



The Coordinator-General



Wandoan Coal project

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

November 2010

Under Part 4 of the *State Development and Public
Works Organisation Act 1971*



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Synopsis

Introduction

This Coordinator-General's (Coordinator-General) report has been prepared pursuant to s.35 of Queensland's *State Development and Public Works Organisation Act 1971* (SDPWO Act) and provides an evaluation of the environmental impact assessment process for the Wandoan Coal Project (the project). The project is detailed in section 2 of this report.

The report includes an assessment and conclusion about the environmental effects of the project and the proposed mitigation measures. This report evaluates the environmental impact statement (EIS), the issues raised in submissions, the supplementary EIS (SEIS), and the advice received from state and local government agencies and the then Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA—now the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)).

Pursuant to section 35A of the SDPWO Act, this report lapses four years from the execution date of this report by the Coordinator-General, unless the project substantially starts within this four year period.

The proposal

The proponent for the project, the Wandoan Joint Venture (WJV, the proponent), is proposing a new open-cut, thermal coal mine and supporting infrastructure located in the Surat Basin, to the west of Wandoan, approximately 350 kilometres (km) north-west of Brisbane and 60 km south of Taroom.

The thermal coal deposits for the project are estimated to be in excess of 1.2 billion tonnes located within three Mining Lease Applications (MLAs) 50229, 50230 and 50231. The MLAs make up approximately 32 000 hectares (ha) and approximately 11 000 ha would be used for mining operations. The remaining land is proposed to act as a buffer between mining operations and sensitive places.

The proponent is seeking a 32-year mining lease (two years for construction and 30 years operational) for the extraction of the coal resource at a rate of approximately 30 million tonnes per annum (Mtpa) run-of-mine (ROM) coal from the three MLA areas. Ten pit areas, incorporating 16 individual pits in total, are scheduled for opening during the 30-year operation of the mine. Approximately 853 million tonnes ROM coal are proposed for mining during the 30-year period. This ROM coal will be washed on-site at a coal handling and processing plant (CHPP) and result in production of approximately 22 Mtpa of product coal.

The project is related to three other major infrastructure projects in the Central Queensland region that are proposed to be developed over the next few years. These are the Surat Basin Rail Project, the Wiggins Island Coal Terminal expansion and the Balaclava Island Coal Export Terminal. These projects are the subject of separate assessment processes.

Given the prospect of major developments in the Surat Basin proceeding over broadly the same timeframe, a range of cumulative impacts of projects needs to be considered as part of the assessment process for individual projects. This adds to the complexity of assessment processes.

The environmental impact assessment process

The EIS, prepared by the proponent, was released for public and advisory agency comment from December 2008 until February 2009. Sixty-two submissions were received. A SEIS was released for advisory agency and public comment from November 2009 until December 2009, on which 34 submissions were received.

The key issues raised in submissions during the EIS process included:

- Mining lease process, boundaries and sensitive places
- impacts of dust, noise and vibration to the nearby township of Wandoan



- economic impacts including changing from traditional agricultural activities to mining activities and resultant business opportunities
- social impacts, particularly relating to changing employment (agriculture to mining) and housing affordability
- clarification of soil classifications, loss of good quality agricultural land, final land form
- use and quality of coal seam methane water proposed to be used across the site.

Summary of key issues

This report contains the following conclusions and recommended conditions for the following topics:

Mineral and petroleum tenements

The proponent has applied for MLAs over areas that are also subject to existing authorities to prospect for petroleum and one petroleum lease. Under the *Mineral Resources Act 1989* (MRA), the parties must use reasonable attempts to reach agreement on coordination arrangements. These commercial discussions are taking place and this report does not provide further commentary on these matters.

Land use and visual amenity

The majority of the land within the project site is highly disturbed, has a long history of vegetation clearing and has been primarily used for cattle grazing. There is some small-scale dry land cropping, which is mainly used for cattle feed lots and fodder.

The Coordinator-General recommends that the proponent considers progressively releasing land at the completion of mining activities in a particular area and that the land be rehabilitated to allow it to be released back to the land holder or on the market for primary production.

It is also recommended that the proponent expands its proposed trials under the project's Implementation of Rehabilitation Strategy, to assess the success of rehabilitation measures. The objective would be to return mined land to as close to its pre-mining conditions.

In order to mitigate potential adverse amenity impacts of the project, as well as dust, noise and vibration impacts on the township of Wandoan, a recommendation to the minister administering the *Mineral Resources Act 1989*, that no open-cut coal mining shall occur during the life of this project at any point which is located within a 2 km 'high management zone' surrounding Wandoan. Mining activities other than open cut coal extraction, including for example, construction and operation of roads, pipelines, powerlines etc. will not be excluded from this zone.

In the longer term, the residual visual impacts of the project are considered to be minimal, although some impacts during the mine life have the potential to be high due to the open-cut nature of the mining operations and the large scale of the development. The mitigation measures proposed by the proponent, combined with progressive rehabilitation of mined and disturbed areas, will greatly minimise visual contrasts.

Air quality management

Air quality and noise and vibration studies undertaken as part of the EIS process indicated that operating a dragline at full capacity in Frank Creek Pit had the potential to adversely impact living conditions in the township of Wandoan. As part of the SEIS process, the proponent delineated a 2 km zone around the western side of Wandoan as a 'high management zone' for impact mitigation.

Dust generation from a large-scale, open-cut mine, in close proximity to the township of Wandoan was a key issue in submissions received about the project. The 2 km mining exclusion 'high management zone' is intended to partly mitigate dust impacts.

The SEIS took into account the revised air quality standards and acceptable limits specified in the Environmental Protection (Air) Policy 2008 (EPP (Air)).



Based on Queensland Health advice, the EPP Air objective of 50 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and five allowable exceedences per annum for 24 hour average concentration of airborne particulate matter with a diameter less than ten micrometres (PM_{10}) is a key element of air quality management applied to the project. The proponent is commended for adopting this standard as a key management objective for the project.

A condition has been stated requiring the proponent to adopt 'high management control measures' on days where meteorological conditions indicate that the $50\mu\text{g}/\text{m}^3$ PM_{10} limit is likely to be exceeded if additional changes to mine management practices are not implemented.

Noise and vibration

Approximately 10 per cent of submissions on the EIS raised issues about noise and vibration emanating from the mining activities. A 2 km mining exclusion 'high management zone' is intended to mitigate noise and vibration impacts on the township of Wandoan.

Under the conditions proposed by Department of Environment and Resource Management (DERM) for the draft Environmental Authority (EA), the proponent is required to monitor noise and vibration levels at various 'sensitive places', employ noise and vibration mitigation measures as required and have complaint handling processes in place.

Accommodation facility—air quality, noise and vibration

After releasing the SEIS, the proponent advised a new preferred location for the accommodation facility for the project workforce. The proposed location is within MLA 50229, just west of Woleebee Creek and south of Booral Road. The accommodation facility will be by assessed by Western Downs Regional Council (WDRC) against its planning scheme in accordance with the *Sustainable Planning Act 2009* (SPA).

A recommendation is made that the proponent treats the proposed workforce accommodation facility in the same way for air quality and noise and vibration impacts as if it were regarded as a sensitive receptor for the purposes of DERM's conditions B5 to B11 and D1 to D20 of the draft EA. This will ensure that the project workers housed in the accommodation facility are treated in the same way as residents of Wandoan for air quality, noise and vibration.

Water supply and management

DERM advised that further information is required on how the off-lease impacts of the Woleebee Creek diversion—which is the largest proposed creek diversion for the project—could be managed during construction and operation of the diversion. DERM's advice is that this matter can be dealt with through the water licensing process as regulated under the provisions of the *Water Act 2000*. Hence, no conditions have been set in this report.

The proponent is required to carry out failure impact assessments on dams that exceed the dimensions in section 343 of the *Water Supply (Safety and Reliability) Act 2008*. A failure impact assessment determines if a dam is a referable dam and, if it is, it becomes assessable development (operational works). A condition is not required in this report as DERM has advised that this matter can be effectively regulated under the provisions of the *Water Supply (Safety and Reliability) Act 2008*.

As part of the draft infrastructure agreement currently being negotiated between the proponent and the Western Downs Regional Council (WDRC), funding will be required by the proponent to facilitate upgrades to the wastewater treatment facility and the potable water supply facility. Given that these facilities are related to the operation of the project, conditions are stated to ensure that the proponent provides funding and facilitates their development to the satisfaction of the WDRC and the benefit of the Wandoan community.

Subject to the discussion of particular issues in this report, the relevant impacts of the two water supply options being considered for the mine have been adequately assessed in the EIS and SEIS. Those impacts can be appropriately managed by the implementation by the proponent of the relevant commitments made by the proponent and the environmental management plans proposed for these water supply options.



The water supply options for the project do involve additional development approval under the SPA and other non-SPA approvals as identified in the EIS and SEIS and section 4.6 of this report.

Terrestrial ecology

The EIS acknowledged that the project will impact on native terrestrial flora and fauna in the project area. Mitigating measures are recommended for each of the state-listed threatened species and further measures, such as habitat rehabilitation, restoration and/or offsets, are recommended to address any adverse residual impacts on these species.

Vegetation clearing would be required for all proposed project components, including the mining of the MLA areas, and the construction of the gas supply pipeline, southern CSM water supply pipeline and Glebe Weir raising and pipeline. The exact footprint of all clearing areas would not be accurately defined until power and water supply options have been selected, detailed alignments and designs have been completed.

For both the MLA areas and southern CSM water supply pipeline option, the proponent has committed to developing a Biodiversity and Land Management Plan (BLMP) prior to the start of construction to minimise impacts on terrestrial (and aquatic) ecology resulting from the construction and operational phases of the project.

For the Glebe Weir raising and pipeline option, the proponent has committed to the preparation of specific management plans related to terrestrial ecology that are to be included in the project construction and operational environmental management plans.

The proponent has committed to finalise and implement a Biodiversity Offset Strategy, based upon the draft Biodiversity Offset Strategy provided with the SEIS, to address the objectives of state and Commonwealth legislation and policy requirements for biodiversity offsets.

In consideration of the size, location, ecological integrity, protection status, local/regional significance and connectivity of regional ecosystems proposed to be cleared, the following minimum offset ratios are recommended to apply to all components of the project:

- zero offsets for 'least concern' (*Vegetation Management Act 1999* (Qld) (VM Act) status) or 'no concern at present' (Biodiversity status) REs
- 1:2 offsets for 'of concern' REs (VM Act status and/or Biodiversity status)
- 1:3 offsets for 'endangered' REs (VM Act status and/or Biodiversity status).

Aquatic ecology

The project's impacts on aquatic ecosystems are unlikely to be significant, provided that proposed mitigation measures are implemented. However, a condition has been set that the proponent must design and implement an Aquatic Ecosystem Monitoring Program including, amongst other things, the capability to detect if the ephemeral streams downstream of the mine are subject to an increase in the concentration of contaminants because of inadequate flushing.

Groundwater and surface water connectivity

In response to submissions from landholders to preserve access to Juandah Bore, this report recommends that the proponent must exclude Juandah Bore from the mining leases for the project. This recommendation is made to the minister responsible for considering the application for mining leases for the project under the MRA.

For raw water supply for mining operations, the proponent has concluded that supply of water from the Great Artesian Basin is not a sustainable option. Accordingly, the proponent is considering alternative options for raw water supply for mining operations.

While the proponent has undertaken preliminary investigations into the potential for connectivity between artesian groundwater and surface water, it has not proposed a strategy to mitigate any impacts that may result if identified connectivity between surface water and groundwater is impacted by mining activities. A recommendation is made to the minister responsible for administration of the *Water Act 2000* that the proponent must investigate the potential for connectivity between local groundwater and



surface water, including, the requirement to minimise and 'make good' any adverse impacts of the mining activities on groundwater quality and quantity experienced by other groundwater users.

Greenhouse gas emissions

Consistent with the recently released Coordinator-General evaluation report for the Caval Ridge coal mine, the Coordinator-General believes that it would not be reasonable at this stage to impose a definitive offset requirement on the construction and operation phase of a high-volume commodity production project such as this project. To mitigate the carbon footprint for both the construction and operation phases of the project, a condition has been imposed that requires the proponent to develop and implement a greenhouse gas reduction management plan in relation to Scope 1 and Scope 2 emissions of the project.

Transport impact management

A new rail spur is proposed to connect the MLA areas into the proposed Surat Basin rail line to the north of Wandoan township. The Surat Basin rail line is the subject of a separate assessment process.

The proponent is considering two possible alternatives for flying workers to and from the site for mining operations. One option is to upgrade the existing public Taroom Aerodrome and the other is to construct a new public airstrip at Wandoan, at a location yet to be determined. The Coordinator-General supports, in principle, the establishment of a new, publicly accessible airstrip at Wandoan, subject to a separate assessment process.

The Coordinator-General is satisfied that the EIS process has adequately investigated and addressed the impacts of the project on the local and state-controlled road networks in the vicinity of the mine, during both construction and operation, including public and mine-site safety and efficiency and pavement impacts.

This report states conditions requiring the proponent to continue to liaise with the Department of Transport and Main Roads (DTMR) and local governments to ensure the completion of the infrastructure agreements, road impact assessments, road management plans and traffic management plans for approval by state and local authorities.

In relation to road safety fatigue management, this report recommends that the proponent investigate the feasibility of providing enhanced fatigue and road safety training and awareness programs, in consultation with the Queensland Police Service (QPS) and the Mine Safety and Health Inspectorate of the Department of Employment, Economic Development and Innovation (DEEDI).

Cultural heritage

It is noted that there will be some impacts on both Indigenous and non-Indigenous cultural heritage as a result of the project. It is also noted that the non-Indigenous cultural heritage affected by the project is of low significance though nevertheless important, and archival recording is being undertaken with the cooperation of the local community.

It is noted that, as required under the *Aboriginal Cultural Heritage Act 2003*, the proponent has developed a Cultural Heritage Management Plan (CHMP) in consultation with the Iman People # 2 who are the only registered native title claimants over the MLA areas. The CHMP for the project was approved by the then Department of Natural Resources and Water (now DERM) on 27 February 2009.

Social and cumulative impacts

Section 5.17 of this report addresses the following social impacts:

- landholder resettlements
- housing and accommodation issues
- cumulative impacts
- community health, safety and wellbeing
- social infrastructure



- community safety and road safety
- employment, training and economic development
- community workforce behaviour and community interaction
- Indigenous engagement
- stakeholder engagement.

To ensure the above social impacts are adequately addressed by the proponent, the Coordinator-General has imposed eight conditions and made three recommendations, which, among other things, require the proponent to:

- finalise and submit a Social Impact Management Plan (SIMP)
- continue consulting with the community
- continue working with state agencies, local government authorities and other resource industry stakeholders to develop future cumulative social impact mitigation and management strategies.

Matters of national environmental significance

This report provides a review of the extent to which the EIS process addresses the actual or likely impacts of the project on each of the matters protected by the controlling provisions under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

To reduce the net residual adverse impacts to EPBC-listed threatened flora and fauna species and endangered ecological communities to an acceptable level, conditions are recommended regarding environmental offset requirements to be included in a Biodiversity Offset Strategy to be approved by SEWPaC.

Also of note, regarding the EPBC-listed critically endangered boggomoss snail (*Adclarkia dawsonensis*) the SEIS reported that, from a survey of 52 sites considered to have potential to contain the boggomoss snail within its known range, the snail was found at four sites, two of which were previously known. However, no sites inhabited by the snail were found within the directly impacted or inundated footprint. SunWater informed the Community Liaison Group for the Nathan Dam and Pipelines project that surveys related to that project detected the boggomoss snail at another 11 sites to those noted in the Wandoan Coal EIS and SEIS, and none of those new locations are boggomosses. None of the new sites are within the impact area of the proposal to raise Glebe Weir or the pipeline component. One community of boggomoss, located on the southern side of the Dawson River east Cockatoo Creek, would be inundated. The EIS predicted the impact of flooding this site on the threatened community as a whole as minor. Nonetheless, the proponent has committed to implementing a boggomoss snail habitat management plan to address any potential adverse impacts to the snail and its habitat.

The Coordinator-General is satisfied that the EIS process adequately meets the requirements for impact assessment, to the greatest extent practicable, in accordance with the provisions of Part 4 of the SDPWO Act and Part 5 of the State Development and Public Works Organisation Regulation 1999 (the Regulation), as specified in Schedule 1 (Item 2, Class 2) of the Bilateral Agreement.

This report will be provided to the Australian Government Minister for the Environment pursuant to section 17(2) of the Regulation, to enable a decision on the controlled actions for the project pursuant to section 133 of the EPBC Act.

Approvals

This report will be provided to the Queensland Minister administering the *Environmental Protection Act 1994* (EP Act) for advice in consideration of the minister's decision on the EA for the project. Therefore, pursuant to section 49 of the SDPWO Act, this report recommends conditions that may be attached to the draft EA, which are contained in Appendix 1 of this report.

This report contains:

- imposed conditions, applied under Division 8 of the SDPWO Act, to mitigate impacts of the project



- observations and recommendations provided for the proponent's consideration in making further commitments in support of the project
- material for assessment of MNES under the EPBC Act. As such, this report will be provided to the Australian Government Minister for Environment to enable a decision on approval of the controlled actions for the project pursuant to s.133 of the EPBC Act.

However, this report does not make a determination regarding certain activities occurring off the mining lease area, which are subject to further detailed design and assessment. The relevant approvals are discussed in section 4.4 of this report.

Similarly, although the assessment of the mine's operational water supply pipeline options, including the raising of the Glebe Weir concludes that these water supply options are acceptable, detailed design and assessment of the water supply options has yet to be addressed by the relevant agencies, with conditions to be finalised on receipt of additional information from the proponent. The relevant approvals are discussed in section 4.5 of this report.

Coordinator-General's conclusion

The requirements of the Queensland Government for impact assessment in accordance with the provisions of the Part 4 of the SDPWO Act have been satisfactorily fulfilled and sufficient information has been provided by the proponent and advisory agencies to evaluate the potential impacts of the project.

Therefore, it is recommended that the project, as described in detail in the EIS and the SEIS and summarised in section 2, Project description, can proceed, subject to specific conditions and recommendations of this report.

.....
Graeme Newton
Coordinator-General
Date:



1. Introduction

This Coordinator-General's (Coordinator-General) report has been prepared pursuant to section 35 of Queensland's *State Development and Public Works Organisation Act 1971* (SDPWO Act) and provides an evaluation of the environmental impact assessment process for the Wandoan Coal project (the project). The project is defined in section 2 of this report. On 21 December 2007, the project was declared a 'significant project for which an environmental impact statement (EIS) is required' under section 26 (1)(a) of the SDPWO Act.

The project is an updated and refined version of the Wandoan project, which was declared a 'significant project for which an EIS is required' on 12 March 2007. The Wandoan project was withdrawn by the proponent on 20 December 2007, owing to changes in the size of the project, the number of activities considered part of the project and changes in the scope of the project.

In June 2008, the proponent referred the project to the then Commonwealth Minister for Environment, Heritage and the Arts under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) as four interrelated EPBC referrals. In July 2008, the Commonwealth Minister's delegate determined that each referral was a controlled action pursuant to section 75 of the EPBC Act for potential impacts on matters of national environmental significance (MNES). Section 3.2 of this report includes details of Commonwealth impact assessment.

For the purpose of this report, the EIS comprises the following documents:

- Wandoan Coal Project—Environmental Impact Statement (Volumes 1–4, December 2008)
- Wandoan Coal Project—Supplementary Environmental Impact Statement (Volumes 1, 2 and 4, November 2009).

The objective of this report is to evaluate 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. It is not intended to record all the matters that were identified during the EIS process and subsequently settled. Instead, it concentrates on the substantive environmental effects and related matters identified during the EIS process.

This report represents the Queensland Government's impact assessment process. In undertaking this evaluation, the Coordinator-General has considered the EIS, issues raised in submissions relating to the EIS, the SEIS, properly made submissions and other submissions he has accepted, and any other material deemed as relevant to the project, such as comments and information from members of the public and advice from advisory agencies and other entities, technical reports and legal advice.

Appendix 1 of this report states conditions and recommendations under which the project may proceed and represents the conclusion of the Queensland Government EIS process.

Acronyms and other key terms used in this report are defined in Schedule 10 of Appendix 1 of this report.



2. Project description

2.1. The proponent

The proponent for the project is the Wandoan Joint Venture (WJV). The WJV partners are:

- Xstrata Coal Queensland Pty Ltd (75 per cent)
- ICRA Wandoan Pty Ltd (12.5 per cent)
- Sumisho Coal Australia Pty Ltd (12.5 per cent).

The project is being delivered and managed by Xstrata Coal Queensland Pty Ltd (XCQ) on behalf of the WJV. The Mining Lease Applications (MLAs) and the existing mining tenements for the mine area are held by the proponent.

XCQ is a subsidiary of Xstrata Coal Ltd and is part of global mining group Xstrata plc. XCQ is headquartered in Brisbane, employing over 2500 people in its operations across Queensland. XCQ manages several existing coal mining operations in Queensland, including the Oaky Creek Mine east of Tieri, the Newlands Mine near Glenden, the Collinsville Mine at Collinsville, the Rolleston Coal Mine near Rolleston and in regard to ports, it operates the Abbot Point Coal Terminal.

XCQ is also participating in a joint venture to investigate the construction of a new rail connection known as the Surat Basin Rail, between Wandoan and the existing Moura-Gladstone line at Banana. XCQ is also working closely with QR Network regarding upgrades to its existing connections from Moura to Gladstone and is involved in potential new port developments at Wiggins Island and Balaclava Island.

Xstrata Coal Ltd is the world's largest exporter of thermal coal and a significant producer of coking coal and semi-soft coal. Headquartered in Sydney, Xstrata Coal Ltd has interests in over 30 operations throughout Australia, South Africa and Columbia and an exploration project in Nova Scotia, Canada.

Xstrata plc is a globally diversified mining group, listed on the London and Swiss stock exchanges, with its headquarters in Zug, Switzerland. Xstrata's businesses maintain a position in seven major international commodity markets: copper, coking coal, thermal coal, ferrochrome, nickel, vanadium and zinc, with a growing platinum group metals business.

ICRA Wandoan Pty Ltd and Sumisho Coal Australia Pty Ltd are both Australian subsidiaries of major Japanese trading houses with interests in numerous industries including mining, power generation and commodity trading.

To clarify future interpretation of this report:

- any references to XCQ or Xstrata Coal Ltd or WJV can also be read as 'the project proponent' (or 'the proponent')
- all references to commitments made by XCQ and/or Xstrata Coal and/or the WJV and recommendations and conditions applying to the WJV for this project also apply to all parties engaged or assigned to construct and/or operate any part of the project and to any party to which the WJV may assign the project.

On 3 June 2010, Xstrata Coal, on behalf of the project proponents, advised the suspension of early works expenditure for the project. These early works, scheduled to commence from July 2010, included drilling, constructing workers' accommodation, communications and road upgrades. Xstrata cited this decision as resulting from initial findings from its ongoing review of planned investment into its Australian operations and growth projects as a result of the Australian Government's proposed resource super profits tax (RSPT).

On 6 July 2010, Xstrata Coal advised that it would recommence planned investment in a range of projects, including early works and exploration activities for the project. This decision was based on the Australian Government's announcement that it proposes to replace the RSPT with a mineral resource rent tax. While the Coordinator-General recognises the effect of potential changes to the federal taxation regime and the underlying impact on project viability and planning, he also notes the



representation to him on this issue from interested members of the public, requesting that he delay review of the EIS for the project to:

- prevent further uncertainty to affected land holders if the project is not developed in a timely manner after approval is given
- maintain the integrity of information provided in the EIS if the project is approved but not developed in a timely manner.

The Coordinator-General considers that project decisions based on viability are not the main focus of this report and, while he has considered the above issues, he does not view the outcomes in regard to proposed taxation as material to his evaluation.

2.2. The project

2.2.1. Project overview

The project comprises a new open-cut thermal coal mine and supporting infrastructure. The project is located in the Surat Basin, to the west of the Wandoan township, located approximately 350 km north-west of Brisbane and 60 km south of Taroom, predominantly within the Western Downs Regional Council (WDRC) area (formerly Dalby Regional Council), Queensland (see Figure 2.1). The Wandoan township has a population of approximately 380 people. The economy of the Wandoan region is based on agriculture, primarily supporting cattle grazing and some cropping.

The thermal coal deposits for the project are estimated to be in excess of 1.2 billion tonnes located within three Mining Lease Application (MLA) areas that would be used for mining operations. The remaining land is proposed to act as a buffer between mining operations and sensitive places.

The proponent is seeking a 32-year mining lease (two years for construction and 30 years operational) for the extraction of the coal resource at a rate of approximately 30 Mtpa run-of-mine (ROM) coal from the three MLA areas.

Ten pit areas, incorporating 16 individual pits in total, are scheduled for opening during the 30-year operation of the mine. Approximately 846 million tonnes ROM coal are proposed for mining during the 30-year period. This ROM coal will be washed on-site at a coal handling and processing plant (CHPP) and result in production of approximately 22 mtpa of product coal.

The project would be mined using dragline, truck, excavator and shovel equipment. It is proposed that the coal would be crushed, processed and blended if required on-site before being transported by rail to the Gladstone area for export. Export of coal from the mine is proposed via the proposed Surat Basin Rail to port facilities at Gladstone.

Two water supply options are being considered by the proponent. The third option—CSM water from west of the MLA areas—was not progressed by the proponent as a potential water supply option beyond the EIS stage.

2.2.1.1. Mining lease application areas

The thermal coal deposits for the project are estimated to be in excess of 1.2 billion tonnes and are located within three MLAs—50229, 50230 and 50231—held by the WJV, which have been submitted to the Department of Employment, Economic Development and Innovation (DEEDI—previously the Queensland Department of Mines and Energy), and comprise approximately 32 000 ha. It is proposed that approximately 11 000 ha of the MLAs will be disturbed during mining operations; the remaining land will act as a buffer between operations and sensitive places. The mining lease boundaries will be determined pursuant to the MRA, which will be a subsequent assessment process to this evaluation under the SDPWO Act.

- MLA 50229—Wandoan No. 1 at 17,211 ha, overlaying MDL 221 and surrounds
- MLA 50230—Wandoan No. 2 at 11,101 ha, overlaying part of MDL 222 and surrounds
- MLA 50231—Wandoan No. 3 at 3,795 ha, overlaying part of MDL 223 and surrounds.



The above mining tenements are referred to in the EIS as the 'MLA areas'. Approximately 16 pits are anticipated for development over the estimated 30-year operation period of the mine (refer Figure 2.2). Generally, each pit, when mined, will be mined 24 hours a day, seven days a week (24/7).

The project's exploration tenure consists of mineral development licences and exploration permits for coal held by the proponent.

On 29 July 2010, the proponent lodged an application with DEEDI for mining lease (ML) 50277 over approximately 22 000 ha of land to the west of the existing MLAs. This application is not part of the Wandoan coal project and would be subject to a separate approval process should the proponent wish to proceed with a coal mine on this site.

2.2.1.2. Bulk coal sampling and mining trial activities

The proponent advised that, from April to June 2008, it mined a sample of about 47 000 tonnes of ROM coal from a bulk supply pit developed within MDL 221 in the late 1980s. The proponent further advised that this sampling activity was conducted under EA 4489 and indicated coal seam conditions of the proposed Austinvale Pit.

A further bulk sample to collect approximately 200 000 tonnes of coal was to have been conducted in late 2008 to early 2009 but has been deferred by the proponent. The SEIS stated that this sampling activity is likely to take place in 2011. The proponent states that the bulk sample works do not form part of the EIS assessment process and that it will seek relevant approvals from relevant agencies for this activity.

Should the mining leases be granted, the proponent has indicated the potential for initial mining trial activities to take place during the project's construction phase. It is understood that the initial mining trial will involve extracting approximately 500 000 tonnes of ROM coal to conduct further market testing and gain market acceptance of coal from the existing bulk sample pit or the proposed Austinvale Pit North.

The EIS stated that any initial mining activities would be conducted under the Plan of Operations and EAs associated with the granting of mining leases over MLAs 50229, 50230 and 50231.

2.2.1.3. Power supply

Four power supply options were discussed in the EIS. These are:

1. Total supply via a new 132 kilovolt (kV) or 275 kV electricity line from a new substation adjacent to the 275 kV Callide to Tarong line, near Auburn River, east of Wandoan, to a substation at or adjacent to the MLA areas.
2. Total supply via a new 132 kV electricity transmission line from the Columboola Switchyard east of Miles, to a substation at or adjacent to the MLA areas.
3. Total supply from an on-site, stand-alone 80 megawatt (MW) gas-fired dual-fuel power station.
4. Partial supply from a new 132 kV electricity transmission line and partial supply from on-site power generation to provide network support.

As options 1 and 2 will require augmentation of the existing 275 kV system at Auburn River or connection to the existing Ergon 132 kV system at Columboola, further approvals will be required separate to this assessment.

Gas supply for options 3 and 4 is proposed to be via a new, mainly underground pipeline from the Peat Scotia lateral gas pipeline, located approximately 30 km north-east of Wandoan. Appendix 2-1-V1.4 of the EIS outlined the selection of the preferred route (route option 3), which exhibited the shortest distance and benefits such as co-location with the proposed Surat Basin Railway. However, this preferred route impacted the second largest area of native vegetation regional ecosystems (REs), which will be required to be offset in accordance with state and Australian Government policies.

It is noted that Powerlink Queensland and Ergon Energy have recently published an Application Notice for New Large Network Asset – *Maintaining a Reliable Electricity Supply to the Surat Basin North West Area*, which has been prepared as part of the prescribed National Electricity Rules (NER) process for the approval of proposed network augmentation. It contains the results of the planning investigation and economic assessment of feasible supply solutions to identify the most appropriate course of action to meet future supply requirements in the Surat Basin North West area.



The draft recommendation to address future supply requirements in the electricity networks supplying the Surat Basin North West area (that is demonstrated to satisfy the regulatory test) involves:

- establishing a new 132 kV substation at Wandoan South, and constructing a new 70 km, 275 kV double circuit line (initially operating at 132 kV) from Columboola to Wandoan South Substation by winter 2013
- installing a 132/66 kV transformer at Wandoan South and constructing a new 35 km, 66 kV double circuit line (initially operating as a single circuit) from Wandoan South Substation to the existing Wandoan township zone substation together with two 66/22 kV transformers by winter 2013
- constructing a new 60 km, 275 kV double circuit line from Columboola East to Western Downs Substation and establishing a connection to the 275 kV double circuit line from Wandoan South, establishing a 275 kV substation at Wandoan South Substation and operating the 275kV double circuit line from Columboola East to Wandoan South at 275 kV by winter 2014
- establishing a new 275/132 kV substation at Columboola East and connecting to the existing Columboola 132kV substation together with fault rating upgrade by winter 2014.

The estimated capital cost of all works proposed under the Surat Basin North-West area draft recommended solution is \$231.9 million in 2009–10 prices.

In accordance with the requirements of the NER, the draft recommendation has been issued as an 'Application Notice for a New Large Network Asset' with submissions on the application notice requested by the closing date of Friday 27 August 2010. It is understood that Ergon and Powerlink have reviewed the submissions received to the Application Notice and consider that no changes to the draft recommendation, as noted above, are necessary. The final Report containing the final recommendation will be published in the near future. The process requirements for the NER require a period for receiving disputes on the final recommendation. The dispute period will be complete by the end of the year. As all responses to the Application Notice supported the draft recommendation, no disputes are anticipated. Ergon and Powerlink will be proceeding with implementation of the final recommendation after the end of the dispute period.

2.2.1.4. Raw water supply options

It is estimated that 9100 megalitres per year (ML/y) would be required for coal washing, dust suppression and associated mining activities.

Coal seam methane by-product water from south of the MLA areas

The proponent is considering the option of securing CSM raw water resources to meet the operational requirements of the project. The CSM development involves extracting methane from coal seams by reducing groundwater pressure that keeps the methane adsorbed to the coal. CSM water is the by-product of that process.

Water resources have been identified from CSM extraction wells located around Talinga and Berwyndale South, over 100 km to the south of the MLA areas. The CSM water would be sourced from the Origin and Queensland Gas Company (QGC) CSM extraction wells and supplied to a collection pond at the nearby QGC Condamine Power Station, where it will be ponded and piped 93 km to the raw water dam at the project mine infrastructure area in the MLA area.

The proposed pipeline is anticipated to supply a water demand to the mine of up to 8400 ML/y (the pipeline will be designed so that it has sufficient capacity for potential mine expansions, up to a maximum of 11 100 ML/y). A lift pump station is proposed at the collection pond to pump water through the pipeline to a dam at the project MLA areas.

Construction is estimated to take approximately nine months and involve up to 50 construction personnel.

Facilities associated with the Condamine Power Station will be the responsibility of the water supply proponent to construct and operate. The water supply proponent will take responsibility for the CSM water from the water intake area at the CSM water collection pond. The CSM water provider will be responsible for treating the CSM water to the requisite standard (see Figure 2.2).



Surface water from the raising of Glebe Weir and associated pipeline option

As an alternative raw water supply source, SunWater proposes to increase the maximum storage capacity of the existing Glebe Weir from 17 700 ML to 30 100 ML by fitting four inflatable fabricams across the existing structure to raise the weir by 2.36 m full supply level (FSL). Construction will involve earth levees on both sides of the weir structure, construction of a control building and multi-level off take, with agreement to build a fishway on Tartrus Weir on the Mackenzie River or on the Glebe Weir, to offset potential impacts. Water will be transported via an underground pipeline 83 km in length and start at the pumping station built on the bank of Cockatoo Creek near its confluence with the Dawson River. While the initial 11 km will traverse private property, the majority of the remainder of the pipeline will follow the Nathan Road reserve, with a single balancing storage and re-lift pump stations constructed at high points approximately halfway along its length (see Figure 2.4).

Given raw water demand for operation of the project is estimated to be up to approximately 9100 ML/y, and the raised weir will have the capacity to supply at least 6500 ML/y, the shortfall water supply of 2600 ML/y could be obtained by the proponent through a trading mechanism involving the purchase and conversion of existing medium priority water entitlements supplied for the Dawson Valley Water Supply Scheme to new high priority entitlements. The SEIS noted that anywhere between 16 per cent and 47 per cent of available water in this scheme is not used in any one water year.

The Coordinator-General is satisfied that, subject to the discussion of particular issues in this report, the relevant impacts of the two water supply options being considered for the mine have been adequately assessed in the EIS and SEIS. The Coordinator-General is satisfied that those impacts can be appropriately managed by the implementation by the proponent of the relevant commitments made by the proponent and the Environmental Management Plans proposed for these water supply options.

Notwithstanding the assessment in the EIS, the water supply options of the project do involve additional development approval under the *Sustainable Planning Act 2009* (SPA) and other non-SPA approvals as identified in the EIS and SEIS and section 4.6 of this report.

To the extent that the Glebe Weir raising requires a development approval for interfering with water in a water course, DERM has provided draft conditions for ERAs and recommendations regarding the clearing of assessable vegetation associated with this development.

Furthermore, it is recommended that a water allocation of 6500 ML/y be made available in the revised Fitzroy Basin and Resource Operations Plan to facilitate the project.

In light of conclusions about the impacts of the water supply options in the EIS and SEIS, it is recommended that any conditions imposed on other approvals for the water supply options should be consistent with the commitments relevant to these water supply options made by the proponent in the EIS and SEIS and relevant environmental management plans.

Subject to these issues, it is recommended that if the proponent selects either Glebe Weir raising and pipeline or the southern CSM and pipeline water supply option for the mine, that they can proceed subject to the specific conditions, recommendations and limitations of this report.

2.2.2. Key features

The key features of the project comprise:

- Open-cut mining of thermal coal on MLAs 50229, 50230 and 50231, at a rate of around 30 Mt/y ROM coal, with first product coal export expected in late 2013 or early 2014. The *in situ* coal resource identified within the Juandah Coal Measures of these MLAs is estimated to be in excess of 1.2 billion tonnes of thermal coal, of which approximately 500 Mt has a ROM strip ratio of less than 3:1, with the remainder of the coal typically being in the range of 3:1 to 5:1 strip ratio.
- Coal will be washed via a CHPP.
- The mine infrastructure area (MIA) will include administration and bathhouse facilities, vehicle parking, fuel storage and handling, lube and oil storage facility, heavy and light-vehicle wash down facilities, services reticulation, workshop and store and hard-stand areas.
- Export of coal from the site via a rail spur from the proposed Surat Basin Railway.
- Raw water supply for coal washing and other requirements by one of two potential options:



- CSM by-product water from south of the MLA areas via a 93 km pipeline
- surface water from the raising of Glebe Weir, including construction of a 83 km pipeline.

(Note: CSM by-product water from west of the MLA areas, which was investigated in the EIS, is not being progressed by the proponent as a potential water source and will not be considered in this assessment report.)

- Proposed upgrading of the existing Wandoan town waste water treatment facilities to allow for discharge of municipal waste water from the mine.
- Security building at the mine site entrance and exit point.
- Dragline construction facilities, including workshop, store and maintenance facility to service dragline erection and maintenance.
- Power supply for the mine by one of four potential options:
 1. total site supply by a 275 kV electricity transmission line, including substation
 2. total site supply by a 132 kV electricity transmission line, including substation
 3. a baseload total-site-supply, on-site, gas-fired power generation of 80 megawatt electric (MWe) gross electric output, including gas supply pipeline from the Peat-Scotia lateral gas pipeline
 4. a partial-site-supply, on-site gas-fired power generation of 30 MWe gross electric output, including gas supply pipeline from the Peat-Scotia lateral gas pipeline. Remaining power would be supplied by a 132 kV electricity transmission line
- Low-voltage and high-voltage power reticulation throughout the mine, including progressive decommissioning and relocation of the existing local supply power system.
- Road construction, including light-vehicle access roads, heavy-vehicle haul roads and a site access road.
- Progressive temporary road closures and road relocations, over the life of the mine, of existing local and state roads.
- Accommodation facilities for a construction workforce of up to approximately 1375 people, and approximately 844 people during the operations phase.
- Transportation of the mine workforce to Wandoan by one of three options:
 1. new public airstrip at Wandoan, which would allow for 'fly-in/fly-out' (FIFO) of the mine operations workforce, on a site to be determined on or adjacent to the MLA areas
 2. upgrade of the existing Taroom aerodrome, which would allow for FIFO of the mine operations workforce
 3. bus transportation from major centres (such as Brisbane).
- Assistance to the WDRC for the development of a new municipal waste disposal and waste transfer facility, on a site to be determined in consultation with the WDRC, adjacent to the mine site (or alternatively, disposal to a licensed waste facility).

2.2.3. Revisions to the project during the EIS process

Since the release of the EIS and, to a lesser extent the SEIS, a number of revisions or alterations have occurred to the design and operation of the project. Issues included for assessment as part of the SEIS included the following:

- Revisions to the proposed mining lease application boundaries following further landowner consultation.
- Revisions to the mine schedule, with the deferral of Woleebee South Pit from the proposed 30-year life of the mine operations; the addition of the Wubagul Pit to the south of Wandoan township, adjacent to the Leichhardt Highway following scheduling changes to the Frank Creek Pit and further exploration drilling; identification of an approximate outline of Glen Haven Pit between Woleebee



South Pit and Wubagul Pit (which is not scheduled to be mined within the first 30 years of operation of the mine); delay in the mining of the Frank Creek Pit within a 2 km zone around the western side of the township of Wandoan during the initial years of mining, with mining dependent upon the results of current and ongoing monitoring program (air, noise and vibration).

- Modifications to the coarse and fine (tailings) rejects disposal strategy.
- Refinement of the post-mine rehabilitation strategy, including clarification on post-mining land use.
- Refinement of the project's biodiversity offsets strategy.
- Refinements to the upgrade of the existing Wandoan town potable water supply treatment facilities, existing Wandoan town waste water treatment facilities and waste water disposal, and continuing to explore options for development of a municipal waste disposal and recycling facility.
- Removal of the western CSM by-product water supply pipeline as an option to meet the project's raw water supply for coal washing and other requirements.
- Variation to the proposed alignment for the southern CSM by-product water pipeline at its northern end resulting from landholder consultation.
- An additional option to develop combined cycle gas fired generators of less than a total of 10 MWe output for construction and long-term emergency power, as an alternative to using diesel generators.
- Refinement of the progressive road closures and road relocations over the life of the mine, including local and state roads, and bridges.
- Refinement of the strategy to transport the operational workforce by air and bus.

Accommodation facility

At the time of the SEIS, the location of the proposed accommodation facility for the project was outside the proposed mining lease area to the north of the Austinvale deposit (that is, north of MLA 50230).

A potential new preferred location for the project accommodation village was nominated by the proponent following the release of the SEIS. It is located within MLA 50229, just west of Woleebee Creek and south of Booral Road. The proposed new location was communicated to the local Wandoan community by the proponent on 2 December 2009.

As the proposed accommodation village would be located further away from mine infrastructure, studies undertaken by the proponent indicated a number of improvements to potentially adverse project impacts. These included reduced impacts from blasting, vibration, noise and flooding, as well as reduced impacts to air quality and ecologically sensitive places.

In support of this new location, the proponent advised that the location exhibited the following existing environmental characteristics and predicted characteristics:

- above the 0.1 per cent annual exceedence probability (AEP) flood inundation area
- at the 20 ug/m³ contour PM₁₀ maximum 24 hour—dust levels in year 5
- less than the 20 ug/m³ contour PM₁₀ maximum 24 hour—dust levels in year 20
- less than the PM_{2.5} 24 hour 10ug/m³ contour in year 20
- below the 35 dBA (1 hour) noise level in year 20
- beyond the 115 dBA (linear) air blast overpressure for blasting
- no remnant ecosystems impacted
- allows the proponent to provide escorted temporary access from Booral Road to the Leichhardt Highway (across a purpose designed and built bridge over Woleebee Creek) during times of flood and for relocation of large agricultural equipment, for example, harvesters with large headers.



On 22 April 2010, the proponent formally confirmed its preferred location of the project accommodation facility as the location within the MLA areas, west of Woleebee Creek and south of Booral Road. The proponent has committed to remove the accommodation facility at the proposed location from the MLA area when the exact location is finalised prior to the mining lease being granted.

The accommodation facility in its new location would need to be the subject of a separate application and approval process under SPA to ensure that appropriate environmental impact assessment, including community consultation, is undertaken.

After submitting the SEIS, the proponent advised that the initial construction workforce would be engaged in access road construction, earthworks and establishing the permanent accommodation village, and that this will take approximately 10 months before the permanent camp (described above) is available for occupancy.

The EIS stated that, during the site preparation and construction phases, temporary accommodation for the initial construction workforce would be provided until project accommodation facilities are developed by using local caravan parks, hotels and motels or through temporary accommodation units provided on-site by the proponent.

The proponent advised that it is considering other options of providing temporary accommodation, including one of two purpose-built accommodation facilities in Wandoan and Miles that are proposed to be provided on a commercial basis by third parties. The Coordinator-General has been advised that negotiations are ongoing between the proponent and these third party camp proponents to secure accommodation for the initial period. Should these negotiations be unsuccessful and the proponent decides on alternative arrangements (one option is the development of a temporary facility near the junction of Wandoan-Jackson Road and the Leichhardt Highway), these would be subject to separate approval processes involving the WDRC, and do not form part of this report.

2.2.4. Related projects

The Surat Basin is recognised as having significant mineral extraction related opportunities, including coal, petroleum and gas proposals. For this reason, the region is expected to be subject to increased mineral resource based development. On 15 February 2010, the Queensland Government endorsed the *Surat Basin Regional Development Future Directions Statement*, which aims to establish a framework for the Queensland Government, community and industry to work together to achieve a prosperous and sustainable future for the Surat Basin.

Initiatives include:

- planning for growth, including establishing a preferred settlement plan for the region
- developing appropriate infrastructure
- building and maintaining liveable communities
- developing a skilled workforce, capturing economic opportunities
- building and maintaining liveable communities and sustaining regional environments.

Given this potential future resource development, this evaluation has also considered the potential development of other regionally related projects, which will have impacts on the provision and timing of infrastructure requirements. This project is directly related to three other major infrastructure projects in the region that are proposed to be developed over the next few years:

- Surat Basin Rail Project—a proposed 210 km multi-user, open access rail line proposed to be constructed from Wandoan to Banana by the Surat Basin Railway Joint Venture
- Wiggins Island Coal Terminal expansion—construction of new wharf and coal handling facilities at Wiggins Island, by the Gladstone Ports Corporation
- Balaclava Island Coal Export Terminal—investigation and potential construction of a new wharf and coal-handling facilities adjacent to Port Alma by XCQ.



These three proposed projects are being developed by different proponents and are the subject of separate assessment processes. Nonetheless, a range of cumulative impacts is evident across the region from these major projects, as well as extensive drilling and development of CSG fields in and around Wandoan, Miles and Taroom. Chapter 28 of the SEIS (Summary of Commitments and Mitigation Measures) outlines a range of initiatives and strategies the proponent has committed to, to mitigate a range of impacts including regular communication with local communities regarding development impacts and opportunities for potential funding of community initiatives.



Figure 2.1: Location of project site

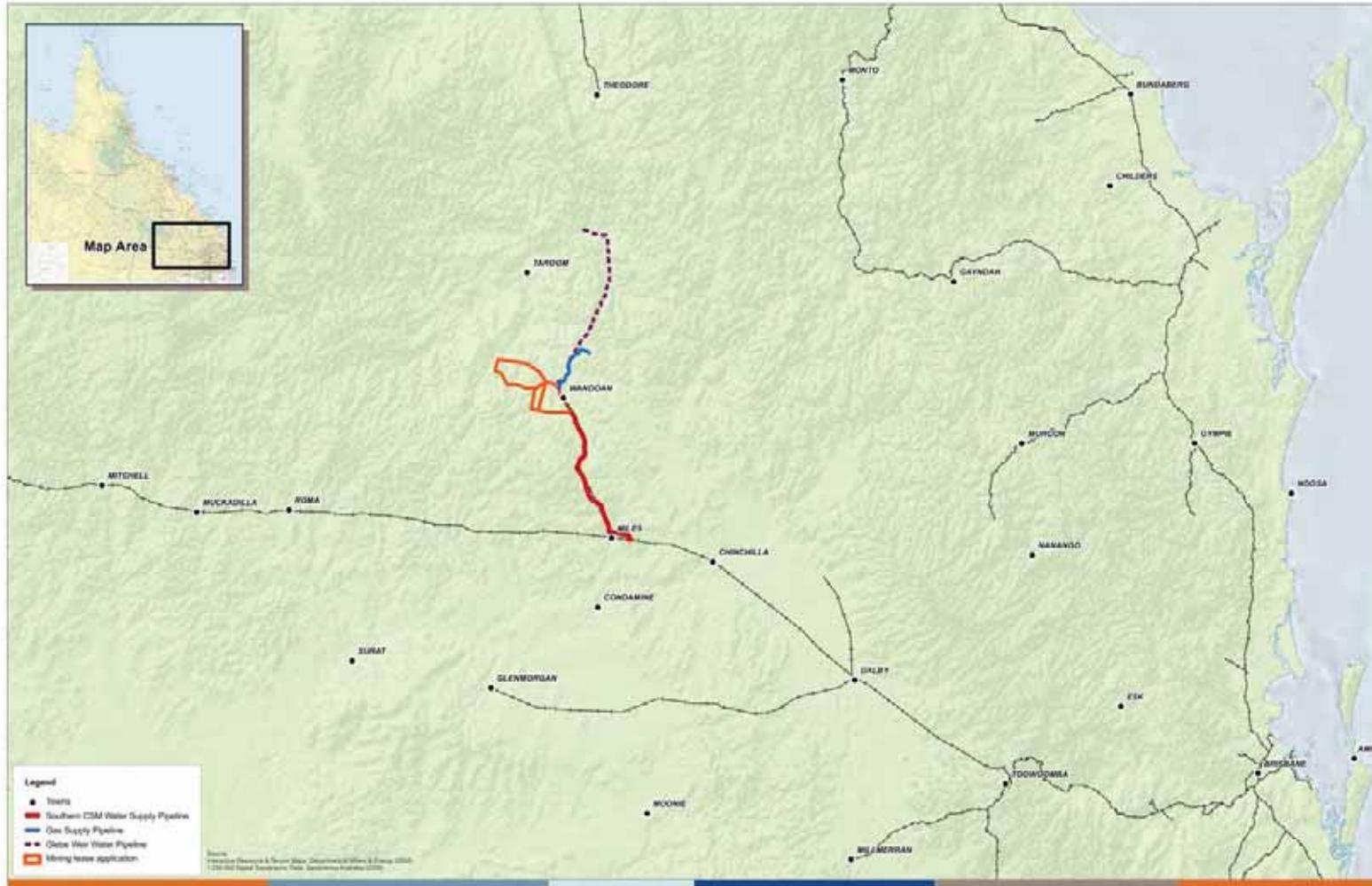




Figure 2.2: Mining activities plan

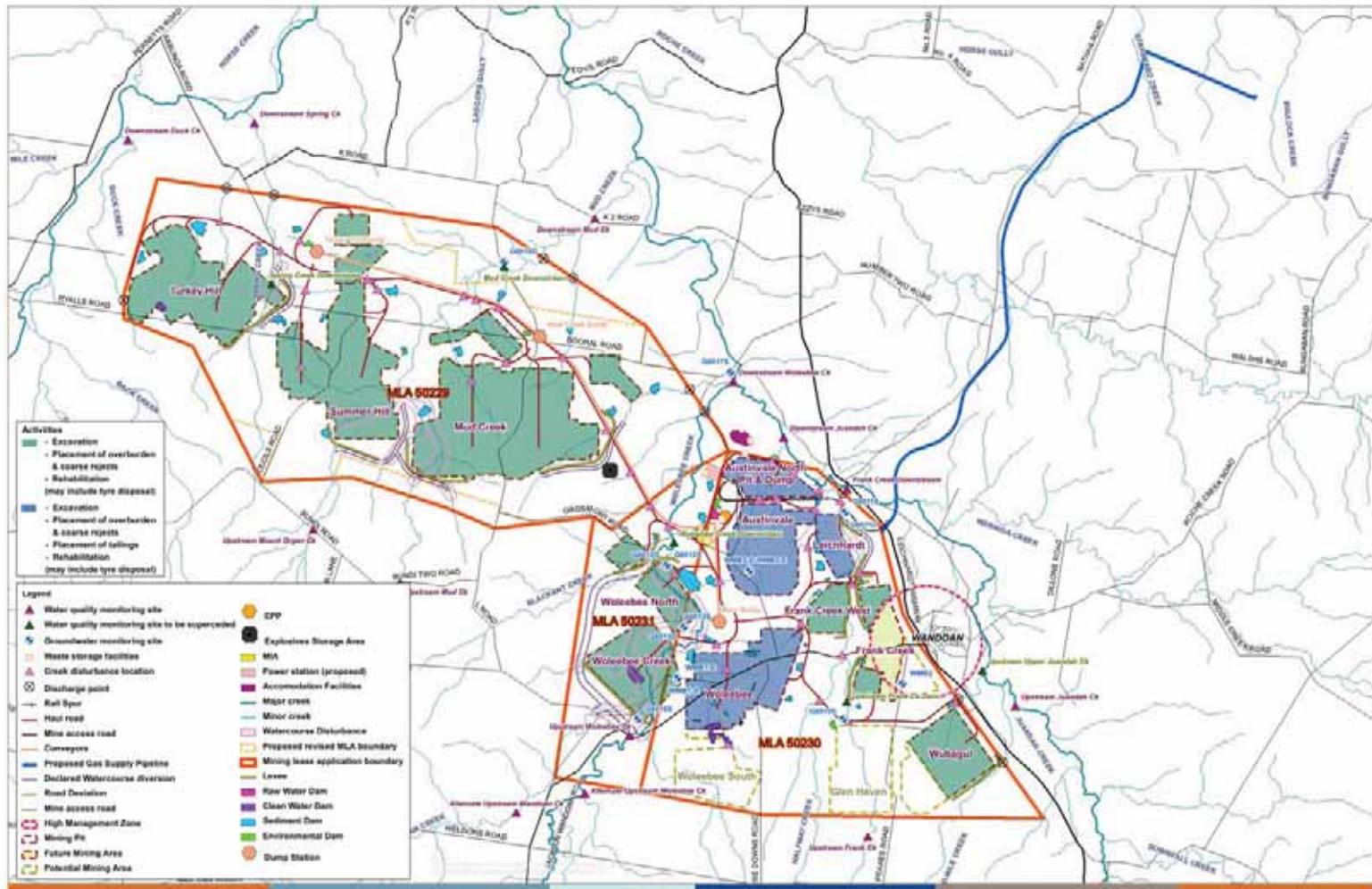




Figure 2.4: Glebe Weir and pipelines





2.3. Project rationale

2.3.1. Project need, costs and benefits

Volume 1, Chapter 2.2 of the EIS detailed the need for the Wandoan Coal project, including the current market demands that the project will fulfil, as well as economic and social benefits that the project will provide to the local, state and national economies.

The proponent plans to establish an open-cut coal mine in the Wandoan area of the Surat Basin as an energy resource for the international and potentially domestic coal markets. The project would contribute to the local, regional, state and national economies through royalties, taxes and wages, and by creating opportunities for regional employment and training, regional development, small business, development of secondary industries and improved local infrastructure.

Coal is an important export commodity for Queensland, providing significant benefits to the state through strong financial returns and creating more employment opportunities. Coal mining is a demonstrated contributor to regional economic development in central Queensland.

Research stated in the EIS from the International Energy Agency (IEA) projects that, on current trends, the world will need 'over 50 per cent more energy in 2030 than in 2002, with fossil fuels anticipated to meet most of those needs' (IEA, press release, World Energy Outlook 2007).

It is expected that ongoing and higher demand for good quality coal is forecast to continue and Queensland coal producers, with access to significant coal reserves and availability of efficient rail and port infrastructure, are well placed to service the increasing global demand for coal. Queensland has approximately 33 billion tonnes of raw coal *in situ* identified through exploration drilling. The Surat Basin region contains more than four billion tonnes of thermal coal reserves located in the Walloon Coal Measures.

The proponent outlined in the Volume 1, Chapter 2.2 of the EIS that with continued international demand and strong coal prices, the prospects for continued growth in the Queensland coal export industry remains positive. Therefore, the development of the Wandoan coal deposits would provide a timely boost in thermal coal supply to meet global demand.

2.4. Project alternatives

The EIS described the alternatives to the project, including conceptual, technological and locality alternatives to the project, and provided a discussion on the consequences of not proceeding with the project, as required by Chapter 1.4 of the terms of reference (ToR) for the EIS.

Volume 1, Chapter 2.4.1 of the EIS ('Do nothing') discussed the potential ongoing global demand for thermal coal to be lost to an international competitor, including losses of export revenue, potential state coal royalties, in local, regional and state employment and ancillary business opportunities. Economically, the potential export revenue lost per year is \$2 billion, based on annual sales of approximately 22 million tonnes of Wandoan thermal coal. Approximately \$3.7 billion of potential state coal royalties would also be lost over the 30-year operation of the project, as well as approximately \$500 million in annual port and rail charges, and loss of rate contributions to local government.

Project alternatives considered by the proponent in the EIS process included:

- mining methodology
- alternative coal mining and coal handling technologies
- mine support infrastructure options
- coal transport options.



3. Environmental impact assessment process

3.1. Significant project declaration

The proponent lodged an initial advice statement (IAS) in December 2007, requesting that the project be considered for declaration as a significant project under Part 4 of the SDPWO Act. On 21 December 2007, the then Coordinator-General declared the project to be a 'significant project for which an EIS is required' pursuant to s.26(1)(a) of the SDPWO Act. The declaration was published by Gazette Notice (Vol. 347, No. 5) as required by the SDPWO Act.

A number of Australian, state and local government representatives and other authorities were invited to participate as advisory agencies for the EIS process and DIP, on behalf of the Coordinator-General, coordinated the consultation process between the proponent, the advisory agencies and the public.

3.2. Commonwealth impact assessment

On 18 May 2008, the proponent referred the project to the then Commonwealth Minister for the Environment, Heritage and the Arts for a determination as to whether the project would constitute a 'controlled action' under section 75 of the EPBC Act. The project was referred as four interrelated EPBC Act referrals addressing:

- the mine and infrastructure (EPBC 2008/4284)
- southern CSM raw water supply pipeline (EPBC 2008/4287)
- western CSM water supply pipeline (EPBC 2008/4283) (note: subsequently withdrawn on 29 October 2009)
- Glebe Weir raising and raw water supply pipeline (EPBC 2008/4285).

On 21 July 2008, the delegate of the Commonwealth Minister determined that each component of the project was a controlled action pursuant to s.75 of the EPBC Act for potential impacts on MNES.

The controlling provisions of all four referrals are:

- listed threatened species and ecological communities (sections 18 and 18A).

The additional controlling provision for the Glebe Weir raising and pipeline is:

- listed migratory species (sections 20 and 20A).

Consequently, the project requires assessment and approval under the EPBC Act by the Australian Government Minister for Sustainability, Environment, Water, Population and Communities. The Australian Government has accredited the EIS process, conducted pursuant to the SDPWO Act, under a bilateral agreement between the Australian and Queensland Governments. This will enable the EIS to meet the impact assessment requirements under both Australian and Queensland legislation.

The draft ToR, draft EIS and draft SEIS were provided to the former DEWHA for comment prior to the public release of these documents.

The SEIS did not contain a Volume 3, which related to the western CSM water supply pipeline option, on the basis that the western CSM water supply pipeline was not pursued by the proponent beyond the EIS. The relevant EPBC referral (EPBC 2008/4283) was withdrawn on 29 October 2009.

Section 8 of this report evaluates the assessment of impacts to MNES as presented in Chapter 17 of the EIS and Attachment J of the associated technical report.



3.3. Terms of reference for the EIS

The draft ToR for the EIS were made available for public and advisory agency comment from 16 August 2008 until 15 September 2008.

Advertisements inviting comments on the draft ToR were placed in national and state newspapers, including the *Weekend Australian* and *The Courier Mail*, on 16 August 2008, and in local newspapers, including the *Western Star* (Roma) on 19 August 2008 and the *Chinchilla News* and *Murilla Advertiser*, on 21 August 2008.

The draft ToR were publicly displayed at:

- Dalby Regional Council Customer Service Centre, Miles (now Western Downs Regional Council)
- Taroom Post Office, Taroom
- Banana Regional Council Customer Service Centre, Taroom
- Wandoan Post Office, Wandoan
- Dalby Regional Council Customer Service Centre, Wandoan
- the proponent's Project Information Centre, Royd Street, Wandoan.

Advisory agency briefings were held in Brisbane on 9 September 2008 and in Wandoan on 11 September 2008.

Twenty-seven submissions on the draft ToR were received, including one from the Australian Government; fifteen from state government advisory agencies¹, one from local government, four from local area interest groups and six from members of the public.

Comments on the draft ToR were received from the following:

Advisory agencies¹

- Department of Communities
- Department of Emergency Services
- Department of Employment and Industrial Relations
- Department of Housing
- Department of Local Government, Sport and Recreation
- Department of Main Roads
- Department of Mines and Energy (two submissions received)
- Department of Natural Resources and Water
- Department of Primary Industries and Fisheries
- Environmental Protection Agency
- Queensland Health
- QPS
- Queensland Transport
- Queensland Treasury

Australian Government

- (then) Australian Government Department of Environment, Water, Heritage and the Arts²

Local government

- Dalby Regional Council

Stakeholder and community groups

- Caboolture Properties Pty Ltd

¹ As a result of machinery of government changes from 26 March 2009 (see *Public Service Department Arrangements Notice (No. 2) 2009*), changes to Queensland Government departments occurred. These are listed in Schedule 10 of Appendix 1 of this report.

² As a result of machinery of government changes from 14 September 2010, the Australian Government environmental impact assessment responsibilities, under the EPBC Act, of the (then) DEHWA were transferred to Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).



- Guluguba Affected Landholders Group
- Long Yard Beef Company Pty Ltd
- Queensland Conservation Council

Private individuals

- Six private submitters.

Following consideration of public and advisory agency comments, the ToR were approved on 5 November 2008 by the Coordinator-General and issued to the proponent.

3.4. Review of the EIS

Volumes 1, 2 and 3 of the EIS were prepared by the principal project consultant, Parsons Brinckerhoff Australia Pty Ltd, and its specialist environmental sub-consultants for the WJV. Volume 4 of the EIS was prepared by MWH for SunWater Ltd.

The then Coordinator-General determined that the draft EIS, prepared by the proponent, was substantially in accordance with the ToR and on 1 December 2008 approved its release as the project EIS. The EIS was made publicly available for comment from 8 December 2008 until 2 February 2009.

Advertisements inviting comments on the EIS were placed in national and state newspapers, including the *Weekend Australian* and *The Courier Mail*, and local newspapers, including the *Western Star* (Roma), *Chinchilla News* and the *Murilla Advertiser* on 6 December 2008.

The EIS was publicly displayed at a range of locations, including:

- Wandoan Library and Council Customer Service Centre
- the proponent's Project Information Office in Royd Street, Wandoan
- Taroom Library and Council Customer Service Centre
- Pioneer Library, Miles.

Information on the project was available on the Xstrata and DIP project websites. A public information meeting was held in Wandoan on 8 December 2008. Advisory agency briefings were held in Toowoomba on 16 December 2008 and in Brisbane on 17 December 2008.

Sixty-two submissions were received on the EIS, including: one from the Australian Government, twelve from state government advisory agencies, two from local governments, twenty-three from local area interest groups and twenty-four from members of the public.

Comments on the EIS were received from the following:

Advisory agencies

- Department of Communities
- Department of Emergency Services
- Department of Housing
- Department of Main Roads
- Department of Mines and Energy
- Department of Natural Resources and Mines
- Department of Primary Industries and Fisheries
- Department of Tourism, Regional Development and Innovation
- Environmental Protection Agency
- Queensland Health
- Queensland Police Service
- Queensland Transport

Commonwealth Government

- (then) Commonwealth Department of Environment, Water, Heritage and the Arts



Local government

- Banana Shire Council
- Dalby Regional Council

Stakeholder and community groups

- Agforce Queensland
- Dawson Valley Development Association Inc.
- Fitzroy Basin Association
- Fitzroy Basin Food and Fibre Association Inc.
- Friends of the Earth Brisbane
- Grosmont State School P&C
- Guluguba Affected Landholders Group
- Juandah Water Board
- Landholder Services Pty Ltd
- Lethbridge Bros.
- Northern Energy Corporation Limited
- Shannon Donaldson—Province Lawyers
- Taroom Shire Landcare Group (two submissions)
- Wildlife Preservation Society of Queensland
- Wildlife Preservation Society of Queensland—Upper Dawson Branch
- Wandoan District Liaison Committee
- Wandoan Housing Association
- Wandoan Sub Branch RSL
- Wandoan State School
- Wandoan Tennis Club Inc.
- Wemala Bore Group
- Queensland Conservation Council.

Private individuals

- 24 private submitters.

The substantive issues raised in these submissions included:

- project timing, MLA process, MLA boundaries and leaseback arrangements
- air quality and dust impacts on sensitive places
- noise and vibration effects from blasting activities and impacts on sensitive places
- mining pits—staged operations to reduce impact to nearby towns
- road closures and relocations and traffic management to reduce impacts on stock routes and impacts to closed roads during flooding
- water supply from groundwater bores and tailings dam and impacts from vibration and water entitlements
- water supply options
- cumulative impacts of other Surat Basin developments, especially relating to resultant social impacts
- visual amenity and social impacts to the township of Wandoan
- accommodation of construction workforce
- changing land use from agricultural to mining activities and economic impact of loss of viable agricultural land and rehabilitation
- concerns on the proximity of mining (specifically Frank Creek Pit) to Wandoan township
- impacts of changes in the environmental protection policies for air and noise, and the Environmental Protection Regulation 2008, which came into effect as of 1 January 2009
- clarification on soil classifications, loss of good quality agricultural land, and final landforms
- mine decommissioning and mine area rehabilitation
- use and quality of CSM water used across the site
- clarification on extent of existing and future estimated economic contributions from agricultural based industries on the MLA areas
- clarification of biodiversity offsets



- various surface water management issues
- impacts on infrastructure under the control of the Dalby Regional Council (roads, waste and water)
- clarification on the content of the draft Environmental Management Plans
- route of the northern portion of the southern CSM water supply pipeline.

All submissions on the EIS were provided to the proponent.

3.5. Supplementary EIS

On 28 August 2009, the then Coordinator-General requested the proponent, under s.35(2) of the SDPWO Act, to provide additional information about the EIS in the form of a SEIS.

Volumes 1 and 2 of the SEIS were prepared by Parsons Brinckerhoff Australia Pty Ltd and its specialist environmental sub-consultants. Volume 4 of the SEIS prepared by SunWater Ltd and WRM Water and Environment Pty Ltd.

In response to this information request, the proponent prepared a SEIS, which was provided for advisory agency review and comment from interested parties from 15 November 2009 to 18 December 2009. The SEIS was available for review on the project website (accessible via a link on the DIP website), with hard copies also available from the proponent's Project Information Centre in Royds Street, Wandoan.

A series of meetings, with directly affected land holders, the Community Reference Group and the general public, were held by the proponent in Wandoan, Taroom and Miles in December 2009 to provide a project update and discuss the information contained in the SEIS.

Advisory agencies were invited to comment on the SEIS and to provide specific advice to the Coordinator-General for consideration for inclusion as conditions or recommendations in this report.

Thirty-four submissions were received on the SEIS, including one from the Australian Government, two from local government, eleven from state government advisory agencies, seven from interest groups or organisations and thirteen from members of the public.

The following advisory agencies advised they were satisfied that all issues had been addressed:

- Queensland Police Service
- Queensland Treasury.

The following advisory agencies either provided advice and/or recommended conditions:

- Department of Communities
- Department of Community Safety
- Department of Education and Training
- Department of Employment, Economic Development and Innovation
 - Employment and Indigenous Initiatives
 - Queensland Mines and Energy
 - Queensland Primary Industries and Fisheries
- Department of Environment and Resource Management
- Department of Transport and Main Roads
- Queensland Health
- Banana Shire Council
- Western Downs Regional Council (formerly Dalby Regional Council)
- (then) Australian Government Department of Environment, Water, Heritage and the Arts.

The following local interest groups and private organisations provided comments on the SEIS:

- Fitzroy Basin Association
- Grosmont School Parents and Citizens Association
- Juandah Water Board
- Landholder Services Pty Ltd
- Wildlife Preservation Society of Queensland
- Wildlife Preservation Society of Queensland—Upper Dawson Branch
- Wandoan District Liaison Committee.



The substantive issues raised in submissions on the SEIS included:

- MLA process, including compensation and timing for confirmation of mining boundaries and property purchase negotiations
- impact of air quality on human health and sensitive places
- impacts to groundwater and bores
- cumulative impacts relating to workforce housing and accommodation
- cumulative impacts of other projects proposed for the Surat Basin
- potential impacts on the Boggomoss Snail
- impacts on riparian corridors
- loss of oversize and flood free access to Wandoan from surrounding areas due to road relocations and closures
- potential changes to the project, including development of the Wubagal Pit and the relocation of the accommodation facility
- project water usage, including questioning the appropriateness of access to the Great Artesian Basin
- confirmation of community infrastructure to be provided (airport, waste facility etc.)
- land rehabilitation and suitability of proposed post-mine land uses
- adherence to weed management strategies, including the introduction of wash down facilities.

In addition to the routine process usually undertaken by DIP to assess submissions received on a SEIS, private individuals and interest groups or organisations received a written response from the proponent. The proponent also offered to meet with a number of individuals to further explain the response and to clarify the issues raised. Copies of the letters of response directed to submitters were considered in the EIS evaluation.

3.6. Other public information and consultation activities

The proponent conducted a comprehensive public information and consultation program throughout the EIS process, as documented in the EIS (Volume 1, Book 2, Chapter 4) and the SEIS (Volume 4, Book 2, Chapter 4). Consultation included activities such as:

- project newsletters and mailings
- community fact sheet
- project advertisements
- community survey
- community information sessions
- direct property owner consultation
- community reference group meetings
- a community tour
- information displays at Wandoan Show 2008 and 2009 and Taroom Show 2008 and 2009
- local community contact points, including a project information office in Wandoan, a project information line, email address, reply paid mailing address and project website.



4. Approvals

4.1. Overview of approvals regime

The SDPWO Act establishes the framework for environmental assessment of declared significant projects in Queensland and is the controlling legislation for the project at the state level.

The environmental impact assessment is undertaken in accordance with the provisions of Part 4 of the SDPWO Act and evaluation of the EIS is pursuant to section 35 of the Act.

The state-based planning and approvals framework applicable to the development of the project is primarily established by the:

- *Mineral Resources Act 1989* (MRA) that regulates mining tenures
- *Environmental Protection Act 1994* (EP Act) that regulates environmentally relevant activities (ERAs) and environmental authorities (EAs) for mining and petroleum activities
- *Sustainable Planning Act 2009* (SPA), which superseded the *Integrated Planning Act 1997* (IPA) in December 2009, that regulates development off the mining lease areas.

SPA establishes the system in Queensland for planning and development assessment, and provides the Integrated Development Assessment System (IDAS) for development assessment and approval.

All aspects of development of a mining activity for which an EA (mining lease) applies are exempt from assessment against a local government planning scheme under SPA.

Chapter 3 of the EIS and SEIS volumes provided lists of approvals for the project. These approvals are also summarised in Table 4.1 of this report.

4.2. Mining lease applications

Mining and associated mining activities undertaken as part of the project will be carried out over an area of approximately 32 000 hectares and located within three MLAs (MLAs 50229, 50230 and 50231).

Prior to mining, a mining lease must be granted by the Governor-in-Council pursuant to the MRA. This process is subsequent to the issue of the EA for mining activities pursuant to the EP Act.

On 29 July 2010, the proponent lodged an application with DEEDI for ML 50277 over approximately 22 000 ha of land to the west of the existing MLAs. This application is not part of the project and would be subject to a separate approval process should the proponent wish to proceed with a coal mine on this site.

4.3. Environmental authority

Under the EP Act, an EA is required to carry out 'mining activities' as defined under section 147 of that Act. The project would involve the following types of mining activities:

- mining under the MRA
- processing mined materials
- a number of activities directly associated with, or facilitating or supporting, the mining and processing activities
- rehabilitation and/or remediation
- actions taken to prevent environmental harm.

DERM has provided draft EA conditions for the mining activities on the proposed mining leases that are included in Schedule 3, Appendix 1 of this report and are referred to, where relevant, in the subsections of section 5 of this report.



As part of this project, an EA is also required under the EP Act for the gas supply pipeline (if the proponent proceeds with construction of the pipeline). DERM has provided draft EA conditions for the proposed gas supply pipeline to the mine site that are included in Schedule 5, Appendix 1 of this report and are referred to, where relevant, in section 5 of this report.

Under the EP Act, an environmental management plan (EM Plan) must be submitted to the administering authority (DERM) with the application for an EA. Approval of the EA and, therefore approval of the EM Plan, is in accordance the EP Act.

For the purpose of approvals required for the project, the EM Plans (required under the EP Act) for the EAs for mining activities and the gas pipeline are distinguished from the other environmental management plans (EMPs) for construction and operation of all other components of the project that are not subject to the EAs.

Certain developments on the ML areas that would otherwise be assessed against a local government planning scheme under SPA would require a development permit to be directly obtained from the relevant assessment manager. For the project these include:

- waterway barrier works—*Fisheries Act 1994*
- watercourse diversions—*Water Act 2000*
- taking or interfering with artesian or sub artesian water (i.e. construction of groundwater bores)—*Water Act 2000*.

Should relocation of a stock route be required, permits would be required from DERM under the *Land Act 1994* for the closure and opening of a road.

In consultation with DERM, conditions are stated, under section 49 of the SDPWO Act, contained in Schedule 3, Appendix 1 of this report, that are to be included in the EA. A copy of this report will be provided to the Minister administering the EP Act.

4.4. Environmentally relevant activities

Under the EP Act, a development permit issued by DERM is required to carry out an environmentally relevant activity (ERA). As mentioned in section 4.3 of this report, the provisions of the EA (mining activities) also provide authority for any ERAs under the EP Act that occur on the mining leases.

As discussed in the SEIS (Volume 1, Chapter 3.3.6), the proponent is also required to submit applications for ERAs that fall outside of the MLA areas and EA.

Schedule 2 of the EP Regulation describes all ERAs, with the following relevant to the project within the MLA areas:

- ERA 6 Asphalt manufacturing
- ERA 8 Chemical Storage
- ERA 14 Electricity generation
- ERA 15 Fuel burning
- ERA 17 Abrasive blasting
- ERA 18 Boiler making or engineering
- ERA 31 Mineral processing
- ERA 38 Surface coating
- ERA 43 Concrete batching.

ERAs relevant to the project that are outside the MLA areas are:

- ERA 60 Waste disposal
- ERA 62 Waste transfer station operation
- ERA 63 Sewage treatment.



DERM has recommended draft conditions under the EP Act for ERAs associated with the raising of Glebe Weir that are contained in Appendix 1, Schedule 5. These include:

- ERA 16 Extractive and screening activities—threshold 1(c) more than 100 000 t to 1 000 000 t in a year
- ERA 43 Concrete batching
- ERA 56 Regulated waste storage—threshold 2
- ERA 61 Waste incineration and thermal treatment—threshold 1.

DERM has provided advice and recommendations concerning specific approvals required from DERM for the ERA 14 approvals to operate a facility to generate greater than 10 MW of electricity. This is included in Schedule 6, Appendix 1 of this report and is referred to, where relevant, in the subsections of section 5 of this report. The proposed conditions should apply to an approval relating to a dual fuel (gas and diesel) power station up to 80 MW generating capacity.

DERM has also provided information requirements for an application for development approval for ERA 63 to upgrade the Wandoan sewage treatment plant to process sewage waste from the mine and town. This is included in Schedule 7, Appendix 1 of this report and is referred to, where relevant, in the subsections of section 5 of this report.

4.5. Local government approvals

All parts of the project are located within the jurisdiction of the WDRC and the BSC. WDRC has administered the former Taroom and Murilla Shires' IPA-compliant (now SPA) planning scheme (the planning scheme) since 15 March 2008 following council amalgamations.

Notwithstanding the approval of the EAs for the project, WDRC and BSC have raised a range of issues concerning the construction and operation of the mine that may impact upon local government infrastructure and services.

In particular, development approval for material change of use (MCU) would be required from WDRC and BSC for any development off the mining lease that is not subject to section 319 of the MRA or Schedule 10 of SPA, for example, any workers accommodation off the ML and, potentially, other forms of support infrastructure located off the ML, such as water pipelines, construction camps, accommodation facility, residential accommodation in Wandoan and other supporting infrastructure such as water treatment and waste disposal facilities. It is noted that SunWater has retained the option of seeking operational works development approval for the Glebe Weir raising and pipeline component. These approvals, if required, would be subsequent to the Coordinator-General's evaluation and any conditions set by the assessment manager cannot be inconsistent with the conditions for the development approvals included in this report.

It is noted that, subsequent to the SEIS, the proponent is considering temporary use of accommodation facilities proposed to be provided in Wandoan and Miles by developers in the form of specifically approved and built multi-user accommodation facilities, principally for workers involved in the construction of major proposed projects in the region. This option is being considered for accommodation for the initial project construction workforce engaged in access road construction, earthworks and the establishment of the permanent accommodation village for the project. It would take approximately ten months before the permanent accommodation facility for the project is available for occupancy.

Development permits for accommodation facilities, developed and operated by a third party, in Wandoan and Miles have recently been issued by the WDRC for ultimate capacity of 1100 and 350 respectively.

The proponent is currently negotiating with the proponents of these camps to secure temporary accommodation for the initial period of mine development. This was not directly contemplated during the EIS, which stated that options for temporary accommodation included the use of local caravan parks, hotels and motels, or the provision by the proponent of temporary accommodation units on-site. Nonetheless, the Coordinator-General is satisfied that appropriate impact assessment has been undertaken as part of the development assessment process undertaken by the WDRC under SPA. He is also satisfied that the proponent's original intent that the majority of operational project workers would



be housed in the project accommodation facilities on-site, with the exception of those individuals who wish to source their own accommodation in Wandoan, Miles or Taroom, is still relevant.

4.6. Other state approvals

Other approvals may be required for project activities, for all components of the project, off the mining lease that are not related to the EA (mining lease) or development approval by WDRC or BSC. These include:

Development permits

- development permit for waterway barrier works (off ML) under SPA and the *Fisheries Act 1994*
- taking or interfering with artesian or sub artesian water (i.e. construction of groundwater bore) (off ML) under SPA and the *Water Act 2000*.

Other approvals (non-development)

- licence to interfere with stream flow (stream diversion) under the *Water Act 2000* (a development approval is also required for the stream works)
- riverine protection permits under the *Water Act 2000*
- permits for destroying flora and fauna protected by the *Nature Conservation Act 2006*
- permits for clearing protected plants under the Nature Conservation (Wildlife) Regulation 2006
- beneficial re-use approval under Part 6A Environmental Protection (Waste Management) Regulation 2000
- cultural heritage management plan (CHMP) under the *Aboriginal Cultural Heritage Act 2003* (ACH Act)
- permit to work in or interfere with a state-controlled road under the *Transport Infrastructure Act 1994* (TIA).

Under section 87 of the ACH Act, a CHMP must be developed and approved where an EIS is required for a project. Furthermore, under section 88 of the ACH Act, the CHMP must be developed and approved prior to obtaining the EA, unless the EA contains conditions requiring that an approved CHMP be in place before any activity occurs that could cause harm to Indigenous cultural heritage.

Table 4.1 outlines a summary of the likely statutory approvals required for the project, including the development approvals mentioned above, together with certain other licences, permits and approvals identified during the EIS that are required for this project under other legislation.

In Schedule 9, Appendix 1 of this report, conditions are recommended (under section 52 of the SDPWO Act) to be attached to any other statutory state approvals required for the project.

4.7. Coordinator-General imposed conditions

Since a number of matters are not appropriate for conditioning under the ML, or are not the subject of a development approval under SPA, an EA under the EP Act or any other statutory authority, conditions have been imposed in this report, under section 54B of the SDPWO Act (refer to Schedule 1, Appendix 1).

An appropriate entity, that is to have jurisdiction for each imposed condition, is nominated in Schedule 2, Appendix 1 of this report.

4.8. Commonwealth approval

As the project was declared a controlled action pursuant to section 75 of the EPBC Act, the EIS process has been undertaken in accordance with the requirements of the bilateral agreement between the Queensland and Australian governments.



Therefore, subsequent to this report, the controlled action will be considered for approval under section 133 of the EPBC Act once the Commonwealth Minister has received this evaluation report prepared under section 35 of the SDPWO Act.

Table 4.1: Summary of likely approvals required for the project

Legislation	Approval	Approval agency
<i>State Development and Public Works Organisation Act 1971</i>	Approval of the EIS	Coordinator-General
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Approval of the controlled action and EIS (under bilateral agreement)	SEWPaC
<i>Environment Protection Act 1994</i>	Approval of EM plan and issue of an EA to operate the mine	DERM
<i>Mineral Resources Act 1989</i>	Grant of mining lease for MLA50230, MLA50231, MLA 50229	DEEDI
<i>Sustainable Planning Act 2009 (SPA)</i>	Grant of development permits (if required) for developments off the mining lease not subject to section 319 of the Mineral Resources Act 1989 or Schedule 10 of SPA (e.g. workers accommodation)	WDRC, BSC
<i>SPA and Vegetation Management Act 1999</i>	Development permit for clearing native vegetation (off mining lease)	DERM
<i>SPA and Water Act 2000</i>	Development permit for watercourse diversions Development permit for taking or interfering with artesian or sub artesian water (i.e. construction of groundwater bores)	DERM
<i>SPA and Fisheries Act 1994</i>	Waterway barrier works (e.g. to construct creek crossings)	DEEDI
<i>Nature Conservation Act 1992</i>	Permit for taking, using, keeping or interfering with a protected animal or plant species listed under the Nature Conservation (Wildlife) Regulation 1994. Permit to be obtained if protected plants or animals are affected by the mine	DERM
<i>Water Act 2000</i>	Licence for groundwater bores Water permit to take construction water from a watercourse, lake or spring, or groundwater (for other than stock or domestic purposes) (e.g. to extract groundwater for construction and development of bores for dewatering coal) Licence to interfere with stream flow (stream diversion) Riverine protection permit to destroy vegetation, excavate and/or place fill within a watercourse, lake or spring.	DERM
<i>Forestry Act 1959</i>	Permit to extract quarry material (if such material is to be used during construction)	DERM
Environmental Protection (Waste Management) Regulation 2000	Beneficial re-use approval (for southern CSG water supply pipeline)	DERM
<i>Aboriginal Cultural Heritage Act 2003</i>	Approval of Cultural Heritage Management Plan Duty of care to take all reasonable and practicable measures not to harm Aboriginal cultural heritage	DERM
<i>Transport Infrastructure Act 1994</i>	Permit to work in, or interfere with a state-controlled road	DTMR



Legislation	Approval	Approval agency
Transport Infrastructure (State-Controlled Roads) Regulation 2006	Approval for connection to the Leichhardt Highway	DTMR
Transport Operations (Road Use Management: Mass, Dimensions and Loading) Regulation 2005	Permit to transport large items (e.g. mining equipment)	DTMR
EP Act and Environmental Protection (Waste Management) Policy 2000	Statutory obligations regarding waste transportation and disposal	DERM
<i>Radiation Safety Act 1999</i>	Licence to hold equipment that contains radionuclide material (e.g. soil/moisture density gauges etc.)	Queensland Health



5. Evaluation of environmental effects

5.1. Land use

5.1.1. EIS findings, submissions and analysis

The three MLA areas cover a total area of approximately 32 000 ha, of which 11 000 ha will be used for mining operations with the remainder intended for associated infrastructure and as a buffer between mining operations and sensitive places.

The current main land use in this area, as well as in the possible water pipeline routes, is grazing, though some small, dry land cropping exists, mainly for feedlot production and fodder. Tenure within the MLA areas is a combination of freehold or leasehold, though areas of reserves, permits to occupy and unallocated state land exist.

5.1.1.1. MLA area boundaries

Submitters to the EIS and SEIS raised issues about the extent and finalisation of the MLA area boundaries and questioned whether statements by the proponent regarding a proposed reduction in the extent of the MLA areas should be initiated prior to the finalisation of the EIS. The MRA requires an applicant seeking a ML to justify land required for mining purposes as part of the application process.

The proponent stated in the EIS and SEIS that it intends to revise the boundary of MLA 50229, following negotiations with affected landholders before finalising the MLA boundary, by removing a number of allotments from the MLA. A number of private submitters on the EIS and SEIS expressed some frustration relating to this issue. However, the proponent has endeavoured to act openly in attempting to quantify the extent of the MLA areas within the EIS process, based on environmental and resource investigations, and will specify the exact area for determination of the ML pursuant to the MRA.

When DERM has issued its EA relating to mining activities, the proponent must confirm to the Minister for Mines and Energy, the exact area proposed for the project, with the Minister then making a determination whether this area is appropriate and justified.

Also important in making a final determination of the MLA boundaries is the requirement under the MRA to exclude 'restricted areas' from mining. A number of submitters on the EIS raised the issue of the Juandah Bore. The bore site—Lot 56 on Plan FT987—is gazetted under the (then) Land Act 1962 as a reserve for water supply purposes of which the Juandah Water Board is trustee. According to the EIS and SEIS, the location of Juandah Bore is contained within MLA 50229. Submitters identified that up to three landowners will continue to use this bore (authorised under Water Licence No. 58133n), even after the project proceeds.

In its response to submissions to the SEIS, the proponent committed to remove this bore from the MLA area. However, to remove any doubt relating to the removal of Juandah Bore from within MLA 50229, a condition is recommended in regard to this matter (Condition 2, Schedule 8).

In its submission on the EIS the Wandoan District Liaison Committee sought progressive release of land at the completion of mining activities in any particular area, and that the land be rehabilitated to allow it to be released onto the property market for primary production. The proponent's response outlined that mining is proposed over much of the MLA areas over a 30-year mine planning timeframe, and that any such release of land would be dependent on the rehabilitation of the land, with further consideration given at the appropriate time. This issue is relevant not only to the continued sustainable agricultural production of the area for the longer term but has a range of social ramifications, with the aim of ensuring sustainable primary production for the Wandoan locality.

The proponent is recommended to consider that such an initiative be over the life of the mining activities and, where possible, once mining activities have concluded and the land rehabilitated in accordance with DERM requirements and EA conditions, that this land be returned to as close to its pre-mining condition as possible (Recommendation 5, Schedule 9).



5.1.1.2. Mineral and petroleum tenements

MLAs have been applied for over areas that are also subject to existing authorities to prospect (ATPs) for petroleum and one petroleum lease (PL). Certain provisions pertaining to overlapping tenures contained within the MRA will apply. If a coal mining lease is sought within the area of an existing PL, the parties must use reasonable attempts to reach a coordination arrangement regarding coal mining under the proposed mining lease and petroleum production under the petroleum lease. The implications of overlapping petroleum tenures for the project are:

- as MLA 50230 overlaps with PL 171, under the MRA the mining lease cannot be granted over the area subject to the petroleum lease unless and until a coordination arrangement has been negotiated between the relevant parties and the Minister has approved the arrangement
- due to there being ATPs overlapping the MLAs, the proponent is required to consult with the ATP holders regarding the development of the coal resource and how it might impact on the ATP holders' planned petroleum operations.

There is a process established under the MRA to deal with such matters and discussions have commenced between the relevant parties.

5.1.1.3. Mining of Frank Creek Pit

Air quality, noise and vibration studies outlined in the EIS indicated that operating a dragline at full capacity in Frank Creek Pit had the potential to adversely impact living conditions in the township of Wandoan.

In response, in the SEIS the proponent delineated a 2 km 'high management zone' around the western side of the township (see Figure 2-2). The proponent proposed that mining, in the initial years of operation, would not occur within the two km zone. The proponent also proposed to compare the monitored results of the actual mining conditions associated with air quality, noise and vibration, with the predicted potential impacts presented in the EIS and SEIS, and the conditions of the EA. Any potential for future mining within the 2 km zone would then depend on this assessment, which would indicate whether or not mining could be undertaken in compliance with the EA conditions.

The north-west (Years 3 to 5) and south-west (Years 6 to 10) corners of Frank Creek Pit that are outside the 2 km zone are proposed to be mined using trucks, excavators and shovels only, which will assist in mitigating noise and dust impacts on the nearby township.

5.1.1.4. Property tenures

The EIS outlined that the project mining leases, if granted, would overlay the land for the duration of the project and would not change the property tenure. No reconfiguring of allotments or alteration to tenures of allotments comprising the project MLA areas is proposed as part of this project. While the MRA does not require that tenure be acquired on a compulsory basis as part of the ML process, it is clear that the proponent has been active in its intention to deal directly with landholders to voluntarily purchase property that would be subject of the MLA areas. Though submitters on the EIS raised this issue, this report does not include a determination in regard to voluntary purchase of properties or other voluntary agreements relating to tenure (for example, easements), as these are currently being negotiated voluntarily with landholders or will be addressed in detail as part of the MRA process, potentially involving the Land Court.

5.1.1.5. Pipelines

The gas and raw water pipelines (depending on options to be decided upon by the proponent) are proposed to be developed in an easement with the relevant land title. As access to a pipeline would be required for maintenance purposes over the life of the pipeline, some restrictions may be placed on the properties affected by the easement. These restrictions could include constraints on subdivision, ensuring that construction on or near land affected by the easement continues to allow reasonable access to the easement, or restrictions on some development and land use immediately within the easement.

It is proposed that pipeline easements be co-located with other infrastructure (including road, electricity, rail etc.), where possible, to minimise environmental and property impact, with route selection avoiding, where possible, existing petroleum and mineral tenements to minimise potential sterilisation of a resource.



In its submissions on the EIS and following the SEIS, the Wildlife Preservation Society of Queensland (WPSQ) opposed the alignment of the southern CSM water pipeline, which was proposed on stock routes and road reserves, due to impacts of vegetation and wildlife corridors. Given the advantages in co-locating linear infrastructure within existing corridors, and the strategies proposed by the proponent to minimise construction impacts, including, where possible, avoiding the removal of large trees containing for instance nesting habitat, that the alignment is considered appropriate, especially considering the pipelines would be generally underground.

5.1.2. Conclusion—land use

Due to a range of considerations—including submissions on the EIS regarding the close proximity of Frank Creek Pit to the Wandoan township (approximately 600 m), the perception of health impacts resulting from open-cut mining operations, and the potential loss of quality of life—open-cut mining should not occur within the 2000 m ‘high management zone’, to maintain the liveability of Wandoan township.

Therefore, a condition is recommended that no open-cut mining of any type shall occur during the life of this project at any point which is located within a zone with a radius or distance of 2000 m measured in a straight line in any direction from the point at which the centre-line of Moore Street in Wandoan intersects with the centre-line of Lawton Street in Wandoan. Mining activities other than open cut coal extraction, including for example, roads, pipelines, powerlines etc. will not be excluded from this zone (Condition 1, Schedule 8).

To be clear, this recommendation does not relate to other areas of the project that are within 2 km of sensitive places.

The proponent has satisfactorily demonstrated a willingness and an openness to liaise and negotiate with land holders in regard to planned property acquisition and has communicated the appropriate process to be undertaken in regard to the mining lease application process, especially in regard to finalisation of the mining lease boundaries.



5.2. Land and mineral resources

The following key matters in relation to land and mineral resources were raised in submissions on the EIS from private submitters, DERM and DEEDI:

- land suitability classification and the potential loss of good quality agricultural land (GQAL)
- rehabilitation and post-mine land use, including the size and slopes of final voids and overburden
- mineral resources.

