation of coal dust from rail loading and transport would be implemented, consistent with the dust mitigation activities presented in the Coal Dust Management Plan (QR Network, 2010), including: • limiting vehicle speeds on unsealed roads to reduce dust generation • automated loading of train wagons to prevent overloading • sill beam brushes to remove coal on the outside faces of the train wagons • veneering system to prevent coal dust generation during transit to port use of spill pit to recover spilt coal under the train load out.
150.	Proactive and reactive dust control measures would be implemented. These measures would include the use of weather forecasting and real-time measurement of dust levels and meteorological conditions to modify mining operations as required in order to achieve compliance with applicable air quality objectives at the nearest privately-owned receivers.
151.	Meteorological data and TSP, PM ₁₀ and PM _{2.5} levels would be monitored on an ongoing basis at the existing monitoring site at the project for the implementation of operational dust controls. A network of dust deposition gauges would also be installed.
152.	If monitoring indicates any unexpected exceedances of air quality objectives, an investigation would be conducted, including additional dust monitoring if required.
153.	Develop and operate a complaints management procedure as part of the project's environmental management plan.
154.	Annual reporting of greenhouse gas emissions, energy production, energy consumption and any other information required under the <i>National Greenhouse and Energy Reporting Act 2007</i> would be submitted to the relevant Commonwealth department.
Blast management	
155.	Blast management measures to minimise the off-site generation of dust and fumes would be detailed in a Blast Management Plan to be prepared for the project. Blast management measures may include product selection, review of prevailing meteorology and review of ground conditions.
156.	The use of non-hydrofluorocarbon products would be prioritised (utilising available information such as safety data sheet information) when selecting blasting materials.
Project rail spur	
157.	The project rail spur would be designed and constructed in consultation with Aurizon to minimise potential impacts on the existing environment in accordance with relevant guidelines, including the Guide for Development in a Railway Environment (Department of Infrastructure and Planning, 2010).
158.	The rail spur and pipeline would be constructed to incorporate cattle underpasses and level crossings at various locations to enable cattle and vehicles to move below/across the infrastructure corridor and access the Isaac River. These underpass points would also accommodate water distribution infrastructure to allow the landholder to move water from pumping locations on the Isaac River to other parts of the Wynette property.
159.	A four-strand stock fence would be installed along the rail spur to control cattle access. Cattle grids and stock gates would be constructed at all existing access tracks to allow for continued access.

160.	The project rail spur would be constructed in accordance with Aurizon's flood design criteria, using culverts and bridge structures along the length of the rail spur to manage impacts of floodwater on neighbouring properties.
Transport	
161.	Parts of Annandale Road, from Daunia Road to the Olive Downs South domain mine access road, would be upgraded for the project in accordance with the infrastructure agreement being developed with IRC. The infrastructure agreement would define the extent of the staged external road infrastructure upgrades, timing and the associated costs. The upgrade works would include construction of an intersection with the yet to be constructed Moorvale South Mine haul road. The intersection will be designed in consultation with the IRC and Peabody to accommodate the project and Moorvale South Mine vehicle movements.
162.	The intersection with the Fitzroy Developmental Road would be constructed in accordance with DTMR (2014) 'Road Planning and Design Manual (Edition 2) – Volume 3: Supplement to Austroads Guide to Road Design Part 4A'. Furthermore, the lighting at the Willunga Domain Access Road and Fitzroy Development Road intersection would be designed and constructed in accordance with the relevant Australian Standards in consultation with the DTMR.
163.	Pembroke would install permanent flood lighting at the new intersection of the ODS project access road and Annandale Road, and street lighting along the extent of Annandale Road that is subject to the proposed upgrade. The lighting requirements at these locations would be identified during detailed design of the road upgrades and intersection design, in consultation with the Isaac Regional Council and DTMR.
164.	The left turn from the Peak Downs Highway to Daunia Road intersection would be upgraded to a full auxiliary lane in 2027 to cater for project generated traffic.
165.	Existing local and regional infrastructure would be used to transport product coal to the port for export, including the Norwich Park Branch Railway and the DBCT.
166.	Any level crossings impacted by the project would be assessed by Aurizon using the Australian Level Crossing Assessment Model and, where required, upgraded to the design standard recommended by Aurizon.
167.	Ongoing monitoring of the usage of the southern portion of Annandale Road would be conducted and, if monitoring indicates that additional traffic is utilising this road and impacts are being generated, the proponent would determine whether upgrades are required in consultation with the IRC. Contributions would be made to the upgrade costs in accordance with the infrastructure agreement with the IRC. All employees and contractors would be instructed to not access the Olive Downs South domain via the southern portion of Annandale Road.
168.	A pavement design specialist would determine the existing capacity of the pavement on Moranbah Access Road, in consultation with IRC.
169.	A pavement design specialist would be engaged to determine the existing capacity of the pavement on affected links of the Peak Downs Highway and Fitzroy Developmental Road, in liaison with DTMR, to determine whether monetary contributions or other compensation would be required to offset the pavement impacts generated by the project.
170.	Consultation would occur with DTMR and emergency service providers during finalisation of the Road-Use Management Plan.

