6. PROJECT OPERATIONS

6.1 INTRODUCTION

This chapter builds on the brief description of the Project in Chapter 1, Section 1.2.3, and describes the Project's infrastructure and activities over the operational life of the mine at an extraction rate of 30 Million tonnes per annum (Mt/a) Run of Mine (ROM) coal.

This chapter focuses primarily on mine operations within and immediately adjacent to the Mining Lease Application (MLA) areas, including the potential gas supply pipeline from the Peat Scotia Lateral Pipeline to the gas fired power station on the mine site.

Reference to Volumes 2, 3 and 4 and other relevant chapters within this volume will be given to further describe the Project's land, infrastructure and activities as appropriate.

Figure 6-1-V1.3 indicates the Project areas discussed in this chapter. Note that figures with numbering ending in V1.3 refer to figures contained in Volume 1, Book 3 of the EIS.

Chapter 11 Water Supply and Management provides further details on the water supply and sewerage infrastructure associated with the Wandoan township, and other water management issues associated with the mine site.

As highlighted in Chapter 5 Project Construction, the EIS will not quote specific years for construction and operation. Rather, the first year of operations will be Year 1, then following operational years to Year 30.

6.2 SITE DESCRIPTION

6.2.1 GEOLOGY

Chapter 9 Geology, Mineral Resources, Overburden and Soils, further outlines the geological and geomorphological features of the Project area. In summary, the geology of the northern Surat Basin, including the Project area, includes:

- quaternary alluvium
- middle to upper Jurassic age Injune Creek Group rocks comprising mudstone, labile sandstone and siltstone (some being calcareous), and coal.

The Jurassic age sedimentary rock is derived from deposition of sedimentary material with six successive cycles of sedimentation. Coals of the Walloon Sub Group developed towards the end of the second cycle of sedimentation, with two sub-cycles being recognised within the Walloon Sub Group.

6.2.2 MINERAL RESOURCES

The Project is based on the Juandah Coal Measures with underlying Taroom Coal Measures of the Walloon Sub Group. The Project will focus on the extraction of thermal coal from the Juandah Coal Measures, with Tangalooma Sandstone separating Juandah and Taroom Coal Measures. The mine targets up to four seams of economic significance of the Juandah Coal Measures, namely the Kogan, Macalister Upper, Macalister Lower and Wambo seams. The underlying Taroom Coal Measures are not currently anticipated to be mined, given the depth of the Measures and open-cut extraction process.

Figure 9-5-V1.2 from Chapter 9 shows a schematic cross section through the Project area and surrounding areas identifying the various coal seams and measures. Individual coal seams can be up to 15 m thick, but are commonly much thinner and exhibit rapid lateral thickness variations. The geological structure is simple, with seams being relatively flat lying with a regional dip of no more than 2° to the south-west. As observed in Chapter 9, overburden is generally characterised by soft sediments, typically ranging from 8 m to 25 m in depth.

Bulk sampling

An early bulk sample pit was developed in the 1980's. At this same site, a 47,000 tonne bulk sample was taken from April to June 2008. The bulk sample was conducted from a pit within MDL 221, shown in Figure 6-2-V1.3, under Environmental Authority 4489. The sample indicated coal seam conditions of the proposed Austinvale Pit. The coal from the bulk sample has been crushed on site. Some small quantities of coal were stockpiled for spontaneous combustion monitoring, with the majority of coal trucked to Oaky Creek Coal Mine approximately 510 km north of Wandoan for washing. The bulk of the washed coal was railed to Gladstone Power Station for combustion testing. A small sample was used for overseas combustion trials and 1,600 tonne was delivered to Tarong Power Station for mill testing.

A further bulk sample of 200,000 tonnes is planned to be conducted in late 2008 or early 2009, subject to regulatory approvals related to the MDLs, agreement on transport logistics for washing, and capacity at the wash facility. The product coal from this bulk sample will be exported for large scale combustion trials.

This bulk sample is not part of the Project and has not been assessed in the EIS.

Initial mining

Subsequent to the granting of the proposed mining leases, there is potential for initial mining activities to be conducted during Years -2 and -1. The extraction of 500,000 tonnes of ROM coal may be undertaken for further market testing and acceptance from the existing bulk sample pit or the proposed Austinvale Pit North. ROM coal will be crushed on-site, and is expected to be trucked to Oaky Creek Coal Mine for washing. Product coal will then be railed to the Port of Gladstone for export to international markets.

Any initial mining activities will be conducted under the Plan of Operations and environmental authorities associated with the granting of mining leases over MLA 50229, MLA 50230 and MLA 50231.

Chapter 12 Transportation and the associated technical report, discuss the potential road and pavement impacts of the truck haulage associated with the initial mining activities and ROM coal transportation for washing, which will not exceed 500,000 tonnes.

Presence of coal seam methane

Chapter 14 discusses coal seam methane in further detail. In summary, coal seam methane measured on site within the Juandah Coal Measures increases with depth, with:

- the total gas content between 15 m to 45 m below ground level being approximately 0.1 m^3/tonne with a standard deviation of 0.072 m^3/tonne, having a gas composition of 20% CH_4, 15% nitrogen (N_2) and 65% CO_2
- the total gas content (m^3/tonne) deeper than 45 m equal to (depth × 0.00488) — 0.12577, with a standard deviation of 0.08 m^3/tonne, equating to approximately

0.3 m^3/tonne of total gas at 90m below ground level. Between 40m and 90m, gas composition approximates 90% CH_4 and 10% CO_2 (Neilsen & Williams 2008).

Chapter 14 Greenhouse Gas and Climate Change describes the coal seam methane gas content of coal from test boreholes in the MLA areas as significantly lower than standard concentrations assumed by published guidance, being the IPCC Guidelines for National Greenhouse Inventories, with consequent lower fugitive emissions from standard guidelines.

The coal seam methane present in the shallow coal seams to be mined during the Project is not considered practical to capture for recovery and use, given the nature of open cut mining and the low gas content.

6.3 MINING OPERATIONS

This section discusses the mining operations from the extraction of coal to the delivery to the ROM dump stations.

6.3.1 MINE LIFE AND COAL RESOURCE

The WJV is seeking a 32 year mining lease (two years for construction and 30 years operation) for the extraction of the coal resource at a rate of approximately 30 Mt/a ROM coal from the MLA areas 50229, 50230 and 50231. 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.

6.3.2 MINE LAYOUT AND SCHEDULE

Figure 6-3-V1.3 provides an indicative layout of the mine footprint and operational scheduling over the 30-year operational components of the mining lease of the Project.

Eight pit areas, incorporating fifteen 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. Table 6-1 identifies the pit areas, likely maximum total depths to the pit floor and estimated ROM tonnes of coal.

Table 6-1: Mine areas

Mine areas	Approximate maximum total depth to floor of pit (m)	Estimated quantity (million tonnes ROM per pit)
Austinvale	32	92
Woleebee	53	117
Leichhardt	33	17
Frank Creek	39	58
Woleebee Creek	50	123
Mud Creek	60	156
Summer Hill	48	153
Turkey Hill	33	114
Satellite Pits	24	16

Generally each pit will be mined 24 hours a day, seven days a week. In broad terms, Figure 6-4 outlines the mining sequence of pit areas.

Figure 6-4: Mining sequence

Aside from initial mining, some overburden may be removed in Years -2 and -1 during earthworks construction and for commissioning of the dragline. Also, small quantities of coal may be mined for commissioning of the coal handling and preparation plant (CHPP) before full production commences. However, this has not been included in the above schedule.

Exceptions to the 24 hour a day, seven day a week mining schedule may include Frank Creek Pit, and possibly the Leichhardt Pit, depending on monitoring results. Frank Creek Pit is located initially approximately 1,200 m west of the Leichhardt Highway opposite Wandoan township and advancing to up to 600m west of the highway. Leichhardt Pit is located approximately 5 km to the north of Wandoan, and south of the Wandoan Cemetery.

For Frank Creek, vibration, air quality and noise impact assessments determined that using a dragline operation working 24 hours a day, seven days a week throughout the entire pit mining sequence potentially posed impacts to environmentally sensitive areas including the Wandoan township. Under worst-case scenario atmospheric conditions, the dragline operations in Frank Creek Pit may not meet environmental legislative criteria for vibration, dust, and noise. Accordingly, the use of a dragline in Frank Creek will be restricted, where necessary, if monitoring of weather conditions, air quality and noise indicate that compliance with environmental authority criteria will not be achieved.

For Leichhardt Pit, if monitoring data measured during Leichhardt Pit operations indicates operations in the north east of the Leichhardt Pit may impose airblast levels approaching the environmental guideline recommendations, then the mining operations will be modified to ensure that legislative requirements are met.

Chapters 13 Air Quality, 15 Noise and 16 Vibration of Volume 1 provide further discussion on the respective issues associated with these mining areas.

6.3.3 MINING METHODOLOGY

The broad mining methodology for each pit is:

- vegetation clearing (where required)
- topsoil stripping and storage or direct spreading
- blasting of the overburden
- removal of overburden by dragline (with some instances by truck and excavator) in box-cuts, creating new mining strips and filling in old/previously mined voids
- possible blasting of coal and the excavation of ROM coal by truck and excavator
- dumping of ROM coal into the designated dump stations or temporary ROM stockpile
- conveying of ROM coal to the Coal Processing Plant (CPP) for washing and processing
- final landform re-profiling, topsoiling and revegetation activities by earthmoving equipment.

Initial box-cut strips in each pit will be approximately 60 m wide, with 80 m wide strips thereafter. Vegetation clearance will incorporate vegetation removal, salvage and storage if unable to be immediately used for beneficial use(s). Topsoil will be stripped, salvaged and stockpiled to ensure viability for future rehabilitation. Chapters 9 Geology, Mineral Resources, Overburden and Soils, and 17A Terrestrial Ecology discuss topsoil and vegetation management respectively in more detail.

Blasting of overburden material is planned to proceed approximately 500 m in front to the dragline operation in lengths of several hundred metres. Chapter 16 Vibration addresses blasting and associated vibration impacts in further detail.

For the first 15 years of planned operation, overburden and interburden removal by dragline is anticipated to advance at approximately 60 m per day per dragline. Total overburden and interburden removal is planned at typically 85 to 95 million bank cubic metres (bcm) per year for the first 15 years of operation. This quantity increases to 130 to 140 million bcm of in situ overburden and interburden in the latter years of the mine plan when five large draglines are scheduled to operate.

The coal mining fleets are planned to mine around 30 million tonnes of ROM coal per year for the mine site.

Three dump stations will be progressively located across the mine site and will be established in line with the opening and closing of adjacent pits. Each dump station will receive the ROM coal via dump trucks, with the ROM coal worked, crushed and loaded onto the conveyors, as discussed in section 6.5.1.

As mining strips progress, void spaces will be filled with dragline overburden from the following strip and partings used to fill between the overburden stockpiles in preparation for rehabilitation. Overburden stockpiles will be levelled out to cap all materials and shaped to provide a gently undulating landform. Given the low strip ratios, final landforms are anticipated to be similar to the existing topography, with typically up to around 5 m increased elevation (except box cuts) compared to existing landform. Initial boxcut stockpiles will form higher final stockpile shapes as overburden material is placed on the existing natural surface. Rehabilitation of the landform is anticipated to commence within two years following a pit strip being mined.

Typically, a single final void will remain after completion of mining for each pit. The final void will be formed by reducing the side slopes of the pit highwall and adjacent overburden stockpiles to infill the void, bringing the pit floor up towards natural topographical surface. Depths of final voids will vary with the volume of material available at each pit for infilling. Chapters 9 Geology, Mineral Resources, Overburden, and Soil and 25 Decommissioning and Rehabilitation further discuss final voids management.

Austinvale Pit North and Austinvale Pit will both be used for tailings and rejects disposal over the life of the mine, as discussed in section 6.5.4. Austinvale Pit North will be mined during Years -1 and 1, then used for tailings disposal from approximately Years 2 to 8. Austinvale Pit will be mined until approximately Year 9 from the east and west sides, with the final void space created in the centre of the pit. This central void space will then be used for tailings disposal until the final year of operation, or until full. The final tailings disposal surface is planned to be at or below the existing natural ground surface. Section 6.5.4 discusses management of rejects in greater detail.

Chapters 9, 11, 17, 25 and 27 of Volume 1 also provide further details associated with final voids management, water management, rehabilitation, revegetation, decommissioning, and site management.

Figure 6-5-V1.3 provides an indicative cross-section of a pit during mining. Figures 6-6-V1.3 to 6-13-V1.3 provide indicative excavation and refill plans for Years 5, 10, 20 and 30 for all MLAs. Figures 19-8-V1.3 to 19-23-V1.3 are photomontages from specific viewpoints that visually reflect the progress of the mine including final landform and revegetation.

