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3. Project Description

Contents

3 Revised Project Description

3.1 Introduction

This Chapter describes the key elements of the revised Project throughout its construction, operation and decommissioning phases. The description for the revised Project also discusses major associated infrastructure requirements and outlines opportunities to capitalise on existing infrastructure currently used for the Mine. A comprehensive regulatory approvals list relevant to the revised Project is presented in **Apppendix C**.

3.2 Revised Project Background

NAC currently operates the Mine as a 4.8 million tonne (product coal) per annum (Mtpa) open cut coal mine on Mining Lease (ML) 50170 and ML 50216 within Mineral Development Licence (MDL) 244, under the approval of Environmental Authority EPML00335713. The Mine reserve is forecast to be depleted by 2017. The revised Project involves the extension and operation of the Mine, while increasing production from 4.8 Mtpa up to 7.5 Mtpa of thermal product coal.

The revised Project involves the extension of the Mine's operating life to approximately 2029 with the inclusion and progressive development of two new resource areas within MLA 50232. These resource areas are identified as the Manning Vale and Willeroo resource areas. The revised Project will include mining in three new mine pits, namely Manning Vale West, Manning Vale East and Willeroo mine pits.

The key objectives of the revised Project are to:

- establish and operate a sustainable and profitable coal mine;
- construct and operate a mine that complies with all relevant statutory obligations and continues to improve operations to ensure best practice environmental management;
- construct, design and operate a mine that does not compromise environmental and social indicators and standards;
- make efficient use of current infrastructure, with upgrades and expansions for the required capacity increase;
- reduce the disturbance to environmental values by minimising the footprint requirements for road and rail construction and the use of areas already disturbed for laydown, storage and handling facilities; and
- use similar proven strategies to those adopted at the Mine, for example:
  - salvage and stockpiling of topsoil;
  - early and progressive rehabilitation of disturbed areas;
  - use of recycled water as the main water supply;
  - protection of water quality by appropriate management systems; and
  - adoption of appropriate landform designs to ensure sustainable final land use.

In addition, key features of the revised Project include the:

- development of a suitable 'off set' strategy to satisfy State and Federal requirements for clearance of significant vegetation within new operational areas (i.e. extent of surface rights areas) on MLA 50232;
- preservation of historical items within Acland;
- comprehensive and progressive rehabilitation program involving continuous monitoring and reporting in line with the agreed post mining land use; and
- amendment of NAC's existing EA commensurate to the revised Project's size and scope.

The justification assessment for the revised Project is presented in **Chapter 2** along with an assessment of the revised Proejct against the standard criteria.

The revised Project will allow the parent company, New Hope Corporation Limited (NHCL), to expand its production capacity at the Mine to meet current and future market demands for its thermal coal products. The revised Project is particularly important considering NHCL's West Moreton Operations near Ipswich will exhaust current coal reserves in the near future.

The revised Project offers an opportunity for NHCL to expand its business base, improve profitability and increase its return to shareholders. The revised Project's thermal coal products are a highly valued energy resource that possesses lower sulphur content, provides higher energy output and produces less greenhouse emissions than many alternative thermal coal sources.

The revised Project will boost economic activity within the Darling Downs region through direct and indirect employment, investment and business opportunities for the life of the revised Project and beyond.

The estimated construction/capital cost of the revised Project is $895.6 million. Operating costs for the revised Project are approximately $450 million per annum. The estimated expenditure is approximately $6.6 billion over the life of the revised Project. A detailed economic assessment for the revised Project is provided in **Chapter 17**.

3.3 Revised Project Overview

The revised Project overview is shown in **Figure 3–1**. The key elements of the revised Project are outlined in the sections below.

3.3.1 Mine Development

The mine will consist of the following key components:

- continuation of existing mining activities to progressively extend to parts of the Manning Vale and Willeroo resource areas within MLA 50232, located to the south and west of current MLs 50170 and 50216;
- production of up to 7.5 Mtpa of product coal equating to approximately 14 Mtpa Run-of-Mine (RoM) coal;
- production of up to 80.4 Mt of product coal over the life of the revised Project;

- maintenance of the existing thin seam coal mining equipment, continuation of the current open cut mining techniques and expansion of the truck and loader mining fleet;
- progressive disposal of coarse rejects to cells within the overburden dumps, along with fine tailings being disposed of in In-Pit Tailings Storage Facilities (ITSFs);
- emplacement of two out-of-pit spoil dumps associated with the Manning Vale and Willeroo mine pits; and
- generation of three depressed landforms at the end of mining by backfilling and re-profiling final mine pits.

In determining the viability of the mine's development, the revised Project reserves have been extensively tested by drilling, geophysical logging, ground geophysics, geotechnical, hydrogeological and geochemical investigations by New Hope Exploration Pty Ltd (NHEPL), a subsidiary of NHCL and sister company to NAC.

3.3.2 Associated Infrastructure

The key infrastructure requirements for the revised Project are outlined below:

- upgrade of the existing CHPP complex, RoM and product coal stockpile areas and supporting infrastructure on ML 50170;
- continued use of tailings disposal within ITSFs located in-pit on ML areas;
- continued use of recycled water from the Wetalla Wastewater Reclamation Facility (WWRF) supplied from Toowoomba via an approved 45 km pipeline that is currently fully operational;
- continued use of a mine surface water management system involving various water management structures staged to accommodate the progressive development of the Mine and based on the principles of diverting clean water and capturing and reusing water from disturbed areas;
- upgrades to the existing administration and heavy vehicle maintenance area on ML 50170;
- relocation and potential upgrade of the current power supply for the mine operation and the local 11kV distribution system;
- diversion of the Jondaryan-Muldu Road around the Manning Vale resource area;
- decommissiong of the Jondaryan Rail Loadout Facility (JRLF);
- construction of a new 8 km rail spur line and balloon loop from Jondaryan onto MLA 50232;
- construction of the Train Loadout Facility (TLF) within MLA 50232; and
- relocation and potential upgrade of the existing local telecommunication network.

It is anticipated the construction period for associated infrastructure will occur from 2015 to 2017.

3.3.3 Accommodation and Workforce

No construction or operational camps will be located on-site during the construction and operational phases of the revised Project. Construction and operational workforces will reside in regional towns and cities. Arrival and departure times for workers will be staggered by at least half-an-hour to minimise traffic and other interactions.

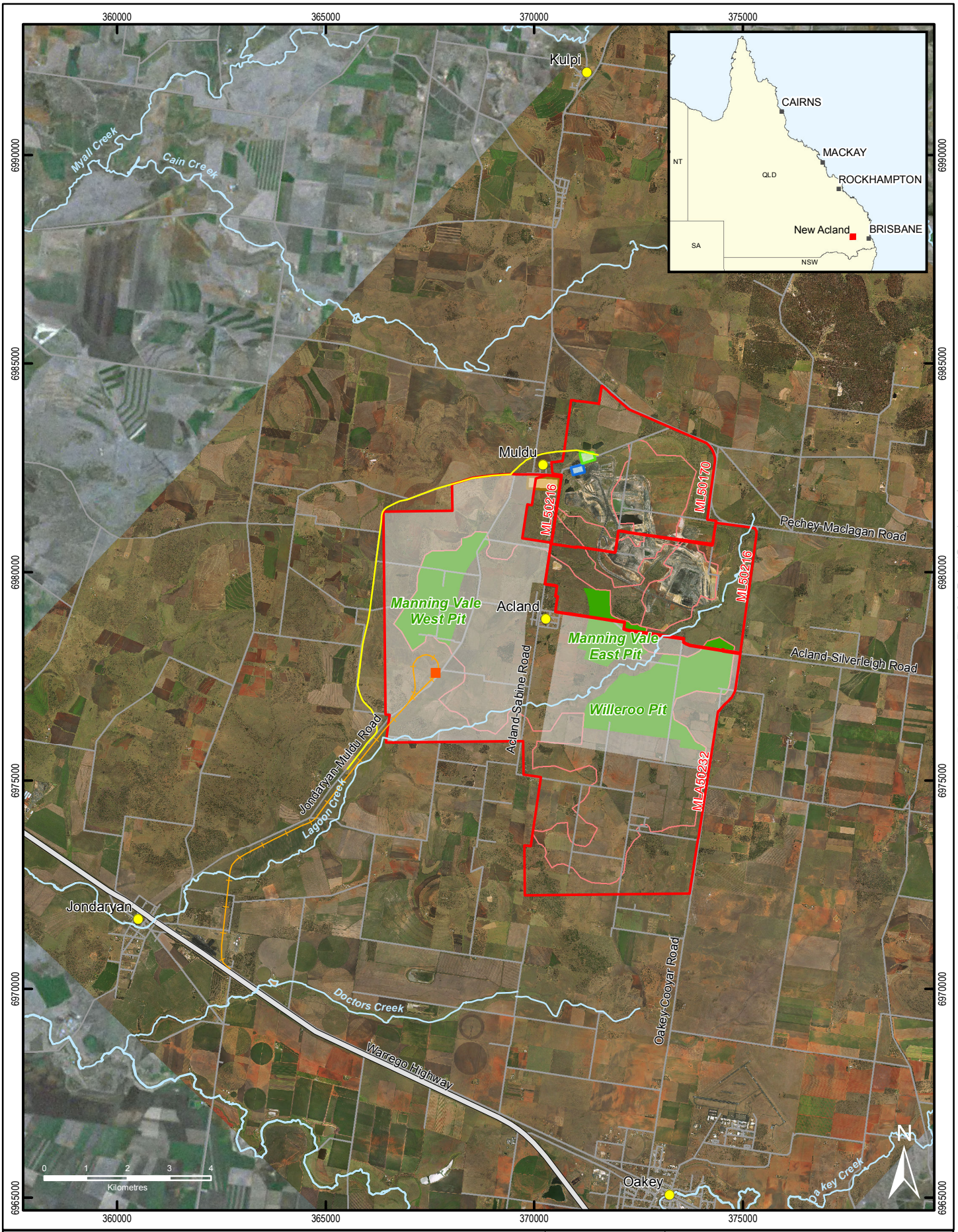
3.3.4 Environmental Management

An EM Plan will be developed for the revised Project and consist of the following key components:

- environmental values likely to be affected;
- potential adverse and beneficial impacts;
- environmental protection objectives; and
- control strategies adopted to achieve these environmental protection objectives.

In particular, the EM Plan will facilitate the:

- development of a suitable 'offset' strategy to satisfy State and Federal requirements for clearance of significant vegetation communities within new operational areas (i.e. extent of surface rights areas); and
- development of a comprehensive progressive rehabilitation program involving continuous monitoring and reporting in line with the agreed post mining land use.
- The EM Plan for the revised Project is provided in **Appendix J.19**.



LEGEND

- Towns and Localities
- Train Loadout Facility
- Rail Spur
- Roads
- Creeks
- Jondaryan-Muldu Road Diversion
- Proposed Extent of Surface Rights Area
- Coal Resource Area
- Mining Tenements
- Stage 3 Pit Areas
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area

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Figure 3-1 - Revised Project Overview

Scale 1:120,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 11/07/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130326_NewHope_ProjectDescription_Figure3-1_ProjectOverview.mxd

3.4 Land Tenure and Ownership

3.4.1 Mining Tenure

An Authority to Prospect (ATP) 129C, covering 89 sub-blocks (280 km^2) was granted on 27 May 1973 to Shell Development (Australia) Pty Ltd (SDA) for a period of three years. This tenure was subsequently extended for periods of between one and three years from May 1976. Shell Coal of Australia (SCA) replaced SDA as holder of ATP 129C on 4 May 1979. The ATP area was reduced to 47 sub-blocks (150 km^2) on 27 May 1982. In 1986, tenure was converted to a Retention Authority to Prospect (ATP 4CR) over 39 sub-blocks. In 1991, in accordance with the MR Act, the title was changed to an Exploration Permit for Coal (EPC 462). In the same year, the area of tenure was enlarged to include the western extension of the Acland Resource at Manning Vale West (EPC 469), previously jointly held in equal share by SCA and Moonie Oil. A new title of 47 sub-blocks covering the enlarged area, EPC 513, was issued in September 1991.

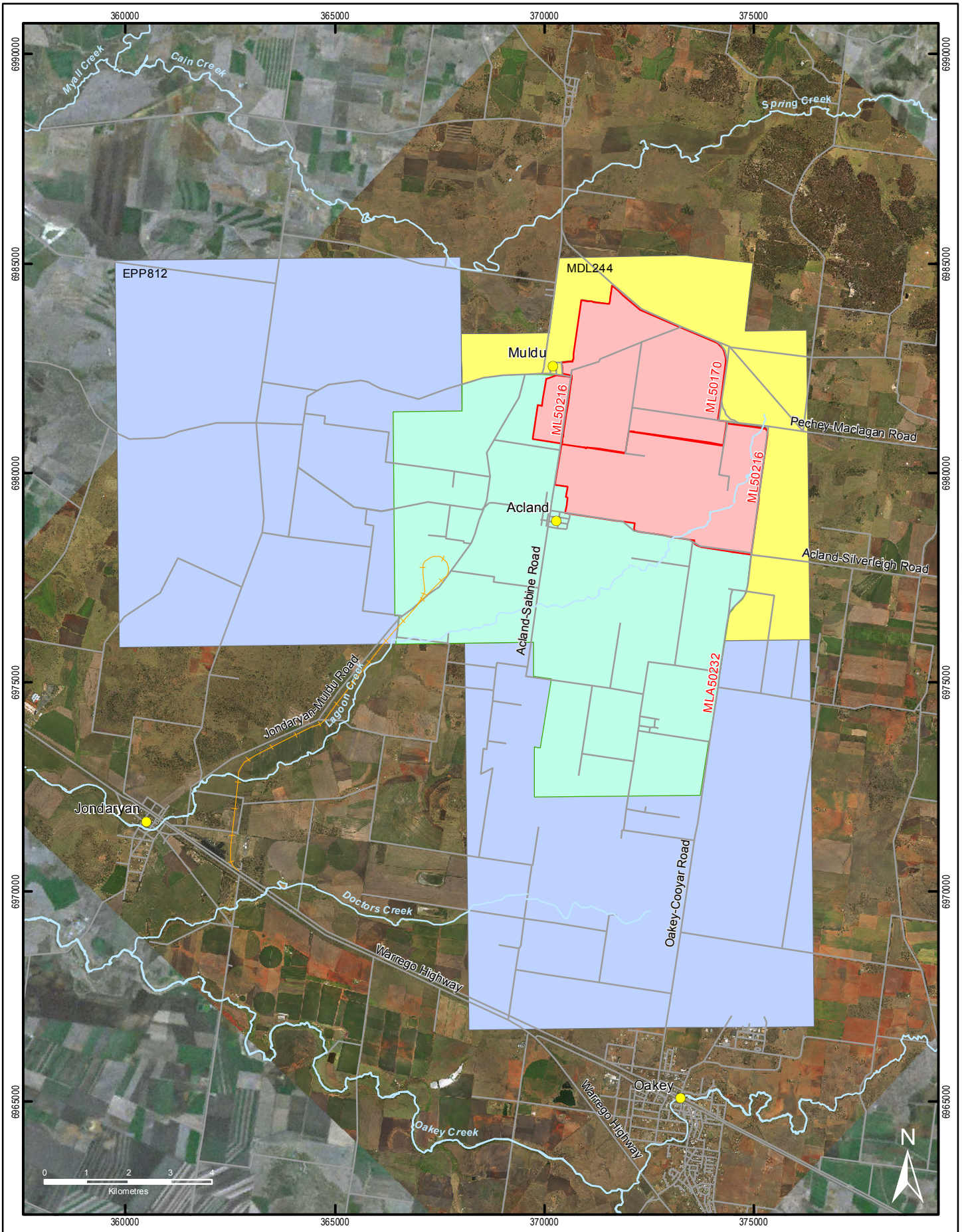
An Application for a MDL covering 30 sub-blocks was made on 11 September 1994 upon expiry of EPC 513. Application for a MDL of 9,981 ha covering the Glen Roslyn coal resource and adjacent land required for mine infrastructure was granted to SCA as MDL 244. NAC acquired MDL 244 and the associated coal resources from SCA in December 1999. NAC submitted an application of renewal for MDL 244 on 4 May 2006.

Application for a ML was made by NAC on 2 November 2000, covering an area of 1,103 ha. The Governor in Council subsequently granted ML 50170 on 6 September 2001, for a term of 21 years commencing 1 October 2001. ML 50170 encompasses the North Pit in the Glen Roslyn Reserve area and the main infrastructure area.

Application for an additional ML was then submitted by NAC on 1 February 2005 and following an EP Act EIS process was subsequently granted on 7 December 2006. This lease encompasses the remaining Glen Roslyn Reserve area not contained within ML 50170.

NAC applied for MLA 50232 over the Manning Vale, Willeroo and Sabine Reserve areas on 24 April 2007. MLA 50232 will continued to be assessed under the current SDPWO Act EIS process. NAC will conduct the revised Project within MLA 50232 by only seeking 'surface rights' for mining over the proposed new operational footprint. NAC will not possess the legal right to conduct mining activities within all other areas of MLA 50232 without obtaining further statutory approval under the MR Act. These tenement areas are depicted in **Figure 3–2**.