171.	Management strategies that would be implemented to minimise potential road safety impacts on all public roads carrying project traffic (including heavy vehicles) include: • operation of lighting on-site in accordance with the relevant Australian Standards • discouraging staff from using roads that do not form part of the preferred access routes to the sites • sponsoring driver reviver rest areas to deal with driver fatigue • developing policy on how long drivers can operate a vehicle and how many breaks they require • limiting overtime and developing safe driving plans.
172.	The project workforce would utilise the existing regional air infrastructure.
	Land
173.	The area of agricultural land disturbed by the project at any one time would be minimised so that beneficial agricultural uses (i.e. cattle grazing) could continue to be undertaken on available grazing land within the project footprint.
174.	Soil stripping and handling measures would be undertaken in accordance with a Topsoil Management Plan to be developed for the project. This would include, but not necessarily be limited to, a description of the site selection for the soil stockpiles and the soil handling and storage measures.
175.	A topsoil inventory would be maintained during the life of the project and detailed in the Topsoil Management Plan. The topsoil inventory would account for the volumes and locations of topsoil to be progressively stripped, stockpiled and reapplied.
176.	Appropriate mitigation and management measures would be implemented to prevent or reduce the potential for contamination as a result of the project. If evidence of unexpected contamination is identified, work would cease in that area and action taken to appropriately delineate the contaminated soil or fill material. In accordance with the EP Act, this material would be managed or remediated and validated under supervision of a suitably qualified person. DES would be notified by telephone, as well as by written notification within 24 hours of detection and advised of appropriate remedial action.
177.	Consultation would occur with DNRME and the IRC regarding the potential impacts to the stock route network and any mitigation measures considered necessary. The rail spur would be fenced to prevent access by stock.
178.	Prior to the commencement of any occupation, activity or construction upon any lands, all appropriate land tenure would be secured and all necessary approvals and/or consents from all parties holding a lawful interest in the lands within the project disturbance footprint would be obtained. DNRME would be consulted regarding obtaining relevant tenure for these parcels of land.
179.	Any future land contamination assessments would be conducted by a suitably qualified person.
	Visual
180.	Whilst ensuring that operational safety is not compromised, light emissions from the project would be minimised by selecting the placement, configuration and direction of lighting to reduce potential impacts to the surrounding environment where practicable in accordance with the relevant Australian Standard.