5.2.1. Good quality agricultural land, strategic cropping land and rehabilitation

5.2.1.1. EIS findings, submissions and analysis

The EIS (Chapter 8, Land Use; Chapter 9, Geology, mineral resources, overburden and soils; and Chapter 17A, Terrestrial ecology) reported that the majority of land within the project site is highly disturbed, has a long history of vegetation clearing and has been primarily used for cattle grazing for many years. While there is some small scale, dry land cropping, mainly used for cattle feed lots and fodder, cattle grazing is the dominant land use across the project area.

A number of submissions on the EIS raised issues on the assessment process used to evaluate the quality of agricultural land both before and after mining. The EIS outlined that a number of different land evaluation methods exist for assessing the classification of agricultural land. The EIS used the 'land suitability classification' under the technical *Guidelines for the Environmental Management of Exploration and Mining in Queensland* (DME, 1995) as the methodology for land assessment. In response to comments on the EIS from DERM relating to the applicability of this assessment in Central Queensland dry land cropping areas, the SEIS provided further information, reassessing the pre-mine suitability based on revised criteria.

In response to submissions on the EIS, an assessment of existing and future cattle grazing potential of the MLA areas was conducted, based on the framework included in Queensland Primary Industries and Fisheries (now part of DEEDI) 'Stocktake' program. The study also assessed the economic impact of the grazing potential during operation and after mining.

State Planning Policy 1/92: *Development and the Conservation of Agricultural Land* (SPP 1/92), provides a framework for consideration of GQAL in development assessment. The EIS outlined that, under Section 2 and Attachment 2 of the associated SPP 1/92 Planning Guidelines: *The Identification of Good Quality Agricultural Land* (Department of Primary Industries and Department of Housing, Local Government and Planning Queensland 1993), Class A, B and C agricultural land in the former Taroom Shire does comprise GQAL.

According to the former Taroom Shire Planning Scheme, the whole of the MLA areas is classified as 'good quality agricultural land' (GQAL).

The findings of the land suitability assessment undertaken in the EIS and SEIS (Volume 1, Chapter 9), considered the land suitability for the existing environment to be Classes 3 and 4 (suitable for dryland cropping) and Class 2 (suitable for beef cattle grazing).

5.2.1.2. Strategic cropping land policy framework

On 23 August 2010, the Queensland Government released a new policy framework for strategic cropping land that recognises the government's commitment to protect Queensland's best cropping land.

While the broad outline of the policy framework has been available for public comment, the critical detail of the policy has not yet been developed, in particular, the specific criteria by which strategic cropping land will be identified.



The Taroom Shire Planning Scheme classified the MLA areas as GQAL—Classes A, B and C. The land suitability assessment undertaken in the EIS and SEIS, however, concluded that Class 3 and Class 4 land suitability—which approximates to GQAL Agricultural Land Class C—occurred on the MLA areas. Therefore, indications are that the MLA areas are unlikely to be classified as strategic cropping land.

Nonetheless, the EIS evaluation provided by this report is made on the basis of the statutory and policy framework prevailing at the time of the report, and on the basis of information provided in the EIS, SEIS and other technical information.

5.2.1.3. Land rehabilitation

As outlined in the EIS (Volume 1, Chapter 25) and in the draft EM Plan, the proponent proposed to establish self-sustaining vegetation communities and grazing land using key native tree, shrub and grass species sourced from local ecosystems, and improved pasture species over land that is presently GQAL.

The proponent's land rehabilitation strategy is based on measures that are consistent with practices described in DERM's *Technical guidelines for the environmental management of exploration and mining in Queensland* (1995). DERM recommended that the proponent should also use *Guideline 18: Rehabilitation requirements for mining projects* as part of its rehabilitation strategy.

While some dry land cropping is presently undertaken within the MLA areas, the EIS outlined that most land within the post-mining landscape is proposed to be rehabilitated to the equivalent of land suitability classes 3, 4 and 5.

In its submission on the SEIS, DERM highlighted the project's 'Implementation of Rehabilitation Strategy' (SEIS, Volume 1, Chapter 25) that proposed trials to assess the success of rehabilitation measures. Grazing trials conducted by the proponent on other land affected by mining have demonstrated that a return to cattle grazing on rehabilitated land is feasible. DERM considered that these trials should be extended to develop measures to rehabilitate GQAL to its pre-mining condition, including suitability for agricultural cropping land use as a possible alternative to grazing.

5.2.1.4. Conclusion—good quality agricultural land, strategic cropping land and rehabilitation

Given that the project would involve open-cut mining, there is potential to affect land suitability for uses post-mining and the loss of some GQAL would be a consequence of the project's mining activities.

Whilst the proponent's rehabilitation strategy makes a commitment to only a partial return to productive grazing activities post-mine over most of the proposed mining area, there is an over-riding need for the project in terms of broader public benefit that would accrue as a result of new employment, training, increased economic activity, taxes, royalties and other charges associated with the project.

In consultation with DERM, conditions are stated that require the proponent to undertake a rehabilitation monitoring program to describe how the rehabilitation objectives will be achieved and verify the success of the proponent's rehabilitation strategy (Conditions F4, F5 and F6, Schedule 3). The content of the rehabilitation monitoring program, which is required to conform to *Guideline 18: Rehabilitation requirements for mining projects*, would be required to satisfy DERM's audit and compliance objectives.

The proponent's commitment to partially return the land to productive grazing for most of the mining area would be satisfactory for post-mining land use and would limit loss of agricultural production resulting from the project.

The proponent is recommended to extend its proposed trials, under the project's 'Implementation of Rehabilitation Strategy' to investigate the rehabilitation of mined land to a condition as close to its pre-mining condition (Recommendation 1, Schedule 9).



5.2.2. Final land form

5.2.2.1. EIS findings, submissions and analysis

The EIS stated that typically a single final void would remain after completion of mining for each pit. However, no final voids will remain for Austinvale, Austinvale North, Frank Creek, Leichhardt or Woleebee North and Woleebee Pits, as these pits are to be used for tailing disposal and covered with approximately 20 m of overburden. Final void slope gradients would be up to 14.2 per cent gradient, with the upper surface of overburden stockpiles to be levelled out and shaped to provide a gently undulating landform.

The EIS proposed that the final landform would be similar to the existing topography, with approximately 5 m and a up to approximately 25 m increased elevation compared to the existing landform. Reassessment of the overburden bulking factor (that is, expansion in volume of overburden as it is excavated), and the revised tailings strategy have resulted in this increase in elevation being reassessed to up to approximately 25 m above the existing landform, although some compaction and settling is likely to occur.

5.2.2.2. Conclusion—final land form

To ensure that the final land form is stable, and that future environmental impacts of the land form are managed, in consultation with DERM, conditions are stated for the EA regarding final land use and rehabilitation (Conditions F1–F10, Schedule 3):

- F1–F3—that requires the proponent to rehabilitate all areas significantly disturbed by mining activities in accordance with specified criteria
- F4–F6—that requires the proponent to conduct a Rehabilitation Monitoring Program once rehabilitation has commenced

F7–F8—that specifies final outcomes for residual voids, including reporting requirements F10 and F11 that require the proponent to prepare a post-closure management plan at least 18 months before processing of coal ceases on site. This plan is to be implemented for a nominal period of at least 30 years (or satisfactory shorter period if approved by DERM) and include operation and maintenance of such elements as waste water collection and reticulation, waste water treatment and final cover systems, including vegetative cover.

5.2.3. Mineral resources

5.2.3.1. EIS findings, submissions and analysis

The EIS (Volume 1, Chapter 8) estimated the thermal coal deposits for the project to be in excess of 1.2 billion tonnes located within the three MLA areas. Of these deposits, approximately 500 Mt has a ROM strip ratio of less than 3:1, with the remainder of the coal typically having a strip ratio in the range of 3:1 to 5:1. The MLAs comprise approximately 32 000 ha, with approximately 11 000 ha of the MLA areas proposed to be used for mining operations, with the remaining area proposed to be used for mining infrastructure and as a buffer between operations and sensitive places.

Exploration drilling undertaken as part of project investigations indicated that the Juandah Coal Measures contain the economic coal reserves for the project in the Kogan, Macalister Upper, Macalister Lower and Wambo seam groups. The Geological Survey of Queensland (GSQ—now part of DEEDI) advised in February 2009 that further information relating to resource identification, resource utilisation and recovery, and potential resource sterilisation was required.

5.2.3.2. Conclusion—mineral resources

It is noted that the GSQ in December 2009 advised that information supplied on a confidential basis by the proponent, including a series of resource maps, geological cross sections and explanatory notes regarding the potential impacts of the mining proposals on the coal resources of the Wandoan Group of deposits, satisfies its information requests. Accordingly, no further explanation is provided in this report regarding the detail of the resource deposits, their extent or composition. Therefore, for the purposes of this EIS evaluation, the relevant authority has been provided with the required information, and appropriate information has been outlined in the EIS.



5.3. Mineral waste

The EIS (Volume 1, Chapters 9 and 6) included discussion on the mineral resources, overburden, waste rock, rejects and tailings management within the Wandoan Coal Mine MLA areas. Mineral waste includes the overburden and interburden (spoil) removed to expose the coal resource, and coarse and fine rejects from coal processing. An overburden investigation was only conducted within the MLA areas and was not conducted for the MLA associated infrastructure or gas supply pipeline, as significant overburden disturbance will not occur for these components of the project.

5.3.1. Characterisation of mineral waste

5.3.1.1. EIS findings, submissions and analysis

The removal of spoil and mining of coal may allow oxidation of sulfidic material within the sediments that contain the coal reserves, to produce sulphuric acid. This process can be accelerated during mining operations, if large volumes of sulfidic material are exposed. The resulting sulphuric acid can make mine water drainage acidic and increase the levels of metal and sulphate concentrations in mine water. Increased acidity levels may also dissolve metals within overburden rock.

The EIS therefore assessed the spoil materials to determine whether potential acidic conditions may arise during operation. As well, the EIS investigated reject material produced by coal washing.

The following characteristics of the overburden and inter-burden were considered:

- acid generation potential and heavy metal content
- erosion potential
- suitability of overburden for use as a capping layer and growth medium.

The potential for acid damage was based on the requirements of the guideline *Assessment and Management of Acid Drainage* (Department of Mines and Energy, 1995). Heavy metal concentrations within the overburden were measured against environmental and health-based investigation levels of the *Draft Guidelines for the Assessment of Contaminated Land in Queensland* (Environmental Protection Agency, 1998).

The EIS (Volume 1, Section 9.3.5) reported that spoil and reject samples results indicated that metal concentrations were low, although the solubility of most heavy metals could increase with elevated acidity.

The EIS also reported that all samples tested showed that the spoil material had a negative net acid producing potential (NAPP). This indicates that the spoil and rejects have a large capacity to neutralise acidity compared to its capacity to generate acidity.

Further evidence of the non-acid forming nature of the overburden was provided by previous water quality testing undertaken in March 2006 and September 2008. The tests found water in the bulk sample pit, water management dam and seepage from rehabilitated overburden to have neutral to slightly alkaline pH.

The EIS assessed the heavy metal content in the overburden samples against environmental and health-based investigation levels established by the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council, 1999). The heavy metal analysis included arsenic, cadmium, copper, chromium, lead, nickel and zinc.

The results showed that the concentrations of all heavy metals within the overburden tested were below the investigation level concentrations. Though the solubility of most heavy metals has a potential to increase with elevated acidity, due to the results of the low NAPP, overburden is not anticipated to generate significant acid mine drainage. Therefore the stockpiling of overburden is unlikely to be a source of heavy metal contamination.

5.3.1.2. Coordinator-General's conclusion—characterisation of mineral waste

The EIS and SEIS have sufficiently determined the character of mineral waste from the mine to be able to provide appropriate mitigation measures.



The relevant mitigation measures, as proposed in Volume 1, Section 9.6 of the EIS and SEIS, to monitor and manage acid producing potential in reject material, are sufficient to manage the low to negligible risk of acid mine drainage forming within the overburden and interburden.

As much of the overburden is considered dispersive and erosion prone, the relevant mitigation measures proposed in sections 9.6.2 and 9.6.3 in the EIS and SEIS to manage this material are sufficient.

5.3.2. Disposal of mineral wastes

5.3.2.1. EIS findings, submissions and analysis

Waste solids and process effluents produced by coal processing comprise both coarse rejects and fine reject (tailings) material. Differentiation of the waste streams into coarse rejects and tailings is based on particle size and, for this project, tailings would consist of waste material less than 2 mm in particle size.

The proponent proposed to truck coarse rejects to nominated containment areas in various pits across the mine area.

Data from the project bulk sample trials undertaken during early 2008, showed that coarse and fine reject material is very similar in nature, consisting of high ash clays and a small quantity of high ash inert and dull coal removed from the feed material during the trial washing process. The feed material from the deposit is very low in sulphur so the tailings will be low in sulphur and will not impose an acid risk on deposition.

The EIS stated that coarse and fine rejects would be progressively disposed into the voids of mined pits. This would provide an effective long-term rejects storage option that does not sterilise future coal pit reserves, and would reduce the environmental footprint by not disturbing areas in addition to the mine pits.

The EIS stated that spoil stockpiles would be progressively rehabilitated over the life of the mine, and that rehabilitation will commence within two years of the land becoming available for rehabilitation. Tailings dams would be rehabilitated within two years of no longer being required for tailings disposal and are of sufficiently dry and stable formation to commence rehabilitation.

The SEIS (Volume 1, Chapter 9.4.1) proposed that, following the completion of mining of the Austinvale North Pit in approximately Year 1, this pit would be used for tailings disposal. Once the Austinvale North pit is filled, tailings placement will be placed in the Austinvale Pit, which is expected to have capacity to accept tailings over the remaining life of the mine.

5.3.2.2. Conclusion—disposal of mineral wastes

The mitigation measures committed to in the EIS (Volume 4, Sections 9.6.1, 9.6.2 and 9.6.3), are intended to ensure that acid producing potential, dispersion and erosion and stability of stockpiles of overburden material is managed and does not cause harm to the environment.

The strategy for the disposal of mineral wastes would be designed to focus on the placement of mineral waste materials to minimise runoff and erosion, and the evaluation of the geochemical characteristics from untested areas. The strategy also refers to the rehabilitation of the mine site as provided for in the draft EA Conditions F11–F12, Schedule 3, which specify the requirements for a mining waste management plan.

Subject to resolution of the matters discussed in section 5.3.3 of this report, the mining waste management plan, and the associated characterisation and monitoring of mineral wastes in the EM Plan, would ensure appropriate disposal and rehabilitation of the mineral wastes

In consultation with DERM, the following stated conditions are to be included in the EA:

- Condition E5, Schedule 3—that requires the proponent to undertake a risk assessment of any mineral waste to determine hazardous waste or acid producing potential
- Condition E6, Schedule 3—that requires the proponent to dispose of waste from the coal handling and preparation plant in regulated dams and authorised spoil disposal areas in accordance with Conditions in E7.



- Conditions E7–E11, Schedule 3—that details the requirements for a authorised spoil disposal facilities, requiring the proponent to locate, design and construct the spoil disposal stockpiles to a standard acceptable to DERM to prevent environmental harm
- Condition E12, Schedule 3, Appendix 1—that requires the development and maintenance of an operational plan for the spoil disposal facility, requiring the proponent to implement and manage operational placement techniques for spoil and waste disposal from the CHPP, and decommissioning and rehabilitation strategies that demonstrate consistency with conditions of the environmental authority.
- Condition F11–F12—that specifies the requirements for the proponent to develop and implement a mining waste management plan.

5.3.3. Use of spoil for re-vegetation and rehabilitation

5.3.3.1. EIS findings, submissions and analysis

The overburden material was found to have low nutrient, organic matter content and medium to high salinity levels. The EIS found that the dispersive nature of the overburden, combined with low organic matter content, would result in a hard setting of the surface crust. This limits water infiltration into the soils, limiting plant growth and survival and creates a higher potential for erosion to occur. Therefore, the EIS (Volume 1, Section 9.5.3) found that overburden material waste is not suitable for use in mine rehabilitation. The mitigation measures for the overburden material are discussed in the EIS (Volume 1, Section 9.6.2) and in section 5.3.1 of this report.

The EIS stated that topsoil and subsoils would be stockpiled for later use in rehabilitation of the disturbed mine areas. The EIS (Volume 1, Section 9.6.3) details the proposed management of topsoil including stripping separately from subsoil, stockpiling during clearing to a height of no more than 3 m high to retain seed germination potential and storing for only short periods to maximise reuse potential. The EIS explained that stripping of topsoil on the MLA would result in approximately 2.3 million m³ of topsoil and 6.4 million m³ of subsoil being available for use in rehabilitation over the 30 years of mining activities.

5.3.3.2. Conclusion—use of spoil for re-vegetation and rehabilitation

The spoil management measures described in the EIS (Volume 4, Section 9.6) together with the proposed EA conditions are considered to be sufficient to achieve acceptable environmental outcomes with respect to mine rehabilitation.

The requirement for the proponent to provide a satisfactory level of mine site rehabilitation is discussed in more detail in section 5.3.2 of this report, and addressed by EA conditions F1-12, Schedule 3.

5.4. Non-mineral waste management

5.4.1. EIS findings, submissions, analysis

5.4.1.1. MLA areas and Wandoan local waste management

The EIS provided discussion on the sources, impacts and management of solid, liquid and gaseous waste streams associated with the Wandoan Coal Mine MLA areas, the Southern CSM Water Supply Pipeline option and the Glebe Weir and water supply pipeline option (Chapters 18, Waste Management). This waste is referred to in this section as ‘non-mineral waste’.

Section 5.3 of this report (Mineral waste) addresses mining waste that includes the overburden (spoil) removed to expose the coal resource, and course and fine rejects from coal processing.

The EIS identified the non-mineral waste streams for the project, based on conceptual design of the various project components, ranging from early works and site preparation phases through to construction, operation and decommissioning phases. The EIS provided a general inventory of the non-mineral waste generated during the early works, construction and operation of the mine.



Non-mineral waste management is governed by Environmental Protection Policies and regulations under the EP Act. In particular, waste management legislation includes the Environmental Protection (Waste Management) Policy 2000 (EPP (Waste)) and the Environmental Protection (Waste Management) Regulation 2000 (Waste Regulation). Waste is categorised as general, hazardous or regulated.

The EPP (Waste) provides a strategic framework for managing wastes by outlining a preferred waste management hierarchy, from most preferred to least preferred method, as follows:

- 1) avoidance
- 2) waste re-use
- 3) waste recycling
- 4) energy recovery
- 5) waste disposal.

The EPP (Waste) also provides a set of waste management principles involving polluter pays, user pays, and product stewardship.

The EIS provided specific management methods for waste generated during the construction and operation phases of the mine, based on the waste type and sources.

Waste generated during the early works phase would be associated with works external to the MLAs area, including proposed upgrade of the Wandoan township's potable water treatment facilities, proposed upgrade of the town's wastewater treatment facilities, and proposed assistance to WDRC with construction of a new municipal waste disposal and recycling facility for the Wandoan township.

Waste produced during early works and initial construction activities is proposed to be disposed of at the existing landfill facility or through a licensed contractor.

Waste generated during the site preparation phase would be associated with works inside and immediately adjacent to the MLA area, including construction of the project accommodation facilities, the restoration, removal, relocation or demolition of existing structures, bulk earthworks and construction of mine access to the accommodation facilities and MLAs.

Wastes generated during the construction phase would be from construction of the mine infrastructure including civil earthworks, concrete batching, structural components, and structural fit-out.

The draft EA conditions, developed in consultation with DERM, require the proponent to implement a waste management plan in accordance with the EPP (Waste), which will be subject to regular internal audits and review by the proponent's Waste Management Coordinator. Management control strategies for waste must address:

- the types of waste
- segregation of wastes
- storage of the wastes
- transport of the wastes
- monitoring and reporting matters concerning the wastes
- emergency response planning
- disposal, reuse and recycling options.

The waste management strategies proposed in the EIS and the draft EA conditions recommended by DERM generally accord with the waste management hierarchy and principles of the EPP (Waste).

The proponent has also committed to prepare and implement an environmental management system for the mine that would also address waste management with an aim to further minimising waste generated and improving waste disposal and management techniques.

The EIS highlighted that the existing Wandoan landfill has been identified as not being a suitable long-term waste disposal option for this project. Preliminary consultation between the proponent and the WDRC indicated that the current landfill is nearing capacity from waste generated in the local region. The proponent and WDRC are negotiating the development of a new multi-user, municipal



waste disposal facility, including waste transfer station operation, at a suitable location adjacent to the mine site, provide a long-term solution to general and domestic waste disposal in the Wandoan area.

The WDRC may consider the capacity level of this new waste facility, having regard to other proposed projects within the Wandoan region. However, the stated conditions recognise that the proponent's responsibility is limited to the impacts of this project. Relevant guidelines and operational procedures for ERAs 60 and 62 for Waste disposal, and Waste transfer station operation, need to be considered in the site selection, design and associated impact assessment, so as to minimise the potential impacts on soils, groundwater, surface waters, visual amenity, air quality, noise, ecological health and human health.

The new facility would allow timely closure of the existing Wandoan landfill once capacity has been reached, and for best practice waste disposal and a long-term waste disposal solution for the Wandoan area.

Subject to an agreement between the proponent and the WDRC, an upgrade of the existing waste water treatment plant facilities in Wandoan township will increase the performance of the existing facilities, allowing for improved retention times and ultimately better treatment of sewage effluent.

The proponent has committed to ensuring impacts are minimised, by considering the waste management hierarchy, segregation of materials during handling and storage on-site.

The Wandoan District Liaison Committee raised concern in their EIS submission about project waste needs from infrastructure facilities (airport, potable water, waste management and sewerage), and supported consultation and negotiations in developing an agreement between the WDRC and the proponent regarding the provision of the municipal waste facility.

DERM highlighted the importance of properly maintaining green waste and taking care with stockpiling of vegetation to ensure it does not concentrate or divert overland flow with the potential to increase erosion.

As discussed in section 4 of this report (Approvals), the EA for the mine also provides authority for any activities ERAs under the EP Act that occur on the mining leases. ERAs 60 and 62 Waste Disposal and Waste transfer station operation were identified in the SEIS (section 3.3.6, Project Approvals) for the project but to occur outside the MLA area. Consequently, the draft EA contains conditions for the storage of regulated waste.

Sewage waste water would be treated to Class B quality and used for irrigation on the site. Recycled water would be managed in accordance with the *Australian Guidelines for Water Recycling* (2006).

5.4.1.2. Gas supply pipeline option

If construction of a gas supply pipeline is required for power generation for the project, then, for the installation and assembly of the gas pipeline, wastes generated during the construction phase would include construction materials, vehicle emissions, effluent and general waste.

5.4.1.3. Southern coal seam gas water supply pipeline option

If the southern coal seam gas for raw water supply option is pursued, waste generated during early works phase of the pipe construction would predominantly be green waste associated with clearing of vegetation along the pipeline route. Wastes generated during construction would be from installation and assembly of the pipeline and would include construction materials, vehicle emissions, effluent and general waste. During operation, the pipeline is expected to generate significant amounts of waste materials, only minor amounts of liquid waste, from routine maintenance activities of the pipeline.

5.4.1.4. Glebe Weir raising and water supply pipeline option

If the Glebe Weir raising and water supply pipeline option is pursued, wastes generated by the Glebe Weir raising and water supply pipeline option would use the principle of waste avoidance wherever practical to reduce raw materials and optimise efficiency of materials that are used. In the first instance, waste streams as part of the Glebe option will be reused and recycled, and disposal of material to landfill will be a last resort for waste management.



5.4.2. Conclusion—non-mineral waste management

The non-mineral waste streams associated with the construction and operation phases of the above options can be satisfactorily managed in accordance with statutory requirements.

The measures proposed in the EIS, the commitments made by the proponent, the proposed EA conditions for non-mineral waste management to be included in the EM Plan and many conditions of development are sufficient to mitigate and manage any potential adverse impacts associated with non-mineral waste associated with all components of the project.

In consultation with DERM, the following stated conditions for the EA require the proponent to monitor, measure and mitigate impacts associated with non-mineral waste:

- Conditions E1–E3, Schedule 3—that require the proponent to provide for the tyre management, including the appropriate transport, storage and disposal
- Condition E4, Schedule 3—that requires the proponent to implement a non-mineral waste management plan in accordance with the Environmental Protection (Waste Management) Policy 2000

In addition, a condition is recommended that requires the proponent to appropriately manage regulated waste and implement a waste management plan for the gas supply pipeline, to ensure appropriate storage, conditioning, treatment and disposal of regulated waste materials from petroleum activities (Conditions D1–D10, Schedule 4).

DERM has provided information requirements for an application for development approval for ERA 63 to upgrade the Wandoan sewage treatment plant to process sewage waste from the mine and town. This is included in Schedule 7 of this report.

In regard to development of a municipal waste facility and an upgraded wastewater treatment facility, conditions are imposed that require the proponent to negotiate with the WDRC regarding necessary upgrades or the provision of facilities to accommodate the demands of the project (Condition 2 and Condition 3, Schedule 1).

If agreement cannot be reached between the parties, either party may refer the matter to the Coordinator-General for resolution.



5.5. Water supply and management

5.5.1. Context

The EIS provided an assessment of the existing environment and potential impacts associated with the supply and management of water for the project (EIS and SEIS, Volume 1, Chapter 11, Water Supply and Management).

Issues relating to groundwater are dealt with in section 5.6 of this report.

The project is located in the southern reach of the Fitzroy River drainage basin, in the upper catchment of the Dawson River. Approximately 83 per cent of the MLA areas drains to Juandah Creek, with the remainder draining to Horse Creek. Both Juandah and Horse Creeks flow north to the Dawson River. Mean annual flows from the MLA areas makes up about 1.4 per cent of the mean annual inflow to Glebe Weir on the Dawson River and less than 0.2 per cent of the total mean annual flow at the Fitzroy River mouth.

At the time of writing this report, there were two potential raw water supply options for the operational phase of the project:

- the southern coal seam methane (CSM) water supply pipeline
- the Glebe Weir raising and associated pipeline (the Glebe Option).

The proponent indicated that the preferred operational raw water supply option would be subject to detailed design and commercial supply arrangements.

The mine proposal involves extensive open-cut mining of 11 000 ha of the MLA areas and the isolation of mined pits from the natural drainage flows by the diversion of some local drainage ways and levees.

The MLA catchments are included within the Water Resources (Fitzroy Basin) Plan (WRP) and related Resource Operation Plans (ROP) prepared by DERM under the *Water Act 2000*. These plans set water supply and management objectives to maintain a balance between waterway health and community water needs by exercising controls over water allocations, alterations to major waterways and construction of large water impoundments. The plans are subjected to ten-yearly reviews and the Fitzroy Basin WRP is currently being revised. The revised WRP will apply to the MLA areas and will require the proponent to obtain approvals for the construction of storage dams, the diversion of major creeks and the maintenance of overland flows.

During the EIS process, several nearby landholders, who rely upon seasonal waterholes for stock water, expressed concern that creek diversions and mine pits may impact on stock access to water and, by reducing flows, this may lead to shorter periods over which water is available for stock. Landholders also expressed concerns that potential increases in the salinity may make water unsuitable for livestock.

The containment of rainfall within mine excavation areas would reduce the available catchment and hence flows into local creeks following rainfalls. In addition, the proponent was concerned that little or no flows may occur during rainfalls in those creeks where the catchment above mining pits is small and hence opportunities to release contaminated pit water at the 20 per cent dilution rate during flow events imposed by the draft EA Condition (W9) may not arise.

5.5.2. Water supply

5.5.2.1. Context

The environmental assessment was based on the water requirements for all phases of the project and the infrastructure and upgrades required to service the project. Water required for supply and discharge needs would be required for three principal purposes:

- potable water supply—to supply the mine workforce both on and off the project area, in the accommodation village and within Wandoan township



- construction raw water—to supply the project with water during the estimated two year construction period
- operational raw water supply—to deliver a washed export coal product during mine operations.

Potable water supply

The potable water for both the mine and accommodation facilities would be sourced from the existing water treatment plant and storage facilities located in Wandoan. The project would have a peak demand of 168 ML/y. The increase in potable water demand would mostly be required at the accommodation facilities, in the Wandoan town from personnel housed in town, and for additional population attracted to support the mine population.

The new total Wandoan township water demand (including the project requirements) would amount to 373 ML/y, which is less than the 400 ML/y currently allocated from the Great Artesian Basin (GAB) to the Wandoan township water supply. This water demand is greater than the capacity of the existing potable water treatment plant (WTP) and that negotiations are taking place between the proponent and the WDRC to upgrade the facilities to meet the new combined town and project demand.

Construction raw water

The EIS states that the expected total construction raw water demand is 350 ML/y over the period of construction (that is, approximately 700 ML over a two year construction period), made up as follows:

- dust suppression—270 ML/y (that is, approximately 825 kL/d)
- moisture adjustment—35 ML/y
- concrete mixing—5 ML/y over the two year construction period
- evaporation—40 ML/y.

The SEIS confirmed that further investigations of water supplies available from overland flow captured on the MLA areas and accommodation facilities area suggest it is likely that a large portion of the construction raw water demand can be satisfied from existing surface water dams. This is the preferential source of construction raw water.

The most reliable alternative potential source is the Precipice Sandstone aquifer of the GAB. The proponent proposes to establish a new bore into the Precipice Sandstone at a site within the MLA area adjacent to the Jackson-Wandoan Road. If required, this bore will be used as a last resort to draw construction water supplies under a temporary water permit issued by DERM. When the operational raw water pipeline has been commissioned, it is proposed the construction water bore will be handed over to the WDRC for use as a third potable water supply bore to be used in conjunction with its other two bores. The third bore would be initially connected to the town water treatment plant and provide the opportunity to refurbish the two existing town bores.

Operational raw water

Operational raw water requirements include process water, fire fighting services, site dust control, and light and heavy vehicle washdown. The major demand for operations raw water on-site is the CHPP. During periods of peak operational demand, the CHPP can account for 80 per cent of the total demand.

The estimated net CHPP raw water make-up demand, after allowing for the return of recycled decant water from the tailings management system, has increased to 290 L/t ROM coal.

5.5.2.2. Potential raw water sources

The proponent is currently considering two alternative options for the supply of operational raw water, that are:

- water associated with coal seam gas (CSG) sourced from Berwyndale (owned by Queensland Gas Company) and Talinga (owned by Origin) to the south of the project site
- raising of Glebe Weir (owned by SunWater) on the Dawson River.



The proponent is no longer considering a third option of coal seam methane associated water sourced from Spring Gully to the west of the MLA areas, as described in the EIS Volume 3, 'Western Coal Seam Methane (CSM) Water Supply Pipeline'.

The development of the water supply will be subject to negotiation of a commercial agreement with water service providers during the detailed design of the project.

5.5.2.3. Raw water supply option—southern CSM water supply pipeline

The management of impacts to surface water resources during the construction phase of the proposed pipeline will be closely linked to soil management. Prior to the commencement of any construction activities, an erosion and sediment control plan will be prepared in accordance with *Soil Erosion and Sediment Control; Engineering Guidelines for Queensland* (Institution of Engineers Australia, 1996). The EIS (Volume 2, Section 11.6.1) proposed mitigation measures to minimise impacts at waterway crossings during construction of the proposed pipeline.

The impacts from the proposed pipeline are expected to be minimal due to its design and construction. It is also proposed to be located at an adequate depth from the bottom of all watercourses crossed to ensure that there is minimal potential for scour and resulting changes to channel morphology. This ensures that operation of the proposed pipeline would not affect the existing stream profile at any of the crossings.

Due to the unlikelihood of any changes to the cross section profile at crossing locations, there will also be no change to the conveyance of any of the waterways and no impact to the flow or flooding regime.

Further details of flooding along the extent of the pipeline route have not been assessed as the proposed pipeline will be constructed below ground and will not impact on flooding either the Dawson River or the Condamine River catchments.

The proponent has committed to consulting with DERM during pre-construction activities to ensure that design factors such as depth of cover will be suitable to minimise potential impacts and to obtain any approvals required under the Water Act.

During the operation of the pipeline there is potential for leakage or rupture of the pipeline as a result of accidental damage to the pipe. However, the risk of pipeline failure and uncontrolled emissions entering watercourses will be low as long as the proposed mitigation measures as stated in the EIS (Volume 2, Section 11.6) are incorporated into the pipeline design and operation. The proponent has committed to regular maintenance and monitoring of the pipeline to minimise the potential for pipeline leaks or ruptures to occur.

In relation to potential use of CSM water for dust suppression on haul roads, concerns were expressed by some submitters on the EIS about the long-term impact on soil salinity. The proponent proposes periodic monitoring and mitigation measures.

A number of other approvals would be required under IDAS for the southern CSM water supply pipeline. The proponent has identified that the likely approvals include:

- development permit for taking or interfering with water in a watercourse under the Sustainable Planning Act
- riverine protection permits under the Water Act
- permits to disturb, harm or destroy flora and fauna protected by the Nature Conservation Act
- clearing protected plants under the Nature Conservation (Wildlife) Regulation
- a development permit for operational works—clearing of native vegetation under the Sustainable Planning Act (subject to final alignment and design).

5.5.2.4. Raw water supply option—Glebe Weir raising

EIS findings, submissions, analysis

For the operation of the Wandoan coal mine up to 9100 ML/y of high priority water allocation is required. An assessment of the viability of supplying this quantity of water from the Glebe Weir raising was provided in the EIS and SEIS (Volume 4, Chapter 8). The assessment was undertaken by



SunWater, conducting a range of hydrological modelling scenarios and utilisation of the NRW 'IQQM' model to determine the impacts of extracting additional volumes from the raised weir.

SunWater is considering the use of an inflatable fabridam for the potential Glebe Weir raising. As a consequence of an incident involving a fabridam at Bedford Weir on the Mackenzie River, the use of inflatable fabridams is subject to review by SunWater, pending the outcome of an inquiry by DERM into an incident involving a fabridam at Bedford Weir on the Mackenzie River.

Depending on the outcome of the current inquiry, design changes may need to be made to facilitate the weir raising. For example, SunWater may consider the use of collapsible steel shutters instead of a fabridam. SunWater has advised that it has used steel shutters on two other water storages, including Clare Weir on the Burdekin River and Ben Anderson Barrage on the Burnett River.

As noted in the SEIS (Volume 4, Section 5.1.1) the manner of raising the dam (either by fabridam, steel shutter or some other method) would make little material difference to the assessment of impact because each method would result in almost identical changes to the flow regime. Hence the full supply level is the same for all methods of weir raising so all environmental effects would be the same.

Results of the modelling presented in the EIS demonstrated that the maximum amount of water that can be extracted from the raised weir without impacting existing allocation holders within the Dawson Valley Water Supply Scheme or environmental flow objectives established under the Fitzroy Basin (FB) ROP is 6500 ML/y. DERM has advised that the FBROP is being reviewed and a revised FBROP is expected to be finalised in mid 2011. The EIS also stated that the shortfall of 2000 ML/y against the proponent's requirements would be met through alternative measures, such as purchase of existing allocations.

The Dawson River is characterised by extended periods of no-to-low flow. The recorded annual flow volumes at Glebe Weir vary considerably, with several wet years, particularly during the 1950s, and several years with no to very low runoff.

The EIS noted the potential hydrological impacts of raising Glebe Weir and supplying the additional high priority demand to the project as follows:

- potential increase in erosion downstream of the dam due to rapid inflation and deflation of fabridam
- increase the extent of flooding upstream of the weir
- impact on Water Allocation Security Objectives (WASOs) for downstream water entitlements
- impact on downstream EFOs.

Flooding and erosion impacts

The project high priority water demand will change the storage level behaviour of the Glebe Weir. Under the current operation strategy, water is released from the weir on a regular basis to top up the downstream storages and, therefore, the water level can fluctuate significantly throughout the year. The high priority demand for the project will require sufficient water to be stored at the weir to supply the mine through extended dry periods. This will mean that the weir will be full to near full more frequently and the water level fluctuations will reduce. The change in operating strategy would improve the opportunity to pump for the three allocation holders located on the Glebe Weir pool.

The proposed inflatable fabridam to raise Glebe Weir could potentially increase flood levels upstream of the dam and erosion downstream of the dam if it is not operated correctly. The proponent has committed to implementing operating rules for the proposed weir to mitigate the impacts for the fabridam based water levels. Also, a fail-safe mechanism will be included so that the fabridam will always deflate when the storage level reaches a set headwater level to ensure that no additional overbank flooding occurs.

Thus under the operating rules discussed in the EIS (Volume 4, Section 8.3.3.1), the weir upgrade will not significantly impact on upstream flood levels or downstream erosion. Further hydraulic analysis is



to be undertaken during detailed design to develop operating rules to mitigate any flood and erosion impacts of the raised weir.

5.5.2.5. Conclusion—Glebe Weir raising and pipeline option

Should the proponent decide to proceed with the water supply option involving the raising of the Glebe Weir and a water supply pipeline to the mine site, details of the changes required to the FBROP would need to be submitted by SunWater to DERM. When making its decision on changes to the FBROP (including a potential water allocation for the project), DERM will need to take into account the availability of water from a raised Glebe Weir; conversion rates between water allocation priority groups; operating and water sharing arrangements; impacts on existing entitlements; and compliance with the revised FBROP which is currently being developed by DERM.

Whilst the FBROP is currently being reviewed by DERM, a condition is recommended to the Minister responsible for administering the Water Act, and who is responsible for approval of changes to the FBROP associated with a raised Glebe Weir, to include a water allocation of 6500 ML/y in the revised FBROP to facilitate the project (Condition 5, Schedule 8).

A number of other approvals would be required under IDAS for the Glebe Weir raising and pipeline. The proponent has identified that the likely approvals include:

- development permit for taking or interfering with water in a watercourse under the Sustainable Planning Act
- riverine protection permits under the Water Act
- permits to disturb, harm or destroy flora and fauna protected by the Nature Conservation Act
- clearing protected plants under the Nature Conservation (Wildlife) Regulation
- a development permit for operational works—clearing of native vegetation under the Sustainable Planning Act.

5.5.3. Water management

5.5.3.1. Mine water management system

The EIS (Volume 1, Section 11.4.5) presented a surface water management system (WMS), to mitigate the potential impacts of the project on receiving water quality and to protect the operation of the project from interruptions due to flooding. The EIS presented three separate WMSs (in ascending order of cleanliness) as follows:

- pit water and process dirty water management system—managing water captured in pits and running off dump stations and other areas with the potential to contribute high concentrations of dissolved salts, such as the CHPP and coal product stockpiles
- overburden runoff water management system—treating water running off overburden dumps and other disturbed areas of the site with the potential to have elevated concentrations of suspended solids
- clean water management system—water from undisturbed areas of the MLA areas and the catchments discharging through the site from upstream.

The SEIS stated, under the revised mine layout and schedule, there are 12 potential discharge points from the MLA areas. The overflows from the WMS would drain to the four creeks crossing the MLA areas, being Juandah Creek, Woleebee Creek, Mud Creek and Spring Creek, as shown in the EIS Volume 1, Table 11-2.

A water management plan (WMP), prepared in accordance with the DERM Guideline – *Preparation of Water Management Plans for Mining Activities* (2009), is required to ensure the proper and effective management of the actual and potential environmental impacts on surface water values.

Pit water/process water management system

To maximise the opportunity for reusing the pit/process water across the site, a water pipeline is proposed to be constructed along the conveyor alignment between the CHPP and the dump stations in MLA 50229. During wet periods, the rate of return from the pits may exceed the capacity of the



CHPP to use it and additional storage will be required to store this excess waste water. The EIS states that storage would only be required in later stages of the mine life and that storage of this water could occur in disused pits in either MLA 50229 prior to being pumped to the CHPP.

Overburden runoff water management system

Runoff from active overburden dumps will have high turbidity and will require settlement in sedimentation dams. The EIS stated that the first instance of these dams will be 'dry basins', with low level outlet pipes which would restrict the outflow from the sedimentation dams, but not permanently contain water. This will allow for coarse sediments to settle and, if necessary, allow a flocculant to be added to remove very fine sediment to meet allowable receiving water quality limits for turbidity associated with receiving watercourses.

Clean water management system

The clean water management system would ensure that neither local runoff nor flood waters from the significant creek systems flowing through the project area enter the mine pits.

The system comprises:

- diversions of streams around active mining areas where they cross creek channels
- flood levees adjacent to pits and dumps to prevent flood waters entering the pits. Flood levees are sized to provide flood immunity during 0.1 per cent AEP (average exceedence probability, that is, a 1000 year average recurrence interval (ARI) design flood event)
- high-wall bunds and clean water catch drains to divert catchments upslope of high-walls around the end-wall. Relatively few are required for the project due to the nature of the site topography and the pit layout. The proposed drains will largely follow existing contours to minimise the risk of erosive velocities.

The draft EA conditions provided in Conditions W23–W37, Schedule 3 provided by DERM are sufficient to ensure the suitable preparation, implementation and ongoing review of the project's mine water management system (WMS).

In consultation with DERM, the following conditions are stated to be included in the EA:

- Conditions W25–W28, Schedule 3—that require the proponent to develop a Water Management Plan, in accordance with the DERM Guideline—*Preparation of Water Management Plans for Mining Activities* (2009)
- Conditions W34–W36, Schedule 3—that require the proponent to develop a WMS, to conduct a yearly review of the mine catchments, storage capacity, current storage volumes, transfer capacity, and Standard Operating Procedures of all key infrastructure elements of the mine WMS and update the mine water balance model.

In consultation with DERM, the receiving environmental release criteria, stated in the Conditions W1–W37, Schedule 3 must be used, where applicable, for the water balance modelling and design of the components of the WMS.

5.5.3.2. Raw water management

Raw water storage

Sufficient raw water storage would be provided adjacent to the CHPP to deliver the water demand. The dam is expected to store approximately 400 ML (or approximately 14 days supply), though this volume is to be confirmed during later design phases to provide acceptable system reliability.

It is likely the raw water dam would need to be lined to protect nearby groundwater and soils. Consideration would also be given to clay-lining the dam if suitable materials can be obtained locally. In addition, monitoring bores will be installed to detect any leakage before any potential contamination of downstream water resources could occur.



Raw water quality

CSG water often has high concentrations of salts and other constituents that render it unsuitable for many direct beneficial uses and thereby the poor quality of the water produced makes the management of this water one of the major concerns associated with CSG development.

The current water specification for the CSM water supply option is to deliver raw water to the project up to 4000 mg/L total dissolved solids (TDS). Water is a by-product of CSM extraction and is proposed to be made available to the proponent from a collection pond adjacent to the Condamine Power Station (EIS Volume 2, Section 1.3). This option provides the opportunity to beneficially re-use CSM by-product water which is unsuitable for many direct beneficial users.

The quality of the raw water, including any treatment required to achieve the stipulated water quality required by the proponent, would be the responsibility of the licensed water provider. The treated water quality up to 4,000 mg/L TDS is unlikely to be suitable for washing vehicles, fire water or for general wash purposes around the MIA and CHPP. If required to further reduce salinity, a reverse osmosis or similar appropriate treatment facility operated by the proponent may be located near the CHPP, and reject water will be disposed of in the tailings storage facilities.

In consultation with DERM, the following stated conditions are to be included in the EA:

- Conditions W16–W17, Schedule 3—that provide specifications for water quality monitoring locations, frequency and characteristics for storages associated with controlled releases.

5.5.3.3. Wastewater treatment and disposal

Elements of the existing waste water treatment plant (WWTP) at Wandoan will need to be upgraded to meet the requirements of the mine development. Further negotiations are taking place between the proponent and the WDRC on a strategy for transferring sewage from the source to the upgraded WWTP.

5.5.4. Watercourse diversions

The proponent has committed to preparing a detailed creek diversion strategy for all proposed creek diversions, with timeframes allowing establishment of stable, vegetated creek channels prior to carrying entire flows of diverted creeks. The creek diversion strategy will be developed to mitigate against flood events, and will form part of the project's Plan of Operations.

Construction of structures on the MLA area would cause disturbance to the bed and banks of watercourses, and consequently require licensing under the Water Act. The SEIS provided an updated list of the works potentially requiring approval .



Table 5.1).



Table 5.1: Works potentially requiring approval

No.	Purpose	Watercourse	Approximate year of construction
1	Rail crossing	Frank Creek	-1
2	Access and haul road crossing	Frank Creek	3
3	Conveyor, access and dragline walk road crossing	Woleebee Creek	4
4	Haul road crossing	Woleebee Creek	9
5	Conveyor, access and dragline walk road crossing	Mud Creek	9
6	Haul road crossing	Spring Creek	10
7	Stream diversion A at Turkey Hill Pit	Spring Creek/Unnamed Creek	10
8	Stream diversion B at Summer Hill Pit	Mount Organ Creek/Unnamed Creek	18
9	Stream diversion C at Mud Creek Pit	Mud Creek/Unnamed Creek	18
10	Stream diversion F at Woleebee Creek Pit	Woleebee Creek/Wandoan Creek/Blackant Creek	9
11	Stream diversion G at Leichhardt Pit	Frank Creek	15

During the EIS process, DERM advised that for the Woleebee Creek diversion, the largest planned diversion, the EIS was inadequate in describing how any off-lease impacts could be minimised during construction and operation of the diversion.

DERM advised that, when applying for a permit for the diversion, the proponent should describe any likely impacts off the mining lease. DERM further advised that these impacts would be assessed during the water licensing process and may require negotiation with potentially affected parties.

DERM also advised that a specific condition for watercourse diversions is not required in this report as this matter can be effectively regulated under the provisions of the Water Act.

5.5.5. Hazard assessment of dams

The EIS stated that the components of the WMS will evolve as the project expands, to be compatible with the proposed pit layout and mine schedule. Excluding in-pit pump sumps, up to approximately 53 water management dams, including 46 sediment dams and seven environmental dams, are required to manage runoff from disturbed areas at any point during the life of the project. The number of dams increases over time as summarised in Table 5.2.

Table 5.2: Total number of water management dams over the project life

Year	Sediment dams	Environmental dams
5	20	5
10	27	7
20	35	7
30	46	7

Referable dams are regulated by the *Water Supply (Safety and Reliability) Act 2008*. A referable dam is one that, in the event of failure, would put a population at risk. The exact number and design of referable dams for the project will not be finalised until the detailed design stage and during operation of the project. The proponent has committed to consult with DERM once the design is finalised.



Under the currently proposed mine site WMS, all of the seven proposed environmental dams could meet the storage and catchment criteria that define when a failure impact assessment is required.

Dams containing hazardous waste are not considered referable dams under the *Water Supply (Safety and Reliability) Act 2008* but instead are regulated under the EP Act. Therefore, in accordance with the definition of hazardous waste in the EP Act, it is possible that the environmental dams may be deemed hazardous waste dams.

5.5.5.1. Conclusion—hazard assessment of dams

Dams and water storages of the project are required to be appropriately located, designed, constructed and operated to avoid causing environmental harm. In consultation with DERM, the following stated conditions are to be included in the EA:

- Conditions G1–G4, Schedule 3—that require the proponent to provide all dams and water storages in a manner that avoids causing environmental harm
- Conditions G5–G19, Schedule 3—that provides detailed requirements for all regulated dams, including location, configuration, hydraulic performance, certification and operation, and annual inspection and reporting requirements.

Condition G7 and Table G3 of the draft EA conditions provides hydraulic performance criteria for the dams with respect to annual exceedence.

DERM advised that where a failure impact assessment indicates that a proposed dam is referable under the *Water Supply (Safety and Reliability) Act 2008*, an application must be made to DERM for an operational works permit that applies conditions related to dam safety under the *Water Supply (Safety and Reliability) Act 2008*. DERM also advised that a specific condition in this report is not required as this matter can be effectively regulated under the provisions of the *Water Supply (Safety and Reliability) Act 2008*.

5.5.6. Water released from the site

The proponent considered that the relative impacts of released waters and changed flow rates are likely to reduce at distances down stream. Therefore, as existing licensed water users are a long way downstream, the impact on water availability to them is expected to be minimal.

5.5.6.1. Conclusion—water released from the site

In consultation with DERM, the following stated conditions are to be included in the EA:

- Conditions W1–W17, Schedule 3—that provide the proponent with conditions and parameters for controlled water releases for the project.
- Conditions W34–W37, Schedule 3—that provide the proponent with conditions and parameters for uncontrolled water releases for the project.

5.5.7. Flooding

The proponent proposes to implement a system of stream diversions and flood levees to prevent the ingress of flood waters to the mine pits in events up to the 0.1 per cent AEP (1,000 year ARI design flood event), and to ensure that during project operations flow in major streams will pass through the site and maintain downstream processes. As described above in section 5.5.4 (Watercourse diversions), a creek diversion strategy will be developed to mitigate against flood events, and will form part of the project's Plan of Operations.

The proposed diversion designs aim to mimic conditions in the existing channels of the creeks to be diverted, including in-channel storage. This would result in the diversions largely having no impact on the frequency and volume of flows passing to downstream users.

The results from flood modelling for the Woleebee Creek diversion show that it is possible to mitigate the impacts on downstream flooding by re-introducing flood storage in the diverted reaches of the various creeks that contribute to flow in the proposed creek diversion. The final design of the diversion will include this flood storage, which depends on the final mine pit layout and rehabilitation schedule.



The results of the modelling show that at the Woleebee Creek diversion peak flood flows may increase slightly due to a loss of flood storage, and consequently downstream peak flood levels in Juandah Creek could increase by up to 300 mm during a one in a hundred year flood (1 per cent AEP flood).

During detailed design, the proponent proposes to incorporate mitigation measures to confine flood afflux to the MLA areas, though this may not always be possible without sterilising coal reserves.

The EIS noted that the risk posed by flooding would vary during the life of the project (Volume 1, Chapter 23), as changes occur as part of the project (that is, changes in landforms, catchment areas, storage areas, structures and creek diversions as required). The proponent will develop emergency response procedures, which will be regularly reviewed throughout the project in response to changes in the site hydrology, mining operations, assessed risk and available controls.

The proponent has committed to monitor and assess the impacts of flooding during the project, as floodplain works are designed and constructed, to ensure risks to the community and the environment are appropriately identified and mitigated.

5.5.8. Receiving water monitoring

During a flow event in the receiving waters, releases may be made from the site WMS to reduce the quantity of stored water and the risk of uncontrolled discharge.

It is current State Government policy that receiving water assessment using water quality guidelines should only be used for triggering investigations and reporting rather than being used as a primary mechanism for regulation. That is, if downstream water quality monitoring indicates levels of contaminants over trigger limits, an investigation is required to compare upstream water quality data and downstream water quality data, rather than enforce an exceedence.

DERM requires monitoring of the receiving environment to record effects of controlled and uncontrolled discharges on the receiving environment. Receiving environment monitoring may also detect other impacts such as sedimentation due to creek diversions or other land disturbance.

5.5.8.1. Conclusion—receiving water monitoring

In consultation with DERM, the following stated conditions are to be included in the EA:

- Condition W18, Schedule 3—that requires the proponent to monitor the quality of the receiving environment at locations both upstream and downstream of the proposed controlled release site and at specified frequencies.
- Condition W19, Schedule 3—that requires the proponent to conduct an investigation into potential for environmental harm where contaminant concentrations exceed nominated trigger levels.
- Conditions W20–W22, Schedule 3—that require the proponent to prepare a receiving environment monitoring program in accordance with DERM requirements
- Conditions W23, Schedule 3—provides a general condition regarding the methods and specifications for water quality testing
- Conditions W24, Schedule 3—specifies information that must be recorded in relation to all water quality monitoring required under the conditions of the EA.

5.5.9. Final voids

The SEIS stated that no water balance studies are necessary for final voids. Hydrological modelling of voids will form part of the mine closure planning process and will be carried out once the number and location of mine voids has been finalised.

Conditions F7 and F8, Schedule 3 relate to the matter of final voids, requiring that residual voids must not cause any serious environmental harm to land, surface waters or any recognised ground water



aquifer and the proponent must complete an investigation into residual voids and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in condition F7.

5.6. Groundwater

5.6.1. EIS findings, submissions and analysis

The EIS (Volume 1, Chapter 10) provided an assessment of the potential impacts of the proposed mining project on existing groundwater aquifers within the MLA areas and surrounding region. The EIS provided a general assessment of the characteristics of the groundwater environment at Wandoan within the MLAs and surrounds, with investigations concentrated within MLA 50230, where mining will be concentrated in the first five years. The proponent has committed to ongoing investigations to provide more detailed characterisation of the groundwater environment in the three MLAs.

The MLA area and surrounds are characterised by Quaternary sediments along the major creeklines of Frank Creek, Mud Creek, Woleebee Creek and their tributaries. This environment, containing shallow aquifers with a limited number of users, is underlain by the Surat Basin, which is further underlain by the sedimentary rocks of the Great Artesian Basin (GAB). The GAB supplies the majority of groundwater users in the region compared other aquifer types.

The interference and extraction of groundwater in Queensland is regulated by the Water Act, with the regulatory authority being the DERM.

The Water Act provides for DERM to grant licences and permits for the extraction, use and interference of the flow of water, including groundwater. All bores that 'take water' (i.e. pumped) are required to have a development permit which gives the authority to construct a bore and defines the conditions of extraction (that is, maximum depth). The licence grants a share of the resource (that is, an entitlement). A water permit allows for the extraction of water and designates the use, purpose, volume for extraction and time frame.

The EIS identified that a large proportion of the construction raw water demand could be supplied from existing surface water dams. Water from dams and other on-site sources (such as production bores in coal seams or existing farm water bores not tapping the Precipice Sandstone Aquifer) would be preferentially used.

However, the construction raw water source with the greatest potential yield is the Precipice Sandstone aquifer of the GAB. Consequently, the proponent proposed to establish a new bore into the Precipice sandstone at a site within the MLA area adjacent to the Jackson-Wandoan Road. If required, this bore would be used as a last resort to draw construction water supplies under a temporary permit issued by DERM under the Water Act. When the operational water pipeline for the project is commissioned, the construction water bore would be transferred to the WDRC for use as a third municipal potable water supply bore to be used in conjunction with its other two bores.

The proponent initially assessed the possible use of water from the GAB for raw water supply for mining operations. The proponent considered that this option was not sustainable and that the proponent is evaluating two alternative options involving pipelines for the supply of raw water for the operations phase of the project. These options are discussed in section 5.5 of this report.

Several public submitters on the EIS expressed concerns about potential impacts of the project on existing groundwater supplies and about the efficacy of the proponent's commitment to implement 'make good' mitigation measures in case of any detrimental impacts on quality and quantity of existing supplies.

The proponent also committed that, where there is a risk of contamination from artificial recharge from water storage, design considerations such as the use of appropriate impermeable linings would be considered and adopted where necessary. Further, the risk of potential contamination of aquifers due to infiltration from fuel or chemical spills is proposed to be addressed by the design of appropriate storage and bunding procedures.



5.6.1.1. Groundwater monitoring—MLA areas and possible gas pipeline

The EP Act (principally sections 15 to 20) and Environmental Protection (Water) Policy 2009 govern the discharge of wastewater to land, surface waters and groundwater. They provide a framework for defining the environmental value of water and guidelines for water quality. The policy aims to protect groundwater to the designated environmental value.

The proponent's monitoring program was comprised of sixteen monitoring bores, ten of which are open-holed (converted exploration boreholes intersecting various coal seams) and six specifically-designed monitoring or production bores. The proponent's groundwater monitoring program was intended to establish the baseline and ongoing groundwater levels within the MLA areas and surrounding areas.

The proponent committed to continued monitoring to determine longer term baseline monitoring for the duration of the project. The proponent also proposes to install additional monitoring bores progressively across the MLAs, which would further enable the recording of water levels to inform a regional groundwater contour map for the project as additional data is collected. At this time, seasonal variations within the aquifers have not been established. Longer term baseline monitoring for the duration of the project would allow for time series data to be collected and any season variations established.

5.6.1.2. Groundwater use

The proponent has undertaken an initial survey that identified 599 registered bores within 15 km of the mining leases and of these; 77 bores were found to be suitable for hydro-census (water depths, flow rates, water quality) to provide baseline data. The proponent undertook additional testing of bores drilled through the coal beds at four locations near proposed pits. Only one of these bores provided sufficient ground water for testing flow parameters. A further 14 geotechnical bores within the alluvium and shallow coal seams were subjected to hydrological tests.

Stock and/or domestic use

The results from the hydrocensus indicated that there are a number of private bores across the MLAs, some of which are registered with DERM and many that are not. The EIS noted that the majority of bores are for stock and domestic purposes which utilise shallow groundwater of the alluvium and Walloon Coal Measures.

Community bores

There are eight community bores and records indicated that these bores are extracting groundwater from either the Hutton Sandstone or Precipice Sandstone aquifers of the GAB from depths of between 600 m and 1300 m.

The EIS concluded that deep bores (greater than 600 m) extracting water from the GAB were deemed not to be impacted due to significant depth of separation and presence of impermeable strata between the proposed mine operations and these aquifers.

Proposed gas pipeline trench

The proponent advised that the pipeline trenches would be up to 1.5 m deep for the proposed gas pipeline. Accordingly, there is likely to be a minimal amount of groundwater encountered during the installation of any pipeline through shallow alluvial aquifers. It is unlikely that there would be any residual groundwater impacts to the pipeline areas after construction.

Potential Glebe Weir raising

The EIS (Volume 4) identified a risk of potential waterlogging of land immediately adjacent to the levee proposed to be constructed on the left bank of the Dawson River near Boggomoss Creek, as a result of the proposed weir raising. Whilst the risk is estimated to be low, the proponent recognises that mitigation measures will be implemented to prevent any waterlogging. Also, the proponent proposes a monitoring program to identify if any changes in groundwater levels occur over time.



5.6.2. Conclusion—groundwater

The proponent expects that the project will have negligible impacts on users and environmental values of groundwater from the GAB and sub-artesian bores.

The proponent has undertaken preliminary investigations into the potential for connectivity between artesian groundwater and surface water, but has not proposed a strategy to mitigate any impacts that may result if identified connectivity between surface water and groundwater is impacted by mining activities.

A condition is recommended that requires the proponent to conduct investigations into the potential for connectivity between local groundwater and surface water (Condition 3, Schedule 8). The results of the investigation must be made available to DERM prior to commencement of mining activities.

The proponent has committed to ensure continued access and supply of groundwater from community or other multi-user bores for users within the MLA areas and that, should any unacceptable impacts on these groundwater bores be experienced, the proponent will make good any water losses caused as a direct result of mining activities in consultation with any impacted users. Such measures may include establishing new bores, deepening existing bores or providing alternative water supply. A condition is recommended to this effect (Condition 4, Schedule 8).

Also, in consultation with DERM conditions are stated for the EA with respect to groundwater monitoring (Conditions W38-W40, Schedule 3) that require:

- W38—that requires the proponent to design and implement a groundwater monitoring program in accordance with the parameters specified in the condition
- W39—groundwater contaminant levels in aquifers potentially affected by mining activities must not exceed any of the contaminant limits and levels specified in the table in the condition
- W40—that groundwater monitoring bores must be constructed and operated in accordance with methods prescribed in the latest edition of the Land and Water Biodiversity Committee publication, *Minimum Construction Requirements for Water Bores in Australia* (2003).

5.7. Air quality

5.7.1. EIS findings, submissions and analysis

5.7.1.1. Context

Climatic factors and existing regional land uses contribute to background air quality. Impacts on air quality from local agricultural land uses derive from dust generation by vehicles on unsealed roads, overgrazing by cattle during droughts, ploughing of paddocks and grass fires.

The Wandoan region experiences low rainfalls (650 mm/y) with increased mid summer rains. Droughts are a common occurrence and, together with strong westerly winds, occasionally result in widespread dust storms.

Air quality impacts from vehicle emissions are negligible due to low local traffic volumes on local highways.

Local and daily atmospheric conditions influence the elevation, dispersion and settlement of suspended particles.

The EIS identified legislation and guidelines that establishes the criteria for acceptable levels of ambient air quality regulate the. The EIS was prepared under the Environmental Protection (Air) Policy 1997 (EPP (Air)), which was revised in 2008 and used for the SEIS.

The EPP (Air) identifies upper limits for air particulate (dust) pollutants based on exposures that may potentially impact on human health. PM_{2.5} refers to particulate matter less than 2.5 micrometres (µm) in diameter and PM₁₀ refers to particulate matter less than 10 µm in diameter. The revised EPP (Air) (2008) introduced finer particle size (PM_{2.5}) objectives and implemented revised PM₁₀ objectives. Finer particles are of greater concern to human health. The new objective sets five allowable exceedences per annum, taking into consideration background PM₁₀ concentrations of airborne



particulate matter with a diameter less than $10\mu\text{m}$ (PM_{10}). The $\text{PM}_{2.5}$ objective for 24-hours is $25\mu\text{g}/\text{m}^3$ with an annual objective of $8\mu\text{g}/\text{m}^3$.

For this project, DERM recommended a dust deposition goal of $120\text{ mg}/\text{m}^2/\text{day}$, based on the annoyance threshold applied in the coal mining areas of the NSW Hunter Valley.

A key element of the air quality management applied to the Wandoan Coal project is the aim of achieving air quality within the allowable limits of the revised policy.

The EIS identified Wandoan and 138 rural residences in the vicinity of the MLA areas as sensitive receptors. Residences purchased by the proponent and the proposed site for the mine workers accommodation village were not considered as sensitive places. The EIS and SEIS provide findings of background air quality monitoring at selected sites.

5.7.1.2. Potential project impacts

The EIS identified potential air quality impacts due to the construction and operation of the mine, for example:

- construction is expected to generate soil (crustal) dust during vegetation clearing, earth works for buildings, roads, rail and pipe lines, and from haulage on unsealed roads
- the mining operations are expected to generate soil and coal dust during vegetation clearing, excavations, rock blasting, dragline operations, the movements of heavy machinery at excavations and along unsealed haulage roads, and from the stockpiling, handling and transport of coal
- coal dust is expected to be generated from coal stockpiles and by the coal handling and processing plant, conveyor belts and the rail line
- some methane and odours will be released from the Wandoan sewage treatment plant (an existing infrastructure which is being expanded to cater for the mine work force), but as this is a point source, impacts will be confined to the immediate locality
- additional impacts on air quality may arise from small quantities of coal seam gas release during mining and from burning natural gas in a proposed 80 MW on-site gas engine power station. The station will release nitrogen oxides (NO_x), carbon monoxide (CO), and low amounts of particulate matter, unburnt hydrocarbons and sulphur oxides (SO_x). A gas powered generator is one of four options under consideration to supply electricity to the mine.

The proposed gas fired power generation plant may be located 1.5 km south-west of the proposed mining accommodation village and 8.5 km north-west of Wandoan. (The proponent has subsequently advised it is considering an alternative site for the mine accommodation village located 11 km north-west of Wandoan). Specifications indicate that an air volume flow of $28\text{ m}^3/\text{s}$ will pass through the 8 MW power plant (option 2) possibly releasing $250\text{ mg}/\text{Nm}^3$ of NO_x and $250\text{ mg}/\text{Nm}^3$ of CO concentrations. Modelling predicts ground level concentrations (including background levels) in Wandoan of NO_2 of $58.8\mu\text{g}/\text{m}^3$ (1 hour average) and CO of $1493.4\mu\text{g}/\text{m}^3$ (8 hour average). Both these values are well below EPP (Air) requirements for human health.

The proponent estimated that during the two-year mine construction period and over the 30-year mine operation the additional local traffic due to the mine would not generate significant levels of emissions.

The Wandoan Liaison Committee, WDRC, Queensland Health and several local residents raised concerns about air quality in their submissions on the EIS including potential impacts of soil and coal dust on rain water storages, air conditioners, child play grounds, vegetation and cattle feed lots at Wandoan or rural residences and schools (Wandoan, Grosmont) with a potential to affect human and farm animal health. Several of these respondents considered that the dust deposition threshold levels required to trigger dust suppression actions by the proponent as established under the 1997 guidelines to the EPP (Air) were too high, and suggested that these be significantly lowered.

The EPP (Air) was updated in 2008, after the proponent undertook background monitoring and prepared the EIS and the revised EPP (Air) imposes stricter air quality limits for human health, and that DERM now recommends a dust deposition $120\text{ mg}/\text{m}^2/\text{day}$ limit for this project.

The proponent advised that some dust emissions will be created during construction of proposed gas and water pipelines associated with the project and with upgrading (if required) of the wastewater



treatment plant and potable water treatment plant. These emissions are expected to be low and relatively short in duration and mitigation measures would be adopted by the proponent.

5.7.1.3. Monitoring background air quality

For the EIS, the proponent established baseline conditions by monitoring background air quality for 8 months in 2008 near the project's weather station (5 km west of Wandoan), Jondale Property and at a private property in Wandoan township. Since April 2009, continuous monitoring of PM_{2.5} has been undertaken at the monitoring stations providing three months of data for analysis in the SEIS.

The results of the ambient monitoring conducted in Wandoan and on the MLA area indicated that 24-hour average concentrations of PM₁₀ vary between 2 and 110 µg/m³ depending on synoptic circulation patterns and surface interactions. The natural variability of background concentrations were found to exceed the EPP (Air) objective of 50 µg/m³ for a 24-hour averaging period on six occasions. These exceedences are attributed to regional scale dust storms initiated by passage of fast moving cold fronts. The exceedences ranged from 57 to 108 µg/m³.

The annual background concentrations of PM₁₀ were determined to average 15 µg/m³, and the average dust deposition rate was 15 mg/m²/day in Wandoan and 22 mg/m²/day at Jondale. A rate of 30 mg/m²/day was the highest recorded in Wandoan and this value is recommended by the proponent as a conservative background level for dust.

No background monitoring of NO₂ or CO was undertaken in Wandoan but monitoring in Toowoomba showed levels well below the EPP (Air) goals, and levels in Wandoan would be lower still, owing to a lack of industry and fewer car numbers.

Background odour emissions from Wandoan wastewater treatment plant were measured, and modelling predicted no exceedences of EPA odour guideline of 2.5 ou³ (99.5th percentile, 1 hour average) by an upgraded plant.

5.7.1.4. Air quality predictions and targets

The proponent applied weather records and manufacturer specifications to estimate pollution plumes from the proposed power station, and from the mining construction and operations activities.

The SEIS reported the predicted emission rates for the project, estimating that the majority of the dust emissions (approximately 90 per cent) are in the coarse size range that is larger than PM_{2.5} and originate from crushing soil and rock during earth works. The proponent advised that the majority of the dust suspended in the atmosphere as a result of the mine's operation would not be coal dust, and predicted that 70 per cent of the dust would originate from soil and 30 per cent from coal.

Limited findings summarised in the SEIS found that cattle grazing and health were not significantly affected by dust deposition levels on pastures or when high amounts were added in feed trials. Impacts on cattle health are considered to be minimal at the highest predicted levels at Wandoan Coal Mine.

Table 5.3 shows the ratio of PM_{2.5} to PM₁₀ and the relative contribution of PM_{2.5} to the total PM₁₀ emission for each individual source assessed in the air dispersion model for the project (from table 13-3 in SEIS).

Table 5.3: Ratio of PM_{2.5} to PM₁₀

Source	PM ₁₀ (g/s)	PM _{2.5} (g/s)	Ratio
Dragline	2.90	0.20	0.07
Truck and Shovel	1.78	0.12	0.07
Truck loading coal	1.78	0.22	0.12
Bulldozing – overburden	0.19	0.10	0.53
Truck dumping overburden	0.10	0.04	0.42

³ AS 4323.3 'Stationary source emissions—Part 3: Determination of odour concentration by dynamic olfactometry' (Standards Australia 2001), specifies the odour unit 'ou' to report odour concentration.



ROM	1.95	0.11	0.06
Wind erosion	0.02	0.001	0.05
Truck dumping coal	1.33	0.06	0.05
Coal loading onto trains	0.01	0.00	0.15
Conveyor	0.03	0.00	0.06
Blasting	2.11	0.12	0.06
Drilling	0.05	0.003	0.06
Grader	0.04	0.01	0.14
Haul Road	0.79	0.08	0.10

The EIS provided scenarios of the different combinations of machinery and other dust generating activities that would be used over the 30 year life of the mine, including in the Frank Creek pit (which is close to Wandoan). Each scenario predicted amounts of dust generated and hence air quality measures in Wandoan and at other local residential receptors.

The predictions found that, in some scenarios, dust at ground level exceeded EPP (Air) trigger levels for 24-hour and annual PM₁₀; annual TSP (Total Suspended Particles) and dust deposition, requiring the application of suppression measures. For example, in the SEIS (Volume 1, Table 13-22) that modelling predicted exceedences at sensitive receptors due to both mine and natural influences. The impact of the mine above the background exceedences is expected to increase the number of exceedence days above PM₁₀ of 50 µg/m³ by up to six extra days per year, although the predicted number of exceedences varied between years.

The proponent made predictions of nitrogen dioxide and carbon monoxide at ground levels in Wandoan, given specifications for the gas fired power station. All measures were found to be less than EPP (Air) trigger values as stipulated in relevant standards. Given the rural nature of the site, the region is likely to experience relatively low levels of these gases.

Since the EIS was prepared, air quality standards and acceptable limits have been revised from the Environmental Protection (Air) Policy 1997 applied in the EIS to the Environmental Protection (Air) Policy 2008 adopted in the SEIS. New dust criteria now apply to the project and these are set out in Schedule 1 of the EPP (Air) 2008. Air quality indicators and objectives for Queensland are summarised in Table 5.4 (based on SEIS Table 13-1).

Table 5.4: Existing ambient air quality objectives and guidelines

Parameter	Averaging period	Source	Value ¹	Units
Total suspended particulates (TSP)	annual	EPP (Air) 2008	90	µg/m ³
Particulate matter less than 10 µm (PM ₁₀)	24-hour	EPP (Air) 2008	50 ²	µg/m ³
		US EPA and former EPP (Air) (1997) ³	150	µg/m ³
Particulate matter less than 2.5 µm (PM _{2.5})	24-hour	EPP (Air) 2008	25	µg/m ³
	annual	EPP (Air) 2008	8	µg/m ³
Dust deposition rate	annual	DERM ⁴	120	mg/m ² /day

Notes:

1. no exceedences allowed unless otherwise indicated
2. EPP (Air) Environmental Protection (Air) Policy 2008. Five exceedences allowed per year
3. former EPP (Air) Environmental Protection (Air) Policy 1997 goal and current US EPA standard
4. recommended goal



It is widely acknowledged that dust is considered to be a non-threshold pollutant and that any air quality standards that are set have some level of risk associated with them. The SEIS provides commentary regarding the revised PM₁₀ goals on the basis that disparity exists in the setting of ambient PM₁₀ standards amongst developed nations. The maximum 24-hour objectives vary from 50 to 150 µg/m³ depending on issuing country or state; while the allowable number of days that PM₁₀ can exceed a given objective ranges from 1 to 35 days per year. Australia, Germany and the United Kingdom have passed legislation adopting a maximum 24-hour concentration of 50 µg/m³ for PM₁₀. Germany and the United Kingdom have set the limit of acceptable exceedences of the PM₁₀ objective at 35 days per year, while Queensland has adopted the NEPM objective of 5 days per year. DERM has recommended a dust deposition goal of 120 mg/m²/day, as applied in the Hunter Valley coal mines.

The proponent in the SEIS mentions that direct health effects can be attributed to the concentration of fine particulate matter airborne particulates (PM_{2.5}). Recent studies in the United States indicate that for susceptible sub-populations, fine airborne particulates (PM_{2.5}) generated by combustion are markedly more detrimental to health than coarse particulate fractions (PM_{10-2.5}) generated by earth works.

The proponent plans to continuously monitor dusts and air quality over the operation of the mine at Wandoan and at selected rural residential receptors, and apply the findings in implementing its dust suppression program. The EIS indicates that this will entail:

- maintaining continuous real time monitoring of PM₁₀ in Wandoan
- establishing continuous real time monitoring of PM₁₀ at representative sites of potential high dust occurrences as the mine progresses. This will also include chemical analysis of sampled dust particles
- meteorological monitoring to form the basis of a high dust potential forecasting system coupled with the dust monitoring program. Meteorological conditions will inform the implementation of the reactive management plan
- implementing an action trigger response indicated by a 24 hour average rolling PM₁₀ concentration of 120 µg/m³. The response will consist of a range of options employed at the proponent's discretion, for example application of chemical spray suppressants on haul roads; application of water sprays on ROM dump stations; alteration of haul routes and suspension of operations until adverse conditions abate.

5.7.1.5. Proposed mitigation measures

In the EIS, the proponent has offered to develop an air quality management plan, detailing measures to minimise and monitor dust generation and to maintain acceptable levels of air quality during the construction and operation of the mine. The air quality management plan will have both proactive and reactive measures.

The proactive management measures aim to address impacts resulting from the mining of Frank Creek pit (adjacent to Wandoan) and mining activities that may impact other receptors. These controls include:

- Implementing a weather and dispersion forecasting system to identify adverse meteorological conditions likely to produce elevated levels of PM₁₀ due to natural events (such as dust storms) and/or the project
- progressive ambient monitoring of PM₁₀ at representative sensitive receptor locations as mining activities approach these locations
- implementing an action trigger response indicated by a 24-hour average rolling PM₁₀ concentration of 120 µg/m³. The response will consist of a range of options employed at the proponent's discretion
- ceasing operations in affected areas until adverse meteorological conditions return to normal, or restricting the use of dust generating plant (for example, dragline or minimisation of the drop height for dragline operations) and optionally changing to truck and excavator operations where monitoring of dust levels indicates that the objectives and performance measures described in the EA will not be met



- the surface of coal in wagons will be profiled to a flat 'garden bed' shape and a surface treatment will be applied to minimise coal dust emissions during transit
- completing laboratory work to investigate the relationship between dustiness and moisture of the Wandoan coal to assist in the management of coal dust emissions
- completing laboratory work to investigate the dustiness of the wash rejects to assist in the management of dust emissions from the reject emplacement
- continuously reviewing mining schedules and activity rates will be conducted based on forecasting, monitoring and community reference feedback for operations that directly impact on, or nearby, the township of Wandoan
- implementing road dust management such as setting speed limits on haulage roads, vehicle wash downs to remove soil, water sprays or the application of a dust suppressant on unsealed roads, earth mounds, coal stockpiles and exposed ground
- installing continuous real time PM₁₀ and meteorological monitoring stations at representative sites prior to the commencement of operations in Turkey Hill, Mud Creek and Woleebee Creek, and review the required management actions closer to the time of mining these pits
- locating stockpiles in sheltered areas, planting wind breaks around the tailings storage facility; the reuse of vegetation waste as ground cover in preference to burning, and rehabilitating disturbed soils
- acting upon requests by property owners and will install first flush diverters and filters onto existing rainwater tank collection systems on dwellings, schools, businesses and community facilities, within 2 km of the boundary of the MLA areas. Ongoing upkeep and maintenance of any devices installed is the property owner's responsibility.

The reactive measures of the air quality management plan include implementation of additional mitigation measures when wind conditions become adverse, such as ceasing operations, reducing activity rates or covering equipment, and a complaints management system.

The proponent's strategy for mitigating air quality impacts is to inform the management of on-site activities with a real-time air quality monitoring and forecasting system.

The main pollutant criteria of issue are PM₁₀, total suspended particulates (TSP) and dust deposition. The baseline and predictive air quality modelling indicated that annual PM₁₀, TSP and daily dust deposition are unlikely to exceed EPP (Air) limits at any sensitive receptors outside of the MLA areas. However, the 24 hour average PM₁₀ at some residences within 2 to 5 km of the MLA will exceed levels under certain meteorological conditions. Therefore, the proponent plans to develop a coupled weather forecasting and dust monitoring system that will initiate the application of management and mitigation strategies prior to the onset of an air quality exceedence.

A minimum criteria level for the implementation of a trigger action response has been set to 80 per cent of the 24 hour PM₁₀ goal. If ambient levels of PM₁₀ exceed 120 µg/m³ then the trigger action response is activated, and the source is identified and appropriate mitigation and management steps are taken until levels return to below the trigger criteria.

The real time measurement system for PM₁₀ concentrations would allow the proponent to make informed, accurate and immediate decisions on mine operations, equipment locations and extraction rates to mitigate any adverse impact on the surrounding sensitive receptors, before any impact actually occurs. The proponent has developed three mitigation zones (refer Table 15 of TR 13-V1.4, Air Quality Assessment of the Proposed Wandoan Coal Mine):

- Mitigation Zone 1—dwellings identified as having more than five exceedences of the 24 hour PM₁₀ goal or located within 500 m of the MLA boundary (Receptors MLA-505 and MLA-552)
- Mitigation Zone 2—dwellings identified as having at least one exceedence of the 24 hour PM₁₀ goal or located within 2 km of the MLA boundary (Receptors MLA-297, MLA-300, MLA-595, MLA-50, MLA-404, MLA-459, MLA-484, MLA-520, MLA-687, MLA-693, MLA484, MLA-557, MLA-693)
- Mitigation Zone 3—involvement and communication with the community of the greater Wandoan region that feels it is impacted by the mine operations.



5.7.2. Conclusion—air quality

Air quality modelling indicated that PM₁₀ 24 hour EPP (Air) objective of 50 µg/m³ 24-hour PM₁₀, and the DERM recommended dust deposition objective for this project of 120 mg/m²/day will be exceeded at some sensitive receptors on some days throughout the life of the mine, due to adverse meteorological conditions and elevated natural background concentrations. With the adoption of best practice management measures, as outlined above, these exceedences will be minimal.

Modelling undertaken by the proponent indicated that other air quality parameters identified by DERM, such as total suspended solids, PM_{2.5} 24-hour and annual average and annual average dust deposition, will be met. Nonetheless, in consultation with DERM, conditions are stated for air quality for the EA to ensure this impact of mining is minimised and managed appropriately (Conditions B1 to B11, including Tables B1a, B1b and B2, Schedule 3).

Conditions B1 to B4 are required to ensure the proponent undertakes best practice measures to control odours, airborne contaminants and dust associated with the mining activity.

Conditions B5 to B11 require the proponent to undertake specified particulate matter, monitoring, control and reporting programs, in particular to ensure that particular matter concentrations are limited to the specifications provided.

Of note, under condition B11, the proponent is required to report annually to DERM on, inter alia, the results and an analysis of dust and particulate matter monitoring and details of use and effectiveness of high management control and mitigation measures. Therefore, in consultation with DERM a condition is stated for the EA, (Condition B5, Schedule 3) that requires the proponent to undertake dust and particulate matter monitoring and prepare and implement a control plan that includes the proposed mining village accommodation-site as a sensitive place.

DERM has provided advice and recommendations concerning specific approvals required for the power station, in particular the ERA 14 approvals to operate a facility to generate greater than 10 MW of electricity. Specific recommendations relating to air quality are included in Schedule 6B, Appendix 1 of this report.

In addition, a condition is recommended that any applications made for the power station (as described in the EIS) under the EP Act would need to meet all statutory requirements and should meet the recommended requirements for the emission of combustion of products to air (Condition 1 and Table 1, Schedule 8).

DERM has also provided information requirements for an application for development approval for ERA 63 to upgrade the Wandoan sewage treatment plant. Specific recommendations relating to air quality included in Schedule 7, Appendix 1 of this report

5.8. Terrestrial ecology

5.8.1. Context

The following section provides an analysis of terrestrial ecological values of state significance that may be affected by the project. For further discussion on matters of national environmental significance (MNES), see section 8 of this report.

Terrestrial ecological values of state significance are addressed in:

- EIS:
 - Volumes 1 and 2 ('MLA areas and Surrounds Impact Assessment' and 'Southern CSM Water Supply Pipeline Impact Assessment', respectively): Chapter 17A Terrestrial Ecology
 - Volume 4 ('Glebe Option Impact Assessment'): Chapter 12 Terrestrial Ecology
- SEIS:
 - Volumes 1 and 2 ('MLA areas and Surrounds Impact Assessment' and 'Southern CSM Water Supply Pipeline Impact Assessment', respectively): Chapter 17A Terrestrial Ecology
 - Volume 4 ('Glebe Option Impact Assessment'): Chapter 12 Terrestrial Ecology



- Appendix A17A-1-SV1.4: WJV Draft Offset Strategy.

To fulfil the requirements of the ToR for conducting seasonal surveys, supplementary seasonal terrestrial field surveys were undertaken in the summer of 2009 and reported on as part of the SEIS.

Additional terrestrial ecology field surveys were undertaken in February and March 2009 to verify ecologically sensitive areas and species of plants and animals that are known or likely to occur in the study area and surrounds for the gas supply pipeline associated with the MLA areas and the southern CSM water pipeline route.

Due to refinements and modifications to the mine scheduling and changes to the northern portion of the southern CSM water supply pipeline, the impact assessment for the MLA areas and southern CSM water supply pipeline was also reviewed and updated as part of the SEIS.

The following sections provide a summary of the most up-to-date information presented in the relevant chapters of the SEIS, in addition to relevant unchanged information presented in the EIS, for all project components.

The proponent has not yet selected a water supply option (that is, either the Glebe Weir raising and pipeline or southern CSM water supply pipeline). Consequently, both water supply options have been included within this assessment and will be subject to offset negotiations.

5.8.2. Threatened flora

5.8.2.1. EIS findings, submissions and analysis

Desktop analysis and field surveys conducted for the EIS identified 22 flora species listed under the NC Act as predicted to occur (based on the existence of potential habitat) in the study area for the MLA areas, southern CSM water pipeline and Glebe Weir raising and pipeline options⁴ (Table 5.5, Table 5.6 and Table 5.7).

Table 5.5: NC Act-listed flora species predicted to occur in the MLA areas and gas supply pipeline area

Listed flora species common name	Botanical name	NC Act status ⁵
Belson's Panic	<i>Homopholis bensonii</i>	endangered
salt pipewort, button grass	<i>Poaceae sp.</i>	endangered
hairy joint-grass	<i>Arthraxon hispidus</i>	vulnerable
ooline	<i>Cadellia pentastylis</i>	vulnerable
N/A	<i>Rutidosis crispata</i>	vulnerable
finger panic grass	<i>Digitaria porrecta</i>	near threatened

Table 5.6: NC Act-listed flora species predicted to occur in the southern CSM water supply pipeline area

Listed flora species common name	Botanical name	NC Act status
shiny-barked gum	<i>Eucalyptus pachycalyx</i> subsp. <i>Waigensis</i>	endangered
Belson's Panic	<i>Homopholis bensonii</i>	endangered
N/A	<i>Micromyrtus carinata</i>	endangered

⁴ The study area equates to the study site and any additional areas that could potentially be affected by the proposal either directly or indirectly, such as ancillary construction areas.

⁵ The Nature Conservation (Wildlife) Regulation 2006 provides and defines five classes of protected plants of state environmental significance: extinct in the wild, endangered, vulnerable, near-threatened and least concern.



Listed flora species common name	Botanical name	NC Act status
N/A	<i>Micromyrtus patula</i>	endangered
Waajje wattle	<i>Acacia barakulensis</i>	vulnerable
N/A	<i>Acacia chinchillensis</i>	vulnerable
curly bark wattle	<i>Acacia curranii</i>	vulnerable
N/A	<i>Acacia handonis</i>	vulnerable
N/A	<i>Calytrix gurlmundensis</i>	vulnerable
N/A	<i>Homoranthus decumbens</i>	vulnerable
N/A	<i>Westringia cheelii</i> (syn. <i>W. parvifolia</i>)	vulnerable

Table 5.7: NC Act-listed flora species predicted to occur in the Glebe Weir raising and pipeline area

Listed flora species common name	Botanical name	NC Act status
N/A	<i>Haloragaceae</i>	endangered
salt pipewort, button grass	<i>Poaceae</i>	endangered
hairy joint-grass	<i>Arthraxon hispidus</i>	vulnerable
ooline	<i>Cadellia pentastylis</i>	vulnerable
king blue-grass	<i>Dichanthium queenslandicum</i>	vulnerable
N/A	<i>Rutidosis crispata</i>	vulnerable
N/A	<i>Thelypteris confluens</i>	vulnerable
N/A	<i>Bertya pedicellata</i>	near threatened
finger panic grass	<i>Digitaria porrecta</i>	near threatened
Carnarvon fan palm	<i>Livistona nitida</i>	near threatened

Only one of these species, Belson's panic (*Homopholis bensonii*), which is a native perennial grass, was identified during field surveys for the SEIS as being within the vicinity of the MLA areas and southern CSM water pipeline. This species was recorded within non-remnant vegetation analogous with RE 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks).

Population estimates of Belson's panic were not established due to the frequency and dominance of the grass within a number of the sampled vegetation communities occurring on a section of road reserve of the Leichhardt Highway. However, it is estimated that over 3000 individual specimens exist within this section of road reserve.

No state-listed plant species were identified during field surveys of the study area for the Glebe Weir raising and pipeline option.

5.8.2.2. Potential impacts and mitigation measures

As discussed in the EIS (Volumes 1 and 2, Chapter 17A, Technical Report Appendix I, Section 1), if a terrestrial flora species was recorded in the study area or identified as having a moderate to high likelihood-of-occurrence, and the species is listed as endangered or of-concern under VM Act, then the significance of impacts was assessed under both the EPBC Act Policy Statement 1.1 Significant Impact Guidelines.



Sections 17A.4.8, 17A.4.9 and 12.3.2.1 of Volumes 1, 2 and 4 of the EIS and SEIS, respectively, conclude that, with the exception of Belson's panic, the three components of the project are not likely to have a significant impact on any state-listed threatened flora species known or likely to occur within the study area.

This conclusion was based on the fact that the study areas do not include habitat suitable for the state-listed threatened flora species and the species were not recorded as part of field surveys within the study area.

For Belson's panic, the extent of occurrence along a section of road reserve of the Leichhardt Highway indicated that the construction and operation of the project would not have any adverse affect on this species.

5.8.3. Threatened fauna

5.8.3.1. EIS findings, submissions and analysis

Desktop analysis and field surveys conducted for the EIS and SEIS identified a total of 28 threatened fauna species listed under the NC Act (identified in Table 5.8, Table 5.9 and Table 5.10) as predicted to occur in the study area for the MLA areas and gas supply pipeline, southern CSM water supply pipeline and/or Glebe Weir raising and pipeline.

Table 5.8: Listed threatened fauna species predicted to occur in the MLA areas and gas supply pipeline area

Listed fauna species common name	Zoological name	NC Act status
Mammals		
greater long-eared bat	<i>Nyctophilus timoriensis</i>	vulnerable
eastern long-eared bat	<i>Nyctophilus timoriensis</i>	vulnerable
little-pied bat	<i>Chalinolobus picatus</i>	near threatened
Birds		
pink cockatoo	<i>Cacatua leadbeateri</i>	vulnerable
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	vulnerable
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
painted honeyeater	<i>Grantiella picta</i>	vulnerable
Australian painted snipe	<i>Rostratula australis</i>	vulnerable
grey goshawk	<i>Accipiter novaehollandiae</i>	near threatened
cotton pygmy goose	<i>Nettapus coromandelianus</i>	near threatened
grey falcon	<i>Falco hypoleucos</i>	near threatened
square-tailed kite	<i>Lophoictinia isura</i>	near threatened
black-necked stork	<i>Ephippiorhynchus asiaticus</i>	near threatened
black-chinned honeyeater	<i>Melithreptus gularis</i>	near threatened
Reptiles		
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmalli</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
common death adder	<i>Acanthopis antarcticus</i>	near threatened
golden-tailed gecko	<i>Strophurus taenicauda</i>	near threatened



Table 5.9: Listed threatened fauna species predicted to occur in the southern CSM water supply pipeline area

Listed fauna species common name	Zoological name	NC Act status
Mammals		
eastern long-eared bat	<i>Nyctophilus timoriensis</i>	vulnerable
little-pied bat	<i>Chalinolobus picatus</i>	near threatened
Birds		
glossy black-cockatoo	<i>Calyptorhynchus lathami</i>	vulnerable
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
powerful owl	<i>Ninox strenua</i>	vulnerable
painted honeyeater	<i>Grantiella picta</i>	vulnerable
black-necked stork	<i>Ephippiorhynchus asiaticus</i>	near threatened
square-tailed kite	<i>Lophoictinia isura</i>	near threatened
black-chinned honeyeater	<i>Melithreptus gularis</i>	near threatened
Reptiles		
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmalli</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
common death adder	<i>Acanthopis antarcticus</i>	near threatened
golden-tailed gecko	<i>Strophurus taenicauda</i>	near threatened
Amphibians		
rough collared frog	<i>Cyclorana verrucosa</i>	near threatened

Table 5.10: Listed threatened fauna species predicted to occur in the Glebe Weir raising and pipeline area

Listed fauna species common name	Zoological name	NC Act status
Mammals		
greater long-eared bat	<i>Nyctophilus timoriensis</i>	vulnerable
large-eared pied bat	<i>Chalinolobus dwyeri</i>	near threatened
little-pied bat	<i>Chalinolobus picatus</i>	near threatened
Birds		
red goshawk	<i>Erythrorhynchus radiatus</i>	endangered
swift parrot	<i>Lathamus discolor</i>	endangered
star finch (eastern and southern subspecies)	<i>Neochmia ruficauda ruficauda</i>	endangered
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
painted honeyeater	<i>Grantiella picta</i>	vulnerable
powerful owl	<i>Ninox strenua</i>	vulnerable



Listed fauna species common name	Zoological name	NC Act status
Australian painted snipe	<i>Rostratula australis</i>	vulnerable
black-breasted button-quail	<i>Turnix melanogaster</i>	vulnerable
grey goshawk	<i>Accipiter novaehollandiae</i>	near threatened
black-necked stork	<i>Ephippiorhynchus asiaticus</i>	near threatened
grey falcon	<i>Falco hypoleucos</i>	near threatened
black-chinned honeyeater	<i>Melithreptus gularis</i>	near threatened
cotton pygmy goose	<i>Nettapus coromandelianus</i>	near threatened
Reptiles		
grey snake	<i>Hemiaspis damelii</i>	endangered
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmalli</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
golden-tailed gecko	<i>Strophurus taenicauda</i>	near threatened
common death adder	<i>Acanthopis antarcticus</i>	near threatened
Amphibians		
rough collared frog	<i>Cyclorana verrucosa</i>	near threatened
Insects		
imperial hairstreak butterfly	<i>Jalmenus evagora eubulus</i>	vulnerable

The above species are considered to be priority taxa species of animal for the Brigalow Belt South bioregion. No essential habitat (an area or location with essential resources for the maintenance of populations of priority taxa) has been mapped within the study area or surrounds for the MLA areas. The southern CSM water supply pipeline route, however, traverses areas of essential habitat mapped west of Miles on the Leichhardt Highway and at Gurulmundi on Baileys Road. Much of this essential habitat is incorporated in the Gurulmundi Special Area that incorporates Gurulmundi State Forest, Stones Country Resources Reserve and surrounding remnant vegetation on the escarpment west of the Leichhardt Highway.