NHEPL also holds the overlying petroleum tenure, ATP 812P, which encompasses MDL 244 and only allows petroleum exploration activities to be conducted. Under the provisions of the MR Act, NAC and NHEPL have completed and lodged a Development Plan for the overlapping coal and petroleum tenures. This Plan was lodged with the DNRM for assessment and subsequent approval prior to grant of MLA 50232.



LEGEND

- Towns and Localities
- Rail Spur
- Roads
- Creeks
- Mining Leases
- MDL Area
- EPP Area
- MLA Area

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Figure 3-2
Revised Project Tenement Areas

Scale 1:120,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130422_NewHope_ProjectDescription_Figure3-2_ProjectTenementAreas.mxd

MLA 50232 covers the majority of the remaining reserves within MDL 244, including the Manning Vale and Willeroo resource areas. **Table 3–1** summarises the details of the revised Project tenements.

Table 3–1 Tenements for the revised Project

Tenement Number	Description	Date of Granting	Term of Mining Lease (years)	Licensee	Licensor	License to Mine
ML 50170	Mining Lease: North Pit (Stage 1)	6/9/2001	30/9/2022	New Acland Coal Pty Ltd	Department of Mines and Energy Queensland	Coal Shale Clay Bentonite Kaolinite
ML 50216	Mining Lease: South & Centre Pit (Stage 2)	7/12/2006	31/12/2026	New Acland Coal Pty Ltd	Department of Mines and Energy Queensland	Coal
MLA 50232	Mining Lease Application: Manning Vale Willeroo Sabine (Stage 3)	Submitted 25/5/2007 awaiting ML granting	not applicable	New Acland Coal Pty Ltd	Department of Mines and Energy Queensland	Coal
MDL 244	Mineral Development License	30/09/1998	30/9/2016	New Acland Coal Pty Ltd	Department of Mines and Energy Queensland	Coal
EPC 919	Exploration Permit: Goombungee (Far East)	4/3/2005	3/3/2015	New Hope Exploration Pty Ltd	Department of Mines and Energy Queensland	Coal
EPP812	Exploration Permit	11/11/2004	31/12/2008 (renewal application in progress)	New Acland Coal Pty Ltd	Department of Mines and Energy Queensland	Petroleum

The background land tenure covering MLA 50232 excluding roads, comprises 374 real property descriptions and three non-road reserves. **Section 3.6.10** lists the roads located within MLA 50232 that will be required to be diverted or permanently closed due to mining operations.

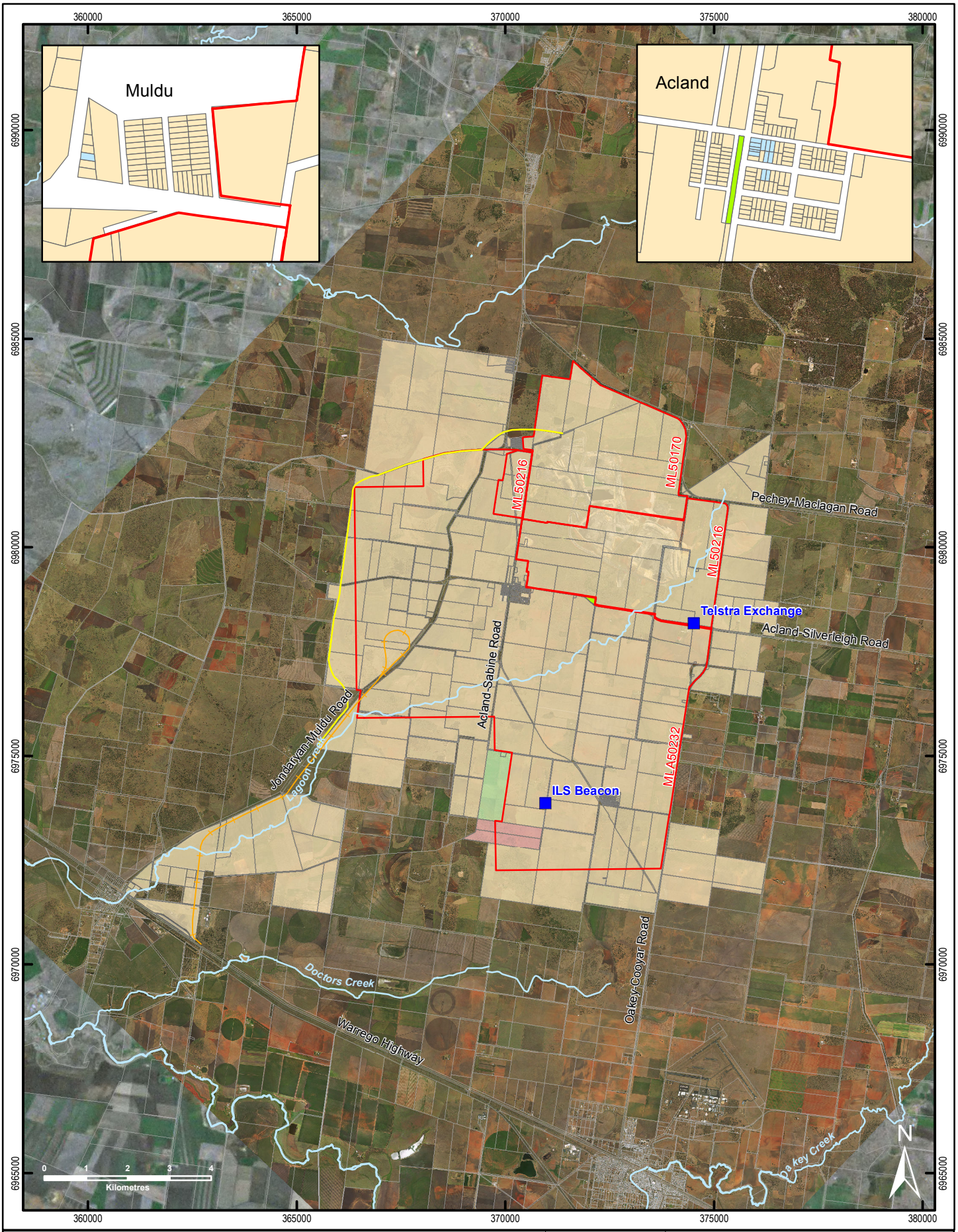
Three non-road reserves exist within MLA 50232, two are owned by the TRC and one is owned by the APC. The two TRC reserves comprise a park reserve and a reserve for sanitary purposes. NAC currently has compensation agreements in place for both parcels of land to allow progression of the ML process. NAC also has an agreement in place with TRC in relation to the purchases of these properties at the successful completion of the ML process. The reserve owned by APC is the former Acland Primary School site.

3.4.2 Land Ownership

The NHG has invested significantly to secure surface rights over future development areas within MDL 244, to establish buffer zones between operations and surrounding landowners, and to secure transport corridors. Negotiations with landowners have involved several strategies including outright purchase, option to purchase and compensation agreements. The majority of landowners have opted to sell their properties outright.

Since the development of the Mine, the NHG has acquired 160 lots totalling 10,151 ha from 157 owners. The NHG owns the majority of the land within MLA 50232. The APC is responsible for the sustainable management of the NHG's Acland district landholdings, which generally involves the application of recognised agricultural practices outside the active mine areas. **Figure 3–3** depicts the extent of current NHG land ownership within the Study area.

The real property descriptions of the background land tenure for MLA 50232 are illustrated in **Figure 3–4** and provided in **Appendix G.1.1**.



LEGEND

- Towns and Localities
- Rail Spur
- Jondaryan-Muldu Road Diversion
- Roads
- Creeks
- Mining Tenements

Ownership

- Acland Pastoral Company
- Private Owner
- Private Owner with Compensation Agreement
- Private Owner with Special Agreement
- Toowoomba Regional Council with Compensation Agreement
- Utilities

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Figure 3-3 - Land Ownership within the Study Area

Scale 1:120,000 on A4

Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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LEGEND

- Towns and Localities
- Rail Spur
- Roads
- Cadastre
- Mining Tenements
- Easements

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Figure 3-4 - Real Property Description Within the Study Area

Scale 1:73,500 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/11/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\131121_NewHope_ProjectDescription_Figure3-4_RealPropertyDescriptionWithinProjectSite.mxd

3.5 Resource Characterisation

3.5.1 Regional Stratigraphy

MDL 244 is located in the northwest of the Moreton Basin over the northerly trending Kumbarilla Ridge which separates the Moreton and Surat Basins. Although the Kumbarilla Ridge is considered to structurally separate the Moreton Basin from the Surat Basin, the Walloon Coal Measures of the Moreton Basin are laterally continuous with those of the Surat Basin. The Surat Basin contains early Jurassic to early Cretaceous age non-marine and marine sediments. The Moreton Basin contains non marine sediments dating from the late Triassic. The Moreton Basin represents an eastern lobe of the Mesozoic Great Artesian Basin (GAB).

The economic coal-bearing sediments of the Surat-Moreton Basin occur in the Walloon Coal Measures of the Middle to Upper Jurassic Injune Creek Group. This Group conformably overlies the Lower Jurassic Marburg Formation. Two characteristics of the group are recognised as being:

- the Walloon Coal Measures, which is a productive coal bearing lower unit; and
- the Kumbarilla Beds, a distinctive barren upper unit.

The major coal bearing unit in MDL 244 is referred to by NAC as the Acland-Sabine Sequence. The coal seams of the Acland-Sabine Sequence occur at a similar stratigraphic position within the Walloon Coal Measures as the Ebenezer Sequence which is currently being mined by the NHG at the Jeebropilly Coal Mine. The Acland-Sabine Sequence and the Ebenezer Sequence both occur in the lower coal bearing unit of the Walloon Coal Measures.

3.5.2 Stratigraphy of the Study Area

The upper part of the Injune Creek Group, including the whole of the Kumbarilla Beds, has been eroded from the Study area. Only 150 m to 200 m of coal bearing Walloon Coal Measures are preserved above the Marburg Formation.

The Walloon Coal Measures consist of grey and light grey shales, siltstones, fine clayey sandstones, carbonaceous shales, mudstones and coal seams. The coal seams are laterally continuous but are characterised by rapid lateral variation of the interseam sediment thickness. The Waipanna, Acland-Sabine and Balgowan seam intervals of the Lower Walloon Coal Measures are present across MDL 244.

The principal coal sequence which is economically important to the revised Project is the Acland-Sabine Sequence, which typically comprises 20 m to 30 m of alternating coal and non-coal rocks of which approximately half consists of coal.

The two other coal sequences within the Study area are the Waipanna Sequence, located approximately 20 m to 40 m stratigraphically above the Acland-Sabine Sequence and the Balgowan Sequence which is located approximately 30 m stratigraphically below the Acland-Sabine Sequence. Both the Waipanna Sequence and Balgowan Sequence were intersected in numerous exploration holes. However, the coal thickness is not considered economically viable at this time.

Isolated basalt ridges occur throughout the Study area and are remnants of extensive mid-Tertiary lava flows which have in filled pre-Tertiary age palaeo-channels. Post Walloon Coal Measure sediments, believed to be Tertiary in age cover some of the Study area. The Tertiary age sediments in the Study area are up to 17 m thick and are mainly soft mudstones with occasional sandstone and ironstone bands. Recent alluvial deposition is in excess of 60 m in thickness and occurs to the southeast of the Sabine area and is associated with the Oakey Creek Flood Plain. **Chapter 6** describes additional information regarding the local geology of the Study area. **Table 3–2** details the lithological description of the Walloon Coal Measures, as they occur in the Study area.

Table 3–2 Stratigraphy of the Walloon Coal Measures in the Study Area

Coal Sequences	Thickness (m)	Lithology and Comments
Waipanna	>40	Mainly thickly bedded sandstone with argillaceous matrix fining upwards to interbedded fine sandstone and mudstone.
	<75	Predominantly thinly bedded fine sandstone. At least four extremely banded coaly intervals are present. The lowest interval is named the A seam and reaches 6 m in thickness but is of poor quality and banded. All coal seams in this unit exhibit rapid lateral facies changes.
	28 - 35	Medium to coarse sandstone units up to 10 m thick fining upward to interbedded fine sandstone, siltstone and mudstone.
Acland/Sabine	30 - 60	Predominantly thinly bedded fine sandstone to mudstone. Contains eight laterally persistent coal seam groups. Acland Interval up to 18 m of banded coal, divisible into A, B, C, D, E, F, G, H and J coal seam groups. Three high gamma claystones (BB, LAG, LGM) have been recognised throughout the Acland area, and are considered to be time stratigraphic markers.
	35	Mainly thick sandstone, thin interbeds of fine sandstone, siltstone and mudstone.
Balgowan	30	Medium to fine grained sandstone fining up to mudstone and massive mudstone with minor thin fine sandstone interbeds. This unit contains numerous thin coal seams. Persistent gamma markers can be used for correlation purposes.
	>40	Thickly bedded sandstone fining upward sequences to interbedded fine sandstone and mudstone.

The Acland-Sabine sequence is characterised by coal seam and interburden continuity. Continuity of coal seams, intra seam partings, and seam interburden are features of the Walloon Coal measures and can be demonstrated in the highwalls of the New Acland and Jeebropilly Coal Mines.

3.5.3 Mining Reserves

The total JORC classified reserves identified for the NAC mining tenements on 30 July 2013 is shown in **Table 3–3**. The revised Project's JORC reserves within MLA 50232, ML 50170, ML 50216 and MDL 244 for RoM tonnes totals 441 Mt.

Table 3–3 JORC Classified Total NAC Reserves

Tenement	RoM Tonnes (Mt)		
	Proved	Probable	Total
ML 50170 ML 50216 MLA 50232 MDL244	292	149	441

Note: 29 Mt of reserves have been removed due to preservation of the Lagoon Creek corridor.

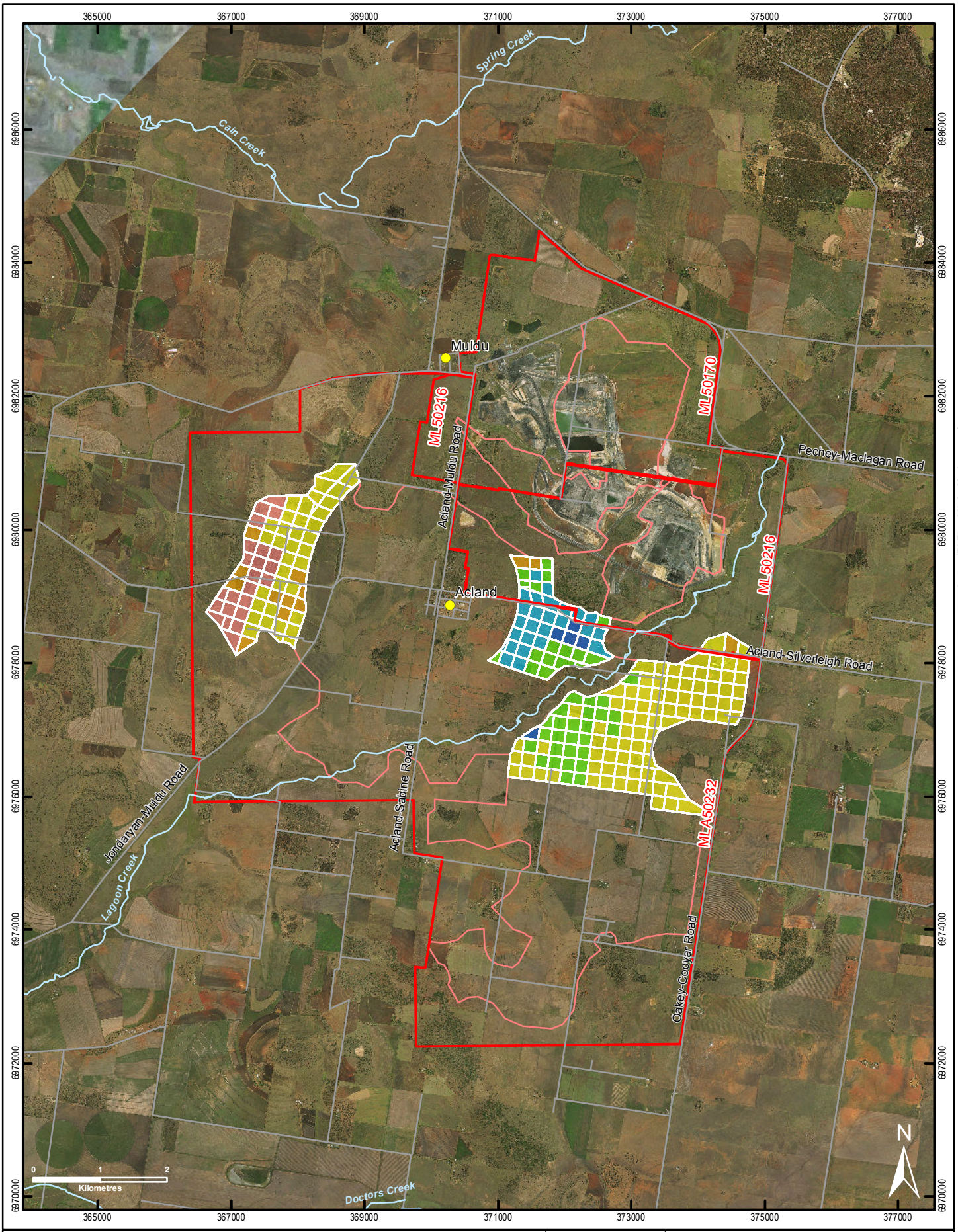
The mining reserves for the revised Project including selected coal quality parameters are presented in **Table 3–4**.