6.3.4 MINING EQUIPMENT

The equipment required to undertake the mining and associated ancillary mining activities for the extraction of 30 Mt/a ROM coal is expected to include:

- 100 m^3 bucket dragline, with up to four draglines scheduled in the Years 1 to 17, with a fifth dragline becoming operational in Year 18 onwards
- 550 tonne, 29 m^3 bucket, medium sized hydraulic excavator, with up to two excavators in operation in any one year
- 350 tonne, 21 m^3 bucket, small sized hydraulic excavator, with up to two excavators in operation in any one year
- 30 m^3 bucket front end loader for overburden removal, larger bucket if used for coal removal, with up to two front end loaders in operation in any one year
- 220 tonne capacity rear dump truck, with up to twenty-seven rear dump trucks in operation in any one year
- 850 hp diesel track dozer, with up to twenty-nine track dozers in operation in any one year
- 760 hp diesel engine overburden drill, with up to seven drills in operation in any one year
- 475 hp diesel engine overburden drill, with one drill in operation in any one year
- 800 hp wheel dozer, with up to three dozers in operation in any one year
- 24’ blade, 500 hp diesel wheeled grader, with up to three graders in operation in any one year (and potentially substituted with 16’ blade, 275 hp diesel wheeled graders)

- 100,000 L water truck, with up to three water trucks in operation in any one year.

Note that the sizes and numbers of equipment are indicative only based on the mine plan and proposed mining operations.

This impact assessment has assumed that, potentially, up to five new draglines may be purchased and assembled on the mine site. At this time, three draglines will be used for at least the first 15 years of operations, with two additional draglines potentially brought on line in Year 16 and Year 18 respectively, subject to future commercial considerations and long term mine operations.

Typically, each pit will be mined and supported by using one dragline, five tracked dozers, one front end loader, five rear dump trucks, a hydraulic excavator, an overburden drill, a grader and a water truck to extract 10 million tonnes ROM coal annually. Figure 6-14-V1.3 shows a snapshot during Year 10 of Woleebee Pit, which provides an indicative layout of mining equipment.

Chapter 2 Needs and Alternatives outlines the options considered by the WJV for mining.

6.3.5 ONGOING EVALUATION AND EXPLORATION ACTIVITIES

The WJV holds Exploration Permits (Coal) (EPCs) and mineral development licences (MDLs) outside of the MLA boundaries that are the subject of this EIS, which will continue to be evaluated and explored to establish the potential for future coal extraction. An EPC allows the WJV to determine the existence, quality and quantity of minerals on, in or under land by prospecting, geophysical surveys, drilling, and sampling and testing of materials to determine coal bearing capacity or other associated parameters.

A MDL allows the WJV to undertake geoscientific programs such as drilling and seismic surveys, mining feasibility studies, metallurgical testing and marketing, environmental, engineering and design studies to evaluate the development potential of the coal resource.

Areas of MDL 224 and the southern portion of MDL 223, which are not covered in the mining areas described above, will potentially be developed during the long term operational life of the Project. If they are to be developed, these MDLs will be subject to their own impact assessment and approvals processes, and do not form part of this Project.

6.4 PROCESSING AND PRODUCTS

The CHPP is proposed to operate 24 hours a day, seven days a week, up to 7,200 hours a year. A total of forty-one personnel are anticipated to operate this facility over a 24 hour period.

6.4.1 ROM RECEIVAL AND RAW COAL HANDLING

Figures 6-15-V1.3 and 6-16-V1.3 graphically and schematically depict the ROM coal receival and raw coal handling process. Conveyors from the three dump stations will transfer ROM coal to the Coal Processing Plant (CPP) area located in the Mine Infrastructure Area (MIA).

At the ROM dump stations, ROM coal may be stockpiled (approximately 100,000 to 300,000 tonnes) adjacent to the ROM pads before being loaded by 220 tonne trucks into 1,000 tonne hoppers or dumped directly into the dump station. Each ROM pad will contain two hoppers. Each ROM hopper will feed into a chain feeder and primary sizer combination prior to discharging onto a raw coal transfer conveyor. This conveyor will have a weigher to control feed. Tramp metal will be removed by an over belt magnet positioned before a metal detector. Primary sized coal will be delivered to the sizing station which will contain two secondary sizers that will further reduce the topsize of the raw coal. Two high volume overland conveyors (OLCs), one from MLA 50230 and the other from MLA 50229, will deliver coal from each sizing station to a central distribution station adjacent to the CPP.

The distribution station will house two transfer bins, one for each OLC. Each distribution bin will be serviced by two belt feeders. The bins will have the ability to feed either of the CPP feed bins with either 100% or a blend of raw coal from the OLCs. The CPP feed surge bin feed conveyors will lift the raw coal into the bins. Discharge from each bin will be via four vibrating feeder and tertiary sizer combinations. Tertiary crushed coal will be pumped into the CPP.

6.4.2 COAL PROCESSING PLANT

Figure 6-17-V1.3 presents a process block flow block diagram for the CPP.

The CPP will include three modules that process the ROM coal into washed product coal, coarse rejects and tailings. Sufficient space will be allowed for a fourth CHPP module that will allow for increased coal processing to over 30 million tonnes per year in the event that production is to be expanded in the future.

Each module will stand four storeys high and will have an overhead crane. Each module will have a concrete floor and be a free-standing steel structure, and will be fully lit to provide adequate lighting for continuous 24 hour operations.

Desliming

Each module will be pump fed and the raw tertiary crushed coal slurry will discharge into the desliming screen feed box, and feed directly onto multislope desliming screens. Water sprays will assist the desliming operation and the slurry material up to 1.4 mm wedge wire (w.w) diameter and water will be collected and piped to the desliming cyclone feed sump. The oversized slurry material of 1.4 mm to 50 mm in diameter (w.w) will discharge from the desliming screens into a launder and will be flushed by correct medium into two dense medium cyclone (DMC) feed sumps. The correct medium, magnetite, consumption is expected to be around 0.5 kg/ROM tonne.

Coarse coal circuit

The DMC feed sumps will be of wing tank type design with a constant sump level maintained through overflow of excess medium to a common correct medium sump. Mixed dense medium and coarse coal from the DMC feed sumps will be pumped to the dense medium cyclones.

Product coal and medium will overflow from each cyclone and discharge directly to a tile lined screen feed box which will distribute onto separate multislope product drain and rinse screens. Product coal will discharge from the end of each screen into a dedicated coarse coal centrifuge for dewatering and then be discharged onto a product conveyor.

Reject coal and medium will underflow from the cyclones into a single tile lined feed box which will distribute onto a single multislope reject drain and rinse screen. Rejects material will be sent directly to the rejects conveyor.

Medium drained from the product coal and reject on the drain section of each screen will be returned directly to the correct medium sump to be recirculated. Adhering medium will be rinsed from the coal and reject on the rinse section of the screens, and flow to the dilute medium sump from where it will be pumped to the magnetic separators. Concentrate from the magnetic separators will gravitate into the correcting medium sump and the effluent will be directed to the desliming screen feed box to assist in dilution of the raw coal prior to desliming.

Fine coal circuit

The fine coal captured as part of the material up to 1.4 mm in diameter in the desliming screen, will be fed into the desliming cyclone feed sump, and then pumped to the desliming cyclone cluster located on the top floor of the CPP. The cyclone overflow will flow to the tailings thickener.

The cyclone underflow will gravitate to the spiral feed sump and be pumped into four banks of triple start spirals. The spirals will beneficiate the fine coal into rejects and fine coal product, with the fine rejects gravitating to two high frequency screens for dewatering before being discharged onto the reject conveyor.

Fine coal product from the spirals will be laundered to a spiral product sump and pumped to the spiral product thickening cyclone cluster. The cyclone overflow will go to the desliming screen feed box for recirculation.

The thickened cyclone underflow will gravitate to the fine coal centrifuge feed box. Product coal will discharge from the fine coal centrifuge feed box into fine coal centrifuges for dewatering, and will then be discharged onto a product conveyor.

6.4.3 REJECTS HANDLING

As depicted in Figure 6-18-V1.3, a coarse rejects conveyor will convey coarse reject material from the CPP into a coarse rejects bin, which will discharge into trucks for disposal to mine pits or to other nominated beneficial uses (e.g. road base if material is inert). The rejects bin will have an overflow chute should the rejects bin exceed its nominated capacity.

The desliming cyclone overflow will feed into a conventional high rate thickener. Flocculant will be added at a rate of approximately 0.032 kg/ROM tonne to the thickener feed launder to assist settling of the tailings (fines rejects). Underflow will be pumped to a tailings sump and pumped to the tailings dam. During the first year, tailings disposal will be to the starter tailings dam, from Year 2 disposed to Austinvale Pit North and from Year 9 disposed to Austinvale Pit. Recoverable water from the tailings dam will flow into a return water dam to then be pumped back into clarified water tanks. Clarified water will also overflow from the high rate thickeners into the clarified water tanks from where it will be recirculated through the CPP as required.

6.4.4 REJECT WASTE DISPOSAL

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 will consist of waste material less than 0.125 mm in particle size.

Coarse rejects, comprising the greater mass of processing waste, is commonly disposed of in external dumps or the voids created by overburden stockpiles or mined-out pits. The WJV proposes to truck coarse rejects to nominated containment areas in various pits across the mine area.

Tailings are typically disposed of in a variety of ways across the coal processing industry, depending on the tailings' physical and chemical nature, resources required to effect storage (especially water), site characteristics and risk profile. The requirement of any chosen tailings storage facility is to provide safe, stable, and economical storage of tailings presenting negligible public health and safety risks and acceptably low social and environmental impacts during operation and post-closure of the mine.

Conventional tailings slurry, of the type proposed to be used for this Project as described in Section 6.5.3, is suitable for disposal in below ground mined-out pit voids, known as tailings pits or void backfill pits. Alternatively, tailings may be stored on the surface within purpose built retaining embankments. Retaining embankments for conventional storage facilities are designed to retain tailings and water whereas thickened, paste, and other dewatered tailings streams have embankments designed to retain runoff, bleed water, and fines rather than the weight of the tailings mass itself.

Below ground storage of fine reject material in tailings pits will require monitoring of seepage to establish the potential for groundwater contamination or coal reserve sterilisation. Void backfilling, provided those voids are made available by the mining sequence and tailings disposal and does not sterilise future pit reserves, and has the advantage of creating a reduced environmental footprint.

In cases where mining is advanced as a series of pits, such as for this Project, the progressive filling of mined-out pits with coal processing wastes is an effective long term tailings storage option.

Data from the Project bulk sample trials undertaken during early 2008, shows that the coarse and fine rejects material from the trial to be 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 and consequently the tailings will be low in sulphur also, and will not impose an acid risk on deposition. There are no known other chemical species likely to cause any problems in respect of disposal.

Project coarse rejects storage requirements

Coarse rejects will be stored within the limits of the Austinvale Pit and progressively deposited as overburden stockpiles become available from the second year of the Project, during the ramp-up to peak production of 30 Mt/a. The coarse rejects will be deposited by truck, initially in the voids between the overburden stockpiles. The overburden stockpile peaks will then be dozed to cover the rejects, and subsequently overlain by topsoil as part of rehabilitation. Following completion of coal mining in Austinvale Pit the central east–west coal access ramp is filled with coarse rejects as this void is no longer required. Coarse rejects will be progressively deposited over the Austinvale Pit tailings cells as they are successively filled and stabilised. The areas will subsequently be sealed with overburden and rehabilitated. The rehabilitated coarse reject deposits are expected to rise no higher than 25 m above the original natural surface level.

The volume required and corresponding volume available for the storage of coarse rejects over the 30 year operation of the Project is shown in Figure 6-19.

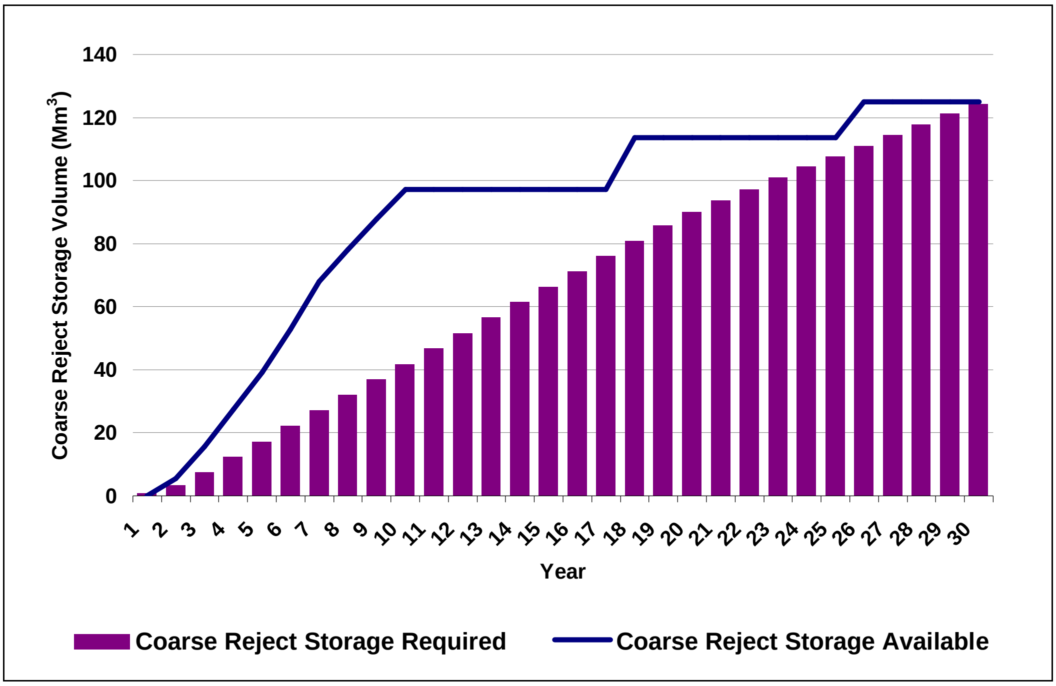

Figure 6-19: Volume of coarse reject and storage area available

Project tailings storage requirements

The estimated volume required and corresponding volume available for the storage of tailings over the 30 year operation of the Project is shown in Figure 6-20. This storage assumes that tailings require 30% by volume of total disposal requirements, compared to the 70% by volume for coarse rejects.