Based on database searches, one state-listed terrestrial invertebrate species of conservation significance was identified to potentially occur within the local area: imperial hairstreak butterfly (northern subspecies) (*Jalmenus evagoras eubulus*)—vulnerable (NC Act).

Ground surveys did not find the imperial hairstreak butterfly and, although suitable habitat (i.e. brigalow communities) is present, it is considered highly unlikely to occur in the study area.

The EIS (Volumes 1 and 2, Chapter 17A, and Volume 4, Chapter 12) described the extent of suitable habitat for the listed fauna species under the NC Act.

Limited remnant vegetation has been mapped along the Glebe pipeline route.

The EIS (Volume 4, Chapter 12) reported that the inundation area for the raised Glebe Weir is considered to contain areas of state and regional importance in terms of biodiversity significance. In part this is due to the area possessing REs with large tract sizes (therefore less susceptible to ecological edge effects) with very high levels of connection between remnant habitats and broad-scale fauna movement opportunities.



Table 5.11: Threatened fauna species' preferred habitats

Species	Habitat preference
Mammals	
greater long-eared bat	<i>Callitris/ironbark/</i> box open forest and buloke woodland in southern Queensland.
large-eared pied bat	Low to mid-elevation dry open forest and woodland close to preferred roosting sites which includes caves.
Birds	
grey goshawk	Most forest types, especially tall closed forests, including rainforests.
little pied bat	Dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box.
black-chinned honeyeater	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga ironbark (<i>Eucalyptus sideroxylon</i>), white box (<i>E. albens</i>), inland grey box (<i>E. microcarpa</i>), yellow box (<i>E. melliodora</i>) and forest red gum (<i>E. tereticornis</i>).
painted honeyeater	Boree, brigalow and box-gum woodlands and box-ironbark forests.
squatter pigeon (southern subspecies)	Wide range of vegetation types – prefers areas of sandy soil dissected by low gravelly ridges with the shortest cover of grasses. Nearly always found near permanent water. Recorded in woodland of river red gum within the proposed inundation zone.
Reptiles	
golden-tailed gecko	Open woodland and open forest.
common death adder	Wide variety of habitats, in association with deep leaf litter. Habitats include rainforests, wet sclerophyll, woodland, grasslands, chenopod dominated shrublands and coastal heathlands.
grey snake	Favours woodlands especially eucalypt communities, usually on heavier, cracking clay soils prone to seasonal inundation. Particularly associated with water bodies or naturally occurring drainage features
brigalow scaly-foot	Sandstone ridges in woodlands and vine thickets, and in open forests and woodlands, especially ironbark, cypress pine, brigalow, bull oak, spotted gum and vine scrubs.
Dunmall's snake	Open forest and woodland, particularly brigalow <i>Acacia harpophylla</i> forest and woodland growing on floodplains of deep-cracking black clay and clay loam soils.
Insects	
imperial hairstreak butterfly	Eucalypt woodland, brigalow woodland, open grassy woodland.

5.8.3.2. Potential impacts and mitigation measures

As discussed in the EIS (Volumes 1 and 2, Chapter 17A, Technical Report Appendix I, Section 1), if a terrestrial fauna species was recorded in the study area or identified as having a moderate to high likelihood-of-occurrence, and the species is listed as threatened under the NC Act, then the significance of impacts was assessed under both the EPBC Act Policy Statement 1.1 Significant Impact Guidelines.

The EIS and SEIS reached the following conclusions for each NC Act- listed threatened fauna species:



Table 5.12: Impacts and mitigating measures – listed threatened fauna species predicted to occur in the MLA areas and gas supply pipeline area

Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
MLA areas and gas supply pipeline				
little pied bat cotton pygmy goose grey goshawk grey falcon square tailed kite black necked stork common death adder golden tailed gecko		Species not listed as threatened under the NC Act, therefore no significance of impact assessment undertaken.		
glossy black-cockatoo	no	Low density of foraging individuals recorded (2), however were not recorded using tree hollows for breeding. No critical habitat present and <i>Casuarina/ Allocasuarina</i> feed trees are distributed throughout the study area and surrounds	none recommended	negligible
brigalow scaly-foot	no	Low density of animals recorded (2) and similar suitable habitat available in the surrounding landscape	none recommended	negligible
greater long-eared bat pink cockatoo squatter pigeon (southern race) Australian painted snipe yakka skink Dunmall's snake	no	Not recorded within study area and no important habitat present	none recommended	negligible



Table 5.13: Significance of impacts – listed threatened fauna species predicted to occur in the southern CSM water supply pipeline area

Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
little pied bat square-tailed kite painted honeyeater black-necked stork black-chinned honeyeater common death adder golden-tailed gecko rough collared frog		Species not listed as threatened under the NC Act, therefore no significance of impact assessment undertaken.		
glossy black-cockatoo	no	Low density of foraging individuals recorded (2), however were not recorded using tree hollows for breeding. No critical habitat present and <i>Casuarina/ Allocasuarina</i> feed trees are distributed throughout the study area and surrounds	none recommended	negligible
brigalow scaly-foot	no	Low density of animals recorded (1) and similar suitable habitat available in the surrounding landscape	none recommended	negligible
eastern long-eared bat squatter pigeon (southern subspecies) powerful owl yakka skink Dunmall's snake	no	Not recorded within study area and no important habitat present	none recommended	negligible



Table 5.14: Significance of impacts – listed threatened fauna species predicted to occur in the Glebe Weir raising and pipeline area

Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
greater long-eared bat	yes – minor impact	A minor impact may occur as a result of loss of foraging and roosting habitat, and predation by native predatory birds when fleeing disturbance, as a result of construction of the Glebe Weir Works and Inundation area.	Offset and/or rehabilitation or restoration of comparable habitat in the local area	minor
large-eared pied bat	yes – minor impact	A minor impact may occur as a result of loss of foraging habitat as a result of construction of the Glebe Weir Works and Inundation area.	Offset and/or rehabilitation or restoration of comparable habitat in the local area	minor
little pied bat	yes – moderate impact (Glebe weir works and inundation area)	Loss of habitat. Predation by native predatory birds when fleeing disturbance.	Offset and/or rehabilitation or restoration of comparable habitat in local area	minor
red goshawk	yes – minor impact (Glebe Weir works and inundation area only)	Loss of habitat. Loss of prey species by clearing and inundation of foraging habitat.	The area of possibly suitable habitat lost to this species is minor given the large home ranges used (up to 200 km ²). The area is on the western edge of the species' local distribution. Hence, no mitigation or compensatory actions are recommended.	negligible
squatter pigeon (southern subspecies)	yes – minor impact	Operation of the Inundation area: provision of resources for feral predators which increases likelihood of predation in surrounding areas.	Offset of suitable woodland with native grassy understorey	minor
painted honeyeater	yes – moderate impact (Glebe Weir works and inundation area)	Loss of habitat	Offset and/or rehabilitation or restoration of comparable habitat in local area	minor
Australian painted snipe	yes – minor impact	Construction of the Glebe Weir and Inundation	Exclusion of livestock from edges of the	minor – probably



Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
		area: replacement of existing wetland habitat by inundation, and loss of seasonally inundated grassland and pasture.	impoundment would allow establishment of suitable habitat and would offset any habitat loss due to inundation. Control of feral pigs by implementation of a Pest Management Plan. Impacts of the project on this species may be positive	positive
grey goshawk	yes – minor impact (Glebe Weir works and inundation area)	Loss of habitat	None recommended. No loss of important habitat. This is a species more typical of closed habitats and wet sclerophyll forest	minor
black-necked stork	yes – minor impact (Glebe Weir works and inundation area)	Replacement of existing wetland habitat by inundation. Loss of breeding trees.	Exclusion of livestock from edges of impoundment. Control of feral pigs by implementation of Pest Management Plan. Retention of large dead trees where possible. Impacts of the project on this species are likely to be positive.	minor – positive
black-chinned honeyeater	yes – moderate impact (Glebe Weir works and inundation area)	Loss of habitat	Offset and/or rehabilitation or restoration of comparable habitat in local area	minor
cotton pygmy goose	yes – minor impact (Glebe Weir works and inundation area)	Replacement of existing wetland habitat by inundation. Loss of breeding trees.	Exclusion of livestock from edges of impoundment. Retention of large dead trees where possible. Impacts of the project on this species are likely to be positive.	minor – positive
grey snake	yes – moderate impact (Glebe Weir works and inundation area), minor impact (pipeline)	Loss of habitat. Predation from feral predators when fleeing disturbance. Mortality from vehicle strike. Provision of prey (frogs) due to inundation.	Fauna spotter/catcher during clearing. Cover/fill in trenches. Implementation of Pest Management Plan. Exclusion of livestock from edges of impoundment. Appropriate speed limits for construction vehicles. Wildlife awareness	minor



Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
			training for construction staff.	
yakka skink	yes – minor impact (pipeline route only)	Loss of habitat and predation by feral predators when fleeing disturbance	Fauna spotter/catcher during clearing and while any trenches are open. Cover/fill in trenches. Implementation of a Pest Management Plan. Retention of log piles where possible on adjacent land.	negligible
Dunmall's snake	yes – moderate impact	Construction of the Glebe pipeline route: loss of habitat and predation by feral predators when fleeing disturbance and mortality from vehicle strike. Operation of the Inundation Area: constraints to local movements and mortality by vehicle strike.	Fauna spotter/catcher during clearing and while any trenches are open. Cover/fill in trenches. Implementation of Pest Management Plan. Appropriate speed limits for construction vehicles. Wildlife awareness training for construction staff. Offset and/or rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock.	minor
brigalow scaly-foot	yes – moderate impact	Construction of the Glebe Weir and Inundation area: loss of habitat and predation by feral predators when fleeing disturbance during the During operation, a minor impact may occur as a result of constraint to local movement.	Offset and/or rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock	minor
golden-tailed gecko	yes – moderate impact (Glebe Weir works and inundation area only)	Loss of habitat	Fauna spotter/catcher during clearing. Cover/fill in trenches. Offset and/or rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock	minor
common death adder	yes – moderate impact	Loss of habitat. Predation by feral predators when fleeing disturbance. Mortality from vehicle strike.	Fauna spotter/catcher during clearing. Cover/fill in trenches. Implementation of Pest Management Plan. Appropriate speed limits for construction vehicles.	minor



Listed fauna species	Likely to be significantly affected?	Justification – EIS summary	Proposed mitigation measures	Residual impact
			Wildlife awareness training for construction staff. Offset and/or rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock.	
rough collared frog	yes – minor impact	Loss of habitat. Predation by feral predators when fleeing disturbance.	Implementation of a Pest Management Plan. Exclusion of livestock from edges of the impoundment to allow establishment of suitable habitat and will offset any habitat loss due to inundation.	negligible
imperial hairstreak butterfly	yes – moderate impact (Glebe Weir works and inundation area only)	Loss of habitat	Offset and/or rehabilitation or restoration of comparable habitat in local area.	minor
swift parrot star finch (eastern and southern subspecies) black-breasted button-quail powerful owl grey falcon	no	Not recorded within study area and no important habitat present	none recommended	negligible

The EIS and SEIS for the Glebe Weir raising and pipeline option identified 19 fauna species that, without mitigation, are likely to suffer adverse impacts as a result of the proposed action.

To address adverse residual impacts on these species, the EIS (Volume 4, Chapter 12) proposed offsets and/or the rehabilitation or restoration of comparable habitats in the local area, including the exclusion of livestock.

With mitigation in place, such as the use of fauna spotters during clearing, the exclusion of livestock and control of pest animals and revegetation of impoundment edges and riparian zones, negligible residual impacts are expected for three of these fauna species:

- red goshawk
- yakka skink
- rough collared frog.

Three of the affected species are considered to experience a minor positive impact:

- Australian painted snipe



- black necked stork
- cotton pygmy goose.

The remaining 13 fauna species are likely to suffer from minor adverse residual impacts, including:

- greater long-eared bat
- large-eared pied bat
- little pied bat
- squatter pigeon (southern subspecies)
- painted honeyeater
- grey goshawk
- black-chinned honeyeater
- grey snake
- Dunmall's snake
- brigalow scaly-foot
- golden-tailed gecko
- common death adder
- imperial hairstreak butterfly.

SunWater has committed to substantial replanting of riparian and alluvial floodplain vegetation along the Dawson River and outside the levee on Boggomoss Creek. The SEIS (Volume 4, Section 12.3) stated that the species selected for planting would include threatened species, such as brigalow and hairy joint-grass, where it is their natural habitat. The SEIS reported that this habitat would suit brigalow scaly-foot and rainbow bee-eater and would reconstitute the east-west and north-south movement corridors which would benefit a range of species.

5.8.4. Regional ecosystems

5.8.4.1. EIS findings, submissions and analysis

Vegetation clearing would be required for all proposed project components, including the mining of the MLA areas, and the construction of the gas supply pipeline, southern CSM water supply pipeline and Glebe Weir raising and pipeline. The exact footprint of all clearing areas would not be accurately defined until power and water supply options have been selected, detailed alignments and designs have been completed and, for those areas outside of the MLA areas, applications have been lodged for clearing permits under the *Vegetation Management Act 1999* (VM Act). Nonetheless, the vegetation areas likely to be disturbed by each of the broad project components have been documented in the EIS and SEIS. Table 5.15, Table 5.16 and Table 5.17 list the observed regional ecosystems (REs) that occur on the study area for all project components, indicating the VM Act status and Biodiversity Status, and the estimated areas of REs to be cleared.

Table 5.15: Observed regional ecosystems in the MLA areas and gas supply pipeline area

RE description	Remnant status	VM Act status ⁶	Biodiversity status ⁷	Area to be cleared (ha)
MLA areas				
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on	remnant	endangered	endangered	22.6

⁶ Sections 22LA, 22LB and 22LC of the VM Act provide and define three categories of regional ecosystems: endangered, of concern and least concern.

⁷ 'Biodiversity Status' is based on an assessment of the condition of remnant vegetation in addition to the pre-clearing and remnant extent of a regional ecosystem which is used to determine its class under the VM Act.



RE description	Remnant status	VM Act status ⁶	Biodiversity status ⁷	Area to be cleared (ha)
fine-grained sedimentary rocks				
11.9.4 ⁸ Semi-evergreen vine thicket or <i>Acacia harpophylla</i> with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks	non-remnant	of concern	endangered	13.1
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	5
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	290.4
Total				331.1
Gas supply pipeline				
Total				1.1

Table 5.16: Observed regional ecosystems in the southern CSM water supply pipeline area

RE description	Remnant status	VM Act status	Biodiversity status	Area to be cleared (ha)
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	1.6
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	4.2
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains	remnant	of concern	of concern	2.8
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	1.9
11.3.27c Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species	remnant	least concern	of concern	0.3
11.5.1 <i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains/remnant surfaces	remnant	least concern	no concern at present	19.7
11.5.1a <i>Eucalyptus populnea</i> woodland with <i>Allocasuarina luehmannii</i> low tree layer	remnant	least concern	no concern at present	4.8
11.5.4 <i>Eucalyptus crebra</i> , <i>Callitris glaucophylla</i> , <i>C. endlicheri</i> , <i>E. chloroclada</i> , <i>Angophora leiocarpa</i> on	remnant	least concern	no concern at present	4

⁸ RE 11.9.4 Semi-evergreen vine thicket (SEVT) or *Acacia harpophylla* with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks comprises non-remnant vegetation.



RE description	Remnant status	VM Act status	Biodiversity status	Area to be cleared (ha)
Cainozoic sand plains/remnant surfaces. Deep sands				
11.5.21 <i>Corymbia bloxsomei</i> +/- <i>Callitris glaucophylla</i> +/- <i>Eucalyptus crebra</i> +/- <i>Angophora leiocarpa</i> woodland on Cainozoic sand plains/remnant surfaces	remnant	least concern	no concern at present	10.2
11.7.2 <i>Acacia</i> spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	remnant	least concern	no concern at present	3.5
11.7.4 <i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> on Cainozoic lateritic duricrust	remnant	least concern	no concern at present	4
11.7.6 <i>Corymbia citriodora</i> or <i>Eucalyptus crebra</i> woodland on Cainozoic lateritic duricrust	remnant	least concern	no concern at present	21.5
11.7.7 <i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. on Cainozoic lateritic duricrust	remnant	least concern	no concern at present	6.6
11.10.1 <i>Corymbia citriodora</i> open forest on coarse-grained sedimentary rocks	remnant	least concern	no concern at present	1.1
11.10.7 <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	remnant	least concern	no concern at present	6.8
Total				93

Table 5.17: Observed regional ecosystems in the Glebe Weir raising and pipeline area

RE description	Remnant status	VM Act status	Biodiversity status	Area to be cleared (ha)
Glebe Weir				
11.3.1 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	remnant	endangered	endangered	3.9
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	0.3
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	110.1
11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains	remnant	of concern	of concern	341.4
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. tall woodland on alluvial plains	remnant	of concern	of concern	5.2
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing	remnant	least	of concern	165



RE description	Remnant status	VM Act status	Biodiversity status	Area to be cleared (ha)
drainage lines		concern		
11.10.7 <i>Eucalyptus crebra</i> woodland on coarse-grained sedimentary rocks	remnant	least concern	no concern at present	0.3
Total				626.2
Pipeline				
11.3.1	remnant	endangered	endangered	0.3
11.9.5	remnant	endangered	endangered	0.8
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	2.3
11.9.7 <i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	remnant	of concern	of concern	8.4
11.3.2	remnant	of concern	of concern	1.5
11.3.3	remnant	of concern	of concern	0.8
11.3.25	remnant	least concern	of concern	3
11.10.7	remnant	least concern	no concern at present	0.8
Total				17.9

In summary, the total areas of REs to be cleared include:

- MLA areas: 331.1 ha (includes 13.1 ha of non-remnant SEVT RE 11.9.4)
- gas supply pipeline: 1.1 ha
- southern CSM water pipeline option: 93 ha
- Glebe Weir raising and pipeline option: 644.1 ha.

Area estimates for the gas supply pipeline and southern CSM water supply pipeline corridors assume a 20 m vegetation clearing width. A 30 m wide vegetation clearing width has been assumed for the Glebe pipeline.

MLA areas and gas supply pipeline

The MLA areas and gas supply pipeline route is largely cleared of remnant vegetation and has a long history of disturbance including grazing and dryland agriculture. Figure 5.1 shows that the remaining remnant vegetation is generally restricted to the main drainage lines traversing the site including:

- Spring Creek and Mud Creek, which flow through the western MLA area (MLA 50229)
- Wandoan Creek and Woleebee Creek, which flow through the central MLA area (MLA 50231)
- Halfway Creek, Frank Creek, Two Mile Creek and Juandah Creek, which flow through the eastern MLA area (MLA 50230).

Vegetation along these drainage lines forms continuous linear patches dominated by RE 11.3.25 (*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines), with RE 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains) spreading across the floodplains. Both of these REs share an 'of concern' DERM Biodiversity Status and form part of a wider regional corridor



network. The wildlife corridor along Woleebee Creek is recognised by State Wildlife Corridor mapping⁹, and wildlife corridors along Frank Creek, Mount Organ Creek and Mud Creek are of regional significance under the Biodiversity Planning Assessment for the Brigalow Belt Bioregion.

Other remnant vegetation on the site is highly fragmented and comprises similar REs dominated by *Acacia harpophylla* (brigalow) and *Eucalyptus populnea* (poplar box) (RE 11.9.5, RE 11.9.6, 11.9.7 and RE 11.9.10). Over 1000 ha of vegetation regrowth (non-remnant vegetation) has also been mapped and described, dominated by *Acacia harpophylla* analogous with RE 11.9.5 and small areas of highly modified semi evergreen vine thicket (SEVT—analogous with RE 11.9.4).

Given the degree of previous disturbance and the extent of habitat fragmentation on the site, the riparian vegetation (in particular along the state significant Woleebee Creek wildlife corridor and regionally significant Frank, Mount Organ and Mud Creek wildlife corridors) serves an important ecological function in providing habitat connectivity.

Southern CSM water supply pipeline

Land in the pipeline route study area to the north of Giligulgul has been largely cleared for grazing and dryland agriculture. Between Giligulgul and Miles, however the proposed pipeline traverses the Great Dividing Range. Land through this section of the study area has not been subject to extensive broad scale and routine clearing as that in the north.

Vegetation proposed to be cleared is located primarily along the road reserve or easement edge of large patches of vegetation and, as such, is generally subject to a range of existing edge effects. Nonetheless, much of the vegetation that would be affected is in moderate to good condition and of remnant vegetation status under the VM Act (Figure 5.2).

The vegetation in the study area that would be affected by vegetation clearing has potential to provide habitat for 21 rare or threatened species of plants. The majority of these species are also likely to occur in the vegetation referred to as the Gurulmundi Special Area under the Biodiversity Planning Assessment. This comprises Gurulmundi State Forest, Stones Country Resources Reserve and surrounding remnant vegetation on the escarpment west of the Leichhardt Highway. The Gurulmundi Special Area is also identified as a State Wildlife Corridor and consists of large areas of essential habitat for priority taxa. The pipeline alignment has been chosen to traverse road reserve and does not run through the Gurulmundi Special Area.

Glebe Weir raising and pipeline—works and inundation area

Ground surveys have confirmed that the study area is situated within a highly fragmented landscape that has been subject to historical clearing practices for improved pasture and livestock grazing and, more recently, for the clearing of regrowth vegetation. This has resulted in patches of remnant and non-remnant vegetation remaining within an agricultural matrix (Figure 5.3). Large habitat patches remain at Spring Creek and downstream within Nathan Gorge. Smaller patches are located to the north-west of Glebe Road, on some of the smaller hills and ranges, along major road reserves and along the Dawson River and major tributaries, although these are either isolated or linear remnants.

Pipeline

Based on a 30 m wide construction corridor, the construction of the pipeline would involve the clearing of a limited area (18 ha) of vegetation. This is due to the pipeline route traversing mainly open, highly modified habitat. The vegetation proposed to be cleared can be grouped into three broad habitat types: open woodland on alluvial soils, open woodland on sedimentary soils and acacia open forest (brigalow) (Figure 5.4).

Potential impacts and mitigation measures

As discussed in the EIS (Volumes 1 and 2, Chapter 17A, Technical Report Appendix I, Section 1), if an ecological community was recorded in the study area or identified as having a moderate to high likelihood-of-occurrence, and the community is listed as endangered or of-concern under VM Act, then the significance of impacts was assessed under both the EPBC Act *Policy Statement 1.1 Significant Impact Guidelines*.

⁹ Environmental Protection Agency, 2004



Figure 5.1: MLA areas and gas supply pipeline regional ecosystems

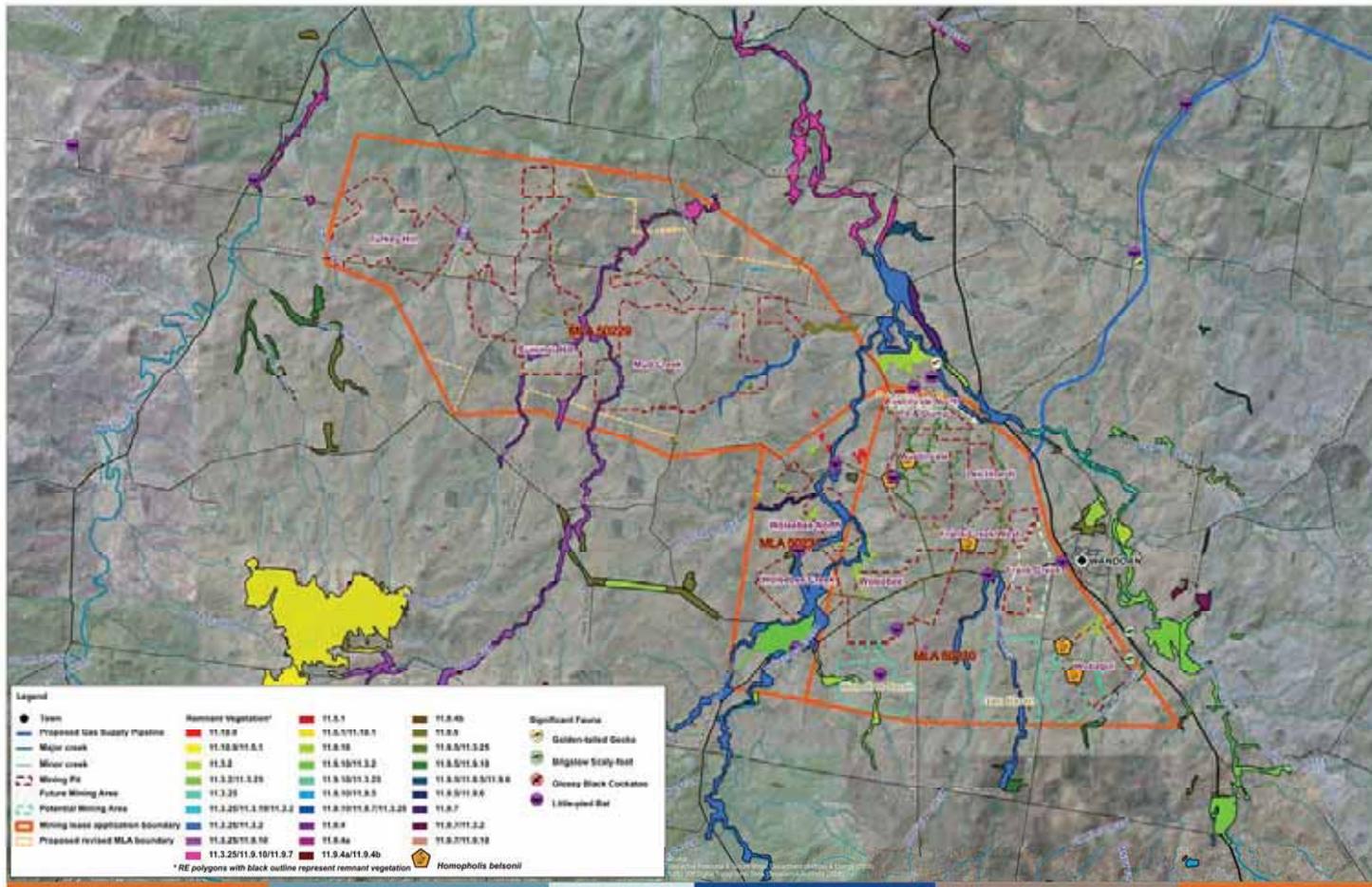




Figure 5.2: Southern CSG water supply pipeline regional ecosystems

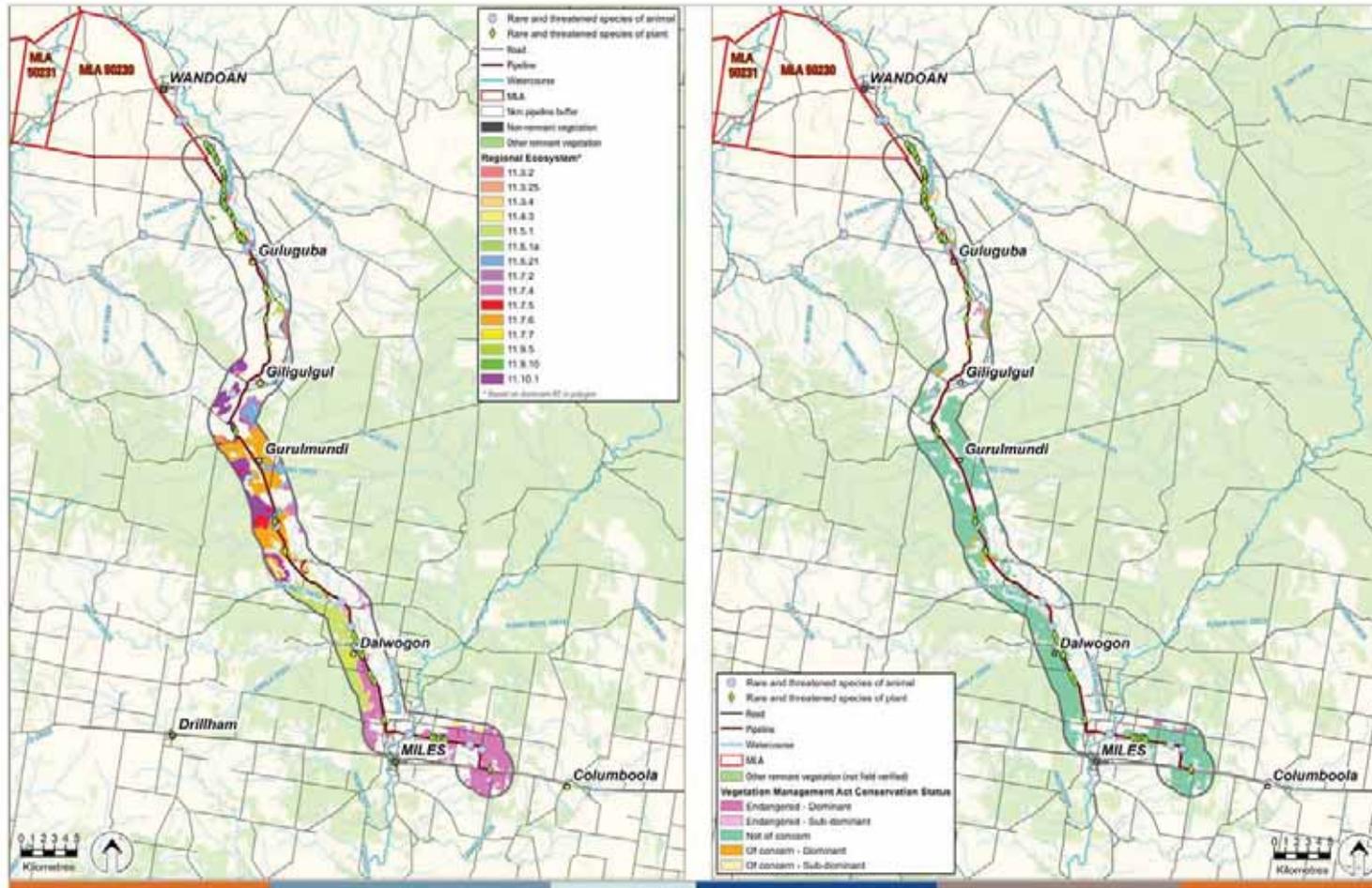




Figure 5.3: Glebe Weir raising ground truthed regional ecosystems

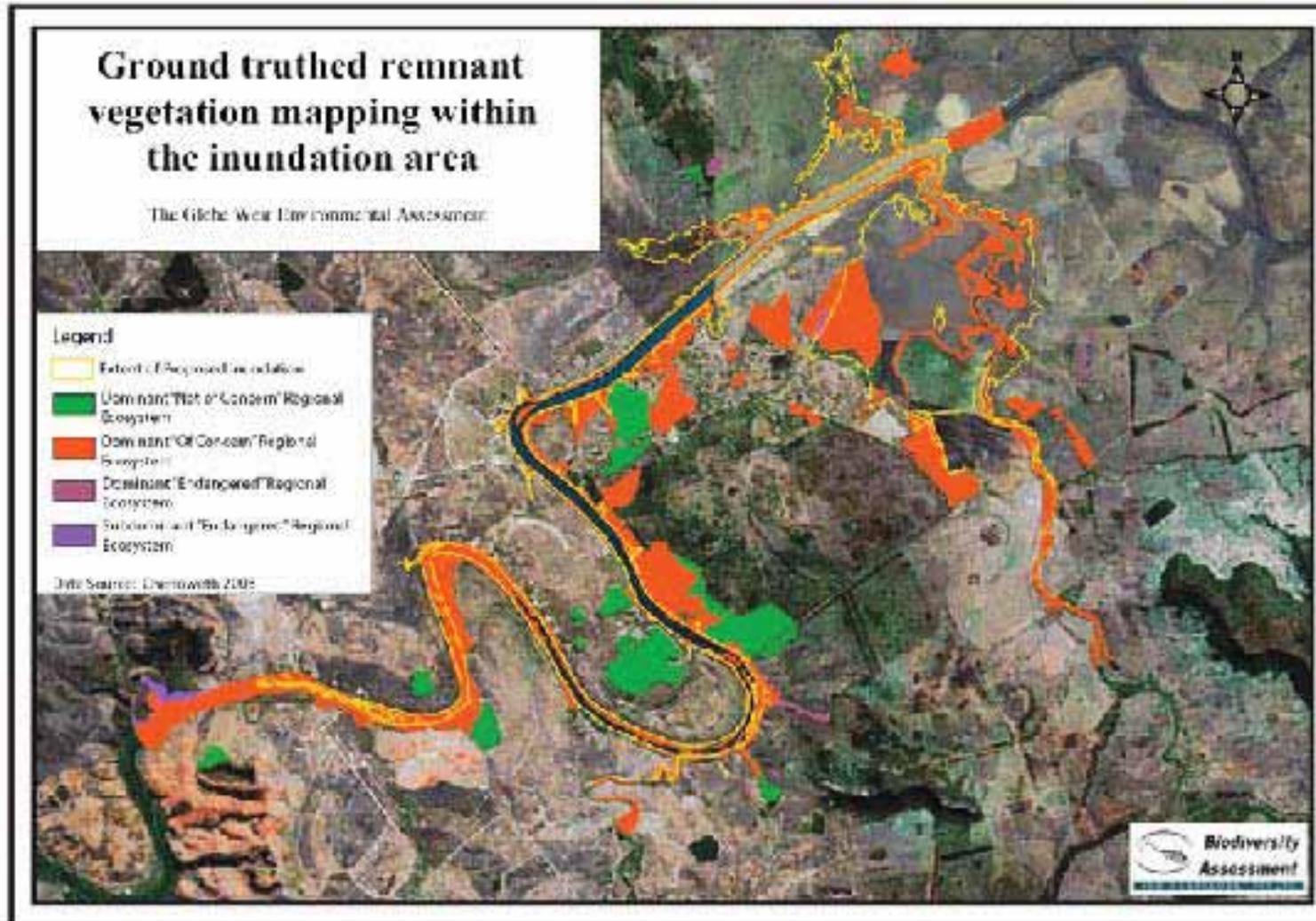
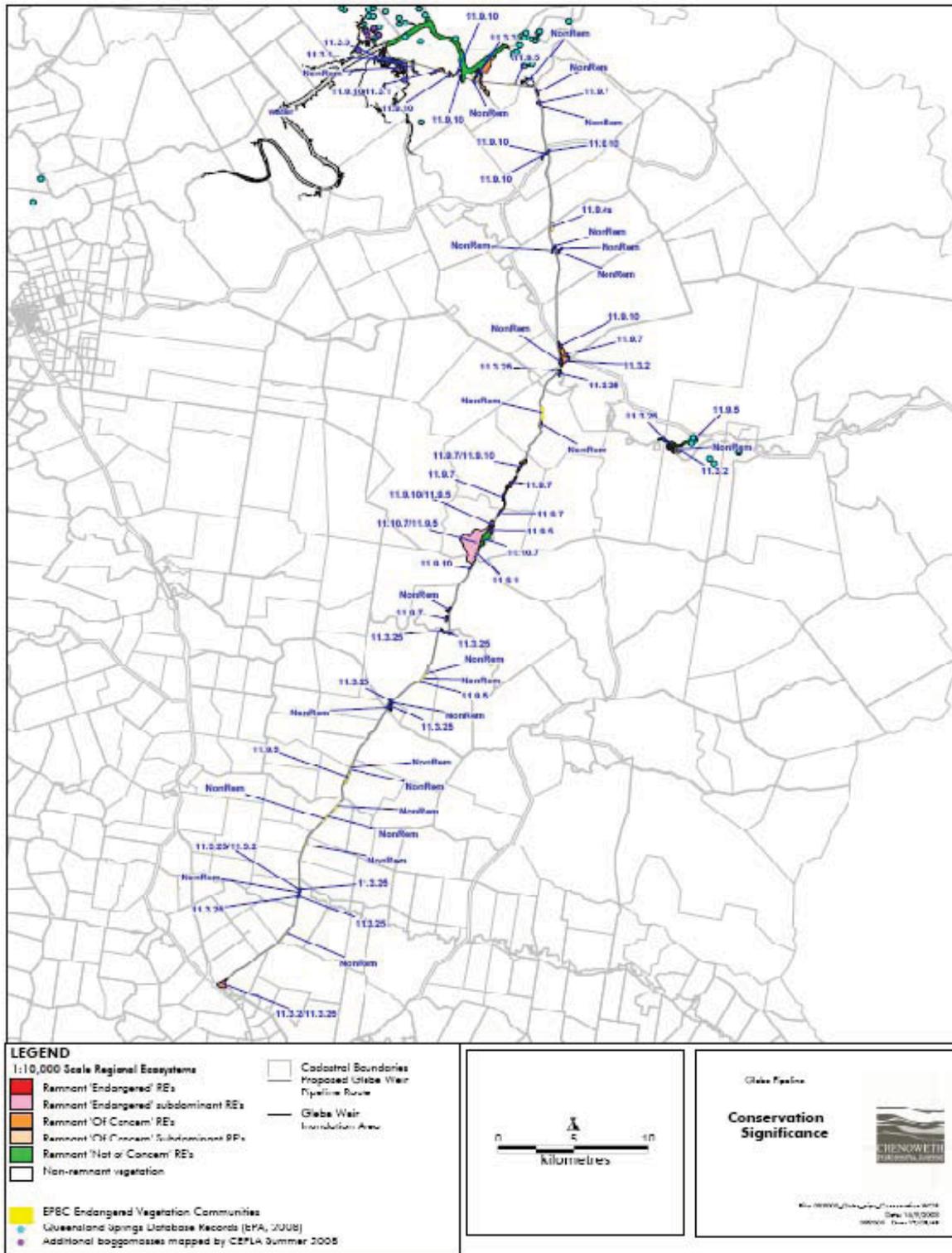




Figure 5.4: Glebe Weir pipeline route ground truthed regional ecosystems





MLA areas and gas supply pipeline

Clearing of remnant vegetation for the MLA areas would require the clearing of 22.6 ha of RE 11.9.5 (brigalow), 5 ha of RE 11.9.10 (*Eucalyptus populnea*, *Acacia harpophylla*) and 290.4 ha of RE 11.3.25 (*Eucalyptus camaldulensis* or *E. tereticornis*). In addition, 13.1 ha of non-remnant RE 11.9.4 (SEVT) would be cleared.

Clearing of native vegetation would result in the direct loss of plant species, and the reduction and fragmentation of wildlife habitats and populations. Secondary impacts on vegetation may occur as a result of dust, erosion, altered water flows, weed invasion, soil exposure, and increases in herbivory and light penetration. In addition to the direct loss of habitat, vegetation clearing associated with the development of the MLA areas would result in fragmentation of important wildlife corridors associated with the drainage lines which provide landscape-scale linkage between Hinchley and Mount Organ State Forests to the south-west and Juandah Creek to the north-east.

The EIS stated that the proposed clearing of brigalow would not result in significant adverse impacts, primarily due to the small extent of fragmented and modified REs to be removed and, in the case of brigalow, the significant proportion of community in the MLA areas to be retained.

The proponent expects that future detailed mine planning would result in a reduction in vegetation clearing requirements, where the mine and associate infrastructure footprint would be further defined, and an allowance for surplus areas would no longer be required. The proponent expects the timing of detailed mine planning to occur prior to approval for mining and to be done in conjunction with scoping studies aimed at identifying offset opportunities.

A modification of the pits and infrastructure layout within the MLA areas since the public release of the EIS has also resulted in a reduction of the extent of vegetation clearing. Within the MLA areas, 82 per cent of the remnant vegetation and 53 per cent of regrowth (non-remnant) vegetation would be retained (compared with 63 per cent of remnant and 51 per cent of non remnant vegetation stated in the EIS).

Clearing of vegetation for mining activities on a mining lease is not an assessable development under the Sustainable Planning Regulation 2009, therefore the Regional Vegetation Management Code and the Policy for Vegetation Management Offsets do not apply to vegetation clearing on MLA areas.

Notwithstanding this, the proponent has committed to ensuring a biodiversity offset for all components of the project, including the non-assessable MLA areas, to meet a 1:3 ratio for project-related disturbance of remnant endangered RE vegetation (using the Biodiversity Status) in addition to offsets for endangered ecosystems under the EPBC Act (see section 8 of this report). Section 5.8.5 of this report provides more details on the proponent's proposed Biodiversity Offset Strategy.

However, the targeting of remnant 'endangered' vegetation only for a biodiversity offset does not address potential habitat fragmentation impacts resulting from the clearing of 290.4 ha of remnant 'of concern' (Biodiversity Status) riparian vegetation (RE 11.3.25) on the MLA areas, which provides linkages to a wider wildlife corridor network of state and/or regional importance.

In its submission on the SEIS, DERM considered that impacts on habitat connectivity are unlikely to be fully mitigated, and a submitter on the EIS raised concerns about impacts to existing corridors and connectivity resulting from the clearing and removal of vegetation from riparian zones.

To minimise habitat connectivity impacts, DERM recommended that the proponent prepare and implement a plan to re-establish native riparian vegetation on at least 100 ha associated with Frank, Woleebee, Mud and Spring Creeks prior to the commencement of mining.

The proponent considered that the re-establishment of 100 ha of riparian vegetation prior to the commencement of any mining activities was not reasonable on the basis that creek diversions on the MLA area are proposed to take place over the life of the mine (30 years). In particular, the diversion of Woleebee Creek is not proposed to take place until at least Year 10 of the mine life. Consequently, the proponent has committed to the rehabilitation of riparian planting on a staged basis only, to commence approximately 4 years prior to each creek diversion.

The proponent acknowledged that revegetated creek diversions would not immediately replicate the habitat functions of an established riparian ecosystem. The SEIS noted that whilst vegetation maturity ultimately depends on the various species used in the revegetation, many native species require 15 years or more.



Therefore, the proponent's commitment to commence the construction of creek diversions approximately 4 years prior to any creek diversion being required to accommodate creek flow may not allow sufficient time to enable the establishment of vegetation for the purposes of facilitating habitat connectivity.

The proponent has considered avoiding the mining of the Woleebee Creek area, thereby avoiding a creek diversion and consequent habitat fragmentation impacts. Water may be released into this creek in accordance with the provisions of the water licence for creek diversions. The proponent has expressed its intention to plan future mining to avoid this area. However, the proponent is unable to warrant this as a project commitment.

In order to mitigate potential habitat fragmentation impacts to significant wildlife corridors on the MLA areas, a condition is recommended that requires a staged 10-year re-establishment period for native riparian vegetation within the state-significant Woleebee Creek wildlife corridor (Condition 9, Schedule 8).

Southern CSM water supply pipeline

Vegetation clearing for the southern CSM water supply pipeline option for the project would require the clearing of 1.6 ha of endangered brigalow (RE 11.9.5 and 11.9.6, dominant/co-dominant).

The EIS found that due to the small extent to be affected in the study area, brigalow is unlikely to be significantly affected.

The potential for clearing of native vegetation has been avoided as far as possible through the route selection and preliminary design process, with much of the route following existing road corridors and transmission line easements. The proponent has also committed to avoiding impacts to riparian vegetation through the use of directional drill (as opposed to trenching) in order to cross drainage lines with minimal impact.

The southern CSM water supply pipeline route is outside of the MLA areas, therefore the pipeline must comply with the relevant requirements of the VM Act, regional vegetation management code/s for the Brigalow Belt and New England Tablelands bioregions (Department of Natural Resources and Water, 2006) and subsequent policy requirements for vegetation management offsets (Department of Natural Resources and Water, 2007).

DERM also advised that:

- Clearing assessable vegetation for the construction of the water pipeline would be limited to a maximum corridor width of 20 m.
- Access tracks, lay down areas and construction facilities will be located in existing cleared areas.
- All large mature habitat trees must be retained within the corridor unless there is a risk of interference with the installation and maintenance of the pipeline.
- Clearing of 'high value regrowth' for infrastructure such as water supply pipelines must be undertaken in accordance with the requirements of the regrowth vegetation code current at the time of clearing.

To meet the performance requirements outlined in the codes, the proponent has committed to modifying the pipeline alignment during detailed design within the assessed alignment corridor in the following two locations:

- Oberina Road, south of Myall Street
- corner Gilgulgul Road and Baileys Road.

This would ensure the pipeline does not reduce the width of remnant vegetation in these two areas to less than 200 m in width.

In consultation with DERM a condition is recommended (Condition 7, Schedule 8) that any applications made for the southern CSM water supply pipeline under the VM Act would need to meet all statutory requirements and have the following features:

- The clearing easement would be a maximum of 20 metres wide.



- All mature habitat trees within the corridor should be retained unless there is a risk of interference with the construction and operation of the pipeline.

As part of its draft Biodiversity Offset Strategy, the proponent committed to ensuring a biodiversity offset to meet a 1:3 ratio for project-related disturbance of remnant endangered regional ecosystem vegetation (using biodiversity status), endangered ecosystems listed under the EPBC Act and vegetation covered under the vegetation management code. For the CSM water supply pipeline areas, these unavoidable impacts include no more than the clearing of 18.9 ha of vegetation, resulting in a biodiversity offset of approximately 56.7 ha.

The proponent reported that these figures would be refined as part of the Biodiversity Offset Strategy during the detailed design phase.

Glebe Weir raising and pipeline

The EIS identified the following impacts and mitigation measures for the proposed clearing of identified REs:

Table 5.18: Impacts and mitigation measures for REs in the Glebe Weir raising and pipeline area

RE	Potential impact (without mitigation)		Proposed mitigation measures	Residual impact (with mitigation)	
	Inundation area	Pipeline		Inundation area	Pipeline
11.3.1	significant	moderate	<ul style="list-style-type: none"> • confine weir construction impacts to the inundation footprint • design pipeline to avoid the RE • confine clearing to the pipeline corridor (15 m either side of the centre line) • habitat restoration and enhancement of a comparable ecosystem in the local area • offset design and measurement of progress to be in accordance with the DERM Policy for Vegetation Management Offsets 	minor	minor
11.9.5	moderate	moderate		minor	minor
11.9.10	N/A	minor		N/A	negligible
11.3.2	significant	minor		minor	negligible
11.3.3	significant	minor		minor	negligible
11.9.7	N/A	moderate		N/A	minor
11.3.4	minor	N/A		negligible	N/A
11.3.25	significant	minor		minor	negligible
11.10.7	minor	negligible		minor	negligible

With specific regard to the proposed clearing of 168 ha of RE 11.3.25, the EIS stated that significant habitat restoration and enhancement of a comparable ecosystem in the local area that reinstates the corridor is required. A significant land buffer to the storage has been included in the purchase requirements of the Glebe Weir raising and pipeline option to account for this need.

Key mitigation strategies to minimise impacts to terrestrial flora include:

- the proposed restoration of the buffer to the inundation area to link to a wildlife corridor to the east and west
- restoration, enhancement or offset of endangered and of concern REs, which in turn provide habitat for fauna.

The presence of the weir would represent a permanent water source that would attract species adapted to lakes and impoundments, particularly the over-bank area of Cockatoo Creek, which is expected to result in some positive impacts.

The edge effects from the inundation area would present a continual management challenge, primarily with regard to the control of weeds. Control of access by cattle to impoundment edges would increase habitat values for native species where cattle are excluded.

The EIS (Volume 4, Appendix 12C) provides a suite of preliminary flora and fauna management plans that describe the mitigating measures for potential impacts of the construction and operation of the Glebe Weir raising option. These include:



- Clearing Management Plan—a management plan for clearing vegetation would be required under the Vegetation Management Act and in accordance with the State Policy for Vegetation Management, November 2006
- Construction Habitat Management Plan—to be incorporated into the overall Construction Management Plan
- Habitat Rehabilitation Management Plan—the corridors mapped to the east and west of the inundation area are to function as a continuous corridor due to the presence of non-remnant vegetation, albeit in places only as a single row of mature trees and in places degraded by livestock and feral animals such as pigs
- Operational Habitat Management Plan—to ensure the success of rehabilitation works, to identify need for remedial measures, and to conduct regular pest management programs

The SEIS (Volume 4, Section 12.3) SEIS stated that the OHMP would comprise a number of sub-plans and actions including:

- a fire management plan (EIS, Volume 4, Table 19-16)
 - a weed management plan (EIS, Volume 4, Appendix 12C)
 - a pest management plan (EIS, Volume 4, Appendix 12C)
 - a boggomoss snail habitat management plan (EIS, Volume 4, Appendix 12C, and SEIS, Section 21.2.8)
- Weed and Pest Animal Management Plan.

DERM advised that the Glebe Weir raising and water supply pipeline component of the project must comply with the relevant requirements of the VM Act, regional vegetation management code/s for the Brigalow Belt and New England Tablelands bioregions (Department of Natural Resources and Water, 2006) and subsequent policy requirements for vegetation management offsets (Department of Natural Resources and Water, 2007).

DERM also advised that:

- clearing assessable vegetation for the construction of the water pipeline would be limited to a maximum corridor width of 30 metres.
- all large mature habitat trees must be retained within the corridor unless there is a risk of interference with the installation and maintenance of the pipeline.
- clearing of assessable vegetation resulting from the weir construction and raising must be limited to the area of inundation and the works site as described in Figure 5-4 of the EIS.
- clearing of 'high value regrowth' for infrastructure such as water supply pipelines must be undertaken in accordance with the requirements of the regrowth vegetation code current at the time of clearing.

In consultation with DERM a condition is recommended (Condition 8, Schedule 8) that any applications made for the Glebe Weir and associated water pipeline under the VM Act would need to meet all statutory requirements and have the following features:

- where the water pipeline corridor from Glebe Weir can not be aligned to avoid the clearing of assessable vegetation, then clearing easement must be limited to a maximum of 30 metres wide
- all mature habitat trees within the corridor should be retained unless there is a risk of interference with the construction and operation of the pipeline.

5.8.4.2. Biodiversity and Land Management Plans

For both the MLA areas and southern CSM water supply pipeline option, the proponent has committed to developing a Biodiversity and Land Management Plan (BLMP) prior to the start of construction to minimise impacts on terrestrial (and aquatic) ecology resulting from the construction and operational phases of the project.



The BLMP is considered to be an over-arching document that provides sub-sections relating to the construction and operation of all aspects of the project that are not otherwise included in the EM plan for the sake of the mine EA.

The BLMPs would include, where appropriate, procedures for:

- detailed design of mitigation measures such as fauna underpasses and fencing
- general impact mitigation
- staff and contractor inductions and ongoing education
- pre-clearing surveys and fauna salvage and/or translocation where practical
- rehabilitation and restitution of adjoining habitat where possible
- weed control
- pest management
- rehabilitation protocols
- monitoring.

The BLMPs would include clear objectives and actions for the project including, where appropriate:

- minimising human interferences to flora and fauna
- minimising vegetation clearing/disturbance
- minimising impact to threatened species and communities
- minimising impacts to riparian and aquatic habitats and species
- ongoing monitoring of impacts on flora and fauna.

The EIS (Volumes 1 and 2, Tables 17A-9 and 17A-10 respectively) identified a range of mitigation measures to be included in the BLMP, including but not limited to:

- targeted species searches for those threatened species and priority taxa considered to have the potential to occur prior to any staged development
- pre-clearing surveys for fauna prior to the commencement of construction
- placing transportable habitat features such as large logs and boulders in adjacent retained areas to allow their continuation as potential fauna refuge sites
- collection of native seeds for use in the revegetation of disturbed areas
- revegetation of areas not required for operation during the life of the mine
- development and implementation of a weed and feral animal management plan
- development and implementation of a flora and fauna monitoring program.

The BLMP would also include measures to minimise impacts to riparian habitats and species, including the:

- progressive rehabilitation of creek diversions within 1 month of earthworks being undertaken (where practicable)
- commencement of creek diversion construction approximately 4 years (as far as practicable) prior to any creek diversion being required to accommodate creek flow
- design of revegetated creek diversions to encourage continued fauna movement by connecting fauna habitats, before maturing into viable fauna habitat
- consideration and, where practical, inspection, repair and maintenance of existing fencing around watercourses and other measures installed around riparian areas by previous landowners and environmental groups such as Landcare and Greening Australia



For the Glebe Weir raising and pipeline option, the proponent has committed to the preparation of the following overarching management plans (described in the EIS, Volume 4, Appendix 12- C) related to terrestrial ecology, incorporating relevant sub-plans, that are to be included in the project construction and operational EMPs:

- clearing management plan
- construction habitat management plan
- habitat rehabilitation management plan
- operational habitat management plan
- construction and operational EMP sub-plans for aquatic and terrestrial flora and fauna, including a boggomoss snail habitat management plan.

For the Glebe Weir raising and pipeline option, SunWater has committed to incorporate its commitments to mitigate impacts to terrestrial flora and fauna into the construction and operational EMPs.

For the MLA areas and southern CSM water pipeline, however, these commitments are generally broad in nature and have not all been included in the draft environmental management plans, either for the EA or for construction and operations of other components of the project. Therefore, a condition is recommended (Condition 10, Schedule 8) that specific mitigation measures addressing terrestrial flora and fauna committed to by the proponent should be documented in the construction and operational EMPs for the MLA areas and gas supply pipeline, and southern CSM water supply pipeline.

5.8.5. Offsets

5.8.5.1. Identification of areas requiring offset

Threatened flora species

As discussed in section 5.8.2.2 of this report, with the exception of Belson's panic, the three components of the project are not likely to have a significant impact on any state-listed threatened flora species known or likely to occur within the study area.

For Belson's panic, the extent of occurrence along a section of road reserve of the Leichhardt Highway indicated that the construction and operation of the project would not have any adverse affect on this species.

Therefore, no offsets are required for state-listed threatened flora species.

Threatened fauna species

Tables 5.8.8, 5.8.9 and 5.8.10, in section 5.8.3.2 of this report, provide a summary of the likely significant impacts and measures proposed to mitigate adverse potential impacts on threatened fauna species as a result of construction and/or operation of all components of the project.

With mitigation, the EIS (Volumes 1 and 2, Chapter 17A) considered that for the MLA areas and southern CSM water pipeline option, no listed threatened fauna species are likely to suffer significant adverse impacts.

Notwithstanding this, the EIS (Volume 4, Chapter 12) identified 13 species that may suffer minor adverse residual impacts (that is, with mitigation in place) as a result of construction and/or operation of the Glebe Weir raising and pipeline option.

Regional ecosystems

Tables 5.8.11, 5.8.12 and 5.8.13, in section 5.8.4.1 of this report provide a summary of the vegetation communities (REs) to be cleared for MLA areas and water supply options for the project comprising:

- MLA areas: 331.1 ha (includes 13.1 ha of non-remnant SEVT RE 11.9.4)
- gas supply pipeline: 1.1 ha



- southern CSM water pipeline option: 93 ha
- Glebe Weir raising and pipeline option: 644.1 ha.

On the basis that clearing of 'least concern' REs (based on Biodiversity Status) do not need to be offset, the total area of vegetation requiring offset for each of the project components would be as follows:

- MLA areas: 331.1 ha
- gas supply pipeline: 1.1 ha
- southern CSM water supply pipeline: 10.8 ha
- Glebe Weir raising and pipeline: 643 ha.

5.8.5.2. Proponent's biodiversity offset commitments

The proponent has committed to finalise and implement a Biodiversity Offset Strategy (SEIS Appendix 17A), based upon the draft Biodiversity Offset Strategy provided with the SEIS (SEIS, Appendix 17A-1-SV1.4, dated November 2009), to address the objectives of state and Commonwealth legislation and policy requirements for biodiversity offsets, in consultation with relevant agencies.

The Strategy aims to provide a net improvement in ecological value as a result of the project, including providing protection immediately for an equal or greater area of similar habitat as that lost through the project. Once a raw water supply (that is, either the southern CSM water supply or Glebe Weir water supply options) and a power supply option are selected, the Strategy would incorporate offsets for vegetation impacts associated with the selected water pipeline and mine-related infrastructure.

The Strategy proposes a mixture of offsets to provide immediate protection or additional conservation during the development of the mine. Subject to further verification and consultation with key interest groups, the strategy proposes a minimum commitment of 1:3 ratio for unavoidable project-related disturbance of assessable remnant vegetation regional ecosystems that are defined as threatened under current state and Commonwealth legislation.

Subject to undertaking detailed assessments of offset areas for the characteristics and quality (in terms of ecological value) and further verification and consultation with key interest groups, the proponent's draft Biodiversity Offset Strategy identifies the following potential offset areas:

- non-remnant REs located on the MLA areas
- areas near the Lake Murphy Conservation Park (approximately 56 km north of the MLA areas)
- areas near the Mt Organ State Forest (approximately 12 km south-west of the MLA areas)
- areas near the Mt Lawton State Forest (approximately 25 km south-east of the MLA areas)

In addition, the proponent is in early discussions with accredited 'biobank' providers to procure offsets with the appropriate development approvals on behalf of the proponent.

As part of its review of the draft Biodiversity Offset Strategy, DEWHA advised that in addition to the providing offsets for endangered ecological communities, the strategy would also need to address the loss of suitable habitat for EPBC-listed threatened species, in particular the brigalow scaly-foot, squatter pigeon and star finch.

In its response to the DEWHA review of the draft Biodiversity Offset Strategy, the proponent considered that the draft strategy did actively provide for increased habitat value for the brigalow scaly-foot by securing offset areas for brigalow EECs. This matter is address in section 8.8.1 of this report.

The proponent has proposed to actively increase the habitat value of the offset areas through appropriate means, which may include planting of native species. An estimate of the area within each proposed offset suitable for active planting would be made based primarily on topography, as this heavily influences the ability to conduct planting.



Chapter 9 of the EIS and SEIS identified the proponent's intention to rehabilitate some mining areas for nature conservation which would provide further habitat, further contributing to the long-term ratio of conserved vegetation to vegetation disturbed by the project.

5.8.5.3. Analysis of offset requirements and draft proposals

As section 2 of the proponent's draft Biodiversity Offset Strategy summarised that current Queensland and Commonwealth Government vegetation and biodiversity offset policies do not set specific ratios, as the ratio requirements vary with the individual circumstances of the particular vegetation to be cleared and the corresponding offsets proposed.

Regional ecosystems

Clearing of REs classified as 'least concern' under the VM Act is not required to be offset. The requirements set in the Coordinator-General's report for the Daunia Mine to offset 'least concern' or 'not of concern' REs was based on the relatively small areas of vegetation impacted for that mine. Offsetting of cleared least concern vegetation for the Daunia mine was required to increase the offset area to a minimum of 20 ha considered practical for offset management purposes. The requirement set for the Daunia mine should not be considered a precedent for other projects.

In consideration of all parameters associated with the current size, location, ecological integrity, protection status, local/regional significance and connectivity of REs proposed to be cleared for the project, the following minimum offset ratios are recommended to apply to all components of the project:

- zero offsets for 'least concern' (VM Act status) or 'no concern at present' (Biodiversity status) REs
- 1:2 offsets for 'of concern' REs (VM Act status and/or Biodiversity status)
- 1:3 offsets for 'endangered' REs (VM Act status and/or Biodiversity status)

In light of current offset policies, these ratios could need to be increased as the ecological integrity, protection status, contiguity, RE similarity and connectivity of proposed offset areas decreased and as the distance of the offset from the project increased.

On this basis, the minimum offset areas for those REs described in Tables 5.8.15, 5.8.16 and 5.8.17 should apply to each of the relevant components of the project.

Table 5.19: Minimum offset areas for REs likely to be affected by the MLA areas and gas supply pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
MLA areas					
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	22.6	67.8
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	5	15
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	290.4	580.8
Gas supply pipeline (not on MLA areas)					
11.3.25	remnant	least concern	of concern	1.1	2.2



Table 5.20: Minimum offset areas for REs likely to be affected by the southern CSM water supply pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	1.6	4.8
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	4.2	8.4
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains	remnant	of concern	of concern	2.8	5.6
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	1.9	3.8
11.3.27c Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species	remnant	least concern	of concern	0.3	0.6

Table 5.21: Minimum offset areas for REs likely to be affected by the Glebe Weir raising and pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
Glebe Weir					
11.3.1 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	remnant	endangered	endangered	3.9	11.7
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	0.3	0.9
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	110.1	220.2
11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains	remnant	of concern	of concern	341.4	682.8
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains	remnant	of concern	of concern	5.2	10.4
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	165	330
Pipeline					
11.3.1	remnant	endangered	endangered	0.3	0.9



RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
11.9.5	remnant	endangered	endangered	0.8	2.4
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	2.3	6.9
11.9.7 <i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	remnant	of concern	of concern	8.4	16.8
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	1.5	3
11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains	remnant	of concern	of concern	0.8	1.6
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	3	6

Of particular note, with respect to Tables 5.8.15–17 above, are my requirements in relation to the offset measures for the clearing of the following REs resulting from the construction of the project, as the regional Biodiversity Status of these REs is of more concern than that indicated by the VM Act status:

- RE 11.3.25 (*Eucalyptus tereticornis*/*Eucalyptus camaldulensis*)—291.5 ha, 1.9 ha and 168 ha to be cleared for the construction of the MLA areas, southern CSM water pipeline option and Glebe Weir raising and pipeline option, respectively
- RE 11.3.27c (palustrine wetland)—0.3 ha to be cleared for the construction of the southern CSM water pipeline option
- RE 11.9.10 (*Eucalyptus populnea*/*Acacia harpophylla*)—2.3 ha to be cleared for the construction of the Glebe Weir raising and pipeline option.

This is because there are a smaller proportion of these REs remaining in this bioregion than for the State of Queensland as a whole.

For infrastructure proposed off the MLA areas, including the Glebe Weir raising and supply pipeline and the southern CSM water supply pipeline, any clearing of assessable vegetation associated with the project must also meet the requirements of the:

- *Vegetation Management Act 1999*
- Regional Vegetation Management Code for Brigalow Belt and New England Tablelands Bioregions—version 2 (6 November 2009)
- Policy for Vegetation Management Offsets—version 2.4 (21 October 2009).

In addition to the above offset requirements for the clearing of remnant REs, the clearing of 'high value regrowth' vegetation outside the MLA areas for infrastructure such as the water supply pipelines would need to be undertaken in accordance with the requirements of the Regrowth Vegetation Management Code current at the time of clearing.



5.8.5.4. Uncertainty about other resource tenures over offset areas

In its submission on the SEIS, DEWHA considered that any proposed offsite offset should be protected in tenure in perpetuity to avoid being disturbed in the future (including future mining) to ensure long-term management.

There is potential for the tenure of the proposed offset lands, as identified in the Draft Biodiversity Offset Strategy, to be subject to future applications for development under the *Mineral Resources Act 1989* and the *Petroleum and Gas (Production and Safety) Act 2004*, hence affecting their protection status for vegetation offsets.

A vegetation offset would normally be expected to have protection from development in a way that would see the area managed sustainably for an indefinite period. It is desirable that some form of conservation status be pursued over the offset lands, as this would provide some protection from development other than mining or petroleum development. However, due to the prior existence of resource tenures over the land, nature refuge agreements cannot be relied upon to deliver absolute security for the proposed offset lands.

It may be some years before the fate of the proposed project offset lands become known. Should the proponent's offset lands be proposed to be cleared in the future by another holder of underlying mining or petroleum tenures, then that tenure holder would also be required to provide additional offsets for that particular clearing. Should this situation arise, then it is appropriate for the situation to be resolved by the relevant stakeholders in accordance with the prevailing statutory and policy requirements at that time.

5.8.6. Conclusion—terrestrial ecology

The majority of vegetation communities on the project site are generally highly modified and in poor condition.

With the exception of Belson's panic (*Homopholis bensonii*), no state-listed threatened terrestrial flora species are present on the site of the proposed MLA areas, southern CSM water supply pipeline option or Glebe Weir and pipeline option.

Based on the findings of the EIS and SEIS, it is unlikely that significant adverse impacts on the majority of state-listed threatened flora and fauna species would occur, and that the mitigation measures proposed for each of the project components would be adequate to minimise potential adverse impacts to those listed threatened species to an acceptable level.

Notwithstanding this, it is likely that minor adverse residual impacts would occur to 13 threatened fauna species as a result of construction and/or operation of the Glebe Weir raising and pipeline option of the project. Also, it is likely that impacts on native vegetation would occur as a result of construction of the MLA areas and southern CSM water supply pipeline and Glebe Weir raising and pipeline options.

The commitment by the proponent to prepare and implement a Biodiversity Offset Strategy, in consultation with relevant agencies, to address the requirements of state and Commonwealth legislation and policies for offsets is acknowledged. A condition is recommended that requires the final approval of the Biodiversity Offset Strategy by DERM and SEWPaC (Condition 6, Schedule 8).

To reduce the net residual adverse impacts to those threatened species and REs to an acceptable level, conditions are recommended regarding environmental offset requirements to be included in the Biodiversity Offset Strategy (Condition 6, Schedule 8).

The commitments made by the proponent to undertake additional and ongoing management activity to mitigate impacts to state-listed flora and fauna species are also acknowledged. To confirm these commitments, a condition is imposed that requires more detail on the proposed mitigation measures outlined in the EIS (chapter 17B, Volumes 1 and 2) for the MLA areas and southern CSM water supply pipeline, to be included in the relevant environmental management plans (Condition 10, Schedule 8).

The Commonwealth Government may also set its own requirements with respect to potential impacts to EPBC-listed threatened species and communities that are MNES that occur on the site of the proposed MLA areas, southern CSM water supply pipeline option or Glebe Weir and pipeline option (see section 8 of this report).



The combined strategies put forward in the EIS, SEIS, draft EM Plans and proposed in this report (subject to finalisation and approval by relevant agencies), which include offsetting of cleared REs and the habitat of threatened NC Act-listed species, and ongoing management of threatening processes within offset areas and retained habitats, are considered adequate to offset and/or manage the potential adverse impacts of the project on terrestrial ecology.

5.9. Aquatic ecology

5.9.1. MLA and gas supply pipeline areas

5.9.1.1. EIS findings, submissions and analysis

This section on aquatic ecology should be read in conjunction with section 5.5 of this report on water supply and management and section 5.6, Groundwater.

Major creeks within the MLA area include:

- Spring Creek and Mud Creek (MLA50229)
- Halfway Creek, Frank Creek, Two Mile Creek and Juandah Creek (MLA50230)
- Blackant Creek, Wandoan Creek and Woleebee Creek (MLA50231)

The major creeks (and their tributaries) crossed by the gas supply pipeline route include:

- Stakeyard Creek
- Roche Creek
- Juandah Creek.

Aquatic flora and fauna surveys and collection of water quality data was undertaken for both the MLA areas and gas supply pipeline route—during the late wet season (March 2008) and early wet season (January/February 2009) for the MLA areas, and during the late dry season (August 2008) and early wet season (February 2009) for the gas supply pipeline route.

The EIS reported that the biological values of aquatic ecosystems within the study areas are relatively low and consistent with those of the wider Dawson River Catchment. Environmental values are influenced primarily by the ephemeral nature of the waterways and agricultural development (principally grazing) within the region, which has significantly influenced water quality and the physical characteristics of aquatic habitat. Degraded creeks in the study area are characterised by riparian vegetation loss, erosion, invasion of weed species, poor water quality and sedimentation.

Water quality is generally poor and is characterised by high turbidity and variable dissolved oxygen levels, which are typical of the region. Biodiversity is relatively low, with only fish and macro-invertebrate species that are tolerant of varying and often harsh conditions inhabiting the study areas. Nevertheless, creeks within the MLA areas and along the gas supply pipeline do provide 'upstream' dispersal habitat for the fish species that were recorded in the study areas (and possibly breeding habitat for some species).

Both palustrine (marshy) and lacustrine (lake) wetlands were identified by DERM's wetland mapping program. Lacustrine wetlands within the study areas are likely to be farm dams, with none of the wetlands within the study areas recognised by DERM as being of national, state or regional significance. The Fitzroy Basin does not drain into Shoalwater Bay, but drains into Keppel Bay. However, Keppel Bay forms part of the Shoalwater and Corio Bay Ramsar wetland site. The EIS concluded that the project is not expected to result in a significant impact on the Coria Bay Ramsar wetland.

No rare or threatened species of aquatic flora or fauna have been recorded from, or are likely to occur in, the waterways of the study areas.

1311 fish from twelve species were captured across sites surveyed in the early wet season survey, with abundance in on-stream pools generally less than 50 fish at any one site. Notwithstanding this, 144 and 101 fish were caught in Woleebee Creek and Juandah Creek respectively. The greatest number of species were caught both in the early and late wet season surveys at Junadah Creek



downstream of the MLA areas, which is close to the perennial waters of the Dawson River (approximately 2km downstream). In the gas supply pipeline area, 181 fish from five species were captured across the three sites surveyed in the early wet season survey.

Only one species of turtle, Krefft's river turtle (*Emydura macquarii krefftii*), was captured or observed in the MLA areas study area. No turtles were caught or observed at any of the sites within the gas supply pipeline study area.

The EIS and SEIS identified the following activities associated with the construction and operation of the project as having the potential to impact on aquatic ecology:

- the loss of catchment area
- seven creek diversions resulting in a loss of riparian and aquatic habitat, including:
 - 2500 m diversion of Spring Creek, commencing construction in Year 9
 - 970 m diversion of an unnamed tributary of Spring Creek, commencing construction in Year 9
 - 9100 m diversion of Woleebee Creek, which will also carry water from Wandoan Creek and Blackant Creek, commencing construction in Year 10
 - 5400 m diversion of an un-named tributary to Woleebee Creek (at the east of Mud Creek Pit on MLA 50229) commencing construction in Year 14
 - 2900 m diversion of Frank Creek, commencing construction in Year 15, proposed in two stages
 - A diversion of Mud Creek, commencing construction in Year 17
 - A diversion of Mount Organ Creek, commencing construction in Year 18
- construction of creek crossings for the access road, haul roads, conveyors, rail spur and the gas supply pipeline
- management of stormwater runoff and worked water, including creation of sediment, environmental, raw water, catchwater and tailings dams
- management of sewage
- the operation of mining equipment and vehicles, and other plant and equipment
- vegetation clearing and earth moving.

In its submission on the EIS, DERM raised concerns that the proposed disturbance of catchments and watercourses in the MLA areas associated with construction and operation of the project could have a significant impact on the in-stream ecology of these watercourses.

DERM advised that, while the proposed conditions of the EA as discussed in section 5.5 of this report will assist in protecting stream water quality and ecology, additional monitoring is warranted to adequately detect and manage impacts on the in-stream ecosystem.

The SEIS noted that the waterways in the study areas provide important fish habitat and that the creeks proposed to be diverted provide a movement/migration pathway for aquatic fauna. The proponent has committed, in Chapter 28 of the SEIS, to mitigation measures including the capture and translocation of turtles and fish potentially stranded as a result of construction activities.

5.9.1.2. Conclusion—aquatic ecology – MLA and gas supply pipeline areas

The proponent's assessment that the diversion of creek channels and the construction of creek crossings, which can affect fish movement, have the potential to result in the greatest localised impact to the aquatic environment is acceptable.

Also, the proponent's conclusion that it is highly unlikely that the project will have an impact on any threatened aquatic species or ecological communities is acceptable, as these species and communities are unlikely to occur in the waterways of the MLA areas or along the gas supply pipeline route.



In consultation with DERM, a condition is imposed that requires the proponent to design and implement an Aquatic Ecosystem Monitoring Program for the duration of the project (Condition 8, Schedule 1). The program should be able to detect if the ephemeral streams downstream of the mine are subject to an increase in the concentration of contaminants.

5.9.2. Southern CSM raw water pipeline option

5.9.2.1. EIS findings, submissions and analysis

This section should be read in conjunction with section 5.5 of this report, Water supply and management and section 5.6, Groundwater.

The EIS found that observed watercourse sites along the proposed southern CSM water supply pipeline alignment typically have extensive bank erosion, low habitat variability and substrates dominated by finer sediments such as sand and silt. The EIS concluded that the environmental values of the aquatic ecosystems along the route alignment are relatively low and consistent with those of the region generally. The ephemeral nature of waterways in the area and agricultural development (particularly grazing) influence existing water quality and the physical characteristics of the aquatic habitat.

The EIS also found no rare or threatened species of aquatic fauna to occur along the alignment of the pipeline.

The proponent advised in the SEIS that the northern section of the proposed corridor for the southern CSM raw water supply pipeline was re-aligned following submissions on the EIS. The SEIS also concluded that the waterways crossed by the re-aligned northern portion of the pipeline route are small order streams that do not contain any significant habitat. Accordingly, the SEIS stated that the likely consequence of impacts to these habitats is considered to be ecologically insignificant in a local and regional context.

The proponent proposed mitigation measures to manage the risk of potential impacts on the aquatic environment from spillage of fuels and other contaminants, vegetation clearing and earth moving, construction of creek crossings, spillage of CSM water and the potential creation of mosquito breeding habitat.

5.9.2.2. Conclusion—southern CSM raw water pipeline

The proponent's conclusion in the EIS and SEIS that construction and operation of the possible pipeline would not significantly impact aquatic flora, fauna or habitats, is acceptable, provided that proposed mitigation measures identified in the EIS and SEIS are adopted.

5.9.3. Glebe Weir Raising and raw water pipeline option

5.9.3.1. EIS findings, submissions and analysis

This section should be read in conjunction with section 5.5, Water supply and management, section 5.6, Groundwater and section 8, Matters of national environmental significance. Section 5.5 refers to the possible use by Sunwater of a fabridam to enable the raising of Glebe Weir, and the review on the use of fabridams following an incident involving a fabridam at Bedford Weir on the Mackenzie River.

As noted in the SEIS (Volume 4, Section 5.1.1) the manner of raising the dam (either by fabridam, steel shutter or some other method) would make little material difference to the assessment of impact because each method would result in almost identical changes to the flow regime. Hence the full supply level (FSL) is the same for all methods of weir raising so all environmental effects would be the same.

Desktop analysis conducted for the EIS identified the Fitzroy River turtle (*Rheodytes leukops*) as potentially occurring within the study area for all components of the project. This aquatic fauna species is EPBC-listed as vulnerable under the NC Act and EPBC Act,

The Fitzroy River turtle is typically found over a large range of permanent riverine habitats within the Fitzroy River catchment. It is not usually found in smaller streams due to a lack of permanent water. The EIS (Volumes 1 and 2, Chapter 17B) reported that no turtles were observed or captured and no



suitable habitat was observed during surveys of the MLA areas or along the proposed southern CSM water pipeline route.

The EIS (Volume 4, Chapter 13) reported that the Fitzroy River turtle has not been recorded from the Glebe Weir pool or within 100 km, however the EIS acknowledged that there is a possibility that it may occur in the area as the Dawson River is permanent in this area. SunWater has recently been informed that DERM staff have seen a photograph of a Fitzroy River turtle, which the photographer said was taken at Glebe Weir. This single anecdotal record does not alter the basic assumptions of the EIS. The EIS noted that the area of the Fitzroy River in which the Fitzroy River turtle currently nests most intensely is the headwaters of the Fitzroy Barrage Weir pool, concluding that the core nesting area of the species is several hundred kilometres downstream.

The EIS found that construction impacts primarily relate to physical disturbance in the weir area as pipeline creek crossing sites are very likely to be dry during construction thereby avoiding downstream impacts. Any impacts are expected to be short-term and localised.

The larger weir pool would provide similar habitat to existing conditions but with colder water of low dissolved oxygen content over a slightly larger area. The shallow expanse of water expected to be created off Cockatoo Creek is likely to favour a number of flora and fauna species including floodplain-breeding fish.

The EIS concluded that, while changes in the length of river inundated were acknowledged and there would be an increase in deep inhospitable areas, there would be a net increase in diversity of habitat because of that offered by the over-bank areas of Cockatoo Creek and Boggomoss Creek.

The EIS also noted that the area of catchment upstream of Glebe Weir was 23 180 km² while the increased inundation area of the weir would represent 901 ha.

In regard to discussions with DEEDI (formerly Department of Primary Industries and Fisheries) about possible provision of fishways, the SEIS advised that discussions between SunWater and DEEDI have confirmed that the preferred option is to retrospectively fit a fishway on the Tartus Weir on the Mackenzie River but not have a fishway on the Glebe Weir.

As the proponent is proposing to use underground (trenchless) pipeline installation techniques (such as drilling) for crossing of larger creeks holding water, impacts during construction of the pipeline will be minimised and no impact is expected during the operation phase of the pipeline.

5.9.3.2. Conclusion—Glebe Weir raising and pipeline

The current review by DERM of use of fabric dams may influence the physical design of the possible raising of the Glebe Weir.

With respect to Fitzroy River turtle, page 13-39 of Volume 4 of the EIS concluded that no impact was expected. Assessment of significance according to EPBC criteria was presented on page 14-30 of Volume 4 of the EIS and a significant impact was not considered likely according to any criteria. SunWater has suggested that the possible recent, anecdotal record of a single Fitzroy River turtle in Glebe Weir does not alter the assessment of significance. Therefore, there would be no significant adverse impacts to the Fitzroy River turtle resulting from the construction and operation of the raised Glebe Weir and pipeline.

The proponent's assessment that the impacts on aquatic ecosystems associated with the raising of the Glebe Weir and water supply pipeline are unlikely to be significant, is acceptable, provided that appropriate mitigation measures identified in the EIS and SEIS are adopted as proposed by the proponent.



5.10. Noise and vibration

5.10.1. MLA areas and gas pipeline

5.10.1.1. Noise

EIS findings, submissions and analysis

The proponent undertook an assessment of construction and operational noise and vibration for the project were included the findings as EIS Chapter 15 (Noise) and Chapter 16 (Vibration) in Volume 1: MLA Areas and Surrounds Impact Assessment.

The EIS established that construction and operation of the project will be carried out in rural areas that typically have low levels of background noise and vibration.

The EIS correctly asserted that the development of the open-cut coal mine and associated mine infrastructure including the potential gas supply pipeline will introduce new noise and vibration sources into the existing rural environment.

The EIS outlined existing background noise of the mine site and surrounds and identifies potential construction and operation noise and vibration impacts (including blasting, and transport and traffic noise) associated with the project.

Sixty-two submissions were received by the Coordinator-General on the EIS from affected property owners, members of the public, non-government organisations and government advisory agencies.

In response, the proponent prepared a SEIS to respond to these submissions and update and refine the project's potential impacts, benefits and proposed mitigation actions. It also incorporated advances made by the proponent in planning for construction and operations, as well as additional assessments conducted because of changes to regulatory requirements for air, noise and water.

The findings were presented in the SEIS as Chapter 15 (Noise) and Chapter 16 (Vibration) in Volume 1: MLA Areas and Surrounds Impact Assessment.

Noise during construction

The proponent undertook an assessment of potential construction and operation impacts of noise (Chapter 15) for the proposed MLA areas and surrounds, which includes the mine, coal handling and processing plant, workshops, train load-out facility, and related facilities within the proposed mining lease areas.

As no specific criteria are outlined in the environmental protection documentation for noise emissions from construction activities, and due to the low levels of expected noise and the short-term duration of activities at each working site, the proponent conducted a qualitative assessment.

The proponent had regard to the Environmental Protection (Noise) Policy 1997, the revised EPP (Noise) 2008 and the EP Act. Likely sources of noise were identified from Chapter 5 (Project Construction) and Chapter 6 (Project Operation), and nearest sensitive places were identified from field inspection and aerial photographs.

Due to the rural environment and relatively low level of development in the district, sensitive places (i.e. residential dwellings, commercial properties, community facilities) currently experience minimal background noise levels, especially during the night time period. Background noise logging was undertaken from March 2008 and analysed to determine applicable noise criteria which was proposed as an allowable LAeq, 1hr noise level to be emitted from the project. Monitoring locations included N1 Nathan Road, N2 Wodonga (a rural property) and N3 Wandoan Town. Average Leq (dBA) during the day ranged from 39 dBA at the monitoring site located in the township of Wandoan, to 48 dBA at Nathan Road, with the range from 32 dBA to 38 dBA at the same locations at night.

The EIS reported that existing noise sources in the area consist predominantly of traffic noise along the Leichhardt Highway, with evening and night time noise likely to be influenced by insects at rural locations. Other noise sources in the town area consist of a timber mill, cattle trucking station, and a grain silo facility, although the timber mill and grain silo are unlikely to add to night-time noise levels.



Assessment of both construction noise as well as operational noise impacts for mine operational years 1, 5, 10, 20 and 30 were then modelled and outlined in the EIS.

Construction activities generally include building activities associated with construction of machinery and infrastructure, such as building of the dragline, the coal handling and preparation plant, the optional power station and gas pipeline, conveyors, stockpile areas and water treatment upgrades, construction of buildings, haulage road construction and rail spur construction. These construction activities are to be undertaken over a two to three year period and will be confined to areas located centrally within the MLA areas and as such are evidenced in the EIS to have minimal impact on sensitive places, as they are typically located at a distance of approximately 5 km.

Development of the rail spur line and gas supply pipeline may impact nearby receptors, though evidence indicates that the impact will be minimal and of a short duration.

Other off-site infrastructure and activities were also considered as part of the EIS assessment. These include:

- wastewater treatment plant at Wandoan
- potable water treatment plant at Wandoan
- gas supply pipeline connection to the lateral Peat-Scotia Gas Pipeline
- construction haulage traffic along the Leichhardt Highway.

The EIS indicates that these activities will be undertaken within the allowable noise limits applied to relevant development applications, with limits applied to the time of the day construction activities are to be undertaken.

Off-site (to the MLA areas) construction will also be required for the potential development of the airstrip and that the location of the airstrip has not been finalised. A separate noise study will be carried out for this operation once the location is decided. This study will require details of aircraft models to utilise the airstrip, predicted aircraft takeoff and landing frequency, flight path predictions and runway specification. Assessment of airport and civil aviation operational requirements for the project and subsequent approvals relating to this aspect of the project will be dealt with pursuant to approvals required under Commonwealth legislation—*Airports Act 1996, Civil Aviation Act 1988* and *Civil Aviation Safety Regulation 1998*.

Noise during operation

Operation of the mine will be undertaken 24 hours per day seven days per week. Noise generating activities from the project include noise emissions associated with the following mining infrastructure and equipment:

- mobile equipment including dump trucks, water trucks, graders, dozers
- draglines
- coal handling and preparation plant, including coal processing plant, conveyors, reclaimers
- trains on the rail spur
- potential on-site power station
- wastewater treatment plant
- potable water treatment plant
- potential airstrip.

For consistency, noise associated with rail movements was modelled and provided by the proponent of the Surat Basin Rail project, and while being incorporated into the modelling for this overall project, and discussed in this document, the approval conditions for construction and operation of the Surat Basin Rail project are part of a separate approvals process.

Similarly, assessment and approval for the operation of the proposed airstrip is not part of this evaluation report.



The EIS reported that there were 38 properties in the vicinity of the MLA areas. The locations of these properties are shown in Figures 15-2-V1.3 and 15-3-V1.3 of the EIS.

The closest sensitive noise receptors to the site were several residences and an abattoir located within the mining leases, all of which have been subsequently purchased by proponent.

Seven other residences are located within 500 m of the mining leases including six residences within Wandoan.

The proponent has already purchased a number of sensitive places near the mine.

Potential impacts from the mining activities were assessed by modelling based on-site specific and project specific information, as discussed in EIS Volume 1, Chapter 15 (Noise), section 15.2.4, and was conducted using a virtual model of the development during six different operating scenarios. The noise levels in Wandoan township and surrounding sensitive receptors were shown in Figures 15-4-V1.3 to 15-7-V1.3, with updated noise contours from the revised mining plan shown in Figure 15-4-SV1.3 to 15-8-SV1.3 of the SEIS. The noise predictions show that noise levels within Wandoan will be within the EPP (Noise) developed assessment criteria of 35 dBA_{Leq, 1 hour}.

The EIS concluded that based on the results of the noise modelling, minor exceedences were predicted at various receptors using sound power data for mining equipment in standard specification, without specific noise control treatments fitted. However, through the use of noise attenuation measures on appropriate mining equipment, the emitted noise levels can be controlled to within allowable limits for 24 hour operation at most receptors.

The EIS proposed that regular review of noise monitoring results be carried out at sensitive place MLA-378 at Nathan Road throughout the whole project life due to predicted levels being close to or slightly exceeding the night time design criteria, with regular on-going monitoring to be undertaken at the most exposed receptors during each operating scenario.

The proponent proposes to mitigate and manage noise impacts on sensitive places by implementing a combination of management actions that include:

- a Noise Management Plan with triggers for management actions based on allowable noise criteria under the Environmental Authority
- the use of lower noise and noise attenuated machinery in specific mining pits during respective operational scenarios
- noise monitoring program
- meteorological forecasting system
- community hotline for reporting of any noise related incidents and complaints management process.

In response to a public submission on the SEIS concerning the impact of spur rail noise on the peaceful conduct of funeral service undertaken at the Wandoan cemetery, the proponent has committed to developing a protocol with the WDRC to schedule funerals in between train schedules and exclude blasting activities that have the potential to impact on the cemetery during funeral services.

Conclusion—MLA areas and gas pipeline— noise

Approximately 10 per cent of all submissions on the EIS raised concerns about noise and vibration. Many of these were Wandoan residents concerned about the potential impacts of mine blasting vibration on the structural integrity of buildings in the town.

The SEIS sufficiently incorporated advances made by the proponent in planning for construction and mining operations, as well as additional assessments conducted because of changes to regulatory requirements for air, noise and water.

The additional attenuation methods proposed by the proponent in the SEIS (Volume 1, Chapters 27 and 28), including measures committed by the proponent and included in the EMP and the triggering of a Noise Management Plan if noise levels at any sensitive place exceed 35 dBA are sufficient to adequately manage issues of noise during the construction of the mine component of the project.



The Wandoan township (at its centre-point) is located approximately 750 m to the east of the MLA areas site boundary, but some residences within the town are situated within 600 m of this boundary. Notwithstanding the proximity of the township to the mine, the proponent has undertaken to not conduct mining operations within 2 km of the centre of the town within the first three years of operation of the project (refer to Condition 2 Schedule 8).

5.10.1.2. Vibration

EIS findings, submissions and analysis

Vibration includes the impact of operating machinery, as well as effects arising from blasting such as ground vibration, airblast overpressure and flyrock.

Vibration during construction

The proponent undertook an assessment of potential construction and operation impacts of vibration (Chapter 16) for the MLA areas. As there are no established vibration criteria in Queensland for the assessment of construction and operational vibration, other applicable criteria provided in other Australian states and International standards were used for assessment purposes and are as follows:

- NSW Criteria Assessing Vibration: a technical guideline, 2006
- German Standard DIN 4150-3: 1999 Effects of vibration on structures, 1999
- British Standard BS 6472 'Evaluation of exposure to vibration in buildings', 1992.

Likely sources of vibration were identified from Chapter 5 (Project Construction) and Chapter 6 (Project Operation), and nearest sensitive places were identified from field inspection and aerial photographs.

These standards were used to establish criteria for maximum permissible vibration levels for peak particle velocities (PPV) levels for allowable human vibration and effects of vibration of structures as outlined in Chapters 16.2.3 and 16.2.4.

The main generators of vibration from construction works are likely to be:

- heavy machinery (dozers, excavators and cranes) used for clearing, excavating, pipe laying, backfilling and rehabilitation
- concrete delivery trucks and concrete pouring for thrust blocks and similar structures
- portable generators and grinders
- rock cutters if required.

Thirty-eight potentially sensitive places were identified from aerial photographs. The nearest place is approximately 600 m away from the MLA areas. No ambient vibration monitoring has been carried out at the sensitive places as no significant sources of ground vibration are present within their vicinity. Sufficient buffer zones are present between any sensitive places and roadway and railway corridors to sufficiently attenuate any vibration transfer.

Vibration levels from construction activities were modelled at the nearest sensitive places and are not expected to exceed the allowable levels due to the large propagation distance between the source and place (minimum distance between place and pipeline route is 600 m). Typical vibration peak particle velocities (PPV) levels from construction equipment are shown in Table 16-6 of the EIS including a predicted vibration transmission at a distance of 100 m. The predicted values satisfy the criteria for allowable human vibration and effects of vibration on structures at a distance of 100 m as outlined in Chapters 16.2.3 and 16.2.4. The increase in propagation distance from 100 m to 600 m, means that values at 600 m are likely to be significantly lower.

The proponent states, in Chapter 16.5.1, that 'no blasting is likely to be required for the construction phase'.

Vibration during operation

Operation of the mine will be undertaken 24 hours per day seven days per week.



The main generator of vibration will be blasting which is required to fracture overburden and allow loading by draglines and shovels.

Other, and relatively minor, vibration generating activities from the project include vibrations associated with the following mining infrastructure and equipment:

- mobile equipment including dump trucks, water trucks, graders, dozers
- draglines
- coal handling and preparation plant, including coal processing plant, conveyors, reclaimers
- trains on the rail spur.