Table 3–4 Mining Reserves and Selected Coal Quality

Parameter	Unit	Manning Vale West	Manning Vale East	Willeroo	Total
Overburden Volume	Mbcm	83.3	52.2	128.3	263.8
Thick Parting Volume	Mbcm	38.7	13.2	102.2	154.2
Thin Parting Volume	Mbcm	16.9	8.1	38.8	63.3
Total Waste Volume	Mbcm	139	73.5	268.8	481.3
RoM Coal Volume	Mbcm	28.7	16.5	44.3	89.5
Total Volume	Mbcm	167.7	90	313.2	570.8
RoM Tonnes	Mt	43.9	25.9	69.8	139.6
Product Tonnes	Mt	26.9	14.7	38.8	80.4

3.5.4 Optimal Seam Floor

Mining to date has seen the majority of the mine pit floor extend to the F series coal seam group. However, as mining progresses into the new resource areas, the lower series seams from the Acland sequence either pinch out or have high incremental cut-off ratios. The optimal pit floor for the new mine pit designs has been developed firstly by reserving to the base of the Acland sequence (F3 coal seam) and then identifying the coal seam down through the sequence that provides the economic viability of each seam. Therefore, the optimal pit floor mining horizon for the revised Project comprises the F, C, D and E seams. The optimal pit floor mining horizon is shown in **Figure 3–5**.



LEGEND

- Towns and Localities
- Mining Tenements
- Coal Resource Area
- Roads
- Creeks

Optimal Pit Floor Mining Horizon

- C8 coal seam
- D4 coal seam
- D8 coal seam
- E4 coal seam
- E8 coal seam
- F2 coal seam

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Figure 3-5 - Optimal Pit Floor Mining Horizon

Scale 1:75,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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3.5.5 Product Coal Ratings

NAC currently describes the different coal products it produces as Gold or Bronze depending on the product quality. The gold product is the better quality coal and is predominantly sold to export markets. Bronze coal is a higher ash product with export markets also established by NAC.

Table 3–5 identifies the typical coal product types and their associated typical ash contents. The percentage of ash within the coal represents the ash content after the coal has been washed.

Table 3–5 Coal Product Types and typical Ash Content

Product Type	Typical Ash % (air dried)
Gold	13 %
Bronze	22 %

3.5.6 Coal Washability

The reserves developed for the revised Project's mining schedule have been based on the following key parameters described in **Table 3–6**.

Table 3–6 Key Reserving Parameters

Mining Reserve Parameter	
A0 – C3 Series Seams	
Default Coal Loss	**3.0 %**
Default Dilution	**6.0 %**
Minimum Mining Separation Thickness	0.10 m
CHPP Efficiency	94 %
Dilution Removal Efficiency	94 %
Dilution Product Ash	40 %
Typical CHPP Cut-Point	1.50 - 1.55
C4 – F3 Series Seams	
Default Coal Loss	13.5 %
Default Dilution	3.5 %
Minimum Mining Separation Thickness	0.09 m
CHPP Efficiency	93 %
Dilution Removal Efficiency	93 %
Dilution Product Ash	60 %
Typical CHPP Cut-Point	1.45 - 1.50

The washing regime conducted over the revised Project life is based on market conditions and the ability to sell the different product types.

3.5.7 Resource Utilisation

In revising the original proposal, the NHG has actively responded to the comments and concerns raised by government and other stakeholders . In summary, the revised Project includes a reduction in the surface rights area of MLA 50232 from approximately 5,069 ha to approximately 3,276 ha and a reduction in the total disturbance footprint by 2,614 ha through the avoidance of the southern areas from MLA 50232.

In addition, NAC under the revised Project's mining schedule has intentionally sterilised 29 Mt of in-situ coal resource by not mining Lagoon Creek (including an offset of approximately 150 m from the highwall crest of the new mine pits to Lagoon Creek). A mining exclusion zone has also been established in Acland with no surface area application for this zone. The revised Project will not impact on other coal, gas or mineral resources within the surrounding region.

No coal seam methane is known to occur within the Study area at the depth of current mining operations and no significant geological features associated with potential coal seam methane production exist. Economic and production factors will ensure that the revised Project will be developed to minimise general coal resource wastage and sterilisation and to maximise the net project value.

3.6 Mine Planning and Design

3.6.1 Mining Method

The mining method utilised for the revised Project is truck and excavator/loader, which is currently employed at the Mine. This has been a proven mining method that operates efficiently with the current resource geometry while offering a significant level of flexibility.

Initially, all topsoil is stripped using bulldozers, and relocated using front end loaders and trucks and is directly respread on current progressive rehabilitation areas behind the active mine pit or stockpiled for future rehabilitation purposes. Direct respread is the preferred method to minimise topsoil handling, which reduces loss of viability from damage to soil structure and propagules. Topsoil is removed primarily for the purposes of rehabilitation followed by overburden drilling and blasting.

Once topsoil removal is completed a new box-cut is initially developed with the overburden removed and dumped within an out-of-pit spoil dump or used to backfill other existing voids. The revised Project's Topsoil Management Plan is presented in **Appendix J.3**.

Coal mining commences once sufficient overburden is removed to expose the coal seams. This involves working a number of blocks in conjunction with one another to develop a staggered pattern in relation to the vertical coal seam horizons. The overburden and thick partings (>1.5 m) are typically mined through the use of large excavators. Thin partings (<1.5 m) and coal seams are mined by loaders with assistance from dozers to rip and stack the material in windrows which increase loader productivity.

Once the box-cut is completed, successive strips are opened to maintain consistent coal flow to the CHPP. The number of strips and blocks opened at any given time depends on the coal production schedule and equipment productivity requirements for that particular mine pit. Once enough floor area

is available in the mine pit, spoil dumping then commences in-pit allowing progressive backfilling of the void as mining traverses across the resource area.

A typical cross section of an operating mine pit is shown in **Figure 3–6**.

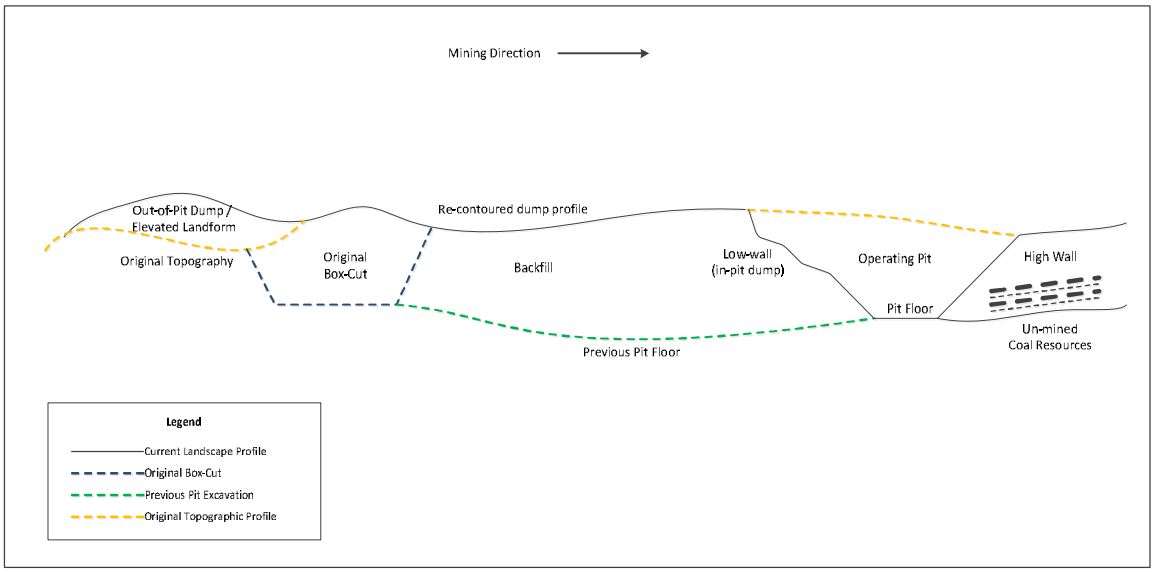


Figure 3–6 Mining Process Cross Section

A generalised representation of the mining process (from mine to customer) is presented in **Figure 3–7**. Once the raw coal has been extracted from the active mine pit it is transported to the RoM pad for delivery via conveyor to the CHPP where it is processed. Coarse rejects from the CHPP are disposed of through in-pit dumping or comingled with overburden for out-of-pit dump development while fine tailings are directed to ITSFs. The product coal is then stockpiled via conveyor and transported to the TLF for distribution to various markets.

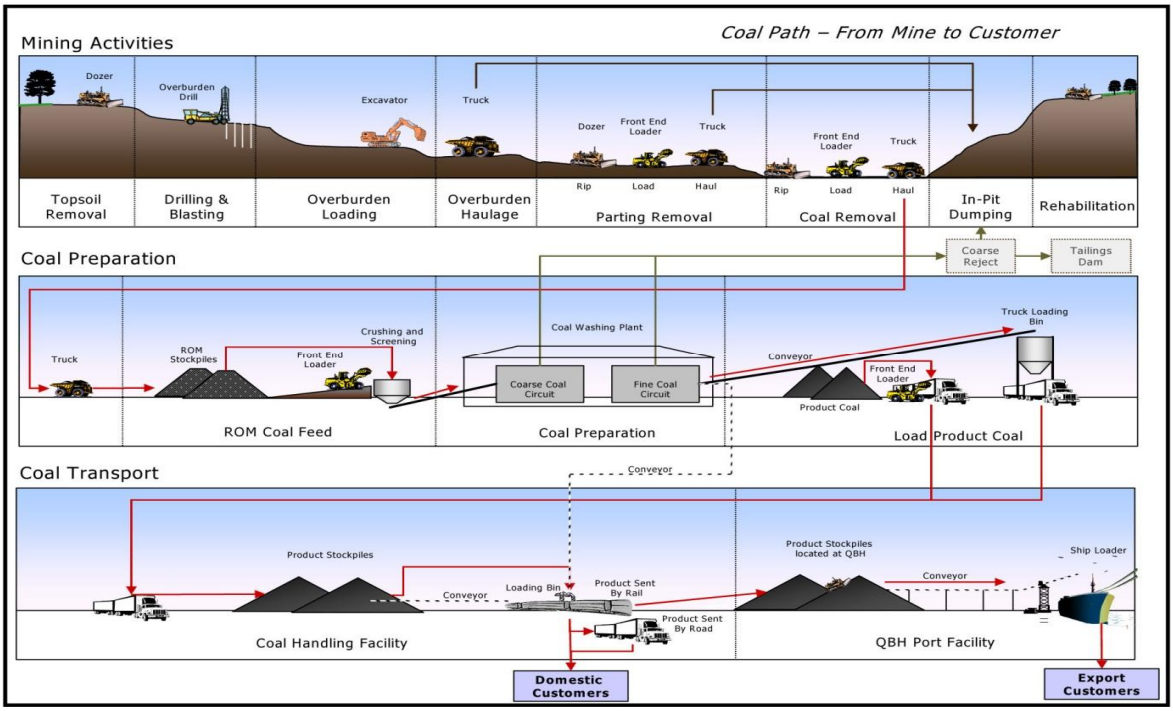


Figure 3–7 Mining Process Overview

3.6.2 Mine Plan Schedule

The revised Project involves the continued development of the Mine by the progressive commissioning of two additional resource areas within MLA 50232. The two resource areas will be developed sequentially and combined with the current operations to supply up to 7.5 Mtpa of saleable product coal for export and domestic markets until approximately 2029.

Overview of Mining Related Activities

Following the successful grant of MLA 50232 in around 2015, NAC estimates that approximately 2.5 years will be required to complete design, construction and other related activities that facilitate the continuation of mining. The proposed length of the construction period is governed by external rail developments which influence the rate of product coal transportation off-site. **Table 3–7** outlines an indicative schedule for mining related activities on MLA 50232. The construction phase for the revised Project involves the increase in the mining fleet and workforce, construction of supporting infrastructure and development of the new resource areas.

Table 3–7 Indicative Schedule for Mining related activities on MLA 50232

Year	Activity
2015	Environmental and mining approvals (Federal & State)
2015-2017	Cultural Heritage clearance Road closure applications Construction of the rail spur from Jondaryan and a balloon loop within the mining lease Construction of site access and roads (including re-alignments) Construction of water management structures Construction of the additional supporting infrastructure Gradual employment of additional workers
2016	Mining commences within the Manning Vale reserve area (box-cut and out-of-pit dump construction)
2016	Mining commences within the Willeroo reserve area (box-cut and out-of-pit dump construction)

NAC will be responsible for all mining activities within the revised Project site. In line with current practices, NAC may employ contractors for specialist mining activities, such as blasting.

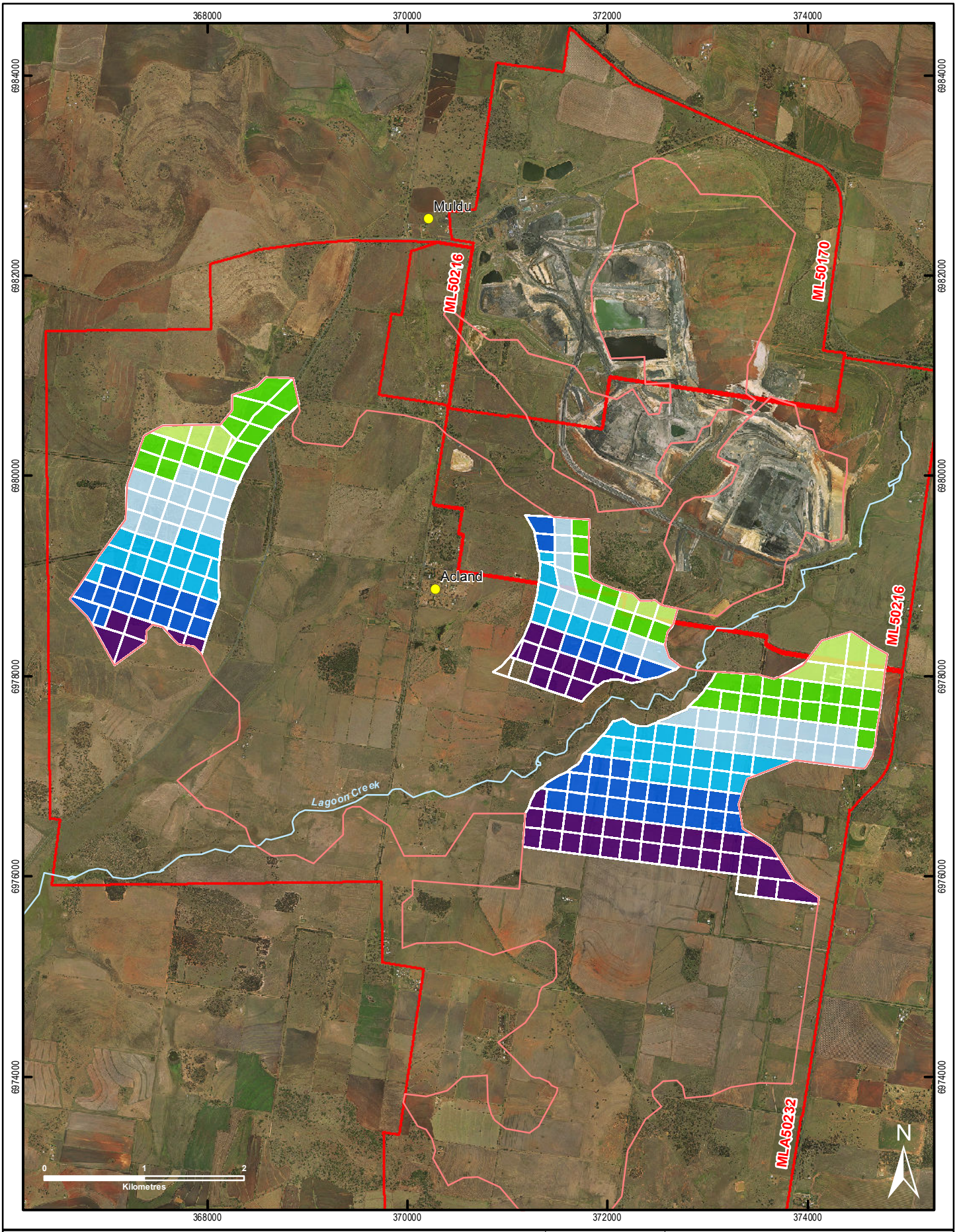
All mining and construction activities will be conducted in compliance with the *Coal Mining Safety and Health Act 1999* (CMSH Act). First aid and other required facilities will be supported from the existing operations until equivalent facilitaties are established on MLA 50232.