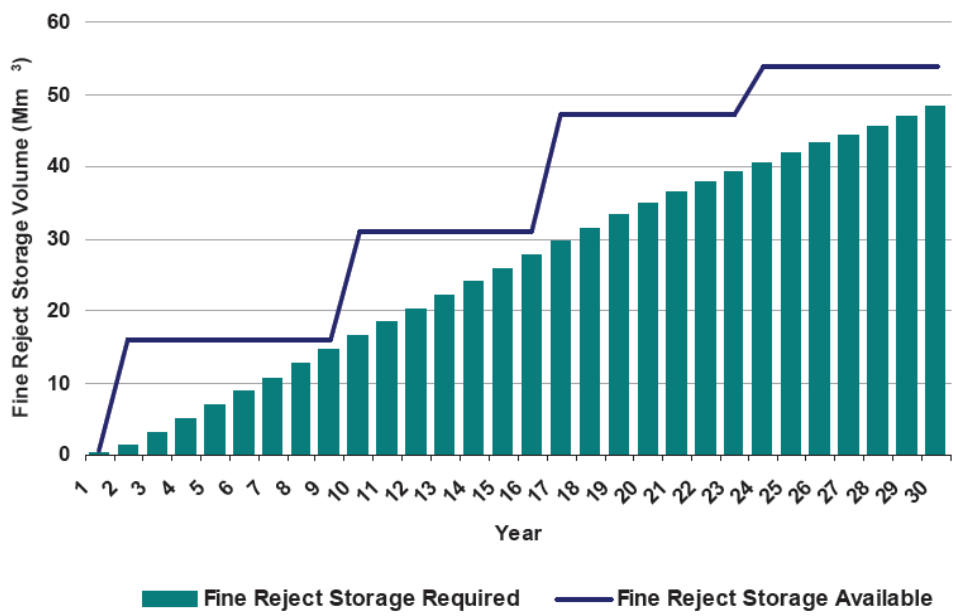

Figure 6-20: Volume of tailings and storage area available

The main features of the tailings storage design are shown in Table 6-2. Tailings storage requires averages of around 1.9 million cubic metres during the years of peak mine production.

Table 6-2: Features of tailing storage design

Year	Storage available Mm^3	Activity
1	0.4	Tailings storage available in Tailings Starter Dam
2-9	16	Tailings storage available in Austinvale Pit North void
10	15	Tailings storage available in northern tailings cell of the Austinvale Pit void
17	16	Tailings storage available in central tailings cell of the Austinvale Pit void
24	6	Tailings storage available in southern tailings cell of the Austinvale Pit void

In the first year of mining, prior to the completion of coal mining in Austinvale Pit North, a tailings starter dam (TSD) is required to store around 0.4 Mm^3 of fine reject waste. A TSD has been designed to store this volume. The likely TSD site is shown on Figure 6-21.

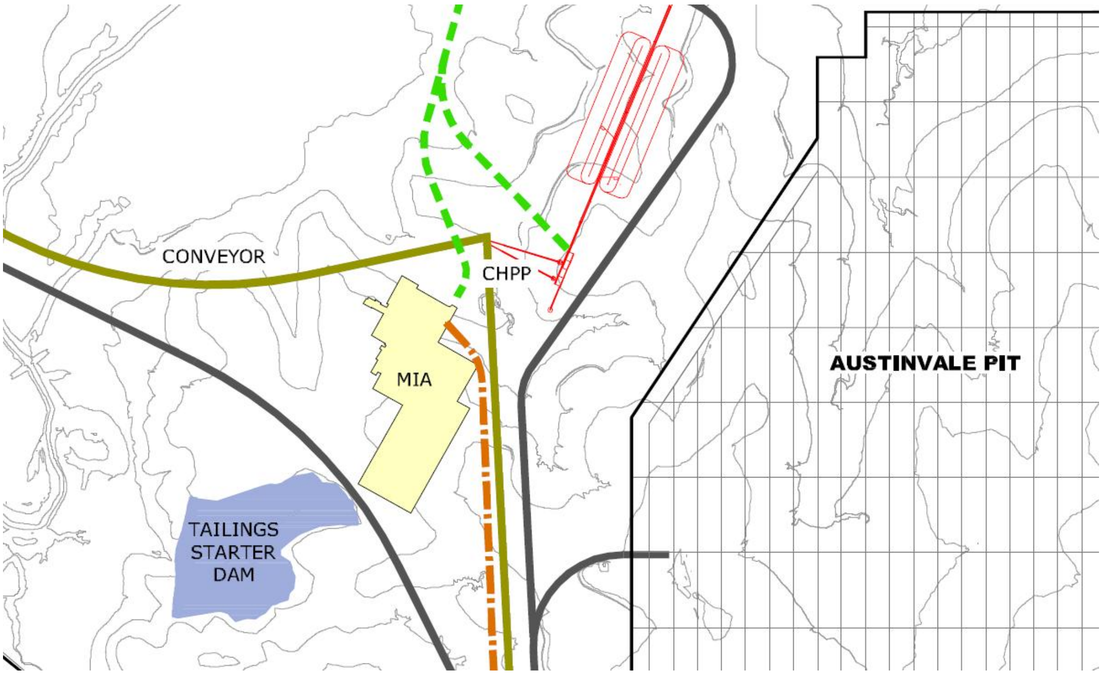

Figure 6-21: Location of Tailings Starter Dam

Tailings are to be disposed of in Austinvale Pit North and Austinvale Pit, being the first two pits mined by the WJV. Austinvale Pit North is located around 2.3 km from the CPP and Austinvale Pit 2.1 km from the CPP, as shown in Figure 6-22.

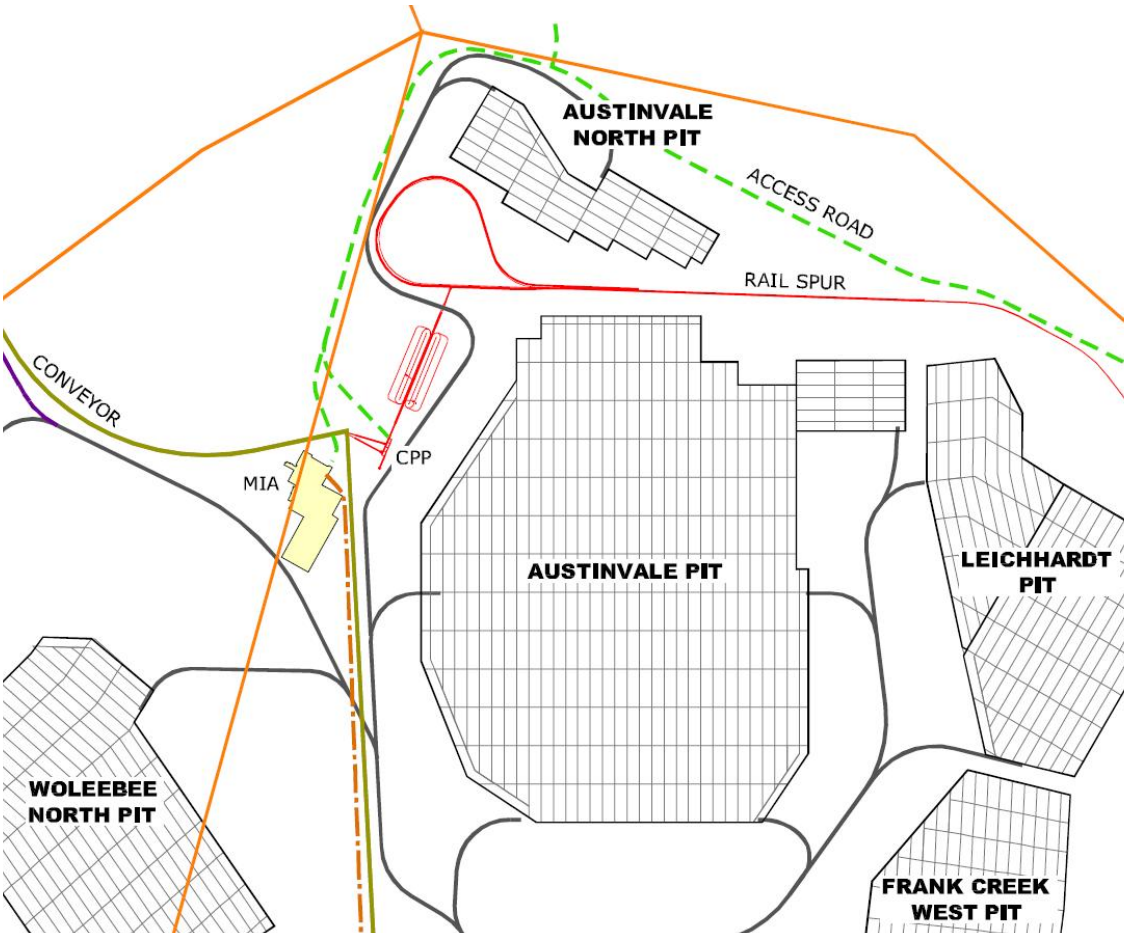

Figure 6-22: Location of Austinvale Pit North and Austinvale Pit

From Year 2 to Year 9, Project tailings will be stored in the Austinvale Pit North void following completion of dragline stripping and coal mining in Austinvale Pit North. The Austinvale Pit North void provides storage of 16 Mm^3 for tailings, including contingency and freeboard allowances, with the final tailings surface maintained well below the natural surface level.

As shown in Figure 6-23, in Year 10, tailings disposal will commence in Austinvale Pit, when 15 Mm^3 of tailings storage space is made available following the filling of the east and west central coal access ramps with coarse reject and the construction of a 40 m wide bund wall, built from coarse reject, across the north-south Austinvale Pit void to create the northern tailings cell. The bund walls also act as 'leaky dams' allowing more efficient recovery of water for return to the CPP. A leaky dam is an earth/rock embankment that allows seepage of water for the purpose of reducing the risk of pore pressure build-up within the dam.

In Year 17, an additional 16 Mm^3 of tailings storage space will be made available following the construction of a 40 m wide bund wall across the southern end of the north-south Austinvale Pit void to create the central and southern tailings cells and completion of tailings disposal in the northern tailings cell.

In Year 24, an additional 6 Mm^3 of tailings storage space is made available following the completion of tailings disposal in the central tailings cell.

A schematic of these cells within Austinvale Pit is shown in Figure 6-23.

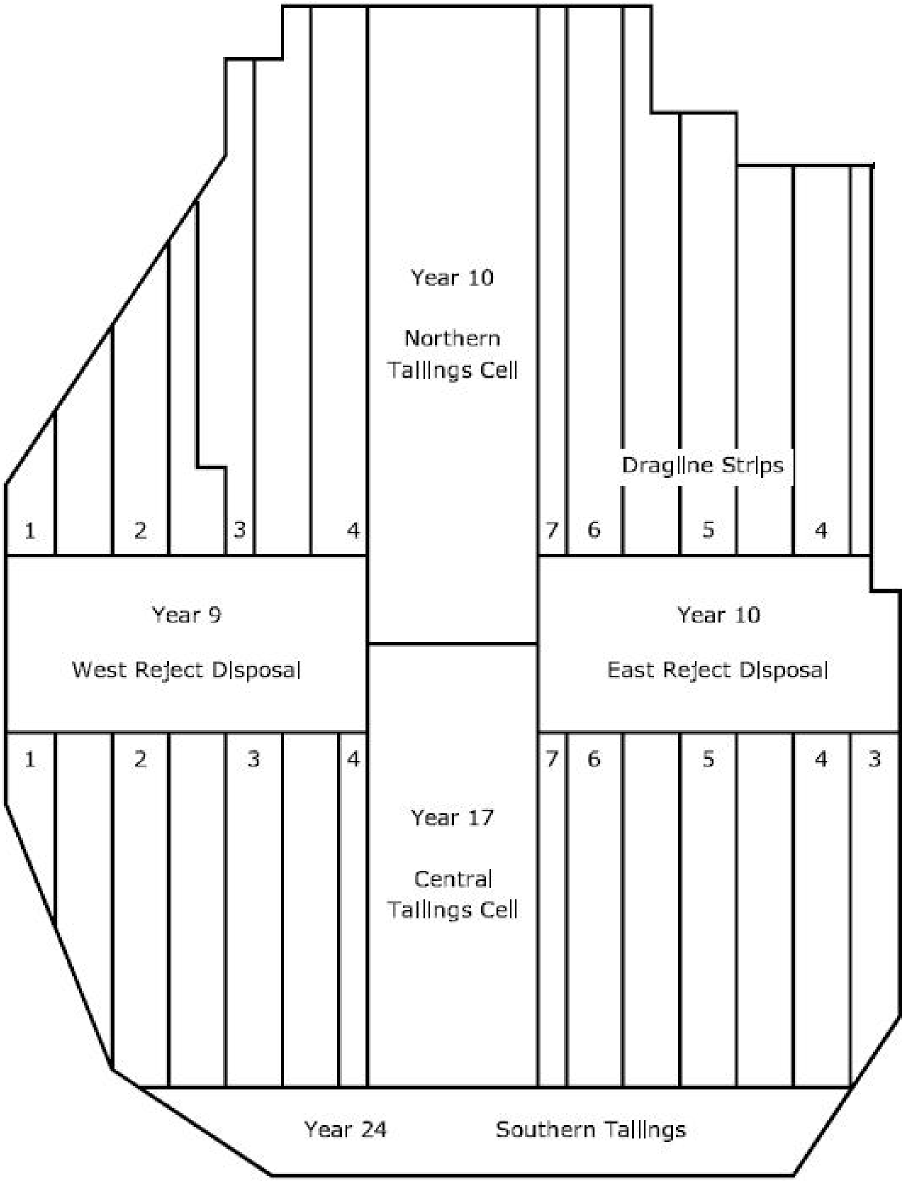

Figure 6-23: Waste reject disposal areas in Austinvale Pit

As tailings storage space exceeds the anticipated quantity of tailings produced by coal processing, the number of storage cells that need to be created will be ultimately determined by operational circumstances throughout the operation of the Project. In later years, it may be more beneficial to create smaller cell sizes such that area is made available for dumping of coarse rejects at appropriate intervals.