For consistency, vibration associated with rail movements was modelled and provided by the proponent for the Surat Basin Rail project, and while being incorporated into the modelling for this overall project, and discussed in this document, the approval conditions for construction and operation of the Surat Rail Basin project are part of a separate approvals process.

Due to the relatively low magnitude and long distances from receptors, the vibration from the operation of infrastructure and equipment (other than blasting) is so low that further consideration is deemed unnecessary. The remainder of my assessment will therefore focus upon blasting and related issues.

The proponent drew blasting criteria from the Environmental Protection Agency (EPA) guideline: *Noise and Vibration from Blasting* (EPA, 2006) (the Blasting Guideline). These criteria are more restrictive than those defined in the Environmental Protection Regulation 1998. The EPA guideline lists recommended human comfort criteria relating to:

- ground vibration peak particle velocity (PPV)
- airblast overpressure level
- times of blasting

These criteria are listed in Chapter 16.2.1 as:

- Vibration criteria
 - The Blasting Guideline recommends that ground-borne vibrations caused from blasting operations will not exceed:
 - a PPV of 5 mm/s for nine out of any ten consecutive blasts initiated, regardless of the interval between blasts
 - a peak velocity of 10 mm/s for any blast.
- Noise criteria
 - The Blasting Guideline recommends that air blast over pressure from blasting operations will not exceed:
 - 115 dB(linear) peak for nine out of any ten consecutive blasts initiated, regardless of the interval between blasts
 - 120 dB(linear) peak for any blast.

Times of blasting

- The Blasting Guideline recommends blasting only occur during the hours of 9 am to 5 pm Monday to Friday, and from 9 am to 1 pm on Saturdays, with blasting not taking place on Sundays or public holidays.

Conclusion—MLA areas and gas pipeline – vibration

Overall, the vibration assessment demonstrated that impacts from the construction phase of the project will be within the required levels at all sensitive places, however, the project's mining activities have the potential to impact some sensitive places, during the operating phase of the mine.



Through the development and implementation of a construction environmental management plan and Noise Management Plan as part of the project EMP, noise and vibration impacts will be adequately addressed. Moreover, in consultation with DERM, conditions are stated for activities on mining leases (Conditions D1 to D20, Schedule 3), that require the proponent to monitor, measure and mitigate noise, vibration and blasting impacts.

Noise monitoring of the receiving acoustic environment is required, to ensure adherence to the noise limits, and where these are exceeded, measures are required to be undertaken, including addressing and resolving complaints and immediately implementing noise abatement measures. Therefore in consultation with DERM, conditions are stated to this effect (Condition D8, Schedule 3, Appendix 1)

In response to submissions on the EIS, in the SEIS (Chapter 15.4) the proponent discussed the likely noise impact on the town of Wandoan from operations in the Frank Creek Pit, and proposed that a non-mining buffer zone be established with a radius of 2 km from the centre of the town until year five.

A number of submissions on the EIS addressed the issue of noise and vibration so a condition is recommended (Condition 1, Schedule 8) to the effect that no mining activity of any type must occur during the life of the project at any point which is located within a radius or distance of 2000 m measured in a straight line in any direction from the point at which the centre-line of Moore Street in Wandoan intersects with the centre-line of Lawton Street in Wandoan.

In consultation with DERM, conditions are stated for the EA (Conditions D9-D20, Schedule 3, Appendix 1) for the EA that require the proponent to monitor, measure and mitigate actual vibration and blasting impacts, especially where those are higher than those predicted by modelling undertaken for the EIS.

Conclusion—MLA areas and gas pipeline – noise and vibration

In consultation with DERM, conditions are stated for the EA (Conditions D1–D20, Schedule 3) that require the proponent to monitor, measure and mitigate actual noise, vibration and blasting impacts, especially where those are higher than those predicted by modelling undertaken for the EIS.

In addition, a recommendation is made that the proponent treats the proposed accommodation village as a sensitive place for the purpose of noise and vibration monitoring required under Conditions D1 to D20 (Recommendation 7, Schedule 9).

5.10.2. Southern CSM water supply pipeline

5.10.2.1. Noise

EIS findings, submissions and analysis

The proponent undertook an assessment of potential construction and operation impacts of noise (Volume 1, Chapter 15) for the proposed southern coal seam methane (CSM) water supply pipeline. As no specific criteria are outlined in the environmental protection documentation for noise emissions from construction activities, and due to the low levels of expected noise and the short-term duration of activities at each working site, the proponent conducted a qualitative assessment.

The proponent had regard to the Environmental Protection (Noise) Policy 1997, revised EPP (Noise) 2008 and the EP Act. Likely sources of noise were identified in the EIS (Volume 1, Chapter 5) and nearest sensitive receivers were identified from field inspection and aerial photographs.

Noise during construction

The main generators of noise from pipeline construction works are likely to be:

- heavy machinery (dozers, excavators and cranes) used for clearing, excavating, pipe laying, backfilling and rehabilitation
- concrete delivery trucks and concrete pouring for thrust blocks and similar structures
- portable generators and grinders
- rock cutters, if required.



Twenty-four potentially sensitive places were identified from aerial photographs along the pipeline route. The nearest place is approximately 100 m away from the pipeline. The acoustic environment of most of the potentially sensitive places is already influenced by their proximity to the Leichhardt and Warrego Highways, the Great Western Railway and the Miles township.

Construction noise impacts will relate to each phase of works but each is of short duration (about seven working days) in the vicinity of each site as work progresses along the line. Stock pile sites will be selected away from the vicinity of any sensitive places.

The proponent proposed that work will be restricted to the hours of 6:30 am to 6:30 pm on weekdays and Saturdays with no work at all on Sundays or public holidays, unless approved in consultation with the administering authority of the EPP (Noise).

The proponent had regard to Section 11, including sub-section 1, of the EPP (Noise) which provide a numerical value to determine an *acoustical quality objective* for residential areas. This is the objective of achieving an ambient level of L_{Aeq} 55 dBA or less when measured over 24 hours outside a dwelling. The proponent also had regard to *AS 2438-01981 Guide to noise control on construction, maintenance and demolition-sites*.

Noise logging at Site N1 (Nathan Road) near Wandoan (approximately 400m from the Leichhardt Highway reflected a daytime Average L_{eq} dBA of 48, while Site N2 (Wodonga) which is described as very rural, with no traffic noise contribution, recorded a daytime average L_{eq} dBA of 45.

Construction of the CSM pumping station proposed to be erected adjacent to the existing.

The proponent has committed to developing a Noise Management Plan which will include:

- the use of temporary structures or screens will be used where required to limit noise exposure to meet noise goals when construction occurs within 500 m of the affected sensitive places
- noise logging will be carried out at the affected noise sensitive places when the construction activities will be within 500 m of the dwelling.

A community consultation program will be undertaken.

Noise during operation

The main generator of noise from pipeline operation will be the water pumps installed at the pumping station at the beginning of the pipeline, adjacent to the Condamine Power Station.

The pumping station will comprise a number of gas powered engines of between 375 kW and 600 kW rating, operating 20 hours per day.

Detailed design of the pumping station will incorporate a suitable acoustic enclosure to attenuate noise emissions from each gas engine to no more than L_{Aeq} 85 dBA at 1 m, based on Workplace Health and Safety Regulation 2008. No other noise sources will be audible from this development.

The two nearest sensitive places are both approximately 2.5 km away from the site of the proposed pumping station, and the acoustic environment of both places is already influenced by their proximity to the Warrego Highways and the Great Western Railway.

Operation of the CSM pumping station adjacent to the existing Condamine Power Station is not expected to impact upon any sensitive place.

Other noise associated with the operation will be due to inspection and maintenance of the pipeline and pumping station at intermittent times during the life of the project. This will concentrate predominantly around the pumping station unless repairs are required to the pipeline itself, where activities will occur in the access easement along the proposed pipeline route. The potential noise associated with these activities is expected to be minimal.



5.10.2.2. Conclusion—Southern CSM water supply pipeline – noise

The proponent has committed to developing a Noise Management Plan which will include:

- the use of temporary structures or screens will be used where required to limit noise exposure to meet noise goals when construction occurs within 500 m of the affected sensitive receptors
- noise logging will be carried out at the affected noise sensitive places when the construction activities will be within 500 m of the dwelling.

A community consultation program will be undertaken.

The implementation of a Noise Management Plan, when combined with the measures committed to by the proponent and included in the EMP, is sufficient to adequately manage issues of noise during the construction and operation of the CSM water supply pipeline.

5.10.2.3. Vibration

EIS findings, submission and analysis

The proponent undertook an assessment of potential construction and operation impacts of vibration (Chapter 16) for the proposed southern coal seam methane (CSM) water supply pipeline. As there are no established vibration criteria in Queensland for the assessment of construction and operational vibration, other applicable criteria provided in other Australian states and International standards were used for assessment purposes and are as follows:

- NSW Criteria Assessing Vibration: a technical guideline, 2006
- German Standard DIN 4150-3: 1999 Effects of vibration on structures, 1999
- British Standard BS 6472 'Evaluation of exposure to vibration in buildings', 1992.

Likely sources of vibration were identified from Chapter 5 (Project Construction) and Chapter 6 (Project Operation), and nearest sensitive places were identified from field inspection and aerial photographs.

These standards were used to establish criteria for maximum permissible vibration levels for peak particle velocities (PPV) levels for allowable human vibration and effects of vibration of structures as outlined in Chapters 16.2.1 and 16.2.2.

Vibration during construction

The main generators of vibration from pipeline construction works are likely to be:

- heavy machinery (dozers, excavators and cranes) used for clearing, excavating, pipe laying, backfilling and rehabilitation
- concrete delivery trucks and concrete pouring for thrust blocks and similar structures;
- portable generators and grinders
- rock cutters if required.

Twenty-four potentially sensitive places were identified from aerial photographs along the pipeline route. The nearest place is approximately 100 m away from the pipeline. No ambient vibration monitoring has been carried out at the sensitive places as no significant sources of ground vibration are present within their vicinity. Sufficient buffer zones are present between any sensitive places and roadway and railway corridors to sufficiently attenuate any vibration transfer.

Vibration levels from construction activities are not expected to exceed the allowable levels due to the large propagation distance between the source and receptor (minimum distance between receptor and pipeline route is 100 m). Typical vibration peak particle velocities (PPV) levels from construction equipment are shown in Table 16-4 of the EIS including a predicted vibration transmission at a distance of 100 m. The predicted values satisfy the criteria for allowable human vibration and effects of vibration on structures as outlined in Chapters 16.2.1 and 16.2.2.

In instances where the proposed pipeline is to traverse or intersect existing pipelines or other infrastructure easements, exact specifications of the infrastructure being affected will be acquired



from the respective operator to identify if any potential vibration issue will arise. The proponent does not expect that significant changes in the construction methodology will be required in those areas however lower vibration construction techniques will be implemented if required.

Vibration during operation

Any potential vibration levels expected to be associated with the operational phase of the pipeline will occur due to the operation of the pump station and will be limited to its immediate vicinity, adjacent to the Condamine Power Station.

The pumping station will comprise a number of gas powered engines of between 375 kW and 600kW rating, operating 20 hours per day.

The proponent states that mitigation measures related to the operation phase of the development will only be potentially installed at the pump station. Vibration isolation mounts can be incorporated into the pumps and other associated reciprocating machines with detailed specifications being outlined during the design phase.

The two nearest sensitive places are both approximately 2.5 km away from the site of the proposed pumping station, and the vibration environment of both places is dominated by vibrations from the Warrego Highway and the Great Western Railway line.

Operation of the CSM pumping station adjacent to the existing Condamine Power Station is not expected to impact upon any sensitive place.

Other vibration associated with the operation will be due to inspection and maintenance of the pipeline and pumping station at intermittent times during the life of the project. This will concentrate predominantly around the pumping station unless repairs are required to the pipeline itself, where activities will occur in the access easement along the proposed pipeline route. The potential vibration associated with these activities is expected to be minimal.

5.10.2.4. Conclusion—Southern CSM water supply pipeline – vibration

The Coordinator-General is satisfied that the measures committed by the proponent and included in the EMP, are sufficient to adequately manage issues of vibration during the construction and operation of the CSM water supply pipeline.

5.10.3. Glebe Weir raising and pipeline

5.10.3.1. Noise and vibration

EIS findings, submissions and analysis

SunWater on behalf of the proponent undertook an assessment of the existing noise and vibration environment that may be affected by the Glebe Option including the weir and pipeline works in both construction and operation phases. Potential impacts and measures to mitigate those impacts were identified and discussed.

SunWater had regard to the Environmental Protection Regulation and EPP (Noise). Likely sources of noise and vibration were identified from the EIS (Volume 4, Chapter 5, Description of Project), and nearest sensitive places were identified from field inspection and aerial photographs.

Glebe Weir

The main generators of noise from weir and weir pump station construction works are likely to be:

- dozers and excavators engaged in clearing, site preparation and levee construction
- heavy vehicle movements
- air compressors, jackhammers and concrete saws used to reshape the existing spillway and discharge apron
- small equipment such as angle grinders, portable generators and pumps



- sheet pile drivers used for pumping station foundation construction and possibly on the weir
- the concrete batch plant and associated activity.

The nearest homestead is approximately 3.3 km from the weir construction-site so distance will attenuate noise to a considerable degree.

Most of the construction work, except the control room building, will take place in the bed of the Dawson River so the existing weir structure and/or the stream bed and banks with their associated vegetation, will provide appreciable shielding.

Work will be restricted to the hours of 6:30am to 6:30pm on weekdays and Saturdays with no work on Sunday and public holidays.

Pipeline from Glebe Weir

The main generators of noise from pipeline construction works are likely to be:

- heavy machinery (dozers, excavators and cranes) used for clearing, excavating, balancing storage construction, pipe laying, backfilling and rehabilitation
- concrete delivery trucks and concrete pouring for thrust blocks and similar structures
- portable generators and grinders
- rock cutters if required.

Twenty-one homesteads have been identified within approximately one km of the pipeline route, with the closest homesteads approximately 200 m away. Consultation has been undertaken with the residents of the identified homesteads. Construction noise impacts will relate to each phase of works but each is of short duration in the vicinity of each site as work progresses along the line. Stockpile sites will be selected away from the vicinity of any sensitive places.

A balancing storage will be required on the highest point of the pipeline (on Nathan Road approximately 15.7 km south of the intersection of Nathan Road and the road to Eidsvold via Deearne) but no homesteads were identified within several kilometres of this location. This is a hilly and well treed area which will buffer construction noise.

The activity is mobile, with activities in any one area lasting from days to a week or more. Adverse impacts from noise will therefore be temporary.

Work will be restricted to the hours of 6:30am to 6:30 pm on weekdays and Saturdays with no work on Sunday and public holidays.

Other issues

The EIS (Chapter 11.4.2, Transport Noise and Vibration) stated that heavy vehicle traffic on the Leichhardt Highway is expected to increase by only 4–6 per cent for a period of about five months due to transportation of personnel and materials required for the Glebe Option.

The EMP (Chapter 21) concluded that there would be no adverse impacts on native or domestic (farmed) fauna due to noise or vibration.

The EMP provides a range of control strategies for noise and vibration that Sunwater will implement, including a combination of permanent and short-term (non-permanent/mobile) monitoring and validation of actual noise and vibration levels, and a public complaints register and reporting process.

SunWater states that it will not use blasting for the project.

Chapter 22 of the EIS (Summary of Commitments) sets out a number of the proponent's commitments which are derived from the mitigation measures referred to in the EIS and also the EMP, which SunWater proposes to incorporate into the construction contracts.



Conclusion—Glebe Weir raising and pipeline – noise and vibration

The measures committed to by the proponent and included in the EMP are sufficient to adequately manage issues of noise and vibration during the construction and operation of the Glebe Option.

5.11. Transport and traffic

5.11.1. MLA areas and gas pipeline

5.11.1.1. EIS findings, submissions and analysis

General description of transport infrastructure requirements

The EIS (Volume 1, Chapter 12) provided an overview of the road transportation requirements and a road impact assessment on the local road network and road users within the MLA areas and gas pipeline project area. Due to the interrelated construction transport impacts of the mine and pipelines, this section of the EIS included transport issues for coal handling and storage, coal transportation, air transportation, the proposed 500 000 tonne initial mining and impacts related to the MLA areas and water supply options.

Section 12.3.1 of the EIS (Volume 1) outlined that the region has well established road infrastructure. The Leichhardt Highway is located directly to the east of the Project area and connects Miles, Wandoan and Taroom. At the town of Banana, the Leichhardt Highway connects to the Dawson Highway which in turn connects to the Port of Gladstone.

To the south-east of the project, the Warrego Highway connects Miles to Toowoomba and continues further east to Brisbane.

The project area itself is traversed by a number of roads, most notably the Jackson-Wandoan Road, which is a state-controlled road. Road works have recently been undertaken on the Dawson Highway between Banana and Prospect Creek (reconstructed— completed November 2007), and on the Leichhardt Highway north of Wandoan (shoulder reseal—ongoing).

The EIS stated that the proposed coal pit locations would result in a number of temporary road closures, new sections of roads and road relocations within and adjacent to the MLA areas. Apart from the Jackson-Wandoan Road, these roads are local government controlled.

The mine would be accessed via a newly constructed access road which will intersect the Leichhardt Highway approximately 6 km to the north of the Wandoan Township. The mine access road will provide safe traffic movement to and from the mine site and also connect the accommodation facilities with the mine infrastructure area (MIA) via security facilities at the main gate to the mine site.

In Section 6.6.2 of the SEIS, the proponent outlined that with the addition of Wubagul Pit some realignment of the haul road network and the inclusion of a haul road bridge over the realigned Jackson-Wandoan Road had been considered. The proposed grade separated crossing would be similar to other haul road grade separated crossings in Queensland coal mine areas and would be built to appropriate design standards, particularly height and width clearances, and in consultation with DTMR. The proponent would also consult WDRC and the local community on the proposed crossing, and stock route access would be incorporated. An indicative design for the proposed haul road crossing was provided in Figure 6-49-SV1.3 of the EIS.

Generally, the remainder of the proposed haul road network would be as described within the EIS, with some minor realignments associated with Frank Creek Pit haul roads.

The mine access road would intersect with the Leichhardt Highway, would be generally formed and featured as described in the EIS, and built to DTMR standards (EIS, Section 12.7.1). However, the mine access road may traverse within and immediately north of the MLA boundary in lots 110 and 111 on plan FT487 and, if so, may require development approval under SPA.

As discussed in Section 6.5.2 of the EIS, product coal from the mine would be transported by rail to Gladstone port facilities for export. A rail spur from the MLA areas would connect into the proposed Surat Basin Rail (SBR) rail line to the north of the Wandoan township, which would require the construction of a new grade separated, rail line under a road bridge crossing of the Leichhardt



Highway. The design and construction of the bridge would be undertaken by the SBR Joint Venture, and therefore does not form part of the Wandoan Coal project. The rail spur and all necessary infrastructure extends approximately 250 m beyond the MLA boundary to join the SBR rail line.

Construction transport for construction workforce

The project would cause an increase in road traffic due to the construction workforce, which would be spread over six years of construction on the MLA areas. As outlined in the EIS and SEIS, the main form of traffic in the Wandoan region would be buses transporting the construction workers between the construction site and the proposed project accommodation facility. Separate development approvals are required for this accommodation facility.

During the two year mine construction period, an additional 13 251 vehicles trips per year (29 vehicles per day) will occur, and that an additional 6447 trips per year (14/day) will occur over the 30 year mine operation on the local highway.

Transport between the accommodation facilities and employees' home bases would not be provided by the proponent and the construction workforce is expected to organise its own individual travel arrangements. Based on estimates of the EIS, it is assumed that half the total workforce would be on-site at one time, with approximately 700 workers travelling to and from the project site during shift changes (during Year -1). The EIS states that a third of the workforce is likely to car pool, resulting in 460 private vehicles to and from the project site every 10 days (that is, the length of the shift roster).

The SEIS reiterated that the workforce is expected to organise its own transport between the accommodation facilities and employees' home bases. In the EIS, Chapter 24, Health and Safety, section 24.6.4, the proponent has committed to develop and implement a Fatigue Management Policy (for both the construction and operational workforce). The SEIS further stated that this policy may include measures such as requiring workers to stay for a set period following the end of a shift, as well as traffic and journey awareness training and monitoring.

In relation to road safety fatigue management, the proponent should provide further fatigue and road safety training and awareness programs to the project's workforce to reduce the incidence of fatigue related traffic accidents. A recommendation is made that the proponent investigate the feasibility of providing further fatigue and road safety training or awareness programs by consulting with the QPS (through the Staff Officer, Southern Police Region, Toowoomba) (Recommendation 4, Schedule 9).

Road haulage routes, oversized loads and gravel supply

The EIS stated that the main construction impacts of the project (including the mine and water supply option) would occur over a two year period, with some construction activities continuing over the first four years of mine operations. The haulage route for materials and plant equipment would be via the Warrego and Leichhardt Highways, primarily originating from Brisbane. Larger components, (such as transformers, draglines and parts for the coal processing plant) would be delivered from the Port of Gladstone and the haulage route would be via the Dawson Highway and Leichhardt Highway to the north of the MLAs. Haulage of materials and plant equipment coming from the Leichhardt Highway would be delivered by the new mine access road and stored on-site within the MLAs to enable internal distribution. The EIS stated that under the *Guidelines of Road Impacts of Development* (DMR, 2006), traffic impacts due to construction of the project are considered to be insignificant as the project contributes to increases in traffic levels of less than 5 per cent on the surrounding road network (EIS, Table 12-9).

The EIS indicated that over-sized haulage loads would be mainly associated with the construction phase of the project, spread over Year -2 and Year 4, and during the construction of additional draglines in Years 15 and 17. Also, during the operational phase of the project, some oversized loads are expected to be generated, depending on the equipment requirements of the mine for each operational year. Oversized loads for materials would follow the haulage routes, delivered from either Brisbane or the Port of Gladstone.

Special permits for transporting oversized loads on state-controlled roads would be required and the proponent has committed that all oversized loads are to conform to DTMR standards. All haulage contractors would be responsible to ensure suitable arrangements are made to meet compliance assessment. During the planning of project movements (and before construction commences), the



proponent would require the relevant contractors to liaise with DTMR and the QPS regarding oversize loads.

A local source for gravel material for road construction and concrete use, and sand for pipeline bedding, is planned to be sourced from the local region, within a 50 km radius. The proponent is investigating potential gravel sources to meet mine road requirements and that any such suitably located source would require approval from WDRC.

Bulk sampling and initial mining activities

Bulk sampling was conducted from April to June 2008, from a bulk sample pit developed in the late 1980s. The sample collected 47 000 tonnes within MDL 221, under EA 4489, which indicated coal seam conditions of the proposed Austinvale Pit.

A further bulk sample to collect 200 000 tonnes, which was planned to be conducted between late 2008 or early 2009 (as stated in the EIS), was delayed and the SEIS stated the sample is likely to be conducted in 2010. As confirmed by both the EIS and SEIS, the bulk sample works do not form part of the EIS assessment process. It is important to note that the proponent would apply for all required approvals, such as tenure related to MDLs, agreement on transport logistics for washing, and capacity at the wash facility. Discussions regarding the mine access road are ongoing between the Surat Basin Rail Pty Ltd and DTMR.

Should the mining leases be granted, the proponent has indicated the potential for initial mining trial activities to be conducted during Years -1 and -2. The initial mining trial would extract 500 000 tonnes of ROM coal, to conduct further market testing and acceptance from the existing bulk sample pit or the proposed Austinvale Pit North. As stated by the proponent in the EIS, any initial mining activities are to be conducted under the Plan of Operations and EAs associated with the granting of mining leases over MLA 50229, MLA 50230 and MLA 50231.

Operational transport

Operational workforce—by road

In the first year of project operations (Year 1), an initial workforce of 502 people is expected. Over the following three years (to Year 4), the number of operational employees is expected to increase to the full complement of staff and operators (including shut down personnel) of 844. From Year 4 onwards, the number of employees and operators will remain relatively constant. Shuttle buses would be provided for employees daily from the towns of Wandoan, Taroom and Miles.

Section 6.6.1 of the SEIS suggests that some of the operational workforce may come from or choose to live in Dalby and/or Chinchilla. While this is possible, given the relative distance from the mine site and associated health and safety considerations, the proponent has committed that these workers will not commute daily from these locations. Workforce personnel who live permanently in these towns and become employed at the mine will be accommodated in the accommodation facilities with other employees during their rostered shift and commute home at the end of their shift.

In the SEIS, the proponent has committed to monitor the geographical accommodation spread and commuting requirements of its operational workforce and liaise with the relevant government agencies, including WDRC and BSC if necessary.

Also, whilst the EIS stated that the proponent would implement a Fatigue Management Policy, the SEIS noted that this policy may include measures such as requiring workers to stay for a set period following the end of a shift, as well as traffic and journey awareness training and monitoring.

Operational workforce—by air

As discussed in both the EIS and SEIS, Section 6.6.4, the proponent is considering, as an option, flying workers to and from the site for the project operations. Two possible alternatives exist for providing air transport services during the operation of the mine. The air transport service option would transport employees in and out of the mine site during shift changes, within the project operation phase. Air transport would transport management personnel, shift employees and any emergency evacuations. The two alternatives for air transport are:



- upgrade of the existing public Taroom Aerodrome (owned and operated by BSC) or
- construction of a new public airstrip at Wandoan (owned and operated by WDRC).

The proponent is still considering both of these options, given community and council feedback received during the EIS public consultation process.

As noted in the EIS, the upgrade of the aerodrome would be the subject of a separate impact assessment and regulatory approvals process, including consultation with all relevant agencies and community organisations. Consideration of any road impacts associated with all passenger travel to and from the airstrip, would also be considered as part of the impact assessment.

The proponent stated in the EIS its preference for a new public airstrip at Wandoan, in regards to distance and time to transport workers to and from Taroom Aerodrome, including flow on benefits to the Wandoan community.

If either of these air transport options are not implemented then transportation by bus would be the preferred option, which was assessed in the EIS.

The establishment of a new airstrip at Wandoan is generally supported due to the immediate benefits to Wandoan, including quicker travel times, emergency travel to Brisbane and major coastal centres for the local community and mine employees. As well as improving access for the community to medical facilities, employment opportunities and social activities that are not currently available for the Wandoan and surrounding areas. A number of submissions on the EIS from local members of the community, as well as the WDRC, support a new airstrip being built close to the township of Wandoan, and the WDRC will support in financial terms with its development should it be chosen to proceed.

If a new airstrip at Wandoan is developed, it will be located adjacent to the mine site with public road access that is not on an area of existing remnant or regrowth vegetation or over an existing natural watercourse. The final location would be subject to discussions with WDRC (as owner of the facility), DTMR, the Civil Aviation Safety Authority (CASA) and other relevant authorities. The new airstrip would be subject to negotiation of a commercial agreement with air transport operators during the design stages and subsequently subject to state and Commonwealth regulatory approvals required for development of a new, public-use airstrip.

The condition is imposed to address any new aerodrome construction or upgrade at Wandoan (Condition 5, Schedule 1).

Operational workforce—by bus

Once the number of operational employees reaches the full commitment of 844 it is anticipated that the regional town-based accommodation would be around 125-150 persons, with an assumed 60:20:20 split residing in Wandoan, Taroom and Miles respectively. Transportation of these employees would be provided solely in the form of coaches, during operation shift changes. Shuttle buses would be provided for employees travelling daily from the towns of Wandoan, Taroom and Miles. A total of four return trips are estimated by the shuttle buses every day.

For the other employees, if air transport is not provided, transport would be provided solely in the form of coaches, travelling between Wandoan and Brisbane. This would allow for a worst-case scenario in the traffic assessment. Based on anticipated shift changes and numbers of personnel requiring transportation, five return trips per week between the MLA areas and Brisbane would be required during Year 1, gradually increasing to a maximum of nine return trips per week by Year 4.

Coal handling, storage and transport—by rail

The EIS described the coal handling and train load out process, whereby two product conveyors deliver product coal from the coal handling and processing plant to a transfer station. Product coal would then be delivered to one of two product stockpiles via one of two bucketwheel stacker reclaimers.

Each product stockpile will have a maximum live capacity of approximately 300 000 t, with further capacity to allow a maximum total product stockpile capacity of approximately 1 140 000 t. The stockpile area will be fitted with dust suppression sprays, to control dust. Product coal is reclaimed from the stockpile by stacker reclaimers. A second transfer station will direct reclaimed coal into a final



reclaim conveyor at a rate of up to 5500 t/hr, delivering coal to the 800 t train load out bin for loading. During operations, coal produced will be transported by rail to Gladstone Port facilities for export. As noted above a rail spur from the MLA areas will connect into the proposed Surat Basin Rail (SBR) rail line, which is planned to run to the north of the Wandoan township. The SBR project and the rail line is yet to be approved and constructed, and will greatly minimise impacts to the local and larger road networks, as well as providing ease of distribution to the port facility.

The SEIS stated that prior to the commencement of project construction and mine operations, chemical composition analysis of the sampled dust particles will commence, with the proponent committing to continue sampling and chemical composition analysis of dusts for the life of the project, including for those of heavy metals.

In regard to the control of coal dust during the transport of coal by rail, the proponent has committed to predictive and proactive air quality management measures in both the EIS and SEIS (chapter 13, Air Quality). This was further refined in discussions with DTMR and the proponent after the release of the SEIS and a recommendation is made that the proponent adopts these agreed measures (Recommendation 6, Schedule 9).

The QR *Environmental Evaluation of Fugitive Coal Dust Emissions from Coal Trains Report* showed that 80 per cent of all dust emissions that were deposited beyond the rail corridor were generated by dust lift-off from the surface of loaded coal wagons. QR's reporting on literature reviews and test programs indicated that at least 85 per cent of surface lift-off could be reduced by surface veneering treatment. Surface veneer treatments can reduce total coal dust emissions beyond the corridor by around 68 per cent. The use of surface veneering treatments would help to reduce coal loss to the rail track and coal dust deposition within the rail corridor. The use of surface veneering also provides benefits by improving economic costs in the form of reducing rail ballast cleaning, maintenance and loss of rail network capacity due to track maintenance. Therefore, it is essential that effective mitigation measures are implemented to handle issues associated with coal dust emissions with all existing and future coal handling operations.

In its submission on the EIS, DTMR requested that there be a requirement for the project train load-out facility to be designed to incorporate a surface veneering treatment system to enable the implementation and use of dust suppression systems consistent with QR's Transitional Environmental Program (TEP) and Coal Dust Management Plan (CDMP). The type and dosage of surface veneering treatment should be based on the findings of laboratory work into the relationship between dustiness, moisture content and the particular circumstances of the product coal. The selection of the type of surface treatment and its method of application would consider the overall potential environmental impact of the surface treatment. The proponent advised that incidence of dust will be reduced because most of the coal will be washed in the CHPP and the coal itself is relatively hard in texture meaning that it is not a dusty coal. This a valid consideration in regard to air quality management, and the improved management of coal dust emissions along all coal transport corridors in Central Queensland is a high priority for the Queensland Government, therefore a condition is recommended that requires the proponent to provide for installation of a surface veneering treatment system (if practical experience determines that it is required for dust suppression) (refer to Recommendation 6, Schedule 9).

Impact on road networks

Road closures and relocations: construction and operation

The EIS stated that the proposed coal pit locations have required a number of relocations of state-controlled roads and local government controlled roads, new sections of road and temporary closure of some roads. With the exception of the Jackson-Wandoan Road, all the other temporary road closures or relocation are local roads controlled by WDRC. The proponent would require road reserves for temporary road closures and realignments, in accordance with DERM processes to gain a permit to occupy under the *Land Act 1994*. All state and local road realignments are to be undertaken in consultation with the DTMR, DERM, WDRC as well as the local community prior to any road closures. These roads would also need to be constructed to DTMR standards and appropriate traffic management measures are to be employed during the construction of these roads. Figure 6-32-SV1.3 of the EIS showed the timing of proposed temporary road closures and realignment schedule.



A number of submissions on EIS, raised the issue of the closure and realignment of local roads in the Wandoan area. Roads of key concern were sections of Grosmont Road and Q Road between Booral Road and Jackson Wandoan Road. The following issues were raised:

- increase in travel time to Wandoan and Roma
- reduced access to Wandoan during times of flood or high rainfall events
- reduced accessibility and use of local and state roads by wide loads
- stock routes needing to be maintained.

The Wandoan District Liaison Committee was concerned about stock routes needing to be maintained, and road closure of Grosmont Road during early stages of mine development, which may cause access restrictions during flood events. Access during flood events was a common concern raised by private individuals and the Landholder Services Pty Ltd group of affected landholders.

A private submitter raised concerns about closing the Wandoan-Jackson Road during construction, due to it being the primary sealed road used to transport loaded road trains of cattle to and from Wandoan. In its response, the proponent noted that this road was proposed to be realigned, not closed, and that the road would need to remain trafficable during construction, in accordance with DTMR requirements.

The proponent provided further information in relation to flood restrictions and concerns raised in the SEIS. Travel from the west of the Leichhardt Highway has the potential to reduce access to the Wandoan township during flood events. In the SEIS, the proponent reviewed the existing bridges and crossings of the MLA areas and the roads that are adjacent or in an adjoining area.

A private submitter raised concerns on the SEIS over the width of the Woleebee Creek bridge on the Jackson-Wandoan Road and the capacity of this bridge to enable access to some wide agricultural machines when the Woleebee Creek Causeway on the Grosmont Road is closed in Year 2. The submitter contended that if this causeway is closed then an alternative with the same wide access must be made available.

The SEIS confirmed that closures of the Woleebee Creek Causeway on Grosmont Road may impede the movement of wide agricultural machinery, coming from the west and north of the MLA areas towards the Wandoan township or south. The Woleebee Creek Causeway, which is to be temporarily closed, is the only double lane bridge within the local and state road network.

In response to the road access issues raised in the EIS, the proponent has conducted further assessment, sought further information and made changes in the SEIS. The proponent has committed to provide a solution for access during flood events and wide load accessibility including:

- a new crossing of One-Arm Man Creek on the Jackson–Wandoan Road
- a new crossing of Wandoan Creek at or near the existing Sundown crossing at Bundi Road

The construction of the new crossing at One-Arm Man Creek, would maintain a similar bridge height (of 4.0 m) and provide a two-lane bridge width. As stated by the proponent, the crossing would be designed in consultation with DTMR and in accordance with the DTMR specifications for state-controlled roads.

The SEIS stated that the current crossing of Woleebee Creek on the Jackson-Wandoan Road would remain open. The current bridge crossing is a full bank-to-bank height of the low flow channel and remains within the larger floodplain of One-Arm Man, Woleebee and Wandoan Creeks.

The proponent proposed to completely replace the Sundown crossing of Wandoan Creek on the Bundi Road, with a two-way bridge crossing at near-full bank height of the low flow channel, to improve flood immunity and carriageway width of the crossing. This crossing of the Western Deviation, which includes crossings of Mud Creek, Mt Organ Creek and Spring Creek, and any associated creek crossings, would be designed in consultation with WDRC.

However, the proponent has advised that, if an alternative site for the accommodation facility is chosen to the west of Woleebee Creek, a purpose designed bridge would need to be built across the Woleebee Creek, possibly on Q Road. This bridge would be built to a minimum of 5.1 m wide, which would address wide machinery access. Provision of escorted temporary access from Booral Road to



the Leichhardt Highway via a mine access road would therefore be required. Escorted temporary access would also be provided in times of flood, when the Booral Road is impassable at the Juandah Creek crossing, with residents to the north of the MLA areas having lost the Grosmont Road and L Road wet weather access in Year 4.

If the accommodation facility be situated east of Woleebee Creek—and the proponent has advised subsequent to the SEIS that this is now unlikely—the alternatives for wide agricultural machinery access would include widening of the Woleebee Creek Bridge on the Jackson Road or the upgrade of Juandah Creek crossing on the Booral Road.

Traffic impact assessment

The traffic impact assessment considered the potential impacts of the project during the construction and operational stages, which was compared over the six year period (from Year -2 through to Year 4) for the project estimated future traffic levels and impacts to the local network. To assess the level of traffic impacts, the proponent used the *Guidelines for Assessment of Road Impacts of Development* (DMR, 2006), which considers impacts due to a development as significant when it leads to an increase in traffic that equals or exceeds 5 per cent of the existing levels.

The traffic impact assessment found that the project would not result in significant traffic impacts to the surrounding road network, as the project contributes to less than 5 per cent of increased traffic levels to the surrounding road network (EIS, Table 12-9). As the impact is less than 5 per cent, the EIS concluded that no mitigation measures are required, as the capacity of state-controlled roads investigated is considered adequate to cope with the traffic generated by the project.

During the first two years of construction, due to transport required for the construction of the proposed gas, water and services pipelines, there will be a substantial increase and disruption to traffic on the road network.

With the use of private vehicles, during Years -2 and -1, there is expected to be an increased movement every 10 days when construction crews change shifts. The use of private vehicles every 10 days, adding to the commercial vehicle activity occurring, will create a significant increase (above the 5 per cent level) in traffic along the Leichhardt Highway between the Warrego Highway and Capricorn Highway (EIS, Figure 12-10). The proponent stated that this would only occur every 10 days and, given it is only private vehicular traffic, it should not have any pavement impacts. Impacts to the road network would be manageable, due to the light vehicles being used and as it is not a daily occurrence.

The proponent has committed to develop a traffic management plan in consultation with the DTMR and the WDRC for the road network (state-controlled roads and local roads), to ensure the safety of the public (including school buses) and construction workers, and to minimise as far as practicable disruptions to traffic.

Water supply options

During construction of the proposed gas, water and services pipelines, there would be some disruptions to the local traffic, as the proposed pipelines are required to cross several roads, which would require trenches to be cut across the affected roads. Appropriate traffic management techniques are to be employed to the road network (both state-controlled roads and local roads) during such construction works to ensure the safety of construction workers and the general public, and to minimise disruptions to the affected traffic. Also, the road pavement would need to be maintained and repaired to a suitable condition.

Where pipelines cross the proposed SBR and existing QR corridors, approval is required under the *Transport Infrastructure Act 1994*. Consultation and agreement is required with local government to use any local government controlled road reserves for the pipeline alignments.

Pavement impacts assessment

The increase in traffic volumes and heavy vehicles over the first 6 years is likely to reduce the life of road pavements. This would impact on the existing local traffic and the on-going maintenance of the identified roads, which may lead to increased costs to maintain road standards in the region. There is likely to be a consequential effect on roads within the Banana Shire from increased traffic in the



region. As such, it is necessary for the proponent clearly accounts for any road infrastructure upgrading and maintenance created by the project.

The EIS stated that during construction and operation there would be significant pavement impacts (in excess of 5 per cent) predicted on the Leichhardt Highway between its intersection with the Warrego Highway and the new mine access road for each year from Year -2 through to Year 4. Increased pavement impacts would be experienced along the Leichhardt Highway, Capricorn Highway, Fitzroy Development Road and Dysart-Middlemount Road due to the bulk sample transport requirements during Years -2 and -1.

The proponent has committed to undertake early consultation and negotiations with DTMR and WDRC (in relation to local roads) regarding provisions for any necessary upgrades, maintenance and rehabilitation, considering the existing and proposed Roads Implementation Program and infrastructure maintenance programs of DTMR and WDRC.

In its submission on the SEIS, BSC expressed concern that any increase in traffic volumes, in particular heavy vehicles, would reduce the pavement life of roads used for the project. It recommended that the proponent should be responsible for the costs of upgrades and maintenance, and should develop a management plan for the delivery of maintenance to the roads used during the life of the project. BSC recommended that a condition of approval for the project should be that proponent takes responsibility for any damages or decreased quality in the pavement surfaces during the life of the project, and consult with BSC regarding specific design, pavement dimensions, signage, drainage and delineation.

WDRC also submitted that, with the increased number of major projects occurring in the region, the volume of traffic has increased significantly. It recommended that the proponent should be responsible for any road infrastructure upgrading and maintenance by the project. WDRC submitted a number of development conditions for consideration.

Intersection upgrades

The project is expected to increase traffic to the mine and on the Warrego, Leichhardt and Capricorn Highways during the construction and operation of the mine. A new intersection, which would comply with DTMR standards, is proposed for the MIA access road and Leichhardt Highway.

Turning right from the MIA access road onto the Leichhardt Highway presents a safety concern so channelised right turn treatment, with a short turn slot, is proposed as it provides safer traffic environment for both the through-traffic along Leichhardt Highway and the traffic turning into the MIA access road.

Traffic safety

The increased traffic, particularly when construction shifts change, creates traffic safety concerns for the surrounding road network.

The proponent is proposing to minimise this impact, by staggered workforce movements by stipulating when construction crews are to leave the site during set hours of the day.

Also, variable message signs are proposed to highlight reduced speed limit around the intersection of the MIA access road and Leichhardt Highway, particularly during times when construction crews arrive and depart.

During the operational phase, traffic increases are not expected to impact negatively on the safety of road links and intersections. However, the proponent has committed to implementing measures to maintain road safety during the life of the project. These measures include consideration of Queensland Transport *Safe School Travel* policies to minimise disruption to school busses along the routes of the Leichhardt and Warrego Highways, Jackson-Wandoan Road and Grosmont Road.

5.11.1.2. Conclusion—transport and traffic – MLA areas and gas pipeline

Conditions are imposed that require the proponent to prepare and implement a road impact assessment, a road-use management plan and a traffic management plan (Condition 4, Condition 5, Condition 6 and Condition 9, Schedule 1) for the MLA areas and gas pipeline components of the project.



Contributions towards road infrastructure upgrades and pavement maintenance are warranted. Therefore, conditions are imposed (Condition 4 and Condition 6, Schedule 1) that requires the proponent to develop and implement infrastructure agreements for both state-controlled and local road upgrades and maintenance.

5.11.2. Southern CSM water supply pipeline

5.11.2.1. EIS findings, submissions and analysis

The EIS and SEIS (Volumes 1 and 2, Chapter 12) provided an assessment of transport and the road impacts issues for the southern CSM water supply pipeline.

The potential transport and traffic impacts and mitigating measures of all water supply options were integrated into the assessment undertaken for the MLA areas and gas pipeline (EIS and SEIS Volume 1).

The pipe sections for the raw water supply are assumed to be sourced from Brisbane and transported via the Warrego Highway and Leichhardt Highway. The pipes would be delivered to a series of drop-off points spaced approximately 20 km apart between the Condamine Power Station and the MLA areas. Baileys Road and Fosters Road would also be used for haulage during the pipeline construction.

The EIS stated that further analysis relating to transport and storage of pipes may be required during the detail design phase once a decision on a preferred water supply has been made.

5.11.2.2. Conclusion—transport and traffic – Southern CSM water supply pipeline

Conditions are imposed that require the proponent to prepare and implement a road impact assessment, a road-use management plan and a traffic management plan (Condition 4, Condition 5, Condition 6 and Condition 9, Schedule 1) for the southern CSM water supply pipeline components of the project.

Contributions towards road infrastructure upgrades and pavement maintenance are warranted. Therefore, conditions are imposed (Condition 4 and Condition 6, Schedule 1) that requires the proponent to develop and implement infrastructure agreements for both state-controlled and local road upgrades and maintenance.

5.11.3. Glebe Weir raising and pipeline

5.11.3.1. EIS findings, submissions and analysis

Construction activities for the Glebe Weir raising and pipeline option would be dependent on road transport, as Taroom is not served by rail infrastructure. The nearest operational railhead is at Miles 125 km south and there is a railway line between Taroom and Wandoan that has not been used for four years, is in poor condition, and has no unloading facilities capable of handling large freight or the bulk materials required for this project. The SBR is proposed to be constructed in parallel to the water supply options and mine development but would not be available for use in the construction phases of the project.

Impacts on roads are mainly associated with increased vehicle movements during construction as few vehicle movements would be required during the operation.

The construction workforce would be transported between Taroom and the weir construction sites by buses via the Leichhardt Highway and Glebe Weir Road. Other light-vehicle traffic is expected for some personnel, visitors and deliveries. During the construction period, traffic would vary but the total number of bus and light vehicle trips over this period was estimated as follows:

- buses—two return journeys per day, that is, 2400 bus movements over the construction period (buses driven out in the morning, remain on-site and return in the evening)
- sedans, utilities, and light vans—12 return journeys per day, that is, 14 400 vehicle movements over the construction period.



To assess the level of traffic impacts, the proponent used the *Guidelines for Assessment of Road Impacts of Development* (DMR, 2006), which considers impacts due to a development as significant when it leads to an increase in traffic that equals or exceeds 5 per cent of the existing levels. Raising of Glebe Weir and construction of the weir pumping station would generate a temporary increase in traffic on the Leichhardt Highway north of Taroom of less than 5 per cent. Therefore, the EIS concluded that the impact would not be significant and that no mitigation measures were required.

Nonetheless, the EIS outlined that some local roads subjected to additional traffic during construction would require minor upgrading. Any upgrading, repair and maintenance works on local roads, to mitigate construction impacts, would be subject to negotiation and agreement with BSC and WDRC.

5.11.3.2. Conclusion—transport and traffic – Glebe Weir raising and pipeline

Safety at the intersection of Leichhardt Highway and Glebe Weir Road and, in particular, increased traffic at school bus times, is still an issue of concern. In order to minimise the transport and traffic impacts for the Glebe Weir site, a condition is imposed (Condition 9, Schedule 1) that requires the proponent to prepare and implement a traffic management plan for Glebe Road that also addresses safety concerns.

5.11.4. Conclusion—transport and traffic – general

The EIS process has adequately investigated and addressed the impacts of the project on the local and state-controlled road networks during both construction and operation, for all components of the project, including public and mine-site safety and efficiency, intersection, waterway crossings and pavement impacts.

However, to ensure the satisfactory management of transport and traffic issues, the proponent is to continue to liaise with DTMR and the Regional Councils to ensure the completion of the Infrastructure Agreements, road impact assessments, road management plans and traffic management plans for approval by state and local government authorities as required.

5.12. Cultural heritage and Native Title

5.12.1. Context

The EIS (Volumes 1 and 2, Chapter 20A, Indigenous Cultural Heritage and Chapter 20B, Non-Indigenous Cultural Heritage, and Volume 4, Chapter 16, Cultural Heritage) provided a record of the indigenous and non-indigenous cultural heritage places, items and values associated with the project as part of the cultural heritage investigations and presented a description of the process for identification and management measures for cultural heritage.

5.12.2. MLA areas and gas pipeline

5.12.2.1. Non-indigenous cultural heritage

EIS findings, submissions and analysis

The EIS, SEIS and the Addendum to the Technical Report confirmed that there are no known sites of state or national heritage significance located in the project area or along the proposed gas pipeline easement.

The SEIS noted that three items are listed as items of interest on the heritage inventory administered by DERM, which are considered to have potential state, regional or local level cultural heritage significance. These items are yet to be formally assessed by DERM. The proponent has considered the recorded items in the cultural heritage assessment and all have been demonstrated to be locally significant but are not likely to meet the requirements for inclusion in any state or Australian Government heritage register. The three sites include the Juandah Homestead and Lagoon, the Wandoan Railway complex and the Wandon-Jackson Camping Reserve and Stock Route.

Other non-indigenous cultural heritage sites were identified within the study area (but not necessarily within the project area), which were found to be of local significance. These included the:



- intact Booral Homestead
- dilapidated meat shed with original bark roofing
- ruins of a pre-World War 1 dairy farm with associated yards
- various sheds and huts
- survey trees and boundary fences
- a coach stop
- a 1930s employment scheme camp
- 1930s bridge and access track
- Soldier Settlement dairy and fibro house
- windmills and associated dams, roads
- a pre-1900 stock route.

These items are representative of the range of land use activities over various periods from the time of first contact between the indigenous inhabitants and European settlers. EIS Volume 1, Figure 20B-1-V1.3 provided a summary of significance, potential impacts and mitigation measures for the 27 non-indigenous items located and assessed in the MLA and gas pipelines study area.

The historical items recorded in the study area demonstrate the pattern of European occupation, the land use and activities that arose from the use of natural resources in the area over the period from 1840 to the present.

The assessment found that all items within the study area were under some form of current threat of deterioration through lack of maintenance or through unfavourable change.

The EIS assessment found the sites in the study area of local interest but, as a whole or individually, do not meet the criteria for inclusion on the Queensland Register. It is important to note that this does not mean that the area overall has no historical significance or that there are no other items of local significance.

While none of the items are listed or warrant listing under current cultural heritage legislation, these items are important to the understanding of the local cultural heritage history in the region. The proponent has committed to proposed mitigation measures for the known and potential items to manage impacts during construction and operations phases.

For the construction phase, the proponent will develop a Construction EMP to minimise the projects impacts on the identified items. All mitigation actions are to be undertaken during the site preparation and initial construction phase in consultation with the Juandah Historical Society and the local community.

For the operations phase, the proponent has proposed potential funding initiatives from its community fund that will recognise and celebrate the non-indigenous cultural heritage of the area. The proponent will consult with the community, the RSL, the Juandah Historical Society and the WDRC regarding the following initiatives:

- commissioning of a community memorial to the settlers
- development of a community based oral history study to document the local history of Wandoan.

Booral House and meat house

The Booral House and meat house are considered to be culturally significant at a local level. The proponent has committed to retaining the Booral House and meat house items *in situ* and maintaining and using them appropriately in accordance with the Australia ICOMOS Burra Charter Guidelines.

Juandah Homestead and Lagoon

The Juandah Homestead and Lagoon are listed on the DERM inventory as Item 22314, as an item of interest. The Juandah Historical Site land is owned by the Juandah Historical Society and there is a management plan in place which controls actions on this site.



The Juandah Homestead remnants or the Lagoon will no longer be impacted, as the Booral House and meat house are not being relocated to the Juandah Historical Site, thus no mitigation measures are required.

Wandon-Jackson Camping Reserve and Stock Route

This item is listed as Item 22315, Camping Reserve and Stock Route, Wandoan, as an item of interest on the DERM inventory. The SEIS confirms a portion of the stock route from Peakes Road to Woleebee Creek will be realigned, due to that section being affected by the project.

The stock route has local significance as it connected Juandah Station to stations further west and has been used continuously since then for local cattle movement and later as the main access road east to Wandoan. This route is documented on local maps and in stock route documents and the section to be affected has been documented as part of the proponent's impact assessment.

The proponent will provide information on the ultimate extent of any impacts and the outcome of the project on the stock route will be provided to DERM over the life of the project, to enable DERM to update records accordingly.

Wandoan Railway complex

The Wandoan Railway complex is listed as Item 2628 as an item of interest on the DERM Inventory. However, there will be no impact to the railway complex from the project construction or operations.

Gas supply pipeline

The EIS considered that it was unlikely that any items of historical significance would be impacted during the construction of the proposed gas pipeline.

5.12.2.2. Indigenous cultural heritage

EIS findings, submissions and analysis

Searches conducted of the Australian Heritage Database and the National Heritage List found no results for sites of Indigenous cultural heritage interest within the MLA areas and gas supply pipeline area.

Eight Aboriginal cultural heritage sites located within the MLA areas were identified from searches of the Cultural Heritage Database and Register for Aboriginal and Torres Strait Islander Cultural Heritage, held by DERM. All sites identified are within MLA 50230, with no records found for MLA 50229 or MLA 50231. Two identified Aboriginal cultural heritage sites were located in the vicinity of the proposed gas supply pipeline area. A list of the sites identified is provided in Table 5.12.2 (based upon EIS, Volume 1, Table 20A-1).

Table 5.12.2: Identified Indigenous cultural heritage sites

Location	DERM Site I.D.	Attribute
MLA 50230	HC: A65	artefact
MLA 50230	HC: A66	artefact
MLA 50230	HC: A67	artefact
MLA 50230	HC: A68	artefact
MLA 50230	HC: A69	artefact
MLA 50230	HC: A70	artefact
MLA 50230	HC: A71	artefact
MLA 50230	HC: A72	tree, hearth
gas supply pipeline area	JD: B40	isolated finds
gas supply pipeline area	JD: D05	resource



In addition to these sites, three archaeological studies are known to have occurred within the MLA areas and one within the proposed gas supply pipeline area. The studies conducted included the following archaeological assessments:

- Morwood (1992)—archaeological assessment covered three prospect coal deposits, labelled as Frank Creek, Austinvale and Woleebee
- Wallin & Associates (circa 1996)—based on background research, predictive modelling and reviewing past archaeological investigations of the area. The study also included Frank Creek, Austinvale and Woleebee areas
- Bindon (2007)—a preliminary cultural heritage survey of the MLA areas undertaken with representatives of the Iman People #2 in July 2007
- Bultreys (2009)—non-systematic and preliminary cultural heritage assessment of the proposed gas pipeline for the project in association with representatives of the Iman People #2.

Results from each study are summarised below.

Morwood (1992) Study

Morwood indicated that no further archaeological work was recommended for Frank Creek and Austinvale areas, as both had been heavily disturbed by past clearance and cultivation and the artefacts found were of limited archaeological significance. Further work was suggested for the Woleebee area, including systematic surveys, as a range of archaeological sites had been identified.

Wallin & Associates (circa 1996) Study

Based on the predictive modelling, Wallin suggested that cultural heritage may be predicted to exist in the area, principally around water supplies (especially creeks, rivers and water holes), certain geological features (such as mountains), geomorphological features, and certain vegetation types. Wallin concluded that further cultural heritage analysis should be undertaken on the proposed mining lease areas.

Bindon (2007) Study

The purpose of the survey was primarily to establish the general existence, or likely existence, of significant Aboriginal objects or sites with the MLA areas. A field survey was conducted over MLAs 50229, 50230 and 50231. Ten sites and objects were identified during the field survey, which were considered to be of small and low scientific or historical significance. Bindon indicated the area may nonetheless still be culturally significant to the Iman People #2. Bindon acknowledged that areas of significance may yet be identified by native title claimants and it should not be assumed that no areas of significance are present.

Bindon recommended that the Iman People #2 be consulted in relation to any future work on the area.

Bultreys (2009) Study

The proposed gas supply pipeline area is located within the cultural boundaries of the Iman People #2.

Indigenous cultural heritage was identified at two of seven locations visited: one low density stone artefact scatter located near Roche Creek; and a single scarred tree almost certainly of indigenous origin located within remnant vegetation.

No sites of regional or outstanding cultural heritage, historic or scientific significance were recorded during the targeted field survey. No indications were seen that subsurface deposits of significant structure, content or integrity would be contained within the study area. The Traditional Owner Field Officers who participated in the field survey considered the cultural heritage recorded at the sites to be of low-moderate significance.

Under section 87 of the *Aboriginal Cultural Heritage Act 2003* (ACHA), a cultural heritage management plan (CHMP) must be developed and approved where an EIS is required for a project.



Furthermore, under section 88 of the ACHA, the CHMP must be developed and approved prior to obtaining the EA, unless the EA contains conditions requiring that an approved CHMP be in place before any activity occurs that could cause harm to indigenous cultural heritage.

The proponent is also obliged under section 23 of the ACHA to comply with the CHMP and the Act's duty of care guidelines to take all reasonable and practicable measures not to harm Aboriginal cultural heritage.

In accordance with the ACH Act, the proponent developed a CHMP in consultation with the Iman People #2 who are the only registered native title claimants over the MLA Areas (NNTT No. QC97/55; Federal Court No. QLD 6162/98).

The CHMP for the Wandoan Coal project, was approved by the then Department of Natural Resources and Water (now DERM) on 27 February 2009. The proponent will continue to manage indigenous cultural heritage in accordance with the approved CHMP and as per the commitments outlined in the EIS (Vol 1, Chapter 20A Indigenous Cultural Heritage section 20A.4).

Gas supply pipeline

If the gas supply pipeline option is selected, the proponent has committed to develop an 'approved' CHMP, as required under the ACH Act, for the Gas Supply Pipeline Area. The WJV have indicated they will consult with the relevant Aboriginal party, the Iman People #2, who will be involved in developing any CHMP for the Gas Supply Pipeline Area.

At the time the EIS was published, the proponent had just completed negotiations with the Iman People #2 regarding the CHMP for the MLA areas.

The proponent has finalised the CHMP for the MLA area. Once the CHMP has been executed and approved by the chief executive that administers the ACH Act, then a similar CHMP process can be used for negotiations with the Iman People #2 for the gas supply pipeline area and the preferred water supply option.

5.12.3. Southern CSM water supply pipeline

5.12.3.1. Non-indigenous cultural heritage

EIS findings, submissions and analysis

No sites of national or state heritage significance were located along the preferred route for the proposed southern CSM water supply pipeline corridor. The proposed route mainly follows road and rail easement. The route was selected to avoid impacts on structures. The investigations identified six non-indigenous historical items located along the pipeline route:

- the Giligulgul State School 1914 to 1928 location. A plaque has been erected at the site
- a wood house with gable roof and skillion on private property, west of Baileys Road
- a stone chimney, west of Baileys Road, with a section of rail line used in the chimney support
- a telegraph pole
- a fence at entrance to Possum Park (formally World War II ammunitions storage facility)
- the remnants of a low level timber bridge at Nine Mile Creek.

The study found that the items identified in the vicinity of the proposed pipeline route do not meet the criteria for inclusion on any state or Australian Government heritage register. However, the items identified do have local significance and are representative of the

The proponent has committed to implementing the following mitigation measures:

- the location of the historical items identified in the survey will be noted in field maps, and design and construction drawings of the proposed pipeline. These locations will be avoided during design and construction
- a cultural heritage management plan will be implemented to address the management of any historical items/material which may be located during clearing or construction work.



The residual impacts to the proposed southern CSM water supply pipeline are expected to be low, provided that the cultural heritage management plan is complied with appropriately.

5.12.3.2. Indigenous cultural heritage

EIS findings, submissions and analysis

Searches of the Cultural Heritage Database and Register identified 21 sites, places and/or artefacts of Aboriginal cultural heritage significance located within the area of the proposed southern CSM water supply pipeline. The proponent stated that some cultural heritage sites will be impacted by the proposed CSM water pipeline.

There are two relevant Aboriginal parties regarding indigenous cultural heritage in relation to the CSM water supply pipeline area. The Iman People #2 are the registered Native Title claimants to the northern portion of the proposed pipeline area. The Barunggam People had a registered claim over the southern part of the proposed pipeline area, which has since been dismissed. Although they no longer have a registered claim over the area, the proponent will invite the Barunggam People to consult over a CHMP, as the Aboriginal party, for the part of the proposed pipeline which overlaps with their dismissed claim.

If the southern CSM water supply pipeline option is selected, the proponent will develop an approved CHMP with each of the Iman People #2 and the Barunggam People, as required under the ACHA and will commission a comprehensive cultural heritage survey over the alignment to locate any further items, sites or places of cultural heritage significance.

5.12.4. Glebe Weir raising and pipeline

5.12.4.1. Non-indigenous cultural heritage

EIS findings, submissions and analysis

One site was identified on the Queensland Heritage Register—the Glebe Homestead, which is in the vicinity of the Glebe Weir, overlooking the Dawson River, north-east of Taroom.

Sites that have been reported within the vicinity of the Glebe Option area include: Timber Slab Cattle Dip, Slab Hut, Spring Vale Homestead, Brodie Homestead and Bundulla Aboriginal Mission. None of the sites above are expected to be impacted by the works, from inundation or vibration impacts from pipeline construction.

The presence of these sites highlights places of unknown cultural heritage value within the vicinity of the Glebe Weir that are likely to inform upon the unknown sites and values located within the area. These sites do show that potential exists for other sites and places of heritage significance to occur in the area, which are currently unrecognised.

No sites listed on any national, state or local government register will be impacted by the weir raising or the pipeline to Wandoan. As there is a possibility that unknown sites may be present in the area, a cultural heritage survey will be undertaken during the detailed design phase. The proponent has committed that if any places or sites of cultural heritage significance are encountered, significant assessments and management plans will be developed in accordance with relevant legislation and guidelines.

As the area of impact is very small, the weir is largely contained within the riparian zone of a river that frequently floods and the pipeline is predominantly within a highly disturbed road reserve, the potential for significant finds is not considered high.

Indigenous cultural heritage

EIS findings, submissions and analysis

If the Glebe Weir option is selected, the proponent will consult with the registered Aboriginal parties to assess and manage indigenous cultural heritage over the Glebe option area. In accordance with the ACHA, the Wulli Wulli People and the Iman People #2 are registered Native Title claimants, who have been endorsed as Aboriginal parties to develop the CHMPs in both the Glebe Option area subject to



their respective registered claims and the area where there has been no registered claims since the commencement of the ACHA.

Searches conducted from the Indigenous Site Database indicate that one site is likely to be impacted by the Glebe Weir raising. No sites have been registered along the pipeline route for the Glebe Option.

5.12.5. Conclusion—cultural heritage and Native Title

There will be some adverse impacts to both Indigenous and non-Indigenous cultural heritage as a result of the project. However, the non-Indigenous cultural heritage likely to be disturbed is of low significance. It is also possible that the project site contains other artefacts of low-level cultural heritage significance that may be encountered during the construction and operation of the mine.

The proponent has committed to ensuring Indigenous and non-Indigenous cultural heritage matters are managed. Mitigation measures proposed in the EIS are to be incorporated into construction and operational EMPs. The proponent has also committed to develop and implement a cultural heritage management plan, to record and manage items that may be identified during the planning, design and construction of the project, and record and manage items that will remain in place to prevent inadvertent impacts during the mining activities.

Therefore, the measures described in the EIS, SEIS, EM Plan, and matters considered for including in the CHMP under the ACH Act, are sufficient to identify significant cultural heritage places and artefacts affected by the project, mitigate and manage any adverse impacts to Indigenous and non-Indigenous cultural heritage, and satisfy the statutory responsibilities and duties of care, including those under the EPBC Act and the *Queensland Heritage Act 1992*.

5.13. Health, safety and risk

5.13.1. EIS findings, submissions and analysis

Wandoan town is on the eastern side of the MLA areas and has a population of 380 people. The construction of the project is expected to employ up to approximately 1375 workers over a two to three year period, while operations are expected to employ up to 844 workers over a 30 year period. A small number of workers with families are expected to live in Wandoan with the largest portion of workers living in a purpose built project accommodation village. Limited health and emergency services are provided in Wandoan and other towns located within 70 km of the mining leases. The existing land uses (for example, agricultural activities, road travel and grass fires) pose few risks to the community members.

Due to the extensive nature of the proposed open-cut mining operation, there is a potential for impact upon human health and safety from construction and operational activities associated with the project. Therefore, the EIS included an appraisal of the health, safety and hazard aspects of the construction, operations and decommissioning phases of the project and identified aspects of the project that may contribute a risk to the health or safety of workers, local residents and visitors in the district. This appraisal included:

- activities—construction, mining, travel, machine operations
- structures—pits, stockpiles, storages, buildings, dams, pipelines, rail lines, haulage roads, gas and electric installations)
- inventories of materials—explosives, flammable substances, chemicals, wastewater etc.

The proponent has committed to implementing its policies and procedures for identifying and managing risks and hazards concerning workplace and general public health and safety. These policies and procedures include preparing risk, incident and emergency management plans for monitoring risk and hazardous activities, quantities of substances and recording incidents and recovery actions.



5.13.2. Conclusion—health, safety and risk

Due to the low population density in the area and proposed mitigation strategies, the potential impacts to workforce and public health and safety are expected to be limited and manageable.

To ensure that hazard and risk associated with the project are appropriately identified and managed, it is recommended that the proponent develop and implement hazard, risk and incident management plans, to address workplace and community health and safety issues, in accordance with its workplace health and safety requirements and in accordance with relevant legislation including the *Workplace Health and Safety Act 1995* and the *Coal Mining Safety and Health Act 1999* (Recommendation 3, Schedule 9).

5.14. Greenhouse gas emissions

5.14.1. EIS findings, submissions and analysis

The EIS presented the projected future annual emissions for each greenhouse gas (GHG) and total emissions, expressed as carbon equivalents, for the two year construction phase and 30 year operational phase of the project. The estimation of the project's GHG emissions associated with every year of construction and operation was undertaken in accordance with the following methodology:

- Greenhouse Gas Protocol (the Protocol)
- emission factors in the National Greenhouse Accounts (NGA) Factors from the Commonwealth Department of Climate Change (2008)
- methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2005—Energy (Fugitive Emissions) from the Australian Greenhouse Office (2006)
- International Panel on Climate Change (IPCC) Good Practice Guidance
- *National Greenhouse and Energy Reporting Act 2007* (Cwlth) (NGER), which establishes a national framework for Australian corporations to report Scope 1 and Scope 2 greenhouse gas emissions, reductions, removals and offsets and energy consumption and production, from July 2008
- Energy Efficiency Opportunities (EEO) legislation, which came into effect in July 2006, and requires large energy users (over 0.5 PJ of energy consumption per year) to participate in the program.

Both the direct and indirect GHG emissions from the project were assessed. The concepts and definitions of direct and indirect emissions as outlined in the Greenhouse Gas Protocol are broadly as follows:

- Scope 1: Direct GHG emissions. For the construction phase of the project, Scope 1 emissions are associated with fuel use by construction vehicles, blasting using ammonium nitrate/fuel oil explosives and on-site power generators. For the operational phase of the project, Scope 1 emissions are fugitive emissions of coal seam gas from the open-cut mining of coal and emissions associated with the fuel consumption of vehicles and with the use of explosives.
- Scope 2: Mostly emissions from the generation of purchased electricity consumed by the project for operation of draglines, the CHPP and for lighting and workforce facilities.
- Scope 3: Other indirect GHG emissions resulting from the project's activities but occurring from sources not owned or controlled by the project. The overwhelming majority of Scope 3 emissions from the project are associated with the end use of the coal in electricity generation. This will occur totally or predominantly overseas. Scope 3 emissions are not routinely reported by companies and it is customary to exclude Scope 3 emissions from any analysis of offset considerations of a project.



5.14.1.1. Electricity consumption derived emissions

Open-cut coal mines consume significant amounts of electricity to power draglines, conveyors, pumps, compressors, motors, haul-road lights and offices. The EIS stated that there are three options relevant to GHG assessment for the project's power consumption:

- Option 1 is 100 per cent on-site generation via twelve dual-fuel diesel and gas engine units, each having 8 MW of electrical output. GHG emissions associated with this option are classed as Scope 1 emissions.
- Option 2 is partial on-site generation via six dual-fuel diesel and gas engine units, each having 8 MW of electrical output. The balance of the power demand will be supplied via a grid connection. This combination results in both Scope 1 and Scope 2 emissions.
- Option 3 is 100 per cent grid-purchased electricity, which creates emissions classed as Scope 2 emissions.

Table 5.22 provides a comparison of the GHG emissions of the three power options for the project, based on operational power consumption by year and throughout the life of the mine. This also includes emissions associated with the use of on-site diesel generators during construction. As shown, the 100 per cent on-site generation option is the least GHG intensive power option, due to a high reliance on gas as the fuel source.

Table 5.22: Comparison of the three power consumption options

Power option	Emission scope	Annual minimum GHG emissions (t CO ₂ -e/yr)	Annual maximum GHG emissions (t CO ₂ -e/yr)	Annual average GHG emissions (t CO ₂ -e/yr)	Life of mine GHG emissions (t CO ₂ -e/yr)
Option 1: 100 % on-site generation	Scope 1	94 736	250 346	225 674	6 770 213
Option 2: partial on-site generation, balance grid purchased	Scope 1	36 694	100 138	90 270	2 708 085
	Scope 2	(export*)	309 021	270 685	8 186 474
Option 3: 100 % grid-purchased electricity	Scope 2	175 165	478 022	430 913	12 927 377

Note: * Export of energy generated onsite to the power grid

5.14.1.2. Glebe Weir raising and raw water pipeline option

The EIS stated that water supply pipeline options other than the Glebe Weir raising and associated pipeline are expected to be significantly less in GHG impacts than the Glebe Weir and pipeline option and therefore have not been separately assessed.

Scope 1 and 2 emissions associated with construction of the raised Glebe Weir and pipeline are estimated to be:

- Scope 1 emissions: 12,012 tonnes CO₂-e
- Scope 2 emissions: 81 tonnes CO₂-e.

The EIS predicted annual operational emissions, predominantly from the use of electricity for pumps, to be 569 t CO₂-e¹⁰.

¹⁰ The annual GHG emissions associated with the use of a domestic refrigerator are approximately 0.8 tonne CO₂-e and approximately 3.77 tonnes CO₂-e for a medium sized car.



5.14.1.3. Estimated life-of-mine scope 1 and scope 2 GHG emissions

Table 5.23 shows the estimated total Scope 1 and 2 GHG emissions for the two year construction period and 30 year operations period of the mine, based on existing technology and dependent upon the three power supply options (see section 5.14.1.1 above).

The EIS estimated that, over the life of the mine, total GHG emissions would be 11.6 Mt CO₂-e, if power is fully generated by an on-site power station (power supply option 1), and 17.7 Mt CO₂-e if the mine is powered by electricity fully purchased from the Queensland grid (power supply option 3).

Table 5.23: Life-of-mine scope 1 and scope 2 GHG emissions from mine activities (tonnes CO₂-e)

Scope	Mine activity	100% on-site generation	Partial on-site generation	100% grid-purchased electricity
1	Fugitive emissions	1 208 728	1 208 728	1 208 728
1	Diesel consumption – trucks	3 335 844	3 335 844	3 335 844
1	Total explosives	223 192	223 192	223 192
1	Diesel consumption – power	102 290	71 497	50 969
1	Gas consumption – power	6 770 213	2 708 085	0
2	Purchased electricity	0	8 186 474	12 927 377
Total GHG emissions		11 640 266	15 733 880	17 746 110

At an indicative offset price of \$20 per tonne of CO₂-e, the cost of carbon offset for Scope 1 and 2 emissions over the life of the project would be approximately \$233 million¹¹ if power is fully generated by an on-site power station and approximately \$355 million¹⁴ if electricity is fully purchased from the Queensland grid.

The proponent proposes to develop a Greenhouse Gas Reduction Management Plan in relation to Scope 1 and Scope 2 GHG emissions. The proponent has also committed to measures to improve energy efficiency, identified in the EIS (Volume 1, Chapter 14) would be incorporated into a Greenhouse Gas Reduction Management Plan.

5.14.2. Conclusion—greenhouse gas emissions

It would not be reasonable to impose a definitive offset requirement on the construction and operational phases of a high-volume commodity production project such as this project. Such an impost would be unprecedented. The EIS evaluation report (publicly released in July 2010) for an EIS for the proposed Caval Ridge coal mine in the Bowen Basin area is consistent with this approach.

To mitigate the carbon footprint for both the construction and operational phases of the project, a condition is imposed that requires the proponent to develop and implement a Greenhouse Gas Reduction Management Plan in relation to the Scope 1 and Scope 2 emissions of the project (Condition 7, Schedule 1). The Plan must include, but not be limited to, the proponent's policy on GHG emissions, regular and accurate monitoring of GHG emissions from the construction and operation phases of the project, energy efficiency program, a continuous improvement program and a fugitive gas management plan.

¹¹ At the time of this report.



5.15. Visual amenity

5.15.1. EIS findings, submissions and analysis

The EIS presented a thorough and detailed assessment of the likely visual impacts arising from the project. A baseline study was completed in order to review the visual significance and magnitude of the project on the landscape. The baseline studies recorded and analysed the existing character, quality and sensitivity of the landscape and any visual resources in the vicinity.

The EIS also provided photomontages to represent indicative images of the proposed landscape, once mining activities have commenced. The visual significance of project impacts was considered, as was an assessment and description of the visibility and visual sensitivity of the project. The project and site surrounds were divided into four sectors to determine visibility and sensitivity impacts, namely the north-east sector, south-east sector, south-west sector and north-west sector.

Sixteen open pits within the three MLAs would be operated at different times during the life of the project. Several of the mining pits would be visible or partially visible from a number of viewing locations throughout the area. These visual effects will change over time depending on the stage of the mining operation.

The project has the potential to create adverse visual impacts on areas surrounding the project site, especially on sensitive visual places such as homesteads and the Leichhardt Highway.

Descriptions of the visual impacts from the project range from high, where plant for mining activities is easily discernable and in close proximity to a viewing location (that is, a sensitive place, public road, high elevation in the locality), to faint and distant images or glows from night time lights.

Project impacts that were described as having high visual impact have the potential to significantly alter the visual environment. These include mining activities in the various pits, road realignments which may now provide vistas to mining activities, overburden dumps, out of pit spoil dumps and other general infrastructure.

The EIS stated that mitigation measures for reducing visual impact consist of at-site treatments and at-viewer location treatments. At-site treatments involve progressive rehabilitation of landforms and land cover, while at-viewing location treatments involve a range of treatments to screen views, filter views and/or reorientate primary views.

The EIS identified a number of public places that would be impacted by the mine activities and outlines the treatment of these areas to significantly reduce visual impact and restore the integrity of regional landscape views.

These locations include:

- Leichhardt Highway adjacent to Fairfield Hill Homestead
- Leichhardt Highway, Wandoan to Juandah Creek
- Wandoan Cemetery
- realigned Jackson-Wandoan Road
- Grosmont Primary School.

Visual impact mitigation of these areas would require detailed design by a suitably qualified person (such as a landscape architect in co-ordination with terrestrial ecologists).

A number of submissions on the EIS highlighted that the development of Frank Creek Pit would require specific treatment given its close proximity to the township of Wandoan. This may include planting and other visual screening from the town of Wandoan.

Another local receptor that was the subject of a number of submissions is the Grosmont School. This receptor has the potential to be impacted by mining associated activities during school hours and has the potential to interrupt schooling. The proponent has committed to a range of specific treatments for the Grosmont School. Such measures may include tree planting, barriers, window tinting and screens.



As presented in the EIS and SEIS, properties within 2.5 km of a light source from the mine may be visually impacted by light exposure at night from the 24 hour mining operations, depending upon their direct line of sight to the mining operations.

The visual effect levels of indirect light of the mine infrastructure area and mine pit areas were predicted to be low. However, the visual effect of direct light associated with mine pit areas (for example, dragline, excavator and truck lighting), would be moderate and in some cases, may be high where houses are within 1 to 2 km of the light source and without intervening vegetation or physical barriers. The EIS also stated that these visual effects are mitigated, in part, by the fact that while there is direct line of sight, people are usually indoors at night-time and so not affected.

The proponent has committed to undertake mitigation measures for light exposure at night for potentially affected dwellings or community facilities that will have direct line of sight to areas up to 2.5 km from the light source. This would require an assessment of potential light source impacts from various directions, where appropriate. Where residences are more than 2.5 km away from a light source, or out of direct line of sight and where the property owners consider that they are affected in a significant way, the proponent has committed to liaise with the property owners with a view to undertaking assessments on a case-by-case basis.

The proposed accommodation facilities for the construction and operations workforce would be a cluster of single-storey buildings that would be obscured from nearby roads by established roadside vegetation and scattered vegetation in close proximity to the accommodation buildings. Accordingly, the accommodation facilities were assessed to have minimal visual impact.

The major visual impact of the proposed dual fuel power station, if built, would be the 21 m high emission stacks. The EIS stated that the visibility of the proposed power station would be generally limited due to screening provided by the existing vegetation surrounding the project site. However, there is the possibility of some over-viewing from distant homesteads situated to the east of the project site, along the Leichhardt Highway and Nathan Road.

In the case of some sensitive places, the proponent has achieved mitigation of visual and other impacts by purchasing the properties.

The proponent has committed to prepare a Landscape Management Plan as part of its Biodiversity and Land Management Plan, containing mitigation strategies that would also assist in reducing visual impacts from project activities.

5.15.2. Conclusion—visual amenity

In the longer term, the residual visual impacts of the project are minimal, although some impacts during the 30 year mining period have the potential to be high due to the nature of the mining operation and the scale of the development. With the adoption of the proposed mitigation measures, including the preparation and implementation of a Landscape Management Plan (as part of the project Biodiversity Management Plan to be included as part of the project EMP), combined with the progressive rehabilitation of mined and disturbed areas, the finished landforms will not vary greatly from the original landform, which will go a long way to minimising visual contrasts.

The implementation of 'at viewer location' visual management strategies, as outlined in the EIS, would reduce visual effects at the point of viewing and in so doing also enhance the landscapes of those locations in a permanent way.

The residual visual impact of the possible gas pipeline (proposed to be generally underground) and the development of the preferred raw water supply pipeline (proposed to be generally underground) would be minor and temporary, with most impact occurring during the construction phase.

Additional attention to spoil rehabilitation in locations visible from the Leichhardt Highway, Nathan Road and the re-aligned Jackson-Wandoan Road is justified.

Consequently, it is recommended that the results of the proposed mitigation strategies outlined in the proposed Landscape Management Plan be monitored by the proponent in consultation with the WDRC throughout the life of the mine, and those strategies be enhanced wherever they are considered to have insufficiently reduced the visual contrasts between the major components of the project, as viewed from key viewpoints on the Leichhardt Highway, Nathan Road and the Jackson-Wandoan Road and the Wandoan township (Recommendation 2(a), Schedule 9).



Notwithstanding the obligations on the proponent to provide a satisfactory level of mine site and spoil rehabilitation (discussed in more detail in sections 5.2 and 5.3 of this report and addressed by EA conditions F1 to F8, Schedule 3), it is recommended that the proponent, in consultation with DERM and the WDRC, achieves a minimum average of 30 per cent revegetation of all elevated spoil areas (excluding any potential tourist lookouts established as part of the project) that are visible from key viewpoints on the Leichhardt Highway, Nathan Road and the Jackson-Wandoan Road and Wandoan, within three years of completion of placement of spoil in those areas (Recommendation 2(b), Schedule 9).

6. Social impacts

6.1. Overview

The proponent has prepared a draft social impact assessment (SIA) as part of the EIS for the project.

Wandoan has experienced a decline in recent decades due to drought, changes to rural industry and social change. The population decreased from around 700 in 1965 to 380 in 2008. At the time of the 2006 census, the project study area (Wandoan, Gulugaba, Grosmont and surrounding areas) had a population of 918, 24.1 per cent lower than that recorded in the 2001 census. This population loss has left many local houses vacant and many blocks of land in the town undeveloped.

Key social impact issues raised in the SIA report will be managed through the development of a Social Impact Management Plan (SIMP), which is discussed in detail in under 'New social impact management plan requirements' (section 6.4.2 below). The requirement for resource projects to develop SIMPs is a new initiative of the Queensland Government's Sustainable Resource Communities (SRC) policy.

6.1.1. Workshops

Workshops with local community residents held in 2007 and 2008 as part of the EIS community consultation process identified that all communities in the study area valued safety and security, and highlighted the lack of services, particularly in health-related fields as the region's major negative.

Wandoan residents highlighted the district's grazing land as the most important feature of the area, while Taroom residents valued recreational and ecological aspects of the Dawson River. Miles participants identified the historical village as its most important feature.

Wandoan residents indicated that the project was the major issue facing their community, while Taroom residents identified accommodation, banking facilities, a decline in essential services, viability of farm labour versus mining wages and local government amalgamations. Miles residents identified skills shortages and the loss of young people from the community as their greatest concerns.

Other specific issues identified at the workshops included:

- the Wandoan Coal project should employ people from the local community and support local businesses if the project proceeds
- potential impacts on the community resulting from a loss of families due to property purchases (Wandoan)
- potential positive impacts on communities from upgrades and improvements to town facilities and from increased levels of population, capital, and community investment in the towns (Taroom, Miles)
- economic benefits (Taroom, Miles)
- labour concerns for local employers unable to compete with project wages (Wandoan)
- negative impacts on lifestyle (Wandoan, Taroom)
- positive impact on lifestyle (Miles)
- environment, land use and community impacts relating to creek diversions, water storage, mine water run-off, impacts to sub-artesian water (Wandoan, Taroom, Miles)
- impacts on bore water and equipment (Taroom)
- water supply and source (Wandoan, Miles)
- development of a buffer zone around pits to reduce the impacts of blasting and dust on the highway and livestock (Wandoan)
- the need for significant upgrades to the town's local roads, water supply, and treatment works to accommodate potential population increases (Wandoan)
- the use of town facilities by mine employees (Wandoan)

- the proposed rail alignment infrastructure and direction of coal haulage (Wandoan, Miles)
- the importance of Wandoan Coal project contributing to and supporting local services
- the potential loss of employees to mining employment.

Other general issues identified included:

- the proposed accommodation facilities
- accommodation in Wandoan
- the potential need and likely location of a new airport at Wandoan
- community participation through the project phases
- the importance of site rehabilitation during and after operations
- the importance of the region's local history.

6.1.2. Property owner meetings

At meetings of property owners held in 2007 and 2008, the most frequently reported concerns were related to the consultation process, impacts on lifestyle, loss of families from the area, uncertainty about the future, loss of local history, the valuation and compensation processes, loss of good agricultural land, environmental concerns including dust, noise and water issues, visual impacts, and impacts on flora and fauna.

6.1.3. Community Reference Group

An established Community Reference Group (CRG), featuring representatives from key community groups, agencies and government, has been actively engaged since project inception and has continued to meet since. In 2007 and 2008, five CRG meetings were held. These early meetings identified the following potential issues:

- the change in community members
- the need for upgraded social infrastructure in the Wandoan township
- changes to the project's IAS
- potential water sources and town water use
- the need for a new airport at Wandoan
- upgrade of water supply and facilities in Wandoan
- accommodation facilities
- farm versus mine employment
- amenity concerns
- lack of information and communications.

6.1.4. EIS Community Consultation Report

A list of recommendations from the EIS Community Consultation Report is listed in the Stakeholder Engagement section of the EIS (Volume 1, section 5.11.9).

Of the 62 EIS submissions received, social impact issues were raised on 45 occasions. Of these, the following social impact categories were identified:

- increased demands on amenity and the airport (11 submissions)
- road relocations, including concerns about the impact on bus stops (9 submissions)
- air quality, dust emissions, noise and vibration (15 submissions)
- effects on landholders, including lease back arrangements and compensation (7 submissions)
- impacts on housing market (3 submissions).

For the purposes of this report, the key issues raised in submissions in response to the SIA section of the EIS are grouped in accordance with the following themes:

- social impacts
- cumulative impacts
- landholder resettlements
- community health, safety and wellbeing
- social infrastructure
- housing and accommodation issues
- workforce matters
- employment, training and economic development
- Indigenous engagement
- stakeholder engagement.

6.1.5. Ongoing community consultation

Community consultation continued throughout 2009 and 2010. Appointment of a locally-based community liaison officer and the opening of a project office in 2008 allowed for constant contact and interaction with community members. The office is in the main street of Wandoan and is set up as a drop-in centre to encourage community interaction. Community consultation in 2009 and 2010 also included:

- individual and small group meetings
- meetings of the project CRG
- community meetings
- landholder meetings
- attendance at and involvement in community events
- presentations to community groups
- operation of a '1800' number and email information system
- publication of community newsletters and notices
- compilation of a suppliers listing and discussion with potential suppliers
- consultation with community and local groups regarding initiatives under Xstrata Coal's CSI Partnerships with QMEA and Department of Education and with Queensland Health for the upgrade of the Wandoan Outpatients Clinic
- consultation with local community groups about community projects and funding from the Xstrata Coal Wandoan Community Fund.

Key issues raised by local stakeholders included:

- applications for community funding support through Wandoan Community Fund and requests for Xstrata's involvement in community activities and projects
- matters relating to management and leasing of Xstrata-owned properties
- uncertainty about the impact of the proposed RSPT and MRRT and the impact on the local community should the project be stalled
- uncertainty regarding the impacts of the strategic cropping land policy framework on the project
- conditions offered by Xstrata Coal for land purchases.

6.2. Managing social impact in resource communities

6.2.1. General government policy

The SRC policy was released in September 2008. It builds on the *Sustainable Futures Framework for Queensland Mining Towns* released by the state government in June 2007. The policy outlines the government's commitment, in partnership with industry and local government, to strengthening SIA within existing EIS processes. The initiatives contained in the SRC policy reinforce the principles of leadership, partnership and collaboration, corporate responsibility, sustainability, communication and community engagement.

As part of the SRC policy, the Queensland Government established a \$100 million SRC Fund to improve social infrastructure in communities affected by mining industry growth. Approximately \$23.65 million from this fund has been allocated to provide key social and economic infrastructure in the Surat Basin during the period from January 2009 to March 2010.

Funded initiatives include:

- road upgrades and road safety improvements
- upgrades to the Roma Airport
- a trade training hub including a new stand alone facility at Miles State High School and refurbishment of industrial workshops at Wandoan and Taroom schools
- refurbishment and rebuilding of State Emergency Service facilities and construction of SES staff housing
- new pools at the Dalby Aquatic Centre
- a new Chinchilla Community Centre.

The SRC policy identified improved SIAs as a core strategy to deliver better social outcomes in resource communities as they provide:

- an existing mechanism for identifying and appraising the social impacts and mitigating the adverse impacts on communities of proposed new or expanded major mining and petroleum developments
- an existing framework within which all stakeholders, including state and local governments, the resource industry, and the community can have input into the decision making process about resource development projects that will affect them.

6.2.2. New social impact management plan requirements

Proponents of new or expanded major resource development projects requiring an EIS under either the EP Act or the SDPWO Act are now required to develop a SIMP as part of the project approval process.

The SIMP establishes the roles and responsibilities of proponents, government, stakeholders, and communities throughout the life of a project to mitigate and manage social impacts and enhance benefits and opportunities that may be associated with the construction, operation and decommissioning of major resource development projects. DIP's Social Impact Assessment Unit (SIAU) has prepared a SIMP guideline to assist proponents to develop SIMPs. The SIMP will become integral to the EIS process through proposed legislative amendments planned for early 2011.

As the EIS process for the project was well advanced before the preparation of a SIMP became routine practice, the Coordinator-General requires the proponent to undertake formal public consultation on a draft SIMP for the project, and he commends the proponent for preparing a draft SIMP for his consideration.

6.2.3. Development of draft SIMP for the Wandoan Coal Project

6.2.3.1. EIS findings, submissions and analysis

In November 2009, the SEIS Executive Summary identified the proponent's commitment to develop a draft SIMP, which is referred to as a 'Social Involvement Plan' but which has since been re-titled to reflect the progression to SIMPs.

Although the ToR for the EIS did not specify that the proponent must prepare a SIMP, the proponent's SEIS indicated their intention to develop a comprehensive plan in consultation with the community, the WDRC, and the state government to cover the construction and operation phases of the project. It is noted that the township of Taroom is located within the Banana Shire Council local government area, which will need to be consulted during the finalisation of the Wandoan Coal project SIMP.

Proposed social impact mitigation measures and strategies

The SEIS provided an overview of proposed social impact mitigation measures and strategies (Volume 1, pages 21-3–21-5) as outlined below:

- Ongoing community consultation and communication processes to keep the community informed of project activities and provide for community feedback to the WJV, through measures such as:
 - preparing and distributing regular newsletters
 - shopfront displays
 - continue to operate a '1800' telephone hotline
 - continue employment of a project liaison officer, based at Wandoan
 - community information sessions
 - community surveys to identify issues and concerns and gain feedback
 - continue the CRG
 - continue to participate in the Wandoan Interagency Network
 - liaise with the WDRC Community Development Unit
 - liaise with the WDRC's Wandoan Liaison Committee.
- A community visioning process to involve the community in determining their future goals and aspirations for the township of Wandoan.
- A social issues and project impact monitoring process to involve the community in:
 - identifying social issues and project impacts to be monitored, metrics for measurement and processes for data collection
 - isolating the project's contribution to social issues, compared with contributions from other social, economic or environmental forces, and from other projects and industries.
- Ongoing social issues management initiatives co-developed with the Queensland Government and WDRC to address social issues, as identified through the monitoring process above, by:
 - working with all community service providers to ensure appropriate levels of community services continue to be available within local and regional areas
 - working with local health providers and government agencies to plan for future health service needs
 - working closely with the Queensland Police Service and other emergency services, particularly in relation to traffic management and associated road safety issues.
- Specific corporate-community projects co-developed with the Queensland Government, Western Downs Regional Council and local community organisations, to address social issues that may be identified through the monitoring process above.
- Economic development and business opportunities initiatives and tendering policies during both project construction and operation to, in conjunction with relevant government agencies to encourage:
 - participation by local business in business opportunities generated by the project
 - business support and enterprise development networks.
- Employment and training initiatives and recruitment policies in cooperation with relevant government agencies, local schools and training institutions to:

- encourage participation by local job-seekers in employment and training opportunities generated by the Project
- encourage the provision of apprenticeships/traineeships for local youth and the school-based training
- conduct a local community skills audit to understand the range of skills and experience available locally and to determine where training opportunities could be directed
- Engagement of Wandoan Coal project employees in the local community by implementing a Corporate Volunteering Program and encouraging personal volunteering.
- Small donations and sponsorships through the Xstrata Coal Wandoan Community Fund to:
 - grass-roots community organisations in Wandoan, Taroom and Miles
 - be fully funded and distributed by the Wandoan Coal project.
- Major donations through the Xstrata Coal Global Social Involvement Program, including a partnership with:
 - Queensland Health to re-develop the primary health care facilities in Wandoan
 - Education Queensland to bring a range of enriched curricular programs to Wandoan, Taroom and Miles State Schools.
- A complaints management system to:
 - track and report on complaints by type and location
 - employ mitigation measures to address issues causing complaints
 - ensure appropriate follow up and resolution with complainants.
- Behaviour protocols for all Wandoan Coal project employees, as part of a robust site induction process, including employee sign-off, covering:
 - after hours behaviour
 - travel and driving
 - interactions with the community
 - involvement in community organisations and volunteering.
- Employment of appropriately experienced community engagement staff, including a:
 - Community Liaison Manager to design and implement the SIMP
 - Local Project Liaison Officer to address concerns and enable proactive actions.
- Appropriate and agreed key performance indicators to measure the plan's implementation.
- Provision for annual internal review and five-yearly external review, based on surveys, consultation with the local communities and local service providers.