The transportation of plant and equipment (including the additional mining fleet) to the revised Project site is expected to take the full construction period. NAC will ensure that local government services (i.e., emergency services and police) are appropriately advised of the revised Project activities and timing.

No significant quantities of additional construction materials are required for the revised Project. Sufficient basaltic materials are available from existing and new areas on-site for the construction of haul roads and other related infrastructure such as water management structures. Some minor quantities of specialist materials may be required for construction and operational purposes and would be sourced off-site on an as required basis and delivered under the appropriate transport arrangements.

Life of Mine Schedule

The life of mine schedule is outlined in **Figure 3–8**. **Figure 3–9** to **Figure 3–15** identify the location of the mine pits and working areas over the life of the revised Project in 2015, 2017, 2019, 2021, 2023, 2025 and 2029, respectively. The life of mine schedule has been modified to allow an exclusion zone around Acland, increase the buffer distance from Oakey and to avoid disturbance of Lagoon Creek, **Figure 3–16** provides the proposed conceptual final landform including the locations of the elevated landforms (former out-of-pit spoil dumps) and the depressed landforms (former residual voids).



LEGEND

- Towns and Localities
- Mining Tenements
- Coal Resource Area
- Creeks

Year

- FY2017-18
- FY2019-20
- FY2021-22
- FY2023-24
- FY2025-26
- FY2027-29

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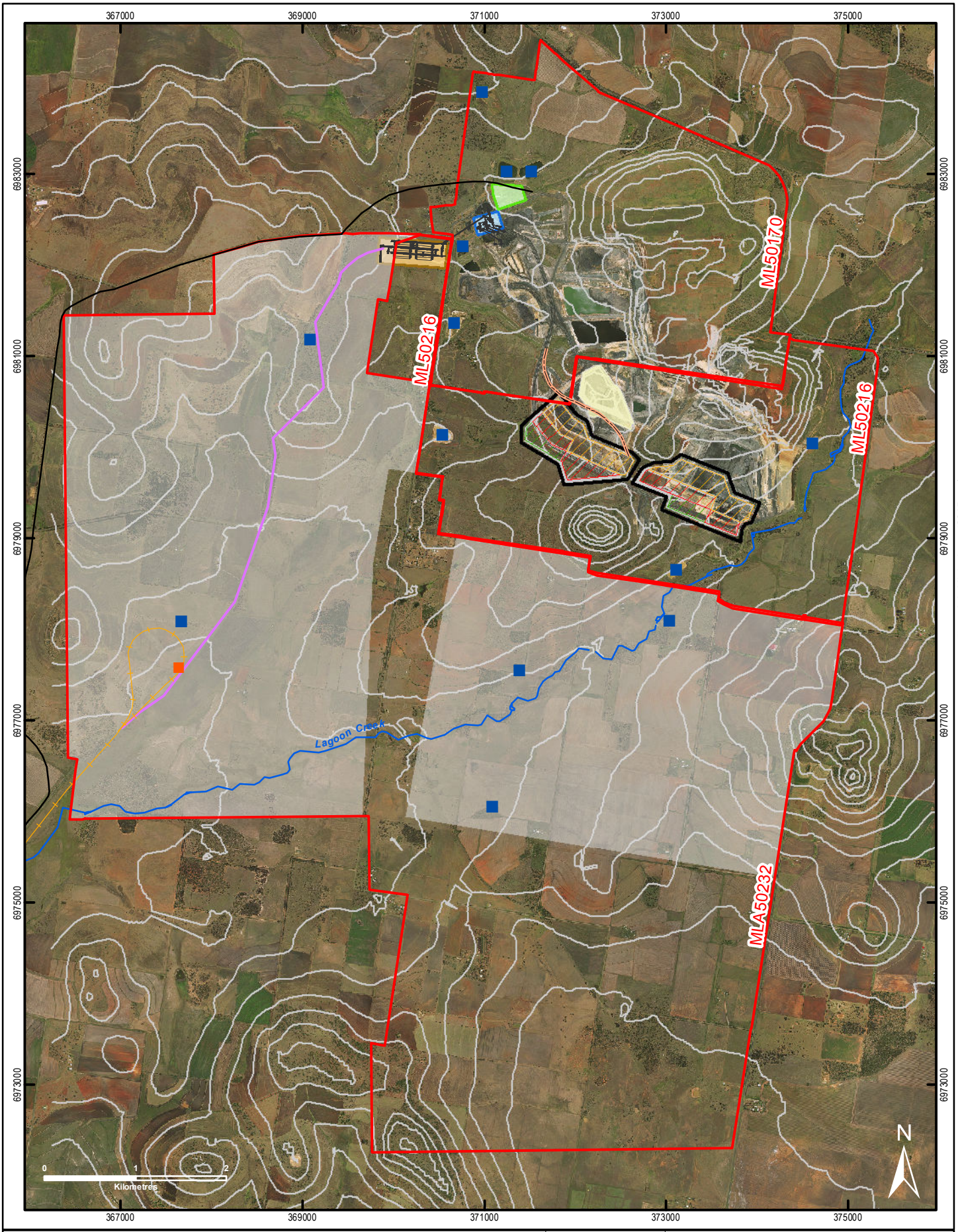
Figure 3-8 - Life of Mine Schedule

Scale 1:50,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 3/07/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130423_NewHope_ProjectDescription_Figure3-8_LifeOfMineSchedule.mxd



LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographic Contours (10m)
- Mining Tenements
- Mining Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps

Name

- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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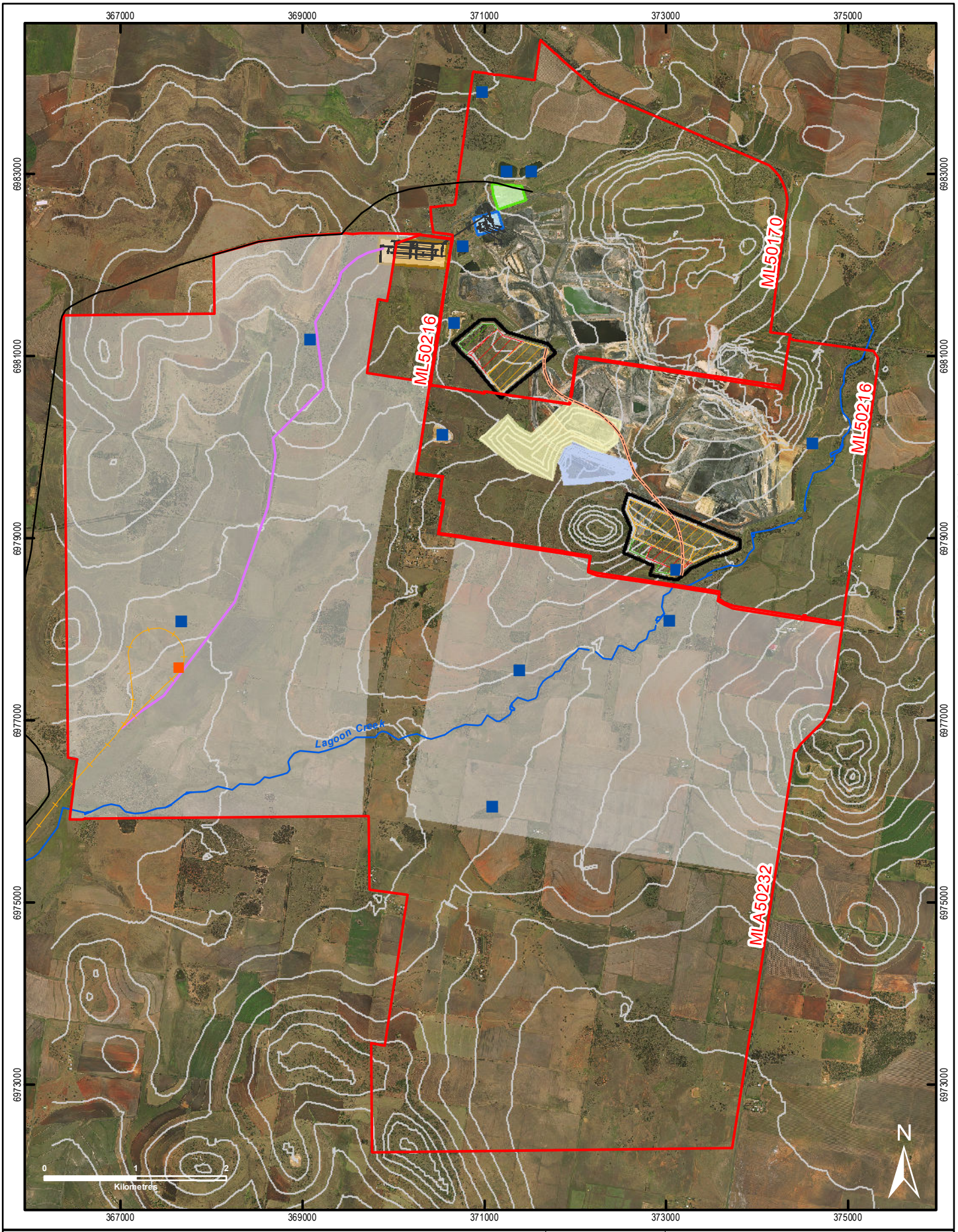
Figure 3-9 - Mining Layout 2015

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 27/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130704_NewHope_ProjectDescription_Figure3-9_MiningLayout2015.mxd



LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topogrphic Contours (10m)
- Mining Tenements
- Mining Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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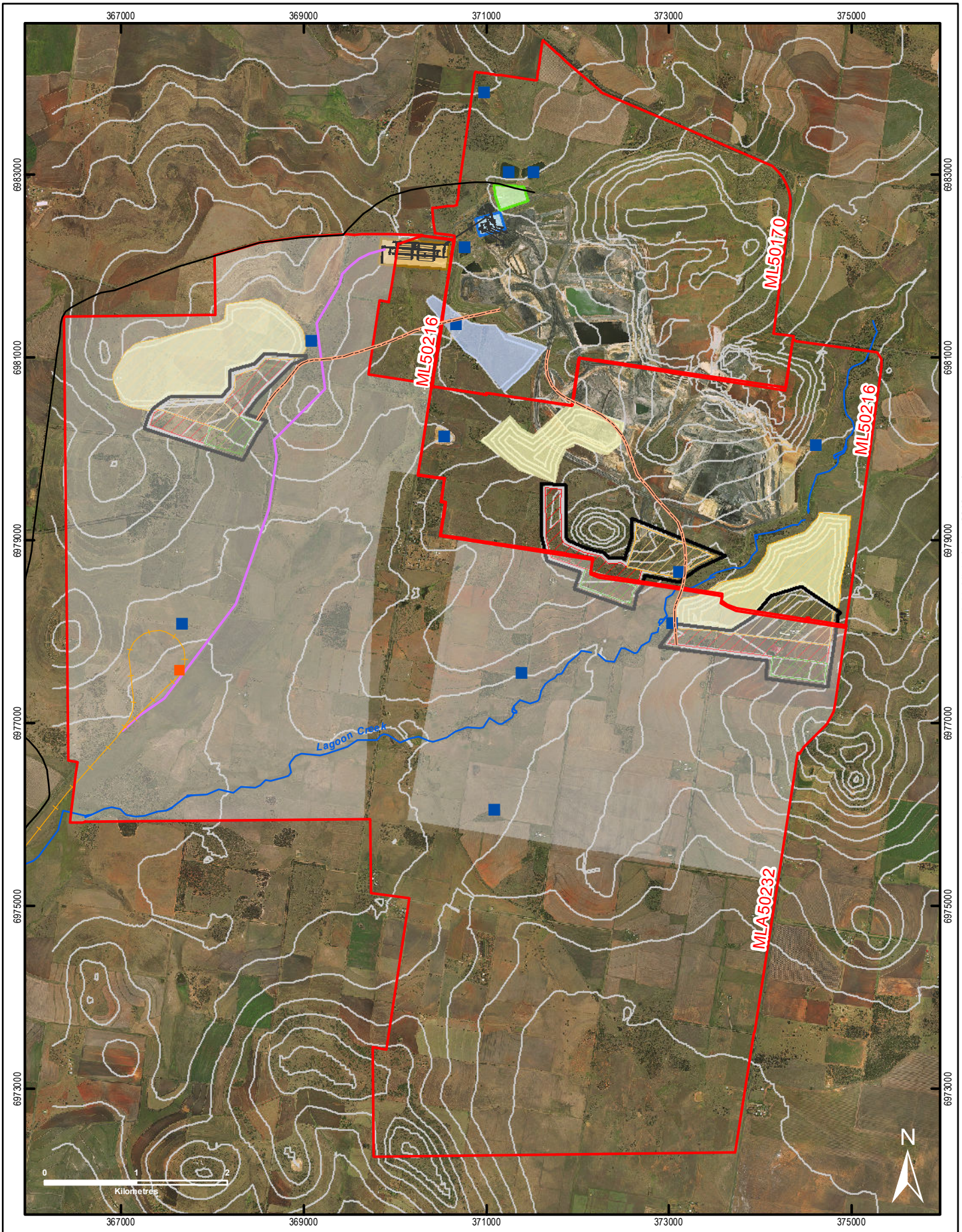
NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-10 - Mining Layout 2017

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 27/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130704_NewHope_ProjectDescription_Figure3-10_MiningLayout2017.mxd



LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographic Contours (10m)
- Mining Tenements
- Mining Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-11 - Mining Layout 2019

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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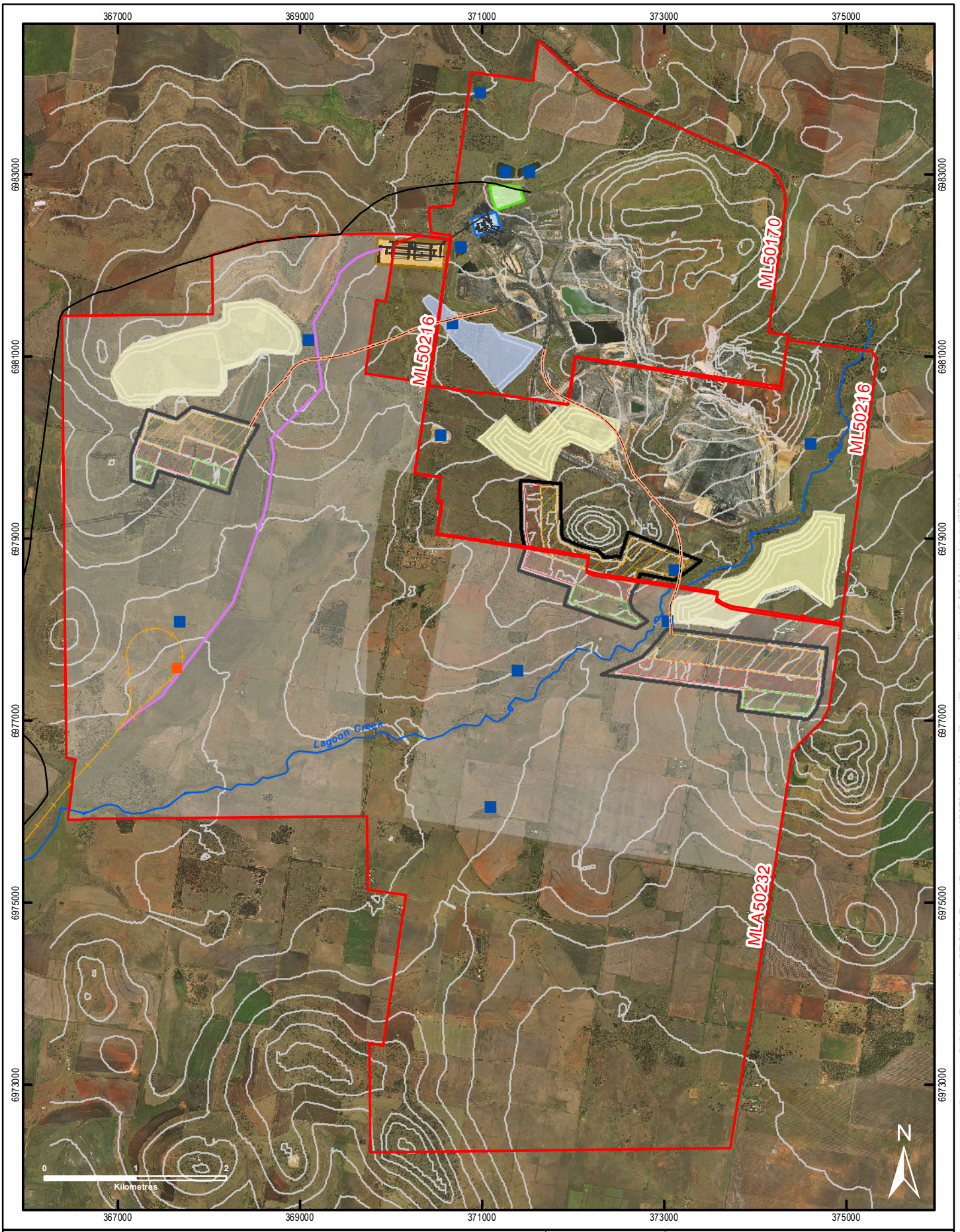

LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographic Contours (10m)
- Mining Tenements
- Mine Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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Figure 3-12 - Mining Layout 2021

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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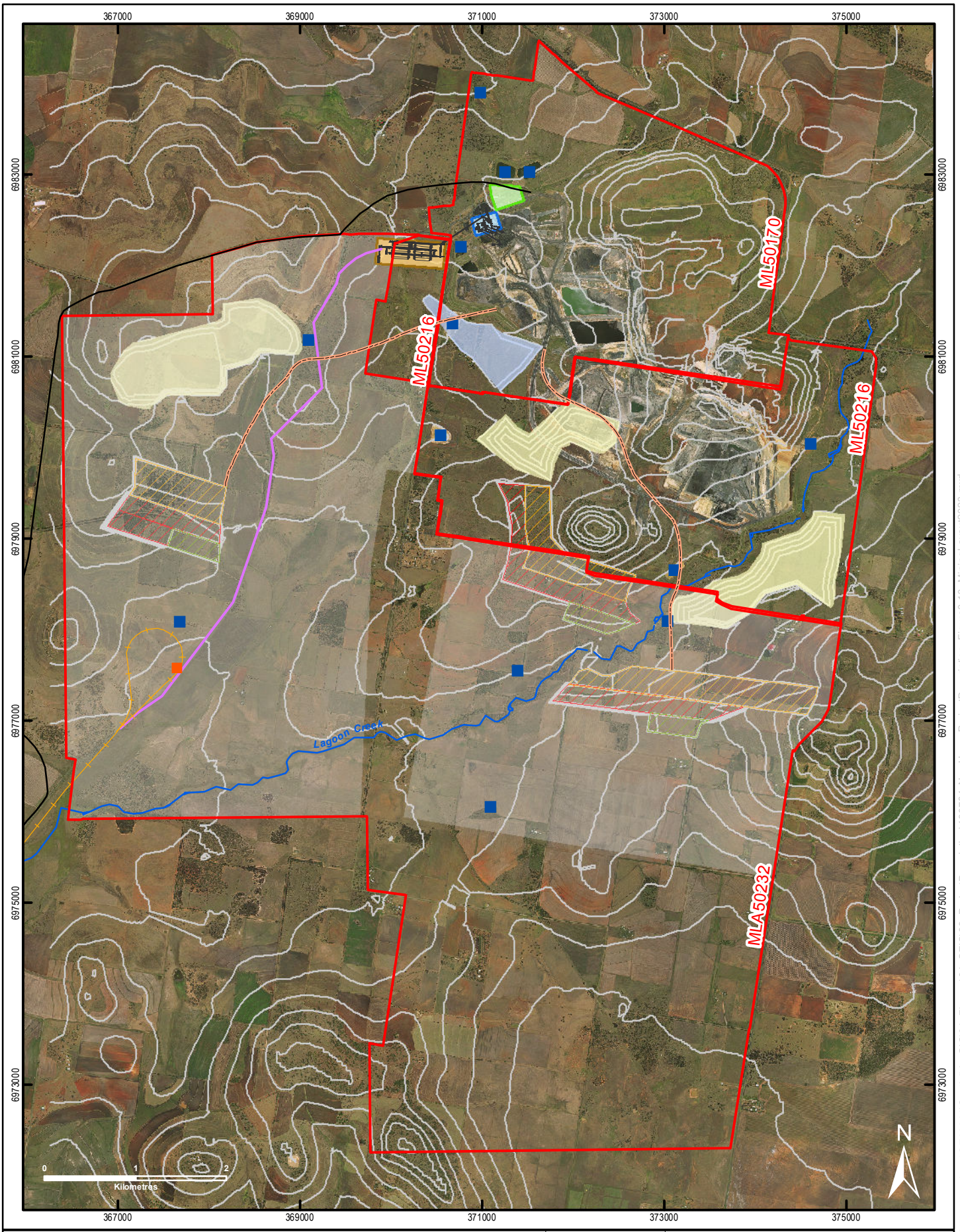

LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographical Contours (10m)
- Mining Tenements
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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Figure 3-13 - Mining Layout 2023

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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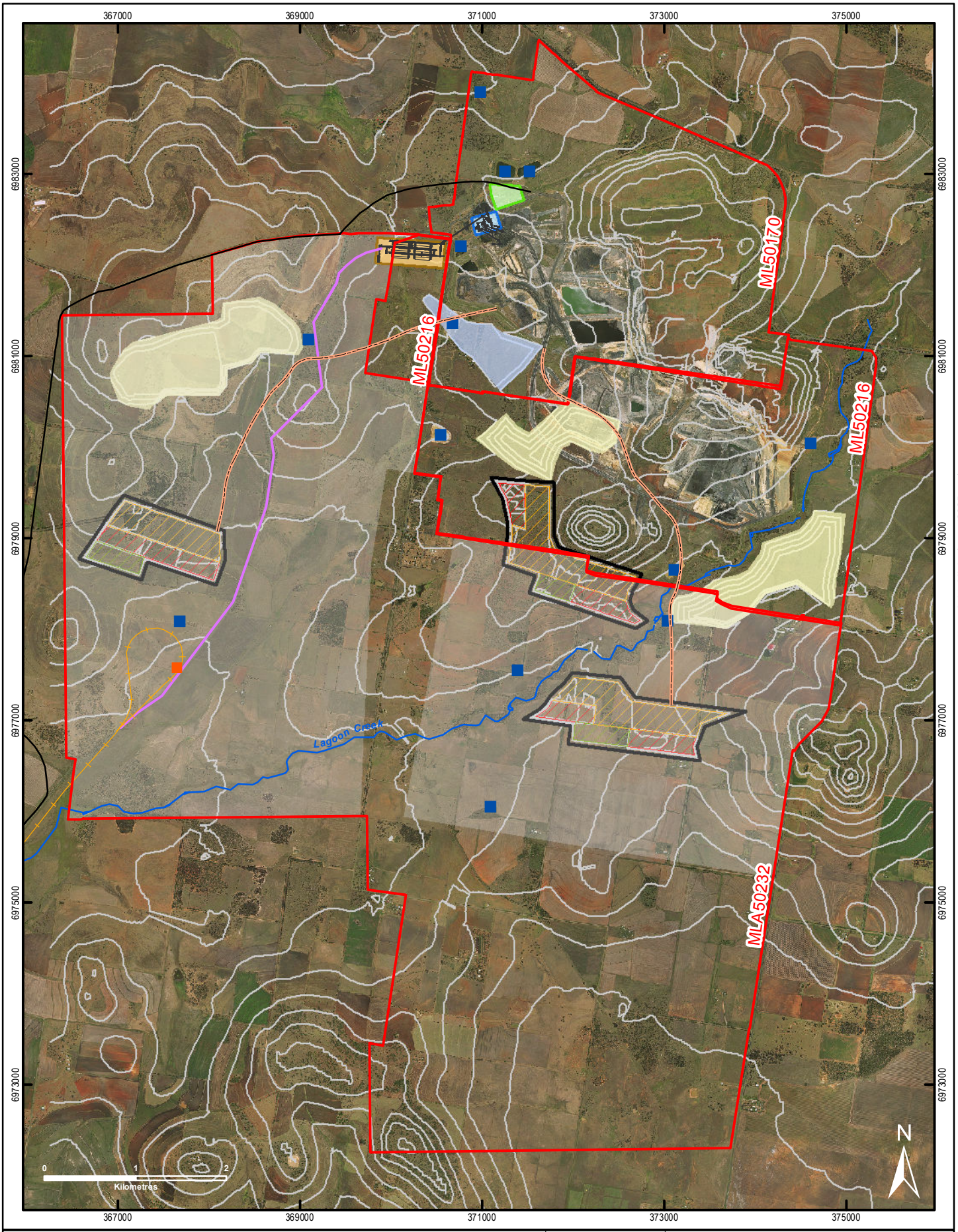

LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographical Contours (10m)
- Mining Tenements
- Mining Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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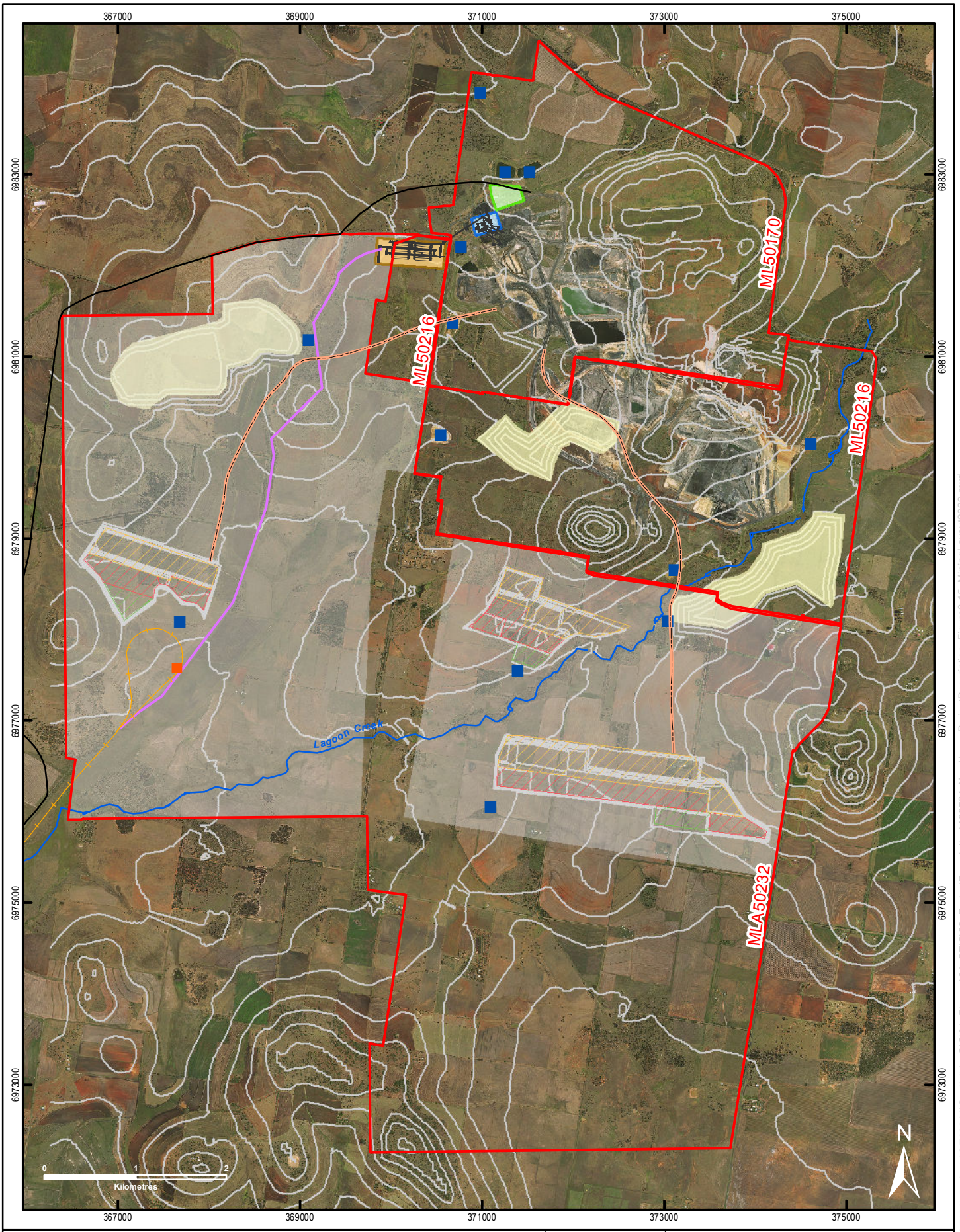
NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-14 - Mining Layout 2025

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 27/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130704_NewHope_ProjectDescription_Figure3-14_MiningLayout2025.mxd



LEGEND

- Train Loadout Facility
- Dams
- Rail Spur
- Creeks
- Jondaryan-Muldu Road Diversion
- Internal Road Haulage
- Haulage Route - Pit to ROM
- Topographical Contours (10m)
- Mining Tenements
- Mine Pit Area
- Dumping Area
- Void Area
- Pre-Stripping Area
- Out of Pit Spoil Dumps
- In-Pit Tailings Storage Facility (ITSF)
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area
- Proposed Extent of Surface Rights Area

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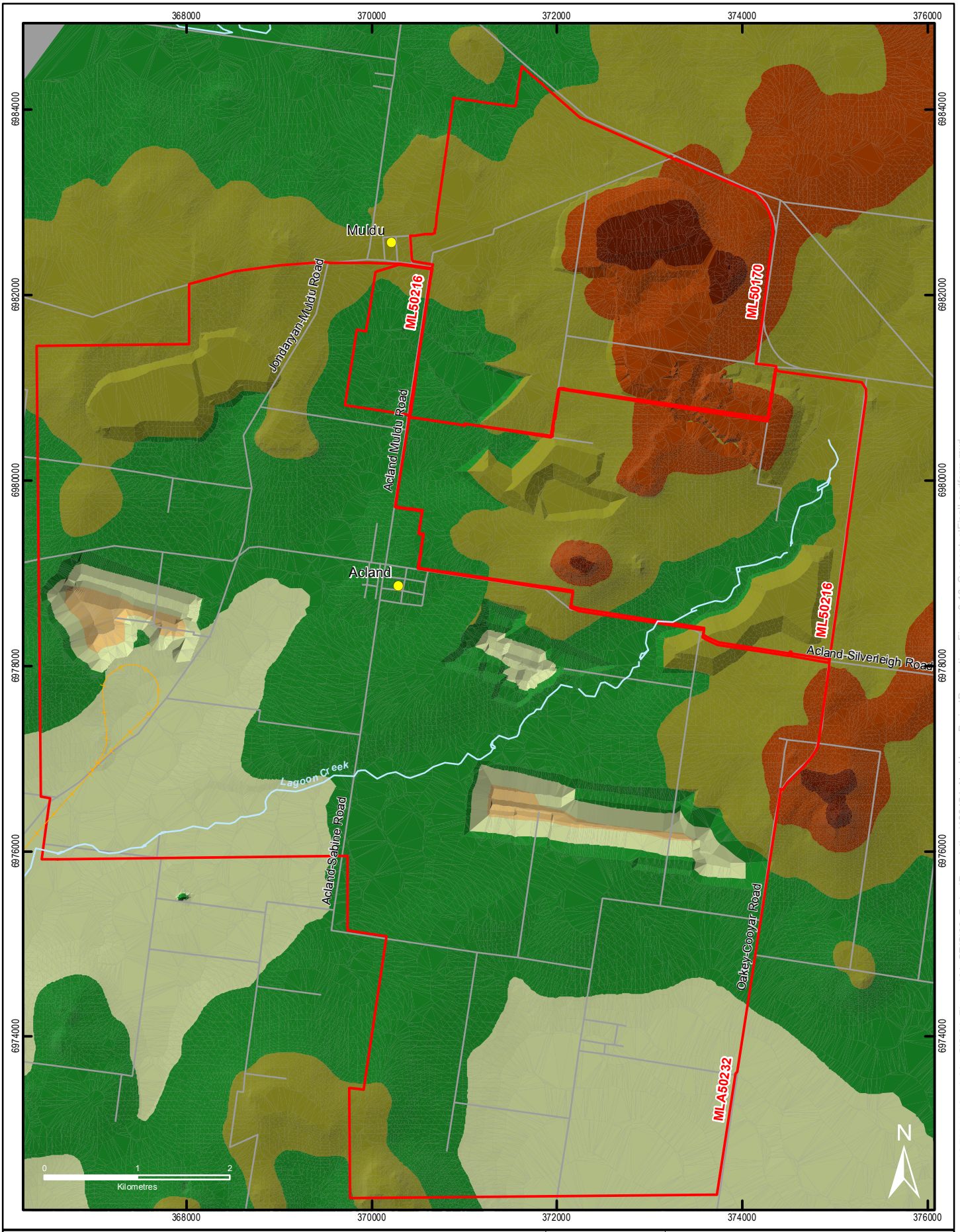
Figure 3-15 - Mining Layout 2029

Scale 1:55,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 18/07/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130704_NewHope_ProjectDescription_Figure3-15_MiningLayout2029.mxd



LEGEND

- Towns and Localities
- Rail Spur
- Roads
- Creeks
- Mining Tenements

Elevation

- 604 - 636
- 573 - 604
- 542 - 573
- 511 - 542
- 480 - 511
- 449 - 480
- 417 - 449
- 386 - 417
- 355

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NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-16 - Conceptual Final Landform

Scale 1:54,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 2/05/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130424_NewHope_ProjectDescription_Figure3-16_ConceptualFinalLandform.mxd

3.6.3 Target Production Rates

Current production at the Mine is 4.8 Mtpa of product coal for the granted Mining Leases. This production rate utilises NAC's current available CHPP capacity and transport capacity of product coal off-site to the various market locations. This production rate is dependent on geological, technical, financial, statutory approvals and market factors and may vary throughout the remaining mine life.