181.	Visual screening to mitigate visual impacts during operations (e.g. through tree planting) would be considered if requested by a nearby landholder.
Waste	
182.	Waste would be managed in accordance with the waste and resource management hierarchy as stipulated in the <i>Waste Reduction and Recycling Act 2011</i> . If waste must be disposed of, it would be done in a way that prevents or minimises adverse effects on environmental values.
183.	Waste generated at the project that requires off-site disposal will either be transferred to the Dysart, Moranbah or Clermont resource recovery centres. If capacity at these facilities is unavailable or an agreement with IRC for waste disposal cannot be reached, waste from the project would be disposed within landfill sites in the Mackay Regional Council (e.g. disposal within the Hogan's Pocket Landfill, via the Paget Waste Management Centre).
184.	An appropriately qualified person would be engaged to operate the sewage treatment plant.
185.	A Waste Management Plan would be developed and implemented at the project.
Safety	
186.	All equipment and vehicle operators would be trained in the safe operation of the equipment (including operating procedures for the refilling and maintenance of fuel storage tanks and mine vehicles) and the relevant emergency response procedures in the event of an incident.
187.	Regular inspection programs would be undertaken to monitor the structural integrity of fuel tanks and bunds.
188.	The explosive magazine would be fenced, signed and maintained in accordance with AS 2187.1:1998 <i>Explosives – Storage, Transport and Use</i> .
189.	The following processes and measures would be implemented at the project to reduce the risk of impacts on health, safety and the environment associated with the project: • Development and implementation of a Risk Management System. • Hazardous substances (including, hydrocarbons, chemicals and explosives) would be transported, stored and handled in accordance with relevant legislation, standards and guidelines. • The management of all chemicals would be conducted in accordance with the relevant safety data sheet. • Training of vehicle and equipment operators would be undertaken to allow for safe and stable operation of the equipment and emergency response procedures would be implemented in the event of an incident. • Contractors would be required to dispose of waste on-site per their existing agreements, or waste will be trucked out of the IRC area to waste facilities with the capacity to take the waste generated by the project. • Regular inspections would be conducted to maintain the structural integrity of hazardous substance storage tanks and bunds. • Spill control kits would be located at all chemical storage areas and within storage vehicles. • Consultation would occur with relevant community emergency services and implement community engagement processes. • The explosives magazines would be fenced, signed and maintained in accordance with AS 2187.1:1998.

190.	An Emergency Response Procedure would be prepared in consultation with emergency services (e.g. Queensland Police Service, Queensland Fire and Emergency Service). The Emergency Response Procedure would be provided to the QAS prior to the commencement of the project.
191.	A risk study specific to hazardous chemicals stored on-site would be performed during the detailed design phase of the project, in accordance with relevant standards and codes.
Biosecurity	
192.	Pembroke would prepare and implement a Weed and Pest Management Plan for the project.
193.	The project would be managed so that it does not result in the spread of pests, diseases or contaminants.
194.	Weed management (prevention, monitoring and control) would be undertaken to lessen the abundance and species of weeds in the project area and minimise the potential for weeds to spread into adjacent habitat areas. Weeds that are present on-site would be identified by regular surveys (of tracks, revegetation [rehabilitation] areas and topsoil stockpiles, etc.).
Bushfire risk	
195.	All reasonable and practicable fire prevention measures would be implemented during construction and operation, including: • clearing restrictions • controlled grazing • restricted vehicle movements • construction and maintenance of fire breaks (if required) • use of diesel vehicles • prohibition of smoking in fire prone areas • rapid response to any outbreak of fire • provision of fire-fighting equipment around site • training of staff in the use of the fire-fighting equipment.
196.	Bushfire prevention and management measures would include: • Implementation of a Safety Management System and associated frameworks to record and monitor fire including: – incident management framework – hazard / near miss reporting process – incident notification – crisis management and evacuation framework. • Allowance for appropriate buffer distances between the project and surrounding bushland. • Minimise any chemicals used in the project area and ensure they are handled and disposed of in accordance with the relevant Safety Data Sheet. Ensure access tracks are able to be used for fire-fighting and other emergency purposes by Queensland Fire and Rescue Service.
A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E).	