The proponent has prepared a draft SIMP for the project. It articulates how the proponent intends to mitigate and manage social impacts identified during the construction and operation phases of the project (see subsection 6.2). The proponent has committed to engage with key stakeholders to finalise the SIMP within six months of the release of this report. The Coordinator-General considers the draft SIMP satisfactory for the purposes of conducting the final consultation phase.

The proponent's draft SIMP considers social impact mitigation and management strategies, which, in turn, consider existing regional plans, community plans and government policies, strategies, programs and services to maximise their effectiveness and ensure that the future versions of the SIMP address local and regional impacts.

The draft SIMP states that the proponent will engage with the project CRG and other stakeholders to finalise the draft SIMP. The techniques identified by the proponent to finalise the draft SIMP and ensure that stakeholders have an opportunity to provide input include:

- draft SIMP to be posted on the project website www.wandoancoalproject.com.au which will include a feedback form for stakeholders
- interested local community groups and service providers to be notified of release of draft SIMP of opportunities to provide feedback
- meetings with interested community stakeholders

- local, state and Australian government agencies to be notified of release of draft SIMP and of opportunities to provide feedback
- meetings with the CRG
- direct mail of information about the draft SIMP
- well-publicised contact points such as an information hotline, email address and reply paid address
- notification on local community notice boards
- Wandoan shopfront.

The proponent has indicated that it intends to engage stakeholders about the draft SIMP as soon as it is available for release. It is anticipated that this will occur immediately following the release of this report. Stakeholders will have six weeks to provide comments, their responses will then be collated and considered and any alterations and additions made in consultation with relevant groups. A final SIMP will then be issued within six months of the issue of this report for the Coordinator-General's approval.

6.2.4. Conclusion—Managing social impact in resource communities

A condition is imposed that ensures the proponent implements its commitments towards issues raised in the EIS and SEIS submissions, and to ensure the potential social impacts identified in the SIA are mitigated and managed (Condition 11, Schedule 1).

6.3. Relocating landholders

The EIS and SEIS identified approximately 70 land titles required for acquisition within the MLA areas and that these belong to 42 property owners. Twenty-five have entered into purchase or compensation agreements with the proponent.

A number of the property owners affected by the project both reside and operate their businesses from their properties while others live on other properties in the district or further afield. There is evidence of considerable investment in relevant infrastructure to accommodate the various industries and lifestyles enjoyed by the owners.

The directly affected properties are used for agricultural purposes with the majority used for beef cattle production. Some properties have a mixture of cattle and fodder crops and three properties have registered feedlots.

Furthermore, the EIS identified that some of the affected property owners have a strong historical and emotional connection to their properties and the community, with some properties having passed through several generations of the one family. Some property owners are long-term residents of the Wandoan community and strong social and family connections among the affected property owners were identified. Some property owners have elderly parents living locally who rely on their assistance and care. These local ties extend to participation in community work and volunteering in local community and sporting groups, committees, churches, local schools and the kindergarten.

Section 5.28 of the SIA (Properties directly affected by the MLAs) states that property owners, their families, their employees and tenants will be required to vacate their properties. All property owners may be offered the option of lease back. Discussions with owners at the time of the SIA indicated that many wished to stay in the area (because of social and family connections and high regard for land quality) but this was contingent on the availability of local suitable, affordable properties.

Section 4.2.6 of the SIA outlines consultation with property owners. It is noted that consultation with property owners has continued since EIS and SEIS submission. Property owners meetings were held with those who lived within the initial MLAs and those whose properties adjoined the study area.

Section 4.6 summarises the issues raised by property owners as:

- property valuation and project access
- project timing

- the consultation process
- loss of lifestyle
- loss of history
- effects on the community
- loss of employees from local businesses to the mining industry
- loss of agricultural land
- environmental impacts.

More information about the issues and concerns raised during discussions with property owners and the project team is in Table 4.8 of the Community Consultation Report.

6.3.1. Resettlement process

The proponent advised that the project would involve resettling up to 24 families from the MLA areas and purchasing 18 properties from non-resident owners. Negotiations with all 42 affected landholders have been carried out since project inception and currently 17 property owners have yet to finalise purchase or compensation agreements.

The process of resettlement causes social impacts such as anxiety and stress, uncertainty, disruption to daily living, and potential changes to family structure.

Similarly, an increasing population and the presence of temporary construction workers are not social impacts in themselves but they may cause other impacts such as changes in the perceptions of residents about their community, and possible stresses on social infrastructure.

Locally, the proponent has detailed initiatives to minimise the social impact of resettlement on affected property owners and the community within the draft SIMP.

In overseas operations, Xstrata resettlement practice is in line with International Finance Corporation (IFC) Standards on Land Acquisition and Involuntary Resettlement (see www.xstrata.com/sustainability/community/resettlement).

Resettlement good practice requires consideration of issues specific to the affected communities. The draft SIMP identifies how the proponent has and intends to respond to affected landholders (refer to section 5.1.1 Landholder Resettlement).

To assist landholders to resettle away from the Wandoan project MLA area, the proponent has offered landholders a variety of conditions to land sale contracts and to compensation agreements.

These include:

- lease back provisions that allow landholders to continue to occupy and operate their business on the property for a period rent-free
- lease back provisions that allow landholders to continue to occupy and operate their business on the property for a period at commercial rates
- provisions to allow other affected landholders to take up leases on properties own by Xstrata Coal when the former owners of that property do not want to lease back the property
- a buy-back clause that allows former landholders the opportunity to re-purchase the land they formerly owned at the price they sold it to Xstrata Coal for, should this land be offered for sale by Xstrata Coal within the next five years
- the opportunity for the landholder to use the deposit paid by Xstrata Coal before the landholder becomes entitled to the deposit, to assist the landholder with the purchase of another rural property
- the opportunity for the landholder to remove any houses, sheds, yards, fencing, or other buildings from the property. Some have taken advantage of this provision and removed houses of re-erection

elsewhere, have donated such property to charitable organisations or have salvaged the materials for use elsewhere

- provisions to allow existing residences to be moved to other parts of the property if this is the affected landholder's preference, or constructing a new home on a different part of the property by the WJV (or financed by WJV) if this is the landholder's preference
- reimbursement of legal, valuation and accounting costs relating to the sale or compensation agreement by Xstrata Coal to an agreed amount.

Other assistance offered to affected landholders during resettlement includes:

- assistance to help preserve any historically significant items from their properties in consultation with the Wandoan Historical Society
- free access to telephone and face-to-face confidential counselling services
- assistance from the Xstrata Coal's land consultant to find other suitable properties for sale
- access to the proponent's community liaison officer, who is based in Wandoan, and/or Project Manager for advice, clarification or to discuss matters relating to resettlement
- the collation of a local history of the properties within the MLA area by a local amateur historian and author (this history will be collated into a publication to provide a permanent record of local history).

6.3.2. Conclusion—Relocating landholders

The Coordinator-General notes the issues raised by affected property owners about the impacts of the project (as detailed in section 4.6 of the SIA and Section 4.3 of the Community Consultation Report).

Also noted is that the proponent has identified a number of measures to mitigate negative impacts on affected landholders within the draft SIMP, including paying landholders' legal, accounting and valuation costs up to a certain value; offering access to independent and confidential counselling; offering leasebacks of purchased land to sellers, then other affected landholders; and sponsoring a historical project to record the history of the directly affected land holding.

The proponent has indicated that it will continue to consult with directly affected landholders regarding measures to mitigate the direct negative impacts of the project on landholders.

The Coordinator-General acknowledges actions taken by the proponent to date to manage the resettlement of affected landholders. A condition is imposed, stating that the project's SIMP must identify future actions that the proponent will undertake to continue implementing landholder resettlement mitigation and management strategies (Condition 2a, Appendix 1).

6.4. Housing issues

6.4.1. Government policy and EIS findings

Project proponents are responsible for identifying and considering worker accommodation and impacts on the housing market as part of their project development and planning, and analysing these issues in the SIA part of an EIS. Proponents must also mitigate any adverse accommodation and housing impacts as a result of planned resource projects and specify mitigation and management strategies. These strategies must be based on a strong understanding of:

- any likely adverse impacts
- local and regional circumstances
- the nature and lifecycle of the resource project under consideration.

Together, the *Sustainable Planning Act 2009* and the *Local Government Act 2009* establish a range of planning mechanisms, including regional plans, local government priority infrastructure plans, community plans and planning schemes. These planning mechanisms must be taken into account by the proponent when considering worker accommodation and project impacts on the housing market and

in developing strategies to mitigate and manage adverse impacts. The Queensland Government's SRC policy also supports better planning for, and responses to housing issues in resource communities.

The Coordinator-General notes that DIP is currently engaging with the Local Government Association of Queensland (LGAQ) and the Queensland Resources Council (QRC) to develop a Major Projects Housing Policy, which is a key government commitment under the SRC policy.

Furthermore, the Queensland Government's new Growth Management Strategy promotes effective and coordinated planning for growth in Queensland. Effective planning for resource communities is an important part of this strategy.

The Queensland Government is committed to the liveability of resource communities and to develop better linkages between land use, infrastructure delivery, economic development, environmental protection and affordable housing, as reflected in the recent establishment of Growth Management Queensland.

Partnerships between the Queensland Government, local governments, industry and community underpin consideration of accommodation and housing impacts of resource projects.

The EIS (Volume 1, section 5.17.1) identified that the project is likely to affect accommodation availability and affordability within the region and particularly within the township of Wandoan. It is likely that housing and accommodation in Wandoan and the surrounding area impacted by the project may outstrip the current supply.

The location of the proposed airstrip is also likely to impact housing and accommodation demand and supply. As the site for the airstrip is yet to be determined, the potential impacts of this project activity have not been assessed as part of this EIS.

Regarding the location of the airport, the proponent has advised DIP that the project had reached agreement with Queensland Gas Corporation (QGC) for a joint approach to the planning and construction of the airport. To progress this matter, a consultant has been engaged to carry out a concept study, to finalise the location and to cost the airport. Final detailed design approvals for the airport and agreement with WDRC will be completed during 2011.

6.4.2. Direct impacts from workforce for Wandoan Coal Mine

6.4.2.1. EIS findings, submissions and analysis

Information on the project's proposed workforce profile and accommodation proposals can be found in Chapters 6 and 21 of Volume 1 of the project's EIS and SEIS.

The project will require an estimated construction workforce of 1300 with an additional 210 flow-on jobs generated in the region. The operational workforce is expected to comprise 844 jobs on the mine site, of which 754 will be permanent operational employees and 90 would be contract maintenance workers.

In total it is projected that the population of the Wandoan township will increase by approximately 380 people (the 2006 resident population was 413) and the Taroom township will increase by 135 (the 2006 resident population was 668).

At similar Xstrata Coal operations in Queensland, the proponent has advised that 20 per cent of employees live locally and go home to their families after work every day. For the Wandoan Coal project, this proportion would equate to around 150–200 flow-on employees in the local area around the towns of Wandoan, Miles and Taroom.

Furthermore, it is anticipated that employees who are located in the mine accommodation village would travel back to their homes at the end of their shift cycle by company-provided bus or air service, or would drive themselves if they did not live in an area close to those serviced by company-sponsored transport. Those driving themselves home would be expected to comply with the project's fatigue-management protocols. The proponent has advised that it will be providing incentives to permanent employees to purchase houses in Wandoan.

The draft SIMP identifies that the proponent proposes the following accommodation arrangements for their workforce:

- building a permanent, fully serviced mine accommodation village on or adjacent to the mining area to house the majority of the project's operational workforce
- constructing 15 new houses and 10 duplexes in Wandoan to house 35 of the project's staff members, some with families; the construction of another 15 houses in year 5 of the project is planned
- encouraging permanent employees to purchase or build local residences
- caravan parks, hotels and motels will not be used for long-term accommodation of personnel in the operational phase of the project
- implementing protocols that clearly outline the behaviour expected from the project workforce.

6.4.3. Construction workforce

The EIS states that the construction and operational workforces will be primarily housed in purpose-built accommodation facilities in or close to the mine site. It also states that the workforce required to build these on-site accommodation facilities will initially provide their own accommodation or use accommodation available within the region until sufficient units are constructed on site.

The proponent has estimated that 1345 beds will be required in the accommodation facility by year 1, with around 30 workers accommodated in Wandoan, Taroom, and Miles. The number of beds is expected to peak at 1425 as the operations workforce begin to stay in the accommodation village.

The proponent recently advised DIP that to accommodate pre-construction workers it may seek approval to build a temporary camp on the Wandoan-Jackson Road should other opportunities to house the initial construction workforce not be realised.

The proponent advised that it is considering other options of providing temporary accommodation, including one of two purpose-built accommodation facilities in Wandoan and Miles that are proposed to be provided on a commercial basis by third parties.

The WDRC submission on the EIS noted local community concerns about the proposal in the EIS to locate workforce accommodation facilities adjacent to the mining lease. These local concerns centred on the potential for the EIS workforce accommodation proposal to create an 'us and them' situation and a preferred position for the camp accommodation to be located adjacent to the existing Wandoan township to support integration of the mine workforce with the Wandoan community.

The WDRC supported the community preference for work camp accommodation to be located adjacent to Wandoan, noting that the Western Downs region is different to more remote centres given the well-established communities in the region.

The Coordinator-General considers that the forecast 20 per cent of the operational workforce living locally outside of a camp will contribute to competition for private rental accommodation in and around Wandoan, Taroom, and Miles unless the project provides new dwellings for these individuals or they are existing permanent residents. However, it is noted that, out of the existing 204 dwellings in Wandoan, 42 are currently vacant and that WDRC plans to develop five separate subdivisions, totalling about 144 blocks, on presently unallocated state land within the town.

The Coordinator-General will need to be assured that the housing market can respond to the increased demands created by any increase in workers (either directly or indirectly associated with the mine) living in and around Wandoan, Taroom, and Miles. The issue particularly relates to the potential decline in the availability and affordability of housing and accommodation for existing residents.

6.4.4. Operational workforce

The proponent's proposed workforce accommodation arrangements are outlined in the section 'Direct impacts from workforce for Wandoan Coal Mine'. A number of options are currently being considered by the proponent in discussion with the WDRC. These include whether to locate the worker accommodation village on or off the mining lease. It is noted that the accommodation village will be the subject of a separate development assessment under SPA by the WDRC if it is located off the mining lease.

6.4.5. Conclusions

Given the change in the location of the proposed worker accommodation village that was investigated in the EIS, and the likelihood of permanent employees taking up incentives to reside at Wandoan, the Coordinator-General agrees that the proponent will undertake an accommodation and housing data collection project to inform the development of project accommodation and housing mitigation and management strategies.

This work will comprise the following two stages:

- Stage 1: An accommodation and housing data collection project during the construction phase of the project, to assess the project's impacts on accommodation, housing and housing markets; the effectiveness of the project's accommodation and housing mitigation and management strategies; and whether new strategies should be developed, implemented and incorporated in the SIMP.
- Stage 2: A repetition of the accommodation and housing data collection project during the first five years of operation of the project (at a date to be agreed with the Coordinator-General) to assess the effectiveness of the project's proposed accommodation and housing mitigation and management strategies; and to identify if new strategies need to be developed, and incorporated into future versions of the SIMP over the life of the project.

The requirement for the accommodation and housing data collection project and accommodation and housing mitigation and management strategies will be undertaken as detailed in the section on 'WJV responses to housing impacts' (page 139), as a component of the final SIMP.

6.4.6. Broader housing impacts of the Wandoan Coal Project

6.4.6.1. EIS findings, submissions and analysis

With regard to the impacts of the project on the broader housing market, the following issues were raised and noted by the Coordinator-General during the EIS process:

- the findings referred to above in relation to community housing
- concerns raised by DoC in regard to the potential adverse impacts on housing affordability and social amenity in the township of Wandoan and surrounding region
- DoC's view that housing issues in the Surat Basin should be mitigated and managed in view of a possible increase in resource activity similar to that which is occurring in the Bowen Basin that is resulting in some degree of housing stress
- WDRC noted the lack of affordable housing proposals in the EIS and would be supportive of a package to develop affordable housing in all centres affected by the project (it is also noted that the WDRC owns three houses in Wandoan that are rented to external tenants)
- the Wandoan State School's concerns about the loss of families from the region and impacts of this loss on the school enrolments and staff
- the view of the WDRC that the housing of 35 personnel in Wandoan is underestimated, suggesting a doubling of this estimate is more accurate
- that there are likely to be up to 30 jobs created during the early construction phase before construction of accommodation villages is complete. Some of these may be local residents and some may be new to the area and may require local accommodation
- that the proposed accommodation village and airstrip will be subject to a separate DA with WDRC.

As the site for the airstrip is yet to be determined, the determination of the impacts of this project activity, including impacts on housing, has not been assessed as part of this EIS.

6.4.7. WJV responses to housing impacts at local and regional level

The draft SIMP addresses cumulative impacts in relation to housing shortage by rating rental costs and rental waiting lists as a medium impact. The proposed social impact management strategies are to:

- provide company housing for managerial staff living locally as per EIS commitments

- build a worker accommodation village as per EIS commitments
- communicate with and provide information to the Department of Communities (DoC) and other interested groups to help plan for future housing needs
- establish methods to track housing demand to ensure the project has prior warning of any potential housing stress—for example, . housing to be a regular agenda item for the CRG, establish regular and informal meetings for local housing/social welfare stakeholders and the project, that is, Juandah Housing Association, churches, community care providers, Murilla Community Centre
- work with these and other stakeholders to find local housing solutions if housing stress occurs.

6.4.8. Conclusions—Housing issues

The Coordinator-General notes that, since the EIS, the proponent has engaged in ongoing dialogue with the WDRC about the likely number of project personnel likely to be housed in Wandoan and that these discussions continue to inform WDRC and the proponent's views on accommodation and housing options.

It is the Coordinator-General's view that the project EIS and SEIS have outlined potential requirements to date; however, further detail on any changes to market conditions, planned developments and accommodation strategies is required.

There is currently a gap in data available to estimate the impacts of resource projects on resource communities. This gap derives from the fact that Australian Bureau of Statistics census results are based on the usual resident population and ABS inter-censal population estimates are based on the estimated resident population.

Hence, service populations, such as non-resident workers, are not accounted for in these statistics. Estimates of the size of this population component are currently only available through the Queensland Office of Economic and Statistical Research (OESR), which collates this information from primary sources including surveys of accommodation providers and confidential collections of workforce projections from major resource project proponents.

Therefore, the proponent must provide information to the OESR or another research body to expand on the information provided in the SIA and draft SIMP. The research body will analyse the impacts of each component of the project on the housing market in Wandoan, Taroom and Miles and surrounding areas.

Collating housing market data will accurately assess the potential project housing and project-related cumulative impacts of this development in an area that may in the future be characterised by significant resource development-related activities. The Coordinator-General considers that OESR's or another research body's access to unique and sometimes confidential data sources makes it a suitable entity to undertake this study (however, DIP would need to agree to another research body undertaking the task).

A condition is imposed to confirm the proponent undertaking to further develop accommodation and housing mitigation and management strategies for inclusion in the Wandoan Coal project SIMP, including strategies for continued monitoring to assess the change in demand over time (Condition 2b, Appendix 1).

6.5. Cumulative impacts

6.5.1. EIS findings, submissions and analysis

As noted in the EIS (Volume 1, section 2.3.3—Cumulative Effects) identified that the project is the first mine development in the region and may be a catalyst for similar projects to be developed.

The proponent indicated that a number of mine infrastructure projects are undergoing technical assessment including the provision of water to the project by developing either the CSM water supply pipeline or the raising of the Glebe Weir. The Surat Basin Rail and Nathan Dam projects are also undergoing environmental impact assessment as significant projects declared under the SDPWO Act. Each of these projects surrounding the study area will produce their own individual positive and

negative impacts on the study area and the region. The expansion of the gas industry in the region will also have impacts during the life of the Wandoan Coal project.

The Coordinator-General understands that the proponent lodged an application with the Department of Employment, Economic Development and Innovation (DEEDI) for MLA 50277 over approximately 22 000 ha of land to the west of the existing MLAs. This application is not part of the Wandoan Coal project and would be subject to a separate approval process should the proponent wish to proceed with a coal mine on this site. Any future approval process for this new application would need to consider the interaction in terms of impacts of this potential coal mine with other projects in the Wandoan area.

Section 2.3.2 of the project's SIA, indicated that increased interest in the study area and region would create planning issues and cumulative impacts associated with access, property management, property viability, lifestyles and aspirations, potentially creating distress for affected property owners, neighbours and the broader community.

Thirteen submissions were received on the project EIS and SEIS related to cumulative impact issues. Cumulative impacts include those effects which may increase over time, or be exacerbated by the intensity, scale, frequency or duration of a project both at a specific project site or remote to a project site.

6.5.2. WJV EIS cumulative social issues

The proponent is developing mitigation and management strategies to address the following key cumulative social impact issues, as identified in the project EIS:

- population increases
- increased demand for products and services
- increased demand for childcare
- government health and education services
- increased demand for community support services from council and community organisations
- housing availability and affordability at the local and regional level.

The EIS did not specify specific mitigation measures to address cumulative social impacts. The EIS did propose the following overall social mitigation measures for the study area:

- community involvement in determining future goals and aspirations
- communication about the planning needs of community stakeholders and service providers
- appointing a Community Liaison Manager
- developing a SIMP
- education and training for school leavers
- funding for identified community needs such as:
 - health
 - training
 - opportunities to support cultural and community values
 - incentive packages to encourage employees to move to the study area
 - business and service provider support activities developed to assist in sustainable growth and skill development.

The WDRC considers that the most significant issue associated with mining activity in the region is the potential increase in the population of Wandoan. In WDRC's view, the most likely impact of this population increase would be the destruction of the social fabric of the community and its agricultural heritage.

Key negative social impacts, identified by WDRC, requiring mitigation and management include:

- the impacts of mine shift rosters on health, family life, and community and business viability
- itinerant work population impacts including community safety and increased demand on social infrastructure

- impacts on the housing market especially cost and availability impacts on low income workers not employed in the mining industry
- social costs associated with income differentials
- shortages of skilled people in local jobs as skilled locals move out of the local workforce to better paid jobs in the mine workforce.

To address these issues, WDRC urged the proponent to collaborate closely with local and regional stakeholders during the development of a social impact monitoring and management strategy for the Wandoan area.

In response to the issues described above, it is noted that the WDRC chairs the SRC, Surat Basin Local Leadership Group. The group includes membership of the mayors of regional councils in the Surat Basin as well as other key industry and community representatives. It is understood that the group has also begun considering the cumulative impacts of resource development at the broader regional level.

Members of this group include representatives of local governments, local resource development, unions or industry associations, local and regional community organisations, and business and economic development organisations.

It is also noted that the brief for the development of the WDRC draft 2050 Vision: Community Plan identifies a number of potential cumulative impacts of industry development in the WDRC local government area including:

- the unprecedented growth in resource related industrial activity including coal mining, coal seam methane gas projects and associated pipelines to LNG projects at Gladstone
- construction of a bio-refinery for ethanol production
- several gas and coal fired power stations.

A statutory regional plan is the principal planning tool to address the cumulative growth management issues facing the region. While the majority of the study area is not currently covered by a regional plan, the Queensland government has made a commitment to roll out regional plans across the state. A future regional plan for the area will be a key planning tool in supporting the coordination of future growth management strategies.

The township of Taroom falls within the ambit of the Central Queensland Regional Growth Management Framework (RGMF) which is a broad-based regional plan focusing on regionally significant issues across environmental, economic and social dimensions. The RGMF complements and enhances other planning processes and strategies across the region by providing a vehicle through which the region's vision and aspirations can be articulated to state and federal governments.

The RGMF is built around six guiding principles in the areas of resource use, conservation and management, economic development, infrastructure, social and cultural development, education, training and research, and planning and governance. These guiding principles are drawn together by a set of integrated outcome statements, strategies and actions.

The following values and attributes have been identified by people of the central planning region as underpinning philosophies through which future growth should be achieved and form the context in which this plan is set:

- community vitality and safety
- cultural diversity and acceptance
- ecological sustainability
- improved health and wellbeing
- learning, knowledge and information
- principles of social justice, namely equity, access, participation and equality
- regional and rural communities

- respect for the environment, the land, the climate
- shared and committed vision for the region
- thriving economy.

As a prelude to a regional plan, which would include the Wandoan township, the Queensland Government has committed to the development of a Surat Basin Regional Planning Framework under the Surat Basin Future Directions Statement. The statement, released in March 2010, sets out an effective framework to shape a prosperous and sustainable Surat Basin region to 2030, identifies the major issues facing the region and provides an integrated approach to how the region will address those issues and establishes clear mechanisms to coordinate the work of the Queensland Government and Surat Basin stakeholders.

The development of the *Surat Basin Regional Planning Framework* is being led by DIP and is scheduled for public release in October 2010. The key strategic directions of this framework include:

- sustainability and climate change
- environment and natural resources
- strong communities
- housing choice and affordability
- strong economy
- rural futures
- resource sector growth
- infrastructure and servicing.

The Coordinator-General notes that the proponent, through Xstrata Coal Queensland, is an active member of the Surat Basin Future Directions Steering Committee and is involved in most sub-committees.

6.5.3. Conclusion—Cumulative impacts

It is noted that the draft SIMP proposes that cumulative impacts be managed through collaborative actions developed in conjunction with state and local governments, the proponents of other projects in the Wandoan district and broader region, the WJV community reference group, and other community organisations.

The Coordinator-General considers that the proposed Surat Basin Regional Planning Framework, the WDRC Community Plan, the Central Queensland RGMF and the future development of a regional plan for parts of the study area, including Wandoan, will provide the principal planning tools to address the cumulative impact issues of coal mining in the study area.

These local and regional planning tools will assist with the management of future growth and development in the planning regions, with the aim of such growth occurring in a coordinated manner that balances social, environmental and economic needs. Therefore, a condition is imposed that sets out the actions that the proponent must take to address cumulative social impacts (Condition 13, Schedule 1).

6.6. Community health, safety and wellbeing

The assessment and management of community health, safety and wellbeing impacts is increasingly considered part of the risk management and social responsibility of mining and metals operators¹².

In 2010, the International Council on Mining and Metals (ICMM) released a document entitled *Good Practice Guidance on Health Impact Assessment*. ICMM's vision is one of leading companies working together and with others to strengthen the contribution of mining, minerals and metals to sustainable development. Xstrata is one of ICMM's 19 mining and metals member companies.

¹² *International Council on Mining and Metals. Good Practice guidance on Health Impact Assessment. Guidance 2010-11*

The *Good Practice Guidance on Health Impact Assessment* lists the key determinants of health and wellbeing as:

- environment
- economic conditions
- biological factors
- lifestyle
- personal circumstances
- social influences
- availability and access.

This document provides a list of evidence-based community health and wellbeing indicators. These include chronic disease, physical injury, mental health and wellbeing, housing and accommodation, transport and connectivity, learning and education, and crime and safety.

6.6.1. EIS findings, submissions and analysis

The key issues raised in submissions in response to the SIA section of the EIS had the following themes:

- decreased levels of liveability for families (community identity and lifestyle) and visual amenity) due to impacts from declining air quality, excessive noise levels, increased light, increased vibration (including property damage) and increased traffic impacts
- impacts on individual land owners and sensitive receptors associated with negotiated purchase of lands and impacts on adjacent landowners (air quality, vibration, and visual amenity)
- changing community identity
- changes to age and gender structure of the community due to loss of families from the area and the increased percentage of the local population subject to FIFO-DIDO workforce arrangements
- limited capacity of council and state road infrastructure to safely support increased usage levels
- impact on wider community and service providers.

In its submission on the EIS, Queensland Health (QH) stated that not all the potential adverse health impacts have been addressed by the proponent in their EIS. In particular, the EIS did not address measures to satisfactorily control dust, noise and vibration impacts. QH also commented that the ability of the health service to cope with the increased demand was not fully assessed.

QH also indicated that the proponent must re-assess the air quality and noise levels, as they had conducted their assessment against superseded policies. It is QH's opinion that the proponent must reassess air and noise emissions against the current objectives of the Environmental Protection (Air) Policy 2008 and the Environmental (Noise) Policy 2008. These issues were subsequently addressed in the SEIS.

WDRC's EIS submission stated that: *'the complaints process and Air Quality Management Plan that are both yet to be prepared must include measures that will include the retrofitting of devices to remove excessive dust from properties. This is particularly important in rural towns, where there is wide use of evaporative air conditioning and rainwater for use as drinking water; both may be required to be protected against excessive dust'*.

Similarly, the EIS submissions from the Wandoan State School raised concerns in regard to vibration, odour, dust and noise of Frank Creek Pit being located in close proximity to the Wandoan School; and concerns about the health and well being of students and staff due to possible deterioration of air quality or contamination of school's tank water supply.

This submission also identified concerns regarding the *'... increased risk of students suffering respiratory complaints; and that the school is not identified as a sensitive receptor'*.

The Wandoan Housing Association mirrored concerns related to the effects of dust and the requirement for monitoring of dust impacts.

6.6.2. Conclusions

Of the 62 EIS submissions received for the project, the issue of air quality, including dust emissions, was raised 21 times, representing 6 per cent of submissions.

The Coordinator-General is concerned about the perceptions of impact on community health, safety and wellbeing concerns that were raised in the EIS and SEIS and submissions. He requires that these be investigated comprehensively by further developing a Public Health Study on the social impacts of air quality dust emission on the community as a result of the project. The scope of the study should be developed in consultation with QH.

6.6.3. WJV Health impacts—need for health study

In response to concerns raised about air quality issues, the Coordinator-General understands that the proponent and QH have agreed to discuss the scope of a possible health impacts study and to determine a process to manage this measure as part of the SIMP, including involvement of relevant stakeholders.

The Coordinator-General is further advised that a possible approach to this issue may involve the following elements:

- determining the study area and including a control community to monitor secular change (for example, by time and perception)
- involving the Division of General Practice as a key stakeholder.

It is recommended that the proponent work with QH in relation to the social impacts of air quality including dust emission impacts on local residents and the community as a result of the project (Recommendation 1, Schedule 5).

It is recommended that the proponent incorporate the management of community health concerns related to the project into the SIMP, in consultation with DIP and QH, and with other key stakeholders.

The proponent has agreed that they will include consideration of the public health study as a standing agenda item of the Wandoan Coal project CRG.

6.6.4. Liveability

The EIS and SEIS submissions raised concerns about decreased levels of liveability for families. In recently published work on factors that contribute to the liveability of an urban area, a sense of community is described as the degree to which a person feels that they belong to a readily available, supportive and dependable social structure¹³.

This work indicates that social interaction within a community may reduce social isolation and enhance community connectedness. By contrast, reduced interactions can have a negative effect on social capital, decrease social bonding, and the sense of belonging to one's neighbourhood.

Social interactions can be enhanced or restrained through the design of the neighbourhoods. A sense of community can be associated with the social characteristics of place, and also connection with the physical characteristics of the built environment. The benefits of liveability in encouraging a sense of community include:

- physiological benefits for individuals resulting from improved interaction
- community benefits from an increase in the quality and quantity of social networks and connections (i.e. improved social capital)

¹³ Queensland University of Technology High-Density Liveability Guide Fact Sheet 9 (2010)

- commercial benefits through improvements in the perceptions of the local area leading to higher demand for local goods and services.

6.6.5. Community resilience

6.6.5.1. Managing the social dimensions of community change

Strong views have been expressed by community representatives about the possible social, economic, and environmental costs of new development to their communities (for example, the future liveability of their communities and possible impacts on road safety and air quality). However, at the same time, people are keen to find ways to mitigate these impacts and to take advantage of the economic development opportunities offered by new project developments in the region.

A robust approach is required to understand and assist impacted communities with social and economic changes likely to occur as the study area transitions from a predominantly agricultural to a mixed agricultural and mining area.

Proven strategies and measures to strengthen community resilience can be drawn from leading community economic development practice developed in jurisdictions such as Canada where small, resource-dependent towns have learned to plan for, and manage social changes, and to maximise the local economic benefits of projects and development.

Published examples of Australian community resilience practice are also available as guidance for community, government, and private sector stakeholders interested in improving the long term outcomes for local and regional communities experiencing significant social and economic change.

It will be essential that measures to manage social and economic changes in the Wandoan Coal project EIS study area are developed to ensure that the potential impacts on the local community are well understood, monitored and evaluated across the life of the project.

These measures should be developed through the stakeholder engagement process identified by the proponent in the SEIS as commencing with a community visioning exercise, with a focus on minimising vulnerabilities, and strengthening and maximising the adaptive capacities and resilience of local towns such as Wandoan, Taroom, and Miles. This engagement process should also take into account local government community planning processes.

Under the *Local Government Act 2009*, councils are required to prepare a long-term community plan and to report on the results of an annual review of the implementation of the plan. The community plan represents the community's views, visions and values for the future of the local government area. It is the primary tool to guide council's corporate plan, long-term financial forecast and long-term asset management plan.

The specific details of the plan and the method of community engagement are decided by individual councils. However, some direction is provided in the Local Government Regulation 2005, including:

- a five-step process for developing a community plan:
 - intelligence gathering
 - community input
 - community vision
 - validation
 - policy and adoption
- how a community plan can be adopted or changed
- the contents of a community plan, covering economic, environmental management, governance and social wellbeing.

6.6.5.2. Conclusions

The Coordinator-General commends the proponent for their proposal to undertake a community visioning approach to support the community in determining their future goals and aspirations for the township of Wandoan.

It is suggested that this community visioning approach take into account the Western Downs 2050 Community Plan (as described in the subsection on 'WJV EIS cumulative social issues' on page 141) and it be expanded to capture the vision of the Taroom and Miles communities.

6.6.5.3. Community resilience to be addressed by CRG

In the face of significant social change that is likely to occur as a result of the Wandoan Coal project, it is recommended that the Wandoan Coal project CRG implement a standing agenda item to discuss developing community-based initiatives that are designed to support, maintain and build the resilience of the Wandoan community (Recommendation 2a, Schedule 5).

6.7. Social infrastructure

Social infrastructure plays an important role in bringing people together, developing social capital, maintaining quality of life, and developing the skills and resilience essential to strong communities. It is clear that investment in social infrastructure is essential support for the health, safety, wellbeing and economic prosperity of communities and regions in Queensland.

6.7.1. EIS findings, submissions and analysis

Social infrastructure planning and delivery is a shared responsibility of local, state and Commonwealth government agencies and community organisations, with increasing participation from other interests, including the private sector.

The Queensland Government, in the *SEQ Regional Plan 2005–2026 Implementation Guideline No 5 – Social Infrastructure planning (2007)* document, defines 'social infrastructure' as: '... the community facilities, services and networks that help individuals, families, groups and communities meet their social needs and maximise their potential for development, and enhanced community wellbeing'.

The Wandoan Coal project SIA (Section 3.20) identified that residents in the study area had only limited access to government and community services in the area. Residents accessed some government services through local agents in Wandoan and Miles.

The potential key negative and positive impacts, as identified in the Executive Summary of the project's SIA, relate to changing individual and community needs, including:

- current trend towards a consistent population loss in the area that is currently without the proposed resources developments
- potential changes in the demographic profile, with increases in the population and an increase in the proportion of younger people and males residing within the region
- potential for some low income households to be displaced from existing housing due to an increase in housing costs once construction begins
- potential changes to local social values and the rural atmosphere
- loss of farming families that contribute to the existing social amenity and community participation but the gradual increase in new community members from diverse backgrounds that will be able to participate in community life.
- community perceptions that their feelings of safety and security may be compromised
- potential for social isolation between mine workforces and the community
- potential safety risks associated with road travel as mine personnel drive to and from the site
- potential for a diverse and improved local economy with increased opportunities for small business and local employment

- potential for the improvement of local services and facilities
- potential employment and training opportunities that will help to reduce the loss of young people from the area
- environmental changes which affect lifestyle through increased noise and changes in air quality

The key social infrastructure issues raised through EIS and SEIS submissions included:

- the need for a detailed Community Benefit Package for State and local government infrastructure requirements (WDRRC)
- continuing viability of the Grosmont State School and the impact of a possible closure on students who would have to travel to the Wandoan State School (community submission)
- the impacts of initial population decreases as families leave the area on Wandoan State School staffing and enrolments (before new Wandoan Coal project families move to the area)
- secondary impacts on school bus runs
- negative impacts on communication technology availability and usage (internet usage)
- increased demand for childcare (cumulative)
- increased demand for government health and education services (cumulative)
- increased demand for community support services from council and community organisations (cumulative)
- structural and corrosive damage to community and recreational infrastructure including machinery and fittings from blasting and dust
- decreases in the amenity of social infrastructure due to odours from the waste water treatment plant including negative impacts on the residents of the aged care centre, the health centre and the social life of residents using the tennis club facilities.

The Wandoan Coal project has identified a range of mitigation strategies to address these impacts in the draft SIMP. These include:

- communicate project activities and milestones and make other relevant information available to the following groups to help plan for future education and skills training, health service, recruitment and child care needs:
 - The Department of Education and Training
 - local health providers and Queensland Health
 - local child care providers and DoC
- ensure that project personnel are available to these groups to discuss problems, issues and planning
- develop contract with a general practitioner for recruitment health checks and drug testing outsourcing
- implement a Corporate Social Involvement Partnership with QH in relation to upgrading the Wandoan primary health care facility
- implement a Corporate Social Involvement Partnership with Queensland Education
- provide mine-site occupational health and safety officers and emergency paramedics
- continue to provide donations through the Xstrata Coal Wandoan Community Fund to local community groups for activities and equipment needed to maintain the groups' vitality and ability to provide services, support and opportunities for social interaction for the local community.

6.7.2. Conclusion—Social infrastructure

The Coordinator-General concludes that a consistent message from the Wandoan Coal project EIS is that better social infrastructure planning and provision needs to take place. Good practice suggests that this planning and provision needs to occur at different levels (i.e. at local, state and Commonwealth government levels) as 'vertical integration' is essential to securing adequate resources to meet social

infrastructure needs. The provision of adequate time, opportunity and resources to enable input and ideas from local residents is also essential¹⁴.

The Coordinator-General recognises the pivotal role that social infrastructure plays in supporting better community health, safety, and wellbeing outcomes. To address social mitigation and management, a recommendation has been included in this report (Recommendation 3, Schedule 5).

6.8. Community safety and road safety

6.8.1. EIS findings, submissions and analysis

The EIS stated that the Wandoan Police Station currently employs two police officers and currently has some capacity to cater for population growth associated with the project. The EIS also reported that there were five police officers currently servicing Miles and that this station also has some capacity to cope with population increases.

In the Queensland Police Service (QPS) EIS submission, QPS stated that it would continue to monitor this project and potential impacts on community safety and road safety.

Similarly, the Department of Community Safety (DCS) notes that the proponent proposes to develop an Emergency Management Plan. DCS has recommended that an Emergency Response and Action Plan (ERAP) be prepared in accordance with the State Planning Policy 1/03 Guideline.

Specifically, the ERAP should address the matters associated with the likely direction of bushfire attack, environmental values that may limit mitigation options, location of evacuation routes and/or safety zones. DCS requires that the ERAP should be prepared in consultation with the regional offices of Queensland Fire and Rescue Service, Queensland Ambulance Service and Emergency Management Queensland.

Issues to be addressed are:

- site access and egress
- construction staging
- road closures and traffic hazards
- storage and location of hazardous goods on site and
- other concerns as identified.

The proponent has advised in its EIS and SEIS responses that:

- it will work with the QPS and the Department of Emergency Services (DES) particularly in relation to traffic management and associated road safety issues
- develop a traffic management plan for traffic directly related to the Wandoan Coal project in consultation with contractors and the QPS
- conduct traffic awareness training for communities as appropriate, especially for children using the school bus services and the project's interaction with the region's school bus routes
- establish working relationships with the regional police inspectors and the local sergeant in charge.

6.8.2. Conclusion—Community safety and road safety

The Coordinator-General notes the community concerns that have been raised about the potential impacts, road safety concerns, the increased traffic associated with the workforce shift change periods, access from the mine site to the Leichhardt Highway, and the road safety issues concerning the project's interaction with the region's school bus routes.

¹⁴ Sharyn Casey (2005): *Establishing Standards for Social Infrastructure*. A publication by the University of Queensland Boilerhouse Community Engagement Centre.

He further notes that the QPS, in its submissions to the EIS and SEIS, stated that it would continue to monitor this project and potential impacts on community safety and road safety. The proponent has committed to collaborate with QPS on community road safety and traffic management issues.

However, given the potential cumulative increase in traffic in the region, a condition is imposed, requiring the proponent to respond to community safety and road safety issues by continuing to engage collaboratively with DCS, Department of Transport and Main Roads (DTMR) and the WDRC and the BSC to respond to community safety and road safety issues (Condition 14, Schedule 1).

6.9. Employment, training and economic development

6.9.1. Background

The economic base of the study area is dominated by the agricultural sector. The EIS showed that the largest numbers of businesses in the Taroom region were classified as agricultural, forestry and fishery (75 per cent), followed by construction (5.2 per cent), and property and business services (4 per cent).

Chinchilla mainly comprised of agriculture, forestry and fishing (50.8 per cent), retail trade (10.3 per cent) and property and business services (10 per cent). However, it should be noted that Chinchilla includes some level of mining employment that is not captured in the ABS census, with Wilkie Creek mine operating in this locality.

Similarly, Murilla comprised mainly of agriculture, forestry and fishing (57.6 per cent), construction (7.6 per cent), and retail trade (7.1 per cent). The Banana region, also mainly comprised of agriculture, forestry and fishery enterprises (58.6 per cent), followed by property and business services (8.1 per cent), and retail trade (7.5 per cent). In this context, it should be noted that the Shires of Murilla and Banana have a small number of mining businesses in the project area. That is, Murilla has six mining businesses, while Banana has nine.

In reviewing the characteristics of the Wandoan locality more specifically, the EIS observed that the mining industry currently makes up a small proportion of employment. Based on 2006 census data, employment in the mining industry accounted for 3 per cent of total employment in the area.

The main employment activity in the area was agriculture, accounting for 46 per cent of total employment. Thus, as noted above, it is evident that agricultural activity supports local employment and income. This is followed by education and training (8 per cent) and public administration and safety (7 per cent). WJV notes that while it may not be immediately evident that the local labour market will benefit from the initial expansion of mining activities in the study area, the ability of the current workforce to adapt through further education and training in mining is expected to grow with the operation of the project.

The project is expected to change the underlying economic base and industrial structure of the Wandoan locality by developing businesses and industries that directly and indirectly support the construction and operation of coal mining activities. The key driver of this underlying change relates to the increase in demand for goods and services and population growth resulting from increased employment opportunities.

At a high level, the types of businesses expected to benefit directly, based on the OESR's (2004) Input-Output industry classification, are:

For construction: additional economic activity and employment in:

- non-residential building construction
- non-building construction
- construction trade services.

For operation: additional economic activity and employment in coal mining activities.

The types of businesses most likely to be affected indirectly for both construction and operation of the coal mine are:

Additional economic activity and employment in:

- electricity supply, gas and water
- residential building construction
- accommodation, cafes, and restaurants
- wholesale and retail trade
- machinery, appliances and equipment
- road transport
- rail and pipeline transport
- services to transport
- communication services
- finance, property and business services
- residential property operators
- education services
- health and community services.

The existing economic environment in the Wandoan locality is mainly agricultural oriented; however, there is a possibility that the existing workforce and industrial activities in the wider region could shift towards coal mining activities. While the change in industry orientation is highly likely to be offset by mining associated activities, to address the potential impacts and the constraints identified in section 22.5.4 of the EIS (as part of a range of measures outlined within Volume 1, Chapter 21), the proponent has committed to:

- indigenous employment, business/enterprise, and training opportunities, including any school-based education, assistance and support programs, business/enterprise, and training opportunities
- employ suitably qualified local people in cooperation with relevant government agencies, local schools and training institutions to encourage participation by local job-seekers in employment and training opportunities generated by the Project.
- work in partnership with traditional owner groups, Xstrata Coal Queensland, other relevant project proponents, Queensland Government agencies, Western Downs Regional Council, Banana Shire Council and the Federal Government and Agencies
- conduct a local community skills audit to understand the range of skills and experience available locally and to determine where training opportunities could be directed
- provide apprenticeships, traineeships and school-based training for local youth
- use agreements with Native Title claimants to create opportunities for training and employment for indigenous people
- provide \$720,000 in funding for a partnership with local schools, the QMEA, and the Department of Education and Training for enriched educational opportunities for local students and pathways to employment, tertiary study and training
- provide \$750,000 in funding for a partnership with QH to upgrade the Wandoan Outpatients Clinic to help improve local residents' access to GP services.

These initiatives will be monitored through the Wandoan Coal project SIMP.

6.9.2. EIS findings, submissions and analysis

The key issues raised in submissions in response to the SIA section for the EIS can be grouped in accordance with the following themes:

- need for local job creation and participation in workforce
- long-term unemployed, youth unemployment
- training opportunities
- local business development opportunities; enterprise development

DEEDI's EIS submission stated that the EIS refers to labour market issues including:

- the size and source of the workforce required for the construction and operational phase of the project
- labour force statistics for the area
- proposed new skills and training related to the project including occupation skill groups required and potential skill shortages anticipated
- the development of a Business and Employment Register for local and regional firms and interested persons to be included on the project information database

DEEDI noted that the proponents have committed to developing employment and training initiatives with the Queensland Government or WDRC. DEEDI is keen to assist the proponent to maximise employment opportunities for local people, including local Indigenous people.

6.9.3. Conclusion—Employment, training and economic development

To maximise the local employment benefits arising from the project, a condition has been imposed regarding training employment, training and economic development (Condition 15, Schedule 1).

6.10. Community workforce behaviour and community interaction

6.10.1. EIS findings, submissions and analysis

The DoC EIS submission proposed the development of a workforce social order/control analysis in terms of any negative impacts on the social life and order of nearby townships or communities.

The SEIS identified the following relevant workforce proposals, mitigation strategies and initiatives:

- behaviour protocols for all Wandoan Coal project employees, as part of a robust site induction process, including employee sign-off, covering:
 - after hours behaviour
 - travel and driving
 - interactions with the community
 - involvement in community organisations and volunteering
- engagement of Wandoan Coal project employees in the local community by:
 - implementing a Corporate Volunteering Program during work time
 - encourage personal volunteering by employees in their own time.

6.10.2. Conclusion—Community workforce behaviour and community interaction

The proponent is commended for committing to develop behaviour protocols for all Wandoan Coal project employees, as part of a robust site induction process. To maximise the local employment benefits arising from the project, a condition is imposed regarding workforce management requirements (Condition 16, Schedule 1).

6.11. Indigenous engagement strategy

6.11.1. Government policy

The Queensland Government's Reconciliation Action Plan 2009–2012 commits the Queensland Government to proactively engaging with private sector companies and peak bodies, including charitable and philanthropic organisations, to broker employment and business opportunities with Aboriginal and Torres Strait Islander peoples.

The government's target in this area is that each year there will be an increase in economic and business development opportunities and partnerships between the private sector, the community and Aboriginal and Torres Strait Islander peoples.

These commitments are supported by related initiatives such as the annual Reconciliation Business Forum (led by DoC); the Queensland Reconciliation Awards for Business (led by the Department of the Premier and Cabinet) and Queensland Closing the Gap Partnerships (led by the Departments of Education and Training and Employment, Economic Development and Innovation).

The Queensland Closing the Gap Partnerships initiative supports cross-sectoral partnerships, initially in the areas of economic development and education, and is championed by relevant ministers to mobilise key organisations to tackle Aboriginal and Torres Strait Islander disadvantage.

DEEDI has a range of policies and initiatives to assist Indigenous jobseekers into the workforce including:

- The Indigenous Employment and Training Strategy 2008–2011 (Positive Dreaming, Solid Futures) to meet the Australian Government's target of halving the gap in Indigenous employment outcomes within a decade through a focus on achieving improved employment and training outcomes by drawing on good practice initiatives, identifying areas for improved cooperation and collaboration.
- Indigenous Employment and Training Managers employed by the department to help identify and create sustainable employment and training opportunities for local Indigenous people in specified regions.
- Indigenous Employment and Training Support officers to help indigenous apprentices, trainees and vocational students complete their training and stay in the workforce.

The proponent has advised they intend to employ suitably qualified local people in cooperation with relevant government agencies, local schools and training organisations.

The draft SIMP has identified a social impact management strategy which incorporates the Indigenous Land Use agreements negotiated with native title claimants to create opportunities for training and employment for Indigenous people.

Further, the draft SIMP includes a commitment to cooperate with relevant government agencies, local schools and training institutions to encourage participation by local job seekers in employment and training opportunities generated by the project, focusing on Wandoan township and district residents, Wandoan youth and Indigenous people.

The proponent has identified that the project will draw on Xstrata's national and international expertise and programs to maximise opportunities for Indigenous people to be directly and indirectly employed by the project.

6.11.2. Conclusion—Indigenous engagement strategy

The Coordinator-General notes the proponent's commitments to Indigenous training and employment in the draft SIMP. It is recommended that they work closely with local Indigenous community organisations, DEEDI, DoC, and the Wandoan Coal project CRG to further develop to Indigenous training and employment initiatives to be included in the final SIMP.

A condition has been imposed regarding Indigenous engagement and employment, business and enterprise, and training opportunities including any school-based education assistance and support programs in the SIMP (Condition 17, Schedule 1).

6.12. Stakeholder engagement

Community consultation for the project is reported in Chapter 4 of the EIS and documented in the Community Consultation Report (October 2008).

The EIS reported that a range of consultation activities were undertaken including project newsletters; the distribution of a community fact sheet, project advertisements; a community survey; community information workshops in 2007 and 2008; property owner consultation; community reference group meetings; an information display at the Wandoan Show 2008, and the establishment of community contact points at the start of the project for the life of the project including a project information line, email address and reply paid mailing address. Further comprehensive stakeholder consultation has been undertaken throughout 2009 and 2010.

6.12.1. Community consultation recommendations

The Community Consultation Report recommended:

- given the effect of the project and its proximity to Wandoan, the proponent will continue to provide regular information to the residents about the status of the project as it progresses
- the project continue to provide focused consultation with directly affected property owners to ensure this specific group does not feel isolated from the general community
- it would be advisable to establish a local contact point for the community to respond to enquiries and to provide information at opportunities such as school information days and Landcare meetings
- the project continue to provide information to the surrounding towns of Taroom and Miles to help manage the region's expectations
- following the release of the EIS, the proponent has agreed to:
 - continue conducting one-to one meetings with affected property owners as required
 - conduct another series of community information workshops involving the technical team to facilitate discussion about flora and fauna findings and proposed water sources
 - continue CRG meetings to present and discuss impacts and mitigation strategies as described in the EIS
 - continue discussions with local service providers
 - conduct a follow-up survey to measure possible changes to community opinion after the release of the EIS
 - maintain community contact points.

The report further notes that the timing of these activities is considered in relation to the making of project decisions and progress of the studies. This will ensure that information being received by the community is relevant, timely and will assist in the overall understanding of the project.

6.12.2. Conclusion—Stakeholder engagement

As stated earlier in this report, the Coordinator-General reiterates the importance of stakeholder engagement for the life of the Wandoan Coal project, and a condition is imposed that requires the proponent to prepare a Stakeholder Engagement Strategy in relation to the SIMP (Condition 11(b)IV, Schedule 1).

A condition is also imposed that outlines the requirement for the life of the Wandoan Coal project CRG (including decommissioning) (Condition 18, Schedule 1).

It is further noted that the proponent has agreed to provide adequate resources for the establishment and work of the Wandoan Coal project CRG, including:

- reimbursement of reasonable out of pocket expenses of the Chair and/or CRG members, as required
- meeting facilities
- secretariat support.

The proponent will also develop a Wandoan Coal project CRG Charter, (similar to a ToR) in consultation with stakeholders and will detail the resource commitment for the Wandoan Coal project CRG.

7. Environmental management plans

7.1. Context

The EIS and SEIS (Volumes 1 and 2, Chapter 27, and Volume 4, Chapter 21) outline draft environmental management plans for all components of the project.

The environmental studies and consultation conducted as part of the impact assessment process have identified the potential construction and operational impacts of proceeding with the project.

The environmental management plans propose environmental management strategies, actions and procedures to be implemented during the construction and operation of the mine in order to mitigate adverse and enhance beneficial environmental and social impacts.

Environmental outcomes are achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing, to ensure that the commitments are met. The environmental management plans also identify corrective actions if monitoring indicates that the performance requirements have not been met.

In effect, the environmental management plans become the key reference documents that convert the undertakings and recommendations of the environmental studies into actions and commitments to be followed by the designers, constructors and future operators of the proposed project.

The environmental management plans will be further refined and expanded after this report is finalised, during the detailed design phase of the project and through ongoing consultation with the relevant advisory agencies.

For the purpose of approvals required for the project, there are two categories of environmental management plans:

- EM Plans—that are specifically required under the EP Act for the EA for mining activities and the gas supply pipeline
- EMPs—for construction and operation of all other components of the project (including components of the mine) that are not subject to the EA.

7.1.1. EM Plans

An EM Plan is required under section 201 of the EP Act, to be submitted to the administering authority (DERM), as part of an application for an EA (mining activities) and mining lease. Similarly, an EM Plan has been prepared to support an application an EA (petroleum activities) in relation to the construction and operation of a gas supply pipeline running from the existing Peat-Scotia lateral pipeline to WJV's mining leases (the petroleum activities).

Section 202 of the EP Act states that the purpose of an EM Plan is to propose environmental protection commitments to assist the administering authority (DERM) to prepare the draft EA. Approval of the EA and therefore approval of the EM Plan is in accordance with the EP Act.

In accordance with section 203 of the EP Act, an EM Plan for the purposes of an EA must contain the following sections:

- section 1—provides a description of all elements of the project including the relevant mining leases and land tenure, potential adverse and beneficial impacts on the environmental values likely to be affected by mining activities, states any code of environmental compliance environmental protection commitments and any other information to allow the administering authority of the EP Act to decide the application and conditions to be imposed on the EA
- section 2—outlines how the environmental protection commitments and objectives are to be measured and audited, and includes control strategies to ensure the objectives are achieved
- section 3—states the rehabilitation objectives and identifies rehabilitation indicators against the environmental protection objectives described in section 2

- section 4—states that the indicators described in section 3 may vary for different parts of the land that have different types of disturbance.

In addition to the EM Plan, the proponent will be required to prepare a Plan of Operations, under chapter 5, part 7 of the EP Act, with contents specified by section 234 of the EP Act.

7.1.2. EMPs

The EMPs, for construction and operation, relate to all other components of the project (including components of the mine) that are not subject to the EA and are therefore not legally required to be approved.

There are certain plans that, while not required for the EA, are still required to fulfil some other statutory obligation, for example the cultural heritage management plan under the *Aboriginal Cultural Heritage Act 2003*, or greenhouse gas reporting under the Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

The effective implementation of the EMPs will satisfy the commitments made by the proponent in the EIS, the SEIS, and in correspondence with members of the public and advisory agencies, and will ensure the effective management of environmental impacts of the project.

The project commitments made by the proponent during the EIS process are included in the structure of the EMPs.

The following sections provide further information on the EMPs for each component of the project.

7.2. MLA areas and gas supply pipeline

The environmental management plans for the MLA area and gas supply pipeline are presented in the EIS and SEIS (Volume 1) for mining activities (27A) gas supply pipeline (27B).

Additional sections included in the SEIS for waste water treatment plant (27C) and potable water supply (27D) that are not subject to an environmental authority for mining or petroleum under the EP Act.

The topics for the environmental or other comparable management plans, outside or beyond the scope of the EA for the MLA areas include:

- biodiversity and land management (also referred to in the EIS as the 'Biodiversity Plan', and also includes fauna and flora, vegetation, pests—both weed and feral, fire, land rehabilitation, contaminated site management, and visual amenity considerations)
- blast management
- cultural heritage management
- greenhouse gas and energy management
- health and safety management (including contractor management, biting insect management and emergency management)
- social involvement/social impact management
- traffic management (including stock route and access management).

The operational EMPs for the mining leases will provide an action program for achieving or implementing the environmental protection commitments and control strategies in the EM Plan for the mining leases.

As discussed in section 5.8.4.2 of this report, the proponent has prepared a draft Biodiversity and Land Management Plan (BLMP), which will integrate with the Plan of Operations, for activities other than those included in the EM Plan for the sake of the EA, and not including activities associated with the Glebe Weir dam and pipeline. The BLMP includes a suite of topic-specific management plans to address such matters as weeds, pest and feral animals, contaminated land management, fire etc.

The BLMP relates exclusively to the MLA areas and associated infrastructure where relevant, and will integrate with other plans that have been or will be produced for the mine. However, the BLMP does not overlap with commitments made as part of the Glebe weir raising and pipeline, potable water treatment plant upgrades in Wandoan, or sewage treatment plant upgrades in Wandoan.

7.3. Southern CSM water supply pipeline

The topics nominated for the EMP for the southern CSM water supply pipeline include:

- air quality (including dust) management
- biodiversity and land management (also referred to in the EIS as the 'Biodiversity Plan', and also includes fauna and flora, vegetation, pests—both weed and feral, fire, land rehabilitation, contaminated site management, and visual amenity considerations)
- cultural heritage
- erosion and sediment control
- health and safety management (including contractor management, biting insect management and emergency management)
- noise management
- traffic management (including stock route and access management)
- waste management.

7.4. Glebe Weir raising and pipeline

The EMP for the Glebe Weir raising and pipeline component of the project was prepared by SunWater and relates exclusively to the weir raising and the pipeline. It does not correlate in any way with other plans that have been produced by the WJV for either the mine or the southern CSM water supply pipeline option.

The topics that SunWater has nominated for the EMP for the Glebe Weir and pipeline include:

- soils, geology and geomorphology
- land contamination
- visual amenity
- hydrology
- air, noise and vibration
- aquatic flora and fauna
- terrestrial flora and fauna
- cultural heritage
- waste management
- hazard and risk
- social and economic
- traffic and safety.

For each key issue, the structure of the EM plan provides:

- implementation strategies
- monitoring requirements
- reporting requirements
- corrective actions.

7.5. Coordinator-General's conclusions— environmental management plans

The SEIS (Volume 1, Chapter 28) contains commitments for the MLA areas and gas supply pipeline that were revised further to the EIS. In particular, a range of monitoring programs was identified to support the implementation of management and mitigation measures for the project. The requirement for these monitoring plans to be prepared and implemented will be incorporated in the project's construction and operational EMPs.

The proponent has not altered its commitments for the southern CSM water supply pipeline since the EIS was published, and the commitments have been referenced to their source chapter as depicted in the summary table in the EIS (Volume 2, Chapter 28).

SunWater has not altered its commitments for the Glebe Weir raising and pipeline since the EIS was published, and the commitments have been referenced to their source chapter as depicted in the summary table in the EIS (Volume 4, Chapter 22).

A condition is stated that requires the proponent to incorporate all project commitments into the relevant environmental management plan, wherever applicable (Condition 1(c), Schedule 1 and Condition 10, Schedule 8).

8. Matters of national environmental significance

8.1. Introduction

This section of the report addresses those sections of Part 5 of the State Development and Public Works Organisation Regulation 1999 that deal with the requirements of the Coordinator-General's report for proposals:

- declared as a significant project for which an EIS is required
- for which the Commonwealth Government has accredited assessment of the relevant impacts pursuant to the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act).

This section provides the state's interim evaluation of the potential impacts of the project on the 'controlling provisions' being the 'matters of national environmental significance' (MNES)¹⁵ under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act).

Ecological matters that are of state significance only are addressed in other sections of this report, notably section 5.8, Terrestrial ecology and section 5.9, Aquatic ecology.

8.2. Controlling provisions of the project

On 23 June 2008, the project was referred to the then Commonwealth Minister for the Environment, Heritage and the Arts for assessment under the EPBC Act. The EPBC Act establishes a Commonwealth Government process for environmental assessment and approval of proposed actions that are likely to have a significant impact on MNES or on Commonwealth land.

On 21 July 2008, the delegate of the Commonwealth Minister determined that the project, comprising coal mine and associated infrastructure, as well as the three water supply options, each constitute a 'controlled action' pursuant to section 75 of the EPBC Act, including:

- EPBC 2008/4284: Coal mine and associated infrastructure
- EPBC 2008/4285: Glebe Weir raising and pipeline
- EPBC 2008/4287: Coal seam methane (CSM) water supply south
- EPBC 2008/4283: CSM water supply west (which was subsequently withdrawn and not considered as part of this assessment).

The controlling provisions of the EPBC Act for all project components are sections 18 and 18A (listed threatened species and communities¹⁶). For the Glebe Weir raising and pipeline only, the additional relevant controlling provisions are sections 20 and 20A (listed migratory species).

The environmental impact statement (EIS) process has been undertaken in accordance with the requirements of the bilateral agreement between the Queensland and Australian governments, which accredits the Queensland Government's assessment process for significant projects under the SDPWO Act. Therefore, the EIS was required to address both state and Australian Government matters.

¹⁵ Part 3 Division 1 of the EPBC Act provides 'matters of national environmental significance'.

¹⁶ Sections 178 and 179 of the EPBC Act provide and define six 'categories' of 'threatened species' of national environmental significance: extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent. Sections 181 and 182 of the EPBC Act provide and define three categories of 'threatened communities': critically endangered, endangered and vulnerable.

Under the bilateral agreement, the controlling actions may be considered for approval under section 133 of the EPBC Act once the Commonwealth Minister has the Coordinator-General's EIS evaluation report prepared under section 35 of the SDPWO Act.

8.3. Context

Matters of national environmental significance are addressed in:

- EIS:
 - Volumes 1 and 2 ('MLA Areas and Surrounds Impact Assessment' and 'Southern CSM Water Supply Pipeline Impact Assessment', respectively): Chapter 17A—Terrestrial Ecology and Chapter 17B—Aquatic Ecology
 - Volume 4 ('Glebe Option Impact Assessment'): Chapter 12—Terrestrial Ecology, Chapter 13—Aquatic Ecology and Chapter 14—Matters of National Environmental Significance
- Supplementary EIS (SEIS):
 - Volumes 1 and 2 ('MLA Areas and Surrounds Impact Assessment' and 'Southern CSM Water Supply Pipeline Impact Assessment', respectively): Chapter 17A—Terrestrial Ecology and Chapter 17B—Aquatic Ecology
 - Volume 4 ('Glebe Option Impact Assessment'): Chapter 12—Terrestrial Ecology, Chapter 13—Aquatic Ecology and Chapter 14—Matters of National Environmental Significance
 - Appendix 17A—WJV Draft Offset Strategy.

For the purpose of this report and chapter, the three project components are referred to as:

- 1) Mining Lease Application (MLA) areas and gas supply pipeline
- 2) southern CSM water supply pipeline
- 3) Glebe Weir raising and pipeline.

Volumes 1 and 2 of the EIS and SEIS were prepared by Parsons Brinkerhoff, as the principal consultant to the proponent for those project components. SunWater, as owner and operator of the Glebe Weir infrastructure, prepared Volume 4 of the EIS and SEIS on behalf of the proponent.

To fulfil the requirements of the terms of reference (ToR), initial field surveys were conducted in August 2008 with supplementary seasonal terrestrial and aquatic ecology field surveys undertaken in the summer of 2009 and reported on as part of the SEIS for some components of the project.

Additional terrestrial ecology field surveys were undertaken in February and March 2009 to verify ecologically sensitive areas and species of plants and animals that are known or likely to occur in the study area and surrounds for the gas supply pipeline associated with the MLA areas and the southern CSM water pipeline. Seasonal surveys for the MLA areas and Glebe Weir raising and pipeline had already occurred and were included in the EIS.

Aquatic ecology field surveys were replicated in the early wet season between January and February 2009 for the MLA areas and gas supply pipeline, southern CSM water supply pipeline route. Seasonal surveys for Glebe Weir raising and pipeline had already occurred and were included in the EIS.

Due to refinements and modifications to the mine scheduling and changes to the northern portion of the southern CSM water pipeline, the impact assessment for the MLA areas and southern CSM water pipeline was also reviewed and updated as part of the SEIS.

As the proponent has not as yet selected a water supply option for the project (that is, either the Glebe Weir raising and pipeline or southern CSM water supply pipeline option), the then Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) (now the Department of Sustainability, Environment, Water, Population and Communities—SEWPaC) advised that it will proceed with the assessment and consideration of offsets for both water supply options, even though only one water supply option would be constructed.

Under the *Environmental Protection Act 1994* (EP Act), an environmental management plan—(EM Plan)—must be submitted to the administering authority (DERM) with the application for an environmental authority (EA) for mining activity. Approval of the EA and therefore approval of the EM Plan is in accordance with section 193 of the EP Act.

For the purpose of approvals required for the project, the term 'EM Plan' is the environmental management plan specifically required under the EP Act for the EA for mining activities, which is distinguished from the environmental management plans (EMPs) that are the suite of plans for the construction and operation of all other components of the project that are not subject to EAs.

8.4. Listed threatened species

8.4.1. Flora

8.4.1.1. EIS findings, submissions and analysis

The listed threatened species EPBC Act controlling provision applies to the three components of the project.

Desktop analysis and field surveys conducted for the EIS identified a combined total of 25 EPBC-listed threatened flora species as predicted to occur in the study area¹⁷ for the three project components (see Table 8.1, Table 8.2 and Table 8.3).

Table 8.1: EPBC-listed threatened flora species predicted to occur in the MLA areas and gas supply pipeline area

Listed flora species common name	Botanical name	EPBC Act status
finger panic grass	<i>Digitaria porrecta</i>	endangered
salt pipewort/button grass	<i>Eriocaulon carsonii</i>	endangered
Belson's panic	<i>Homopholis belsonii</i>	vulnerable
tricolour diuris	<i>Diuris tricolor (syn. Diuris sheaffiana)</i>	vulnerable
ooline	<i>Cadellia pentastylis</i>	vulnerable

Table 8.2: EPBC-listed threatened flora species predicted to occur in the southern CSM water supply pipeline area

Listed flora species common name	Botanical name	EPBC Act status
Chinchilla wattle	<i>Acacia chinchillensis</i>	vulnerable
curly-bark wattle	<i>Acacia curranii</i>	vulnerable
Hando's wattle	<i>Acacia handonis</i>	vulnerable
Tara wattle	<i>Acacia lauta</i>	vulnerable
–	<i>Acacia wardellii</i>	vulnerable
lobed bluegrass	<i>Bothriochloa biloba</i>	vulnerable
–	<i>Calytrix gurulmundensis</i>	vulnerable
small-leaved denhamia	<i>Denhamia parvifolia</i>	vulnerable
Queensland western white gum/ Chinchilla white gum	<i>Eucalyptus argophloia</i>	vulnerable
shiny-leaved ironbark	<i>Eucalyptus virens</i>	vulnerable
Belson's panic	<i>Homopholis belsonii</i>	vulnerable
–	<i>Homoranthus decumbens</i>	vulnerable
tricolour diuris	<i>Diuris tricolor (syn. Diuris sheaffiana)</i>	vulnerable
ooline	<i>Cadellia pentastylis</i>	vulnerable
cadarga – G.P. Guymer, 1642	<i>Commersonia sp.</i>	vulnerable

¹⁷ The study area equates to the study site and any additional areas that could potentially be affected by the proposal either directly or indirectly, such as ancillary construction areas.

Listed flora species common name	Botanical name	EPBC Act status
–	<i>Philotheca sporadica</i>	vulnerable
Cobar greenhood orchid/horned greenhood	<i>Pterostylis cobarensis</i>	vulnerable
Austral cornflower/native thistle	<i>Stemmacantha australis/Rhaponticum australe</i>	vulnerable
–	<i>Westringia cheelii</i> (syn. <i>W. parvifolia</i>)	vulnerable

Only one of these species, Belson’s panic (*Homopholis belsonii*), which is a native perennial grass, was identified during field surveys for the SEIS as being within the vicinity of the MLA areas and southern CSM water pipeline. This species was recorded within non-remnant vegetation analogous to regional ecosystem (RE) RE 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks).

Population estimates of Belson’s panic were not established due to the frequency and dominance of the grass within a number of the sampled vegetation communities occurring on a section of road reserve of the Leichhardt Highway. However, it is estimated that over 3000 individual specimens exist within this section of road reserve.

Table 8.3: EPBC-listed threatened flora species that may potentially occur in the Glebe Weir raising and pipeline area

Listed flora species common name	Botanical name	EPBC Act status
finger panic grass	<i>Digitaria porrecta</i>	endangered
salt pipewort/button grass	<i>Eriocaulon carsonii</i>	endangered
aquatic macrophyte	<i>Myriophyllum artesium</i>	endangered
hairy joint-grass	<i>Arthraxon hispidus</i>	vulnerable
ooline	<i>Cadellia pentastylis</i>	vulnerable
cadarga – G.P. Guymer, 1642	<i>Commersonia sp.</i>	vulnerable
king blue-grass	<i>Dichanthium queenslandicum</i>	vulnerable

Three of these species were found near but not within any area impacted or inundated by the Glebe Weir raising and pipeline: salt pipewort/button grass, *Myriophyllum artesium* and hairy joint-grass.

8.4.1.2. Potential impacts and mitigation measures

Sections 17A.4.8, 17A.4.9 and 12.3.2.1 of Volumes 1, 2 and 4 of the EIS and SEIS, respectively, conclude that, with the exception of the EPBC-listed Belson’s panic, the three components of the project are not likely to have a significant impact on any EPBC-listed threatened flora species known or likely to occur within the study area. This conclusion was based on the fact that the study areas do not include habitat suitable for the EPBC-listed threatened flora species and the species were not recorded as part of field surveys within the study area. For Belson’s panic, the extent of occurrence along a section of road reserve of the Leichhardt Highway indicates that the construction and operation of the project would not have any adverse affect on this species.

SunWater proposes to collect seeds of hairy joint-grass and use it for rehabilitation purposes, which would result in an overall positive residual impact for this species.

Therefore, no mitigation or offset measures are necessary for any EPBC-listed threatened flora species that may occur in the project area.

8.4.2. Fauna

8.4.2.1. EIS findings, submissions and analysis

Desktop analysis and field surveys conducted for the EIS identified a combined total of 18 EPBC-listed threatened fauna species as predicted to occur in the study area for the three project components (see Table 8.4, 8.5 and 8.6).

Table 8.4: EPBC-listed threatened fauna species predicted to occur in the MLA areas and gas supply pipeline area

Listed fauna species common name	Zoological name	EPBC Act status
Mammals		
large-eared pied bat/large pied bat	<i>Chalinolobus dwyeri</i>	vulnerable
greater long-eared bat/south-eastern long-eared bat	<i>Nyctophilus timoriensis</i> (South-eastern form) = <i>Nyctophilus corbeni</i> ¹⁸	vulnerable
Birds		
swift parrot	<i>Lathamus discolor</i>	endangered
star finch (eastern and southern subspecies)	<i>Neochmia ruficauda ruficauda</i>	endangered
red goshawk	<i>Erythrotriorchis radiatus</i>	vulnerable
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
Australian painted snipe	<i>Rostratula australis</i>	vulnerable
black-breasted button-quail	<i>Turnix melanogaster</i>	vulnerable
Reptiles		
five-clawed worm-skink/long-legged worm-skink	<i>Anomalopus mackayi</i>	vulnerable
collared delma	<i>Delma torquata</i>	vulnerable
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmali</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
Fitzroy River turtle	<i>Rhodytes leukops</i>	vulnerable

¹⁸ Where two scientific names appear for one result, the "=" symbol means that the second name is the currently accepted scientific name.

Table 8.5: EPBC-listed threatened fauna species predicted to occur in the southern CSM water supply pipeline area

Listed fauna species common name	Zoological name	EPBC Act status
Mammals		
large-eared pied bat/large pied bat	<i>Chalinolobus dwyeri</i>	vulnerable
greater long-eared bat/south-eastern long-eared bat	<i>Nyctophilus timoriensis</i> (South-eastern form) = <i>Nyctophilus corbeni</i> [†]	vulnerable
grey-headed flying-fox	<i>Pteropus poliocephalus</i>	vulnerable
Birds		
swift parrot	<i>Lathamus discolor</i>	endangered
star finch (eastern and southern subspecies)	<i>Neochmia ruficauda ruficauda</i>	endangered
red goshawk	<i>Erythrorichis radiatus</i>	vulnerable
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
Australian painted snipe	<i>Rostratula australis</i>	vulnerable
black-breasted button-quail	<i>Turnix melanogaster</i>	vulnerable
Reptiles		
grassland earless dragon	<i>Tympanocryptis lineata pinguicollis</i> = <i>Tympanocryptis pinguicollis</i>	endangered
five-clawed worm-skink/long-legged worm-skink	<i>Anomalopus mackayi</i>	vulnerable
collared delma	<i>Delma torquata</i>	vulnerable
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmali</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
Fitzroy River turtle	<i>Rheodytes leukops</i>	vulnerable
Fishes		
Murray cod	<i>Maccullochella peelii peelii</i>	vulnerable

Table 8.6: EPBC-listed threatened fauna species that may potentially occur in the Glebe Weir raising and pipeline area

Listed fauna species common name	Zoological name	EPBC Act status
Mammals		
large-eared pied bat/large pied bat	<i>Chalinolobus dwyeri</i>	vulnerable
greater long-eared bat/south-eastern long-eared bat	<i>Nyctophilus timoriensis</i> (South-eastern form) = <i>Nyctophilus corbeni</i> ⁴	vulnerable
Birds		
swift parrot	<i>Lathamus discolor</i>	endangered
star finch (eastern and southern subspecies)	<i>Neochmia ruficauda ruficauda</i>	endangered
red goshawk	<i>Erythrotriorchis radiatus</i>	vulnerable
squatter pigeon (southern subspecies)	<i>Geophaps scripta scripta</i>	vulnerable
Australian painted snipe	<i>Rostratula australis</i>	vulnerable
black-breasted button-quail	<i>Turnix melanogaster</i>	vulnerable
Reptiles		
yakka skink	<i>Egernia rugosa</i>	vulnerable
Dunmall's snake	<i>Furina dunmalli</i>	vulnerable
brigalow scaly-foot	<i>Paradelma orientalis</i>	vulnerable
Fitzroy River turtle	<i>Rheodytes leukops</i>	vulnerable
Gastropods		
boggomoss snail	<i>Adclarkia dawsonensis</i>	critically endangered

Three EPBC-listed threatened terrestrial fauna species were recorded in field surveys to occur in the vicinity of the study area for the project, as follows:

For the MLA areas and gas supply pipeline:

- brigalow scaly-foot (*Paradelma orientalis*)—EPBC-listed vulnerable, recorded within:
 - one adult captured within gas supply pipeline study area, in non-remnant vegetation analogous to RE 11.9.5 (*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks)
 - one adult captured within road side vegetation along Nathan Road.

For the southern CSM water supply pipeline:

- brigalow scaly-foot (*Paradelma orientalis*)—EPBC-listed vulnerable, recorded within:
 - one adult captured at Site W1 sheltering beneath refuse in a homogenous tract of dry sclerophyll forest
 - one adult captured from Site S3 around 4 kilometres south of Gurulmundi
 - two adults captured about 1 kilometre apart from roadside brigalow and poplar box woodland habitats between Gulugaba and Wandoan.

For the Glebe Weir raising and pipeline:

- squatter pigeon (*Geophaps scripta scripta*)—EPBC-listed vulnerable. This species was detected in river red gum (*Eucalyptus populnea*) woodland (RE 11.3.2) within the proposed inundation zone.
- brigalow scaly-foot (*Paradelma orientalis*)—EPBC-listed vulnerable. This species was recorded within cypress pine (*Callitris sp.*) woodland on sand outside of the inundation zone and preferred habitat for this species occurs within and immediately adjacent to the proposed inundation zone.

- boggomoss snail (*Adclarkia dawsonensis*)—EPBC-listed critically endangered. The SEIS (Volume 4, Section 12.1.1) reported that, from a survey of 52 sites considered to have potential to contain the boggomoss snail within its known range, the snail was found at four sites, two of which were previously known. However, no sites inhabited by the snail were found within the directly impacted or inundated footprint.

The EIS (Volumes 1 and 2, Chapter 17A; Volume 4, Chapter 12) describes the extent of suitable habitat for the EPBC-listed threatened terrestrial fauna species.

SunWater has informed the Community Liaison Group for the Nathan Dam and Pipelines project that surveys related to that project detected the boggomoss snail at another 11 sites to those noted in the Wandoan Coal EIS and SEIS, and none of those new locations are boggomosses. None of the new sites are within the impact area of the proposal to raise Glebe Weir or the pipeline component.

Desktop analysis conducted for the EIS identified the Fitzroy River turtle (*Rheodytes leukops*) as potentially occurring within the study area for all components of the project and the Murray cod (*Maccullochella peelii peelii*) as potentially occurring within the study area for the southern CSM water supply pipeline option of the project. Both of these aquatic fauna species are EPBC-listed as vulnerable,

The Fitzroy River turtle is typically found over a large range of permanent riverine habitats within the Fitzroy River catchment. It is not usually found in smaller streams due to a lack of permanent water. The EIS (Volumes 1 and 2, Chapter 17B) reported that no turtles were observed or captured and no suitable habitat was observed during surveys of the MLA areas or along the proposed southern CSM water pipeline route.

The EIS (Volume 4, Chapter 13) reported that the Fitzroy River turtle has not been recorded from the Glebe Weir pool or within 100 km, however the EIS acknowledged that there is a possibility that it may occur in the area as the Dawson River is permanent in this area. SunWater has recently been informed that DERM staff have seen a photograph of a Fitzroy River turtle, which the photographer said was taken at Glebe Weir. This single anecdotal record does not alter the basic assumptions of the EIS. The EIS noted that the area of the Fitzroy River in which the Fitzroy River turtle currently nests most intensely is the headwaters of the Fitzroy Barrage Weir pool, concluding that the core nesting area of the species is several hundred kilometres downstream.

The EIS reported that the Murray cod is found in a range of warm-water habitats in the waterways of the Murray Darling Basin, and the species has not been recorded within 15 km of the proposed CSM pipeline crossing of Dogwood Creek situated north of Miles.

Potential impacts and mitigation measures

The EIS and/or SEIS reached the following conclusions regarding potential impacts and proposed mitigation measures for each EPBC-listed threatened fauna species (see Table 8.8 and Table 8.9).

Table 8.7: EPBC-listed threatened fauna species—significance of impacts for the MLA areas and gas supply pipeline

Listed fauna species	Potential impact	Justification—EIS summary	Proposed mitigation measures	Residual impact
brigalow scaly-foot	no	Low density of animals recorded (2 individuals) and similar suitable habitat available in the surrounding landscape	none recommended	negligible
greater long-eared bat squatter pigeon (southern race) Australian painted snipe yakka skink Dunmall's snake	no	Not recorded within study area and no important habitat present	none recommended	negligible

Table 8.8: EPBC-listed threatened fauna species—significance of impacts for the southern CSM water supply pipeline

Listed fauna species	Potential impact	Justification—EIS summary	Proposed mitigation measures	Residual impact
brigalow scaly-foot	no	Low density of animals recorded (4 individual) and similar suitable habitat available in the surrounding landscape	none recommended	negligible
greater long-eared bat squatter pigeon (southern subspecies) Yakka skink Dunmall's snake	no	Not recorded within study area and no important habitat present	none recommended	negligible

Table 8.9: EPBC-listed threatened fauna species—significance of impacts for the Glebe Weir raising and pipeline

Listed fauna species	Potential impact	Justification—EIS summary	Proposed mitigation measures	Residual impact
large-eared pied bat	minor adverse	A minor impact may occur as a result of loss of foraging habitat as a result of construction of the Glebe Weir works and inundation area.	Rehabilitation or restoration of comparable habitat in the local area.	minor adverse
greater long-eared bat	minor adverse	A minor impact may occur as a result of loss of foraging and roosting habitat, and predation by native predatory birds when fleeing disturbance, as a result of construction of the Glebe Weir works and inundation area.	Rehabilitation or restoration of comparable habitat in the local area.	minor adverse
squatter pigeon (southern subspecies)	minor adverse	Operation of the Inundation area: provision of resources for feral predators which increases likelihood of predation in surrounding areas.	Rehabilitation of suitable woodland with native grassy understorey	minor adverse
Australian painted	minor	Construction of the Glebe	Exclusion of livestock	minor –

Listed fauna species	Potential impact	Justification—EIS summary	Proposed mitigation measures	Residual impact
snipe	adverse	Weir and Inundation area: replacement of existing wetland habitat by inundation, and loss of seasonally inundated grassland and pasture.	from edges of the impoundment would allow establishment of suitable habitat and would offset any habitat loss due to inundation. Control of feral pigs by implementation of a pest management plan Impacts of the project on this species may be positive	probably positive
Dunmall's snake	moderate adverse	Not recorded within study area however presence is possible due to existence of habitat. Construction of the Glebe pipeline route: loss of habitat and predation by feral predators when fleeing disturbance and mortality from vehicle strike. Operation of the Inundation Area: constraints to local movements and mortality by vehicle strike.	Fauna spotter/catcher during clearing and while any trenches are open. Cover/fill in trenches. Implement pest management plan. Appropriate speed limits for construction vehicles. Wildlife awareness training for construction staff. Rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock.	minor adverse
brigalow scaly-foot	moderate adverse	Construction of the Glebe Weir and Inundation area: loss of habitat and predation by feral predators when fleeing disturbance. During operation, a minor impact may occur as a result of constraint to local movement.	Rehabilitation or restoration of comparable habitat in local area, including exclusion of livestock	minor adverse
boggomoss snail	highly unlikely	During construction the identified risk is related to curious workers who may wish to see the snail (very low risk). During operations the risk is related to the possible waterlogging of soils adjacent to the levee on Boggomoss Creek. This was identified as a low risk in a limited area and would only occur when the weir storage was full or near full.	Substantial rehabilitation of the riparian zone on alluvial areas adjacent to the proposed levee and in the immediate vicinity of boggomoss site 16 (refer to Figure 8.5). Development and inclusion of a boggomoss snail Habitat Management Plan in the Construction EMP (as per SEIS, Vol.4, S.21.2.4) to ensure no impact to boggomoss snail habitat as a result of construction activities associated with the	none

Listed fauna species	Potential impact	Justification—EIS summary	Proposed mitigation measures	Residual impact
			raising of Glebe Weir.	
swift parrot star finch (eastern and southern subspecies) black-breasted button-quail	negligible	Not recorded within study area and no important habitat present.	None recommended	negligible

With respect to Fitzroy River turtle, pages 13–39 of Volume 4 of the EIS concluded that no impact was expected. Assessment of significance according to EPBC criteria was presented on pages 14–30 of Volume 4 of the EIS and a significant impact was not considered likely according to any criteria. SunWater has suggested that the recent, anecdotal record of a single Fitzroy River turtle in Glebe Weir does not alter the assessment of significance. Therefore, there would be no significant adverse impacts to the Fitzroy River turtle resulting from the construction and operation of the raised Glebe Weir and pipeline.

The EIS (Volume 2, Chapter 17B) reported that Murray cod may be impacted by the installation of the proposed southern CSM water supply pipeline. This would only occur in the event that the species is present in Dogwood Creek and if in-stream habitat structures such as boulders, logs, undercut banks and overhanging vegetation would be affected. However, due to the low likelihood of the Murray Cod being present, and the restricted (20 m wide) construction footprint in the creek, the likelihood of an adverse impact on the species is low. In addition, the EIS notes that the consequence of any impact would be low and reversible, provided that aquatic habitat is replaced after construction. The EIS (Volume 2, Chapter 17B.6) details the mitigation measures proposed for all creek crossings, including the rehabilitation of in-stream aquatic habitat after clearing, including bed and bank rehabilitation. Therefore, there would be no significant adverse impacts to the Murray cod population resulting from the construction of the southern CSM water supply pipeline.

In summary, for the MLA areas and southern CSM water supply pipeline option, the EIS and SEIS considered that none of the EPBC-listed threatened fauna species are likely to incur a significant impact as a result of the proposed action.

However, the EIS and SEIS for the Glebe Weir raising and pipeline option identified seven fauna species that may occur in the project areas (based on records, observation and/or presence of available habitat) and without mitigation, are likely to suffer adverse impacts as a result of the proposed action.

With mitigation in place, such as the use of fauna spotters during clearing, the exclusion of livestock and control of pest animals and revegetation of impoundment edges and riparian zones, negligible residual impacts are expected for two of these fauna species. The remaining five fauna species are likely to suffer from minor adverse residual impacts associated with the Glebe Weir raising and pipeline, including:

- large-eared pied bat
- greater long-eared bat
- squatter pigeon
- Dunmall’s snake
- brigalow scaly-foot.

The EIS (Volume 4, Appendix 12-D) provided a definition for ‘minor’ impact as one that fell within the natural fluctuation of a local population and would be overcome without mitigation. Given the predicted residual adverse impacts are all at the minor level and the habitat rehabilitation and offsets proposed in section 8.8.1 of this report relate to habitat of these species, no additional offsets are required for these species.

Boggomoss snail

With regard to the boggomoss snail, it is important to note that the initial ranking of potential impact was minor to moderate adverse but the impact level in the EIS was raised in recognition of the

critically endangered status of the species. The SEIS (Volume 4, chapter 12) addresses the potential impact on the snail and its habitat by reviewing the risks identified in the *Recovery Plan for the Boggomoss Snail*¹⁹, including land clearing, fire, cattle grazing, weeds, earthworks, and hydrology changes, as they specifically relate to the Glebe Weir raising. In summary:

- Land clearing—the project does not include land clearing or inundation of known or suspected snail habitat.
- Fire—while the project does not include deliberate burning of actual or potential snail habitat, the works associated with the construction phase of the project do increase the fire risk in the area. This is considered a low risk and a new and specific Boggomoss Snail Habitat Management Plan has been developed and incorporated into the EM Plan (section 21.2.4).
- Cattle grazing—the project does not include nor will it lead to an increase in cattle grazing in any area near boggomoss snail habitat. Fencing of riparian zones and rehabilitation areas in order to protect habitat from cattle is included in the Boggomoss Snail Habitat Management Plan contained in section 21.2.4 of the EM Plan.
- Weeds—the potential for weeds to be transported on construction machinery or to colonise disturbed land has been addressed as part of the Boggomoss Snail Habitat Management Plan.
- Earthworks—various earthworks will occur as part of the Glebe Weir raising but none will directly impact on snail habitat. The Construction Terrestrial Flora and Fauna EM Plan element includes the recognition and demarcation of all sensitive environmental areas to ensure no accidental damage occurs.
- Changes to hydrology—no snail habitat would be inundated by the project and the flow regime downstream at Isa-Delusion Crossing would change only very minimally such that the drying of the riparian zone would not occur. The snail has been found in habitat adjoining the weir pool of Gylanda Weir, which was built in 1987, so the riparian zone will react more to water levels in the weir than to natural water levels. Given the weir's presence, it is highly unlikely that this site would be under threat from drying as the river has a higher standing water level than natural and would remain so.

8.4.2.2. Additional proposed mitigation measures

General

The terrain downstream of the levee is relatively wide and flat. This allows flow to spread out and dissipate energy therefore reducing velocities and potential damage to the boggomoss.

The proposed substantial revegetation downstream of the levee will reduce flow velocities and stabilise soil in the unlikely event of levee failure. The area between the levee and Boggomoss 16 (the nearest site where the boggomoss snail has been recorded, shown in Figure 8.5) is included within this revegetation.

Mitigation against levee failure

In its submission on the EIS, DEWHA suggested that further mitigation should be proposed in the event that the purpose built levee (on the eastern side of Boggomoss Creek) breaks. The SEIS (Volume 4, Chapter 12) stated that the engineering design of the levee is very secure. During flood events, flood waters would pass down the river such that when the river overtops its banks, the difference between the water level immediately upstream of the weir and that downstream of the weir would be less than 30 cm. By the time the levees are overtopped that difference would only be 20 cm. Hence, there would be no rush of water over the levees that could lead to failure. In non-flood circumstances, failure would not be expected because the depth of water abutting the levee would be no more than 1.8 m and would be abutting a compacted earth battered structure 12 m wide.

Mitigation against overtopping flood failure

During a flood event, the area downstream of the levee bank (including the boggomoss) will be drowned out by the time the levee overtops, as it normally would prior to the introduction of the levee.

¹⁹ Stanic, J. (2008): *Recovery plan for the boggomoss snail Adclarkia dawsonensis*. Report to Department of the Environment, Water, Heritage and the Arts, Canberra. Environmental Protection Agency, Brisbane.

By the time the levee overtops, the tailwater level will be approximately 173.3 m AHD giving a drop of only 0.2 m over the levee. The high tailwater will impede flow and will decelerate the velocities relatively rapidly.

The levee will be designed against overtopping failure by providing surface protection such as rock mattresses. In the unlikely event of overtopping failure, the surface protection will be engineered so that failure initiates within purpose-built low levee sections. This will minimise the impact of the downstream flow velocities on the boggomosses.

The low sections of the levee will overtop sequentially. The minimum elevation of the top of bank will be 173.5 m AHD. As this elevation is required to provide the necessary storage, the remainder of the levee will need to be slightly higher than originally designed. The lower sections will be located to direct flow velocities away from Boggomoss 16 so, pending detailed design, will be best located south of Boggomoss 16.

The lateral extent of levee failure will be contained in accordance with the principles of fuse plug design. For example, a vertical concrete retaining wall could be built at each end of each low section to prevent lateral erosion of the levee beyond the low sections. This will limit the higher flow velocities to the desired locations. It will also have the added benefit of limiting the amount of levee embankment material deposited downstream.