The increase of capacity to 7.5 Mtpa will not occur until:

- all approvals are acquired, including:
  - the successful completion of this EIS process, including a comprehensive community and stakeholder engagement program;
  - the issuance of an approval for EPBC 2007/3423 from the Commonwealth government;
  - the issuance of an amended EA to address the additional requirements of the revised Project by the DEHP;
  - the granting of MLA 50232 (for the proposed extent of 'surface rights' to conduct mining activities); and
  - receipt of ancillary approvals, for example road closures.
- construction of associated infrastructure required to produce and transport coal off-site at a production rate up to 7.5 Mtpa.

The production rate of 7.5 Mtpa is targeted to be reached after 2017. This mine plan allows sufficient time for the mining lease to be granted and the upgrades to the CHPP to be completed. More importantly, it also coincides with the depletion of the Glen Roslyn mining reserves. **Table 3–8** describes NAC's planned increase in production rates for the life of the revised Project.

Table 3–8 Planned Production Rates

Date From	Date To	Planned Production Rate
2013	2016	4.8 Mtpa
2017	2029	Up to 7.5 Mtpa

The revised Project's production rate will be closely governed by available road, rail and port capacities. Although the ability to increase production up to a 7.5 Mtpa rate occurs from 2017, NAC's current mine plan is to gradually increase production up to the proposed maximum level over a two year period. The multiple thin seam mining technique to be employed for the revised Project relies on highly experienced operators with the relevant experience required to mine the coal in an efficient and effective manner. Time will be required to train additional operators to provide the production increases. In addition, time will be required to fully open the two new mining pits within the revised Project site.

For example, due to the thin seams that are mined at Acland, there is typically a set mining sequence that is carried out many times over as mining progresses deeper down into a mining block. Typically the parting material needs to be either ripped and pushed, or drilled and blasted depending on its

thickness, followed by being loaded out. This same process then occurs for the coal material before the same mining sequence starts over again on the subsequent seam. In order for these processes to be carried out effectively, the mining production rate partially correlates to the area available (footprint of the active mine pit) for these activities to be carried out within.

Subsequently there is typically a number of blocks on a staggered sequence at differing levels down through the mining horizon that are being mined at any one time. This approach allows the different mining processes to be carried out at the same time in different areas of the mine pit, and therefore, positively influences the production rate that can be sustained.

In order to increase the production rate, the available area of production must be increased proportionately. The most cost effective solution to deliver this outcome is to open up more mining blocks in production at the same time. However, without a sufficient strike length within the mine pit, it could mean that there may be two strips overlapping in production at the same time, dramatically increasing haulage distances and subsequent mining costs. Alternatively, the strip widths can be widened to increase the mining area, although this too increases haulage distances and mining costs.

As a general rule the total mining rate able to be achieved from a single mine pit within the thin seam mining environment, in an efficient production scenario, is reliant upon the available pit strike length. The pit strike lengths available for the revised Project in the southern resource areas have been limited by the number of constraints placed upon the deposit. As such, this has had the effect of also potentially limiting production for a given pit/reserve area. Combined with this, is that the average mining ratio for the revised Project after the depletion of the Glen Roslyn resources (Stages 1 and 2), increases beyond current levels, so a greater quantity of material is required to be mined for a given production output.

The cumulative effects of increasing the production rate, combined with increases in mining ratio, will result in the need for a third mine pit to be developed. The three pit mining scenario offers the highest probability of achieving the planned increase in production without seeing substantial increases in operating costs. The concurrent operation of three mine pits also reduces project risk by providing a higher potential for blending, by facilitating a higher ability to target specific seams for unique shipments, and by lowering production risks from possible future geotechnical and groundwater issues.

3.6.4 Out-of-pit Spoil Dumps (Future Elevated Landforms)

The primary objective of the dumping strategy for the revised Project is to backfill voids where practical to reduce the void space remaining at end of the project life. In general, dumping is carried out in-pit. Out-of-pit dumping is kept to a practical minimum and generally only carried out when a box-cut is being developed, or when ITSFs have displaced some of the in-pit dumping volume.

The out-of-pit dumps for the revised Project have been designed based on current dump design principles using geotechnical support to back the design. Previous geotechnical analysis for the Acland operations has shown that the long term dump design should incorporate slopes of no greater than 17 degrees. This is a conservative estimate based on the material being fully saturated. Current NAC final rehabilitated dump slopes are built at 10 degrees where practical, substantially less than the geotechnical recommendations. To date, these slopes have remained stable with no evidence of

failure. These rehabilitated dump slopes are being used for a successful on-going cattle grazing trial by APC.

The revised Project's three out-of-pit spoil dumps will be designed based on the following criteria:

- the final spoil dump slopes are battered to between 8.5 and 17 degrees slope angle based on geotechnical and final land use considerations, with a target of 8.5 degrees;
- a 10 m berm will be included at least every 20 m in dump height; and
- water management structures such as contour banks and rock-lined water ways will be constructed as required with respect to the slope length and catchment area of each spoil dump face to be treated.

Figure 3–17 represents a schematic diagram demonstrating the conceptual engineering design parameters for the out-of-pit spoil dumps or elevated landforms.

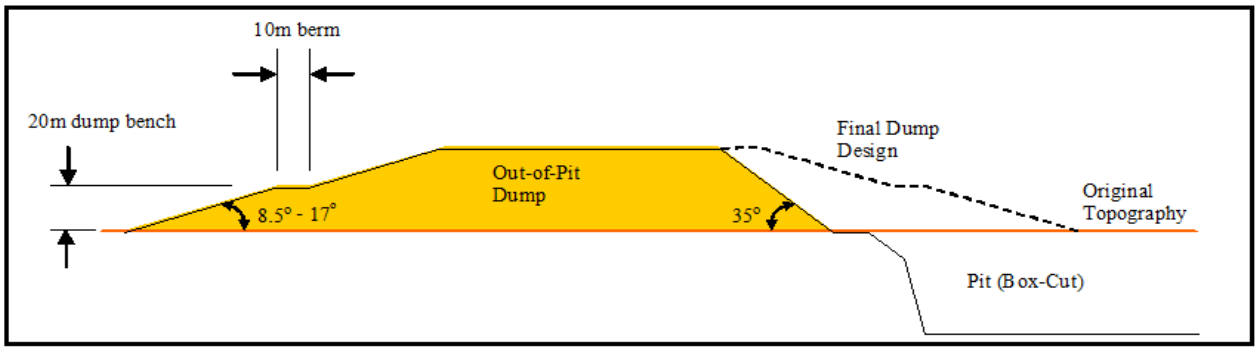


Figure 3–17 Spoil Dump Conceptual Design Plan

The revised Project's out-of-pit spoil dump volumes have been estimated based on operational demands that occur with thin seam mining and the physical parameters such as location and size of the box cuts required to open new mining areas. There are a total of three new mine pits that will be developed during the life of the revised Project and an additional ITSF, which displaces some dumping volume. The estimated volumes for each of the revised Project's box-cuts and corresponding out-of-pit spoil dumps have been estimated and are detailed in **Table 3–9**.

Table 3–9 Box Cut/Out-of-Pit Volumes

Deposit	Parameter	Volume
Manning Vale West	Strip Waste Volume	15.4 Mbcm
	Strip 2 Waste Volume x 50%	6.9 Mbcm
	Total	22.3 Mbcm
	@ 15 % Swell	25.6 Mbcm
Manning Vale East	Strip Waste Volume	14.8 Mbcm
	Strip 2 Waste Volume x 50%	5.6 Mbcm
	Total	20.4 Mbcm
	@ 15 % Swell	23.4 Mbcm
Willeroo	Strip Waste Volume	13.1 Mbcm
	Strip 2 Waste Volume x 50%	7.3 Mbcm
	Total	20.4 Mbcm
	@ 15 % Swell	23.5 Mbcm

The Manning Vale West box cut material is required to be dumped in an adjacent out-of-pit area. There are no mine pits adjacent to the Manning Vale reserve area. The closest void to the Manning Vale West box cut is the Centre Pit, which is planned to operate as an ITSF.

The east box cut of the Manning Vale East pit will be an extension of the existing South Pit resource located on ML 50216. Therefore, waste material mined from the box cut on the east side of Manning Vale East pit will be used to backfill the South Pit void. In the same way, overburden from the Manning Vale East box cut will be hauled to the final void in Centre Pit and used for final landform rehabilitation. The Willeroo pit will require another out-of-pit dump adjacent to the Willeroo box-cut.

The design volume required for the out-of-pit dumps and associated box cut volumes have been based on the following criteria.

- 100 % of waste rock within the first box cut strip is dumped out-of-pit.
- Due to the disparity between the low wall angles of the dump, and the angle of the highwall for the first strip, not all waste volume mined within Strip 2, can fit within the mine pit. Based on approximate geometries, 50 % of the waste material mined in Strip 2, will also be required to be dumped out-of-pit. This is consistent with previous out-of-pit dump volumes.
- The waste volume mined from the subsequent strips will be dumped within the confines of the previous strip. The volume of the product coal and tailings extracted will on average be similar to the level of swell that is achieved. Hence long term, the final in-pit dump profile will be on a comparative basis, similar to original topography. Depending on the interaction of the different yields achieved, material properties and their swell, along with the change in-pit floor heights, the final dump height will typically swing up and down between slightly surcharging the dump and dumping to a level slightly below that of the original topography.

- The swell factor used for out-of-pit dump design volumes is 15 %. Based on previous work conducted at a similar operation, the swell was identified as being potentially less than 10 % on average. Hence 15 % is a conservative number whilst using the truck and excavator/loader mining method with minimal dump heights.

NAC's key goal for its elevated landforms is to ensure they can support a sustainable grazing regime as the proposed final land use. NAC will use a targeted monitoring program of accepted rehabilitation success criteria and grazing trials to scientifically assess rehabilitation performance over time and to develop a body of positive evidence to support future surrender of the revised Project's mining leases. The APC and independent third parties will play a pivotal role in this process.

Figure 3–16 presents the locations of the revised Project's out-of-pit spoil dumps, while **Figure 3–16** depicts the conceptual final landform.

3.6.5 Void Design and Depressed Landforms

The revised Project's final landform design comprises a two staged approach initially involving the completion of mining activities which will result in a void being created in each of the three mine pits. The second stage involves the backfilling and re-shaping of the voids to create depressed landforms. These stages are described below.

Void Design

The objective of the dumping and in-pit tailings management strategies are to limit the area and quantity of voids that remain once mining has been completed. Based on the current mine design, three voids are planned to remain at the completion of mining, which correspond to the three mine pits that will be operating throughout the life of the revised Project.

The revised Project's three final void areas are planned to be backfilled and reshaped into depressed landforms. As previously explained, the void that remains from the remnants of Glen Roslyn South Pit is planned to be backfilled as part of the box-cut development of the Manning Vale East Pit, and with tailings material capped with a sustainable cover.

The designed void space that remains at the completion of mining has been based on the following:

- the location of the void aligns with the location of the mine pit as determined by the mine schedule;
- the void area takes into account the areas associated with pre-stripping, coal mining and the adjacent strip partially being backfilled; and
- voids before being reshaped, are based on the highwall slope design of 45 degrees to the top of coal and 65 degrees to mine pit floor, and a low-wall slope design of 25 degrees (average).

In addition, the revised Project's void locations are determined by the mining sequence and the final two to three strip widths remaining as a void at the cessation of mining. The revised Project's estimated final mine pit locations and sizes prior to rehabilitation are provided in **Table 3–10**.

Table 3–10 Final Mine Pit areas before rehabilitation

Resource Area	Size (ha)
Manning Vale West	124
Manning Vale East	111
Willeroo	222
TOTAL PIT AREA	457

Depressed Landforms

To facilitate the rehabilitation of the residual voids, the highwalls and low walls of these voids will be battered down to develop safe, stable and sustainable 'depressed landforms'. The angles for the depressed landforms will be in the order of 10 degrees and match the rehabilitation design angle of the out-of-pit dumps (elevated landforms). At 10 degrees, cattle can safely graze these rehabilitated slopes and therefore, sustainable grazing practices can be employed as the final land use. The estimated rehabilitation volumes for development of the depressed landforms are presented in **Table 3–11**.

Table 3–11 Rehabilitation Volumes for the Depressed Landforms

Depressed Landform Area	Approx Rehab Cut/Fill Volume
ITSF 4 + ITSF 5	0.35 Mm^3
Manningvale West Pit	7.4 Mm^3
Manningvale East Pit	2.0 Mm^3
Willeroo Pit	10.4 Mm^3
Total	20.15 Mm^3

Final Landform

The final landform based on the development of elevated and depressed landforms as at 2029 is presented in **Figure 3–16**. A comprehensive assessment of the revised Project's final landform is located in **Chapter 4**.

NAC plans to explore additional opportunities to reduce the area and volume of the out-of-pit spoil dumps and residual voids through further backfilling operations over the life of the revised Project. Importantly, this option is not always economically feasible due to increased haulage requirements and the requirement to 'double handle' spoil, which significantly impacts operational costs and the overall economics of the revised Project.

Through the on-going mine planning process, beneficial outcomes for landform design and development will be continuously explored, assessed and measured to ensure the most efficient methods are adopted. Mine planning is an iterative process that is sensitive to many operational factors and as a consequence is constantly evolving in an effort to generate the best possible economic and environmental outcomes for the revised Project.

As an extensive background landowner in the region, the NHG will be commercially driven to ensure this land can support a beneficial and sustainable post-mine land use. Currently, the NHG possesses the same business imperatives for its mining operations within the West Moreton district, near Ipswich, where mine closures are imminent, and as a result, innovative and valuable post-mine land use options and ideas are being contemplated. This knowledge and experience will be a useful planning tool in the future when the revised Project approaches closure.

As a minimum, NAC's rehabilitation efforts for the out-of-pit spoil dumps and despressed landforms will ensure that these locations:

- satisfy staturatory requirements for post mine land use
- are rehabiltated so that the risks to public safety and stock minimised;
- are stable from an erosion perspective after the completion of mining;
- possess a suitable, self-sustaining vegetative cover that is compatible with the agreed final land use; and
- do not adversely impact the downstream receiving environment.

3.6.6 Mining Equipment

The revised Project's equipment requirements were determined by a process of iterative scheduling of quantity, personnel roster and size of proposed equipment. The following parameters were used to determine equipment requirements:

- Quantity of production units (excavators and loaders) was determined by the mining schedule to maintain target production rates.
- Quantity of trucks calculated based on the number and type of production units installed within the mining schedule combined with haulage distances.
- Number of auxiliary fleet determined partially on the number of mine pits operating at any one time along with the total number of production fleet.

This process has ensured that the coal production profile and overburden volumes are acceptable to achieve a 7.5 Mtpa mining case. The mining equipment used will include excavators for removing overburden and thick parting material with wheel loaders predominantly used to mine the coal and thin partings. In order to provide a consistent coal output, there are some instances where loaders will also be used to mine thick partings and/or overburden to limit coal production. The equipment requirements assume a progression of swapping 180 t class trucks for the larger 220 t class trucks for use with the excavator fleets. In line with this, spare 180 t class trucks will be transferred to the wheel loader fleet and used for coal haulage, negating the requirement for 140 t class trucks on-site. This will also require work on the RoM pad to enable 180 t class truck Coal loads to dump into the crusher hoppers.

Currently, there is a mix of 700 kW wheel Loaders and a 900 kW wheel Loader being used on-site for mining the coal and parting material. However, the 700 kW wheel loader units may be replaced with larger 900 kW or 1500 kW wheel loaders to better match the 180 t class trucks. **Table 3–12** summarises the mining equipment required for the revised Project.