197. The following key principles would be applied for the project to meet the water management objectives:
- all temporary flood levees would be designed to provide flood ingress protection to a flood level of a 1:1000 AEP plus suitably designed freeboard
 - permanent highwall emplacements would be designed to be self-sustaining and long-term stable
 - all water storage dams, structures and facilities would be designed, constructed and managed in accordance with Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (DEHP, 2016)
 - water storage dams that manage mine affected water would be designed and operated to achieve zero uncontrolled release to the receiving environment
 - water for mine operating purposes would be preferentially sourced from dedicated on-site water storage dams
 - water collected in water storage dams, sediment dams and/or haul road runoff dams would be captured and retained for reuse
 - on-site and/or controlled release off-site to the receiving environment in accordance with Guideline: Resource Activity - Mining: Model Water Conditions for Coal Mines in the Fitzroy Basin (DEHP, 2013)
 - surface runoff from rehabilitated waste rock emplacements would be directed to dedicated sediment dams for settling and release to the receiving environment.
- Updated flood modelling to reflect the final (detailed) design of the temporary levees and waste rock emplacements would be undertaken during the life of the mine and results reported in the Water Management Plan.
- A GDE and Wetland Monitoring Program would be prepared and implemented to detect potential impacts on GDEs and wetlands associated with the project. This will include monitoring of:
- groundwater depth and quality
 - health of the terrestrial vegetation
 - surface water quantity and quality.
- In order to confirm that this reduction in catchment does not result in an adverse impact to the ecological values of the wetlands, further investigation and monitoring would be undertaken through the installation of shallow piezometers within these wetlands and the development and implementation of the GDE and Wetland Monitoring Program.

Ornamental snake

198. The following measures would be undertaken to minimise potential adverse impacts on important habitat for the Ornamental Snake:
- Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher.
 - Implementation of a Weed and Pest Management Plan to monitor and control feral animals (including feral pigs which can degrade important habitat for the Ornamental Snake [DEE, 2019]).
 - Bushfire prevention would be undertaken, noting that the important habitat for the Ornamental Snake occurs in Brigalow Woodland and this species uses groundcover which is susceptible to fire (DEE, 2019).
- A National or State recovery plan has not been prepared for this species. The above measures are predicted to be effective in minimising potential adverse impacts from the project on the important and dispersal habitat for the Ornamental Snake because they are focused on addressing the recognised threats to the species and they are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and minimising the risk of invasive and predatory species) (DEE, 2019).
- Further to this, the unavoidable loss of habitat for the Ornamental Snake associated with the project would be offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC, 2012a) (Section 10).

Australian Painted Snipe

199. The following measures would be undertaken to minimise potential adverse impacts on breeding/foraging habitat for the Australian Painted Snipe:
- Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher.
 - Implementation of a Weed and Pest Management Plan to monitor and control feral animals (including foxes and feral cats which are known threats to the Australian Painted Snipe) within the breeding/foraging habitat identified.
- The above measures are predicted to be effective in minimising potential adverse impacts from the project on potential foraging habitat for the Australian Painted Snipe because they are focused on addressing the recognised threats to the species identified in the *Approved Conservation Advice for Rostratula australis Australian Painted Snipe* (DSEWPC, 2013) and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling feral animals) (after DotE, 2014b). Further to this, the unavoidable loss of habitat for the Australian Painted Snipe associated with the project would be offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC, 2012a) (Section 10).

Squatter Pigeon (Southern)

200.	The following measures would be undertaken to minimise potential adverse impacts on the breeding, foraging and dispersal habitat for the Squatter Pigeon (southern): • Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. • A Weed and Pest Management Plan would be implemented to monitor and control feral animals (such as the European Rabbit, Feral Cat and European Red Fox which are known threats to the Squatter Pigeon [southern]) in the breeding, foraging and dispersal habitat for this species. The above measures are predicted to be effective in minimising potential adverse impacts from the project on the breeding, foraging and dispersal habitat for the Squatter Pigeon (southern) because they are focused on addressing the recognised threats to the species and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling predators and herbivores) (DEE, 2019). A National or State recovery plan has not been prepared for this species. Further to this, the unavoidable loss of habitat for the Squatter Pigeon (southern) associated with the project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10).
Koala	
201.	The following measures would be undertaken to minimise potential adverse impacts on critical habitat for the Koala: • Impact avoidance measures outlined in Table 7-6 of the Additional Information to the EIS (including minimising potential impacts to the riparian corridor associated with the Isaac River). • Vegetation clearance procedures outlined in Table 7-6. This includes progressive vegetation clearing, demarcation of habitats proposed to be cleared, the implementation of pre-clearance surveys and the use of a qualified fauna spotter catcher. • Implementation of fauna crossings to ensure safe fauna movement across haul roads (between areas of critical habitat). • A Weed and Pest Management Plan would be implemented to monitor and control feral animals (such as the feral dog which is a known threat to the Koala) in the critical habitat for the Koala. The above measures are predicted to be effective in minimising potential adverse impacts from the project on critical habitat for the Koala because they are focused on addressing the recognised threats to the species and are consistent with the relevant threat abatement actions (e.g. avoiding additional habitat loss and controlling predators) (DEE, 2019). A National or State recovery plan has not been prepared for this species. Further to this, the unavoidable loss of habitat for the Koala associated with the project would be offset in accordance with the <i>EPBC Act Environmental Offsets Policy</i> (DSEWPC, 2012a) (Section 10).
Brigalow EEC	