Subject to the availability of materials, the internal levee material will be constructed of material with low erodability. This will:

- increase erosion time
- provide gradual rather than rapid failure
- limit the depth of erosion and therefore limit downstream flow velocities and downstream material deposition.

A non-erodable sill will be provided at the base of each low section to prevent potential erosion below FSL. This will prevent the river from re-routing through the boggomoss area in the unlikely event of a levee failure. It will allow the boggomoss to return to natural conditions quickly if a levee failure occurs.

Mitigation against sunny day failure

The levee will be designed against a sunny day failure. This will include the provision of filters to prevent internal erosion.

The levee will be designed with increased factors of safety against internal erosion and slope stability for locations where failure would be most detrimental to the boggomoss. In the unlikely event of sunny day failure, the levee will be engineered to fail preferentially where the impact on the boggomoss is minimal (similar to the principles described for flood failure above).

The period of inundation as a result of sunny day failure would be less than that experienced for a natural flood that would inundate the area.

Summary of boggomoss snail additional proposed impact mitigation measures

Impacts of levee failure relate to only Boggomoss 16. The probability of failure is in the order of 1 in 10 000 years. The additional proposed mitigation measures based on design and construction of the levee can be such that the location of failure is pre-determined. Controlled overtopping and failure locations can be positioned to avoid significant impact on Boggomoss 16. This additional mitigation measure reduces risk to the boggomoss to very low levels. It is noted that floodwaters naturally reach this boggomoss.

8.4.3. Conclusion—listed threatened species

Based upon the information presented in the EIS and SEIS, the fauna and flora surveys conducted for the EIS fulfilled the ToR and were conducted consistent with currently accepted standards.

Based on the findings of the EIS and SEIS, it is unlikely significant impacts on the majority of EPBC-listed threatened flora and fauna species would occur, and that the mitigation measures proposed by

the proponent for each of the project components would be adequate to minimise potential adverse impacts to those listed threatened species to an acceptable level.

The majority of vegetation communities on the project site are generally highly modified and in poor condition.

With the exception of Belson's panic (*Homopholis belsonii*), no EPBC-listed threatened flora species are known to be present on the site of the proposed MLA areas, southern CSM water supply pipeline option, or Glebe Weir and pipeline option.

It is possible that minor adverse impacts would occur to five threatened terrestrial fauna species as a result of construction and/or operation of the Glebe Weir raising and pipeline option of the project.

SunWater, on behalf of the proponent, has committed to substantial replanting of riparian and alluvial floodplain vegetation along the Dawson River and outside the levee on Boggomoss Creek. The SEIS (Volume 4, Section 12.3) stated that the species selected for planting would include threatened species where it is their natural habitat, such as brigalow and hairy joint grass. The SEIS reported that this habitat would suit brigalow scaly-foot and rainbow bee-eater and would reconstitute the east-west and north-south movement corridors which would benefit a range of species.

With the effective implementation of a Boggomoss Snail Habitat Management Plan (to be contained within the draft EM Plan for the construction of the Glebe Weir raising and pipeline option), no significant impacts would occur to the EPBC-listed critically endangered boggomoss snail (*Adclarkia dawsonensis*). Also, the proponent has committed to submitting the Boggomoss Snail Habitat Management Plan to SEWPaC for approval prior to the construction of the Glebe Weir raising.

I accept that no EPBC-listed threatened aquatic fauna species are present on the site of the proposed MLA areas and southern CSM water supply pipeline option but the Fitzroy River turtle may be present in the Glebe Weir and pipeline option. Therefore, no significant impacts should occur to these species.

A condition is stated that requires the proponent to include pre-clearing fauna surveys in the construction and operational EMP for all components of the project, as committed to in the EIS and SEIS (Condition 10, Schedule 8).

8.5. Listed threatened communities

8.5.1. EIS findings, submissions and analysis

The listed threatened communities EPBC Act controlling provision applies to the three components of the project.

The EIS (volumes 1, 2 and 4, Chapter 12) terrestrial ecology assessment identified four threatened communities to potentially occur in the project area:

- bluegrass (*Dichanthium* spp.) dominant grasslands of the Brigalow Belt Bioregions (North and South)
- brigalow (*Acacia harpophylla*) dominant and co-dominant woodlands
- semi-evergreen vine thickets (SEVT) of the Brigalow Belt (North and South) and Nandewar Bioregions
- the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin (that is, boggomosses).

All of these threatened communities have the status of endangered ecological communities (EECs) under the EPBC Act.

No vegetation communities analogous to the bluegrass EEC were found to occur in the project area.

The EEC described as 'the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin' (that is, boggomosses) does not have an analogous RE as each occurrence of the community is unique.

A summary of the location and condition of these EPBC-listed EECs—analogueous to REs—for each project component is provided below. Table 8.10, Table 8.11 and Table 8.12 list the EECs that occur in the study area for each project component, indicating the EPBC Act status and the estimated areas to be cleared, as reported in the SEIS.

8.5.1.1. MLA areas and gas supply pipeline

The SEIS reported that, for the MLA areas and gas supply pipeline, a total of 319.1 ha of remnant and 471.1 ha of non-remnant vegetation—that is, a total of 790.8 ha—was proposed to be cleared.

Table 8.10: EPBC-listed endangered ecological communities estimated to be cleared for the MLA areas and gas supply pipeline

EEC description (analogous RE)	EPBC Act status	Area to be cleared (ha)	
		Remnant	Non-remnant
RE 11.9.4. Semi-evergreen vine thicket (SEVT) or <i>Acacia harpophylla</i> with SEVT understorey on fine grained sedimentary rocks	endangered	0	13.1
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow – dominant) on fine-grained sedimentary rocks	endangered	22.6	214.4
RE 11.9.6. <i>Acacia melvillei</i> +/- <i>Acacia harpophylla</i> open forest (brigalow – co-dominant)) on fine-grained sedimentary rocks	endangered	-	²⁰

Figure 8.1 shows that remnant brigalow EEC (RE 11.9.5) in the MLA areas was found to be highly fragmented. In addition to the remnant vegetation mapped by DERM, over 1000 ha of non-remnant vegetation regrowth was also mapped and described in the EIS, dominated by brigalow (*Acacia harpophylla*) analogueous to RE 11.9.5 and small areas of highly modified semi-evergreen vine thicket (SEVT) analogueous to RE 11.9.4. SEVT vegetation analogueous to RE 11.9.4 (remnant and non-remnant) is consistent with the EEC listed under the EPBC Act. The listing of brigalow under the EPBC Act includes both remnant and non-remnant vegetation, but excludes regrowth vegetation in poor condition.

Brigalow regrowth in the study area characteristic of RE 11.9.5 and RE 11.9.6 was found to be of poor quality and generally lacked the species composition and structural elements typical of that found in remnant brigalow in the study area. Therefore, regrowth within the study area was not considered part of the brigalow EEC that is listed under the EPBC Act.

²⁰ Area of clearing of co-dominant brigalow RE 11.9.6 is included as part of area of clearing for RE 11.9.5.

8.5.1.2. Southern CSM water pipeline

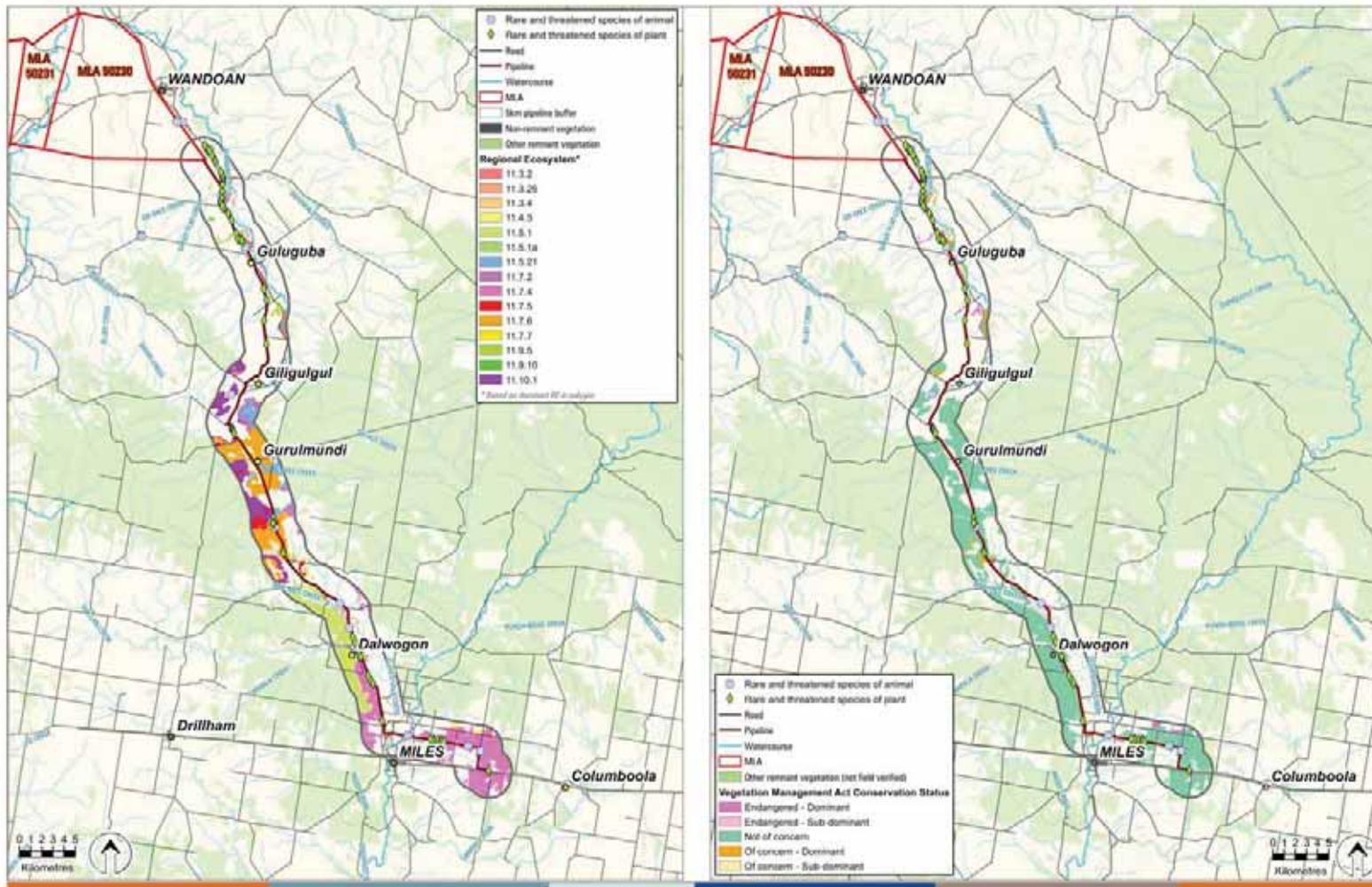
The SEIS reported that, for the southern CSM water pipeline, a total of 93.0 ha of remnant and 64.0 ha of non-remnant vegetation—that is, a total of 157.0 ha—was proposed to be cleared.

Table 8.11: EPBC-listed endangered ecological communities estimated to be cleared for the southern CSM water supply pipeline

EEC description (analogous RE)	EPBC Act status	Area to be cleared (ha)	
		Remnant	Non-remnant
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow) on fine-grained sedimentary rocks	endangered	1.6	3.0

Remnant brigalow EEC was primarily recorded along the road reserve or easement edge of large patches of vegetation and, as such, is generally subject to a range of existing edge effects (see Figure 8.2). Nonetheless, the EIS determined that much of the vegetation likely to be affected is in moderate to good condition.

Figure 8.2: Southern CSM water supply pipeline EECs



8.5.1.3. Glebe Weir raising and pipeline

The SEIS reported that, for the Glebe Weir raising and pipeline, a total of 744.2 ha of remnant and 60.5 ha of non-remnant vegetation—that is, a total of 804.7 ha—was proposed to be cleared.

Table 8.12: EPBC-listed endangered ecological communities estimated to be cleared for the Glebe Weir raising and pipeline

EEC description (analogous RE)	EPBC Act status	Area to be cleared (ha)	
		Remnant	Non-remnant
RE 11.3.1. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow) on alluvial plains	endangered	4.2	0
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow) on fine-grained sedimentary rocks	endangered	1.1	0

For the Glebe Weir raising and pipeline, in addition to the proposed clearing of RE 11.3.1 and 11.9.5 brigalow EECs, one community of boggomosses is located within the inundation area.

Figure 8.3 outline the locations of brigalow EECs recorded within the study area for the Glebe Weir raising and pipeline option. Brigalow (*Acacia harpophylla* dominant and co-dominant) analogous to REs 11.3.1 and 11.9.5 was identified in the following locations:

- various locations adjacent to and within the inundation area and northern-most section of the proposed pipeline route (RE 11.3.1)
- various locations adjacent to and within the inundation area and along the proposed pipeline route (RE 11.9.5).

Of the 4.2 ha of RE 11.3.1 proposed to be cleared, 3.9 ha would be subject to inundation and 0.3 ha would be cleared for pipeline construction. Of the 1.1 ha of RE 11.9.5 proposed to be cleared, 0.3 ha would be subject to inundation and 0.8 ha would be cleared for pipeline construction. The total areas that are likely to be affected are composed of a number of very small, discontinuous patches.

The only occurrence of an SEVT EEC within the study area was a single area analogous to RE 11.9.4a (SEVT on fine grained sedimentary rocks) recorded adjacent to but not within the northern section of the pipeline route. Therefore, it is not included for consideration in this evaluation.

Figure 8.3: Glebe Weir raising EECs

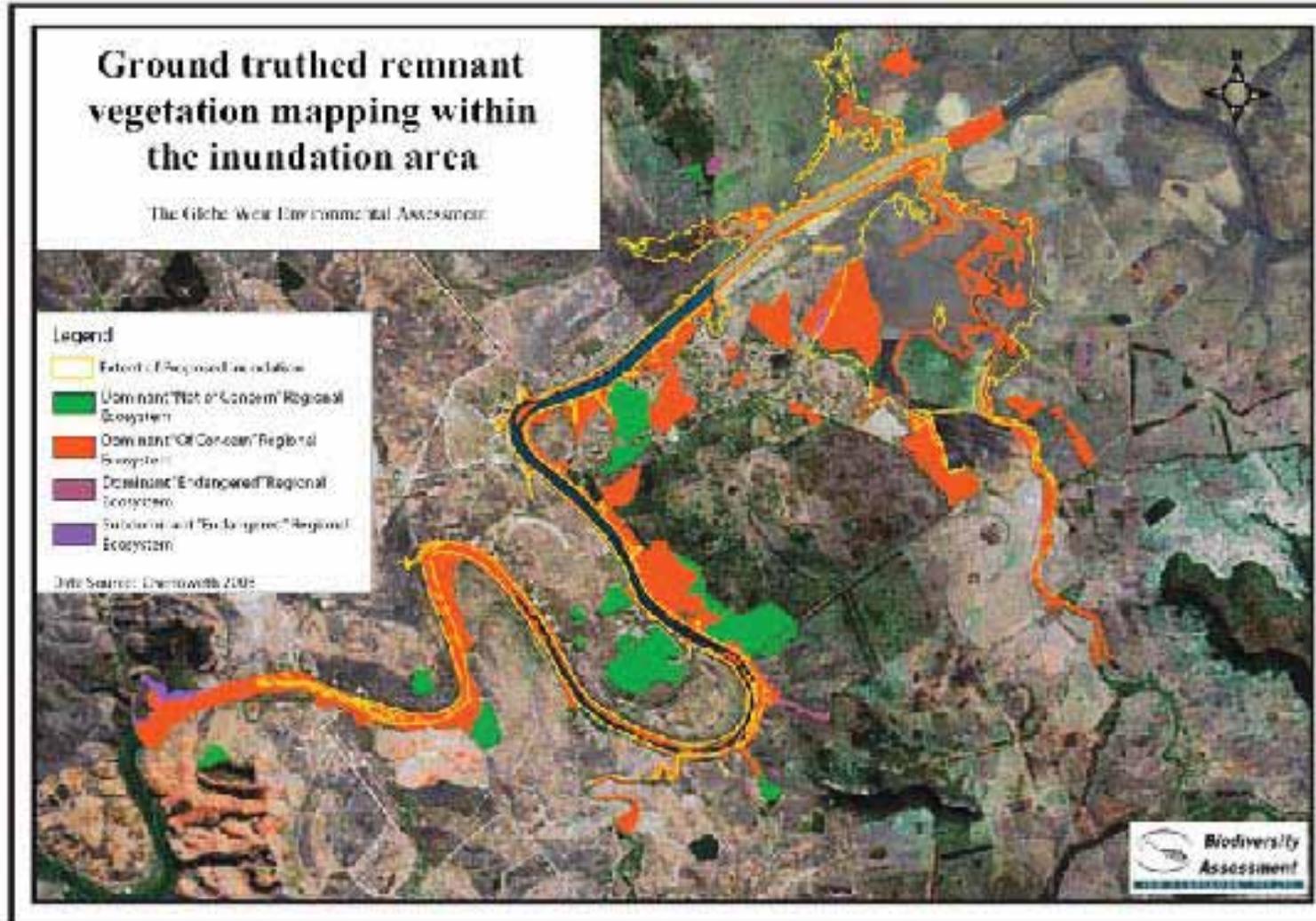
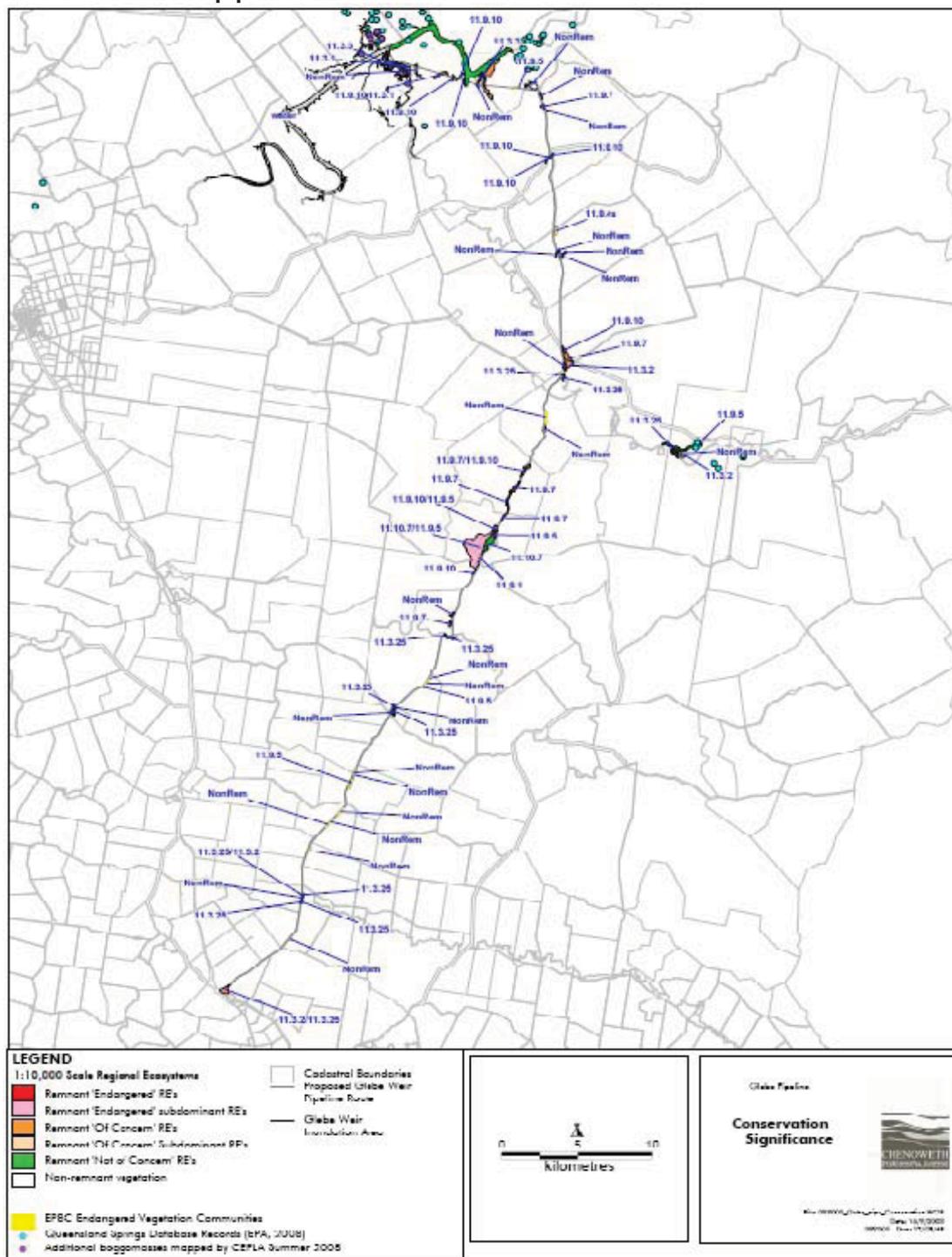


Figure 8.4: Glebe Weir pipeline EECs



8.5.1.4. Boggomoss habitat

Sixteen boggomosses were mapped in the vicinity of the Glebe Weir, of which nine are recorded on the DERM Queensland Springs database and an additional seven were recently recorded during the EIS process.

Figure 8.5 shows the location of the single boggomoss that will be inundated (labelled 'new') and the otherwise closest boggomoss to the infrastructure (Site 16).

One 'new' community of boggomoss, located on the southern side of the Dawson River east Cockatoo Creek, would be inundated. This spring is small and grassy and in an area grazed by cattle. The EIS (Volume 4, chapters 12 and 14) predicted the impact of flooding this site on the threatened community as a whole as minor.

The EIS (volumes 1 and 2, Chapter 17A) also reported that boggomoss habitat is located approximately 100 km downstream from the watercourses of the MLA areas and creeks crossed by the proposed southern CSM water pipeline option. Due to the distance separating the MLA areas and proposed pipeline and the boggomoss habitat, the EIS determined that boggomoss communities are unlikely to be impacted by the MLA areas and southern CSM water pipeline components of the project.

8.5.1.5. Summary or proposed EEC clearing and impacts

In summary, the project would involve clearing remnant and non-remnant vegetation, listed as EECs under the provisions of the EPBC Act, comprising SEVT and brigalow vegetation.

If the southern CSM water supply pipeline option is adopted, the project would involve the clearing of up to approximately 37.3 ha of EECs but if the Glebe Weir raising and pipeline option is adopted, 41.0 ha of EECs would be cleared. The Glebe Weir option would also inundate one boggomoss.

Area estimates for the gas supply pipeline and southern CSM water supply pipeline corridors assume a 20 m vegetation clearing width. A 30 m wide vegetation clearing width, reduced to 20 m in riparian zones or sensitive environmental areas, has been assumed for the Glebe pipeline construction easement (with an operational width of 16 m).

8.5.2. Potential impacts and mitigation measures

8.5.2.1. MLA areas and gas supply pipeline

Under the provisions of the EPBC Act, vegetation clearing for the MLA areas component of the project would require the clearing of 250.1 ha of remnant and non-remnant EECs, including 13.1 ha of SEVT (RE 11.9.4, non-remnant) and 22.6 ha of remnant brigalow (RE 11.9.5 and RE 11.9.6, dominant co-dominant) and 214.4 ha of non-remnant (that is, regrowth) brigalow.

The EIS stated that both EECs are unlikely to be significantly affected. Only a small extent of fragmented and modified brigalow EEC would be removed, with 76 per cent remnant and 44 per cent non-remnant to be retained within the MLA areas, while only a small extent of highly modified and poor condition SEVT EEC would be removed.

8.5.2.2. Southern CSM water supply pipeline

Vegetation clearing for the project's southern CSM water pipeline option would require 1.6 ha of remnant and 3.0 ha of non-remnant brigalow to be cleared (RE 11.9.5 and 11.9.6, dominant co-dominant).

The EIS found that due to the relatively small area of brigalow to be affected in the study area compared with the overall distribution of this EEC, the condition of the brigalow EEC as a whole is unlikely to be significantly affected by the project.

8.5.2.3. Glebe Weir raising and pipeline

Vegetation clearing for the Glebe Weir raising and pipeline option for the project would require the clearing of 5.3 ha of remnant brigalow (RE 11.3.1 and RE 11.9.5). The EIS determined that, without mitigation, the potential impacts of this clearing would result in a moderate to significant adverse impact on the species.

The EIS identified the following measures to mitigate these impacts:

- confine weir construction impacts to the inundation footprint
- where avoidance is not possible, design the pipeline to avoid the RE where possible and confine clearing to the pipeline corridor (15 m either side of the centre line)
- habitat restoration and enhancement of a comparable ecosystem in the local area
- offset design and measurement of progress to be in accordance with the DERM Policy for Vegetation Management Offsets and in consultation with SEWPaC.
- development and implementation of an Operational Habitat Management Plan to minimise edge effects, particularly the spread of weeds from impoundment edges.

With mitigation in place, the EIS identified a minor residual impact on the brigalow EEC. Offset requirements for this EEC are discussed further in section 8.8.2.

The EIS (Volume 4, Table 12.3) identified a minor adverse impact to the 'community of species dependent on discharge from the Great Artesian Basin' (that is, boggomoss) as a result of clearing/inundation of one boggomoss located within the inundation area (based on the significant local, regional, state-wide and national distribution of the community type). As no mitigation is possible, the residual impact remains as a minor adverse impact.

8.5.3. Conclusion—listed threatened communities

Condition is stated for inclusion in the EA for mining activities that set out the requirements for a rehabilitation plan and rehabilitation monitoring program (Conditions F1–F6, Schedule 3).

The proponent has committed to prepare and implement a Biodiversity Offset Strategy, in consultation with relevant agencies, to address the requirements of state and Commonwealth legislation and policies for offsets. A condition is stated that requires the proponent to obtain final approval of the Biodiversity Offset Strategy from SEWPaC insofar as it relates to MNES (Condition 6, Schedule 8).

The EIS (Volume 4, Table 14-5) assessed the significance of the impact on brigalow against EPBC criteria. The table noted that the areas to be cleared represented small isolated fragments and the

proposed rehabilitation and offset strategies offered an opportunity to improve connectivity, integrity and resilience. Offset requirements for this EEC are discussed further in section 8.8.2.

8.6. Listed migratory species

8.6.1. EIS findings, submissions and analysis

The listed migratory species EPBC Act controlling provision only applies to the Glebe Weir raising and pipeline component of the project; therefore, this report's evaluation of the controlling provision is limited to that component.

Desktop analysis and field surveys conducted for the EIS identified 15 EPBC-listed migratory bird species as being known or likely to occur in the Glebe Weir raising and pipeline project area (see Table 8.13).

Table 8.13: EPBC-listed migratory bird species predicted to occur in the Glebe Weir raising and pipeline project area

Listed migratory bird species common name	Zoological name	EPBC Act status
satin flycatcher	<i>Myiagra cyanoleuca</i>	migratory
great egret	<i>Ardea alba</i>	migratory
cotton pygmy-goose	<i>Nettapus coromandelianus</i>	migratory
glossy ibis	<i>Plegadis falcinellus</i>	migratory
cattle egret	<i>Bubulcus ibis = Ardea ibis</i>	migratory
white-bellied sea-eagle	<i>Haliaeetus leucogaster</i>	migratory
Latham's snipe	<i>Gallinago hardwickii</i>	migratory
little curlew	<i>Numenius minutes</i>	migratory
common greenshank	<i>Tringa nebularia</i>	migratory
march sandpiper	<i>Tringa stagnatilis</i>	migratory
sharp-tailed sandpiper	<i>Calidris acuminata</i>	migratory
oriental cuckoo	<i>Cuculus saturatus</i>	migratory
white-throated needletail	<i>Hirundapus caudacutus</i>	migratory
fork-tailed swift	<i>Apus pacificus</i>	migratory
rainbow bee-eater	<i>Merops ornatus</i>	migratory

Of the bird species identified to potentially occur in the vicinity of the Glebe Weir raising and pipeline project area, only two species, listed as migratory under the EPBC Act, were identified in field surveys to occur. These, were:

- cattle egret (*Bubulcus ibis*)
- white-throated needletail (*Hirundapus caudacutus*).

8.6.2. Potential impacts and mitigation measures

The EIS and SEIS reached the following conclusions for each EPBC-listed migratory bird species predicted to occur in the Glebe Weir raising and pipeline project area (Table 8.14).

Table 8.14: EPBC-listed migratory bird species—significance of impacts for the Glebe Weir raising and pipeline

Listed migratory bird species	Potential impact	Justification – EIS summary	Proposed mitigation measures	Residual impact
great egret	minor adverse	Construction of the Glebe Weir and Inundation area: replacement of existing wetland habitat by inundation, and loss of foraging habitat, including farm dams and pasture (when inundated).	Revegetation of impoundment edges and exclusion of livestock	minor positive
cotton pygmy-goose	minor adverse	Replacement of existing wetland habitat by inundation, and loss of breeding trees, as a result of construction of the Glebe Weir Works and Inundation area.	Exclusion of livestock from edges of impoundment Retention of large dead trees where possible Impacts of the project on this species are likely to be positive	minor positive
glossy ibis	minor adverse	Replacement of existing wetland habitat by inundation during construction of the Glebe Weir and Inundation area.	Exclusion of livestock from edges of impoundment Control of feral pigs by implementation of a pest management plan Impacts of the project on this species are likely to be positive	minor positive
white-bellied sea-eagle	minor adverse	Replacement of existing wetland habitat by inundation, during construction of the Glebe Weir and Inundation area.	Retention of large dead trees where possible. Impacts of the project on this species are likely to be positive	minor positive
Latham's snipe	minor adverse	Replacement of existing wetland habitat by inundation as a result of construction of the Glebe Weir and Inundation area. Loss of seasonally inundated grasslands and pasture as a result of construction of the pipeline route.	Exclusion of livestock from edges of the impoundment would allow establishment of suitable habitat and would offset any habitat loss due to inundation. Control of feral pigs by implementation of a pest management plan Impacts of the project on this species may be positive	minor positive

Listed migratory bird species	Potential impact	Justification – EIS summary	Proposed mitigation measures	Residual impact
satin flycatcher cattle egret little curlew common greenshank marsh sandpiper sharp-tailed sandpiper oriental cuckoo white-throated needletail fork-tailed swift rainbow bee-eater	Negligible	No loss of important habitat and no constraints to movement across the landscape.	none recommended	negligible

In summary, for the MLA areas and gas supply pipeline, and southern CSM water supply pipeline option, the EIS and SEIS considered that none of the EPBC-listed migratory bird species are likely to suffer minor adverse impacts as a result of the proposed action.

The EIS and SEIS for the Glebe Weir raising and pipeline option identified five migratory bird species that, without mitigation, may be likely to suffer negligible or minor impacts as a result of the proposed action. There are:

- great egret
- cotton pygmy-goose
- glossy ibis
- white-bellied sea-eagle
- Latham’s snipe.

With mitigation in place however (for example, revegetation of impoundment edges and the exclusion of livestock) none of the species are likely to suffer adverse residual impacts. Rather, the effective implementation of proposed mitigation measures is predicted to result in minor positive residual impacts for some species.

Although EPBC-listed migratory species is a controlling provision only for the Glebe Weir raising and pipeline component of the project, the greater egret and rainbow bee-eater were observed in the CSM water supply pipeline project area.

8.6.3. Conclusion—listed migratory species

The potential impacts identified to five EPBC-listed migratory birds, as a result of constructing the Glebe Weir raising and pipeline option, are minor adverse and with the implementation of appropriate mitigation measures as identified, residual impacts are generally minor positive. Therefore, no mitigation or offset measures would be required for any EPBC-listed migratory bird species that may occur in the project area.

8.7. Biodiversity and Land Management Plans

For both the MLA areas and southern CSM water supply pipeline option, the proponent has committed to developing an overarching Biodiversity and Land Management Plan (BLMP), prior to the start of construction, to itemise procedures that address impacts on terrestrial and aquatic ecology resulting from the construction and operational phases of the MLA areas and gas supply pipeline, and southern CSM water supply pipeline option.

The BLMP would include, where appropriate, procedures for:

- detailed design of mitigation measures such as fauna underpasses and fencing

- general impact mitigation
- staff/contractor inductions and ongoing education
- pre-clearing surveys and fauna salvage/translocation where practical
- rehabilitation and restitution of adjoining habitat where possible
- weed control
- pest management
- rehabilitation protocols
- monitoring.

The BLMPs would include clear objectives and actions for the project including, where appropriate:

- minimising human interferences to flora and fauna
- minimising vegetation clearing/disturbance
- minimising impact to threatened species and communities
- minimising impacts to riparian and aquatic habitats and species
- ongoing monitoring of impacts on flora and fauna.

Tables 17A-9 and 17A-10, of Volumes 1 and 2 of the EIS respectively, identified a range of mitigation measures to be included in the BLMP, including (but not limited to):

- targeted species searches for those threatened species and priority taxa considered to have the potential to occur prior to any staged development
- pre-clearing surveys for fauna prior to the commencement of construction
- placing transportable habitat features such as large logs and boulders in adjacent retained areas to continue using them as potential fauna refuge sites
- collection of native seeds for use in the revegetation of disturbed areas
- revegetation of areas not required for operation during the life of the mine
- development and implementation of a weed and feral animal management plan
- development and implementation of a flora and fauna monitoring program.

For the Glebe Weir raising and pipeline option, the proponent has committed to the preparation of the following overarching management plans related to terrestrial ecology, incorporating relevant sub-plans that are to be included in the project construction and operational EMPs:

- Clearing Management Plan
- Construction Habitat Management Plan
- Habitat Rehabilitation Management Plan
- Operational Habitat Management Plan
- Construction and operational EMP sub-plans for Aquatic and Terrestrial Flora and Fauna, including a Boggomoss Snail Habitat Management Plan.

The plans were described in Appendix 12-C of Volume 4 of the EIS. For the Glebe Weir raising and pipeline option, SunWater proposes to incorporate its commitments to mitigate impacts to MNES, into the construction and operational EMPs as reported in Chapter 21, Volume 4 of the SEIS.

For the MLA areas and southern CSM water pipeline, however, these commitments are generally broad in nature and have not all been included in the draft environmental management plans, either for the EA or for construction and operations of other components of the project. Therefore, a condition is recommended that specific mitigation measures addressing MNES committed to by the proponent should be documented in the construction and operational EMPs for the MLA areas and gas supply pipeline, and southern CSM water supply pipeline (Condition 10, Schedule 8).

8.8. Offsets

The EIS noted that environmental offsets for impacts on MNES 'may be used to maintain or enhance the health, diversity and productivity of the environment as it relates to MNES' (volumes 1 and 2, Chapter 17A, Technical Report, Terrestrial Ecology).

The proponent has committed to finalise and implement a Biodiversity Offset Strategy (SEIS Appendix 17A), based upon the Draft Biodiversity Offset Strategy provided with the SEIS (SEIS Appendix 17A-1-SV1.4, dated November 2009), to address the objectives of state and Commonwealth legislation and policy requirements for biodiversity offsets, in consultation with relevant agencies.

The draft Biodiversity Offset Strategy has been prepared as the primary ameliorative measure to minimise the residual impacts of all elements of the project on biodiversity. The strategy aims to provide a net improvement in ecological value as a result of the project, including providing protection immediately for an equal or greater area of similar habitat as that lost through the project. Once a raw water supply (that is, southern CSM water supply or Glebe Weir water supply options) and a power supply option are selected, the strategy would incorporate offsets for vegetation impacts associated with the selected water pipeline and mine-related infrastructure.

The strategy proposes a mixture of offsets to provide immediate protection or additional conservation during the development of the mine.

8.8.1. Threatened species offsets

8.8.1.1. Flora

Section 8.4.1 of this report provides a summary of the potential impacts and mitigation measures proposed to address adverse potential impacts on EPBC-listed threatened flora species as a result of construction and/or operation of all components of the project.

The EIS noted, in particular, that offsets may be required by SEWPaC for the habitat of Belson's panic.

It was concluded that the three components of the project are not likely to have a significant impact on any threatened flora species known or likely to occur within the project area and that no mitigation or offset measures would be required for any EPBC-listed threatened flora species that may occur in the project area.

8.8.1.2. Fauna

Section 8.4.2 of this report provides a summary of the potential impacts and mitigation measures proposed to address adverse potential impacts on EPBC-listed threatened fauna species as a result of construction and/or operation of all components of the project.

The EIS noted, in particular, that offsets may be required by SEWPaC for the habitat of the brigalow scaly-foot.

For the MLA areas and gas supply pipeline, and southern CSM water supply pipeline, the EIS concluded that, with mitigation, none of the identified EPBC-listed threatened fauna species are likely to suffer significant adverse impacts (see EIS volumes 1 and 2, Chapter 17A).

Nevertheless, the strategy proposes detailed assessment of potential offsets to include further assessments for suitable habitats and further mitigation strategies for EPBC-listed threatened species.

As part of its review of the strategy, DEWHA advised that the document would need to address the loss of suitable habitat for EPBC-listed threatened species, in particular the brigalow scaly-foot, squatter pigeon and star finch.

The proponent's response to DEWHA's review of the strategy considered that it did actively provide for increased habitat value for the brigalow scaly-foot by securing offset areas for brigalow EECs.

Chapter 9 of the EIS and SEIS identifies the proponent's intention to rehabilitate some mining areas for nature conservation, which will provide further habitat, further contributing to the long-term ratio of conserved vegetation to vegetation disturbed by the project.

For the Glebe Weir raising and pipeline, the EIS identified five fauna species EPBC listed as vulnerable that may suffer minor adverse residual impacts, even with implementation of mitigation measures, should they occur in potential habitat on the project area, as a result of construction and/or operation. These are:

- large-eared pied bat
- greater long-eared bat
- squatter pigeon
- Dunmall's snake
- brigalow scaly-foot.

To address adverse residual impacts on these species, the EIS (Volume 4, Chapter 12) proposed offsets, including the protection and/or enhancement of comparable habitat preferred by these species in the local area. The EIS further recommended rehabilitation and/or management measures and exclusion of livestock to provide and maintain habitat.

Regarding the squatter pigeon, the EIS found that, for the MLA areas and gas supply pipeline, and southern CSM water supply pipeline, this species was not recorded within the study area and that no important habitat was present. For the Glebe Weir raising and pipeline, the EIS found this project component was not expected to have a significant impact on the species. Nonetheless, the offsets proposed for the brigalow EECs potentially disturbed by this component include habitat described as 'suitable woodland with native grass understory', which is habitat suitable for the squatter pigeon.

Regarding the loss of suitable habitat for the star finch, the EIS stated that the species was thought to be regionally extinct from the Southern Brigalow Belt; that the desktop assessment found no known records of this species from the study area; that its occurrence was categorised as 'unlikely'; and that, while some suitable habitat may occur in the Glebe Weir inundation and pipeline area, no field observations were made.

8.8.1.3. Conclusion—threatened species offsets

The proponent has proposed to actively increase the habitat value of the offset areas through appropriate means, which may include planting of appropriate native species. An estimate of the area within each proposed offset suitable for active planting would be made based primarily on topography, as this heavily influences the ability to conduct planting.

The proponent has also acknowledged that habitats for the Belson's panic and brigalow scaly-foot would be impacted by the project and has committed to negotiating to provide offsets required by SEWPaC for any losses of these habitats.

For those EPBC-listed species identified with a possibility or likelihood of occurrence, the impacts of the Glebe Weir raising and pipeline following mitigation were classified as none, negligible or minor. Therefore, the EIS and associated technical reports concluded that, with appropriate mitigation measures, the Glebe Weir raising and pipeline was unlikely to significantly impact EPBC-listed species in the project area. Therefore offsets required for vegetation would provide sufficient offset for the residual impact to fauna species.

To reduce the net residual adverse impacts to those threatened species to an acceptable level, a condition is stated that requires the proponent to ensure that environmental offsets provide for the habitat requirements of EPBC-listed threatened flora and fauna species identified to be adversely impacted by the project (Condition 6, Schedule 8).

8.8.2. Threatened communities offsets

Section 8.5.1 of this report provides a summary of the EPBC-listed EECs proposed to be cleared for MLA areas and water supply options for the project.

The EIS (volumes 1 and 2, chapter 17A, Technical Report, Terrestrial Ecology) noted that offsets may be required for the brigalow and SEVT EECs.

Subject to further verification and consultation with key advisory agencies, the strategy proposes a minimum ratio of 1:3 for unavoidable project-related disturbance of assessable remnant or threatened vegetation as defined under current Australian and Queensland legislation.

Subject to undertaking detailed assessments of offset areas for the characteristics and quality (in terms of ecological value) and further verification and consultation with key interest groups, the strategy identifies the following potential offset areas:

- non-remnant REs located on the MLA areas
- areas near the Lake Murphy Conservation Park (approximately 56 km north of the MLA areas)
- areas near the Mt Organ State Forest (approximately 12 km south-west of the MLA areas)
- areas near the Mt Lawton State Forest (approximately 25 km south-east of the MLA areas).

In addition, the proponent is in early discussions with accredited 'biobank' providers to procure offsets with the appropriate development approvals on behalf of the proponent.

8.8.2.1. Conclusion—threatened communities offsets

As section 2 of the strategy summarises, current state and Commonwealth government vegetation/biodiversity offset policies do not set specific ratios, as the ratio requirements vary with the individual circumstances of the particular vegetation to be cleared and the corresponding offsets proposed. Also, relevant precedents have recently been set for declared significant projects with respect to the application of offset policy to inform my decisions on this matter.

Considering all parameters associated with the current extent, location, ecological integrity, protection status and connectivity of vegetation proposed to be cleared for the project, a minimum offset ratio of 1:3 for EPBC-listed remnant brigalow and non-remnant SEVT EECs (analogous REs) is recommended to apply to all components of the project.

On this basis, the minimum offset areas for EPBC-listed EECs described in Table 8.15, Table 8.16 and Table 8.17 should apply to the project, should the identified areas be disturbed. The areas will require refinement during the detailed design stage and will be reflected in the revised Biodiversity Offset Strategy for the project.

Table 8.15: Minimum offset areas for EPBC-listed EECs likely to be affected by the MLA areas and gas supply pipeline

EEC (RE) description	EPBC status	Area requiring offset (ha)	Minimum offset required (ha)
RE 11.9.4. Semi-evergreen vine thicket (SEVT, non-remnant) or <i>Acacia harpophylla</i> with SEVT understorey on fine grained sedimentary rocks	endangered	13.1	39.3
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow, remnant) on fine-grained sedimentary rocks; and RE 11.9.6. <i>Acacia melvillei</i> +/- <i>Acacia harpophylla</i> open forest (brigalow, remnant) on fine-grained sedimentary rocks	endangered	22.6	67.8

Table 8.16: Minimum offset areas for EPBC-listed EECs likely to be affected by the southern CSM water supply pipeline

EEC (RE) description	EPBC status	Area requiring offset (ha)	Minimum offset required (ha)
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow, remnant) on fine-grained sedimentary rocks	endangered	1.6	4.8

Table 8.17: Minimum offset areas for EPBC-listed EECs likely to be affected by the Glebe Weir raising and pipeline

EEC (RE) description	EPBC status	Area requiring offset (ha)	Minimum offset required (ha)
RE 11.3.1. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow, remnant) on alluvial plains	endangered	1.1	3.3
RE 11.9.5. <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest (brigalow, remnant) on fine-grained sedimentary rocks	endangered	4.2	12.6

An environmental offset is not practicable for the one site of EEC listed as ‘the community of native vegetation species dependent on natural discharge of groundwater from the Great Artesian Basin’ (that is, boggomosses) that would be inundated by the Glebe Weir raising. The SEIS (Volume 4, Section 12.3) noted that the spring did not have any attributes that distinguished it from others in the area. Each of the native vegetation species that were identified on it are common and widespread. The EIS (Volume 4, Section 13.4.2.1) noted that the shallow habitat created on the Cockatoo Creek side of a raised Glebe Weir would support such emergent species. Therefore no offset for this site is required.

8.8.2.2. Uncertainty about other resource tenures over offset areas

In its submission on the SEIS, DEWHA considered that any proposed offsite offset should be protected in tenure in perpetuity to avoid being disturbed in the future (including future mining).

There is potential for the tenure of the proposed offset lands, as identified in the Draft Biodiversity Offset Strategy, to be subject to future applications for development under the *Mineral Resources Act 1989* and the *Petroleum and Gas (Production and Safety) Act 2004*, hence affecting their protection status for vegetation offsets.

A vegetation offset would normally be expected to have protection from development in a way that would see the area managed sustainably for an indefinite period. It is desirable that some form of conservation status be secured for the offset lands, as this would provide some protection from development other than mining or petroleum development. However, due to the prior existence of resource tenures over the land, nature refuge agreements cannot be relied upon to deliver absolute security for the proposed offset lands.

It may be some years before the fate of the proposed project offset lands become known. Should the proponent’s offset lands be proposed to be cleared in the future by another holder of underlying mining or petroleum tenures, then that tenure holder would also be required to provide additional offsets for that particular clearing. Should this situation arise, then it is appropriate for the situation to be resolved by the relevant stakeholders in accordance with the prevailing statutory and policy requirements at that time.

8.9. Conclusion—MNES general

The commitment by the proponent to prepare and implement a Biodiversity Offset Strategy, in consultation with relevant agencies, to address the requirements of state and Commonwealth legislation and policies for offsets is acknowledged. A condition is recommended that requires the final approval of the Biodiversity Offset Strategy by DERM and SEWPaC (Condition 6, Schedule 8).

To reduce the net residual adverse impacts to those threatened species and EECs to an acceptable level, conditions are recommended regarding environmental offset requirements to be included in the Biodiversity Offset Strategy (Condition 6, Schedule 8).

The combined strategies put forward in the EIS, SEIS, draft EM Plan for the EA, and draft construction and operational EMPs for all project components (subject to finalisation), which include offsets for cleared EECs and the habitat of threatened EPBC-listed species, and ongoing management of threatening processes within offset areas and retained habitats, are adequate to

offset and/or manage the potential adverse impacts of the project on those MNES for which the project is declared a controlled action.

In accordance with the Commonwealth offset policy the Commonwealth Minister for Sustainability, Environment, Heritage, Population and Communities may set his own requirements with respect to potential impacts to EPBC-listed threatened species and communities that occur on the site of the proposed MLA areas, southern CSM water pipeline option or Glebe Weir and pipeline option, and migratory birds that occur on the site of the proposed Glebe Weir and pipeline.

To be clear, nothing within the conditions set by this report limits the Commonwealth Government from providing further conditions regarding MNES under the EPBC Act.

9. Conclusion

Having regard to the documentation provided during the EIS process for the project, the Coordinator-General is satisfied that the Queensland Government's impact assessment requirements, in accordance with the provisions of part 4 of the SDPWO Act, have been met.

The EIS process has provided sufficient information to the Queensland Government and the community to allow evaluation of potential environmental impacts that could be attributed to the project.

The Coordinator-General is satisfied that, subject to the discussion of particular issues in this report, careful management of the key construction and operation activities of the project, and adoption of any proposed additional items recommended should ensure that potential environmental impacts will be minimised or avoided.

The proponent has made commitments through the EIS and SEIS process, as summarised in Chapter 28 of the SEIS. A number of these commitments have been included as conditions for the project while others are to be included in the environmental management plans, for the EA and for all other aspects of construction and operation, as referred to in Section 6 of this report.

The draft EM plan that the proponent has developed is required under the EP Act as part of an application for an environmental authority (EA) for a mining lease, to address specific environmental matters identified during the EIS process associated with the construction and operation of the mine. The draft EM plan will be further refined and expanded following the finalisation of this report, during the detailed design phase of the project and through ongoing consultation with the relevant advisory agencies.

In reaching a conclusion on the acceptability or otherwise of the management of potential impacts of the project, these commitments and the EM plan have been considered.

Where necessary, conditions have been stated and imposed that must be implemented by the proponent and other relevant entities. Recommendations have also been provided, which the proponent is encouraged to undertake when developing the project.

On the basis of the information provided, including that from advisory agencies, the Coordinator-General is satisfied that the adverse environmental impacts associated with the project can be addressed through:

- implementing the conditions of the EA, under the EP Act, for construction and operation works associated with the mine (refer to Schedule 3, Appendix 1)
- implementing the conditions of the EA, under the EP Act, for construction and operation works associated with the gas supply pipeline to the mine site (refer to Schedule 4, Appendix 1)
- implementing the Coordinator-General's imposed conditions for aspects of the project that are not the subject of an EA (refer to Schedules 1 and 2, Appendix 1)
- implementing the conditions of the EA, under the EP Act for construction activities for the raising of Glebe Weir (refer to Schedule 5, Appendix 1,
- addressing information requirements and recommendations relating to development approval for ERA 14 for operating a facility to generate greater than 10 MW of electricity (refer to Schedule 6, Appendix 1)
- addressing information requirements and recommendations relating to development approval for ERA 16 to upgrade the Wandoan sewage treatment plant (refer to Schedule 7, Appendix 1).
- obtaining all other relevant necessary statutory approvals, licences and permits as required subject to conditions recommended in Schedule 8, Appendix 1
- implementing the other recommendations made in Schedule 9, Appendix 1
- obtaining a development approval and registration certificate from DERM under the EP Act for any ERAs not located on the mining leases.

It is considered that, on balance, the proposed project would provide a net social and economic benefit to the Wandoan region and the State of Queensland. This is evidenced by job creation opportunities and economic development associated with related projects, including the Surat Basin Rail project as well as the future expansion of the Wiggins Island Coal Terminal at Gladstone.

Therefore, pursuant to section 35 of the SDPWO Act, the Coordinator-General recommends that the project, as described in detail in the EIS, the SEIS and summarised in section 2 of this report, can proceed, subject to the conditions contained in Appendix 1 of this report.

In the event of any inconsistencies between the EIS documents and the recommended requirements in this report, the recommended requirements in this report prevail.

The proponent and its agents must implement the conditions of this report and all commitments presented in the EIS, SEIS and EM plans.

In accordance with section 17(2) of the SDPWO Regulation, a copy of this report will be provided to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities to enable a decision to be made under part 9 of the EPBC Act.

Under the provisions of part 9 of the EPBC Act, the Commonwealth Minister may approve or refuse the taking of the proposed action. In approving a proposed action, the minister may attach conditions to the approval if he is satisfied that the condition is necessary or convenient to protect a matter of national environmental significance, or to repair or mitigate damage to a matter of national environmental significance.

Copies of this report will be issued to the proponent, in accordance with section 35(5)(a) of the SDPWO Act.

Copies of the report will be also issued to agencies responsible for implementation of conditions including:

- DERM
- DEEDI
- DTMR
- WDRC
- BSC.

Other advisory agencies who participated in the EIS process will be notified about the availability of this report.

In accordance with section 35(5)(b) of the SDPWO Act, a copy of this report will be made available to the public on DIP's website at: <http://www.dip.qld.gov.au/projects>



Appendix 1: Conditions

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Schedule 1 Coordinator-General's imposed conditions

These conditions are imposed by the Coordinator-General (Coordinator-General) on the project under section 54B of the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

All of the conditions stated in this Schedule 1 take effect from the date of this Coordinator-General's report.

These conditions do not relieve the proponent of the obligation to obtain any other statutory approvals and licences from all relevant authorities.

In accordance with section 54B(3) of the SDPWO Act, the Coordinator-General has nominated entities to have jurisdiction for a number of conditions in this schedule. Schedule 2 describes which entity has jurisdiction for the conditions and the entities that should be consulted by the proponent in regards to each condition ('Consultative Bodies').

Condition 1 General conditions

- (a) The project must be carried out generally in accordance with the Wandoan Coal project Environmental Impact Statement (EIS) (December 2008) for the project, and the Wandoan Coal project EIS Supplementary Report (SEIS) for the project (November 2009), or as otherwise authorised by the Environmental Authority and/or the Plan of Operations for the project issued under the *Environmental Protection Act 1994*.
- (b) The proponent must notify the Coordinator-General and all consultative bodies for this Condition 1, as listed in Schedule 2 in writing of the commencement of the construction stage of the project and the commencement of the operation stage of the project at least four weeks prior to the relevant commencement date.
- (c) Within six months of advertising the draft environmental authority for the mining activities on the proposed mining leases for the project, unless otherwise agreed by the Coordinator-General, the proponent must provide a copy of the final commitments register for the project to the Coordinator-General including all Social Impact Management Plan (SIMP) commitments.
- (d) The proponent must, when first becoming aware of a non-compliance of any Coordinator-General imposed condition:
 - i) authorise and undertake action to bring the matter into compliance within an effective time frame as approved by the Coordinator-General
 - ii) report the non-compliance and remedial action to the Coordinator-General within five business days of becoming aware of the non-compliance matter.

Condition 2 Municipal waste facility

- (a) Prior to the commencement of construction of the project, the proponent is required to enter into an agreement with the Western Downs Regional Council for the development of new waste transfer station, and landfill facilities in the Wandoan area.
- (b) The landfill and waste transfer station facility should be initially designed and licensed to cater for at least 25,500 tonnes of waste per year during construction of the mine. The landfill and waste transfer station should be designed to be able to accept waste for the 30-year duration of the mine operations at approximately 8,700 tonnes per year and, as per SEIS Volume 1, Chapter 18, section 18.5.3.
- (c) Details regarding funding responsibilities and development requirements are to be incorporated into the agreement between the Western Downs Regional Council and the proponent. The proponent will meet the costs associated with the purchase of land and development of a waste receipt, transfer and landfill facility, as per Condition 2(b).
- (d) If agreement cannot be reached between the parties, either party may refer the matter to the Coordinator-General for resolution.



Condition 3 Wastewater treatment system

- (a) Prior to commencement of construction of the project, the proponent is required to enter into an agreement with the Western Downs Regional Council for upgrading of the wastewater treatment system in the Wandoan area to cater for the needs of the project.
- (b) The proponent is to fund all costs associated with upgrade of the Wandoan waste water treatment system to an appropriate size and standard to accommodate the wastewater from the project. This detail is to be incorporated into an agreement between the Western Downs Regional Council and the proponent with respect to responsibility for construction and funding.
- (c) If agreement cannot be reached between the parties, either party may refer the matter to the Coordinator-General for resolution.

Condition 4 Infrastructure agreement for local road upgrades and maintenance

- (a) The proponent must enter into an infrastructure agreement with WDRC (and/or Banana Shire Council) to fund any upgrading or deviation of local government roads required for construction vehicles or ongoing through traffic and any additional maintenance required during the construction period.
- (b) The agreement is to contain the requirement to undertake two joint asset condition assessments - one prior to construction traffic using local government roads; and the second at the completion of construction of the project to determine whether any additional maintenance is required to restore road networks to the original condition, with any identifiable works required being at the cost of the proponent.
- (c) The proponent must submit a traffic management plan (TMP) with the relevant local authority for their approval prior to commencement of the construction phase for any temporary road closures and detours.
- (d) The agreement is to require that all roads providing access to work camps to be constructed to an all weather access standard, with appropriate turning facilities provided from major roads.

Condition 5 Air transport

- (a) If the proponent decides to use air transport to transport operational employees, the proponent must:
 - iii) negotiate with relevant local authority on what construction and upgrades, if any, will be reasonably required and assist the local authority obtain the relevant approvals to undertake these works.
 - iv) negotiate with local authority on what contribution the proponent will make to the cost of the construction/upgrade.
- (b) The relevant local authority is the agency responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.

Condition 6 Glebe Weir and associated pipeline option—transport impacts

- (a) Prior to any construction commencing on the Glebe Weir and the associated pipeline, the proponent will implement the following strategies where relevant:
 - i) liaise with DTMR, BSC, WDRC and the Queensland Police Service (QPS) Regional Superintendent of Traffic regarding a traffic management plan to deal with all phases of the construction program. This will include warning signs and speed limits regarding curve radii and crests, among other things:



- where possible, provide buses for personnel transport to and from the camp to the site, and making bus travel obligatory for people working known, fixed shifts
 - where possible, arrange vehicle pooling where small numbers of people will be working outside fixed shifts
 - research school bus routes and timetables, making drivers aware of these and, if necessary, minimise commercial vehicle movements at school bus times and potentially relocating bus stops if agreed by DTMR
 - encourage 'piggy backing' of any road train dog trailers for return journeys to minimise vehicle lengths
 - discourage travel outside daylight hours to reduce the risk of animal strikes.
- ii) the proponent must enter into an agreement with the local councils regarding funding by the proponent of any upgrading or deviation of roads required for construction vehicles or ongoing through traffic and any additional maintenance required during the construction period.
- (b) DTMR, the relevant local authority and the QPS are the agencies responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.
- (c) Prior to commencing construction of the Glebe Weir and the associated pipeline, the proponent will liaise with DTMR, WDRC and the QPS to determine whether some or all of the following should be put in place at the Leichhardt Highway intersection with Nathan Road for the duration of the construction period:
- i) road widening and construction of turning lanes
 - ii) speed limits that would apply for appropriate distances each side of the intersections
 - iii) warning signs giving notice of trucks turning and entering
- (d) DTMR, the WDRC and the QPS are the agencies responsible for monitoring compliance with this condition. In the event of a dispute either party may refer the matter to the Coordinator-General for resolution.

Condition 7 Greenhouse gas emissions

- (a) The proponent must develop and implement a Greenhouse Gas Reduction Management Plan in relation to the Scope 1 and Scope 2 emissions of the project.
- (b) The plan in (a) must include, but not be limited to:
- i) the proponent's policy on greenhouse gas emissions
 - ii) annual monitoring of emissions from the construction and operation phases of the project, as also required by the National Greenhouse and Energy Reporting System
 - iii) an Energy Management Plan, incorporating the identification and evaluation of opportunities for continuous improvement in energy efficiency and emissions control, as is also required as part of the Energy Efficiencies Opportunities Program
 - iv) a Fugitive Gas Management Plan, incorporating the identification and evaluation of reasonable and practical opportunities to reduce fugitive emissions of methane gas.
- (c) The plan in (a) must be initially submitted to the authority administering the Environmental Authority for the mining activities prior to commencement of construction activities. This plan is to be reviewed annually for the construction and operations phases of the project and be submitted annually to the authority administering the Environmental Authority for the mining activities. The plan is to be made publicly available upon request.



Condition 8 Aquatic ecosystem monitoring program

- (a) The proponent must design and implement an Aquatic Ecosystem Monitoring Program to incorporate the requirements of the environmental authority (Schedule 3, Conditions W) for the mining lease(s). The monitoring program is to be provided to DERM for review and approval prior to the issue of the environmental authority for the mining lease(s), or other time as agreed by the Coordinator-General.
- (b) The monitoring program is to include:
 - i) a plan for each catchment area affected by the mining activity
 - ii) capability to detect if the ephemeral streams downstream of the mine are subject to an increase in the concentration of contaminants because of infrequent flushing
 - iii) details of event sampling, including a comprehensive selection of suitable reference sites determined in accordance with guidelines for reference sites as detailed in the Queensland Water Quality Guidelines 2009
 - iv) a description of monitoring site characteristics and reasoning behind site selection
 - v) the frequency of intended sampling effort for the duration of the project.

Condition 9 Road impact assessment and road management plan

Prior to the commencement of any significant construction works on the project, the proponent must pursuant to the *Transport Infrastructure Act 1994*:

- (a) Review and finalise the road impact assessment (RIA) that includes details of all project transport impacts on the safety and efficiency of state-controlled roads in accordance with the Guidelines for Assessment of Road Impacts of Development (2006) in consultation with the Manager of DTMR Toowoomba Regional Office; then submit the RIA to the Manager DTMR Toowoomba Regional Office for review and approval.
- (b) Prepare a road-use management plan (RMP) for use of state-controlled and other roads for each phase of the project. The RMP will detail traffic volumes, proposed transport routes, required road infrastructure maintenance and/or upgrades to mitigate road impacts, any necessary conditions about access/connection to public roads, transport scheduling, dust control and road safety. The RIA and RMP will be prepared with reference to the Guidelines for Assessment of Road Impacts of Development (DTMR, 2006) or similar.
- (c) The RMP is to include arrangements to ensure compliance with the management of workforce movements associated with the project. DTMR must approve the plan prior to implementation.
- (d) Provide upgrade/improvement works to the mine infrastructure area (MIA)/Leichhardt Highway intersection which meet DTMR requirements and any necessary road maintenance and upgrades identified in the finalised RMP to ameliorate any adverse impacts of the road use by the project on the assets of DTMR.
- (e) Enter into a road infrastructure agreement with DTMR to formalise the amount of, and timing for the payment of, contributions towards any necessary road maintenance and upgrades identified in the finalised RMP. If the road infrastructure agreement between the proponent and DTMR is not able to be concluded within six months of approval of the RMP either party may refer the matter to the Coordinator-General for resolution. The proponent shall upgrade, maintain or hand back roads in no worse a state of repair compared with the condition at the start of construction activities.
- (f) Prior to undertaking any works, obtain the relevant licences and permits under the *Transport Infrastructure Act 1994* for works within the state-controlled road corridor.



Condition 10 Traffic management plan

- (a) Prior to the commencement of any significant construction works associated with the project in the state-controlled road corridor, the proponent must prepare detailed drawings and traffic management plans (TMP) for all construction and other activities in the state-controlled road corridor.
- (b) The proponent must present detailed drawings and traffic management plans for review by DTMR, the Queensland Police Service, BSC/WDRRC and take account of the reviews.
- (c) The proposed plan must incorporate a provision that, prior to commencing any program of oversize transport movements that may be required for the construction of the project, the proponent will consult with DTMR, the Queensland Police Service and BSC/WDRRC.
- (d) The proponent must obtain the necessary permits for any excess mass or over-dimensional loads associated with the project as required under the *Transport Operations (Road Use Management) Act 1995*.
- (e) The proponent must implement the traffic management plan during construction and commissioning of the project and construction of all access road intersection/s.

Condition 11

Social Impact Management Plan (SIMP)

- (a) Consistent with the *Social Impact Assessment: Guideline to preparing a social impact management plan (September 2010)*, the SIMP is to establish the roles and responsibilities of proponents, government, stakeholders and communities throughout the life of the project in mitigating and managing social impacts and opportunities during the construction, operation, and decommissioning of the project.
- (b) Within six months of the release of the Coordinator-General's evaluation report for an environmental impact statement for the Wandoan Coal project, the proponent must submit to the Coordinator-General a final SIMP for approval, which must include:
 - I. a concise summary of the project
 - II. social impact mitigation and management strategies
 - III. a monitoring plan, reporting and review procedures, and any requirements for coordination or joint action among various parties
 - IV. a Stakeholder Engagement Strategy (refer to Condition 18) which contains a list of key stakeholders and describes their interest in the project, actions, outcomes and mechanisms, to support a regular review of the effectiveness of the SIMP
 - V. a dispute resolution mechanism that supports an active response to community and stakeholder concerns about social impact issues
 - VI. mitigation and management strategies to address the decommissioning stage of the project which are developed at a time agreed between the proponent and key stakeholders
 - VII. the relevant imposed conditions imposed in this report.

Specification for release of draft SIMP for consultation

- (c) With respect to the draft SIMP, the proponent must:



- I. prepare a consultation plan and consultation schedule (as outlined in section 4.1 of draft Wandoan Coal project SIMP) to provide opportunities for input to the SIMP from key stakeholders to discuss actions to partner in delivery of the SIMP
 - II. provide opportunities for input to the draft SIMP from those who are most affected by the Wandoan Coal project
 - III. take into consideration any increased demands and cumulative effects placed on stakeholders and the community to participate in consultative processes in the region
 - IV. continue to consult directly with State and local governments, in particular the Department of Communities and other relevant State government agencies identified in the draft SIMP; and all local governments affected by the Wandoan Coal project
 - V. the abovementioned government entities shall be considered key stakeholders.
 - VI. record stakeholder feedback and provide a consultation report on outcomes of the release of the draft SIMP
 - VII. discuss and seek agreement on the content of the draft SIMP including the key responsibilities, timeframes and resource implications for the local governments affected by the Wandoan Coal project.
- (d) In relation to social impact mitigation and management strategies, where clear agreement has not yet been reached (and the proponent provides evidence of reasonable steps to achieve agreement), the proponent is to identify the actions proposed to resolve these matters. Outcomes of these stated actions will be reviewed in the first annual report requirements of the SIMP as specified as part of the reporting, review and auditing arrangements.

SIMP Monitoring

- (e) The proponent must develop a SIMP monitoring plan which includes the following components:
- I. list of impacts and issues to be monitored targets and outcomes sought
 - II. a monitoring strategy, including how management of the impact will be monitored
 - III. details of the responsibilities for implementation of each monitoring strategy
 - IV. timing and frequency of how often monitoring of the impact should take place
 - V. key performance indicators that are informative, relevant, measurable, useful, widely recognised, simple to report, and easily understood.

SIMP reporting, review and auditing arrangements

- (f) With respect to the SIMP, the proponent must:
- I. submit an annual progress report, on a date to be mutually agreed by the proponent and the Coordinator-General
 - II. undertake an external audit:
 - at the completion of the construction stage of the Wandoan Coal project
 - every three years after the commencement of the operational stage
 - during the decommissioning phase of the Wandoan Coal project.
 - III. prepare and submit a report on each audit's findings to the Coordinator-General



IV. all annual, periodical, and audit reports are to be submitted to the Coordinator-General within 60 days of completion of the relevant period.

(g) The proponent may also elect to conduct additional internal reviews of the SIMP.

Amendments and termination of the SIMP

(h) A SIMP may be altered, re-structured, re-scoped or terminated through agreement by both government and the proponent, following consultation with key stakeholders. Any proposal to terminate the SIMP must be formally agreed with and by the Coordinator-General.

(i) A process to facilitate any amendments must be identified and agreed by the proponent and the Coordinator-General. If necessary, the stakeholder engagement strategy undertaken by the Wandoan Coal project Community Reference Group (CRG) (refer to Condition 148) should be updated to describe how stakeholders will be engaged in any change process at the time.

(j) Should the proponent wish to amend or update the SIMP, it must advise the Coordinator-General which of the following circumstances apply:

III. strategies and actions no longer meet the desired outcomes

IV. need to improve effectiveness of strategies and actions

V. changes in government policy

VI. significant changes to company operations or mine plan

VII. significant changes to national or international best-practice management approaches or frameworks.

Condition 12 Other Social Impact Management Plan (SIMP) requirements

1. The Wandoan Coal project SIMP is to contain (but is not limited to) the following initiatives to demonstrate the proponent's commitment to mitigation and management of social impacts for the Wandoan Coal project regarding the following social impacts: affected landholders; and housing impacts. These initiatives must be included in the final Wandoan Coal project SIMP to be submitted to the Coordinator-General for approval.

2. The other SIMP requirements are:

a) Landholder Resettlement Actions

The Wandoan Coal project SIMP is required to identify future actions that the proponent will undertake to continue to implement landholder resettlement mitigation and management strategies.

b) Mitigating and managing project accommodation and housing impacts

I. Integrated accommodation and housing data collection project

The proponent will undertake an accommodation and housing data collection project to inform the development of project accommodation and housing mitigation and management strategies. This project is to be completed as follows:

- Stage 1 is an accommodation and housing data collection project during the construction phase of the Wandoan Coal project to assess the project's impacts on accommodation, housing and housing markets and to assess the effectiveness of the project's accommodation and housing mitigation and



management strategies and to assess whether new strategies should be developed, implemented and incorporated in the SIMP.

- Stage 2 will comprise a repetition of the accommodation and housing data collection project during the first five years of operation of the project [at a date to be agreed with the Coordinator-General] to assess the effectiveness of the project's proposed accommodation and housing mitigation and management strategies; and to identify if new strategies need to be developed, and incorporated into future versions of the SIMP over the life of the project.

The proponent will conduct the data collection project in collaboration with the OESR (or other research body as agreed to with DIP), to inform the development of evidence-based accommodation and housing impact mitigation and management strategies.

The data collection will cover the following matters:

1. Detailed demographic analysis including:
 - a) resident population estimates and age-sex population projections
 - b) dwelling and household projections
 - c) place of work/place of residence analysis
 - d) customised statistical local area and locality-level profiles, as well as information on housing sales and rents
 - e) housing and accommodation – housing tenure, dwelling stock, sales volumes and prices
2. Housing demand and housing need by low and moderate income key workers
3. A description and analysis of the Wandoan Coal project current full suite of accommodation arrangements for all of its entire personnel (both direct employees and contractors engaged in all Wandoan Coal project business activities, including non-Wandoan Coal project activities) in the Surat Basin including regional and local planning processes, including existing and proposed FIFO/DIDO/BIBO arrangements
4. The likely impact of the Wandoan Coal project components on the housing market and on housing demand
5. A description of the currently available options for the provision of accommodation
6. A framework which enables the proponent to develop a more detailed strategy for accommodating workers as well as for developing mitigation strategies in relation to any negative housing impacts on non-resource key workers of each of the Wandoan Coal project components which may occur in the future
7. A final draft of the findings must be presented to the Wandoan Coal project CRG and to the Coordinator-General for review and input and the proponent must take into account any feedback on or suggested amendments provided by the Wandoan Coal project CRG and the Coordinator-General in the finalisation of the project findings
8. The results of the project must be made publicly available and be considered in future revisions of the Wandoan Coal project SIMP, with intellectual property rights of the data collected shared between Wandoan Coal project and OESR



or other research body for data supplied by the proponent; and retained by OESR or other research body for all other data.

II. Development of accommodation and housing mitigation and management strategies

Following the completion of the data collection project, the proponent will further identify any accommodation and housing impacts of the project and develop mitigation and management strategies for inclusion in the Wandoan Coal project SIMP including strategies for continued monitoring to assess the change in demand over time.

Appropriate accommodation and housing impact mitigation and management strategies should address the following issues:

- a) if housing shortfall is identified, options for accommodation provision for the proponent's workforce that are not housed in any project-specific worker accommodation
- b) specific recommendations on contributions required to be made by the proponent to specifically mitigate any negative impacts of each of the Wandoan Coal project components on the housing market
- c) monitoring of the effect of any provision of accommodation on the housing market and on demand for affordable housing
- d) any negative impacts on availability of local housing created by the proposed worker accommodation village, FIFO/DIDO/BIBO arrangements for all Wandoan Coal project components.

Condition 13 Cumulative Social Impacts

With regard to the Wandoan Coal project SIMP, the proponent must:

- (a) continue to collaborate with the state agencies and local government authorities and where necessary, other resource industry stakeholders in the development of any future cumulative social impact mitigation and management strategies
- (b) identify opportunities to work with key stakeholders to establish overarching management strategies to address any cumulative social impact issues identified through the above mentioned stakeholder engagement requirements
- (c) ensure that any future cumulative social impact mitigation and management strategies identified collaboratively with key stakeholders are included in future versions of the Wandoan Coal Project SIMP and consider the planning tools relating to both the Surat Basin and the Central Queensland planning region.

Condition 14 Community Safety and Road Safety requirements

The proponent must continue to engage collaboratively in consultation with QPS, DCS, DTMR, DEEDI and the WDRC and the BSC to respond to community safety and road safety issues (but not limited to):

- (a) a traffic awareness and road safety education campaign extending to all of the Wandoan Coal project communities, especially for children using the school bus services (Wandoan, Taroom and Miles)
- (b) a robust induction process for Wandoan Coal project controlled accommodation villages and employee behaviour policies that incorporate protocols covering:



- III. after hours behaviour
 - IV. employee and contractor travel and driving
 - V. interactions of employees and contractors with the community
- (c) include collaborative strategies to monitor and address these matters in the SIMP over which the Wandoan Coal project has control.

Condition 15 Employment, training and economic development

The proponent must:

- (a) provide opportunities for apprenticeships, traineeships and school-based training for local youth
- (b) use agreements with Native Title claimants to create opportunities for training and employment for Indigenous people
- (c) ensure that employment, training and economic development initiatives are incorporated into the Wandoan Coal project SIMP submitted to the Coordinator- General for final approval.

Condition 16 Workforce management requirements

The proponent must:

1. Ensure that the Wandoan Coal project Employee Behaviour Policy incorporating protocols covers areas of:
 - a. after hours behaviour, travel and driving
 - b. interactions with the community
 - c. development of an Employee Induction Process to include employees and is to be incorporated into the Wandoan Coal project SIMP
2. Ensure that the workforce management requirements are incorporated into the Wandoan Coal project SIMP submitted for the approval of the Coordinator-General.

Condition 17 Indigenous engagement requirements

The proponent must:

- (a) Include the Wandoan Coal project *Cultural Heritage Management Strategy* and specific details about its commitment to Indigenous employment, business/enterprise, and training opportunities, including any school-based education, assistance and support programs in the Wandoan Coal project SIMP
- (b) Employ suitably qualified local people in cooperation with relevant government agencies, local schools and training institutions to encourage participation by local job-seekers in employment and training opportunities generated by the project
- (c) Draw on Xstrata's national and international expertise and programs to maximise opportunities for Indigenous people to be directly and indirectly employed by the Wandoan Coal project
- (d) Work in partnership with traditional owner groups, Xstrata Coal Queensland, other relevant project proponents, Queensland Government agencies, Western Downs Regional Council, Banana Shire Council and the Federal Government and agencies to develop (a) to (c)



Condition 18 Wandoan Coal project Community Reference Group (CRG)

- (a) The proponent shall extend the existing project's CRG to the satisfaction of the Coordinator-General which would have the following functions.
- (b) The proponent shall continue community liaison on the development of the Wandoan Coal project, rail spurline, the proposed gas supply pipeline, and any future project expansion components, specifically to continue to:
 - 1. assist the proponent to understand community views
 - 2. work with the community to determine potential social impacts and mitigation strategies associated with its mining activities, including consideration of the Wandoan Coal Project Public Health Impacts Study recommended under Schedule 9, Recommendation 8 of this report
 - 3. inform and assist Wandoan Coal project to monitor and measure the social cumulative impacts of the project on the local community and region through the SIMP; including the preparation of strategies to respond to emerging issues
 - 4. assist the Wandoan Coal project to monitor and measure the effectiveness and appropriateness of its stakeholder engagement strategy and priority projects for its local communities
 - 5. provide advice to the Sustainable Resource Communities (SRC) Partnership Group and the SRC Surat Basin Local Leadership Group where appropriate
 - 6. at the proponent's discretion, undertake liaison on matters relevant to other projects outside of the scope of the Wandoan Coal project.
- (c) With respect to the SIMP stakeholder engagement strategy requirements (refer to Condition 11(b)IV):
 - 1. continue to provide advice about and input to issues relating to the implementation of social impact mitigation and management strategies that have been identified in the EIS process and documented in the SIMP
 - 2. receive and consider progress reports on the implementation of the SIMP
 - 3. provide the opportunity for the CRG to participate in the design and collection of qualitative and quantitative data pertinent to monitoring SIMP mitigation and management strategies.
- (d) With respect to its functions outlined in (b), membership of the Wandoan Coal project CRG must reflect the full breadth of the community and stakeholders. Invitations for membership should be extended to the following groups and other relevant organisations with a focus on providing local community representation from the following:
 - 1. representatives of landholders – at least 2 representatives
 - 2. a Wandoan business owner - 1 representative
 - 3. an employee of an education institution or childcare centre - 1 representative
 - 4. community services (such as the Miles Community Inc.) - 1 representative
 - 5. a youth member of the community or youth worker (such as the Taroom Youth development officer) - 1 representative



6. an employee of the health or medical sector - 1 representative
7. Western Downs Regional Council - 1 representative
8. Banana Shire Council – 1 representative
9. a partner of a Wandoan Coal project employee working on the Wandoan Coal project - 1 representative
10. representation as agreed through the proponent's indigenous stakeholder engagement strategy – 1 representative of each traditional owner group
11. a workforce representative from Wandoan Coal project- 1 representative
12. a representative of the the lead construction contractor from the Wandoan Coal project (if the lead construction entity is not the proponent) - 1 representative
13. representative from a General Manager (or equivalent) from the Wandoan Coal project for the duration of the construction phase and during the operations phase - 1 representative
14. the proponent's SIMP Manager - 1 representative
15. a State Government agency representative approved by the Coordinator-General in consultation with the Queensland Government's Regional Managers Coordination Network - 1 representative.

Should membership of these groups not be willing or able to undertake CRG membership, the opportunity may be extended to other organisations and agencies without detriment to the WJV.

- (e) The Charter of the Wandoan Coal project CRG shall:
- I. ensure the appointment of a volunteer independent Chair of the Wandoan Coal project CRG or a chair elected by the members of the CRG from within their number depending on the preference of the majority of members
 - II. ensure that the Wandoan Coal project CRG has a clear Charter developed in consultation with stakeholders and approved by the Coordinator-General, that outlines member responsibilities and meeting responsibilities including the provision of advice and input regarding the identification, monitoring and on-going management of cumulative social impact issues
 - III. ensure the group meets during the development of the final SIMP, and quarterly during the first year of implementation of the final SIMP, and thereafter integrated into the regular Wandoan Coal project CRG meeting schedule or as required.
- (f) provide the Wandoan Coal project CRG with regular information on the progress of work on the Wandoan Coal Mine and monitoring results
- (g) promptly provide to the Wandoan Coal project CRG with other information as the Chair may reasonably request concerning the environmental performance of the Wandoan Coal project
- (h) allow the Wandoan Coal project CRG to make comment/s about the:
- I. construction progress and implementation
 - II. the SIMP
 - III. compliance with the conditions of this Coordinator-General's report



IV. other matters relevant to the construction and operation of the Wandoan Coal project.

- (i) ensure that the Wandoan Coal project CRG has access to reasonable and sufficient information to fulfil its purpose
- (j) invite representatives from relevant government agencies or other individuals to attend meetings as reasonably required by the Chair
- (k) provide access for Wandoan Coal project site inspections by the Wandoan Coal project CRG at times that are mutually acceptable to the proponent and the Wandoan Coal project CRG members
- (l) consider the recommendations and comments of the Wandoan Coal project CRG and provide a response to the Wandoan Coal project CRG
- (m) take minutes for each meeting for distribution to CRG members within 14 days of that meeting Agreement of the minutes is to occur at the next meeting.
- (n) ensure that the minutes are available on the Wandoan Coal project web page within 30 days of endorsement by the Chair
- (o) will include a process for CRG involvement in the development of mitigation and management strategies that address the decommissioning stage of the project at a time agreed between the proponent and the CRG.



Schedule 2 Jurisdiction for Coordinator-General's imposed conditions

Condition number	Condition short title	Entity with jurisdiction	Consultative bodies
Condition 1	General conditions	Coordinator-General	DEEDI, DERM
Condition 2	Municipal waste facility	Coordinator-General	DERM, WDRC
Condition 3	Wastewater treatment system	Coordinator-General	DERM, WDRC
Condition 4	Agreement for local road upgrades and maintenance	WDRC/BSC	DTMR
Condition 5	Air transport	DTMR	WDRC, BSC
Condition 6	Glebe Weir and associated pipeline option – transport impacts	DTMR	QPS, WDRC, BSC
Condition 7	Greenhouse gas emissions	Coordinator-General	DERM
Condition 8	Aquatic ecosystem monitoring program	DERM	-
Condition 9	Road impact assessment and road management plan	TMR	QPS, WDRC, BSC, DEEDI
Condition 10	Traffic management plan	TMR	QPS, WDRC, BSC, DEEDI
Condition 11 to Condition 18	Social conditions	Coordinator-General	



Schedule 3 Stated conditions that should apply to a draft environmental authority that would be issued under the *Environmental Protection Act 1994* for the mining activities on the proposed mining leases

General environment

A1 **Financial assurance**

Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.

Note: The calculation of financial assurance for condition (A1) must be in accordance with Guideline 17 and may include a performance discount. The amount is defined as the maximum total rehabilitation cost for complete rehabilitation of all disturbed areas, which may vary on an annual basis due to progressive rehabilitation. The amount required for the financial assurance must be the highest Total Rehabilitation Cost calculated for any year of the Plan of Operations and calculated using the formula: (Financial Assurance = Highest Total Annual Rehabilitation Cost x Percentage Required)

A2 The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.

Note: Where progressive rehabilitation is completed and acceptable to the administering authority, progressive reductions to the amount of financial assurance will be applicable where rehabilitation has been completed in accordance with the acceptance criteria defined within this environmental authority.

A3 **Maintenance of measures, plant and equipment**

The environmental authority holder must ensure:

- a) that all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed;
- b) that such measures, plant and equipment are maintained in a proper condition; and
- c) that such measures, plant and equipment are operated in a proper manner.

A4 **Monitoring**

Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.

A5 Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.

A6 **Spillages**

Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.



Note: All petroleum product storage's must be designed, constructed and maintained in accordance with *AS 1940 - Storage and Handling of Flammable and Combustible Liquids of 2004 or later versions*.

A7 Notification of emergencies, incidents and exceptions

All reasonable and practicable actions are to be taken to minimise environmental harm, or the risk thereof, resulting from any emergency, incident or circumstances not in accordance with the conditions of this environmental authority.

A8 As soon as practicable after becoming aware of any emergency, incident or information about circumstances which results or may result in environmental harm not in accordance with the conditions of this environmental authority, the administering authority must be notified.

A9 Not more than ten (10) business days following the initial notification of an emergency, incident or information about circumstances which result or may result in environmental harm, written advice must be provided to the administering authority in relation to:

- a) proposed actions to prevent a recurrence of the emergency or incident;
- b) the outcomes of actions taken at the time to prevent or minimise environmental harm; and
- c) proposed actions to respond to the information about circumstances which result or may result in environmental harm

A10 As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, with the conditions of this environmental authority, written advice (which may be electronically) must be provided of the results of any such monitoring performed to the administering authority.

Air

B1 The release of noxious or offensive odours, or any other noxious or offensive airborne contaminants resulting from the activities to which this environmental authority relates, must not cause a nuisance at any sensitive place.

B2 The holder must implement and maintain best practice dust control procedures that incorporates a program for continuous improvement for the management of dust resulting from the mining activities.

B3 Dust generated by the mining activities must not cause any of the following air quality objectives to be exceeded at a sensitive place:

- (a) A level of deposited dust of 120 milligrams per square metre per day based on a monthly average; and
- (b) A concentration of total particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time.

B4 The holder must take all reasonable and practicable measures to limit the concentration of particulate matter generated by the mining activities with an aerodynamic diameter of less than 10 micrometres, to 50 micrograms per cubic metre suspended in the atmosphere over a 24 hour averaging time with not more than 5 exceedences recorded over 12 months at any sensitive place.

Dust and particulate matter monitoring, control and reporting

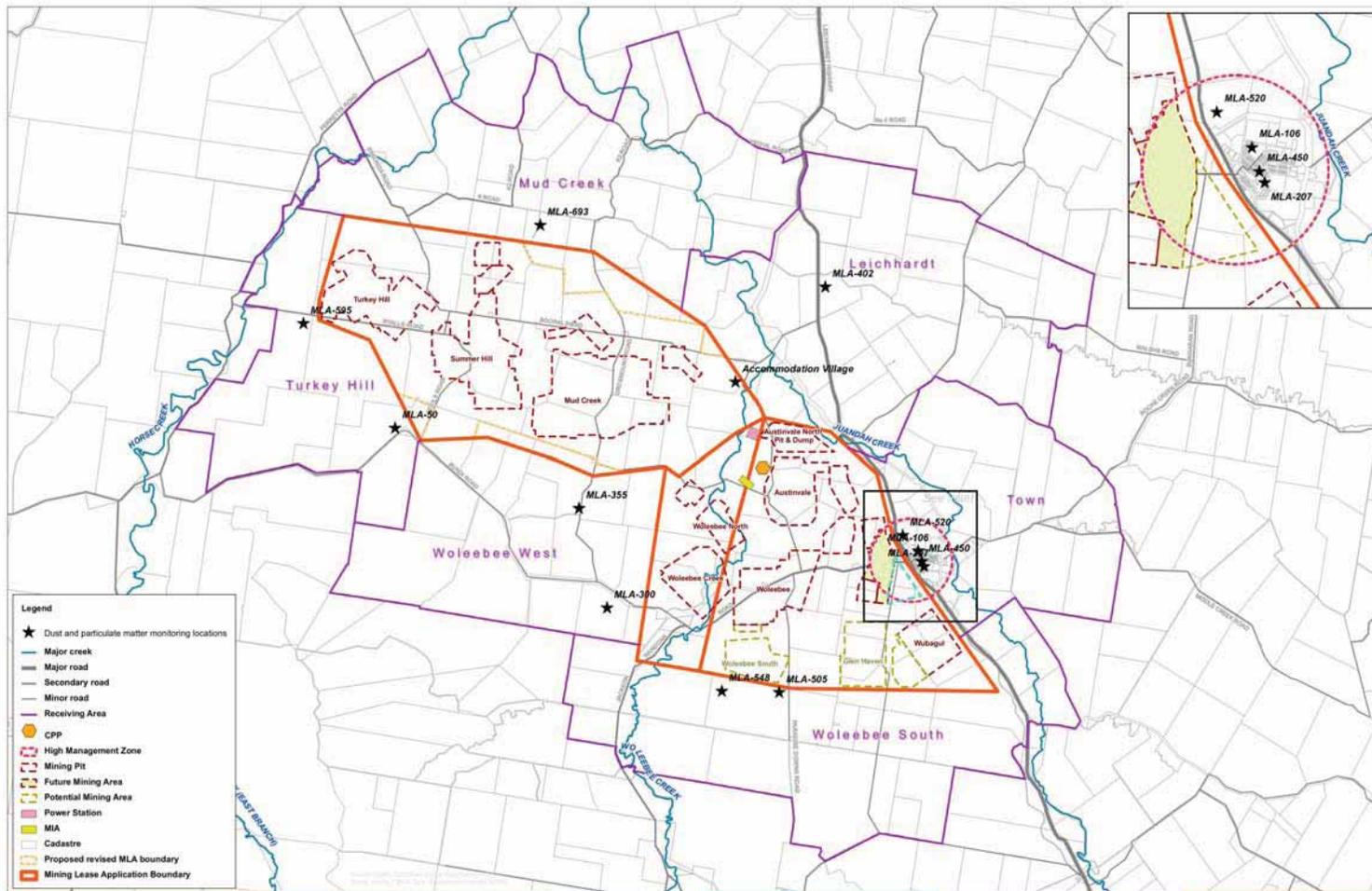
B5 The holder of the environmental authority must develop and implement a dust and particulate matter monitoring and control program.



- B6** The program must include:
- (a) the collection of air quality and meteorological data at locations and using the monitoring methods described in Table B1a, Table B1b and Figure B1 (or suitable alternative location as agreed with the administering authority);
 - (b) a forecasting system to identify adverse meteorological conditions likely to produce elevated levels of PM₁₀ at a sensitive place due to the mining activities; and
 - (c) a dust control strategy that would activate the timely implementation of high management dust control actions (listed in Table B2 Dust and particulate control actions) in addition to the best practice dust control measures during periods identified in (b).
- B7** The dust and particulate matter monitoring and control program must be submitted to the administering authority with the plan of operations.
- B8** Where monitoring identifies instances where the concentration specified in Condition B4 is exceeded, the holder must report to the administering authority within fourteen (14) days.
- (a) the concentration of PM₁₀ particulates at the sensitive place;
 - (b) a description of meteorological conditions occurring at the time;
 - (c) the concentration of PM₁₀ particulates upwind of the mining activities (if known); and
 - (d) measures taken to reduce dust generated by the mining activities.
- B9** Notwithstanding condition B6, if requested by the administering authority, dust and particulate monitoring must be undertaken for a stated period at a specified sensitive place, and the results provided to the administering authority within fourteen (14) days following completion of monitoring.
- B10** If the monitoring required by condition B9 is undertaken for over one month, then monthly interim reports should be provided to the administering authority.



Figure B-1: Dust and particulate matter monitoring locations





- B11** The holder of the environmental authority must report annually to the administering authority:
- (a) the results and an analysis of dust and particulate matter monitoring, including consideration of the relevant meteorological data;
 - (b) details of the use of high management control measures including the dust and atmospheric conditions that triggered the action, when, where and what action was applied, and the effectiveness of the action meeting the requirements of conditions B3 and B4;
 - (c) identification of any trends (daily or seasonally) that should be considered in management of the mining activities and dust management practices; and
 - (d) any changes to the dust and particulate control actions and monitoring resulting from an analysis of (a), (b) and (c).