Table 3–12 Planned Mining Equipment

Plant & Equipment	Machinery Type	Quantity
Production Equipment	500 t Excavator	1
	350 t Excavator	2
	900 kW Wheel Loader	4
	700 kW Wheel Loader	To be confirmed
	220 t Rear Dump Trucks	7
	180 t Rear Dump Trucks	20
	100 t Track Dozer	12
	65 t Track Dozer	2
	50 t Track Dozer	1
	100 t Wheel Dozer	3
	50 t Drilling Rig	2
	140 kL Water Truck	1
	55 kL Water Truck	2
	400 kW Grader	2
	220 kW Grader	2
Ancillary Equipment	55 t Fuel & Lube Truck	1
	Troop carriers	8
	Fitters Trucks	3
	Utility Vehicles	15
	Staff Vehicles	35
	Pumps	10
	Tyre Handlers	1
	Forklifts	2
	Cherry Pickers	1
	Lighting Plants	35
	Crane 30 t	2
	Low Loader 100 t	1

3.6.7 Hours of Operation

Mining activities will be conducted at the Manning Vale West and Willeroo mine pits either on a six day, 24 hr basis or a seven day, 24 hr basis depending on the mining schedule and the type of mining equipment utilised. The Manning Vale East Pit will be closely monitored and managed to satisfy noise, vibration and air quality constraints at Acland and surrounds and may include mitigation steps such as the reduction or cessation of mining operations during heightened sensitive periods .It is envisaged that the Manning Vale East pit blocks closest to Acland will operate on a daytime only basis, unless

real time monitoring of key environmental constraints allow otherwise. Certain mining related activities such as blasting will only be undertaken during daylight hrs and not on public holidays and Sundays. The CHPP activities will continue to be conducted on a seven day, 24 hr basis. The TLF will operate on a seven day, 24 hr basis.

3.6.8 Blasting Activities

Blasting will be used to loosen in-situ overburden/interburden to allow more efficient operation of the mining process. Blasting occurs on an ongoing basis with a permanent crew based on-site. On average, blasting will occur once or twice a week during daylight hrs in each of the operational mine pits, equating to an average of two to three blasts per week when three mine pits are operating. Over the life of the revised Project, adverse geological conditions (areas of harder in-situ overburden) may be periodically experienced in each operational mine pit, and as a consequence, there may be a corresponding increase in the weekly blast rate of the impacted mine pit or mine pits until conditions improve. Overburden will be blasted at depths from 7 m to 50 m with inter-burden greater than 2 m in thickness also blasted.

Each blast will use up to 650 t of ammonium nitrate based bulk explosive and possess an average powder factor of about 0.3 kg/bcm. A water resistant emulsion product will be used when wet boreholes are present. Crushed basalt is commonly used as stemming material and is planned to be utilised for the revised Project's blasting requirements. All basalt used for stemming purposes is sourced from within the Mine.

Blast holes of 229 mm will be drilled using a conventional rotary drill. The typical blast pattern area per blast will be 4 ha to 5 ha. All thin parting intervals of less than 2 m will be ripped using dozers and transported by front-end loaders. Blasting of coal seams is not planned.

NAC have employed external contractors to provide drilling and blasting services at the Mine with this arrangement likely to continue. NAC employs a specialist Drill and Blast Coordinator who works closely with the external contractors and assist with blast management. Two explosive storage magazines have been established on-site for the separate storage of explosive initiators such as detonators and boosters. These facilities will be upgraded appropriately to accommodate the revised Project's increased explosive requirements and be relocated to a more centralised location to improve operational efficiency. A bulk explosives storage facility has also been commissioned to provide for appropriate storage and handling of bulk explosives.

NAC will ensure the necessary approvals under the *Explosives Act 1999* are obtained from the NRM for the proposed changes in explosive management for the revised Project. The safety aspects of blasting activities will continue to be conducted in compliance with the CMSH Act. NAC will also ensure that its current blast notification protocol for near neighbours, blast monitoring regime and fume management procedures are updated at a rate commensurate with the proposed mining activities.

3.6.9 Night Lighting

Permanent lights will be located at the CHPP and at the TLF. General area lighting will be required for the RoM pad and RoM dumping station, reject bin, CHPP modules, warehouse compounds, workshops, heavy vehicle hardstand, product loading and stockpile areas. Low intensity general

lighting and safety lighting will be sufficient for the conveyor walkways, administration blocks, light vehicle car park, crib facilities, ablutions block and additional areas such as the water treatment plant, sewage treatment plant and pump pontoons. It is anticipated that LED lighting will be used where practical.

The TLF is to be relocated approximately 8 km north east of the current JRLF. At the TLF, it is envisaged that product coal will be side-tipped from trucks into a reclaim bunker and conveyed to either of two large storage bins. When required to load a train, mechanical feeders underneath these storage bins will discharge directly into coal wagons.

General area lighting will be required for truck discharge into the reclaim hopper and for the rail loading bin. Low intensity general lighting and safety lighting will be required for the area around the bin structures. Light emitted from the new TLF area is expected to be reduced in comparison to the JRLF.

Lighting in the mining areas is predominantly mobile lighting plants used to illuminate active work areas, such as mine pit faces, dump areas and haul roads. A proportion of the lighting sources for mining will be situated on highwalls at ground level and mainly directed downwards into the mine pits. Other lighting in mining areas will originate from mobile lighting plants located in the mine pits below original ground level and will contribute to a general glow in the night sky. In-pit machinery and mobile equipment will also contribute to the night time glow. Mobile equipment on the surface, for example, haul trucks carrying spoil and RoM coal, will contribute to both the general glow and direct illumination.

Due to the rural landscape within and surrounding the Study area, night lighting is expected to create a glow in the night sky that will be visible from the surrounding region and nearby residences. However, as the Mine already provides some luminance in the night sky, it is unlikely that the revised Project will substantially increase the existing visual impact of night time glow. The impacts on fauna from night lighting are expected to be minimal due to the location and extent of remnant vegetation. NAC will continue to use its 24 hr contact number for near neighbours to allow quick rectification of directional lighting issues from mobile lighting units.

3.6.10 Site Access and Haul Roads

The revised Project's proposed dedicated site accesses for heavy and light vehicles and the key internal haulage route in the context of the surrounding road network are illustrated in **Figure 3–18**. **Chapter 13** presents further detail relating to the traffic expected as a result of the revised Project.

Access to the revised Project site is proposed via the following routes:

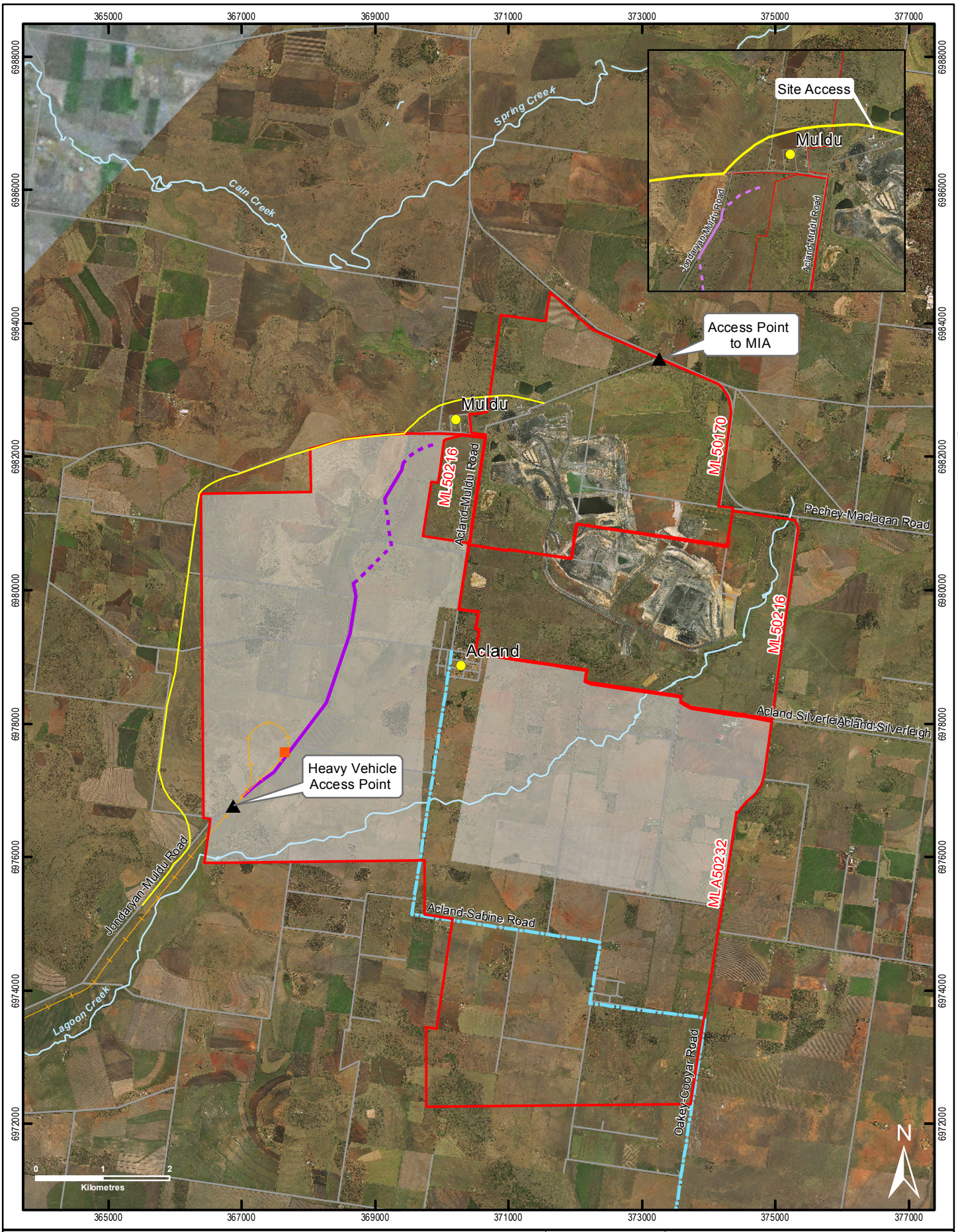
- the re-aligned Jondaryan-Muldu Road will provide access for heavy and light vehicles; and
- the Oakey-Cooyar Road will provide access for light vehicles only.The re-aligned Jondaryan-Muldu Road as shown in **Figure 3–18** runs north-east to the west of the Manning Vale resource area. This re-aligned road will link the revised Project site at Muldu to the Warrego Highway to enable product coal transportation to local customers in southeast Queensland and to allow daily light and heavy vehicle deliveries to the revised Project site for operational purposes.

The Oakey-Cooyar Road will link the revised Project site to the local road network and Oakey and will provide the main access for light vehicles. A dedicated internal light vehicle road network will be designed and constructed to ensure minimal operational conflicts when accessing the revised Project's administration area.

Existing internal access tracks will be used for all mining operations to minimise disturbance areas. Current haul and internal service roads on MLs 50170 and 50216 will be maintained and upgraded as required to accommodate the expansion in mining operations. Access and egress through the revised Project site will be limited to controlled access points only.

The existing Jondaryan-Muldu Road that traverses to the east of the Manning Vale West resource area will be used as an internal haul road connecting the CHPP Precinct within the MIA to the TLF as shown in **Figure 3–18**. The northern section of the Jondaryan-Muldu Road at Campbells Creber Road will be re-aligned to the east of the Manning Vale West resource area to accommodate mining operations. Other new haul and internal service roads will be constructed on an as required basis and where possible will utilise existing tracks within the new mining lease area.

Mine haul roads will follow existing design criteria subject to the requirements of the CMSH Act, including a design speed of 60 km/h, at least 30 m wide and two-way lanes. The maximum grade of the haul roads outside the mine pit areas will be 10 % with a maximum cross fall of 3 %. Safety berms will be constructed in areas where required.



LEGEND

- Towns and Localities
- Access Point
- Train Loadout Facility
- Rail Spur
- Roads
- Creeks
- Internal Haulage Road Diversion
- Internal Road Haulage
- Access to Acland
- Jondaryan-Muldu Road Diversion
- Mining Tenements
- Proposed Extent of Surface Rights Area

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-18 - Site Access and Internal Haulage Route

Scale 1:75,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130424_NewHope_ProjectDescription_Figure3-18_SiteAccessAndInternalHaulageRoute.mxd

3.6.11 Road Diversions and Closures

Road Diversions

The existing alignment of the Jondaryan-Muldu Road traverses the eastern portion of the Manning Vale West resource area. Therefore, the construction of the Jondaryan-Muldu Road realignment is critical to allow NAC access to the Manning Vale West resource area under the current mine plan.

The re-aligned section of Jondaryan-Muldu Road will follow existing road reserves and traverse property owned by APC as illustrated within **Figure 3–19**. The re-aligned Jondaryan-Muldu Road will remain a public road under TRC control and will provide the primary heavy vehicle and secondary light vehicle access routes to the revised Project site.

NAC possess sufficient base materials for the construction of the proposed road diversion to support a high mass road for heavy vehicle transport. Works associated with the construction of the road re-alignment are expected to start during 2015 to coincide with the grant of MLA 50232.

The TRC has a long term contract with NAC for the maintenance and upgrade of the existing Jondaryan- Muldu Road alignment. NAC's relationship with TRC for this type of ancillary works has been economically beneficial for the local area. NAC will continue to advance discussions with the regulatory agencies in relation to the re-aligned Jondaryan-Muldu Road. NAC will also consult with local landowners potentially impacted by the Jondaryan Muldu-Road diversion to ensure appropriate detours are available.

The existing alignment of Cherrys Road runs from Oakey-Cooyar Road and traverses north of the MIA site. Currently, Cherry's Road intersects with the internal haulage road which provides access to the revised Project site. The realignment of Cherrys Road will be independent of the internal haulage road system. The following access roads are proposed along the realigned Cherrys Road during the operation phase of the revised Project as shown in **Figure 3–19**:

- Car Park Access Road - provides light vehicle access to the car park facility adjacent to the MIA; and
- Service Road - provides access for services vehicles entering the MIA and CHPP Precinct.

Cherrys Road will remain a public road under NAC control and will be used as the primary light vehicle access route to the MIA and the car park facility for the revised Project site.

Road Closures

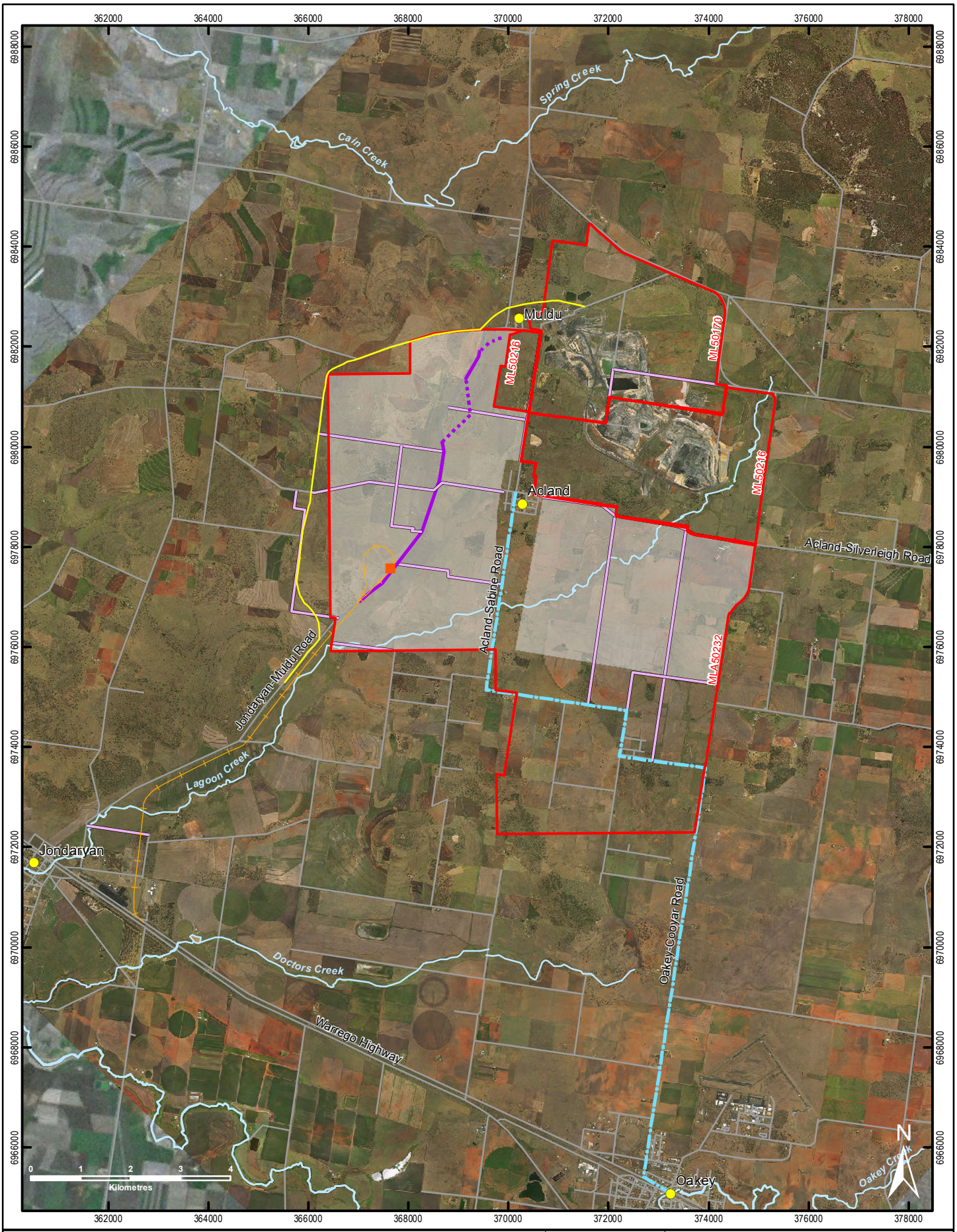
Table 3–13 and **Figure 3–19** outlines the proposed road closures required within MLA 50232. All road closures will be implemented on permanent basis for the life of the revised Project.