Other than in the first twelve months of mine operations, Austinvale Pit North and Austinvale Pit are planned to store all of the coarse rejects and tailings materials for the 30 year operation of the Project.

As outlined in the previous section, the use of tailings pits as a means of containing tailings has many advantages over other methods of tailings waste disposal. Backfilling open-cut pit voids incurs a fraction of the costs associated with designing, constructing, and operating a conventional, thickened, paste, or dry stack facility, and the risks associated with stability of retaining walls are not otherwise present.

Risk management

While there are risks associated with adopting a void backfill strategy, there are also mitigation measures that can be adopted to minimise the risk profile. Amongst the highest priority is the requirement to monitor the seepage plume from the tailings pits to ensure that future coal reserves are not sterilised. However, as a proven waste reject disposal strategy the gains are demonstrably significant.

The strategy for disposing of waste reject into pit voids and coarse and fine reject deposits that progressively become inactive over the life of the Project, will also allow rehabilitation to progress at a relatively constant rate over the full term rather than be delayed until all mining operations have been discontinued.

All external waste disposal sites designed to provide storage for coarse reject waste material are built as close as possible to the final rehabilitation contour. The tailings starter dam and two tailings pits will be capped prior to rehabilitation commencing.

Final designs for high-wall, overburden stockpile placement and floor treatment/ configuration will take into consideration the intended post mining land use.

A groundwater monitoring and tailings pit inspection program will be implemented by the WJV to ensure that the performance and structural integrity of the tailings starter dam and tailings pits is maintained. The location of groundwater monitoring locations will be developed in consultation with the EPA and NRW as detailed design of the mine layout is advanced prior to the commencement of mining operations.

6.5 PRODUCT HANDLING

6.5.1 PRODUCT COAL HANDLING AND TRAIN LOAD OUT

Figure 6-24-V1.3 presents a process block flow diagram for the product coal handling and train load out (TLO).

Two product conveyors will deliver product coal from the CPP to a transfer station. Product coal will be able to 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 tonnes, with further capacity achieved through dozer push to achieve a maximum total product stockpile capacity of approximately 1,140,000 tonnes. The stockpile area will be fitted with dust suppression sprays.

Product coal will be reclaimed from the stockpile by the stacker reclaimers. A second transfer station will direct reclaimed coal onto a final reclaim conveyor at a rate of up to 5,500 tonnes per hour, delivering coal to the 800 tonne train load out bin for loading. Initially, product load out will occur through one loader, although the system will be designed to allow for reconfiguration at a future time to accommodate two product loaders, as the product output of the mine increases with the extraction of ROM coal up to 30 million tonnes.

6.5.2 RAIL

Product coal from the mine will be transported by rail to Gladstone port facilities for export. A rail spur from the MLA areas will connect into the proposed Surat Basin Rail (SBR) rail line to the north of the Wandoan township. For further details on the proposed SBR rail line, reference should be made to www.suratbasinrail.com.au.

For the rail spur, the following sections summarise the key assumptions, design features and route alignment.

Key assumptions

A rail haulage provider will contract the rolling stock to transport coal. The Project's track operating class has been designed to meet the requirements of QR rolling stock under Queensland Rail Civil Engineering Track Standards (CETS), STD/0077/TEC, 22 November 2004.

Other key assumptions are that:

- the rail spur will connect to the SBR rail line close to existing natural surface level
- there will be construction of a new grade separated crossing of the Leichhardt Highway. The crossing will be a rail line under a road bridge crossing. The design and construction of the bridge will be undertaken by the SBR Joint Venture, does not form part of the Wandoan Coal Project and is therefore not considered any further in this EIS
- the rail spur will include a balloon loop that enables reversal of train direction without shunting
- the rail spur will be designed to accommodate the potential for a future second balloon loop to suit the installation of a second train loading facility
- the proposed embankment and cutting design accommodates the requirements of two balloon loops
- the rail spur and all necessary infrastructure extends approximately 250 m beyond the MLA boundary to join the SBR rail line.

Design features

The main design features of the rail spur include:

- a maximum design speed of 25 km/h for arrival, departure and holding roads
- a maximum design speed of 80 km/h for diverging route with the SBR rail line
- trains of approximately 2,400 m length can be accommodated
- a carrying capacity of each train of 11,424 tonnes based on a 136 (104 tonne gross) wagon train, including 3% loading inefficiency
- approximate spur length of 8 km, having approximately 18.2 km of track
- initially one coal loader with a capacity of 5,500 tonnes per hour working at 4,000 tonnes per hour on average
- a 3.5 hour loading time for each train, considering 90% train availability, movement of trains at the balloon loop, waiting time and minor equipment failure

- 320 days per year loader and train availability allowing for scheduled maintenance
- six to seven trains a day to meet the 22 million tonne coal product annual export target
- an ability to have up to four trains along the rail spur at any one time, with two arrivals, one departure and one holding
- allowance for a second train loader, which would increase capacity and reliability.

Route alignment

Figure 6-25-V1.3 provides an overall indicative layout of the rail spur alignment.

The rail spur alignment will form a junction with the SBR rail line at approximately chainage 10,680 m. This junction takes advantage of the curvature of the SBR alignment at this point, allowing installation of the spur's left hand turnout.

The alignment will pass under the Leichhardt Highway (a road bridge is intended to be constructed) towards Frank Creek. The alignment crosses Frank Creek via a rail bridge and then passes near the north eastern corner of Leichhardt Pit, but will not impact on the pit operational clearances. The rail bridge provides for a 75 m span, using Standard QR 25 m spans, with pre-stressed concrete girders. The maximum height of the bridge will be approximately 15 m above natural surface level, which allows for a vertical clearance of approximately 11 m above the Q_{100} flood level. After the rail bridge, the track divides allowing for a single holding road and second loader departure sidings. The overall length of the holding, departure, and arrival roads has been designed to accommodate QR train storage requirements of 2.4 km clear, plus 200 m.

The route continues westward to the north of Austinvale Pit. Immediately prior to the route diverging for the loop, the track can divide for an additional arrival road and second loader, if required in the future. Past the loader/s, 110 m of clear length track will be allowed for faulty wagon repair siding. This enables failed wagons to be detached from the train without significantly delaying the train. The turnouts for these sidings will be manually operated.

The optimum alignment of the rail spur will be finalised subject to detailed design and after further exploration drilling is undertaken by the WJV, to ensure that economically recoverable coal is not unnecessarily sterilised, and so potentially avoid relocation of that spur at some time over the life of the mine.

6.5.3 PORT

Coal from the Project will be railed to Gladstone for export.

At the Port of Gladstone, the existing RG Tanna Coal Terminal is nominally rated at 67 Mt/a. The Gladstone Ports Corporation (GPC) is proposing to construct the new Wiggins Island Coal Terminal to the west of the RG Tanna facility. Wiggins Island will have a nominal ultimate export capacity of 70 Mt/a. The EIS for the Wiggins Island Coal Terminal has been undertaken, with the Coordinator-General's report evaluating the EIS and Supplementary Report completed on 7th January 2008. The Coordinator-General decided that the project could proceed subject to certain conditions as outlined in the report, with relevant approvals also provided under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Access to the Wiggins Island Coal Terminal is the subject of a commercial agreement between XCQ and the GPC.

The potential for development of a new coal port facility at Port Alma is currently undergoing preliminary investigations by XCQ, for panamax sized cargoes from a number of XCQ's current and future operations, with any resulting project being subject to separate impact assessment and approvals processes. Prefeasibility studies of the Port Alma facility are currently being undertaken for completion by mid 2009.

6.6 PROJECT INFRASTRUCTURE

The following section outlines key infrastructure that contributes to the operation of the mine, product processing and handling facilities. Figures 6-26-V1.3 to 6-30-V1.3 provide indicative layouts of Project Infrastructure for Scenario Years 1, 5, 10, 20 and 30.

6.6.1 ACCOMMODATION

- The following section focuses on the workforce accommodation requirements during the operational phase of the Project. As described within Chapter 5 Project Construction, the WJV will develop permanent accommodation facilities adjacent to the MLA areas. The accommodation facilities will be re-configured at the latter phases of construction to cater for the permanent workforce, as described in the following sections.

Operational workforce

Operational workforce numbers and associated accommodation requirements were estimated by examining:

- recent similar mine developments in Queensland
- general operational accommodation requirements for similar operations throughout Queensland
- findings of accommodation preferences from XCQ's Rolleston Coal Mine
- the proposed mining schedule
- Australian Bureau of Statistics data
- operational workforce numbers provided by XCQ, Hastings Deering, Xenith and Sedgman, based on their company's experiences at other mining operations in Australia.

Operational workforce figures are estimates and may be influenced by changes in demography, other major developments in the area, mining method changes, preferences of lifestyle and many other factors. Therefore, the figures presented should be considered as the best approximation based on informed assumptions, and therefore may be subject to variation as the Project requirements are finalised during detailed design and over the life of the mine.

The workforce during the operations of the Project is assumed to operate on a four panel roster. Operational mining is proposed to commence in the fourth quarter of Year -1, involving overburden removal and coal extraction to provide coal for the commissioning of the CHPP in readiness for full operations in Year 1. An early operational workforce of 80 personnel is expected at this time.

In the first half of Year 1, it is expected that the first dragline will be fully operational and management and operating personnel numbers will increase to be around 412 with up to 90 personnel periodically coming to site for dragline or CPP shutdowns. Maximum total operational and shutdown personnel in the first operational year are estimated to be 502.

Over the following three years to Year 4, the number of operational employees is expected to increase to the full compliment of 844 staff and operators, including shut down personnel, and remaining relatively constant from there on, in line with the ramping up of coal extraction to 30 Mt/a ROM. If the fifth dragline is brought into service in approximately Year 18, employee numbers are expected to increase to 972, including 90 shutdown personnel.

- Town-based accommodation is expected to cater for around 125-150 employees plus their families by Year 4, with an assumed split of 60:20:20 residing in Wandoan, Taroom, and Miles respectively. This assumption is based on anecdotal evidence from experiences of workforce behaviour at other mine locations, and the expectation that the majority of personnel will choose to live close to the mine, while the remainder are evenly divided between the next two nearest towns.

In order to develop a worst-case scenario for town-based accommodation demand, the assumption has been made that negligible numbers of local people currently residing in the area will work at the mine. The population of Wandoan is expected to increase by 58% from the current 380 people to around 700. Taroom is expected to increase by 7% from the current 690 people to 740. Miles is expected to increase by 3% from 1,400 to 1,450.

Population increases, particularly in Wandoan, will place increased demands on public infrastructure and services, facilities and utilities. Much of the demands on infrastructure, facilities and utilities will be addressed through augmentation and upgrading during the early works and construction phases of the Project, as discussed in Chapter 5 Project Construction, Chapter 11 Water Supply and Management and Chapter 21 Social.

The majority of employees are anticipated to reside in the accommodation facilities. In Year 4, for operational and shutdown personnel, bed requirements at the accommodation facilities are expected to be 719. However, total bed requirements in Year 4 will need to be increased by an estimated 220 beds to accommodate the construction workforce for the development of the Mud Creek conveyor and dump station. It is estimated that, by Year 18 and with five draglines proposed to be in operation, operational personnel numbers will likely increase, likely requiring some expansion of the accommodation facilities at that time.

Accommodation facilities

The accommodation facilities established during Year -2 for construction workers will be progressively replaced with permanent motel-style facilities towards the end of Year -1 and through Year 1. The construction of the accommodation facilities for the site preparation and construction phases are discussed in Chapter 5 Project Construction.