Table B1a: Dust and particulate matter monitoring

Air quality determination	Monitoring method to be used
Concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM_{10}) suspended in the atmosphere over a 24 hour averaging time	Real-time monitoring of the 24 hour average. Australian Standard AS3580.9.8 : 2008 Determination of suspended PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser (or the most recent version), or any alternative method of monitoring PM_{10} that may be permitted by the Air Quality Sampling Manual as published from time to time by the administering authority.
Concentration of particulate matter suspended in the atmosphere in micrograms per cubic metre over a 24 hr averaging time	AS/NZS 3580.9.3:2003 <i>Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method</i> (or the most recent version)
Deposited Dust	Australian Standard AS 3580.10.1:2003 (or the most recent version);
Meteorological data (including but not limited to wind speed and direction, humidity, temperature and precipitation)	AS 2923-1987: <i>Guideline for measurement of horizontal wind for air quality applications</i> or as approved by the administering authority.
Siting of monitoring equipment	AS/NZS 3580.1.1:2007 Guide to siting air monitoring equipment



Table B1b: Dust and particulate matter monitoring description

Monitoring location	Receiving area on the receiving areas plan	Relevant upwind location	Monitoring point description
MLA-106	<i>Wandoan township</i>	Turkey Hill AWS	house
MLA-207	<i>Wandoan township</i>	Turkey Hill AWS	house
MLA-450	<i>Wandoan township</i>	Turkey Hill AWS	house
MLA-402	<i>Wandoan township</i>	Turkey Hill AWS/ Wandoan AWS	house
MLA-520	<i>Wandoan township</i>	Turkey Hill AWS	house
MLA-548	<i>Woolabee South</i>	Turkey Hill AWS/ Wandoan AWS	*
MLA-505	<i>Woolabee South</i>	Turkey Hill AWS/ Wandoan AWS	homestead
MLA-300	<i>Woolabee West</i>	Turkey Hill AWS/ Wandoan AWS	house
MLA-50	<i>Woolabee West Creek</i>	Turkey Hill AWS/ Wandoan AWS	house
MLA-355	<i>Woolabee West Creek</i>	Turkey Hill AWS/ Wandoan AWS	*
MLA-595	<i>Woolabee Hill</i>	Wandoan AWS	homestead
MLA-693	<i>Woolabee Creek</i>	Turkey Hill AWS/ Wandoan AWS	house
Accommodation facilities	<i>Wandoan township</i>	Turkey Hill AWS/ Wandoan AWS	*

* details to be provided prior to notification of the draft environmental authority



Table B2: Dust and particulate control actions

Activity	High management control²²
Dragline - overburden	Relocation/cease activity/limit hours of operation
Truck and Shovel	Relocation/cease activity/limit hours of operation
Truck loading coal	Relocation/cease activity/limit hours of operation
Bulldozing - overburden	Relocation/cease activity/limit hours of operation
Truck dumping overburden	Relocation/cease activity/limit hours of operation
Tailings disposal area	n/a*
ROM - erosion active stockpile	Regular water sprays
Truck dumping coal	Regular water sprays
Batch drop conveyor	n/a*
CPP (washplant)	n/a*
Loading trains	n/a*
Conveyor	n/a*
Blasting - coal and overburden	Relocation/cease activity/limit hours of operation
Drilling - overburden	Relocation/cease activity/limit hours of operation
Haul roads	application of chemical dust suppressants/use alternative haul routes/cease activity/limit hours of operation
Grader	Relocation/cease activity/limit hours of operation

* the need for control measures is to be determined in consultation with DERM prior to notification of the draft environmental authority

²² Condition B11(d) should be used to periodically update this table.



Water

W1 Contaminant release

Contaminants that will or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

W2 The release of contaminants (that will or have the potential to cause environmental harm) to waters must only occur from the release points specified in Table W1.

Table W1: Contaminant release points, sources and receiving waters

Name	Release point (RP) easting (GDA94)	Release point (RP) northing (GDA94)	Contaminant source and location	Monitoring point*	Receiving waters description
AU-E1	789415	7108589	Environmental Dam	Spillway or outlet works	Woleebee Ck
AU-E2	787562	7111458	Environmental Dam	Spillway or outlet works	Woleebee Ck
AU-E4	788298	7112428	Environmental Dam	Spillway or outlet works	Woleebee Ck
FC-E1	792468	7104540	Environmental Dam	Spillway or outlet works	Frank Ck/ Juandah Ck
MC-E2	781464	7118468	Environmental Dam	Spillway or outlet works	Mud Creek
SH-E3	773639	7121655	Environmental Dam	Spillway or outlet works	Spring Ck
W-E2	787991	7108362	Environmental Dam	Spillway or outlet works	Woleebee Ck
AU-R1	788245	7111989	Raw Water Storage Dam	Downstream monitoring point	Woleebee Creek

* To be advised prior to notification of the draft environmental authority

W3 The release of contaminants to waters must not exceed the release limits stated in Table W2 when measured at the monitoring points specified in Table W1 for each quality characteristic.



Table W2: Contaminant release limits

Quality characteristic	Release limits for all release points	Sampling frequency
Electrical conductivity (uS/cm)	1000*	Daily during release (the first sample must be taken within 2 hours of commencement of release)
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)
Turbidity (NTU)	*	Daily during release* (first sample within 2 hours of commencement of release)
Suspended Solids (mg/L)	*	Daily during release* (first sample within 2 hours of commencement of release)
Sulfate (SO ₄ ²⁻) (mg/L)	1000*	Daily during release* (first sample within 2 hours of commencement of release)

* local trigger values to be advised prior to notification of the draft EA

W4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table W1 for each quality characteristics and at the frequency specified in Table W2 and Table W3.

Table W3: Release contaminant trigger investigation levels

Quality characteristic	Trigger levels (µg/L)*	Comment on trigger level	Sampling frequency
Aluminium	55	For aquatic ecosystem protection, based on LOR for ICPMS	Commencement of release and thereafter weekly during release
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	1	For aquatic ecosystem protection, based on SMD guideline	
Copper	2	For aquatic ecosystem protection, based on LOR for ICPMS	
Iron	300	For aquatic ecosystem protection, based on low reliability guideline	
Lead	3.4	For aquatic ecosystem protection, based on LOR for ICPMS	
Mercury	0.2	For aquatic ecosystem protection, based on LOR for CV FIMS	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	8	For aquatic ecosystem protection, based on SMD guideline	
Boron	370	For aquatic ecosystem protection, based on SMD guideline	



Quality characteristic	Trigger levels (µg/L)*	Comment on trigger level	Sampling frequency
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	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Fluoride (total)	2000	Protection of livestock and short term irrigation guideline	

*local trigger values to be advised prior to notification of the draft EA

Note:

1. All metal and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The list of quality characteristics required to be monitored as per Table W3 will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or an earlier date if the data is, or becomes, available and if it is determined that there is no need to monitor for certain individual characteristics these can be removed from Table W3.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC and ARMCANZ (2000)
4. LOR – typical reporting for method stated. ICPMS/CV FIMS²³ – analytical method required to achieve LOR.

- W5** If water quality characteristics of the release exceed any of the trigger levels specified in Table W3 during a release event, the environmental authority holder must compare the downstream results in the receiving waters to the trigger values specified in Table W3 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 in Table W3 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and;
 - i. if the result is less than the background monitoring site data, then no action is to be taken; or
 - ii. if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining the details of the investigations carried out and actions taken to prevent environmental harm

²³ ICPMS = inductively coupled plasma mass spectrometry; CV = cold vapour; FIMS = flow injection mercury system



Note: Where an investigation is being undertaken in accordance with W5(2)(ii) no further reporting is required for subsequent trigger events for that quality characteristic

W6 If an exceedance in accordance with condition W5(2)(ii) is identified; the holder of the authority must notify the administering authority within fourteen (14) days of receiving the result.

W7 Contaminant release events

The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point for any receiving water into which a release occurs.

W8 The release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table W4 for the release point(s) specified in Table W1.

Table W4: Contaminant release during flow events²⁴

Minimum flow in receiving water required for a release event	Flow recording frequency
≥1m ³ /s	Daily during discharge

W9 Contaminant release flow rate must not exceed **20%** of receiving water flow rate.²⁵

W10 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table W1.

W11 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.

W12 The release of contaminants directly or indirectly to waters:

- must not produce any visible discolouration of receiving waters; and
- must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

W13 Notification of release event

The authority holder must notify the administering authority as soon as practicable (e.g. no later than six (6) hours of having commenced releasing water to the receiving environment) and for every 24 hours while releases occurring and at the cessation of releases. Notification must be in writing (which may be electronically) and include:

- release commencement date/time;
- expected release cessation date/time;
- release point/s;
- if the release limits defined in Table W2 are exceeded;
- release volume (estimated);
- receiving water/s including the natural flow rate;
- any details (including available data) regarding likely impacts on the receiving water(s);
- any actions undertaken by the holder that may have contributed to the release;
- measures that have been taken to prevent or mitigate any potential or actual environmental harm.

²⁴ Details of mixing requirements to be determined prior to notification of the draft EA for each release point

²⁵ Details of mixing requirements to be determined prior to notification of the draft EA



W14 Notification of release event exceedance

If the release limits defined in Table W2 are exceeded, or are likely to have been exceeded, the holder of the environmental authority must notify the administering authority within six (6) hours of the event.

W15 The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours) of the cessation of a release notified under condition W13 and within twenty eight (28) days provide the following information in writing:

- a) release cessation date/time;
- b) natural flow volume in receiving water;
- c) volume of water released;
- d) details regarding the compliance of the release with the conditions of this authority (i.e. contamination limits, natural flow, discharge volume);
- e) all in-situ water quality monitoring results; and
- f) any other matters pertinent to the water release event.

W16 Monitoring of water storage quality

Water storages stated in Table W5, which are associated with the release points identified in Table W1, must be monitored for the water quality characteristics specified in Table W6 at the monitoring locations and at the sampling frequency specified in Table W5.

If water quality characteristics in the water storages listed in Table W5 exceed any of the trigger levels specified in Table W6, the holder of the environmental authority must investigate and undertake appropriate management actions to reduce the levels to or below those in Table W6, and provide a written report to the administering authority in the next annual return, outlining the details of the investigations carried out and actions taken.

Table W5: Water storage monitoring

Name	Water storage description	Monitoring location	Frequency of sampling
AU-E1	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
AU-E2	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
AU-E4	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
FC-E1	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
MC-E2	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
SH-E3	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
W-E2	Environmental dam	within 10 m of spillway or outlet works intake point	Quarterly
AU-R1	Raw water storage dam	within 10 m of spillway or outlet works intake point	Quarterly



Table W6: Onsite water storage quality

Quality characteristic	Value	Trigger levels
pH (pH unit)	Range	Greater than 4, less than 9 ²
EC (µS/cm)	Maximum	5970 ¹
Sulfate (mg/L)	Maximum	1000 ¹
Fluoride (mg/L)	Maximum	2 ¹
Aluminium (mg/L)	Maximum	5 ¹
Arsenic (mg/L)	Maximum	0.5 ¹
Cadmium (mg/L)	Maximum	0.01 ¹
Cobalt (mg/L)	Maximum	1 ¹
Copper (mg/L)	Maximum	1 ¹
Lead (mg/L)	Maximum	0.1 ¹
Nickel (mg/L)	Maximum	1 ¹
Zinc (mg/L)	Maximum	20 ¹

Note:

¹ Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

² Page 4.2-15 of ANZECC & ARMCANZ (2000) 'Soil and animal health will not generally be affected by water with pH in the range of 4–9'.

Note: Total measurements (unfiltered) must be taken and analysed

W17 In water storages containing coal seam gas associated water exposed to air, the dissolved oxygen shall be greater than 2mg/L measured in the impounded water.

W18 Receiving environment monitoring and contaminant trigger levels

The quality of the receiving waters must be monitored for each quality characteristic and at the monitoring frequency stated in Table W7 at the locations specified in Table W8.

Table W7: Receiving waters contaminant trigger levels

Quality characteristic	Investigation trigger level*	Sampling frequency
pH	6.5 – 8.0	Continuous
Electrical conductivity (µS/cm)	1000	Continuous
Suspended solids (mg/L)	*	Daily during release
Sulfate (SO ₄ ²⁻) (mg/L)	1000 (Protection of irrigation value)	Daily during release

* local trigger value to be advised prior to notification of the draft EA



Table W8: Receiving water upstream background sites and downstream monitoring Points

Monitoring points	Receiving waters location description	Northing* (GDA94)	Easting* (GDA94)
Upstream background monitoring points			
J-UJ	Upper Juandah Ck	7105181	799058
J-UF	Frank Ck Dam	7100536	793760
W-UW	Woleebee Ck	7104135	785187
Alt W-UW	Alternative Woleebee Ck	7102081	783585
M-UMu	Mud Ck	7109591	776940
Alt W-UWa	Alternate Wandoan Ck	7101390	781114
M-UM	Mt Organ Ck	7111479	773829
Downstream monitoring points			
J-DJ	Juandah Ck	7114761	790733
J-DF	Frank Ck	7115068	790589
W-DW	Woleebee Ck	7116742	788907
	To replace W-DW Woleebee Ck	7116168	788199
M-DMu	Mud Ck	7122555	783948
	Mud Ck Year 5	7120837	780685
S-DS	Spring Ck	7120213	772325
	Spring Ck Year 9	7125959	771710
D-DS	Duck Ck	7125353	767160

*Approximate location.

- W19** If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table W7 during a release event, the environmental authority holder 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 in accordance with the ANZECC & ARM CANZ 2000 methodology, 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 exceedence of a trigger level has occurred and is being investigated, in accordance with this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

W20 Receiving Environment Monitoring Program (REMP)

A REMP must be implemented by (3 months from the date of issue) to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water.

For the purposes of the REMP, the receiving environment is the waters of the Frank Creek, Woleebee Creek, Mud Creek, Duck Creek and Spring Creek and connected waterways within ten (10) kilometres downstream of the release.

W21 The REMP report must address (but not necessarily be limited to) the following:

- a) Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);
- b) Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water) Policy 2009);
- c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;
- d) Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;
- e) Monitoring for any potential adverse environmental impacts caused by the release;
- f) Monitoring of stream flow and hydrology;
- g) Monitoring of toxicants should consider the indicators specified in Table W3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARM CANZ (2000) guidelines for slightly to moderately disturbed ecosystems;
- h) Monitoring of physical chemical parameters as a minimum those specified in Table W2 (in addition to dissolved oxygen saturation and temperature);
- i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARM CANZ (2000), BATLEY and/or the most recent version of AS/NZS 5667. 12:1999 Water quality - Sampling - *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;
- j) The locations of monitoring points (including the locations specified in Table W8 which are background and downstream impacted sites for each release point);
- k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines 2009*. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
- l) Specify sampling and analysis methods and quality assurance and control;
- m) Any historical datasets to be relied upon;
- n) Description of the statistical basis on which conclusions are drawn; and
- o) Any spatial and temporal controls to exclude potential confounding factors.

W22 The REMP report must be prepared and submitted in writing to the administering authority by (to be determined prior to notification of the EA).



W23 Water – general

All determinations of water quality must be:

- a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;
- b) made in accordance with methods prescribed in the latest edition of the administering authority's Monitoring and Sampling Manual 2009, Environmental Protection (Water) Policy 2009 DERM
- c) collected from the monitoring locations identified within this environmental authority, within ten (10) hours of each other where possible;
- d) carried out on representative samples; and
- e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) for the method of analysis being used.

W24 Annual water monitoring reporting

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 in the specified format upon request:

- a) the date on which the sample was taken;
- b) the time at which the sample was taken;
- c) the monitoring point at which the sample was taken;
- d) the measured or estimated daily quantity of the contaminants released from all release points;
- e) the release flow rate at the time of sampling for each release point; and
- f) the results of all monitoring and details of any exceedances with the conditions of this environmental authority.

W25 Water Management Plan

A Water Management Plan must be developed and implemented within 3 months from the date of issue that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

W26 The Water Management Plan must be developed in accordance with the administering authority's Guideline – *Preparation of Water Management Plans for Mining Activities* or any updates that become available from time to time and must include at least the following components:

- a) Contaminant Source Study;
- b) Site Water Balance and Model;
- c) Water Management System
- d) Saline Drainage Prevention and Management Measures;
- e) Acid Rock Drainage Prevention and Management Measures (if applicable);
- f) Emergency and Contingency Planning; and
- g) Monitoring and Review.

W27 Each year the holder of the environmental authority must ensure that proper and effective measures, practices and procedures are in place as outlined in the Water Management Plan prior to the wet season (i.e. by 1 November) and a further review following the wet season (i.e. by 1 May the following year) so that the mine is operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

W28 A copy of the Water Management Plan and/or revised Water Management Plan must be provided to the administering authority on request.

W29 Saline drainage

The holder of this environmental authority must ensure reasonable and practicable measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.



W30 Acid rock drainage

The holder of this environmental authority must ensure reasonable and practicable measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

W31 Stormwater and water sediment controls

An Erosion and Sediment Control Plan must be developed by a suitably qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to water and contamination of storm water.

W32 The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas that would result in the release of wastes, contaminants or materials to any stormwater drainage system or waters.

W33 Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or waters.

Water management system

W34 On 1 November each year, the holder of the Environmental Authority shall review:

- the spatial extent of controlled catchments
- storage capacity
- current storage volumes
- transfer capacity, and
- standard operating procedures

of all key infrastructure elements of the mine water management system and update the mine water balance model. An assessment of the mine water balance model must be undertaken to ensure that as at 1 November, the mine water management system has sufficient storage capacity, transfer capacity, and transfer operations to ensure that the frequency of uncontrolled discharges of mine water is less than or equal to the specified AEP in Table G3.

The assessment must be undertaken with an appropriate period of climate data that includes representation of wet season rainfall events up to the AEP specified in Table G3. The assessment results must be documented and be available for auditing.

W35 The holder of the Environmental Authority must notify the administering authority within fourteen (14) days, if any assessment of the mine water management system shows that the risk of uncontrolled discharge is greater than the specified AEP in Table G3.

W36 Notwithstanding the provisions for Mandatory Report Levels in Table G3 Dams, the holder of the Environmental Authority must not allow any uncontrolled discharge to be caused by either:

- a) failure to stop transferring water to a dam where the transfer into that dam contributes in part, or full, to the overflow (uncontrolled discharge) of that dam; or
- b) failure to start and continue transferring water from a mine water dam, where the Standard Operation Procedures require the water transfer from the dam to prevent overflow (uncontrolled discharges).

W37 Monitoring and reporting in the event of uncontrolled release

- a) In the event of an uncontrolled release from any component of the mine water system to the receiving environment, the holder of this environmental authority shall: Sample and monitor the uncontrolled release waters during or as immediately practical after the event (recognising that uncontrolled discharges should only occur during rainfall in excess of the design AEP and site may not be accessible) to determine quality characteristics of the uncontrolled release for parameters specified in Table W2, and Table W3;
- b) Sample and monitor the receiving environment monitoring sites listed in Table W8 for sites relevant to the uncontrolled release location.
- c) Estimate the quantity of uncontrolled release waters, by a suitably qualified and experienced person(s);



- d) Provide a written report to the administering authority within fourteen (14) days of the uncontrolled release event, which shall include as a minimum:
- i) the time and dates of the uncontrolled release event;
 - ii) the location of the uncontrolled release;
 - iii) the monitoring quality of the uncontrolled release waters; or if not available due to site access constraints in wet weather during the event, the quality of waters in the dam that contributed to the uncontrolled release before the event (from monitoring undertaken as part of condition W16) and quality in that dam after the release events;
 - iv) the estimated quantity of uncontrolled release;
 - v) downstream receiving water monitoring results;
 - vi) rainfall during, or that contributed to, the uncontrolled release event and dam levels prior to the rainfall event that caused uncontrolled release;
 - vii) a determination of whether uncontrolled release was solely caused by rainfall exceeding the design AEP events specified in Table G3;
 - viii) a determination of whether the uncontrolled release was cause in part or full, by failure to operate the integrated mine water system in accordance with Standard Operating Procedures for the integrated mine water system, or physical failure of one or more components of the integrated mine water system;
 - ix) a determination of whether the uncontrolled release caused environmental harm; and
 - x) if determined that the uncontrolled release could have been reasonably prevented, actions that will be taken to ensure uncontrolled releases comply in all respects with this environmental authority.

Groundwater

- W38** A groundwater monitoring program must be designed and implemented as described in Table W9 and the locations shown in Figure W1.



Table W9: Groundwater monitoring program

Monitoring sites	Parameter	Frequency	Purpose
WMB1-D, WMB1-S, WMB2, WMB3-D, WMB3-S G8011D, G8012D, G8013D, G8018D	Water level	Every 12 hours – electronic loggers	Detect drawdown in shallow coal seam aquifer and any mine induced variation in groundwater quality
	pH, EC, TDS (lab), cations, anions, selected metals (Al, Ba, Fe, As, Cd, Cr, Co, Cu, Ni, Li, Sr, Zn, Bo, Mn)	Every 3 months	
G8010S, G8011S, G8012S, G8013S, G8016S, G8017S	Water level	Every 12 hours – electronic loggers	Determine baseline hydrochemistry and groundwater level variation in alluvium aquifer (minimum 12 months)
	pH, EC, TDS (lab), cations, anions, selected metals (Al, Ba, Fe, As, Cd, Cr, Co, Cu, Ni, Li, Sr, Zn, Bo, Mn)	3 months	

W39 Mining activities must not cause groundwater in aquifers potentially affected by mining activities to exceed any of the contaminant limits and levels in Table W10 – Groundwater contaminant limits and levels.

Table W10: Groundwater contaminant limits and levels

Parameter	Units	Contaminant limits*
Heavy metals	µg/L	Baseline value ± X
TDS	mg/L	Baseline value ± X
EC	µS/cm	Baseline value ± X
Sulphate	mg/L	Baseline value ± X
pH	unit	Baseline value ± X

* local contaminant limits to be advised prior to notification of the draft EA

For table W10, baseline value ± X means for measured groundwater quality, arithmetic means are not to vary above the reference baseline average by more than ± X and measured groundwater maximum values are not to exceed the reference baseline maximum by more than ± X.

Baseline value ±X for pH, means the corresponding variation allowed is X pH unit above and below average and maximum pH values.

W40 Groundwater monitoring bores must be constructed and operated in accordance with methods prescribed in the latest edition of the Land and Water Biodiversity Committee, 2003 *Minimum Construction Requirements for Water Bores in Australia*.

Noise and vibration

D1 Noise nuisance

Noise from the mining activity must not cause a noise nuisance at any sensitive place.



D2 All noise from the mining activity must not exceed the levels specified in Table D1 at any sensitive place.

D3 Noise is not considered to be a nuisance under condition D1 if monitoring shows that noise from the mining activity does not exceed the following levels in the time periods specified in Table D1.

Table D1: Noise limits for mining activity (sensitive place)

Noise Level [dB(A)] (outside) at a 'Sensitive Place' expressed as	Monday to Sunday		
	7am – 6pm	6pm – 10pm	10pm – 7am
L _{Aeq,adj,15 mins}	42	35	35
L _{A1,adj,15 mins}	55	50	40

Noise monitoring

D4 Monitoring of the receiving acoustic environment shall be conducted at the locations described in Table D2 and shown on Figure D1 for the duration shown in Table D2, or alternative locations as agreed with the administering authority.

Table D2: Noise monitoring locations and duration

No.	Location *	Receiving area	Duration	Type
1	MLA-378	Leichhardt	During the operation of the Project.	Fixed automated, continuous monitoring
2	N3	Town (Central)	During the operation of the Project.	Fixed automated, continuous monitoring
3	MLA-520	Town (North)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
4	MLA-640	Town (South)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
5	MLA-720	Mud creek (West)	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
6	MLA-595	Turkey Hill	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
7	MLA-305	Woleebee West (West)	Monthly once mining of the northern 50% of Summer Hill Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven



No.	Location *	Receiving area	Duration	Type
				day) period
8	MLA-693	Mud creek (Central)	Monthly during operation of Summer Hill North Pit.	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
9	MLA-355	Woleebee West (Central)	Monthly once mining of the northern 50% of Mud Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
10	MLA-300	Woleebee West (East)	Monthly once mining of the northern 50% of Woleebee Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period

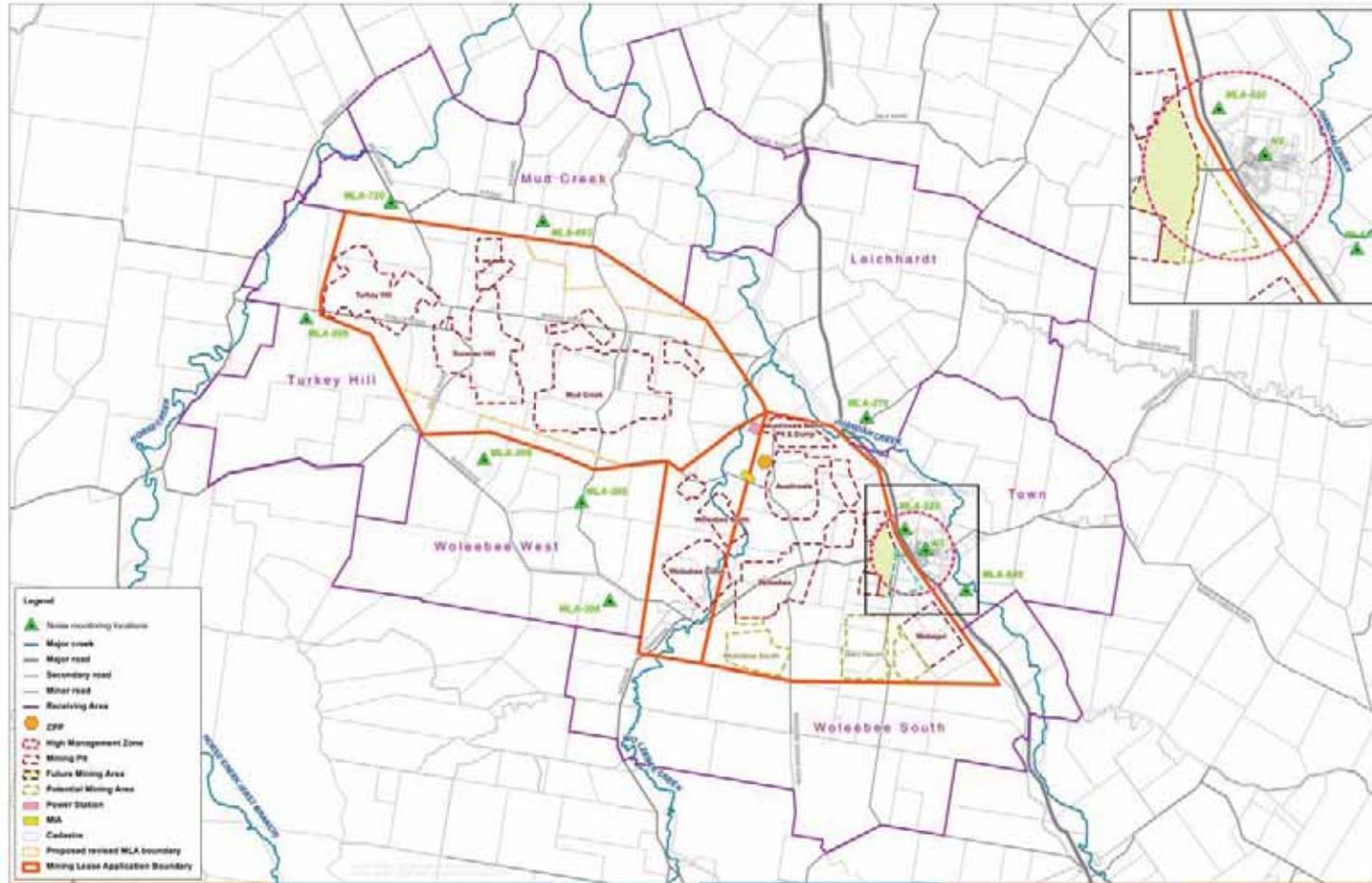
* Shown on Figure D1

D5 Notwithstanding condition D3, if requested by the administering authority, noise monitoring must be undertaken for a stated period at a specified sensitive place, and the results provided to the administering authority within fourteen (14) days following completion of monitoring. Monitoring must include:

- a) $L_{Aeq,adj,15\ mins}$, $L_{A1,adj,15\ mins}$ recorded at 15 minute intervals
- b) the level and frequency of occurrence of impulsive or tonal noise;
- c) atmospheric conditions including wind speed and direction;
- d) effects due to extraneous factors such as traffic noise, insects, etc; and location date and time of recording.



Figure D-1: Noise monitoring locations





- D6** If the monitoring required by condition D5 is undertaken for over one month, then monthly interim reports should be provided to the administering authority
- D7** The method of measurement and reporting of noise levels must comply with the current edition of the Department of Environment and Resource Management's *Noise Measurement Manual* and any subsequent versions.
- D8** If monitoring indicates exceedance of the relevant limits in Table D1, then the environmental authority holder must:
- a) if the monitoring is relevant to a complaint, the holder must address the complaint including the use of appropriate dispute resolution if required; and
 - b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.
- D9** **Vibration nuisance**
Vibration from the mining activity must not cause an environmental nuisance at any sensitive place
- D10** If the Environmental Authority holder can provide evidence through monitoring that the limits defined in Table D3 are not being exceeded then the holder is not in breach of condition D9.
- D11** If monitoring indicates exceedance of the relevant limits in Table D3, then the environmental authority holder must:
- a) address the complaint including the use of appropriate dispute resolution if required; and
 - b) immediately implement vibration abatement measures so that vibrations from the activity do not result in further environmental nuisance.

Table D3: Airblast overpressure and peak particle velocity levels

Blast noise and vibration parameter	Monday to Sunday - 8am to 5pm
Airblast overpressure level (dB Linear peak)	115 dB (linear peak) for 4 out of any 5 consecutive blasts regardless of the interval between blasts. Any single blast must not exceed 120 dB (linear peak).
Peak particle velocity (mm/s)	For vibrations of more than 35 Hz – no more than 25 mm/s ground vibration For vibrations of no more than 35 Hz – no more than 10 mm/s ground vibration

- D12** If requested by the administering authority, vibration monitoring must be undertaken for a stated period at a specified sensitive place, and the results provided to the administering authority within fourteen (14) days following completion of monitoring.
- D13** The method of measurement and reporting of vibration levels must take into consideration Appendix J of AS 2187.2-2006.
- D14** If the monitoring required by condition D12 is undertaken for over one month, then monthly interim reports should be provided to the administering authority
- D15** **Airblast overpressure nuisance**
Subject to Conditions D16 and D17, airblast overpressure level from blasting operations must not cause an environmental nuisance, at any sensitive place.
- D16** If the holder can provide evidence through monitoring that the limits defined in Table D3 are not being exceeded then the holder is not in breach of condition D15.



- D17** If monitoring indicates exceedance of the relevant limits in Table D3, and the monitoring was undertaken in response to a complaint, then the environmental authority holder must:
- address the complaint including the use of appropriate dispute resolution if required; and
 - immediately implement airblast overpressure abatement measures so that airblast overpressure from the activity do not result in further environmental nuisance.
- D18** If requested by the administering authority, monitoring of airblast overpressure must be undertaken for a stated period at a specified sensitive place, and the results provided to the administering authority within fourteen (14) days following completion of monitoring.
- D19** Airblast overpressure monitoring must include the following descriptors, characteristics and conditions:
- location of the blast(s) within the mining area (including which bench level);
 - atmospheric conditions including temperature, relative humidity and wind speed and direction;
 - location, date and time of recording.
- D20** The method of measurement and reporting of airblast overpressure levels must take into consideration Appendix J of AS 2187.2-2006.

Non-mineral waste

E1 Storage of tyres

Scrap tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options must be stored in stable stacks less than 3 m high, and at least 10 m from any other scrap tyre storage area, or combustible or flammable material, including vegetation.

- E2** All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10 m radius of the scrap tyre storage area.

E3 Disposal of tyres

Disposing of scrap tyres resulting from the authorised activities must be consistent with the requirements of DERM's operational policy: Disposal and storage of scrap tyres at mine sites DERM 2006 or any later versions.

E4 Waste management

A waste management program, in accordance with the Environmental Protection (Waste Management) Policy 2000, must be implemented and must cover:

- how the environmental authority holder will recognise and apply the waste management hierarchy;
- identify characterisations of wastes generated from the project and general volume trends over the past five (5) years;
- waste commitments with auditable targets to reduce, reuse and recycle;
- waste management control strategies including:
 - the type of wastes;
 - segregation of the wastes;
 - storage of the wastes;
 - transport of the wastes;
 - monitoring and reporting matters concerning the waste;
 - emergency response planning; and
 - disposal, reused and recycling options;
- identify the potential adverse and beneficial impacts of the wastes generated;
- hazardous characteristics of the wastes generated including:
 - disposal procedures for hazardous wastes;
 - processes to be implemented to allow for continuous improvement of the waste management systems;



- iii) identification of responsible staff (positions) for implementing, managing and reporting the Waste Management Plan; and
- iv) staff awareness and induction programs that encourage re-use and recycling.

Mineral waste

- E5** Prior to construction of any mineral waste storage facility, undertake a risk assessment, in accordance with generally accepted standards to determine if:
- a) the mineral waste is a hazardous waste or has acid producing potential
 - b) the mined pit is a hazardous dam.

E6 Coal handling and preparation plant waste

Waste from the coal handling and preparation plant must be disposed of in regulated dams in accordance with the requirements of Table G2 of this environmental authority if the residual shear strength of the waste is less than 1 kilopascals prior to disposal.

E7 Spoil disposal facility - certification and operation

Authorised spoil disposal facilities, used for the disposal of waste are located within the control points defined in Table E1.

Table E1: Location of spoil disposal facility

Name of spoil disposal facility*	Control points*	
	Longitude (GDA 94)	Latitude (GDA 94)
Spoil dumps (in pit and ex-pit)	XXXX	XXXX
XXXX	XXXX	XXXX
XXXX	XXXX	XXXX

* name and location and spoil disposal facilities to be advised prior to notification of the draft EA.

- E8** Spoil disposal facility(s) shall be designed to prevent environmental harm arising from contaminants being generated in the facility, leachate and runoff from the facility.
- E9** Authorised spoil disposal facility(s) must be constructed and maintained in accordance with certified design plans, submitted to the administering authority.
- E10** Design plans for the authorised spoil disposal facility(s) must include the following performance indicators:
- a) during operations the spoil disposal facility(s) will be operated with minimal or no potential for adverse environmental harm resulting from collapse of any component of the facility ;
 - b) the potential for leachate generation will be minimal or non existent; and
 - c) adequate drainage structures, erosion protection and storage are provided to manage seasonal and rare rainfall events with minimal or no environmental harm.
- E11** Construction of any spoil disposal facility detailed in Table E1 must not commence unless:
- a) the environmental authority holder has submitted to the administering authority two copies of a design plan; and
 - b) certification from a suitably qualified and experienced person that the design of the spoil disposal facility(s) will deliver the performance stated in that design plan and that it will be compliant in all other respects with this environmental authority, and
 - c) at least twenty (20) business days has passed since the receipt of those documents by the administering authority; or
 - d) the administering authority notifies the environmental authority holder that a design plan and certification has been submitted for that disposal facility.



E12 Operational plan – spoil disposal facility

An operational plan must be developed and maintained for the spoil disposal facility. The operational plan must include but not be limited to:

- a) description of landform development stages of the spoil disposal facility;
- b) placement technique for spoil and waste material from the coal handling and processing plant on the mine site;
- c) management of any containment structures within the spoil disposal facility designed to contain materials from the coal handling an processing plant on the mine site;
- d) demonstration of how operations of the spoil disposal facility are consistent with the accepted design plan for the facility; and
- e) decommissioning and rehabilitation strategies for the spoil disposal facility that demonstrate consistency with conditions of this environmental authority.

Land

Final land use and rehabilitation plan

- F1** All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Table F1 and Table F2.



Table F1: Final land use and rehabilitation approval schedule

Disturbance type	Post-mining land use	Post-mining land suitability class for dry land cropping	Post-mining land suitability class for beef cattle grazing
Infrastructure including roads, MIA, etc.	Beef cattle grazing, native bushland, plantation forestry or infrastructure is retained for use.	Class 3 and Class 4	Class 2 and Class 3
Low gradient overburden disposal stockpiles including tailings disposal	Beef cattle grazing, native bushland, or plantation forestry	Class 4	Class 2
Steeper gradient overburden disposal stockpiles	Low density beef cattle grazing or native bushland	Class 5	Class 4
Final voids	Low density beef cattle grazing or native bushland	Class 5	Class 4
Water storage dams	Either retained for subsequent agricultural use or remediated and rehabilitated for beef cattle grazing or native bushland	Class 4	Class 2
Sediment dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing or native bushland	Class 4	Class 2
Environmental dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing or native bushland	Class 4	Class 2
Any contaminated land	A use consistent with a contaminated site management plan for the area.	Not Applicable	Not Applicable

Table F2: Landform design criteria for Wandoan Coal Mine

Disturbance Type	Slope Range (%)
Residual voids (high wall)	0 - 214 % or 65°
Residual voids (low wall)	0 – 100 % or 45°
Recontoured spoil area	0 – 18 % or 10°
Waste rock dumps	0 – 18 % or 10°
Infrastructure and ROM areas	0 – 18% or 10°
Roads and tracks	0 – 10 % or 5.7°

F2 Progressive rehabilitation must commence when areas become available within the operational land.



F3 Complete an investigation into the planned rehabilitation of disturbed areas and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in condition F1 and Table F1 and Table F2 within twelve months of the issue of the Environmental Authority.

F4 Rehabilitation monitoring program

Once rehabilitation has commenced, the environmental authority holder must conduct a Rehabilitation Monitoring Program on a two (2) yearly basis, which must include sufficient spatial and temporal replication to enable statistically valid conclusions as established under the rehabilitation program.

F5 The Rehabilitation Monitoring Program must be developed and implemented by a person possessing appropriate qualifications and experience in the field of rehabilitation management, nominated by the environmental authority holder.

F6 The Rehabilitation Monitoring Program must be included in the Plan of Operations and updated with each subsequent Plan of Operations, describing:

- (a) how the rehabilitation objectives will be achieved; and
- (b) verification of rehabilitation success.

Residual void outcome

F7 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; and
- (b) residual voids must comply with design specifications in Table F3 and the locations shown in Figure F1.

Table F3: Residual void design

Void identification	Void wall - competent rock slope (%)	Void wall - incompetent rock slope (%)	Void maximum surface area (ha)
XXXX *	XXXX *	XXXX *	XXXX *

* to be advised prior to notification of the draft EA.

F8 Complete an investigation into residual voids and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in conditions F7 within twelve months of the issue of the Environmental Authority.

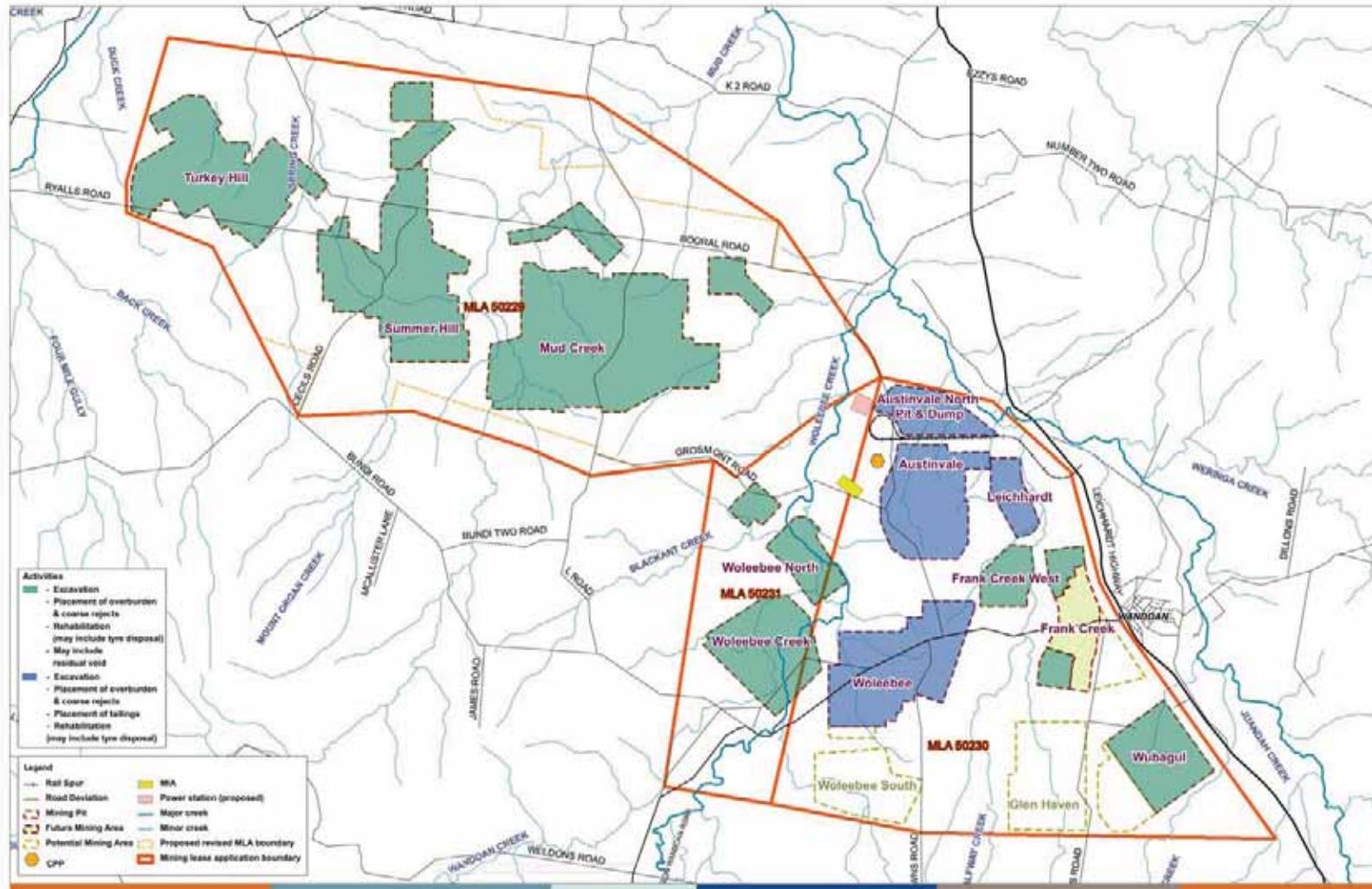
F9 Post closure management plan

A post closure management plan for the site must be prepared at least eighteen (18) months prior to the final coal processing on site and implemented for a nominal period of:

- (a) at least thirty (30) years following final coal processing on site; or
- (b) a shorter period if the site is proven to be stable and it can be demonstrated to the satisfaction of the administering authority that the site has been decommissioned and rehabilitated such that it will not cause environmental harm for the foreseeable future (i.e. within 150 years).



Figure F-1: Residual voids





F10 The post closure management plan must include the following elements:

- a) operation and maintenance of:
 - (i) wastewater collection and reticulation systems;
 - (ii) wastewater treatment systems;
 - (iii) the groundwater monitoring network;
 - (iv) final cover systems; and
 - (v) vegetative cover.
- b) monitoring of:
 - (i) surface water quality;
 - (ii) groundwater quality;
 - (iii) seepage rates;
 - (iv) erosion rates;
 - (v) the integrity and effectiveness of final cover systems; and
 - (vi) the health and resilience of native vegetation cover.

F11 Mining waste management

A mining waste management plan together with the certification by an appropriately qualified person(s) must be developed and implemented within twelve months of the issue of the Environmental Authority.

F12 The mining waste management plan must at a minimum include:

- a) characterisation programs to ensure that all mining waste is progressively characterised during disposal for net acid producing potential, salinity and the following contaminants: pH, Electrical Conductivity (EC), Acid Neutralising Capacity (ANC), Net Acid Generation (NAG) (reporting NAG capacity and NAG pH after oxidation), Net Acid Producing Potential (NAPP), Total Sulfur (S), Chromium Reducible Sulfur (Scr), Boron (B) Cadmium (Cd), Iron (Fe), Aluminium (Al), Copper (Cu), Magnesium (Mg), Manganese (Mn), Calcium (Ca), Sodium (Na), Zinc (Zn) and Sulfate (SO₄). [*Note: The list of contaminants will be reviewed by an appropriately qualified person after the development of the Mining Waste Management Plan, and if it is determined that certain contaminants are a low risk to the environment, these can be removed from the Mining Waste Management Plan*].
- b) characterisation programs to ensure that the physical properties of the mining waste is progressively characterised during disposal;
- c) the availability or leachability of metals from the mining waste;
- d) quantity of potentially acid forming (PAF) mining waste;
- e) review potential impacts of PAF mining waste on the success of proposed rehabilitation methods;
- f) management actions for mining waste that has been identified as having a high availability or leachability of metals;
- g) management actions for mining waste that has been defined as PAF;
- h) identification of environmental impacts and potential environmental impacts;
- i) control measures for routine operations to minimise likelihood of environmental harm;
- j) contingency plans and emergency procedures for non-routine situations; and
- k) periodic review of environmental performance and continual improvement.



Dams

G1 All dams

The hazard category of each dam must be determined by a suitably qualified and experienced person, prior to its construction and at least once every two (2) years thereafter.

G2 Construction of any dam determined to be in the significant or high hazard category (a regulated dam) must not be commenced unless the location, basic details, and hydraulic performance of that dam are specifically referenced in this environmental authority.

G3 On cessation of operation of any dam, that dam must be maintained so as to avoid environmental harm until that dam is decommissioned.

G4 Prior to the cessation of the mining activity, each dam must be decommissioned such that it either:

- becomes a stable landform, that no longer contains flowable substances, or
- is approved or authorised under relevant legislation for a beneficial use, or
- is a void authorised by the administering authority to remain after decommissioning; and,
- is compliant with the rehabilitation requirements of this environmental authority.

Regulated dams – location

G5 The following dams must be wholly located within the control points defined in Table G1.

Table G1: Location of regulated dams

Name*	Regulated dam description	Easting (GDA94)	Northing (GDA94)
Environmental dam AU-E1	Environmental dam	789415	7108589
Environmental dam AU-E2	Environmental dam	787562	7111458
Environmental dam AU-E4	Environmental dam	788298	7112428
Environmental dam FC-E1	Environmental dam	792468	7104540
Environmental dam MC-E1	Environmental dam	781464	7118468
Environmental dam SH-E3	Environmental dam	773639	7121655
Environmental dam W-E2	Environmental dam	787991	7108362
Raw water storage dam AU-R1	Raw water storage dam	788245	7111989
Tailings dam XXXX*	In pit tailings disposal*	*	*
Tailings dam XXXX*	In pit tailings disposal*	*	*

* details to be provided prior to the notification of the EA.

G6 Regulated dams must be consistent with the details in Table G2.



Table G2: Details of regulated dams

Regulated dam*	Maximum surface area (ha)*	Maximum volume of dam (ML)*	Maximum depth of dam (m)*	Purpose of dam
Environmental dam AU-E1	XXXX	XXXX	XXXX	Environmental dam
Environmental dam AU-E2	XXXX	XXXX	XXXX	Environmental dam
Environmental dam AU-E4	XXXX	XXXX	XXXX	Environmental dam
Environmental dam FC-E1	XXXX	XXXX	XXXX	Environmental dam
Environmental dam MC-E1	XXXX	XXXX	XXXX	Environmental dam
Environmental dam SH-E3	XXXX	XXXX	XXXX	Environmental dam
Environmental dam W-E2	XXXX	XXXX	XXXX	Environmental dam
Raw water storage dam AU-R1	XXXX	XXXX	XXXX	Raw water storage dam
Tailings dam XXXX	XXXX	XXXX	XXXX	Tailings storage
Tailings dam XXXX	XXXX	XXXX	XXXX	Tailings storage

*to be provided prior to notification of the draft EA.

G7 All dams must meet the hydraulic performance criteria specified in Table G3.

Table G3: Hydraulic performance dams

Dam type	Hazard category for failure to contain	Design storage allowance	Spillway critical design storm AEP	Mandatory reporting level
Regulated Dams				
Environmental dams	Significant	1 in 20 year, 4 month wet season storage	0.001 (1 in 1,000)	0.01 (1 in 100) AEP 72 hour storm volume below spillway level OR 0.01 (1 in 100) AEP wind wave height below spillway level.
Raw water storage	Significant	1 in 20 year, 4 month wet season storage	0.001 (1 in 1,000)	(as above)
Tailings storage facilities	Significant	1 in 100 year, 4 month wet season storage	0.001 (1 in 1,000)	(as above)
Low hazard dams that form part of the mine water management system				
Sediment dams	Low	NA	0.01 (1 in 100)	NA

G8 Certification and operation

Every regulated dam must be constructed in accordance with a certified design plan that has been submitted to the administering authority, and such that the resulting dam will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority.

G9 Construction of a regulated dam must not be commenced unless:

1. the licensee has submitted to the administering authority two copies of a design plan, together with the certification of a suitably qualified and experienced person that the design of the regulated dam will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority; and



2. at least twenty (20) business days has passed since the receipt of those documents, or the administering authority notifies the licensee that a design plan and certification has been submitted for that dam.

- G10** When construction of any regulated dam is complete and prior to commencing operation of that dam, the licensee must submit to the administering authority two (2) copies of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in that submitted design plan and that dam is compliant in all respects with this environmental authority.
- G11** An operational plan must be kept current for each regulated dam.
- G12** Where an operational plan covers decommissioning and rehabilitation, those operations are to be consistent with the design plan for the dam and the rehabilitation requirements of this environmental authority.
- G13** The licensee must notify the administering authority as soon as practicable, but within twenty-four (24) hours, of the level in any regulated dam reaching the mandatory reporting level (MRL) and must act to prevent or minimize any actual or potential environmental harm.
- G14** **Regulated dams – annual inspection and report**
- Each regulated dam must be inspected annually by a suitably qualified and experienced person.
- G15** At each annual inspection, the condition and adequacy of each regulated dam must be assessed for dam safety and against the necessary structural, geotechnical and hydraulic performance criteria.
- G16** At each annual inspection, if a mandatory reporting level is required, it must be determined and marked on each regulated dam.
- G17** A final assessment of adequacy of available storage in each regulated dam must be based on a dam level observed within the month of October and result in an estimate of the level in that dam as at 1 November.
- G18** For each annual inspection, two (2) copies of a report on the condition and adequacy of each regulated dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each regulated dam; must be provided to the administering authority by 1 December.
- G19** The holder of this environmental authority must, within one week of receipt of the annual inspection report, consider the report and its recommendations; and as soon as possible, but within one month of receipt of the annual inspection report, formulate and implement actions to ensure that each regulated dam safely performs its intended functions.



Definitions

Words and phrases used throughout this Environmental Authority are defined below except where identified in the *Environmental Protection Act 1994* or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

'20th percentile flow' means the 20th percentile of all daily flow measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th percentile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

'accepted engineering standards' in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the Australian National Committee on Large Dams (ANCOLD), guidelines published by Queensland government departments, and relevant Australian and New Zealand Standards.

'acceptance criteria' means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The acceptance criteria indicate the success of the rehabilitation outcome or remediation of areas which have been significantly been disturbed by the mining activities. Acceptance criteria may include information regarding:

- a) vegetation establishment, survival and succession;
- b) vegetation productivity, sustained growth and structure development;
- c) fauna colonisation and habitat development;
- d) ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
- e) microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
- f) effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
- g) resilience of vegetation to disease, insect attack, drought and fire; and
- h) vegetation water use and effects on ground water levels and catchment yields.

'acid mine drainage (AMD)' means any contaminated discharge emanating from a mining operation formed through a series of chemical and biological reaction, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining operations.

'administering authority' means the Department of Environment and Resource Management or its successor.

'AEP' means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

'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).

'ambient (or total) noise' at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

'ANZECC & ARMCANZ' means the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000, Australian and New Zealand Guidelines for Fresh Marine Water Quality.

'appropriately qualified person' means a person or persons who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

'assessed' or **'assess'** by a suitably qualified and experienced person in relation to a hazard 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 at any time:

- a) exactly what has been assessed and the precise nature of that assessment;
- b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- c) 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
- d) 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:

- a) operations of any kind and all things constructed, erected or installed for that dam; and
- b) any land used for those operations.

‘authority’ means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

‘bed and banks’ for a waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam means land over which the water of the waters, lake, lagoon, pond, swamp, wetland or dam normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed and banks that is from time to time covered by floodwater.

‘beneficial use’ in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

- a) of benefit to that owner in that it adds real value to their business or to the general community,
- b) in accordance with relevant provisions of the *Environmental Protection Act 1994*,
- c) sustainable by virtue of written undertakings given by that owner to maintain that dam, and
- d) the transfer and use have been approved or authorised under any relevant legislation.

‘biosolids’ means the treated and stabilised solids from sewage.

‘blasting’ means the use of explosive materials to fracture:

- a) rock, coal and other minerals for later recovery; or
- b) structural components or other items to facilitate removal from a site or for reuse.

‘bunded’ means within bunding consistent with Australian Standard 1940.

‘certification’ or **‘certified’** by a suitably qualified and experienced person in relation to a design plan or an annual report regarding dams, 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:

- a) exactly what is being certified and the precise nature of that certification;
- b) the relevant legislative, regulatory and technical criteria on which the certification has been based;
- c) 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
- d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

‘chemical’ means:

- a) an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994* (Commonwealth); or
- b) a dangerous good under the dangerous goods code; or
- c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 2008; or
- d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers’ Advisory Council and published by the Commonwealth; or
- e) any substance used as, or intended for use as:
 - (i) a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or
 - (ii) a surface active agent, including, for example, soap or related detergent; or
 - (iii) a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or



- (iv) a fertiliser for agricultural, horticultural or garden use; or
- (v) a substance used for, or intended for use for:
- (vi) mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or
- (vii) manufacture of plastic or synthetic rubber.

“**competent person(s)**” means (a) persons with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

‘**construction**’ includes building a new dam and modifying or lifting an existing dam.

‘**contaminate**’ means to render impure by contact or mixture.

‘**contaminated**’ means the substance has come into contact with a contaminant within the meaning of the *Environmental Protection Act 1994*.

‘**contaminant**’ A contaminant can be:

- a) a gas, liquid or solid; or
- b) an odour; or
- c) an organism (whether alive or dead), including a virus; or
- d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
- e) a combination of contaminants.

‘**control measure**’ means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

‘**cover material**’ means any soil or rock suitable as a germination medium or landform armouring.

‘**dam**’ means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However; a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

‘**design plan**’ is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

‘**design storage allowance (DSA)**’ means the minimum storage required in a dam at the first of November each year in order to meet the hydraulic performance requirements.

‘**development approval**’ means a development approval under the *Sustainable Planning Act 2009* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

‘**domestic waste**’ means waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic premises

‘**dwelling**’ means any of the following structures or vehicles that is principally used as a residence:

- a) a house, unit, motel, nursing home or other building or part of a building; or
- b) a caravan, mobile home or other vehicle or structure on land; or
- c) a water craft in a marina.

‘**effluent**’ treated waste water discharged from sewage treatment plants.

‘**end-of-pipe**’ means the location at which water is released to waters or land.

‘**environmental authority**’ means an environmental authority under Chapter 5 of the *Environmental Protection Act 1994*.



‘environmental authority holder’ means the holder of this environmental authority.

‘environmentally relevant activity’ means an environmentally relevant activity as defined under Section 18 of the *Environmental Protection Act 1994* and listed under Schedule 2 of the Environmental Protection Regulation 2008.

‘Equipment and plant’ means any machinery, equipment or plant (whether movable or stationary) used for carrying out mining activities, and includes monitoring equipment.

‘financial assurance’ means a security required under the *Environmental Protection Act 1994* by the Administering Authority to cover the cost of rehabilitation or remediation of disturbed land or to secure compliance with the environmental authority.

‘floodwater’ means water overflowing, or that has overflowed, from waters, river, creek, stream, lake, pond, wetland or dam onto or over riparian land that is not submerged when the watercourse or lake flows between or is contained within its bed and banks.

‘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.

‘foreseeable future’ is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptable probability of failure before that time.

‘general waste’ means waste other than regulated waste.

‘hazard’ in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

‘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 the *‘Manual for Assessing Hazard Categories and Hydraulic Performance of Dams’* or in accordance with generally accepted engineering standards (e.g. Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995)).

‘hazardous waste’ means a substance, whether liquid, solid or gaseous that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause environmental harm.

‘hydraulic performance’ means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *‘Manual for Assessing Hazard Categories and Hydraulic Performance of Dams’* or in accordance with generally accepted engineering standards (eg. Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995)).

‘infrastructure’ means water storage dams, roads and tracks, buildings and other structures built for the purpose of mining activities but does not include other facilities required for the long term management of mining impacts or the protection of potential resources. Such other facilities include dams, waste rock dumps, voids, or ore stockpiles and buildings as well as other structures whose ownership can be transferred and which have a residual beneficial use for the next owner of the operational land or the background land owner.

‘ $L_{Aeq, adj, 15 mins}$ ’ means the A-weighted sound pressure level of a continuous steady sound, (adjusted for tonal character and impulsiveness of the sound) that within a 15 minute has the same mean square sound pressure of a sound that varies with time.

‘ $L_{A 1, 15 mins}$ ’ means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 15-minute measurement period, using Fast response.

‘lake’ includes:

- lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- the bed and banks and any other element confining or containing the water.



‘land’ in the **‘land schedule’** of this document means land excluding waters and the atmosphere.

‘land capability’ as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

‘land suitability’ as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

‘land use’ term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

‘landfill’ means land used as a waste disposal site for lawfully putting solid waste on the land.

‘levee’ means a dam, dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

‘mandatory reporting level (MRL)’ means a warning and reporting level determined in accordance with the *‘Manual for Assessing Hazard Categories and Hydraulic Performance of Dams’* or in accordance with generally accepted engineering standards (e.g. Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995)).

‘mg/L’ means milligrams per litre.

‘Mine Infrastructure Area’ means the indicative area within the MLA areas shown in the Mining Activities Plan where the mine infrastructure will generally be located.

‘mine water’ means process water and contaminated storm water.

‘mineral waste’ means waste from land generated from the extraction of coal, such as overburden, inter-burden, tailings (fines) coarse rejects and spoil, but does not include non-mineral waste..

‘Mineral Waste Storage Facility’ means mined-out pit voids used for disposal of tailings, rejects and overburden, and includes tailings storage facilities.

‘natural flow’ means the flow of water through waters caused by nature.

‘nature’ includes:

- a) ecosystems and their constituent parts; and
- b) all natural and physical resources; and
- c) natural dynamic processes.

‘non-mineral waste’ means waste generated in carrying out the mining activities, including green waste, building and construction waste, general waste and waste tyres, but not including mineral waste.

‘noxious’ means harmful or injurious to health or physical well being.

‘offensive’ means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

‘operational land’ means the land associated with the project for which this environmental authority has been issued.

‘operational plan’ means a document that amongst other things sets out procedures and criteria to be used for operating a dam during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

‘palletised’ means stored on a movable platform on which batteries are placed for storage or transportation.

‘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 (mms-1).



‘protected area’ means:

- a) a protected area under the *Nature Conservation Act 1992*; or
- b) a marine park under the *Marine Parks Act 2004*; or
- c) a World Heritage Area.

‘progressive rehabilitation’ means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

‘process water’ means water used or produced during the mineral development activities.

‘receiving environment’ means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

‘receiving waters’ means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

‘recycled water’ means appropriately treated effluent and urban stormwater suitable for further use.

‘reference site’ or **‘analogue site’** may reflect the original location, adjacent area or another area where rehabilitation success has been completed for a similar biodiversity. Details of the reference site may be as photographs, computer generated images and vegetation models etc.

‘regulated dam’ means any dam in the significant or high hazard category as assessed using the *‘Manual for Assessing Hazard Categories and Hydraulic Performance of Dams’* or in accordance with generally accepted engineering standards (e.g. Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995)).

‘regulated waste’ means non-domestic waste mentioned in schedule 7 of the Environmental Protection Regulation 2008 (whether or not it has been treated or immobilised), and includes:

- a) for an element – any chemical compound containing the element; and
- b) anything that has contained the waste.

‘rehabilitation’ the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

‘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.

‘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.

‘saline drainage’ means the movement of waters, contaminated with salt(s), as a result of the mining activity.

‘self sustaining’ means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

‘sensitive place’ means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
- f) a public park or gardens; or
- g) means a work place used as an office or for business or commercial purposes, which is not part of the mining activity.

‘sewage’ means (a) drainage and other wastes from any form of toilets, urinals, and WC scuppers; (b) drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and



scuppers located in such premises; (c) drainage from spaces containing living animals; or (d) other waste waters when mixed with the drainages defined above. Source: MARPOL Annexure IV 73/78

'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.

'stable' in relation to land, means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

'stormwater' means all surface water runoff from rainfall.

'suitably qualified and experienced person(s)' in relation to dams means one/those who is/are a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002 or equivalent*, OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act; AND the administering authority for the Act is satisfied that person has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

- a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
- b) a total of five years of suitable experience and demonstrated expertise in at least four of the following categories, with the 'geomechanics of dams' category being compulsory:
 - i) geomechanics of dams with particular emphasis on stability, geology and geochemistry;
 - ii) investigation, design or construction of dams;
 - iii) operation and maintenance of dams;
 - iv) hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;
 - v) hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes;
 - vi) hydrogeology with particular reference to seepage, groundwater;
 - vii) solute transport processes and monitoring thereof;
 - viii) dam safety.

'trackable waste' means a waste or combination of waste stated in Schedule 1 of the Environmental Protection (Waste Management) Regulation 2000.

'trivial harm' means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than \$5,000.

'tolerable limits' means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation.

'void' means any man-made, open excavation in the ground.

'waste' as defined in section 13 of the *Environmental Protection Act 1994*.

'waste management hierarchy' has the meaning given by the Environmental Protection (Waste Management) Policy 2000.

'waste management principles' has the meaning given by the Environmental Protection (Waste Management) Policy 2000.

'waste water' means used water from the activity, process water or contaminated storm water.

'water quality' means the chemical, physical and biological condition of water.

'waters' includes:

- river, creek, stream in which water flows permanently or intermittently either:
- a) in a natural channel, whether artificially improved or not; or
 - b) in an artificial channel that has changed the course of the river, creek or stream; or



- i) lake, lagoon, pond, swamp, wetland, dam; or
- ii) unconfined surface water; or
- iii) storm water channel, storm water drain, roadside gutter; or
- iv) bed and banks and any other element of a river, creek, stream, lake, lagoon, pond, swamp, wetland, storm water channel, storm water drain, roadside gutter or dam confining or containing water; or
- v) groundwater; or
- vi) non-tidal or tidal waters (including the sea); or
- vii) any part thereof.

' $\mu\text{g/L}$ ' means micrograms per litre.



Schedule 4 Stated conditions that should apply to a draft environmental authority that would be issued under the *Environmental Protection Act 1994* for a gas supply pipeline to the mine site.

General Comments

Vegetation

Where clearing of remnant vegetation for the gas supply pipeline affects a portion of an intact area of remnant vegetation, the uncleared remnant vegetation is to be of sufficient size and configuration to ensure that the remaining vegetation results in a functioning ecosystem. The clearing should be located so that connectivity is maintained between the affected patch of remnant vegetation and adjacent patches.

Clearing of remnant vegetation should not take place where the width of remnant vegetation is less than 200 metres.

Clearing of remnant vegetation for the gas pipeline and associated with any watercourse crossings should be undertaken in accordance with 'Guideline - activities in a watercourse, lake or spring associated with mining operations' (version 1, 15 April 2008).

Recommended conditions for a draft environmental authority under the *Environmental Protection Act 1994 (s.309)* for a gas supply pipeline to the mine site.

GENERAL CONDITIONS

PREVENT AND/OR MINIMISE LIKELIHOOD OF ENVIRONMENTAL HARM

- (A1) This authority does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.
- (A2) In carrying out petroleum activities the holder of this authority must take all reasonable and practical measures to prevent and/or minimise the likelihood of environmental harm being caused.

MAINTENANCE OF MEASURES, PLANT AND EQUIPMENT

- (A3) The holder of this authority must:
 - 1. install all measures, plant and equipment necessary to ensure compliance with the conditions of this authority; and
 - 2. maintain such measures, plant and equipment in a proper and efficient condition; and
 - 3. operate such measures, plant and equipment in a proper and efficient manner.
- (A4) All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this authority must be calibrated, appropriately operated and maintained.
- (A5) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration increases the level of environmental harm authorised by this environmental authority.



- (A6) The holder of this authority must ensure that daily operation and maintenance of all plant and equipment relating to the authorised petroleum activities are carried out by suitability qualified, competent and experienced person(s).
- (A7) All analyses and tests required to be conducted under this authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.

COMPLIANCE WITH AUSTRALIAN PIPELINE INDUSTRY ASSOCIATION CODE OF ENVIRONMENTAL PRACTICE

- (A8) The holder of this authority must undertake petroleum activities in relation to the operation of petroleum pipelines in accordance with the Australian Pipeline Industry Association *Code of Environmental Practice – Onshore Pipelines*, October 2005 (the Code) or subsequent versions thereof. To the extent of any inconsistency between the conditions of this environmental authority and the Code, the conditions of this authority prevail.

FINANCIAL ASSURANCE

- (A9) The holder of this authority must provide a financial assurance in the amount and form required by the administering authority for the construction, operation and decommissioning of the relevant petroleum pipeline at the time of the submission of the original or any amended work program or development plan. The calculation of financial assurance must be calculated in accordance with the guideline 'Financial assurance for petroleum activities'.
- (A10) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

DEFINITIONS

- (A11) Where a definition for a term used in this authority is sought and the term is not defined within this authority, the definitions in the *Environmental Protection Act 1994*, its Regulation and Environmental Protection Policies must be used.

ENVIRONMENTAL CONSTRUCTION AND OPERATION MANAGEMENT PLAN

- (A12) An Environmental Construction and Operation Management Plan (ECOM plan) must be implemented that provides for the effective management of the actual and potential impacts resulting from the carrying out of the petroleum activities. Documentation relating to the ECOM plan must be kept.
- (A13) The ECOM plan required by condition (A12) must address, at least, the following:
 1. Describe each of the following:
 - (a) each relevant resource authority for the environmental authority;
 - (b) all relevant petroleum activities;
 - (c) the land on which the activities are to be carried out;
 - (d) the environmental values likely to be affected by the activities; and
 - (e) the potential adverse and beneficial impacts of the activities on the environmental values.
 2. State the environmental protection commitments the applicant proposes for the activities to protect or enhance the environmental values under best practice environmental management;
 3. Include a rehabilitation program for land proposed to be disturbed under each relevant resource authority for the application; and
 4. State a proposed amount of financial assurance for the environmental authority as part of the rehabilitation program.
 5. Training staff in the awareness of environmental issues related to carrying out the petroleum activities, which must include at least:
 - (a) The environmental policy of the authority holder, so that all persons that carry out the petroleum activities are aware of all relevant commitments to environmental management;
 - (b) Any relevant environmental objectives and targets, so that all staff are aware of the relevant performance objectives and can work towards these;



- (c) Control procedures to be implemented for routine operations for day to day activities to minimise the likelihood of environmental harm, however occasioned or caused;
 - (d) Contingency plans and emergency procedures to be implemented for non-routine situations to deal with foreseeable risks and hazards, including corrective responses to prevent and mitigate environmental harm (including any necessary site rehabilitation);
 - (e) Organisational structure and responsibility to ensure that roles, responsibilities and authorities are appropriately defined to ensure effective management of environmental issues;
 - (f) Effective communication procedures to ensure two-way communication on environmental matters between operational staff and higher management;
 - (g) Obligations with respect to monitoring, notification and record keeping obligations under the EM plan and relevant approvals; and
 - (h) Monitoring of the release of contaminants into the environment including procedures, methods and record keeping.
6. The conduct of periodic reviews of environmental performance and procedures adopted, not less frequently than annually; and
 7. A program for continuous improvement.

Environmental Nuisance

- (B1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity must not cause an environmental nuisance at any sensitive place.

NOISE

- (B2) In the event of a complaint about noise from the carrying out of the petroleum activity being made to the administering authority and that the administering authority considers is not frivolous nor vexatious nor based on mistaken belief, then the emission of noise from the licensed place must not result in levels greater than those specified in Schedule B, Table 1 – Noise limits.
- (B3) In the event of a complaint about noise nuisance that the administering authority considers is not frivolous or vexatious then the holder of the environmental authority must prepare and submit a noise management plan to the administering authority within the reasonable and practicable timeframe specified in writing by the administering authority.
- (B4) The noise management plan must address, but not be limited to, the following matters:
1. identification of component noise sources and activities at the place(s) which impact on sensitive places;
 2. the measured and/or predicted level of these noise sources and activities at sensitive places;
 3. the reasonable and practicable control or abatement measures (including hours of operation) that can be undertaken to reduce identified intrusive noise sources;
 4. the level of noise at sensitive places that would be achieved from implementing these measures.
 5. the handling of future noise complaints;
 6. community liaison and consultation; and
 7. training of staff and contractors in noise management practices.
- (B5) The holder of this environmental authority must commence implementation of the noise abatement recommendations of the noise management plan not more than 30 days following its submission to the administering authority, accounting for any comments made by the administering authority within that time.



Schedule B, Table 1: Noise limits

Noise level [dB(A)] (outside) at a 'sensitive place' expressed as	Monday to Sunday		
	7am – 6pm	6pm – 10pm	10pm – 7am
$L_{Aeq,adj,15\ mins}$	bg + 5	bg + 5	bg + 5
$L_{A1,adj,15\ mins}$	55	50	40

- bg = background noise level
- In the event that measured bg is less than 25 dB(A), then 25 dB(A) is to be substituted for the measured level

ALTERNATIVE ARRANGEMENTS AVAILABLE WHEN NOISE EMISSIONS MAY CAUSE ENVIRONMENTAL NUISANCE

- (B6) Where the holder of this authority has, at their cost, made alternative arrangements to the satisfaction of and with the written agreement of each person that may be affected by nuisance noise emissions at a sensitive place, then the requirements specified in Schedule B, Table 1- Noise Limits will not apply at that sensitive place for the period of the alternative arrangements.
- (B7) As a minimum each written agreement of an alternative arrangement must state:
1. the location of the sensitive place;
 2. the names of the affected persons;
 3. the nature of the alternative arrangement(s) (e.g. provision of alternative accommodation); and
 4. the period of the alternative arrangement(s).

BLASTING ACTIVITIES

- (B8) All blasting must be carried out in a proper manner by a competent person in accordance with best practice environmental management and Australian Standard 2187 to minimise the likelihood of any adverse effects being caused by airblast overpressure and/or ground borne vibrations at any sensitive places.
- (B9) Noise from blasting operations must not exceed an airblast overpressure level, when measured at or extrapolated to any sensitive place, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiated nor 120 dB (linear peak) at any time.
- (B10) Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or extrapolated to any sensitive place, must not exceed more than 5 mm per second for nine (9) out of any ten (10) consecutive blasts initiated, nor 10 mm per second at any time.

BLAST AND VIBRATION MONITORING

- (B11) Should complaints about blasting and/or vibration be received or when requested by the Administering Authority, monitoring and recording of air blast overpressure and ground borne vibration (as relevant to the complaint) must be undertaken to investigate any complaint of nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:
1. maximum instantaneous charge;
 2. location of the blast within the site (including any bench level);
 3. airblast overpressure level (dB Linear Peak);
 4. peak particle velocity (mms-1);
 5. location, date and time of recording;
 6. measurement instrumentation and procedure;
 7. meteorological conditions for blast monitoring (including temperature, relative humidity, temperature gradient, cloud cover, wind speed and direction); and
 8. distance/s from blast site to potentially noise-affected building/s or structure/s.



WATER MANAGEMENT

RELEASE TO WATERS

- (C1) The holder of this authority must ensure that the petroleum activities do not result in the release of contaminants to waters.

RELEASE TO LAND

- (C2) The holder of this authority may allow pipeline trench water to be released to land for disposal provided that the water does not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.
- (C3) Subject to Condition (C2), the holder of this authority must ensure that the release of trench water to land must be carried out in a manner that ensures that:
1. vegetation is not damaged;
 2. soil erosion and soil structure damage is avoided;
 3. the quality of groundwater is not adversely affected; and
 4. there are no releases of trench water to any surface waters.

MANAGEMENT OF HYDROSTATIC TEST WATER

- (C4) The holder of this authority must ensure that:
1. hydrostatic test water is not released to waters;
 2. hydrostatic test water containing chemical additives is not released to land without written consent from the administering authority; and
 3. hydrostatic test water released to land does not exceed the water quality limits specified in Schedule C, Table 1.

Schedule C, Table 1: Limits for the disposal of hydrostatic test water to land

Parameter	Maximum value
pH	6.5 – 8.5 (range)
Arsenic (mg/L)	2.0
Cadmium (mg/L)	0.05
Chromium (mg/L)	1
Copper (mg/L)	5
Iron (mg/L)	10
Lead (mg/L)	5
Manganese	10
Zinc (mg/L)	5
Nitrogen (mg/L)	35
Phosphorus (mg/L)	10
Electrical conductivity (uS/cm)	2000

- (C5) The release of hydrostatic test water authorised by Condition (C4(3)) must be located at least 100m from the nearest watercourse and carried out in a manner that ensures that:
1. vegetation is not damaged;
 2. soil erosion and soil structure damage is avoided;
 3. the quality of groundwater is not adversely impacted; and
 4. discharge of hydrotest water is controlled to prevent water runoff from the nominated discharge areas.



DETERMINING WATER QUALITY CONTAMINANTS

- (C6) All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management *Monitoring and Sampling Manual*, 2009, and carried out on samples that are representative of the discharge.

CONTAMINANT RELEASES TO GROUNDWATER

- (C7) There must be no release of contaminants to groundwater.

CONTAMINANT RELEASES TO SURFACE WATER

- (C7) There must be no release of contaminants to surface water.

WASTE MANAGEMENT

- (D1) The holder of this authority must ensure that petroleum activities do not result in the release or likely release of contaminants to the environment from the storage, conditioning, treatment and disposal of regulated waste materials.
- (D2) The holder of this authority must ensure that petroleum activities do not result in the release or likely release of a hazardous contaminant to the environment.
- (D3) Any spillage of hazardous waste or other contaminants that may cause environmental harm, must be effectively contained and cleaned up as quickly as practicable. Such spillage must not be cleaned up by hosing, or otherwise thereby releasing such waste or contaminants to any land or waters.
- (D4) The holder of this authority must as soon as practicable remove and dispose of all regulated waste to a licensed waste disposal facility or recycling facility.
- (D5) All regulated waste removed from the site must be removed by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a facility licensed to accept such waste.
- (D6) When regulated waste is removed from within the boundary of the petroleum tenure and transported by the holder of this authority, a record must be kept of the following:
1. date of waste transport;
 2. quantity of waste removed and transported;
 3. type of waste removed and transported;
 4. route selected for transport of waste;
 5. quantity of waste delivered; and
 6. any incidents (e.g. spillage) that may have occurred on route.
- (D7) If a person removes regulated waste associated with activities within the operational land and disposes of such waste in a manner which is not authorised or is improper or unlawful then, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.
- (D8) The holder of this authority must implement a Waste Management Plan consistent with the Environmental Protection (Waste) Policy 2000.
- (D9) The Waste Management Plan must address at least the following matters:
1. The types and amounts of waste generated;
 2. How the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (section 10 of the Environmental Protection (Waste Management) Policy 2000);
 3. Procedures for dealing with accidents, spills and other incidents that may impact on waste management; and
 4. How often the performance of the waste management practices will be assessed (i.e. at least annually); and
 5. The indicators or other criteria on which the performance of the waste management practices will be assessed.



(D10) There must be no treatment and disposal of sewage conducted under this environmental authority.

LAND MANAGEMENT

MINIMISING DISTURBANCE TO LAND AND SOIL MANAGEMENT

- (E1) The holder of this authority must:
1. limit the right of way width to a maximum of 20 metres;
 2. access tracks, lay down areas and construction facilities will be located in existing cleared areas.
 3. minimise disturbance to land in order to prevent land degradation;
 4. ensure that for land that is to be significantly disturbed by petroleum activities (except in area of highly erosive soils), the top layer of the soil profile is removed; and
 - (a) stockpiled in a manner that will preserve its biological and chemical properties, and
 - (b) used for rehabilitation purposes in accordance with condition (E18).
- (E2) The holder of this authority must develop and implement a soils monitoring and management plan prior to commencement of petroleum activities. This plan must include but not be limited to:
1. ground truthing of soils mapping in every mapped unit or every 2 to 5 km in large units;
 2. verification of the allocation of the Australian Soil Classification (ASC) for each mapping unit;
 3. develop soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example:
 - (a) shallow cracking clay soils;
 - (b) deep cracking clay soils;
 - (c) deep saline and/or sodic cracking clay soils with melonholes;
 - (d) thin surface, sodic duplex soils;
 - (e) medium to thick surface (say >15 cm), sodic duplex soils; and
 - (f) non-sodic duplex soils;
 4. detail mitigation measures to manage adverse risks for the construction stage and for ongoing maintenance of the corridor during the operational stage; and
 5. map areas of good quality agricultural land and detail methods to be undertaken to minimise potential impacts

EROSION AND SEDIMENT CONTROL PLANS

- (E6) An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities by a professional with appropriate experience and or qualifications accepted by the Administering Authority.
- (E7) Appropriate measures to achieve compliance with condition (E6) for the petroleum activity must be described in the EM plan and include:
1. diverting uncontaminated stormwater run-off around areas disturbed by mining activities or where contaminants or wastes are stored or handled that may contribute to stormwater;
 2. contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority;
 3. roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 4. using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
 5. erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;



6. an inspection and maintenance program for the erosion and sediment control features; and
 7. provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March.
 8. identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.
- (E8) Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater.
- (E9) The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any waters, roadside gutter or a stormwater drainage system.
- (E10) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must be cleaned up using dry methods that minimise the release of wastes, contaminants or materials to any stormwater drainage system, roadside gutter or waters.

VEGETATION MANAGEMENT

- (E11) The holder of this authority must:
1. prevent or minimise disturbance to vegetation by petroleum activities; and
 2. manage the effects of clearing to prevent the loss of biodiversity, reduction of ecological processes and land degradation.
- (E12) The holder of this authority must ensure that:
1. petroleum activities are not conducted within category A or B environmentally sensitive areas;
 2. petroleum activities do not cause a significant disturbance within 1km of a category A environmentally sensitive area or within 500m of a category B environmentally sensitive area;
 3. petroleum activities are not conducted in a category C environmentally sensitive area without the written agreement from the relevant administering authority;
 4. if the relevant administering authority gives written permission to conduct petroleum activities in a category C environmentally sensitive area with conditions that are in conflict with the conditions of this authority the holder must as a minimum comply with the conditions of this authority; and
 5. staff, contractors or agents carrying out petroleum activities on a petroleum authority are aware of the location of any relevant category A, B or C environmentally sensitive areas within the petroleum authority.
- (E13) Despite conditions (E12)(1) and (2), where no reasonable alternative exists, petroleum activities may be undertaken within an endangered regional ecosystem (ERE) or the 500m buffer zone of an ERE, provided that those activities are located according to the following order of preference:
1. pre-existing areas of significant disturbance within the buffer zone;
 2. undisturbed areas more than 100m from the ESA within the buffer zone;
 3. undisturbed areas less than 100m from the ESA within the buffer zone;
 4. pre-existing areas of significant disturbance within the ESA;
 5. areas within the ESA of lower environmental value; then
 6. areas where clearing of an endangered regional ecosystem is unavoidable.
- (E14) The holder of this authority must ensure that any clearing in accordance with Condition (E13) complies with the following:
1. the clearing does not for the life of the project exceed 10% of the endangered regional ecosystem as ground truthed and mapped before any activity commences as per condition (E13) of this authority;
 2. all reasonable and practical measures are made to minimize the area cleared and to avoid the clearing of mature trees;



3. when requested by the administering authority the environmental authority holder enters into an agreement with the administering authority to provide an environmental offset to counterbalance the impacts of the activity on the ERE in accordance with the *Queensland Government Environmental Offsets Policy*;
 4. access tracks are not located in ERE;
 5. the right of way is limited to 20m in width clearing of mature and hollow bearing trees are avoided where practicable; and
 6. a qualified ecologist is present during clearing activities to ensure impacts on flora and fauna are minimized.
- (E15) The condition and spatial extent of any remnant and regrowth 'endangered' and 'of concern' regional ecosystems must be assessed. This must include but not be limited to the carrying out of field surveys and observations and mapping, prior to carrying out of any petroleum activity within the regional ecosystems.
- (E16) A record of the regional ecosystem assessment required by condition (E13) must be kept and made available to the administering authority on request.
- (E17) The findings of the assessment must be used to implement minor route alignments to avoid disturbance to dense stands or large specimens of regionally significant species.
- (E18) The environmental authority holder must comply with any agreement made in accordance with condition (E14 (3)) of this authority.
- (E19) The holder of this authority must ensure that camps and lay down areas are located at least 20m from remnant regional ecosystems or high value regrowth regional ecosystems.
- (E20) Fallen timber must be moved as little as possible and replaced once construction has been completed. Trees that are required to be felled must be retained on site and subsequently moved back onto the cleared corridor and left as ground habitat, unless otherwise required by the land holder.
- (E21) Where possible, the clearing of native vegetation within road reserves or watercourses must not reduce the width of the vegetation community to less than 50m.
- (E22) Despite condition (E14 (3)), an overall biodiversity offset strategy must be developed for the project that complies with the requirements all relevant legislation and as a minimum mitigates any impacts on remnant and regrowth endangered and of concern regional ecosystems in accordance with the *Queensland Government Environmental Offsets Policy*.
- PROTECTION OF RIVERINE AREAS**
- (E23) The holder of this authority must not:
1. undertake activities within a wetland or spring;
 2. excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including: works that divert the course of flow of the water, or works that impound the water;
 3. undertake activities that take water from a watercourse, wetland or spring; or
 4. undertake activities that take overland flow water using works that are mentioned as assessable development in a water resource plan under the *Water Act 2000*.
- (E24) Activities resulting in significant disturbance to the bed or banks of a watercourse must:
1. only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable alternative location is feasible; and
 2. be no greater than the minimum area necessary for the purpose of the significant disturbance; and
 3. be designed and undertaken by a competent person; and
 4. have rehabilitation commence immediately upon cessation of the authorised petroleum activities.
- (E25) Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse in accordance with condition (E6).



- (E26) Routine visual monitoring must be undertaken while carrying out petroleum activities in a watercourse. If, due to the petroleum activities, water turbidity increases in the watercourse, outside contained areas, works must cease and the sediment control measures must be rectified before activities recommence.

REHABILITATION REQUIREMENTS

- (E27) Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with the authorised petroleum activities on the relevant petroleum authority.
- (E28) For areas of native vegetation, revegetation must use seed sourced from local provenance native species.
- (E29) As soon as practicable and within 3 months at the end of petroleum activities that cause any significant disturbance to land, the holder of this authority must investigate contaminated land status in accordance with *Environmental Protection Act 1994* requirements and the *National Environment Protection (Site Assessment) Measure 1999* where land has been subject to contamination caused by petroleum activities authorised under this authority.
- (E30) All land significantly disturbed by petroleum activities must be rehabilitated to:
1. a stable landform with a self-sustaining vegetation cover with same species and density of cover to that of the surrounding undisturbed areas, except over the area that must be maintained free of large flora species for pipeline integrity and access, and in cases where approval is sought in accordance with Condition (E33);
 2. ensure that all land is reinstated to the pre-disturbed land use and suitability class;
 3. ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities.
- (E31) Notwithstanding Condition (E30) any planned rehabilitation outcome that does not fulfil the rehabilitation requirements listed in Condition (E30) approval must be sought from the administering authority, prior to the rehabilitation being carried out.
- (E32) Maintenance of rehabilitated areas must take place to ensure and demonstrate:
1. stability of landforms;
 2. erosion control measures remain effective;
 3. stormwater runoff and seepage from rehabilitated areas does not negatively affect the environmental values of any waters;
 4. plants show healthy growth and recruitment is occurring; and
 5. declared pest plants are controlled on rehabilitated areas to a level consistent with the surrounding property and prevented from spreading to unaffected areas through authorised petroleum activities.
- (E33) Rehabilitation can be considered successful when the site can be managed for its designated land-use (either similar to that of surrounding undisturbed areas or as otherwise agreed in a written document with the landowner/holder and administering authority) without any greater management input than for other land in the area being used for a similar purpose and there is evidence that the rehabilitation has been successful for at least 3 years.

PEST AND WEED MANAGEMENT

- (E34) The holder of this authority must develop and implement a pest and weed control program that includes but is not limited to the following:
1. identification of areas requiring pest and weed control;
 2. control measures to prevent the spread of pest and weed species; and
 3. measures to eliminate infestations of noxious pest and weed species that may occur.

STORAGE AND HANDLING OF CHEMICALS, FLAMMABLE AND COMBUSTIBLE LIQUIDS

- (E35) All explosives, hazardous chemicals, corrosive substances, toxic substances, gases and dangerous goods must be stored and handled in accordance with the relevant Australian Standard.



- (E36) Flammable and combustible liquids (including petroleum products and associated piping and infrastructure), must be stored, handled and maintained in accordance with the latest edition of Australian Standard 1940 – *The Storage and Handling of Flammable and Combustible Liquids*.
- (E37) Any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied:
1. storage tanks must be bunded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and
 2. drum storages must be bunded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.
- (E38) All containment systems must be designed to minimise rainfall collection within the system.

FAUNA MANAGEMENT

- (F1) The holder of this authority must develop and implement fauna management procedures in such a manner that petroleum activities are undertaken to prevent and/or minimise environmental harm.
- (F2) The fauna management procedures must include but not be limited to:
1. training and awareness of staff and contractors;
 2. conduct of a preconstruction ecological survey to identify the presence of any endangered, vulnerable or rare fauna species and identify and mark hollow-bearing trees;
 3. the development of management strategies to minimise impact on any endangered, vulnerable or rare species;
 4. minimising the clearing of mature and hollow-bearing trees;
 5. minimising the length of time the trench is open through the staging of activities;
 6. temporary exclusion fencing where practicable to restrict fauna access to the trench;
 7. the use of 'night caps' over open pipe string ends to prevent the ingress of wildlife;
 8. pipes being strung with gaps to allow for fauna movement across the line of the pipe;
 9. a suitably qualified person for fauna handling must be present during clear and grade activities to relocate fauna or recover any injured fauna and must check the entire trench for captured fauna at least daily, preferably in the morning;
 10. installation of ramps and trench plugs with a slope less than 50% at least every 1000m to assist fauna to leave the trench; and
 11. installation of shelter material to provide wet weather protection and reduction of heat stress, such as by placing sawdust filled Hessian bags in pairs every 250m.
- (F3) A copy of the fauna management procedures must be made available to the administering authority on request

PROJECT INFRASTRUCTURE

- (H1) All petroleum infrastructure (including buildings, structures, plant and equipment erected and/or used for the petroleum activities) authorised under this authority must be located within the XXXX²⁶ Licence Area.
- (H2) All petroleum infrastructure must be removed from the relevant petroleum authority prior to surrender of this authority, except where agreed in writing by the administering authority and the current landowner.
- (H3) Prior to the commencement of decommissioning or abandonment activities the scope of work for decommissioning or abandonment of project infrastructure shall be developed and agreed to with the administering authority.

²⁶ PL number to be inserted



- (H4) The holder of this authority must decommission the petroleum and gas pipeline to a situation where ongoing, or potential environmental harm is prevented or minimised. As a minimum, pipeline must be decommissioned such that:
1. it no longer contain hazardous contaminants;
 2. it is left in stable condition;
 3. all the above ground infrastructure is removed, and
 4. all areas disturbed by above ground infrastructure are rehabilitated in accordance with the requirements of this authority.

DAMS

- (I1) Conditions (I3) to (I10) apply to all dams installed as part of the petroleum activities, as defined in this authority.
- (I2) Dams in the significant or high hazard category as defined in Appendix 4 are not permitted under this authority.

GENERAL CONDITIONS

- (I3) The holder of this authority must ensure that all dams on the operational land are designed and constructed by a suitably qualified engineer and maintained in accordance with generally accepted engineering standards and practices.
- (I4) In operating or decommissioning any dam, the holder of this authority must not interfere with any groundwater or surface water resource or watercourse so as to cause environmental harm, except where that interference and consequent harm has been authorised in this authority.
- (I5) The holder of this authority must ensure that any activities conducted under this authority, or enabled by this authority, do not compromise the integrity of any dam, either on the operational land or adjacent to the operational land.
- (I6) The holder of this authority must take advice from suitably qualified and experienced persons and, based on that advice, monitor the condition of all dams located on the operational land, for early signs of loss of structural or hydraulic integrity.
- (I7) In the event of any early signs of loss of structural or hydraulic integrity, the holder of this authority must take action to prevent and/or to minimise any environmental harm, and report any findings and actions taken to the administering authority.
- (I8) The holder of the authority must assess the hazard category of each dam using Table 1 of Appendix 4 - prior to construction of any new dam, and thereafter on an annual basis. The holder of the authority must act on that monitoring and assessment in accordance with Condition (I9).
- (I9) Where the hazard category for any dam has been assessed as significant or high, the holder of this authority must:
1. notify the administering authority in writing;
 2. implement measures to manage the potential for environmental harm; and
 3. apply to the administering authority to amend this environmental authority to allow for the operation of a significant or high hazard dam.
- (I10) The holder of this authority must not abandon any dam, but must decommission each dam to a situation where ongoing environmental harm will not occur, unless in accordance with condition (E30). Decommissioned dams must no longer be dams but become landforms on the operational land and must comply with any rehabilitation requirements of this authority.

MONITORING PROGRAMS

- (J1) The holder of this authority must:
1. develop and implement a monitoring program that will demonstrate compliance with the conditions in this authority; and



2. document the monitoring and inspections carried out under the program and any actions taken.
- (J2) The holder of this authority must ensure that a suitably qualified, experienced and competent person(s) conduct all monitoring required by this authority.
- (J3) Record, compile and keep for a minimum of five years all monitoring results required by this authority and make available for inspection all or any of these records upon request by the administering authority. Monitoring results relating to rehabilitation should be kept until the relevant petroleum tenure is surrendered.
- (J4) An annual monitoring report must be prepared each year and submitted to the administering authority when requested. This report shall include but not be limited to:
1. a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this authority and, a comparison of the previous twelve (12) months monitoring results to both this authority limits and to relevant prior results; and
 2. an evaluation/explanation of the data from any monitoring programs; and
 3. a summary of any record of quantities of releases required to be kept under this authority; and
 4. a summary of the record of equipment failures or events recorded for any site under this approval; and
 5. an outline of actions taken or proposed to minimise the environmental risk from any deficiency identified by the monitoring or recording programs.