202. The project would remove approximately 13 ha of Brigalow EEC (represented by RE 11.4.9). These patches are already degraded by edge effects and are highly fragmented. A further two patches of Brigalow EEC would be avoided by the project and it is unlikely that any potential indirect impacts would result in significant impacts to these patches of Brigalow EEC.

The following measures would be undertaken to minimise potential adverse impacts on habitat for the Greater Glider:

- Vegetation clearance procedures, including demarcation of clearing zones to protect the areas of Brigalow EEC to be retained.
- Bushfire prevention would be undertaken.
- A Weed and Pest Management Plan would be implemented to monitor and control weed species in areas of Brigalow EEC to be retained.

The above measures are predicted to be effective in minimising potential adverse impacts from the project on Brigalow EEC because they are focused on addressing the recognised threats to the community and are consistent with the relevant threat abatement actions (e.g. avoiding additional clearance, minimising the risk of fire, weeds and pest animals) (DEE, 2019). A National or State recovery plan has not been prepared for this community. Further to this, the unavoidable loss of Brigalow EEC associated with the project would be offset in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPC, 2012a) (Section 10).

Acronyms and abbreviations

Acronym	Definition
ACH Act	<i>Aboriginal Cultural Heritage Act 2003 (Qld)</i>
AEIS	Additional information to the environmental impact statement
AHD	Australian Height Datum
ALCAM	Australian level crossing assessment model
ANZECC	Australian and New Zealand Environment Conservation Council
ASX	Australian Stock Exchange
BBAC	Barada Barna Aboriginal Corporation
BIBO	bus-in, bus-out
BOS	biodiversity offset strategy
CAMBA	China–Australia Migratory Bird Agreement
CASA	Civil Aviation Safety Authority
CBA	cost-benefit analysis
CDMP	coal dust management plan
CEMP	construction environment management plan
CGE	computable general equilibrium
CHMP	cultural heritage management plan
CHPP	coal handling and processing plant
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLMP	the coal loss management program for coal transport and coal dust emissions
CLR	Contaminated Land Register
CO ₂ -e	carbon dioxide equivalent
CSG	coal seam gas
DAF	Department of Agriculture and Fisheries
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
dB(A)	decibels measured at the ‘A’ frequency weighting network
DBCT	Dalrymple Bay Coal Terminal
dBZ	decibels of Z, a meteorological measure of equivalent reflectivity (Z) of a radar signal
DEE	Department of Environment and Energy (Cwth)
DES	Department of Environment and Science (Qld)
DIDO	drive-in, drive-out
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning
DTMR	Department of Transport and Main Roads (Qld)
EA	environmental authority
EIS	environmental impact statement

Acronym	Definition
ELAM	Emergency and long-term accommodation Moranbah
EMP	environmental management plan
EMR	Environmental Management Register
EP	equivalent persons
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPC	exploration permit for coal
EPP	Environmental Protection Policy (water, air, waste, noise)
EPP (Air)	Environmental Protection (Air) Policy 2008
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity
ESA	environmentally sensitive area
ETL	electricity transmission line
EVNT	endangered, vulnerable and near threatened
FID	financial investment decision
FIFO	fly-in fly-out
FSL	full supply level
FSMP	fauna species management plan
FTE	full-time equivalent
GBRMP	Great Barrier Reef Marine Park
GBRWA	Great Barrier Reef World Heritage Area
GDE	groundwater dependent ecosystem
GDEWMP	groundwater dependent ecosystem and wetland management plan
GHG	greenhouse gas
GP	General Practitioner
GQAL	good quality agricultural land
ha	hectares
HES	high ecological significance
IAHT	Isaac Affordable Housing Trust
IAS	initial advice statement
ICN Gateway	Industry Capability Network Gateway
ILF	in-line flocculation
ILUA	Indigenous Land Use Agreement
IRC	Isaac Regional Council
ISO	International standards organisation
JAMBA	Japan–Australia Migratory Bird Agreement
JORC	Joint Ore Reserve Committee
kL	kilolitres
kPa	kilopascal