It is therefore proposed that:

- forty-two accommodation unit blocks of three rooms to a block, providing a total of 125 rooms will remain after the completion of the construction phase to accommodate shutdown personnel and other ongoing construction personnel

- caravan parks, hotels and motels will not be used for the long term accommodation of personnel in operational phases of the Project
- for permanent accommodation facilities, 320 transportable unit blocks will be provided by Year 4 with two rooms of 36 m^2 each per block
- each person has their own unit, and no units are shared as part of the roster system
- no on-site couple or family accommodation will be provided during the operational phase
- an additional 87 unit blocks will be added in Year 15, and another 41 unit blocks added in Year 17.

The accommodation facilities will likely include:

- 100 uncovered carparks
- 320 covered carparks in close proximity to each accommodation unit and circulating roadway
- dining room, laundries and kitchen
- recreation room and covered barbeque areas
- external lighting to the buildings, walkways and carpark
- communications to all facilities and for each room
- grassing and landscaping
- swimming pool
- security fencing
- internal reticulation of water, power and sewer
- public phones
- covered walkways.

Figure 6-31-V1.3 depicts the various layouts of the accommodation facilities over the operational phases of the mine.

Town-based accommodation

To accommodate WJV staff in Wandoan, it is proposed that:

- the WJV will provide fifteen houses and ten two-bedroom duplexes for its staff in Wandoan, with housing for a total of approximately 35 personnel
- only one operational employee is assumed to occupy either the houses or duplex units proposed to be constructed by the WJV
- based on the recent experience of choices made at the XCQ Rolleston Coal Mine, in addition to the twenty-five town-based housing places provided by the WJV for its staff, an estimated additional 100 personnel and families may choose to live in Wandoan, Miles, Taroom or in the rural areas surrounding the mine or local towns
- the travel distance to Miles or Taroom will not present a major safety issue prior to or after completion of a shift, with the WJV to provide a shuttle bus service from each of these towns before and at the end of each shift.

6.6.2 ROADS

Roads associated with the mine are divided into four main categories:

- haul roads for mining vehicles and equipment within the mine site

- access road into the mine site and accommodation facilities
- light and heavy vehicle internal roads within the mine site
- public roads and road relocations.

Haul roads

Approximately 74 km of haul roads are proposed over the life of the mine, with an additional 24 km of in-pit roads to also be constructed. Haul roads will be constructed as needed by the opening and operation of pits, and closed and rehabilitated once pit access by mining vehicles is no longer required.

Haul roads will be designed to include:

- a width of about 30 m to allow two-way traffic of mining vehicles and equipment
- total pavement thickness around 900 mm, with approximately 600 mm constructed from site work materials and 300 mm from imported gravels
- dam protection when haul roads are adjacent to dams
- creek crossings.

Table 6-3 provides the approximate length of haul roads to be constructed over the mine operational life.

Table 6-3: Haul road construction

Year	Haul road length (km)
-1	11.8
1	8.0
2	4.5
3	2.4
4	2.6
5	0.9
9	16.4
10	1.2
12	2.6
15	4.3
17	5.3
18	4.4
19	0.8
23	4.1
25	5.8

Access road and intersection

The access road intersection and route on the MLAs was determined by using the following criteria:

- avoiding proposed mining pits and areas
- the location of the accommodation facilities
- minimising disruption to the town of Wandoan

- the location of CHPP and MIA
- the location of the Surat Basin Rail main line
- the location of the rail spur into the mine
- the existing and proposed alignment route of the Leichhardt Highway.

Access to the mine site will be off the Leichhardt Highway via a private access road for road registrable vehicles. As noted in Chapter 5 Project Construction, the intersection with the Leichhardt Highway will be the subject of a separate development and approvals process, to facilitate the WJV’s 200,000 tonne bulk sample operations and is not assessed in this EIS. Subject to the approvals required for the bulk sample operations, the intersection will be constructed to meet the long term construction and operational needs of the mine. Tapered deceleration and acceleration lanes have been included in the design, plus appropriate intersection lighting, signage, road markings and road furniture. Chapter 12 Transportation and the associated technical report further discuss the access road intersection layout and assessments.

The access road into the mine site from the intersection will be a new 9.25 km formation, connecting the Leichhardt Highway to the Mine Infrastructure Area (MIA) and accommodation facilities. The access road will lead to the main gate and security building about 5km into MLA 50230, prior to clearance into the mine site. Immediately after the main security gate, the access road will provide access to the accommodation facilities along a separate road, with the main access road continuing to the MIA.

The main features of the access road will be:

- construction during the initial site preparation and construction works in the first quarter of Year -2
- a double box concrete culvert to accommodate low flows, with a concrete causeway extending through the lowest section of the crossing over Frank Creek
- road height will generally be close to grade
- road shoulders at a minimum 3:1 batters, to 2 m wide by 0.6 m deep table drains
- a 7.2 m wide, two-lane, bitumen sealed surface
- road furniture and line marking
- fencing will be four-strand barbed wire stock fence on both sides of the road
- select overburden supplied from an early mine pit will be used as select fill
- imported crushed rock will be used for the pavement.

Light and heavy vehicle internal roads

Approximately 3.5 km of internal roads for light vehicles are proposed to connect the MIA to the Main Dump Station Number 1, on MLA 50230. The light vehicle road will be approximately 6m wide and follow the conveyor alignment. No other dedicated light vehicle roads are proposed for the site. Any other light vehicle access to the mining areas will be via the haul roads and be controlled by site road rules and site operating procedures (SOP’s).

A 10 m wide heavy vehicle (HV) access road is proposed to run from the MIA to the western dump stations to allow for construction and ongoing delivery traffic over the life of the mine.

Public roads and road relocations

The proposed coal pit locations will result in the requirement for a number of relocations of State controlled and local government owned roads, new sections of road and temporary closure of some roads. Figure 6-32-V1.3 outlines the proposed temporary road closures and relocations. With the exception of the Jackson-Wandoan Road, all the following temporary roads for closure or relocation are owned by Dalby Regional Council:

- Year -1:
  - Q Road:
    - temporary closure.
  - Grosmont Road
    - temporary closure from southern end of Grosmont Road to Wollebee Creek.
- Year 2:
  - Jackson-Wandoan Road:
    - partial realignment, with a 12.4 km section closed requiring an 18 km diversion along Peaks Road and the southern boundary of MLA 50230 to be constructed during Year 1, giving 5.6 km extra travel distance, equating to approximately 4 minutes 12 seconds extra travel time assuming 80km/h travel speed.
  - Bundi Road:
    - a realignment to direct Bundi Road onto the Wandoan–Jackson Road diversion, with construction during Year 1.
  - Paradise Downs Road:
    - temporary partial closure.
  - Grosmont Road:
    - temporary partial closure of 13.6 km from the Wandoan-Jackson Road to the government bore on lot 56 on plan FT987. Travel distance from Wandoan township to the point of closure is increased by 15 km, equating to approximately 11 minutes and 15 seconds extra travel time assuming 80km/h travel speed.
- Year 4:
  - Booral Road:
    - temporary partial closure from Grosmont Road to the west of the intersection with Kabunga Road and realignment at intersection of Grosmont Road. Travel distance from Wandoan township to the point of closure is increased by 6 km, equating to approximately 4 minutes and 30 seconds extra travel time assuming 80km/h travel speed.
- Year 8:
  - Kabunga, Ryals and Cecils Roads:
    - partial closure and realignment of the roads, with approximately 17.1 km of new alignment from the Kabunga Road at the intersection with the northern MLA 50229 boundary, running west inside the MLA boundary before turning south at the intersection with Ryals Road, and then south-east across to intersect Cecils Road.

Any proposed temporary road closures and relocation alignments are subject to detailed design and consultation with the Department of Main Roads, Dalby Regional Council and the Department of Natural Resources and Water.

A stockroute is associated with the Wandoan-Jackson Road and will be re-established with the road relocation following consultation with Dalby Regional Council and Department of Main Roads. Chapter 3 Approvals, and Chapter 8 Land Use, provide further details on processes and approvals associated with temporary road and stockroute closures and relocations.

Chapter 12 Transportation discusses issues associated with road impact assessment, pavement impact assessment and road safety over the construction and operational phases of the Project, including temporary road closures and relocations.

6.6.3 MAIN GATE AND SECURITY BUILDING

The main gate is approximately 5 km along the site access road from the intersection with the Leichhardt Highway, and will be serviced by a permanently manned security building. The key features of the main gate and security building are shown in Figures 6-33-V1.3 and 6-34-V1.3.

6.6.4 AIR TRANSPORT

The WJV is considering, as an option, flying workers to site for the Project operations. Two alternatives exist for providing air transport services:

- upgrade of the Taroom Aerodrome, or
- construction of a new public airstrip at Wandoan.

The key assumptions that affect both alternatives are:

- access for community
- during construction, air transport will generally only be for the construction management personnel
- during operations, air transport will be required for the site management personnel, the majority of shift employees, and emergency evacuations
- an airstrip will need to accommodate Code D aircraft (Dash 8 400 sized aircraft or equivalent).

A review of local airports identified that the Taroom Aerodrome, a 1,100m high gravel strip, can be upgraded. The existing Taroom Aerodrome is owned and operated by Banana Shire Council and is located approximately 20 km south-east of Taroom adjacent to the Leichhardt Highway, and approximately 38km north from the MLA areas.

The development of a new greenfield airstrip at Wandoan may be preferable to an upgrade of the Taroom Aerodrome, taking into account the distance and time to transport workers to and from Taroom, and the benefits to the Wandoan community in accessing the new airstrip.

If a new airstrip was to be developed at Wandoan, it will likely be adjacent to the mine site with public road access on existing rural grazing land, that is not on an area of existing remnant or regrowth vegetation, or over an existing natural water course. The final location of an airstrip will be decided subject to discussions with and requirements of Dalby

Regional Council, Queensland Transport, and Civil Aviation Safety Authority (CASA), after the final location of electrical transmission and distribution infrastructure is decided, and consideration of any other objects that may influence approach and take-off safety zones.

In establishing the location of the airstrip, assessment will be undertaken of the available prevailing wind data for the area, existing and future topography, and other Obstacle Limitation Surfaces (OLS). Protruding structures within or near the OLS limits can be painted, marked or lit with safety lighting to attract a pilot’s attention. However, any protruding obstacle within the OLS may ultimately restrict or impose changes on aircraft operations that may prejudice efficient operations in either busy operational times or in times of bad weather. Once a site is selected, a preferred runway orientation will be established and assessed.

If developed, the main airstrip infrastructure features will generally consist of:

- a runway length of about 1,450 m, being the maximum length likely to be required by a Q400 and other propeller-driven aircraft likely to use the airstrip. This indicative runway length requirement will need to be checked and confirmed by the aircraft operator as being suitable for the specific aircraft type, loads and routes proposed
- a runway width of 45 m
- a taxiway width of 18 m, in accordance with the requirements of Code C and D aircraft
- an apron area of 200 m by 60 m to accommodate three commuter aircraft under power-in/power-out parking arrangements
- removal of 600 mm of in-situ material, due to the presence of dispersive clays
- placement of 200 mm compacted select fill, 400 mm of crushed rock pavement, and 50 mm surfacing with asphaltic concrete
- a total runway strip of 1,570 m long by 150 m wide.

Operational infrastructure features will consist of:

- a GPS system to facilitate approach to the runway under Instrument Meteorological Conditions (IMC)
- Pilot Activated Lighting (PAL) to activate along the airstrip and taxiway low intensity runway lighting, flood lighting on the apron, and the Illuminated Wind Direction Indicator (IWDI)
- emergency lighting provided by battery operated lights
- aviation band radios available in the terminal building and site emergency services office, and an Airport Frequency Response Unit (AFRU)
- a Precision Approach Path Indicator (PAPI).

Landside infrastructure features will consist of:

- a terminal building, including check in, weigh scales, covered waiting area, toilet amenities and baggage handling equipment with a small diesel tractor with trailing bag carriers
- two-lane 7.2 m wide access road
- car parking for twenty cars and three coaches
- an aviation band radio, mine band radio and telephone communications at the terminal
- 2.4 m high wire security fencing.

The development of the airstrip will also be subject to negotiation of a commercial agreement with air transport providers during the detailed design of the Project, and then subject to the State and Commonwealth regulatory approvals required for development of a new, public use airstrip.

The option to upgrade the existing Taroom Aerodrome to meet the equivalent operational requirements outlined above remains an option for the WJV; and if Taroom Aerodrome is the WJV's preferred transport option, discussions will be undertaken with the Banana Shire Council as the owners of that facility on the necessary impact assessment and approvals requirements.

The WJV is also still considering a bus in/bus out transport arrangement as an alternative to flying. While air transport is proposed as an option to allow employees to fly in and out during operations shift changes, it has been assumed in Chapter 12 Transportation that transport will be provided solely in the form of coaches which will travel between Wandoan and Brisbane. This allows for a worst case scenario in the traffic assessment.

6.6.5 MINE INFRASTRUCTURE AREA

The Mine Infrastructure Area (MIA) is located centrally on the MLA areas on the boundary between MLA 50230 and MLA 50231, covering an area approximately 520 m by 450 m. To the north of the MIA, the CPP will be located, to the east will be Austinvale Pit, to the south will be the dragline facility and Woleebee Pits group, and to the west, Woleebee Creek. Based on preliminary flood modelling, the MIA site will be above the Q_{100} flood event level of Woleebee Creek.

Figure 6-35-V1.3 shows an indicative three dimensional model of the MIA, and Figure 6-36-V1.3 shows an indicative layout of the MIA.