COMMUNITY ISSUES

MANAGING COMPLAINTS

- (K1) When the administering authority advises the holder of a complaint alleging nuisance (e.g. caused by dust or noise) investigate the complaint and advise the administering authority of the action proposed or undertaken in relation to the complaint.
- (K2) If the administering authority is not satisfied with the proposed or completed action, undertake monitoring or other action requested by the administering authority.
- (K3) Maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident.
- (K4) Retain the record of complaints required by this condition for 5 years.

COMPLAINT RESPONSE

- (K5) The holder of this authority must record the following details for all complaints received and provide this information to the administering authority on request:
1. time, date, name and contact details of the complainant;
 2. reasons for the complaint;
 3. any investigations undertaken;
 4. conclusions formed; and
 5. any actions taken.

NOTIFICATION PROCEDURES

NOTIFICATION OF EMERGENCIES AND INCIDENTS

- (L1) The holder of this authority must telephone the DERM's Pollution Hotline (1300 130 372) or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with the conditions of this authority or any event where environmental harm has been caused or may be threatened.
- (L2) Subject to condition (L1), the holder of this authority is required to report in the case of uncontained spills (including hydrocarbon, associated water or a mixtures of both) of the following volumes or kind:
- a) releases of any volume to water; and



- b) releases of volume greater than 200L to land; and
 - c) releases of any volumes where potential serious or material environmental harm is considered to exist.
- (L3) The notification of emergencies or incidents as required by conditions number (K1 and K2) must include but not be limited to the following:
- a) the holder of the authority;
 - b) the location of the emergency or incident;
 - c) the number of the authority;
 - d) the name and telephone number of the designated contact person;
 - e) the time of the release;
 - f) the time the holder of the authority became aware of the release;
 - g) the suspected cause of the release;
 - h) the environmental harm caused, threatened, or suspected to be caused by the release; and
 - i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

DEFINITIONS

Term	Meaning
Administering authority	Administering authority means - <ul style="list-style-type: none"> (a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the <i>Environmental Protection Act 1994</i> – the local government; or (b) for all other matters – the Chief Executive of the Environmental Protection Agency; or (c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.
Authority	Means an environmental authority granted in relation to an environmentally relevant activity under the <i>Environmental Protection Act 1994</i> .
Associated water	Underground water taken from or interfered with from a petroleum well during the course of or resulting from carrying out petroleum activities. Associated water may be potable or suitable for stock purposes, or saline, high in fluoride, contain hydrocarbons, and/or is otherwise contaminated by a hazardous contaminant. It may be classified as a hazardous waste.
AS 2885	Australian Standard Pipelines – Gas and Liquid Petroleum (2007 or subsequent versions thereof).
Background noise level	Background noise level $L_{A90,15min}$ means the A-weighted sound pressure level of the residual noise exceeded for 90% of a representative time period of not less than 15 minutes, using time weighting, 'F'.
Competent person	A person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.
Construction	Includes building a new dam or pipeline and modifying or lifting an existing dam or pipeline.
Dam	Means a structure that is designed to contain, divert or control flowable substances - including any substances that are thereby contained, diverted or controlled by that structure; but does <i>not</i> mean a fabricated or manufactured tank or container



Term	Meaning
	designed to a recognised standard. The flowable substances referred to in this context may have been, are, or could be flowable under any perceivable conditions; and thereby present a hazard as defined in this authority. In case there is any doubt, a levee or a bund is a dam.
Design plan	The design plan is the documentation required to describe the physical dimensions of the pipeline and the materials and standards to be used for construction of the pipeline. It will also include the decommissioning and rehabilitation objectives in terms of procedures, works and outcomes at the end of pipeline life. The documents must include design and investigation reports, specifications and certifications.
Contaminant	The <i>Environmental Protection Act 1994</i> defines, under Section 11, a contaminant as: (a) a gas, liquid or solid; or (b) an odour; or (c) an organism (whether alive or dead), including a virus; or (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or (e) a combination of contaminants.
Discharge area	Discharge area is: (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and (b) identified by an assessment process consistent with the document: <i>Salinity Management Handbook</i> , Queensland Department of Natural Resources, 1997; or (c) identified by an approved salinity hazard map held by the Department of Natural Resources, Mines and Water.
Dispersible soils	Soils in which clay material disintegrates into particles less than 2 microns across. This can be observed within 24 hours when soil crumbs are submerged in distilled water.
Dissects corridors	Dissects corridors of vegetation means clearing vegetation that results in a break more than 50 metres wide, across a corridor.
Environmental Management Plan (EM Plan)	The EM Plan is an environmental management document to be submitted during the application process for a level 1 environmental authority (petroleum activities).
Environmental nuisance	Environmental nuisance is unreasonable interference or likely interference with an environmental value caused by: (a) noise, dust, odour, light; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.
Environmentally sensitive area	Environmentally sensitive area (as determined from the EPA GIS data base) means a location, however large or small, that has environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community. Appendix 2 contains the definitions of category A, B and C environmentally sensitive areas.
Financial assurance	A security deposit, either cash or a bank guarantee, held by the administering authority to cover the potential costs of rehabilitating areas significantly disturbed by the petroleum activities.



Term	Meaning
Groundwater	Groundwater means subsurface water, generally saturating the soil or rock in which it occurs.
Hazard	In relation to a dam as defined in this authority, means the potential for environmental harm resulting from the collapse, or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.
Hazardous contaminant	A contaminant that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of: <ul style="list-style-type: none"> (a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or (b) its physical, chemical or infectious characteristics.
High hazard category	In relation to a dam is one that, as a result of a hazard assessment using Table 1 Appendix 4, would be assessed as being in the high hazard category.
Infrastructure	Means water storage dams, well sites, pipelines, roads and tracks, buildings and other structures built for the purpose of petroleum activities.
Licensed waste disposal facility	A facility approved under a development approval and operated by a holder of a registration certificate for environmentally relevant activity item number 75 under Schedule 1 of the Environmental Protection Regulation 1998.
'L_{Aeq, adj, 15 mins}'	means the A weighted sound pressure level of a continuous steady sound, (adjusted for tonal character and impulsiveness of the sound) that within a 15 minute has the same mean square sound pressure of a sound that varies with time.
'L_{A 1, 15 mins}'	means the A weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 15
Lake	A natural or artificial body of water, either permanent or intermittent.
Land degradation	Land degradation includes the following: <ul style="list-style-type: none"> (a) soil erosion; (b) rising water tables; (c) the expression of salinity; (d) mass movement by gravity of soil or rock; (e) stream bank instability; and (f) a process that results in declining water quality.
Land use	Term to describe the selected final use of the land, which is planned to occur after the cessation of petroleum operations.
Level 2 petroleum activity	A Level 2 petroleum activity is a petroleum activity that, under section 20(1) of the EP Act is prescribed as a level 2 environmentally relevant activity.
Level 1 petroleum activity	A Level 1 petroleum activity is a petroleum activity that, under section 20(1) of the EP Act is prescribed as a Level 1 environmentally relevant activity.
Low hazard category	In relation to a dam means a dam that, as a result of an hazard assessment using the Table 1 Appendix 4; would be assessed as being in the low hazard category.



Term	Meaning
Noise	Noise means a sound or vibration of any frequency, whether transmitted through air or any other physical medium.
Operational land	Means the land associated with the petroleum activities for which this authority has been issued.
Petroleum activities	Petroleum activities means activities authorised to take place on land subject to a petroleum authority, including rehabilitation and decommissioning activities.
Petroleum authority	A petroleum authority is— (a) a 1923 Act petroleum tenure granted under the <i>Petroleum Act 1923</i> ; or (b) a petroleum authority granted under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> ; or (c) a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the <i>Petroleum (Submerged Lands) Act 1982</i> .
Petroleum project	A petroleum project is all activities carried out, or proposed to be carried out, under 1 or more of the following, in any combination, as a single integrated operation— (a) a 1923 Act petroleum tenure granted under the <i>Petroleum Act 1923</i> ; (b) a petroleum authority granted under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> ; (c) a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the <i>Petroleum (Submerged Lands) Act 1982</i>
Petroleum works site	A separate location on the area subject to a petroleum authority where petroleum activities are undertaken (e.g. a well site, seismic survey line, camp site, compressor site, evaporation pond etc).
Potential discharge area	Low lying parts of the landscape (relative to adjacent terrain) where groundwater movements are within 2-5m of the land surface and the landscape may be subject to upward movement of groundwater in the future.
Protected area	A protected area under the <i>Nature Conservation Act 1992</i> ; or <ul style="list-style-type: none"> • a marine park under the <i>Marine Parks Act 1992</i>; or • a World Heritage Area.
Progressive rehabilitation	Rehabilitation (defined below) undertaken progressively or as a staged approach to rehabilitation as petroleum operations are ongoing.
Rehabilitation	The process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
Representative	A sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the petroleum activities.
Regulated dam	Means any dam in the significant or high hazard category as defined above.
Riverine area	Refers to the land confined to the flood flow channel of a watercourse.
Sedimentation pond	A bunded or excavated structure used to contain and settle waterborne sediment running off disturbed areas.
Self sustaining	An area of land that has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the



Term	Meaning
	administering authority.
Sensitive place	<p>Sensitive place means any of the following places –</p> <ul style="list-style-type: none"> (a) a dwelling; (b) a library, childcare centre, kindergarten, school, college, university or other educational institution; (c) a hospital, surgery or other medical institution; (d) a protected area or an area identified under a conservation plan as a critical habitat or an area of major interest, under the <i>Nature Conservation Act 1992</i>; (e) a marine park under the <i>Marine Parks Act 1982</i>; and (f) a park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment). (g) A work place used as an office or for business or commercial purposes, which is not part of the petroleum activity.
Sewage	Sewage is the effluent discharged from a sanitary appliance (i.e. sewage treatment works).
Significantly disturbed land	<p>Significantly disturbed land and significant disturbance means land if:</p> <ul style="list-style-type: none"> (a) it is contaminated land caused by petroleum activities under this authority; or (b) it has been disturbed by petroleum activities under this authority and human intervention is needed to rehabilitate it: <ul style="list-style-type: none"> i. to a state required under the relevant environmental authority; or ii. if the environmental authority does not require the land to be rehabilitated to a particular state – to its state immediately before the disturbance. <p>Examples of a disturbance to land caused by petroleum activities authorised under this authority include:</p> <ul style="list-style-type: none"> (a) areas where soil has been compacted, removed, covered, exposed or stockpiled; (b) areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion; (c) areas where land use suitability or capability has been diminished; (d) areas within a watercourse, waterway, wetland or lake where petroleum activities occur and human intervention is necessary to restore or stabilise the disturbed area; (e) areas submerged by hazardous waste storage and dam walls in all cases; (f) areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after petroleum activities have ceased; or (g) areas where land has become contaminated land and a suitability statement has not been issued. <p>However, the following areas are not significantly disturbed:</p> <ul style="list-style-type: none"> (a) areas off the petroleum authority (e.g. roads or tracks which provide access to the petroleum authority);



Term	Meaning
	(b) areas previously significantly disturbed which have been rehabilitated to the administering authority's satisfaction; (c) areas under permanent infrastructure (e.g. existing tracks and roads within the petroleum authority area); (d) areas that were significantly disturbed prior to the grant of the environmental authority, unless those areas are disturbed to a greater extent than their current condition by the holder of the environmental authority during the term of the authority; (e) minor disturbances such as drill sumps and minor respreading of soil on GPS located seismic lines.
Significant hazard category	In relation to a dam is one that, as a result of a hazard assessment using Table 1 Appendix 4, would be assessed as being in the significant hazard category.
Stable	Means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
Suitably qualified and experienced person for dams	Means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 1988</i> , OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act, in these 'relevant fields': <ul style="list-style-type: none"> (a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and (b) at least a total of five years of suitable experience and demonstrated expertise in at least four of the following areas: <ul style="list-style-type: none"> • investigation, design or construction of dams; • operation and maintenance of dams; • geomechanics with particular emphasis stability, geology and geochemistry; • hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology; • hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes; and • hydrogeology with particular reference to seepage, groundwater, solute transport processes and monitoring thereof; and • dam safety
Suitably qualified and experienced person for pipelines	Means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 1988</i> , OR registered as a National Professional Engineer (NPER) with the Institution of Engineers Australia, OR holds equivalent professional qualifications to the satisfaction of the administering authority for the Act, in the 'relevant fields' of designing, constructing, operating and decommissioning high pressure petroleum pipelines.
Top layer	The surface layer of a soil profile, which is usually more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from natural surface.
Void	Means any man-made, open excavation in the ground.



Term	Meaning
Watercourse	Watercourse means a river, creek or stream in which water flows permanently or intermittently in a visibly defined channel (natural, artificial or artificially improved) with: (a) continuous bed and banks; (b) an extended period of flow for some months after rain ceases, and (c) an adequacy of flow that sustains basic ecological processes and maintains biodiversity.
Waters	Waters includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea) or any part thereof, stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.
Waterway	A naturally occurring feature where surface water runoff normally collects, such as a clearly defined swale or gully, but only flows in response to a local rainfall event.
Wetland	An area of permanent or periodic/intermittent inundation, whether natural or artificial, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6m. Wetlands typically include areas such as lakes, swamps, marshes, estuaries or mudflats.
Wild river areas	Wild river areas are defined in the <i>Wild Rivers Act 2005</i> and may include the following— (a) high preservation areas; (b) preservation areas; (c) floodplain management areas; (d) subartesian management areas.



Schedule 5 Recommended conditions under the Environmental Protection Act 1994 for construction activities for the raising of Glebe Weir.

This advice relates to the following environmentally relevant activities:

- ERA 16 - Extractive and screening activities – threshold 1(c) more than 100000t to 1000000t in a year
- ERA 43 – Concrete batching
- ERA 56 – Regulated waste storage – threshold 2
- ERA 61 – Waste incineration and thermal treatment – threshold 1

Note:

- Location of activities – unknown in relation to specific lot/plan.
- DERM is of the understanding that approvals for ERA 16 – threshold 2 & 3 will be deferred to those contracted to do the work (refer 5.3.3.1 – Bulk material sources).
- A larger volume of material (viz. extraction etc.) will be required as the design of the weir raising has changed from that originally proposed.
- A quarry allocation permit will be required to remove material (in association with ERA 16 1(c)).
- Approvals and permits with respect to water and vegetation are not addressed.

Schedule of Conditions

The DERM conditions consist of the following schedules:

- Schedule A - General Conditions
- Schedule B - Air
- Schedule C - Water
- Schedule D –Stormwater Management
- Schedule E - Land
- Schedule F - Noise
- Schedule G - Waste Management
- Schedule H - Biodiversity
- Schedule I – Monitoring and Reporting
- Schedule J - Definitions

SCHEDULE A - GENERAL CONDITIONS

Prevent and/or minimise likelihood of environmental harm.

- (A1) In carrying out ERAs, all reasonable and practicable measures must be taken to prevent and/or to minimise the likelihood of environmental harm being caused.



Maintenance of Measures, Plant and Equipment.

(A2) The person responsible for the works must:

- a) install all measures, plant and equipment necessary to ensure compliance with the DERM's conditions; and
- b) maintain such measures, plant and equipment in a proper and efficient condition; and
- c) operate such measures, plant and equipment in a proper and efficient manner.

In this condition, 'plant and equipment' includes:

- a) plant and equipment used to prevent and/or minimise the likelihood of environmental harm being caused;
- b) devices and structures to contain foreseeable escapes of contaminants and waste;
- c) devices and structures used to store, handle, treat and dispose of waste;
- d) monitoring equipment and associated alarms; and
- e) backup systems that act in the event of failure of a primary system.

Site Based Management Plan.

(A3) From commencement of the ERAs, a site based management plan (SBMP) must be implemented. The SBMP must identify all sources of environmental harm, including but not limited to the actual and potential release of all contaminants, the potential impact of these sources and what actions will be taken to prevent the likelihood of environmental harm being caused. The SBMP must also provide for the review and 'continual improvement' in the overall environmental performance of all ERAs that are carried out.

(A4) The SBMP must address the following matters:

- (a) Environmental commitments - a commitment by senior management to achieve specified and relevant environmental goals.
- (b) Identification of environmental issues and potential impacts.
- (c) Control measures for routine operations to minimise likelihood of environmental harm.
- (d) Contingency plans and emergency procedures for non-routine situations.
- (e) Organisational structure and responsibility.
- (f) Effective communication.
- (g) Monitoring of contaminant releases.
- (h) Conducting environmental impact assessments.
- (i) Staff training.
- (j) Record keeping.
- (k) Periodic review of environmental performance and continual improvement.

(A5) The SBMP must not be implemented or amended in a way that contravenes any DERM condition.

Records

(A6) Any record or document required to be kept by any DERM conditions, must be kept at the place of works for the construction period of the project and be available for examination by an authorised person under the *Environmental Protection Act 1994*.

Alterations

(A7) No change, replacement or operation of any plant or equipment is permitted if the change, replacement or operation of the plant or equipment increases, or is likely to substantially increase, the risk of environmental harm above that expressly provided by DERM's conditions.



An example of a substantial increase in the risk of environmental harm is an increase of ten percent (10%) or more in the quantity of the contaminant to be released to the environment.

Equipment Calibration

- (A8) All instruments and devices used for the measurement or monitoring of any parameter under any DERM condition must be calibrated, and appropriately operated and maintained.

Acid Sulphate Soils

- (A9) The latest edition of the Department of Environment and Resource Management's INSTRUCTIONS FOR THE TREATMENT AND MANAGEMENT OF ACID SULFATE SOILS, 2001, ('the Instructions') must be complied with when treating and managing acid sulphate soils.

- (A10) Acid sulphate soils must be managed such that contaminants are not directly or indirectly released to any waters.

- (A11) All ponds used for the storage or treatment of acid sulphate soils or other contaminants must be constructed, installed and maintained:

- (a) so as to prevent any release of contaminants through the bed or banks of the pond to any waters (including ground water);
- (b) so that a freeboard of not less than 0.5 metres is maintained at all times; and
- (c) so as to ensure the stability of the ponds' construction.

- (A12) Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from entering any ponds or other structures used for the storage or treatment of contaminants including acid sulphate soils or wastes.

- (A13) All acid sulphate soils must be disposed of or managed within the authorised place.

- (A14) Any temporary or permanent dewatering ponds or water bodies used to contain or treat acid sulphate soils must not be constructed on a watercourse.

Notification

- (A15) Telephone the DERM's Pollution Hotline or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with DERM's conditions.

Information about Spills.

- (A16) A written notice detailing the following information must be provided to the DERM within 14 days of any advice provided in accordance with condition (A15):

- a) the name of the entity responsible for the works;
- b) the name and telephone number of a designated contact person;
- c) quantity and substance released;
- d) vehicle and registration details;
- e) person/s involved (driver and any others);
- f) the location and time of the release;
- g) the suspected cause of the release;
- h) a description of the effects of the release;
- i) the results of any sampling performed in relation to the release,
- j) actions taken to mitigate any environmental harm caused by the release; and
- k) proposed actions to prevent a recurrence of the release.



Trained/Experienced Operator(s)

(A17) The person responsible for the works, including but not limited to employees and contract staff must be trained in the procedures and practices necessary to comply with the conditions and prevent environmental harm during normal operation and emergencies.

Monitoring

(A18) A competent person(s) must conduct any monitoring required.

Spill Kit

(A19) An appropriate spill kit, personal protective equipment and relevant operator instructions/emergency procedure guides for the management of wastes and chemicals associated with the ERAs must be kept at the site, and in each vehicle used if the activity is a mobile ERA.

Spill Kit Training

(A20) Anyone operating under this approval must be trained in the use of the spill kit.

Complaint Response

(A21) The person responsible for the works must record the following details for all complaints received and provide this information to the DERM on request:

- (a) time, date, name and contact details of the complainant;
- (b) reasons for the complaint;
- (c) any investigations undertaken;
- (d) conclusions formed; and
- (e) any actions taken.

Community Consultation

(A22) In consultation with the administering authority, cooperate with and participate in any community environmental liaison committee established in respect of the construction phase of the project.

End of Conditions for Schedule A

SCHEDULE B – AIR

Odour Nuisance

(B1) The release of noxious offensive odours or any other noxious or offensive airborne contaminants resulting from the activities must not cause an environmental nuisance at an odour sensitive place.

Dust and Particulate Emissions

(B2) Emissions of dust and/or particulate matter resulting from the ERAs must not cause an environmental nuisance at a nuisance sensitive place.



- (B3) An environmental nuisance caused by dust and/or particulate matter includes a release to a dust sensitive place that exceeds either of the following limits at that place:
- (a) Dust deposition of 120 milligrams per square meter per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003;
 - (b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometer (μm) (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic meter over a 24-hour averaging time, at a dust sensitive place downwind of the approved place, when monitored in accordance with:
 - (i) Australian Standard AS 3580.9.6 'Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM_{10} high volume sampler with size-selective inlet - Gravimetric method'; or
 - (ii) any alternative method of monitoring PM_{10} which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the DERM.
- (B4) When requested by the DERM, dust and particulate monitoring must be undertaken and the results notified within 14 days to the DERM following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include:
- (a) for a complaint alleging dust nuisance, dust deposition; and
 - (b) for a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM_{10}) suspended in the atmosphere over a 24hr averaging time.

Excavation and Stockpiles

- (B5) Stockpiles must be maintained using all reasonable and practicable measures necessary to minimise the release of wind blown dust and particulate matter to the atmosphere. Reasonable and practicable measures may include but are not limited to:
- (a) use of water spray as required during winds likely to generate such releases;
 - (b) use of dust-suppressant shielding; and
 - (c) storage in bunkers.

Crushing and Screening Equipment/Batching Plants

- (B6) Fine misting sprays, where practicable, shall be fitted and operated at each transfer point while crushing and screening is carried out as necessary to minimise the release of dust and wind blown particulate matter to the atmosphere.
- (B7) Screens shall be fitted with dust covers on the top deck and dust seals between decks to prevent emissions of dust.
- (B8) Stationary dust generating activities (including concrete batching/rock crushing) should be located as far as practical from sensitive places.

Trafficable Areas

- (B20) Trafficable areas must be maintained using all reasonable and practicable measures necessary to minimise the release of wind blown dust and traffic generated dust to the atmosphere. Reasonable and practicable measures may include but are not limited to:



- (a) keeping surfaces clean;
- (b) sealing with bitumen or other suitable material;
- (c) using water sprays;
- (d) adopting and adhering to speed limits; and
- (e) using dust suppressants and wind breaks

Aggregate Transport Trucks

- (B21) The person responsible for the works must take all reasonable and practicable measures necessary to prevent spillage and/or loss of particulate matter and windblown dust from trucks used for transporting aggregates from the place of work. Reasonable and practicable measures may include but are not limited to:
- (a) wetting down the load prior to transport;
 - (b) having the entire load covered with a tarpaulin or similar material for the duration of transport; and
 - (c) clearing of spillage from side rails, tail gates and draw bars of trucks prior to departure from the approved place and prior to departure from the premises to which the load has been delivered.

Blasting and Rock Drilling

- (B22) Dust collectors must be used as necessary to minimise the release of wind blown dust to the atmosphere while rock drilling is carried out.
- (B23) Dust deposits must not smother or damage vegetation.
- (B24) Blasting must be restricted when strong winds are blowing in the direction of nuisance sensitive places.
- (B25) Dry and fine material within the blasted area should be wetted down to suppress dust evolution.
- (B26) All blasting must be carried out in a proper manner by a competent person in accordance with best practice environmental management to minimize the likelihood of adverse effects caused by impact of air blast over pressure and ground borne vibrations at noise sensitive places and commercial places and on people living in/ or using the surrounding area.

Vibration Nuisance

- (B27) Vibration emitted from the ERA must not cause an environmental nuisance at any nuisance sensitive place or commercial place.

Vibration Monitoring

- (B28) When requested by the DERM, vibration monitoring and recording must be undertaken to investigate any complaint of vibration nuisance, and the results notified within 14 days to the DERM. Monitoring must include:
- (a) peak particle velocity (mm/s);
 - (b) location of the blast/s within the site (including which bench level);
 - (c) atmospheric conditions including temperature, relative humidity and wind speed and direction;
 - (d) the level and frequency of occurrence of impulsive or tonal noise;
 - (e) atmospheric conditions including wind speed and direction;
 - (f) effects due to extraneous factors; and
 - (g) location, date and time of recording.



End of Conditions for Schedule B SCHEDULE C - WATER

Surface Waters Monitoring Program – (during construction).

- (C1) Prior to commencement of the works, an ongoing Surface Waters Monitoring Program must be developed and implemented to monitor the quality of surface waters affected, or likely to be affected, by the works.

The proposal for the Surface Waters Monitoring Program must include but not be limited to the following:

- (a) in-situ testing and sampling point locations which are representative of at least one upstream and one downstream location relative to the place of works;
 - (b) qualifications and experience of the person performing all determination of the quality of contaminants; and
 - (c) provisions for monitoring the parameters as prescribed in Table 1 – Surface waters impact monitoring.
- (C2) The person conducting the works must monitor and keep records of the surface waters characteristics and at the frequency specified in Table 1 – Surface waters impact monitoring.

Schedule C, Table 1: Surface waters impact monitoring

Quality characteristics	Units	Frequency
Turbidity	ntu	On commencement and weekly thereafter
pH	scale	On commencement and weekly thereafter
Electrical conductivity	µS/cm	On commencement and weekly thereafter
Nitrate (as nitrogen)	mg/L	On commencement and weekly thereafter
Total nitrogen (as nitrogen)	mg/L	On commencement and weekly thereafter
Total phosphorous (as phosphorus)	mg/L	On commencement and weekly thereafter

- (C3) All determinations of the quality of surface waters must be made in accordance with methods prescribed in the latest edition of the DERM Water Quality Sampling Manual.

Release of Contaminants to Waters

- (C4) Contaminants that may cause environmental harm must not be directly or indirectly released from the place of works to any waters or the bed and banks of any waters other than:
- (a) as permitted under the stormwater management schedule; or
 - (b) to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.

Groundwater

- (C5) The extraction of materials must not have a detrimental impact on groundwater quality or levels.

End of Conditions for Schedule C



SCHEDULE D – STORMWATER MANAGEMENT

Release of Contaminated Stormwater Runoff

- (D1) Except as otherwise provided by the conditions of the stormwater management schedule and the water schedule of DERM's conditions, the ERAs must be carried out by such practicable means necessary to prevent and/or minimise the release or likelihood of release of contaminated runoff from the place of works to any stormwater drain or waters or the bed or banks of any such waters. 'Contaminated runoff' for the purposes of this condition means stormwater and/or stormwater runoff that contain contaminants that may cause environmental harm.

Stormwater Management Plan

- (D2) The person responsible for the works must implement an effective Stormwater Management Plan which details how the person responsible for the works will manage the actual and potential impacts resulting from the contamination of stormwater at the place of works.
- (D3) The Stormwater Management Plan must address at least the following matters:
- (a) prevention of stormwater and stormwater runoff from contacting contaminants and minimising runoff from the extraction area during overburden removal;
 - (b) minimisation of the amount of soil disturbed by staging works; and
 - (c) details of sediment control measures;
 - (d) separation of clean and contaminated storm waters;
 - (e) measures for continuous improvement; and
 - (f) measures for periodic reporting and implementation of continuous improvement measures.
- (D4) The person responsible for the works must submit a copy of the Stormwater Management Plan to the DERM.
- (D5) A copy of the Stormwater Management Plan and any amendment of the Stormwater Management Plan must be kept at the place of works and be available for examination by an authorised person under *The Environmental Protection Act 1994*, on request.
- (D6) The person responsible for the works must not implement the Stormwater Management Plan where such implementation or amendment would result in a contravention of any condition of DERM's conditions.

Maintenance and Clean Up

- (D7) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.
- (D8) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any stormwater drainage system, roadside gutter or waters.



Sediment and Erosion Control

- (D9) Effective erosion and sediment control structures must be designed, installed and maintained wherever necessary to prevent the erosion of disturbed areas and the release of sediment to waters.
- (D10) Erosion control and sediment control structures must be maintained at all times during the period of construction and checked, repaired or replaced as required after each rain event.
- (D11) The total storage volume of any sedimentation basin for the place of works must be the larger of:
- 450m³ for every hectare of the catchment area of disturbed land; or
 - One and a half times the volume of water that will enter the basin during six minutes of a five year ARI one hour rain event.
- The storage depth must be at least one metre over two thirds of the basin area. Sediment must be removed when accumulated sediment reaches 33% of the total volume. A depth indicator for 33% must be set into the internal banks of sedimentation basins and a spillway at 100% with a minimum 750mm freeboard for the banks above the spillway.
- (D12) All sedimentation basins must be designed by a suitably and experienced engineer.
- (D13) Stockpile areas must be bunded to direct runoff from such areas to the settlement ponds on the site.
- (D14) Clear and uncontaminated stormwater must not be allowed to enter the sedimentation ponds.
- (D15) Releases of treated stormwater from the sedimentation basins must not exceed 50 NTU.

Oil Separators

- (D16) Collected waste oil and sludge removed from each separator must be disposed of in a manner which does not cause contamination of any waters or land.
- (D17) A record must be maintained of the time and date of the desludging and maintenance of each oil interceptor.
- (D18) Collected waste oil and sludge is to be removed from site by a licensed waste contractor in accordance with condition T4.
- (D19) Detergents or other emulsifying agents must be prevented as far as practicable from entering the separator.

End of Conditions for Schedule D



SCHEDULE E - LAND

Preventing Contaminant Releases to Land

- (E1) Contaminants must not be released to land.
- (E2) Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.

NOTE: All petroleum product storages must be designed, constructed and maintained in accordance with AS 1940 - Storage and Handling of Flammable and Combustible Liquids.

Bunding

- (E3) All above ground chemical and fuel tank storages must be banded so that the capacity of the bund is sufficient to contain at least 100 percent of the largest storage tank plus 10 percent of the second largest tank within the bund.
- (E4) All chemical and fuel drum storages must be banded so that the capacity of the bund is sufficient to contain at least 25 percent of the maximum design storage volume within the bund.
- (E5) All bunding must be constructed of materials, which are impervious to the materials stored.
- (E6) All bunding must be roofed where practicable.
- (E7) Where it is impractical to completely roof a banded area the person responsible for the works must ensure that any stormwater captured within the bund is free from contaminants or wastes prior to any release.
- (E8) All empty drums must be stored on a concrete hardstand area with their closures in place.

High Level Alarms

- (E9) The person responsible for the works must ensure that effective and appropriate measures are used to prevent the overfilling of vessels or containers containing petroleum products and prevent the spillage of material during material transfer operations. Effective and appropriate measures may include but are not limited to the use of high level alarms and operator diligence.
- (E10) A tank overfill protection system is to be installed with a mechanical shut off valve and visual/audible alarm for all petroleum product storages.

Tank Dewatering

- (E11) Contaminants arising from tank dewatering operations must not be released within any tank bund.
- (E12) Contaminants arising from tank dewatering operations must not be released to land.
- (E13) Contaminants arising from tank dewatering operations must not be released to waters except in accordance with the requirements of DERM's condition.



Land Rehabilitation

- (E14) Topsoil must be removed and stockpiled prior to carrying out the ERAs.
- (E15) Rehabilitation of disturbed areas, apart from those areas currently being utilised for the ERAs, must take place progressively and must commence within six months of cessation of the ERAs in an area.
- (E16) Native seeds endemic must be collected and propagated for use in revegetation.
- (E17) Excavations that are to remain after cessation of the ERAs on the site must be made safe and accessible to native animals.
- (E18) The water quality of any residual water bodies must comply with the water quality guidelines for livestock drinking water stated in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000.
- (E19) The site (including all disturbed areas such as slopes, sedimentation dam(s) and stockpile areas) must be rehabilitated in a manner such that:
- (a) suitable native species of vegetation are planted and established;
 - (b) effective erosion control measures are implemented in rehabilitated areas;
 - (c) the quality of stormwater, other water and seepage released from the site is such that releases of contaminants such as suspended solids, turbidity, total dissolved salts, pH, total iron, total aluminium and total manganese are not likely to cause environmental harm;
 - (d) the likelihood of environmental nuisance being caused by release of dust is minimised;
 - (e) the water quality of any residual water body meets relevant criteria for the post-site use and does not have the potential to cause environmental harm;
 - (f) the final land form is stable and not subject to slumping; and
 - (g) any actual and potential acid sulphate soils in or on the site are either disturbed; or submerge, or treated so as to not be likely to cause environmental harm.
- (E20) At least six (6) months prior to ceasing carrying out the ERAs at the place of work, you must submit a Draft Site Rehabilitation and Decommissioning Report to the DERM in accordance with the matters prescribed in condition E22.
- (E21) At least three (3) months prior to ceasing carrying out the ERAs at the place of works, submit a Final Site Rehabilitation and Decommissioning Report to the DERM. The Final Site Rehabilitation and Decommissioning Report must include any amendments made to the Draft Site Rehabilitation Report arising from consultation with the DERM.
- (E22) The Site Rehabilitation and Decommissioning Report must address at least the following matters:
- a) description of what land use is ultimately proposed for the site;
 - b) where appropriate revegetation of the site, including ground preparation, species used, methods, density, irrigation, weed control, use of native species endemic to the area where appropriate, staging and timing of revegetation works;
 - c) the proposed landform design to be implemented, including design profile and batter slopes;
 - d) nature of materials utilised and techniques to be employed for any proposed backfilling of extracted areas such as filling, compaction, topsoiling, overburden return and any other soil amelioration leading to vegetation establishment;
 - e) stability of the final landform, including assessment of any changes to the flood gradient, assessment of the stability of slopes and susceptibility to soils slumping;
 - f) stability of the final land surface (i.e. erosion control) including assessment of susceptibility of soils to erosion and anticipated erosion control measures;
 - g) provision and protection of riparian and wildlife corridor widths and any appropriate linkages to other habitat areas;



- h) identification of any habitat areas that have been formed either directly or indirectly as a result of the extractive works or associated activities that may be adversely affected by decommissioning works, for example, any habitat pools upstream and downstream of a weir or causeway, and measures to protect these areas;
- i) potential long term impacts on environmental values and measures proposed to address these, for example, restoration of desired environmental values;
- j) expected short term and long term water quality within any lakes or ponds, with reference to likely uses of the waters, environmental values, appropriate water quality criteria, proposed remedial measures in the event that criteria are not met, and who will be responsible for maintenance of the water bodies in the long term;
- k) a proposed maintenance program, including maintenance of erosion control measures, vegetation being established (e.g. watering, weed control, fencing, site security) and water quality of any lakes or ponds;
- l) in the event that actual or potential acid sulfate soils are present, appropriate management measures for the soils including avoidance, submergence and treatment;
- m) prevention or minimisation of windblown dust from overburden stockpiles, remnant raw material stockpiles and rehabilitation earthworks;
- n) prevention or treatment of the release of contaminated stormwater runoff from remnant material stockpiles, disturbed areas and any lakes or ponds created to the bed or banks of any watercourse;
- o) a proposed monitoring program, for example, plant growth, plant health, stormwater quality, water body water quality, erosion protection measures and stability;
- p) records to be kept and reporting of outcomes, including the monitoring program results and rehabilitation outcomes achieved;
- q) the staging and timing of the expected work;
- r) any bonds kept for rehabilitation, for example, by the local authority; and
- s) submission of written advice to the EPA within fourteen (14) days of completion of site rehabilitation and decommissioning works.

(E23) The person responsible for the works must provide a written report to the DERM at the completion of site rehabilitation and decommissioning works within thirty (30) days of completing the works.

Rehabilitation - Fill Material

(E24) The only material to be used for the filling of voids must be clean rock, clay, gravel, sand or soil (excluding any contaminated rock, clay, gravel, sand or soil):

- (a) obtained from the place of works; or
- (b) another uncontaminated source.

(E25) Rehabilitation of disturbed areas must take place progressively as works are staged and new areas of extraction are commenced.

End of Condition for Schedule E SCHEDULE F - NOISE

Emission of Noise

(F1) A Construction Noise and Vibration Management Plan must be developed to assess the impact of the works on noise sensitive places and must identify the specific management measures to minimize noise nuisance from construction activities.

(F2) In the event of a complaint about noise that constitutes annoyance being made to the DERM, that the DERM considers is not frivolous or vexatious, except as provided for during blasting operations, then the emission of noise from the place of works must not result in levels greater than those specified in Table 1 of the Noise Schedule.



Schedule F, Table 1: Noise level limits

Noise level dB(A) measured as	Monday to Saturday			Sundays and public holidays		
	7am - 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
	Noise measured at a 'Noise sensitive place'					
L _{A10} , adj, 10 mins	Bg + 5	Bg + 0	Bg + 0	Bg + 0	Bg + 0	Bg + 0
L _{A1} , adj, 10 mins	Bg + 10	Bg + 5	Bg + 5	Bg + 0	Bg + 0	Bg + 0
	Noise measured at a 'Commercial place'					
L _{A10} , adj, 10 mins	Bg + 10	Bg + 5	Bg + 5	Bg + 0	Bg + 0	Bg + 0
L _{A1} , adj, 10 mins	Bg + 5	Bg + 10	Bg + 10	Bg + 0	Bg + 0	Bg + 0

- (F3) Notwithstanding any other DERM condition, no operation in association the movement of equipment or loading of vehicles or movement of vehicles onto or off the place of works or the operation of crushing or screening equipment shall be carried out:
- (a) outside the hours of 6.00 am to 6.00 pm Mondays to Fridays;
 - (b) outside the hours of 6.00 am to 4.00 pm Saturdays;
 - (c) on Sundays; and
 - (d) on Christmas Day, Good Friday or Anzac Day.

Noise Monitoring

- (F4) When requested by the DERM, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the DERM following completion of monitoring.

Monitoring must include:

- (a) air blast overpressure [dB (Lin) Peak] (for blast monitoring only);
 - (b) peak particle velocity (for ground vibration monitoring only);
 - (c) LA 10, adj, 10 mins
 - (d) LA 1, adj, 10 mins
 - (e) L_{Amax}, adj, T;
 - (f) L_{Abg, T} (or L_{A90, T});
 - (g) L_{AN, T} (where N equals statistical levels of 1, 10, 50, 90 and 99);
 - (h) Max L_{pA T};
 - (i) L_{Aeq, T};
 - (j) the level and frequency of occurrence of impulsive or tonal noise;
 - (k) atmospheric conditions including wind speed and direction;
 - (l) effects due to extraneous factors such as traffic noise;
 - (m) location, date and time of recording; and
 - (n) details of measurement instrumentation and measurement procedure.
- (F5) Where it is determined by an authorized person of the *Environmental Protection Act 1994* that monitoring results indicate environmental nuisance, the person responsible for the works must:
- (a) address the complaint including the use of appropriate dispute resolution if required; or
 - (b) immediately implement noise abatement measures so that emissions of noise from the ERAs do not result in further environmental nuisance.



- (F6) The method of measurement and reporting of noise levels must comply with the DERM Noise Measurement Manual, 3rd Edition, March 2000, or more recent additions or supplements to that document as become available.
- **Explosive blasting monitoring**
- (F7) Noise monitoring must be undertaken for explosive blasting. For the purposes of this condition monitoring must be done by a competent person in accordance with Australian Standard 2187.2 – Explosives Storage and Use - Part 2: Use of Explosives, and include:
- (a) peak particle velocity (mm/s);
 - (b) air blast overpressure level (dB linear peak);
 - (c) location of the blasting within the site;
 - (d) atmospheric conditions including temperature, relative humidity, wind speed and direction;
 - (e) affects due to extraneous factors; and
 - (f) location, date and time of measurements.
- (F8) Noise from blasting shall be measured using noise measurement equipment with a lower limiting frequency of 2Hz (- 3dB response point of the measurement system) and a detector onset time of not greater than 100 microseconds.
- (F9) Vibration instrumentation must be capable of measurement over the range 0.1mms^{-1} to 300mms^{-1} with accuracy within 5 percent and have a frequency response flat to within 5 percent over the frequency range of 4.5Hz to 250Hz.

End of Conditions of Schedule F

SCHEDULE G - WASTE MANAGEMENT

General

- (G1) Procedures must be implemented to ensure that wastes are minimised, recycled, stored, handled and transferred in a proper and efficient manner and that any disposal of waste (except any release of waste provided for by the DERM's conditions) is to a facility appropriate to accept such waste.
- (G2) The person responsible for the works must not:
- (a) burn waste at or on the place of works; or
 - (b) allow waste to burn or be burnt at or on the place of works; or
 - (c) remove waste from the place of works and burn such waste elsewhere.

Waste Management Plan

- (G3) From commencement of ERAs to which DERM's conditions relates, a Waste Management Program must be implemented. The Waste Management Plan must address at least the following matters:
- (a) the types and amount of waste generated by the ERA;
 - (b) how the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (section 10 of the Environmental Protection (Waste Management) Policy 2000);



- (c) procedures for identifying and implementing opportunities to improve the waste management practices employed e.g. opportunities for beneficial reuse of biosolids;
- (d) procedures for dealing with accidents, spills and other incidents that may impact on the waste management;
- (e) details of any accredited management system employed, or planned to be employed, to deal with the waste;
- (f) how often the performance of the waste management practices will be assessed(at least annually); and
- (g) the indicators or other criteria on which the performance of the waste management practices will be assessed.

(G4) A copy of the Waste Management Plan must be submitted to the DERM prior to any works commencing.

(G5) The person responsible for the works must not implement the Waste Management Plan where such implementation or amendment would result in a contravention of any DERM condition.

Waste Handling and Off Site Movement of Regulated Waste

(G6) Waste generated in the carrying out of the ERAs must be stored, handled and transferred in proper and efficient manner.

(G7) All regulated waste removal from the site must be removed by a person who holds a current approval to transport such waste under the provisions of the *Environmental Protection Act 1994*.

(G8) Where regulated waste is removed from site (other than by a release as permitted under any DERM condition), the person responsible for the works must monitor and keep records of the following:

- (a) the date, quantity and type of waste removed;
- (b) name of the waste transporter and/ or disposal operator that removed the waste;
- (c) the intended treatment/disposal destination of the waste.

Cleared Vegetative Material

(G9) Vegetation including trees, shrubs and under growth should be recycled where possible, including selling any millable timber, retaining the material as fauna habitat and mulching of suitable vegetation (non-weed) for rehabilitation and erosion control on site.

End of Conditions for Schedule G

SCHEDULE H – BIODIVERSITY

(H1) A qualified fauna spotter is to be engaged to work ahead of the site clearing works.

(H2) In the event that native fauna is present, clearing works are to cease until such time as the fauna spotter is able to safely relocate the native fauna.

End of Conditions for Schedule H



SCHEDULE I - MONITORING AND REPORTING

Environmental Impact Analysis Reporting

- (11) The person responsible for the works must ensure the monitoring data gathered in accordance with DERM conditions is analysed and interpreted by an expert in the field of each monitoring program, to assess the nature and extent of any environmental impact of the ERAs. The data, analyses and assessments must be available to the authorised officer of the *Environmental Protection Act 1994* on request.

End of Conditions for Schedule I

SCHEDULE J - DEFINITIONS

Words and phrases used throughout DERM's conditions are defined below.

'administering authority' means the Department of Environment and Resource Management (DERM) or its successor.

'commercial place' means a place used as an office or for business or commercial purposes.

'intrusive noise' means noise that, because of its frequency, duration, level, tonal characteristics, impulsiveness or vibration –

- is clearly audible to, or can be felt by, an individual; and
- annoys the individual.
- In determining whether a noise annoys an individual and is unreasonably intrusive, regard must be given to Australian Standard 1055.2 – 1997 Acoustics – Description and Measurement of Environmental Noise Part 2 – Application to Specific Situations.

' $L_{Aeq, 1hr}$ ' means the time average A-weighted sound pressure level, within the meaning given by AS 1055.1, for a one hour time interval.

' $L_{A_{bg,T}}$ or ($L_{A90,T}$)' Background sound pressure level $L_{A90,T}$ is the A-weighted sound pressure level obtained using time-weighting 'F' exceeded for 90 percent of the measuring period 'T'.

' $L_{A 1, adj, 10 mins}$ ' means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10 minute measurement period, using Fast response.

' $L_{A max, adj, T}$ ' means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

'land' in the 'land schedule' of this document means land excluding waters and the atmosphere.

'mg/L' means milligrams per litre.

'noxious' means harmful or injurious to health or physical well being.

'nuisance sensitive place' includes –

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- a motel, hotel or hostel; or
- a kindergarten, school, university or other educational institution; or
- a medical centre or hospital; or
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- a public thoroughfare, park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

'offensive' means causing offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive.



'site' means land or tidal waters on or in which it is proposed to carry out the development approved under this development approval.

'watercourse' means a river, creek or stream in which water flows permanently or intermittently-

- in a natural channel, whether artificially improved or not; or
- in an artificial channel that has changed the course of the watercourse.

'waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

'you' means the holder of this development approval or owner/occupier of the land which is the subject of this development approval.



Schedule 6 Information requirement and recommendations from DERM for development approval for ERA 14 to operate a facility to generate greater than 10 MW of electricity.

Issue: One of the four power supply options for the mining operations involved the construction and operation of an 80 MW dual fuel (diesel and gas) power station. The proposal involved the operation at any one time of ten 8 MW units with an additional two units on standby. DERM has been advised by DIP that that the proposed power generation facility would not be regulated as a mining activity and a development approval would be required. Sufficient information has been provided in the EIS to indicate that the proposed power station could meet statutory environmental performance requirements. Also, sufficient information is available for DERM to finalise advice on conditions that should apply the proposal. Emissions to air from the combustion of fuel are the main concern to DERM.

Recommendation: Any application made for a development application for ERA 14 generating more than 30 MW would need to meet the following conditions:



Proposed conditions that should apply to an approval – dual fuel (gas and diesel) power station up to 80MW generating capacity

Schedule A - Activity

Prevent and /or minimise likelihood of environmental harm

- (A1) In carrying out the environmentally relevant activities, you must take all reasonable and practicable measures to prevent and/or to minimise the likelihood of environmental harm being caused. Any environmentally relevant activity, that, if carried out incompetently, or negligently, may cause environmental harm, in a manner that could have been prevented, shall be carried out in a proper manner in accordance with the conditions of this approval.

NOTE: This approval authorises the environmentally relevant activity. It does not authorise environmental harm unless a condition contained within this approval explicitly authorises that harm. Where there is no condition or the approval is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.

Maintenance of measures, plant and equipment

- (A2) The holder must:
- install all measures, plant and equipment necessary to ensure compliance with the conditions of this approval; and
 - maintain such measures, plant and equipment in a proper and efficient condition; and
 - operate such measures, plant and equipment in a proper and efficient manner.

Site based management plan

- (A3) From commencement of the activity, a Site Based Management Plan (SBMP) must be implemented. The SBMP must identify all sources of environmental harm, including but not limited to the actual and potential release of all contaminants, the potential impact of these sources and what actions will be taken to prevent the likelihood of environmental harm being caused. The SBMP must also provide for the review and 'continual improvement' in the overall environmental performance of all Environmentally Relevant Activities that are carried out.

The site based management plan must address the following matters:

- Environmental commitments - a commitment by senior management to achieve environmental goals.
- Identification of environmental issues and potential impacts.
- Control measures for routine operations to minimise likelihood of environmental harm.
- Contingency plans and emergency procedures for non-routine situations.
- Organisational structure and responsibility.
- Effective communication.
- Monitoring of the contaminant releases.
- Conducting environmental impact assessments.
- Staff training.
- Record keeping.
- Periodic review of environmental performance and continual improvement.

Report Submission

- (A4) The holder of this approval must ensure that the results of all monitoring performed in accordance with this approval for the period covered by the return is made available to the administering authority.



Notification of Emergencies, Incidents and Exceptions

- (A5) All reasonable and practicable actions are to be taken to minimise environmental harm, or the risk thereof, resulting from any emergency, incident or circumstances not in accordance with the conditions of this environmental authority.
- (A6) As soon as practicable after becoming aware of any emergency, incident or information about circumstances which results or may result in environmental harm not in accordance with the conditions of this environmental authority, the administering authority must be notified.
- (A7) Not more than ten (10) business days following the initial notification of an emergency, incident or information about circumstances which result or may result in environmental harm, written advice must be provided to the administering authority in relation to:
- proposed actions to prevent a recurrence of the emergency or incident;
 - the outcomes of actions taken at the time to prevent or minimise environmental harm; and
 - proposed actions to respond to the information about circumstances which result or may result in environmental harm
- (A8) As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, with the conditions of this environmental authority, written advice (which may be electronically) must be provided of the results of any such monitoring performed to the administering authority.

Schedule B – Air

The release of contaminants to the atmosphere

- (B1) The release of contaminants to the atmosphere from a point source must only occur from those release points identified in Schedule B - Table 1 and must be directed vertically upwards without any impedance or hindrance.
- (B2) Contaminants must be released to the atmosphere from a release point at a height and a flow rate not less than the corresponding height and velocity stated for that release point in Schedule B - Table 1.
- (B3) Contaminants must not be released to the atmosphere from a release point at a mass emission rate/concentration, as measured at a monitoring point, in excess of that stated in Schedule B - Table 1 and monitored not less frequently than Schedule B Table 2.

Schedule B, Table 1: Release of contaminants

Release point	Minimum release height (metres)	Minimum velocity (m/sec)	Contaminant release	Maximum release limit
Stack*	21	25.5	CO	250 mg/Nm ³ and 8.8 g/s
			NO _x	250 mg/Nm ³ and 9.7 g/s

*for each of a maximum of 4 stacks

- (B4) The only types of fuel to be burnt in power generation under normal operating conditions are coal seam gas and diesel.
- (B5) The sulphur content of any fuel burned in power generation is not to exceed 0.5 percent by weight.



Monitoring of Contaminant Releases to the Atmosphere

- (B6) The holder of this approval must conduct and keep records of a monitoring program of contaminant releases to the atmosphere at the release points, frequency, and for the parameter specified in Schedule B Table 2 and which complies with the following:
- (a) Monitoring provision for the release points listed in Schedule B Table 2 must comply with the Australian Standard AS 4323.1 - 1995 'Stationary source emissions Method 1: Selection of sampling positions'.
 - (b) The following tests must be performed for each required determination specified in Table 2:
 - (i) gas velocity and volume flow rate;
 - (ii) temperature;
 - (iii) water vapour concentration
 - (c) where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be normal.

Schedule B, Table 2: Required release point determinations

Determination required	Release point numbers	Frequency
Mass emission rate and concentration of oxides of nitrogen (NO _x) in the flue gas at a 15 percent oxygen reference level.	Stack/s	During commissioning of the power plant and annually thereafter.

Evaluation of Ambient Air Quality (ground level)

- (B7) On or before the commencement of the power station, the holder of this approval must submit to the administering authority an air quality monitoring protocol that must address at least the following:
- (a) sampling practices and procedures for contaminant testing;
 - (b) the selection of sampling locations to demonstrate that samples collected will be representative of the air quality of the area;
 - (c) the frequency of sampling to be undertaken at each location including the number of samples to be taken, the time spent in collecting samples (the sampling time); and
 - (d) meteorological data collection including at least the wind speed and wind direction during the air quality monitoring program the monitoring locations.
- (B8) The holder of this approval must have due regard to comments made by the administering authority regarding the submitted air quality monitoring protocol as required by condition (B7).



(B9) When requested by the Administering Authority, contaminant monitoring and recording must be undertaken to investigate any complaint of contamination, and the results notified within 14 days to the administering authority. If you can provide evidence through monitoring that the limits in Schedule B Table 1 are not being exceeded then you shall not be in breach of condition B2 with regards to any release of the contaminants listed in Schedule B Table 1. When monitoring is requested the following must be complied with:

- monitoring provisions for the release points listed in Schedule B - Table 1 must comply with the Australian Standard AS 4323.1 - 1995 'Stationary source emissions Method 1: Selection of sampling positions'.
- the following tests must be performed for each required determination specified in Schedule B - Table 1:
 - gas velocity and volume flow rate;
 - temperature
- where practicable samples must be taken when emissions are expected to be at maximum rates.

Schedule C - Water

Release to waters

(C1) Contaminants must not be released from the site to any waters or the bed and banks of any waters.

Stormwater management

(C2) There must be no release of stormwater runoff that has been in contact with any contaminants at the site to any waters, roadside gutter or stormwater drain.

Schedule D - Noise and vibration

Noise nuisance

- (D1) Noise from activities must not cause an environmental nuisance at any sensitive place.
- (D2) All noise from activities must not exceed the levels specified in Schedule D - Table 1 and Table 2 at any sensitive place.

Schedule D, Table 1: Construction

Noise Level [dB(A)] (outside) at a 'Sensitive Place' expressed as	Monday to Sunday		
	7am – 6pm	6pm – 10pm	10pm – 7am
L _{Aeq,adj,15 mins}	bg + 5	bg + 5	bg
L _{A1,adj,15 mins}	50	45	bg

Schedule D, Table 2: Operation

Noise Level [dB(A)] (outside) at a 'Sensitive Place' expressed as	Monday to Sunday		
	7am – 6pm	6pm – 10pm	10pm – 7am
L _{Aeq,adj,15 mins}	bg + 5	bg + 5	bg + 3
L _{A1,adj,15 mins}	50	45	30



Noise monitoring

- (D3) When requested by the Administering Authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:
- $L_{Aeq,adj,15\ mins}$
 - $L_{A1,adj,15\ mins}$
 - the level and frequency of occurrence of impulsive or tonal noise;
 - atmospheric conditions including wind speed and direction;
 - effects due to extraneous factors such as traffic noise; and
 - location, date and time of recording.
- (D4) The method of measurement and reporting of noise levels must comply with the latest edition of the Department of Environment and Resource Management Noise Measurement Manual.

Schedule E - Waste

Waste handling

- (E1) All regulated waste removed from the site must be removed by a person who holds a current approval to transport such waste under the provisions of the *Environmental Protection Act 1994*.

Schedule F - Land

Preventing contaminant release to land

- (F1) Contaminants must not be released to land.
- (F2) Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.

NOTE: All petroleum product storage's must be designed, constructed and maintained in accordance with AS 1940 - Storage and Handling of Flammable and Combustible Liquids.



Schedule G - Community

Complaint response

- (G1) All complaints received must be recorded including investigations undertaken, conclusions formed and action taken. This information must be made available to the administering authority on request.

Schedule H - Definitions

Words and phrases used throughout this licence or development approval are defined below:

Word Definitions

'administering authority' means the Department of Environment or its successor.

'sensitive place' includes -

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
- f) a public park or gardens; or
- g) means a work place used as an office or for business or commercial purposes.

'L_{Aeq, adj, 15 mins}' means the A-weighted sound pressure level of a continuous steady sound, (adjusted for tonal character and impulsiveness of the sound) that within a 15 minute has the same mean square sound pressure of a sound that varies with time.

'L_{A 1, 15 mins}' means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 15-minute measurement period, using Fast response.

'waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

'land' in the 'land schedule' of this document means land excluding waters and the atmosphere.

'regulated waste' means non-domestic waste mentioned in Schedule 7 of the Environmental Protection Regulation 2008 s.65 (whether or not it has been treated or immobilised), and includes:

- for an element - any chemical compound containing the element; and
- anything that has contained the waste.

Schedule I - Maps/Plans

A map showing the location of the proposed power station, including the real property description must be provided with an application.



Schedule 7 Information requirements and recommendations from DERM for development approval for ERA 63 to upgrade the Wandoan Sewage Treatment Plant to process sewage waste from the mine and town.

The proposed Wandoan sewage treatment plan (STP) upgrade would increase the treatment capacity to 454 kl/day, which equates to about 1800 equivalent persons. Under the Environmental Protection Regulation 2008 this would trigger the requirement for an approval as ERA 63. Information provided in the EIS and supplementary report regarding sewage treatment and disposal was inadequate assess and provide environmental conditions that would apply to this activity.

The following information is required under the *Environmental Protection Act 1994* (ERA 63 Sewage Treatment) to allow an application to be fully assessed and appropriate conditions prepared:

Site-based management plan

No details are provided regarding a suitable Site-Based Management Plan (SBMP) applicable for the site's sewage treatment plant.

Information requested

A site-based management plan (SBMP) must be provided that addresses the operational issues associated with the day to day management of the sewage treatment plant (STP) and the subsequent irrigation of the treated effluent. The SBMP must identify the potential harm that may occur from routine operations and document what actions will be taken to prevent the likelihood of environmental harm. The SBMP must also detail:

- Monitoring programs for effluent, flow, soil, ground water, air, noise and receiving environment, and any monitoring data.
- Routine plant maintenance/servicing schedule and a list of all persons, companies and contractors who would be responsible for operation and maintenance of the STP and associated infrastructure.
- Provisions for the review and 'continual improvement' in the overall environmental performance of the site-based facilities.
- Contingency planning to deal with emergencies and non-routine situations such as plant/equipment failure, power outage, process upset, overflows/releases, non-conformance with effluent quality criteria, soil/water contamination, irrigation/disposal issues, algal blooms in any wet weather storages and/or associated overflows.
- Site management issues including lines of communication, processes, emergency procedures, record keeping and staff training.

The plan must address the key elements listed in the EPA's *Information Sheet Sewage Treatment – Environmentally Relevant Activity (ERA) 15a* and EPA's *Site Based Management Plan Guidelines* (both documents are available from the DERM's website, <http://www.derm.qld.gov.au>).



Receiving waters

Insufficient information has been provided on the quality of the receiving waters in Juandah Creek. Potential impacts on the instream water quality and ecosystem due to the increase in the quantity of discharge and the changed quality of the discharged water have not been provided.

Information requested

- Details of the receiving water quality in terms of the parameters outlined in Table 27C-8 of the EMP.
- Describe the likely impacts on the in stream environment downstream of the discharge point.
- Identify and describe any impacts on current down stream water users.

Maps

Insufficient information was provided regarding the configuration of the site, specifically with respect to the sewage treatment activities and infrastructure.

Information requested

Provide a scale site plan (preferably A4 in size and in electronic format) which shows:

- Location of all sewage treatment infrastructure, including, but not limited to, tanks, sewage pump stations, sewerage system and pipe work, and their relation to other on-site structures (e.g. buildings, recreational areas, etc)
- Distance (in metres) to site boundaries
- Distance (in metres) from each side of the STP, sewage pump station(s) and disposal area(s) to potentially impacted waters, including rivers, creeks, dams, channels, stormwater drains, etc
- Wet weather/irrigation storage structure/s
- Sensitive features within 200m of the proposed STP location
- Soil monitoring locations
- Groundwater bore locations
- Stormwater collection/drainage system/s
- Site contours
- Q10 and Q100 flood lines.

Soil quality and characteristics

Insufficient information was provided regarding the soil quality for the proposed disposal/irrigation areas.

Information requested

Provide details and analysis results for soil quality parameters including, but not limited to, the following:

- pH (1:5 soil:water)
- Electrical conductivity (1:5 soil:water)
- Sodium absorption ratio (on soil water, 1:5 soil:water)
- Cation exchange capacity
- Exchange cations: calcium/magnesium/potassium/sodium/aluminium
- Organic carbon
- Carbon/nitrogen ratio
- Total nitrogen
- Nitrate
- Permeability results for each layer (not a range).



Sewage treatment activity specific information

Insufficient information was provided regarding the treatment activity proposed for the upgrades WWTP.

Information requested

Provide an accurate description of the WWTP activity. This must include:

- Design drawings for treatment plant, including the irrigation system and infrastructure.
- The capacity (as 'peak design capacity') and effectiveness of the treatment and disposal system (including performance data for the proposed STP for similar qualities and quantities of wastes), including a description of the basis on which the capacities were determined. The EPA's Guideline entitled *Sewage Treatment Works – Peak Design Capacity* will assist in determining the required peak design capacity.
- A description of the method of disposal of grits, scums and sludges.
- A description of how the volume of influent was arrived at and how influent quality will be controlled, e.g. in additional mechanisms such as grease-traps that will reduce the load placed upon the STP.
- A description of how the proposed conversion of part of the existing treatment process to the IDAL/IDEAL process will be able to process five times the current wastewater load. It is also unclear how the proposed process will ensure the required phosphorous concentration levels in the discharge will be achieved.
- A description of the effluent disinfection method/s that will be used to ensure that 'effective' disinfection will be achieved, including, but not limited to, contact time and concentration and form of the disinfectant used for pathogen and virus reduction/elimination.
- A demonstration of the suitability of the location and design of treatment and wet weather storage and irrigation site/s.
- A description of sewer infiltration and unlawful connections detection and management procedures.
- A description of the alarm systems for both plant operations and any sewage pump stations necessary to indicate any overflows or unplanned releases.
- A description of the proposed water sampling devices that will be installed to monitor wastewater generation.
- Identification and description of all sewage pump stations, their locations, overflow storage capabilities, release locations and design requirements of the local authority, including alarms and telemetry. It likely that the proposed pump station on the mining lease would be of sufficient capacity to trigger ERA 63 hence its operation would need to be regulated under the EA for the mine. Sufficient information, consistent with the requirements of DERM's guideline on ERA 63, should be provided.
- A description of emergency backup power available to the pumps and the STP in the event of a power outage.
- Information on the chemicals and polymers to be used in the treatment processes, including material safety data sheets.
- Details of the storage of chemicals on site (types and volumes) and method of storage and containment.
- Waste reuse/disposal method for all chemicals, fuels, etc.
- Details on security measures to prevent unauthorised public access to the STP, sewage pumping stations, effluent/wet weather storage and minimise risks to public health.
- How the STP and infrastructure is going to be operated and maintained.



Effluent and wet weather storage

Insufficient information is provided regarding the on-site storage of effluent.

Information requested

Provide details of effluent storage facilities and their management such that environmental harm and risks to public health are prevented. Matters to be addressed should include, but not be limited to, the following:

- Design details
- Vector management
- Odour control
- Measures to prevent potential overflows to waters
- Measures to prevent stratification of waters
- Weed management
- Measures and strategies for protection of groundwater from dam/pond storages, such as pond lining
- Predicted overtopping and impact of any such losses to the environment
- Algal management (including toxic algal management), including measures to reduce water quality degradation in the storage by measures such as aeration and destratification.

Effluent quality

Insufficient information was provided with respect to the expected effluent quality from the STP both for discharge to land and that discharged to Juandah Creek.

Information requested

Provide information on the expected effluent quality for the following parameters (minimum, median, 50%ile, 80%ile, maximum where appropriate):

- 5 day BOD
- Suspended solids
- pH
- E.coli concentration
- Total dissolved solids
- Dissolved oxygen
- Turbidity in terms of NTU
- Total nitrogen as nitrogen in terms of mg/L
- Ammonia Nitrogen as nitrogen in mg/L
- Total phosphorus as phosphorus in terms of mg/L
- Faecal coliforms in terms of colony forming units per 100mL
- Sodium absorption ratio
- Salinity
- Other appropriate analytes (including viruses, protozoans).

Where possible this information is to be compared with monitoring results from operational STPs of the same type and capacity.

Proposed release quality trigger values and limits should be identified rather than percentiles. Adequate water quality sampling would need to be undertaken prior to the upgrade of the WWTP to determine locally appropriate trigger values and limits.



Effluent irrigation

Concerns

Insufficient information was provided regarding the irrigation of treated effluent at the proposed development site.

Information requested

Provide details on all effluent irrigation projects and the land to be irrigated including:

- A determination of the suitability of the proposed irrigation areas for receiving wastewater
 - Existing land use
 - Description of topography (slope (%)) and stormwater flow paths
 - Flood potential
 - Current and proposed vegetation to be grown in the irrigation area
 - Relevant soil characteristics
 - The presence of groundwater in the proposed irrigation areas, including associated monitoring data and the current and future uses of this groundwater. The monitoring data should cover parameters including but not limited to, static water level (depth to ground water), pH, electrical conductivity, sodium, calcium, magnesium, sodium adsorption ratio, chloride, nitrate, nitrite, ammonia, total nitrogen, total phosphorous, and faecal coliforms
 - A water balance model, which assesses the suitability of the irrigation area/s to receive treated sewage effluent. The preferred model is MEDLI. This model assesses the hydraulic load applied to the irrigation areas, the fate of nitrogen, phosphorous and salts, and the required wet weather storage volume. The assessment must include, but not be limited to the following
 - The required size of the irrigation area/s
 - The required wet weather storage volume/s and frequency of overtopping events
 - Irrigation rates
 - Soil permeability
 - The protection of groundwater and vegetation being irrigated.
- The assessment should be carried out for the proposed and future effluent disposal rates. This must include the maximum predicted effluent disposal resulting from any increases in population and must be based on maximum site occupancy under climatic conditions and soil quality parameters relevant to the site's location. Any predicted overflows to the environment from any storages need to be justified in terms of environmental impact (impact assessment);
- How irrigation rates are to be undertaken and scheduled to ensure that they do not result in an exceedence of water holding capacity of the soil or the crop uptake capacity that may result in surface runoff and how this is to be managed
 - The salinity of the contaminants applied and the capacity of the vegetation and soils in the irrigation area/s to assimilate these salt loadings on a sustainable basis
 - Method/s of effluent application (surface or sub-surface irrigation)
 - Potential for human exposure to irrigated effluent and aerosols
 - Potential for aerosols and drift to be generated and move to distant locations
 - How the irrigation system is to be operated and maintained in a sustainable manner.
 - Maintenance of water quality in the proposed 20ML on-site storages.

**Air issues**

Insufficient information was provided with regards to potential air impacts associated with the sewage treatment activities relevant to the proposed development.

Information requested

Provide a list of all potential odour sources associated with the STP and related infrastructure, and outline measures that will be taken to control odour impacts from sewage treatment activities and irrigation practices so as not to cause nuisance at odour-sensitive areas, existing and future. Appropriate performance levels should be provided (note that the usual detection level is 5 odour units).

Waste issues

Inadequate information was provided regarding the management of some waste streams from the treatment plant.

Information requested

The administering authority requires a waste management program that includes, but is not limited to, the following matters:

- Details of waste generated (such as effluent, recycled water, grit, screenings, biosolids, etc)(by type and proposed quantity/volume)
- Storage method/s
- Odour generation and controls
- Recycle/reuse or disposal method/s
- Details of how waste is managed with reference to the waste management hierarchy and 'cleaner production'
- Procedures for improving waste management practices.

Refer to sections 10 and 19 of the Environmental Protection (Waste Management) Policy 2000.



Schedule 8 Recommended conditions for other approvals

Condition 1 Excluded mining area

I recommend to the Minister responsible for the application for mining lease under the *Mineral Resources Act 1989*, that no open-cut mining of any type shall occur during the life of this project at any point which is located within a 'high management zone' with a radius or distance of two thousand (2000) metres measured in a straight line in any direction from the point at which the centre-line of Moore Street in Wandoan intersects with the centre-line of Lawton Street in Wandoan. Mining activities other than open cut coal extraction, including for example, roads, pipelines, powerlines, etc will not be excluded.

Condition 2 Exclusion from mining lease application area

I recommend to the Minister responsible for the application for mining lease under the *Mineral Resources Act 1989*, that the proponent must exclude Juandah Bore identified as Lot 56 on Plan FT987 from the defined mining lease application area (MLA 50229) for the Wandoan Coal Project.

Condition 3 Groundwater and surface water connectivity

I recommend to the Minister responsible for administration of the *Water Act 2000*, that the proponent must continue investigations into the potential for connectivity between local groundwater and surface water. The results of investigations to date include an assessment of the alluvium aquifers and the shallow coal seam aquifers and their potential connectivity with the local surface water resources. Both aquifers, due to poor aquifer potential and salinity, have limited environmental values. The alluvium has limited effective storage, which does not allow for significant baseflow to surface water during the dry seasons. The shallow coal seam aquifers are not considered to contribute to the surface water resources on site.

The results of the continuing investigation should be made available to DERM prior to the commencement of the mining activities. A hydrogeological report, compiled in April 2010, for the Project includes the results of the additional monitoring bores constructed to monitor shallow groundwater resources.

- (a) Should the results of this investigation indicate that a connection is likely:
 - (i) the proponent must design and implement a strategy to minimise the impact of the mining activities on ground and surface waters, specifically targeted at the findings of the investigation
 - (ii) the strategy should include monitoring and reporting arrangements and actions that the proponent will take to minimise and 'make good' any adverse impacts of the mining activities on groundwater quality or quantity in accordance with 5 below.

Condition 4 Potential groundwater impacts

I recommend to the Minister responsible for administration of the *Water Act 2000* that the following conditions be attached to any licence, permit or approvals required by the proponent associated with groundwater impacts of the project:

- (a) Mechanisms should be implemented to ensure that the project does not result in an undue adverse impact on the availability and quality of groundwater supplies to neighbouring landholders. Dewatering will take place and impacts on groundwater levels within the coal seam aquifers and limited alluvium aquifers are predicted. Monitoring and water replacement has been envisaged to manage this impact.
- (b) The proponent should reach mutually agreeable arrangements with landholders potentially affected by groundwater drawdown for the provision of alternative supplies throughout the mine life, and after mine closure. Alternative supplies should be put in place before supplies from relevant existing landholder bores are adversely affected and the costs associated with



changes to landholder extraction of groundwater from bores on affected land should be covered by the proponent.

- (c) Prior to the surrender of mining leases, post-mining, pursuant to the *Mineral Resources Act 1989* and the EP Act, the conditions under which an alternative supply of groundwater would be provided to any landholders potentially adversely affected by impacts to groundwater directly attributable to the mine dewatering program must be agreed to between the proponent and the relevant regulators.

Condition 5 Water allocation – Glebe Weir raising

I recommend to the Minister responsible for administering the *Water Act 2000* and who is responsible for approval of changes to the Fitzroy Basin Regional Operations Plan (FBROP) associated with a raised Glebe Weir, that a water allocation of 6500 ML/yr be made in the revised FBROP to facilitate the project.

Condition 6 Biodiversity offset strategy

The proponent must provide an ‘Biodiversity Offset Strategy’ for approval by DERM and the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) insofar as it relates to MNES, before the commencement of mining operations. The final minimum offset area will depend on the alignment and design of the project component.

- (k) Biodiversity Offsets Strategy must provide for and include, but not necessarily be limited to the following:
- (i) the minimum area of each Regional Ecosystem (RE) to be secured by the proponent in offset arrangements for the project as shown in Tables A8-1, A8-2 and A8-3, but the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) may specify larger areas of each of these Endangered Ecological Communities (EECs) offsets and DERM may specify larger areas of each ‘endangered’ or ‘of concern’ RE offsets where their respective statutory authorities allow this.

Table A6-1: Minimum offset areas for REs likely to be affected by the MLA areas and gas supply pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
MLA areas					
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	22.6	67.8
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	5	15
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	290.4	580.8
Gas supply pipeline (not on MLA areas)					
11.3.25	remnant	least concern	of concern	1.1	2.2



Table A6-2: Minimum offset areas for REs likely to be affected by the southern CSM water supply pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	1.6	4.8
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	4.2	8.4
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains	remnant	of concern	of concern	2.8	5.6
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	1.9	3.8
11.3.27c Palustrine wetland (e.g. vegetated swamp). Mixed grassland or sedgeland with areas of open water +/- aquatic species	remnant	least concern	of concern	0.3	0.6

Table A6-3: Minimum offset areas for REs likely to be affected by the Glebe Weir raising and pipeline

RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
Glebe Weir					
11.3.1 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	remnant	endangered	endangered	3.9	11.7
11.9.5 <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	remnant	endangered	endangered	0.3	0.9
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	110.1	220.2
11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains	remnant	of concern	of concern	341.4	682.8
11.3.4 <i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus spp.</i> tall woodland on alluvial plains	remnant	of concern	of concern	5.2	10.4
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	165	330
Pipeline					
11.3.1	remnant	endangered	endangered	0.3	0.9



RE Description	Remnant status	VM Act status	Biodiversity status	Area requiring offset (ha)	Minimum offset required (ha)
11.9.5	remnant	endangered	endangered	0.8	2.4
11.9.10 <i>Eucalyptus populnea</i> , <i>Acacia harpophylla</i> open forest on fine-grained sedimentary rocks	remnant	of concern	endangered	2.3	6.9
11.9.7 <i>Eucalyptus populnea</i> , <i>Eremophila mitchellii</i> shrubby woodland on fine-grained sedimentary rocks	remnant	of concern	of concern	8.4	16.8
11.3.2 <i>Eucalyptus populnea</i> woodland on alluvial plains	remnant	of concern	of concern	1.5	3
11.3.3 <i>Eucalyptus coolabah</i> woodland on alluvial plains	remnant	of concern	of concern	0.8	1.6
11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	remnant	least concern	of concern	3	6

- (ii) all proposed offset lands for the project shown on maps which, to avoid the risk of double-counting, delineate areas of vegetation in each proposed offset area attributable to each component of the project
- (iii) an assessment of the extent and condition of the native vegetation proposed to be used as offset areas based upon ground truthing
- (iv) demonstrate that environmental offsets provide for the habitat requirements of EPBC-listed threatened flora and fauna species identified to be adversely impacted by the project
- (v) the management of offset lands to exclude grazing or other development, except when required by law to provide access to resource tenure holders
- (vi) the management of offset lands so as to encourage regeneration and regrowth of the relevant native vegetation to attain remnant or other protected status within 20 years or prior to the surrender of the EA for the mine, whichever is sooner
- (vii) annual reporting to DERM, by a suitably qualified third party acceptable to DERM, on activities at the offset area and its progress towards remnant or other protected area status.

Condition 7 Vegetation clearing for the southern CSM water supply pipeline

Any applications made for the southern CSG water supply pipeline under the *Vegetation Management Act 1999* would need to meet all statutory requirements and have the following features:

- The clearing easement would be a maximum of 20 metres wide.
- All mature habitat trees within the corridor should be retained unless there is a risk of interference with the construction and operation of the pipeline.

Condition 8 Vegetation clearing for the Glebe Weir raising and water supply pipeline

Any applications made for the Glebe Weir and associated water pipeline under the *Vegetation Management Act 1999* would need to meet all statutory requirements and have the following features:

- where the water pipeline corridor from Glebe Weir can not be aligned to avoid the clearing of assessable vegetation, then clearing easement must be limited to a maximum of 30 metres wide.



- all mature habitat trees within the corridor should be retained unless there is a risk of interference with the construction and operation of the pipeline.

Condition 9 Wildlife corridor re-establishment

In order to mitigate potential habitat fragmentation impacts to significant wildlife corridors on the MLA areas, the proponent is required to prepare and implement a program for the staged re-establishment of native riparian vegetation within the state-significant Woleebee Creek wildlife corridor over a 10-year period. This condition is recommended pursuant to relevant permits under the *Nature Conservation Act 1992*.

Condition 10 Relevant environmental management plans

The project construction and operational environmental management plans (not required as part of the project Environmental Authorities required under the *Environmental Protection Act 1994*) must include all project commitments made by proponent in the EIS, SEIS and other impact assessment documentation, and all conditions arising from the project's approval and subsequent permits, authorities and/or licences.



Schedule 9 Coordinator-General's other recommendations

Recommendation 1 Rehabilitation of mined land

The proponent is recommended to expand its proposed trials under the project's Implementation of Rehabilitation Strategy for the purpose of assessing the success of rehabilitation measures, to include the objective of returning mined land to its pre-mining condition, including the possibility of agricultural cropping land use (where appropriate slopes and soil types allow), as an alternative to agricultural land use for grazing purposes.

Recommendation 2 Visual amenity

It is recommended that:

- a) The results of the proposed visual impact mitigation strategies outlined in the proposed Landscape Management Plan be monitored by the proponent in consultation with the Western Downs Regional Council throughout the life of the mine, and those strategies be enhanced wherever they are considered to have insufficiently reduced the visual contrasts between the major components of the project, as viewed from key viewpoints on the Leichhardt Highway, Nathan Road and the Jackson-Wandoan Road and the Wandoan township.
- b) Notwithstanding other obligations on the proponent to provide a satisfactory level of mine site and spoil rehabilitation, the proponent, in consultation with the Department of Environment and Resource Management and the Western Downs Regional Council, achieves a minimum average of 30 per cent revegetation of all elevated spoil areas (excluding any tourist lookouts established as part of the project) that are visible from key viewpoints on the Leichhardt Highway, Nathan Road and the Jackson-Wandoan Road and Wandoan, within three years of completion of placement of spoil in those areas.

Recommendation 3 Hazard, risk and incident management plans

The proponent is recommended to develop hazard, risk and incident management plans in accordance with the proponent's workplace health and safety requirements and obligations under relevant legislation, in accordance with but not limited to the *Workplace Health and Safety Act 1995* and the *Coal Mining Safety and Health Act 1999*.

Recommendation 4 Fatigue and road safety programs

The proponent is recommended to investigate the feasibility of providing further fatigue and road safety training or awareness programs by consulting with the Queensland Police Service (through the Staff Officer, Southern Police Region, Toowoomba).

Recommendation 5 Progressive release of land

The proponent is to consider progressive release of land at the completion of mining activities in a particular area and that the land be rehabilitated to as close to its pre-mining condition.

Recommendation 6 Product transport related air quality

The proponent is recommended to implement the following supplementary proactive/predictive air quality management measures for the project:

- a) The surface of coal in wagons must be profiled to a flat 'garden bed' shape, so as to provide a consistent streamlined surface which will reduce dust generation.
- b) The proponent should liaise with its rail partners regarding the possible timing and implementation of initiatives to improve coal dust management having regard to other coal and rail industry initiatives such as QR's Transitional Environmental Program (TEP), and associated Coal Dust Management Plan (CDMP).
- c) Coal supplied for rail transport should be either be washed through a coal handling and processing plant (CHPP) to remove fines or be bypassed unwashed coal.
- d) Coal supplied for coal transport should have a coal surface water content designed to reduce dust emissions during rail transport.
- e) The coal train load-out facility should include over-loading controls designed to prevent wagon overloading and minimise the loss of coal during transport.



- f) The proponent should make provision for installation of a surface (veneering) treatment for all product coal supplied for rail transport, should practical experience suggest that such treatment is required for dust suppression.

Recommendation 7 Accommodation facility—air quality, noise and vibration

- a) The proponent is recommended to treat the proposed permanent accommodation facility in the same way for air quality and noise and vibration as if it were a sensitive receptor for the purposes of Conditions B5 to B11 of the EA (Schedule 3, Appendix 1) and Conditions D1 to D20 of the EA (Schedule 3, Appendix).
- b) In the dust and particulate matter monitoring and control plan to be prepared by the proponent under Condition B5 of the environmental authority (Schedule 3, Appendix 1) and for noise and vibration monitoring required under Conditions D1 to D20 of the environmental authority (Schedule 3, Appendix 1), the proponent is recommended to include the proposed accommodation facility site as a sensitive receptor.

Recommendation 8 Public Health Impacts Study

I recommend that the proponent work with Queensland Health (QH) in relation to social impacts related to air quality including dust emission impacts on local residents and the community as a result of the project.

Proposed approach to the study

1. I recommend that the proponent note (but is not limited to) Queensland Health advice that the scope of the study may involve the following key elements:
 - a) Determining the study area and including a control community to monitor secular change (e.g. by time and perception)
 - b) Use of data collected from GP encounters regarding respiratory presentations using a two week snapshot stratified by age e.g. the young and the elderly
 - c) Determining the prevalence of asthma including through a telephone survey
 - d) Conducting annual repeat collections of data
 - e) Involvement of the Division of General Practice as a key stakeholder
2. I recommend that the proponent seek the advice of Queensland Health on the design, timing, implementation and scope of the study.
3. I recommend that the proponent:

Work with Queensland Health and an independent research organisation to advise and help design a general health survey during construction and operations phases of the project.

- (a) Include the study within the Wandoan Coal project's Stakeholder Engagement Strategy to inform and educate residents of Wandoan, Taroom, and Miles about the study.
 - (b) ensures that the study is a standing agenda item at meetings of the Wandoan Coal Project CRG.
4. I recommend that the proponent incorporate the public health impacts study into the Wandoan Coal project SIMP, in consultation with the Coordinator-General and QH, and with other key stakeholders.

Recommendation 9 (A) Community Resilience

1. In the face of significant social change that is likely to occur as a result of the Wandoan Coal project, I recommend that the Wandoan Coal project CRG implement a standing agenda item to discuss developing community-based initiatives that are designed to support, maintain and build the resilience of the communities of Wandoan, Taroom, and Miles.
2. The approach to the management of community resilience should be to build on the existing community profile provided in the SIA and detailed in the SIMP and should aim to:
 - (a) identify the vulnerabilities within a community which may reduce its resilience to adapt to change



- (b) identify the community's strengths, resources and adaptive capacities which increase its resilience to change
- (c) develop scenarios to understand how a change might impact on the community, and how that community might utilise its resources and adaptive capacities to respond in an adaptive way
- (d) identify practical strategies to strengthen the community's resources and capacities
- (e) monitor and evaluate changes as they occur to identify expected and unexpected social impacts
- (f) explore the community's values, attitudes and beliefs, how these are influenced by the process of change, and how they may influence the community's response
- (g) Understanding what impact external (social, political, governance) conditions have on a community's response to change.

Recommendation 9 (B) Future resilience strategies

I recommend that the proponent work with the Wandoan Coal project CRG to ensure that any future community resilience strategies:

- (a) are developed in consultation with the Western Downs Regional Council (WDRC) and the Banana Shire Council and are linked to the Western Downs Community Plan 2050 and the Central Queensland Regional Growth Management Framework
- (b) take into account the proposed Surat Basin Regional Planning Framework, and
- (c) are included in the Wandoan Coal project SIMP.

Recommendation 10 Wandoan Coal project social impact mitigation and management

It is recommended that:

- (a) the community health, safety and wellbeing concerns raised in the EIS and SEIS and submissions be addressed comprehensively through the development and implementation of the social infrastructure section of the Wandoan Coal project SIMP in consultation with key stakeholders and the community as described in section 5.17.6 of this report.
- (b) with respect to social infrastructure needs for the project:
 - (i) the proponent works closely with the Wandoan Coal project CRG, the Sustainable Resource Communities Surat Basin Local Leadership Group, the Surat Basin Future Directions Statement Steering Committee, and the Queensland Government South West Queensland Regional Managers Coordination Network to prioritise social infrastructure needs in the Wandoan Coal project study area, and
 - (ii) strategies to address these priorities, as related to the Wandoan Coal project, are detailed in the Wandoan Coal project SIMP.
- (c) the proponent continue to engage with state and local government and non-government organisations (e.g. QPS, DoC, the WDRC, and community organisations) to ensure that key social impacts and associated mitigation strategies identified in the Wandoan Coal project's focus on and reflect local priorities and concerns
- (d) engagement processes to progress workforce and community programs be incorporated into the Wandoan Coal project Stakeholder Engagement Strategy as part of the Wandoan Coal project SIMP
- (e) any outcomes of the proponent's audit of operation sites and accommodation villages to determine its existing practices with regard to buying and investing locally and supporting local businesses which identify new opportunities for local business:
 - (i) be the subject of consultation with members of the CRG for the Wandoan Coal project to determine how local businesses and residents can take advantage of these opportunities
 - (ii) ensure that any strategies devised are incorporated in the SIMP



- (iii) during the development of this strategy, the proponent discuss with Indigenous parties opportunities for the provision of additional support for local Indigenous students in Wandoan, Taroom, and Miles to strengthen pathways from schooling to employment.



Schedule 10 Glossary, acronyms and abbreviations

The following terms have been used in this report:

'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).

'Ambient (or total) noise' at a place, means the level of noise at the place from all sources (near and far), measured as the Leq_n appropriate acoustic parameter/s (e.g. Leq, L₁₀, L_{max}) depending on the requirements of the investigation, and for an appropriate time interval.

'Background' for noise levels means background noise level measured in accordance with the Queensland Government's Noise Measurement Manual.

'Consultative bodies' refer Schedule 2 that describes which entity should be consulted by the proponent in regards to each condition imposed under Schedule 1.

'Construction Works' means all works necessary for the construction of the Project, including demolition of existing buildings and structures, site preparation, Public Utility Works and associated road works.

'Construction EMP' means an environmental management plan or plans, including any sub-plans, for the construction phase of the Project.

'Operational EMP' means an environmental management plan or plans, including any sub-plans, for the operational phase of the Project.

'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).

'Proponent' means the entity responsible for the procurement, construction and operation of the Wandoan coal mine project and other associated works and infrastructure, i.e. WJV.

'Sensitive receptor' means any of the following places:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- f) a public park or gardens but not a public road; or
- g) a work place used as an office or for business or commercial purposes, which is not part of the mining activity.

'Waters' includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), any underground water and any part thereof (*Water Act 2000*).

The following acronyms and abbreviations have been used in this report:

ABS	Australian Bureau of Statistics
ACH Act	<i>Aboriginal Cultural Heritage Act 2000</i>
AEP	annual exceedence probability
AHD	Australian height datum
ARI	average recurrence interval—for flood or rainfall event frequency
BLMP	biodiversity and land management plan



BSC	Banana Shire Council
Coordinator-General	Coordinator-General of the State of Queensland—constituted under the SDPWO Act
CHMP	cultural heritage management plan—under the ACH Act
CHPP	coal handling and preparation plant
CO	carbon monoxide
CO2-e	carbon dioxide equivalent—internationally recognised measure that allows for the comparison of different greenhouse gases in terms of their global warming potential
CRG	community reference group
CSG	coal seam gas
CSM	coal seam methane
Cwth	Commonwealth of Australia
dba	decibels—unit of noise measurement
DCS	Department of Community Safety
DEEDI	Department of Employment, Economic Development and Industry
DERM	Department of Environment and Resource Management
DEWHA	Department of Environment, Water, Heritage and the Arts (Commonwealth)
DIDO	drive-in-drive-out—transportation of workers to work sites and/or accommodation facilities who have a permanent place of residence outside of the project area.
DIP	Department of Infrastructure and Planning
DoC	Department of Communities
DTMR	Department of Transport and Main Roads
EA	environmental authority—under the EP Act
EEC	endangered ecological communities—under the EPBC Act (MNES)
EIA	environmental impact assessment
EIS	environmental impact statement—for the Wandoan Coal Project (December 2008) prepared by WJV
EM plan	environmental management plan—under the EP Act
EMP	environmental management plan—not under the EP Act
EP Act	<i>Environmental Protection Act 1994</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwth)
EPP	Environmental Protection Policy
EPP (Air)	Environmental Protection (Air) Policy 2008
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Waste)	Environmental Protection (Waste Management) Policy 2000
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity—under the EP Act
ERAP	Emergency Response and Action Plan
FB	Fitzroy Basin
FIFO	fly-in-fly-out—transportation of workers to work sites and/or accommodation facilities who have a permanent place of residence outside of the project area
GAB	Great Artesian Basin
GHG	greenhouse gas
GQAL	good quality agricultural land
ha	hectare
IAS	initial advice statement
ICMM	International Council on Mining and Metals
IDAS	Integrated Development Assessment System—under SPA
IPA	<i>Integrated Planning Act 1997</i>
km	kilometre
kV	kilovolt
Leq	average noise level
LGAQ	Local Government Association of Queensland
MDL	mineral development licence—under the MRA
MIA	mine infrastructure area
ML	Mining Lease
MLA	Mining Lease Application
MNES	matters of national environmental significance—under the EPBC Act
MRA	<i>Mineral Resources Act 1989</i>



MRRT	minerals resource rent tax
m ³	cubic metres—measure of volume
m ³ /s	cubic metres per second—measure of flow rate
µg/m ³	micrograms per cubic metre
µm	micrometres
µS/cm	microsiemens per centimetre—measure of electrical conductivity (salinity)
mg/L	milligram per litre
mg/m ² /day	milligram per metre per day—measure of dust deposition rate
Mtpa	million tonnes per annum
NC Act	<i>Nature Conservation Act 1992</i>
NEPC	National Environmental Protection Council
NEPM	National Environment Protection Measures made under the <i>National Environment Protection Council Act 1994</i> (Cwth)
NNTT	National Native Title Tribunal
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen, which includes NO ₂
NRA	Nature Refuge Agreement (under the NC Act)
OESR	Office of Economic and Statistical Research—of Queensland Treasury
OHMP	Operational Habitat Management Plan
ou	odour unit—measurement unit of odour
Pa	Pascals—measurement unit of force
PM _{2.5}	particulate matter with equivalent aerodynamic diameter less than 2.5 µm
PM ₁₀	particulate matter with equivalent aerodynamic diameter less than 10 µm
QGC	Queensland Gas Corporation
QH	Queensland Health
QMEA	Queensland Minerals and Energy Academy
QPS	Queensland Police Service
QRC	Queensland Resources Council
RE	regional ecosystem—under the VM Act
REMP	receiving environment monitoring program
RGMF	regional growth management framework—under SPA
RMP	road-use management plan—under the TIA
ROM	run-of-mine
ROP	(water) resource operation plan—under the Water Act
RSPT	resource super profits tax
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i>
SEIS	supplementary environmental impact statement—for the Wandoan Coal Project (November 2009) prepared by WJV
SEQ	South East Queensland
SES	State Emergency Services
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)
SIA	social impact assessment
SIAU	Social Impact Assessment Unit—of DIP
SIMP	social impact management plan
SNO _x	oxides of sulphur, which includes SO ₂
SPA	<i>Sustainable Planning Act 200</i>
SPP	State Planning Policy
SPR	Sustainable Planning Regulation 2009
SRC policy	Sustainable Resource Communities policy of the Queensland Government released in September 2008
TIA	<i>Transport Infrastructure Act 1994</i>
ToR	terms of reference
TMP	traffic management plan—under the <i>Transport Infrastructure Act 1994</i> and the <i>Transport Planning and Coordination Act 1994</i>
TSP	total suspended particles
VM Act	<i>Vegetation Management Act 1999</i>
WDRC	Western Downs Regional Council



WJV

Wandoan Joint Venture—the proponent (Xstrata Coal Queensland Pty Ltd, ICRA Wandoan Pty Ltd, Sumisho Coal Australia Pty Ltd)

WRP

water resource plan—under the Water Act

XCQ

Xstrata Coal Queensland

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