Acronym	Definition
L _{A1}	those noise levels that are exceeded for one per cent of each one-hour sample period
L _{Aeq}	the average A-weighted sound pressure level of a continuous steady sound that has the same mean square sound pressure as a sound level that varies with time
L _{Amax}	the maximum average A-weighted sound pressure measured over a specified period of time
LAN,T	statistical descriptor for the variation of noise
LGA	local government area
max L _{PZ,15 min}	the maximum value of the Z-weighted sound pressure level measured over 15 minutes
MCU	material change of use
MEDLI	model for effluent disposal using land irrigation
MIA	mine infrastructure area
MIC	maximum instantaneous charge
mg/L	milligrams per litre of liquid/gaseous liquid
ML	megalitres
MLA	mining lease application
MMC	mining model conditions
MNES	matters of national environmental significance
MOU	memorandum of understanding
MR Act	<i>Mineral Resources Act 1989</i> (Qld)
MRC	Mackay Regional Council
MSES	matters of state environmental significance
Mt	million tonnes
Mtpa	million tonnes per annum
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NEPC	National Environmental Protection Council
NEPM	national environment protection measure
NGA	National Greenhouse Accounts
NGAF	National Greenhouse Accounts Factors
NGER	national greenhouse and energy reporting
NGOs	non-government organisations
NICH	non-Indigenous cultural heritage
NT agreement	native title agreement
ODS	Olive Downs South
P&G Act	<i>Petroleum and Gas Act 2004</i> (Qld)
PM ₁₀	particulate matter with equivalent aerodynamic diameter less than 10µm
PM _{2.5}	particulate matter with equivalent aerodynamic diameter less than 2.5µm
PMF	probable maximum flooding
PMST	protected matters search tool

Acronym	Definition
PPV	peak particle velocity, which is a measure of ground vibration magnitude and is the maximum instantaneous particle velocity at a point during a given time interval in mms^{-1}
PRC plan	progressive rehabilitation and closure plan
QAS	Queensland Ambulance Service
QFES	Queensland Fire and Emergency Service
QGEOP	Queensland Government Environmental Offsets Policy
QH	Queensland Health
QPS	Queensland Police Service
QWC	Queensland Water Commission
QWQG	<i>Queensland Water Quality Guidelines</i>
RE	regional ecosystem
REMP	receiving environment monitoring plan
RIA	road impact assessment
RIN	Resource Industry Network
RMP	road-use management plan
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
ROM	run of mine
SCL	strategic cropping land
SDA	state development area
SDPWO Act	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
SDWPO Regulation	State Development and Public Works Organisation Regulation (Qld)
SIA	social impact assessment
SIAU	Social Impact Assessment Unit
SIMP	social impact management plan
SLA	statistical local area
SPP	state planning policy
SPRAT	species profile and threats database
SSRC Act	<i>Strong and Sustainable Resource Communities Act 2017 (Qld)</i>
TDS	total dissolved solids
TEC	threatened ecological community
TMP	traffic management plan
TOR	terms of reference
TSP	total suspended particles
VM Act	<i>Vegetation Management Act 1999 (Qld)</i>
WAV	workforce accommodation village
WMP	waste management plan
WRP	water resource plan