For the operation of the mine, the MIA will generally include:

- general earthworks including hardstands and laydowns
- an administration facility
- workshop and store
- tyre change and store facility
- fuel facility
- lube and oil storage facility
- wash down facilities
- reticulated services.
- The following is an indicative description of the proposed MIA facilities.

Administration facility

The administration facility will provide office facilities for staff, a muster area for shift changes and bathhouse facilities for personnel. Access to the administration facility will be via two-way internal access roads. Key features of the administration facility generally include:

- meeting the Class 5 building requirements in accordance with the Building Code of Australia (BCA) and the Queensland Development Code
- four building wings, including office facilities for 100 personnel containing workstations, kitchen facilities, toilets, meeting and training rooms, IT rooms, and first aid facilities

- bathhouses, sized to accommodate shift changes
- a crib room with a covered area, sized to accommodate shift changes
- a centrally located covered muster area, linking each building wing
- air-conditioned
- a geotechnical laboratory
- approximately 120 covered clean carparks and 90 uncovered dirty vehicle carparks
- emergency equipment store and fire vehicle garage, with slab to be housed near the administration facility
- a bus shelter
- landscaping and concrete pathways
- external lighting.

Figure 6-37-V1.3 provides an indicative three dimensional model of the administration facilities.

Workshop and store

The workshop facility will be centrally located in the MIA for servicing heavy mining equipment. The facility will is proposed to generally include the following key features:

- six maintenance bays covering an area of 1,500 m^2 with a floor to roof height of 15 m, for servicing rear dump trucks with tray raised, assuming a CAT 793D for conceptual design purposes
- two 20 tonne overhead cranes and access, with 900 mm clearance to top of each dump truck with tray raised
- two service bays and two 22.5 m x 20 m axle bays
- store, including pallet racking, storeman's office and secure store
- electrical, tools, hydraulics machining and welding shops adjacent to maintenance bays
- covered drum store and bunded lube area
- eyewash and shower facilities, offices, lunch/meeting room and amenities, training rooms
- a switchboard and compressor
- light vehicle fuel bowser and ten dirty vehicle carparks
- covered battery storage area
- fenced waste storage hardstand area, conceptually designed to accommodate movement of B-double waste removal trucks.

Tyre change and store facility

A dedicated tyre change and store facility will be located to the south-west of the workshop and store. The tyre change and store facility will generally include the key features of:

- a tyre changing building
- a secure tyre and tyre changing equipment store including facilities for tyre change personnel
- eyewash and shower facilities

- an uncovered, fenced hardstand area for large tyre storage, air compressor, potable and fire water supply.

Fuel facility

The fuel facility will comprise a 2 million litre bulk diesel storage facility. Diesel will be reticulated to heavy vehicle service bays, and heavy and light vehicle bowsers. The fuel storage area will be located in the north-east corner of the MIA within the laydown compound designated for storage of belts and large equipment parts. Access to the fuel facility will be via the internal MIA access roads.

The fuel facility is located at a safe operating distance from other MIA and surrounding facilities in accordance with Australian Standard AS1940 The storage and handling of flammable and combustible liquids.

The fuel facility will generally include:

- a 2,000 kL bulk diesel storage in one or more tanks
- a bunded tank storage area
- a tanker unloading slab, allowing for 2000 L/minute tanker unloading
- high flow rate (800 L/minute) reticulation from bulk diesel storage tank/s to the workshop service bay
- high flow rate (400 L/minute) reticulation from bulk diesel storage tank/s to the heavy vehicle dispensing bowser
- reticulation from the bulk diesel storage tank/s to the light vehicle dispensing bowser at 80 L/minute, located adjacent to the workshop
- security fencing with vehicle and personnel access gates to the perimeter of the fuel storage tank area
- safety systems and signage
- dirty water sump and drain discharging to an adjacent environmental dam.

Lube and oil facility

The lube and oil facility will be located adjacent to the workshop and store. The lube and oil facility will generally include:

- a bunded bulk oil and lube storage area with capacity to store six types of oil and lube. A total storage volume of 120,000 L is anticipated, consisting of 40,000 L of transmission oil, 20,000 L of hydraulic oil, 20,000 L of diesel engine oil, 20,000 L of final drive oil and 20,000 L of waste oil
- a bunded covered drum store area for storing transportable grease and coolant storage cubes. A total storage volume of 3,000 L is anticipated, consisting of 1,000 L of engine coolant, 1,000 L of gear oil and 1,000 L of detergent
- slab on ground oil and lube tanker unloading area, allowing for a 45 L/minute oil transfer from the delivery vehicle to the storage tanks
- oil and lube reticulation to maintenance bays, allowing for a 45 L/minute transfer rate
- oil and lube reticulation to service bays, allowing for a 45 L/minute transfer rate
- waste oil reticulation from the workshop service bays to the lube tank farm area, allowing for a 45 L/minute transfer rate

- coolant reticulation to the workshop, maintenance and service bays, allowing for a 45 L/minute transfer rate
- grease dispensing units at the service bays, allowing for a 10 L/minute transfer rate.

Washdown facilities

Heavy vehicle and light vehicle washdown facilities will be provided on the MIA.

A heavy vehicle washdown facility is proposed to be located north of the workshop facility and will provide washdown facilities for heavy vehicles only, and has been sized for rear dump trucks. Access to the washdown facility will be via the MIA hardstand, and is located to minimise the distance travelled by tracked machines coming to be maintained in the workshop. Prewashing by water cannons will remove excessive amounts of large material, before heavy vehicles enter the washpad for washing with hand-held high pressure water cannons. Water from the facility will be collected in a 1.5 m deep silt trap, and discharge via an oily water separator and recycled water collection tank.

A light vehicle washdown facility will be located to the south-east of the tyre change and store facility. This washdown will be an automated “whole vehicle” drive through wash facility, however and overhead spray bar will not be included.

All water and drainage from both washdown facilities will discharge into grit trap then an oil/water separator, with water recycled back into the washdown process where possible, oils removed by licensed contractor, and remaining washdown water discharged to an adjacent environmental dam.

Reticulated services

Reticulated services around the MIA will include:

- raw water and fire water
- potable water
- sewer
- power and lighting
- communications.

The services will be reticulated via a common service trench around the MIA.

Raw water and fire water reticulation

The key features of the raw water and fire water reticulation will include:

- that raw water will be supplied to a raw water storage tank by a rising main from the 400 ML raw water storage dam on the mine site. Further discussion on raw water supply is given in Chapter 11 Water Supply and Management and associated technical reports
- raw water being reticulated by a ring main to supply water for fire fighting and washdown to the truck workshop, administration and bathhouse, dragline store and workshop, washdown facility, diesel storage area and general hydrants
- a separate fire water pumping system and raw water pumping system connected to the single ring mains.

If coal seam methane water is adopted as the supply source, it is possible the raw water storage dam will need to be lined to protect nearby groundwater and soils. Consideration will be given to clay-lining the dam if suitable materials can be obtained locally.

Alternatively, a polyethylene liner may be used to provide an impermeable barrier to leakage. Sufficient monitoring bores will also be installed to detect any leakage before it contaminates downstream water resources.

Potable water reticulation

A potable water reticulation system, including storage tank, pump set and ring mains, will distribute potable water from the potable water storage tank to the administration building, bathhouse, main workshop, CHPP, security building, dragline workshop and warehouse, and covered external eyewash/deluge shower facilities located at fuel and lube tank storage areas and at the battery maintenance area.

Further information on the potable water supply to the storage tank and reticulation throughout the MIA is given in Chapter 11 Water Supply and Management and associated technical reports.

Wastewater reticulation

An underground wastewater reticulation system is proposed to convey sewage from the administration building, bathhouse, main workshop, CPP, security building and the dragline workshop and warehouse to storage or holding tanks on the MIA. From these tanks sewage will be pumped back to the Wandoan Wastewater Treatment Plant (WWTP) located in Wandoan township for treatment. Further information on wastewater reticulation and treatment is given in Chapter 11 Water Supply and Management and associated technical reports.

Communications reticulation

The general communication requirements at the MIA will generally include:

- data and internet connectivity
- communications for the security system between the MIA and security building
- telephone and facsimile services
- UHF radio for site personnel and vehicle communications
- telemetry radio network for control of water infrastructure.

Optical fibre cable will be installed and terminated from the Telstra point of supply to the network communications room within the Administration Building at the MIA. The cable will be terminated at Telstra owned equipment.

Further discussion is provided in Section 6.7.8 of this chapter for the telecommunication requirements of the Project.

Power and lighting reticulation

The MIA power supply will be provided by a 2 MVA transformer based on the maximum demand estimate for the MIA. A main switchboard will reticulate power to switchboards within the MIA, located at the administration building, workshop and washdown facilities. A separate 750 KVA transformer will supply loads at the dragline workshop. Power supply to the MLAs and around the MLAs is discussed further in section 6.7.9 of this chapter.

External area lighting will be provided around all infrastructure, hardstand and the dragline construction pad of the MIA. Internal lighting will be provided in all buildings at the MIA including the dragline workshop.

6.6.6 DRAGLINE FACILITY

The dragline facility is proposed as a dedicated dragline construction and long term maintenance site. The facility will be constructed in two phases. Initially the dragline compound will be constructed to serve as a construction phase laydown area incorporating demountable offices and carparks, as discussed in Chapter 5 Project Construction. Permanent facilities for the operational phase of the mine will be constructed in the second year of the construction phase, in parallel with the completion of the first dragline.

The dragline facility will be located on the southern side of the MIA providing for dragline construction and maintenance. Access to the dragline facility will be via the MIA access road. Figure 6-35-V1.3 depicts of the dragline facility as part of the MIA, being a dragline:

- store compound including warehouse
- construction pad
- construction office facility and workshop
- maintenance facility.

Fencing around the entire dragline facility will be provided.

Dragline store compound and warehouse

The store compound is proposed to consist of:

- a 150 m by 100 m area
- access to the compound sized on a turning radius of a B-double semi-trailer
- a steel portal frame, with cladding
- demountable office, kitchen, crib room and toilets
- air-conditioned offices
- two 5.5 m wide and 6 m high, clear opening roller doors
- the contents of the warehouse to be general shelf storage, pallet racks and general equipment.

Dragline construction pad

The dragline construction pad will generally include pavements and supports, covering an area of 400 m by 200 m. The pad design will be based on dragline and ringer crane supplier specifications.

Dragline construction office

The office structure will cover an area approximately 15 m by 30 m and generally include:

- ten offices, most with open plan layout
- a first aid room
- a training room
- toilets connected to the Wandoan town wastewater treatment plant
- meeting rooms
- a sealed carpark for twenty cars

- PABX and telephones
- communications to main construction office, during the construction phase of the Project.

Dragline construction workshop

The dragline workshop will generally include:

- a steel portal frame
- 2 bay workshop
- 30 m by 15 m wide by 7 m high roller doors, with two on the eastern face, one on the western face
- 1 by 10 t overhead crane
- store
- mezzanine floor staff crib room over store
- offices
- unisex toilet
- an IT control room.

Dragline maintenance facility

The dragline maintenance facility will generally consist of:

- a 15 m by 30 m igloo and arch pit
- a minimum 300 mm thick, 40MPa fibre reinforced concrete slab, supported by 1000 mm of imported gravel pavement
- 3 m by 15 m by 5 m deep arch pit, capable of being water filled and covered with 25 mm thick steel plate
- access ladder provided at either end of the arch pit
- an Igloo roof placed on rails running entire length of slab to provide shade to maintenance staff.

Scheduled maintenance down days for each dragline will occur typically every three weeks. Planned major maintenance shutdowns for each dragline will occur approximately every five to six years, taking about six to eight weeks and undertaken by specialist dragline servicing contractors.

6.6.7 IN-FIELD FUEL FACILITIES

Three relocatable 92 kL self-bunded, self-dispensing diesel fuel tanks will be located across the mine site. Given their ability to be moved, the diesel fuel tanks will be located as required to meet heavy vehicle fleet demands to minimise travel distances for refuelling.

The key features of each of the diesel tanks will be:

- self-bunded
- electric start diesel powered 650 L/min pump
- self-dispensing
- 90,000 L capacity each

- meet all current Australian Standards, including AS1940 The storage and handling of flammable and combustible liquids, CMH&SA requirements and WJV specific requirements.

6.6.8 TELECOMMUNICATIONS

Telecommunication requirements for the MLA areas will largely need to be established during the early works, site preparation and construction phases of the Project, as discussed in Chapter 5 Project Construction. During Project operations, the following telecommunications will be needed:

- a communications tower at the MIA to act as a central point for Project telecommunications
- UHF radio communications equipment for site personnel and within the vehicle fleet
- telemetry radio network for control of water infrastructure from the control room in the MIA, including SCADA software.

6.6.9 POWER

Power supply and distribution are essential functions for the operation of the Project. The following sections provide a basic outline of the considerations associated with power for the Project, addressing:

- power demand
- power supply options
- power distribution across the MLA areas
- existing power infrastructure relocations.

Note that power supply and infrastructure associated with potable water treatment and supply, and wastewater treatment facilities are assumed to be adequate to accommodate any proposed plant upgrades, and will not be discussed further as part of this section of the EIS.