Glossary

Term	Definition
bilateral agreement	The agreement between the Australian and Queensland governments that accredits the State of Queensland's EIS process. It allows the Commonwealth Minister for the Environment to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
Black Business Finder	A directory of Aboriginal-owned businesses in Queensland.
construction areas	The construction worksites, construction car parks, and any areas licensed for construction or on which construction works are carried out.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth).
controlling provision	The matters of national environmental significance, under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth), that the proposed action may have a significant impact on.
coordinated project	A project declared as a 'coordinated project' under section 26 of the SDPWO Act. Formerly referred to as a 'significant project'.
Coordinator-General	The corporation sole constituted under section 8A of the <i>State Development and Public Works Organisation Act 1938</i> and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
environment	As defined in Schedule 2 of the SDPWO Act, includes: a) ecosystems and their constituent parts, including people and communities b) all natural and physical resources 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 d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).
environmentally relevant activity (ERA)	An activity that has the potential to release contaminants into the environment. Environmentally relevant activities are defined in Part 3, section 18 of the <i>Environmental Protection Act 1994</i> (Qld).
FIFO worker (Olive Downs SIA)	A worker who lives farther than one-hour driving distance from the mine and would be required to commute to work for their roster.

FIFO worker (SSRC Act)	A worker who commutes to work for their roster and lives in a town that is not a nearby regional community.
ICN Gateway	A business network that introduces Australian and New Zealand companies to small and large projects
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for the condition.
initial advice statement (IAS)	A scoping document, prepared by a proponent, that the Coordinator-General considers in declaring a coordinated project under Part 4 of the SDPWO Act. An IAS provides information about: • the proposed development • the current environment in the vicinity of the proposed project location • the anticipated effects of the proposed development on the existing environment • possible measures to mitigate adverse effects.
labour draw	People leaving their jobs to work at the project.
large resource project	A resource project for which an EIS is required.
matters of national environmental significance	The matters of national environmental significance protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>. The eight matters are: a) world heritage properties b) national heritage places c) wetlands of international importance (listed under the Ramsar Convention) d) listed threatened species and ecological communities e) migratory species protected under international agreements f) Commonwealth marine areas g) the Great Barrier Reef Marine Park h) nuclear actions (including uranium mines).
mining activity	As defined in section 110 of the EP Act
nearby regional community	A town within 125 km radius of a large resource project that has a population greater than 200 people.
new local	A project worker who moves to the IRC LGA.
nominated entity (for an imposed condition for undertaking a project)	An entity nominated for the condition, under section 54B(3) of the SDPWO Act.
potentially affected communities	One of the local communities located within one-hour driving distance of the mine, including Moranbah, Dysart, Nebo, Middlemount and Coppabella

properly made submission (for an EIS or a proposed change to a project)	Defined under Schedule 2 of the SDPWO Act as a submission that: a) is made to the Coordinator-General in writing b) is received on or before the last day of the submission period c) is signed by each person who made the submission d) states the name and address of each person who made the submission e) states the grounds of the submission and the facts and circumstances relied on in support of the grounds.
proponent	The entity or person who proposes a coordinated project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.
Resource Industry Network	A not-for-profit organisation representing the resource sector and allied industries within the Mackay region.
Significant project	A project declared (prior to 21 December 2012) as a 'significant project' under section 26 of the SDPWO Act. Projects declared after 21 December 2012 are referred to as 'coordinated projects'.
Significant project traffic	an increase in project traffic equal to or greater than 5 per cent in either traffic numbers (AADT) or axle loadings (SRAs), as outlined in the GTIA and/or traffic that has the potential to impact on community amenity. In particular, heavy vehicles associated with construction and/or operational haulage.
stated condition	Conditions stated (but not enforced by) the Coordinator-General under sections 39, 45, 47C, 49, 49B and 49E of the SDPWO Act. The Coordinator-General may state conditions that must be attached to a: • development approval under the <i>Sustainable Planning Act 2009</i> • proposed mining lease under the <i>Mineral Resources Act 1989</i> • draft environmental authority (mining lease) under Chapter 5 of the <i>Environmental Protection Act 1994</i> (EPA) • proposed petroleum lease, pipeline licence or petroleum facility licence under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> • non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EPA.
works	Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that: a) the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body is or may be authorised under any Act to undertake, or b) is or has been (before or after the date of commencement of this Act) undertaken by the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body under any Act, or c) is included or is proposed to be included by the Coordinator-General as works in a program of works, or that is classified by the holder of the office of Coordinator-General as works.

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