Power demand

During operations, the nature of the power demand at the mine is characterised by a base load component originating from steady loads such as the CPP, conveyor belts, MIA facilities, and accommodation facilities, and a significant cyclic load originating from the draglines. The draglines operate on a 50 to 70 second cycle over a range of -17 to 29 MW (averaging 9 MW) per dragline. This cyclic load has the propensity to induce power quality problems, for example system frequency, harmonics and voltage levels on the existing power system, if not properly catered for in the power system design. Table 6-4 gives the assumed loading schedule for the mine.

Table 6-4: Assumed loading schedule

Dragline	Year	Average load	Short term peak
First dragline	1	21 MW	51 MVA
Second dragline	2	35 MW	91 MVA
Third dragline	3	51 MW	131 MVA
Fourth dragline	16	56 MW	158 MVA
Fifth dragline	18	60 MW	184 MVA

Power supply options

Broadly, there are four potential power supply options for the Project. Given that the Project is in the planning and development phase, a preferred power supply option is yet to be finalised by the WJV, so all four options are being considered in the EIS:

- total supply via a new 132 kV or 275 kV electricity transmission 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 MLAs
- total supply via a new 132 kV electricity transmission line from the Columboola Switchyard east of Miles, which is currently under construction, to a substation at or adjacent to the MLAs
- total supply from stand-alone on-site power generation, including energy storage devices and static var compensators (SVC)
- partial supply from a new 132 kV electricity transmission line, and partial supply from on-site power generation to provide network support.

Total power supply from electricity transmission line (Options 1 and 2)

Depending upon which power supply option is chosen, the transmission line may only supply the WJV for its Project requirements, or it may supply multiple users including the WJV.

As decisions are yet been made on the preferred option, whether that option would solely supply the Project or supply multiple users, and who would undertake construction and operation of any transmission line, no impact assessment has been undertaken for the electricity transmission line options. Work to be conducted following any decision will include:

- corridor selection and desktop environmental assessment of the general area
- establishment of potential route options
- establishment of potential substation locations on or adjacent to the MLA areas
- development of assessment criteria for establishment of a preferred route and substation location
- selection of a preferred route and substation location based on the assessment criteria
- community consultation on the preferred route and substation
- consider whether referral under the *Environment Protection and Biodiversity Conversation 1999* (EPBC Act) is required for determination of a controlled action
- environmental impact assessment of the preferred route and substation, subject to the outcomes of community consultation.

Consultation with relevant government departments and agencies will be undertaken throughout the process.

If the result of this work is that the WJV would be undertaking a controlled action for the purposes of the EPBC Act in relation to the construction and operation of the transmission line, the WJV will provide the environmental assessment of the transmission line, based on work including that outlined above, as a separate stage of the EIS.

Total power supply from standalone on-site power generation (Option 3)

One option to provide power supply for the Project is the construction of stand-alone on-site power generation, involving dual fuel engines providing a total supply of up to 80 MW.

The stand alone 80 MW dual fuel engine power station could include:

- twelve dual fuel diesel and gas engine units, each having 8MW of electrical output
- ten engine units will operate at a time, with two units remaining in stand-by mode
- air cooled engine radiators
- gas handling units with gas compressors or pressure reducing systems, so as to increase or decrease gas pressure, depending on the gas supply pressure and engine pressure requirement
- 21 m high chimney stacks. Each engine will release exhaust via its own stack, however stacks may be able to be grouped, for example three stacks at one point
- an array of flywheels and static var compensators to smooth the power frequency and voltage. Flywheels of 1,000 kW and 1,500 kW ratings are available 'off-the-shelf'. A total forty or sixty flywheels will be required, depending on the ratings of the selected flywheels installed
- a substation with step-up transformers, switch gears and associated electrical systems, so that electricity at the generator output voltage can be transformed to the system voltage via transformers and distributed through a distribution network
- maximum automation to minimise operators' requirements.

Conventional gas would be supplied via the gas supply pipeline, as described in the following section. Diesel will be sourced from the 2 million litre bulk diesel tank within the MIA.

Dual fuel engines use both diesel and gas in a ratio of approximately 1 L of diesel consumed to 7GJ of gas consumed. Table 6-5 outlines the approximate diesel and gas consumption for selected years of operation. The years nominated align with the commencement of each dragline operation on site.

Table 6-5: Diesel and gas consumption

Years	1	2	3	16	18
Site energy usage (MWh)	192,500	315,100	452,600	493,100	525,300
Diesel consumption (L)	257,600	421,600	605,500	659,700	702,900
Gas consumption (GJ)*	1,788,200	2,927,500	4,204,300	4,580,700	4,880,000

* GJ = gigajoules

Figures 6-38-V1.3 to 6-39-V1.3 depict the indicative power station elevations and 3D model.

Partial power supply from a 132 kV electricity transmission line and on-site power generation (Option 4)

This option is a combination of the previous three options with the on-site power generation supporting the primary power supply from the electricity transmission line. A 132 kV electricity transmission line would be as described above. However, the on-site power generation would involve fewer dual fuel engines, having a total electrical output of up to 30 MW.

The 30 MW dual fuel engine power station will include:

- six dual fuel diesel and gas engine units, each having 8 MW of electrical output
- four engine units will operate at a time, with two units remaining in stand-by mode
- air cooled engine radiators
- gas handling units with gas compressors or pressure reducing systems, so as to increase or decrease gas pressure, depending on the gas supply pressure and engine pressure requirement
- 21 m high chimney stacks. Each engine will release exhaust via its own stack, however stacks may be able to be grouped together
- no flywheels or static var compensators
- a substation with step-up transformers, switch gears and associated electrical systems, so that electricity at the generator output voltage can be transformed to the system voltage via transformers and distributed through a distribution network
- maximum automation to minimise operators' requirements.

Diesel and gas sources are as previously described.

Figures 6-40-V1.3 and 6-41-V1.3 depict the indicative power station elevations and 3D model. Note that the 30 MW power station would be located in the same position as the 80MW power station.

Gas supply option

For the third and fourth supply options involving on-site power generation, the dual fuel gas engines would be supplied by conventional gas from the lateral Peat-Scotia Gas Line. As discussed Chapter 2 Needs and Alternatives, three gas supply pipeline route options were assessed to enable the selection of the pipeline option presented.

A 25 km high pressure gas supply pipeline will connect into the Peat Scotia lateral gas pipeline in the vicinity of Lot 22 on RP 847424. Throughout the existing petroleum lease (PL) area, the pipeline will endeavour to be aligned with existing fence lines so as to minimise disruption to existing land use practices, unless otherwise agreed with landowners during the detailed design process. The pipeline will then largely run parallel to the eastern edge of the proposed Surat Basin Rail easement for approximately 18km before entering MLA 50230, as shown in Figure 6-1-V1.3.

The high pressure gas pipeline will:

- be made from steel and coated in a polymer seal to protect it from corrosion
- be 300 to 600 mm in diameter and will have a suitable wall thickness to meet the required design standards

- have a wall thickness sufficient to withstand impact from agricultural machinery, backhoes and small excavators
- be buried with a depth of cover ranging from 0.5 m to 1.2 m depending upon the land use and the assessed risk in any location
- use a cathodic protection system to prevent corrosion with monitoring points located every 5 km along the route
- be marked with pipeline route markers, which are also danger signs
- allow at least a 20 m construction access between the edge of the SBR easement and the gas pipeline, to provide offset between the infrastructure
- require a construction access of 20 m, which will be cleared prior to trenching
- have tunnel bored railway and highway crossings, with use of heavy walled pipe. Queensland Rail and the Department of Main Roads historically prefer encased concrete crossings, however these are not recommended in this case due to the impact on the integrity of the cathodic protection system
- have topsoil and cleared vegetation returned to its original location, with suitable rehabilitation and revegetation, consistent with existing land uses.

Power distribution across the MLA areas

Power distribution across the MLA areas will be from a 66 kV switchyard, which would be connected to a 275 kV/66 kV or 132 kV/66 kV substation associated with one of the previously described power supply options, and will include transformers, circuit breakers, switchgear, power quality management and earthing.

Infrastructure for power distribution includes, but is not limited to:

- a 66 kV switchyard
- a 66/22 kV substation for the CHPP, with a 22 kV feeding arrangement supplying the CPP and coal transfer system equipment into and out of the CPP
- a 66/22 kV substation for the accommodation facilities, MIA and dragline workshop
- 66 kV and 22 kV reticulation to substations, transportable substations, accommodation facilities, MIA, dragline workshop, CHPP, security building, and other infrastructure
- power will be reticulated using a mixture of overhead and underground installations depending on connection, application and location
- 66/22 kV transportable substations for the draglines, reticulated to the draglines by trailing cables
- transformers and high voltage reticulation at the accommodation facilities
- low voltage installations at the accommodation facilities, MIA, security building and dragline workshop
- progressive installation of power distribution infrastructure in accordance with the mine schedule
- back-up power from diesel generators already established on-site for the site preparation and construction phases of the Project as discussed in Chapter 5 Project Construction, are only suitable for supplying back-up power to the MIA, dragline workshop and accommodation facilities.

Existing power infrastructure relocations

The existing local Ergon electrical infrastructure is a combination of 22 kV overhead powerlines and single-wire earth return (SWER) lines across the MLAs. These lines supply the properties within and adjacent the MLA areas, with properties within the MLAs subject to acquisition for the mine.

Relocation of the existing electricity infrastructure within MLAs 50229, 50230, 50231 will be timed to co-ordinate with the proposed mining schedule and in conjunction with Ergon. Properties outside the MLA areas which rely on electrical infrastructure that currently crosses the MLA areas will have power provided via the relocated infrastructure.

6.6.10 WATER SUPPLY AND MANAGEMENT

Water supply and management is a key function for the operation of the mine. Chapter 11 Water Supply and Management of Volume 1 discusses potable water supply, wastewater management, raw water demand, stormwater management, mine water management and water quality assessment.

Volumes 2, 3 and 4 provide details on the raw water supply options for the mine. Volume 2 discusses the supply of coal seam methane by-product water from areas to the south of the MLA areas. Volume 3 discusses the supply of coal seam methane by-product water from areas to the west of the MLA areas. Volume 4 discusses supply of water from the raising of Glebe Weir on the Dawson River.

6.6.11 BLAST MAGAZINE AND STORAGE

A permanent magazine to house detonating explosives, bulk storage and all associated materials will be located west of the MIA. The facility will meet Australian Standard AS 2187 Explosives — Storage, Transport and Use, and any other applicable Standards. Based on the requirements of AS 2187.1 and the estimated needs for mining operations using Class 1, Division 1.1 explosives, the predicted minimum separation distances based on a net explosives quantity (NEQ) of 250,000 kg or greater are:

- 940 m to protected works — Class A (for example public roads and railways)
- 1,400 m to protected works — Class B (for example dwellings)
- 2,800 m to vulnerable facilities
- 155 m (mounded) or 305 m (unmounded) to other explosives storage
- 510 m to associated works — process buildings (for example the MIA)
- 115 m to Ammonium nitrate storage.

The blast magazine location provides at least a 600 m separation distance to other mine infrastructure on the MLA areas, being the MLA 50229 overland conveyor and heavy vehicle access road. Approximately 6 km of separation distance will be provided to works and facilities outside of the MLA areas that not associated with Project activities or facilities, and a distance of approximately 10km between the blast magazine and the Wandoan township.

6.7 WASTE MANAGEMENT

Chapter 18 Waste Management discusses the waste management strategies to be implemented during the construction and operational phases of the Project.

Waste streams associated with waste rock and overburden are discussed in Chapter 9 Geology, Mineral Resources, Overburden and Soils.

Liquid waste streams associated water supply and management are discussed in Chapter 11 Water Supply and Management.

6.7.1 MUNICIPAL WASTE AND RECYCLING FACILITY

As a result of consultation with Dalby Regional Council, the existing Wandoan landfill has been identified as not being a suitable long term waste disposal option for this Project. Preliminary consultation with Dalby Regional Council has indicated that the current landfill is already nearing capacity from waste generated from within the local region. Therefore, development of a multi-user, municipal waste disposal and recycling facility at a suitable location adjacent to the mine site for disposal of general and domestic waste is being discussed with Dalby Regional Council so as to provide a long term solution to waste disposal in the Wandoan area.

The requirements associated with siting and operating a general waste facility for the disposal of more than 50 tonnes of general waste or limited regulated waste per year are defined as Environmentally Relevant Activity (ERA) 75(a) under Schedule 1 of the Environmental Protection Regulation 1998. Regulated waste and limited regulated waste are defined in Schedules 7 and 9 (dictionary) of the Environmental Protection Regulation 1998. These activities are level 1 ERAs and need a development permit and a registration certificate. The Environmental Protection Agency is responsible for the administration and enforcement of this ERA.

In providing assistance to Dalby Regional Council to develop a new municipal waste and recycling facility site adjacent to the MLA areas, relevant guidelines and operational procedures for ERA 75 for General waste disposal will 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. Refer to Chapter 18 Waste Management for further details.

6.8 REHABILITATION AND DECOMMISSIONING

Chapter 25 Rehabilitation and Decommissioning discusses rehabilitation of the mine site and decommissioning of associated infrastructure.

Rehabilitation of the mine will be progressive throughout the operation and decommissioning of the mine, and considers many elements addressed throughout the EIS, including but not limited to, mine scheduling, overburden and soils management, water management and terrestrial and aquatic ecology.

Decommissioning will be phased over the life of the mine with the majority of decommissioning activities occurring during the mine closure phase.

6.9 SUSTAINABILITY

Sustainability, sustainable development, ecologically sustainable development (ESD) and environmentally sustainable development are all similar terms for describing a single goal:

- '*development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*' (DEWHA 1992)
- Australia's National Strategy for Ecologically Sustainable Development presents five major elements of ESD:
  - '*integrating the economic, social and environmental concerns and needs of the community*
  - '*accounting properly for the economic costs of environmental degradation*
  - '*accepting that each generation is responsible for the welfare of future generations*
  - '*understanding environmental risk and uncertainty*
  - '*understanding the global scale of environmental issues*' (DEWHA 1992).

Based upon the five major elements above, the International Council on Mining and Metals (ICMM) Sustainable Development Principles, and Xstrata's Sustainable Development Policy, as outlined in Chapter 1 Introduction, section 1.4.1, the WJV aims to balance environmental, social and economic issues when managing its business, including mine development (MCA 2005).

Selection of mine practices and infrastructure by the WJV has considered sustainability in endeavouring to implement best practice options for the development, construction, operations and final decommissioning of the Project. The selection of practices and infrastructure often addresses multiple issues associated with sustainability, with the following sections outlining various sustainable development opportunities of the Project. The information is in no way exhaustive, with further sustainability options likely to be developed and refined during the detailed design, construction and operation of the Project.

6.9.1 ENVIRONMENTAL CONSIDERATIONS IN SUSTAINABILITY

Various environmentally beneficial options associated with mine practices, infrastructure and equipment are being considered through the development of the Project. Ultimate selection of any of these options will be the subject of commercial arrangements by the WJV and detailed design.

The WJV has committed to operating in accordance with Xstrata's Sustainable Development Policy and XCQ's combined Health, Safety, Environment and Community (HSEC) Management System, which encompass health and safety, the environment and sustainable communities and our equal employment opportunities.

Coal Seam Methane (CSM) by-product water

Use of CSM by-product water as the raw water supply for the operations of the mine comprises two out of the three potential raw water supply options being considered by the WJV.

Final selection of a raw water supply is subject to commercial arrangements. However, the use of CSM by-product (also known as 'associated water' under EPA operational policy) would be a beneficial reuse of water that is currently extracted as part of the coal seam methane extraction process, and either treated and discharged or stored in evaporation ponds.

The Environmental Protection Agency's operational policy Management of water produced in association with petroleum activities (associated water) (EPA 2007) encourages direct use and treated use as Category 1 — preferred management options, which are options that would apply to the raw water supply to the Project if CSM by-product water is to be used as a raw water supply.

The Queensland Government's recently released Coal Seam Gas Water Management Policy, October 2008, encourages beneficial reuse of CSM water.

Recycling process water

So as to minimise the demand for raw water supply, recirculation and recycling of process water through the Coal Processing Plant, as discussed in section 6.5.2, is incorporated into coal processing design features and operations. Recirculation of process water will occur throughout the CPP, as product coal and rejects streams are dewatered throughout the process. Recycling of water from the tailings dam back to the CPP will occur as part of water management for the tailings dam, to minimise the requirement for fresh raw water supply.

Grey water reuse

Reuse of grey water from bathroom, washroom, and laundry facilities associated with the accommodation facilities and MIA will be investigated as part of the detailed design process. Reusing grey water will reduce the demand on potable water supply to the Project. Investigations will assess the viability of grey water reuse for toilet flushing and landscape watering associated with the accommodation facilities and MIA.

Rainwater capture

The detailed design phase of investigations will assess the viability of rainwater capture from roofs of buildings in the MIA and accommodation facilities, to reduce the demand on potable water supply to the Project. Investigations will assess the viability of undertaking rainwater capture for use in landscape watering associated with the MIA and accommodation facilities.

In-pit disposal of rejects

Progressive disposal of coarse and fine rejects into the voids of already mined pits provides an effective long term rejects storage option that does not sterilise future coal pit reserves, and allows for a reduced environmental footprint by not disturbing areas in addition to the mining pits.

Renewable Energy

The WJV is investigating renewable energy sources for components of the Project, such as the mine accommodation facilities. This may include on-site solar generation.

Energy Efficiency

Numerous energy efficiency measures will be investigated during the detailed design phase.

To encourage energy efficiency, the use of high efficiency electrical motors throughout the mine site and the use of variable speed drive pumps with high-efficiency linings at the coal handling and preparation plant will be investigated for use during detailed design.

Installation of light-sensitive switches on lighting equipment and energy efficient lightbulbs will be investigated and installed, where practicable, to promote the Project's energy use and efficiency.

Installation of energy saving devices within the MIA buildings and accommodation facilities will be undertaken, where possible.

Additional energy efficiency measures will include, where appropriate and subject to detailed design investigations:

- regular monitoring of electrical load on the draglines and the swing distance, to improve dragline performance
- electrical calibration checks on the draglines as per the manufacturer's instructions
- adoption of a program of bucket inspection and repair to prevent the likelihood of poorly maintained dragline buckets reducing the efficiency of each dragline load through increasing the amount of electricity required to move a tonne of overburden
- regular monitoring of the compressed air circuit so that leaks are repaired in a timely manner, to maximise the operating efficiency of the compressor
- optimisation of haul truck scheduling, routing and idling times to minimise the amount of diesel consumed
- design of pit access ramps to limit the amount of effort required for fully-laden trucks to climb
- compaction of haul roads to reduce rolling resistance
- optimisation of the location of ROM and overburden dumps to limit the amount of distance haul trucks need to cover while fully laden.
- an energy efficiency audit will be undertaken where appropriate as part of the design process.

Accommodation Facilities

In developing the accommodation facilities, the WJV will endeavour to use leading industry practice in terms of sustainability and energy efficiency, including design which maximises air flow, shading and beneficial landscaping, use of energy efficient hotwater systems such as solar hotwater, water saving devices and energy efficiency lighting. The WJV has committed to investigating and implementing, where practicable, roof-mounted solar hotwater systems, rainwater capture and beneficial reuse of grey water associated with the accommodation facilities as part of the detailed design process.

Biodiversity Offsets

The WJV will develop and implement a Biodiversity Offset Strategy as the primary ameliorative measure to minimise the residual impact of the Project on biodiversity. A draft Offsets Strategy is provided in Appendix 17A-1-V1.4. The Strategy will aim to provide a net improvement in ecological value as a result of the Project, including providing protection for an equal or greater area of similar habitat as that lost due to the Project. The Offset Strategy will be developed in accordance with the following:

- a mixture of offsets is proposed to provide immediate protection and provide additional conservation off-sets during development of the mine. Subject to further verification and consultation with key interest groups and relevant government departments, the Biodiversity Offset Strategy proposes a target ratio of up to 3:1 "like for like" in terms of the vegetation protected in offsets compared with that disturbed by the Project. Offset areas are proposed to be located both within and outside the Project area

- it is 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 will be made based site specific feature including topography, soil characteristics, and existing vegetative cover
- the WJV proposes to rehabilitate some mining areas for nature conservation which will provide further habitat for ecological processes
- detailed assessment of the characteristics and quality in terms of ecological value of the offsets compared with the areas to be disturbed. Such assessments will include reviews of foraging value, availability of habitat (e.g. roost trees), and physiological characteristics such as topography and soil type
- the strategy will be used as the starting point for a Green Offsets Package for the Project to be developed in consultation with EPA and DEWHA in accordance with relevant State and Commonwealth policies relating to offsets.

Land management

Landholdings within the MLA areas that are non-mining areas will be used for either grazing or nature conservation, such as vegetation corridor management. Land management within the MLA areas will be based on appropriate land management principles, such as erosion prevention, noxious weed and feral animal and bush fire control. Chapter 8 Land Use and Chapter 9 Geology, Mineral Resources, Overburden and Soils describe land use management practices in further detail.

Greenhouse Gas Reduction Management Plan

Where relevant, the above sustainability measures discussed in this section will be incorporated into a Greenhouse Gas Reduction Management Plan.

6.9.2 SOCIAL CONSIDERATIONS IN SUSTAINABILITY

Co-location of gas supply pipeline

The co-location of the gas supply pipeline with the Surat Basin Rail corridor will minimise vegetation clearing requirements and will reduce impacts on land use for properties affected by the gas supply pipeline. The pipeline is largely aligned along the eastern easement boundary of the Surat Basin Rail corridor, then along a property boundary fenceline with an adjacent local road. Co-location of infrastructure will limit the footprint of development to fewer properties, rather than potentially multiple properties in the affected area.

Airstrip

Establishment of the proposed Wandoan airstrip (one of two air transport options under consideration) for community and WJV use provides the opportunity for quicker travel times including emergency travel to Brisbane and other major coastal centres by the local community and WJV operational employees.

For community members, use of the proposed new airstrip at Wandoan may allow for improved access to medical facilities, employment opportunities and social activities that may not be readily available in Wandoan and the surrounding areas.

For WJV operational employees, use of the airstrip will allow for more time to be spent with family and friends for those not based in the Wandoan area, and rapid evacuation in the event of a medical emergency.

Municipal waste and recycling facility

Assisting Dalby Regional Council to develop a new multi-user municipal waste and recycling facility for the Wandoan area will ensure the ongoing disposal of municipal wastes in the local area without requiring substantial haulage of wastes to other area/s in Dalby Region. A new facility would allow timely closure of the existing Wandoan landfill once capacity has been reached, and for best practicable practice waste disposal and a long term waste disposal solution in the Wandoan area.

Potable water treatment plant upgrade

Subject to agreement with Dalby Regional Council, upgrade to the existing potable water treatment facilities in Wandoan Township will improve existing facilities, providing improvements to extraction and storage capabilities of the plant, with the new cooling tower reducing high extracted water temperatures to drinking water standard levels, before distribution over the potable waster supply network.

Wastewater treatment plant upgrade

Subject to agreement with Dalby Regional Council, upgrade to the existing wastewater treatment plant facilities in Wandoan Township will increase the performance of the existing facilities, allowing for improved retention times and ultimate treatment of sewage effluent.

Sense of community

The Project recognises the important sense of community, the sense of security, participation in community events, and the volunteer mentality. WJV aims to embrace, encourage and enhance these aspects of the community.

6.9.3 ECONOMIC CONSIDERATIONS IN SUSTAINABILITY

Regulated power from an electricity transmission line

If power is supplied using a 132 kV or 275 kV transmission line, the use of regulated supply allows access to a constant and reliable high voltage power supply for multiple users. Access to high voltage power supply may encourage further development in the Wandoan area for industries requiring large quantities of power, and improvements in reliability of supply of low voltage power to the local electricity network.

Employment

Construction and operations of the Project will increase employment opportunities in the Wandoan area and surrounding regions, as well for the broader Queensland community. A mixture of specialist and general labour will be required during the construction and operation of the Project.

Construction workforce numbers are anticipated to peak at 1,375 in Year -1. Operational workforce numbers are anticipated to be reasonably constant from Year 4 onwards, at approximately 844 people including shutdown personnel, once ROM coal extraction reaches 30 million tonnes per year.

6.10 LAND ACQUISITION STRATEGY

The WJV commenced a process of land acquisition in 2007 following the lodgement of the three MLA's for the Project. An area of approximately 32,000 ha within the MLA's owned by 37 separate landowners was initially identified as being potentially required for acquisition.

Current land tenures are discussed further in Chapter 8 Land Use.

Following further exploration and mine planning during 2007, several properties covered by the MLA's were identified in October 2007 as no longer being required for the Project. Letters were forwarded to each landowner to advise them that their properties were no longer the subject of acquisition negotiations. The WJV undertook to modify the MLA boundaries to exclude these properties. Finalisation of mine infrastructure, noise and dust modelling for the EIS has resulted in the WJV re-entering into discussions with some of these landowners to the south of the MLAs with the view of potential acquisition.

Following the EIS process and before the MLA approval process as outlined in Chapter 3, the MLA boundaries will be modified to take into account the removal of properties that are no longer required for the Project.

Negotiations to date have concluded the purchase of about one third of the properties identified, with consultation and negotiations ongoing with the remaining landowners. Landowners in the eastern MLA's have been offered leaseback arrangements at commercial rates until the end of 2009, while western landowners have been offered leaseback arrangements to the end 2011.

The WJV is committed to fair and open negotiations for land acquisition. Principles of the WJV's acquisition strategy include:

- all reasonable attempts will be made by the WJV to reach an amicable agreement with affected land owners
- the WJV will readily participate in any mediation processes deemed necessary
- the WJV will continue to engage the community and potentially impacted landholders in consultation to provide information on the Project, and enable the community to provide feedback and raise any issues of concern. The WJV's consultation strategy is described in Chapter 4 Community Consultation
- the WJV will continue to undertake farming activities on the land acquired and as mining activities expand, the farming activities will be modified to allow mining and continued responsible management of the land.

6.11 REFERENCES

Department of Environment, Water, Heritage, and the Arts (DEWHA) 1992, *National Strategy for Ecologically Sustainable Development*, viewed: 20 October 2008, http://www.environment.gov.au/esd/national/nsesd/strategy/intro.html#GoalsEtc

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