NAC's consultation program for the revised Project has captured the public's main concerns surrounding the proposed road closures**.** A comprehensive analysis of the key concerns raised by stakeholders throughout the EIS process is provided in **Chapter 19**. NAC will consult with the relevant agencies to ensure the regulatory requirements for the road closures are completed to coincide with the grant of MLA 50232.

Table 3–13 Proposed Road Closures

Road	Sections	Closure reason
Acland Road	Between the re-aligned Jondaryan Muldu Road and western boundary of Acland town	Mining area
Acland Road	Between the Oakey-Cooyar Road and the eastern boundary of Acland town	Mining area
Acland-Muldu Road	Between Francis Street and Muldu Road	Mining area
Bothams Road	Between Acland Sabine Road and Greenwood School Road	Mining area
Campbells Creber Road	Between the existing Jondaryan Muldu Road and Acland Muldu Road	Mining area
Conroys Road	Between the existing Jondaryan Muldu Road and Acland Sabine Road	Mining area
Cookes Road	Between existing Jondaryan Muldu Road and Acland Brymaroo Road	Re-alignment of Jondaryan Muldu Road
Greenwood School Road	Between Acland Road and Bothams Road	Mining area
Jondaryan–Muldu Road	North of Cookes Road to Muldu Road	Re-alignment of proposed Jondaryan Muldu Road
McLaughlins Road	Between existing Jondaryan Muldu Road and Osheas Road	Mining area
Osheas Road	Between the existing Jondaryan Muldu Road and the realigned Jondaryan Muldu Road	Re-alignment of Jondaryan Muldu Road
Willeroo Mine Road	Between Acland Sabine Road to Acland Road	Mining area
Woods Road	First section that runs West-East from the existing Jondaryan Muldu Road	Mining area

These road closures are scheduled to be implemented concurrently once the realignment of Jondaryan-Muldu Road is completed and MLA 50232 is granted. Appropriate signage and infrastructure will be in place when these closures are implemented to warn public of the restricted access. NAC will also ensure that the public are appropriately advised via its various public communication tools (e.g. newsletter) in use throughout the region.



LEGEND

- Towns and Localities
- Train Loadout Facility
- Roads
- Rail Spur
- Jondaryan-Muldu Road Diversion
- Access to Acland
- Internal Haulage Road Diversion
- Internal Road Haulage
- Road Closures
- Mining Tenements
- Proposed Extent of Surface Rights Area

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NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-19 - Proposed Road Closures

Scale 1:100,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130424_NewHope_ProjectDescription_Figure3-19_ProposedRoadClosures.mxd

Access to Acland

Access to Acland will be maintained via the existing Acland-Sabine Road which connects to Oakey-Cooyar Road, approximately eight kilometres north of Oakey as depicted in **Figure 3–13**. Directional signage to Acland will be provided at key locations to ensure the surrounding community are aware of the changes. The Acland-Sabine Road will be upgraded to an appropriate standard to support its role as the main access to Acland.

The following roads within Acland will remain accessible to the surrounding community:

- Acland-Sabine Road;
- Francis Road between Church Street and Acland-Sabine Road;
- Church Street between Francis Street and Acland Road;
- Acland Road between Francis Street and west of King Street;
- George Street;
- King Street;
- Mary Street;
- Allen Street;
- Bellevue Street;
- Clark Street;
- South Street;
- William Street; and
- Francis Street from Church Street north to Acland No. 2 Colliery.

3.6.12 Workforce Arrangements

Construction Phase

The revised Project at peak construction on-site is expecting up to require 260 construction workers at any one time. Apart from periodic peaks for major tasks, the construction workforces will fluctuate over the proposed 26 month construction phase. Construction tasks will require skilled and unskilled labour. NAC's intention is to utilise local employment options where possible, but will also require employment from outside the region for certain specialised construction jobs.

No construction camps will be located on-site during the construction phase of the revised Project. Generally, construction workers will be expected to source their own accommodation.

Mining and construction personnel will travel to and from the revised Project site based on their specific working arrangements. Importantly, the arrival and departure times for mine and construction workers will be staggered by at least half-an-hour to minimise traffic and other interactions.

Transport of personnel to and from the revised Project site will be undertaken by private vehicles, nominally from the nearby towns of Oakey, Jondaryan and Toowoomba.

Operational Phase

The revised Project at a production rate of 7.5 Mtpa will require up to 435 people. The Mine currently employs approximately 300 people. Therefore, an additional 135 people will need to be employed before the 7.5 Mtpa production rate can be achieved. Workforce numbers will steadily rise during the life of the revised Projectto allow the planned production rate to be maintained while overburden removal requirements increase.

The new employees will either be sourced locally or further abroad depending on the position's skill requirements and whether job related knowledge and skills can be gained through internal training. The use of local people for employment is not expected to put an additional burden on the region's accommodation resources. The revised Project's staged ramp up in production may also help reduce the demand curve for additional accommodation.

New people moving to the region for employment by the revised Project possess the option of residing in several regional centres, such as Toowoomba, Oakey and Jondaryan. Currently, approximately 45% of the existing workforce permanently lives in Toowoomba. Therefore, it is expected that a majority of new employees will follow this trend. As a result, approximately 58 additional people are likely to take up accommodation in Toowoomba. The remaining new employees seeking permanent accommodation are likely to take up accommodation in Jondaryan, Oakey or the surrounding district. Currently, 35% of the workforce permanently resides within Jondaryan, Oakey and the surrounding district. This trend would represent approximately 45 additional people seeking permanent accommodation within Jondaryan, Oakey or the surrounding district. The remaining 20% of the workforce reside in Warwick, Goondiwindi, Kingaroy and surrounds and may residewithin the TRC area during their working shifts and return to their permanent residence on their off shifts.

The greater TRC area's growing real estate market and service bases are expected to comfortably cover this demand, particularly as it will be spread across several years.

The personnel requirements for the life of the revised Project have been identified on an annual basis at the 7.5 Mtpa production case and are outlined in **Table 3–14**. The expanded workforce will comprise approximately 30 management, 35 professional, 85 technical trade and 280 mining personnel. NAC will source the additional workforce of 135 people from local and other external areas depending on the specific skills required, the status of the labour market at the time, the trainability of the advertised position and the proposed timetable of employment required to meet the scheduled ramp up in production of up to 7.5 Mtpa.

Table 3–14 Project Workforce

Discipline	Role	2018FY	2024FY
Management	General Manager	1	1
	General Managers Assistant	1	1
Safety	Safety Manager	1	1
	Safety Training Coordinators	2	2
	Trainer & Assessors	1	2
Wash plant Operations	CHPP Manager	1	1
	CHPP Superintendent	1	1
Mining	Mining Manager	1	1
	Superintendents	2	2
Maintenance	Maintenance Manager	1	1
	Maintenance Superintendents	1	1
	Maintenance Planners	5	5
	EEM	1	1
Technical Services	Technical Services Manager	1	1
	Senior Mining Engineer	1	2
	Mining Engineers	3	3
	Surveyors	3	3
	Environmental Specialists	2	2
	Geologist – Coal Quality	3	3
	Project Manager	1	1
	Drill and Blast Supervisor	1	1
Business Management	Business Support Officer	1	1
	Receptionist	1	1
	Purchasing Officers	1	1
Total Staff		37	39
Supervisors/Operators	Maintenance Supervisors	4	6
	Pit Supervisors	7	10
	Plant Tradesmen	16	24
	Pit Operators	197	267
	Pit Tradesmen	77	89
Total Mining Personnel		301	396
TOTAL LABOUR REQUIREMENT		338	435

3.7 Mine Infrastructure and Facilities

3.7.1 Overview

The associated mine infrastructure requirements for the revised Project includes the existing infrastructure located mainly on ML 50170, a new infrastructure area on MLA 50232 and the off-site infrastructure for coal transportation.

The existing infrastructure on ML 50170 comprises an administration area, workshop and washdown bay, fuel storage area, two process water dams, two CHPP modules, RoM stockpile pad, product stockpile pad, stacking and loading facilities, access roads, a series of licensed water bores, a number of water management structures, a former out-of-pit TSF (under rehabilitation), and an operational ITSF. The existing infrastructure on ML 50216 comprises a number of water management structures and access roads. The details of these facilities are provided in the EIS for the New Acland Coal Mine Stage 2 expansion (NHCA 2006).

The essential infrastructure required to facilitate mining for the revised Project will comprise:

- a construction period from 2015 to 2017, initially involving the construction of site access, a rail spur and balloon loop, roads (including re-alignments), water management structures and additional supporting infrastructure;
- upgrade of the existing CHPP Precinct, including RoM and product coal stockpile areas, RoM 1 and RoM 2 Upgrades to handle 180 t class haultrucks and supporting infrastructure on ML 50170;
- continued use of tailings disposal within ITSFs progressively located within active mine pit area;
- continued use of raw water supply from the WWRF within Toowoomba via an approved 45 km pipeline that is currently fully operational;
- continued use of a mine surface water management system involving various water management structures staged to accommodate the progressive development of the Mine and based on the principles of diverting clean water and capturing and reusing dirty water from disturbed areas;
- upgrades to the existing administration and heavy vehicle maintenance area on ML 50170;
- relocation and potential upgrade of the current power supply;
- diversion of the Jondaryan-Muldu Road around the Manning Vale West resource area;
- decommissioning of the JRLF;
- construction of a new 8 km rail spur line and balloon loop from Jondaryan onto MLA 50232;
- construction of a new MHF and TLF within MLA 50232;
- relocation and potential upgrade of the existing local telecommunication network; and
- Relocation of the mine 33 kV power supply and the district 11 kV power supply ring feeder power line.

The majority of the new infrastructure requirements will be located on MLA 50232 and are expected to be designed and constructed between 2015 and 2017.

An area of approximately 178 ha is required for construction and operation of the revised Project's new infrastructure on MLA 50232 such as the CHPP Precinct, haulage routes, MHF, MIA, Rail spur and balloon loop and TLF. The proposed construction site is located near the Lagoon Creek flood

plain and as a result, possesses a relatively flat topography. The proposed construction site is located on a grazing and dryland cropping area and as a consequence, is relatively devoid of trees. Therefore, vegetation clearance and earthworks requirements for construction will be minor. Further discussion of the extent of vegetation clearing is presented in **Chapter 4** and **Chapter 7**. The revised Project's planning process has not identified any significant issues that require specialised attention in relation to the earthworks requirements. Clay material and hard rock will need to be imported from other areas within the Study area for dam construction and possibly for foundation preparation.

Construction of the associated infrastructure is proposed to be conducted between 6 am to 6 pm, Monday to Saturday with Sunday available for overtime on specialist tasks. Certain critical path activities such as large concrete pours or commissioning of plant and equipment may require 24 hr operation for a short period.

3.7.2 RoM and Raw Coal

RoM Coal Hopper & Raw Coal Conveyor

The RoM coal will be delivered into a new 450 t RoM dump hopper (BN-251) by 140 t to 180 t haul trucks. The RoM coal will then be reclaimed at a rate of approximately 1,400 t/h from the RoM hopper by a heavy duty feeder breaker for reduction to a nominal material topsize of approximately -250 mm.

Secondary Sizing Station

Discharge from the feeder breaker will be directed to the 1,200 mm wide raw coal conveyor and then elevated to a secondary sizing station. A weigh scale will be located on this conveyor and will be used to control the feeder breaker feed rate. A tramp iron magnet will be located at the head end of the conveyor to remove ferrous material from the coal stream. The magnet will be supported by a motorised trolley which will automatically remove the magnet from its operating position for the material discharge. The magnet will be an electro magnet with a permanent retention feature.

The conveyor will discharge into the secondary sizer for the reduction to nominal material topsize of -75mm. The secondary sizer will be a low speed high torque centre sizing machine which minimises fines generation. It will be mounted on retractable wheels, which allows it to be rolled out from its operating position for maintenance purposes. In addition, a metal detector will be positioned downstream of the magnet to detect the presence of non-ferrous material so it can be removed manually after stopping the conveyor system.

Surge Bin

The discharge from the secondary sizer will be directed to a 1,200 mm wide transfer conveyor and will be elevated to a 600 t raw coal surge bin located adjacent to the existing raw coal conveyor. The bin feed will be through a rotating distribution chute to ensure the material sizing remains homogeneous when split into two plant feed streams. The surge bin will supply a steady state coal feed to CHPP Module 2 and CHPP Module 3 during stoppages in the upstream raw coal supply system and optimise feed rate and maximise product recovery.

The raw coal will be reclaimed through two belt feeders, one reporting onto the existing raw coal conveyor and the other onto a new 1,000mm wide CHPP Module 3 transfer conveyor. A weigh scale will be located on this conveyor and used to control the belt feeder speed. The conveyor will discharge to a new CHPP Module 3 screen & pumping station.

Screen & Pumping Station

The conveyor will feed raw coal to a 'wet' raw coal single deck vibrating screen. This screen oversize will then report to a tertiary sizer used to reduce the raw coal to a nominal topsize of 'wet' raw coal of approximately –50 mm. The tertiary sizer will be a low speed high torque centre sizing machine which minimises fines generation. It will be mounted on retractable wheels, which allow it to be rolled out from its operating position for maintenance purposes.

The screen undersize will be combined with the tertiary sizer discharge and sluiced to the desliming screen feed sump. Here it will be combined with plant water and pumped by a variable speed pump to the desliming screen feed box. A 'clean-out' pit will be provided adjacent to the sizing and pumping station and will be suitable for cleaning by a skid steer loader.

An overview of the raw coal system is presented in **Figure 3–20**.

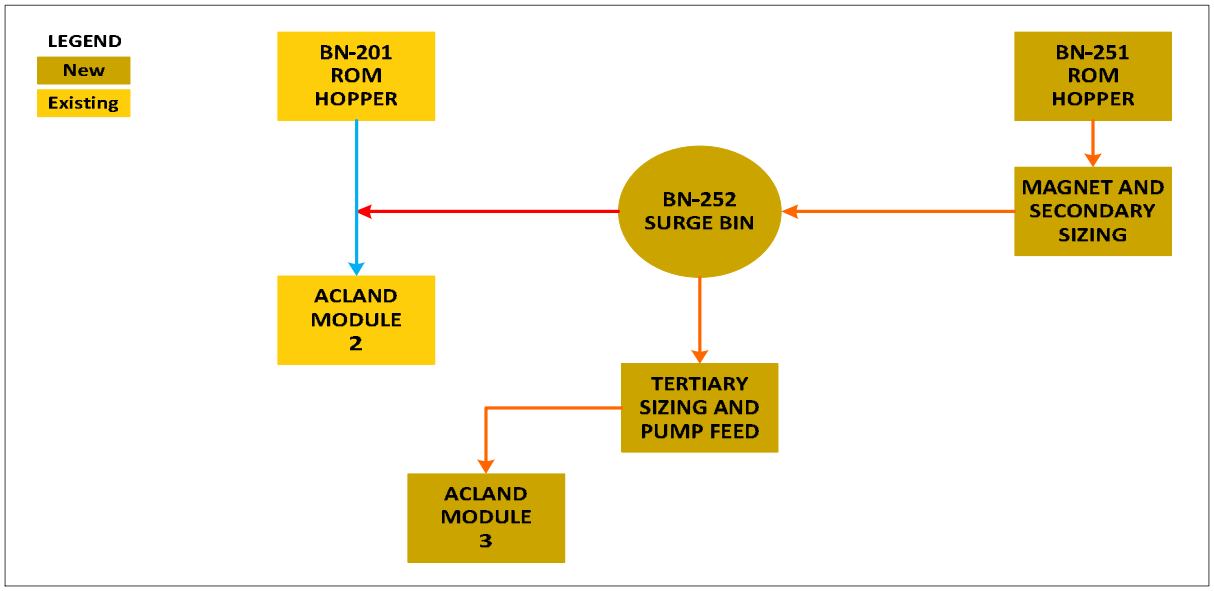

Figure 3–20 Raw Coal System Overview

3.7.3 Coal Handling and Preparation

CHPP Upgrades

The current CHPP will be upgraded to account for the additional RoM coal throughput, such that no new CHPP is required else where within the revised Project site. The main addition to the existing configuration will be an upgrade of Dense Medium Separation capacity and MHF. The CHPP Module 3 will be designed in a similar fashion to what was achieved with the original CHPP Module 2, and its subsequent upgrade. The CHPP Module 3 will be able to process at a 750 t/h design rate.

An appropriately sized thickener will be installed to accommodate for the CHPP 3's750 t/h feed rate. Raw coal is combined with plant water and pumped to the CHPP Module 3. A deslime screen feed sump and two pumps with variable speed motor will undertake this duty. The deslime screen feed

sump will be of a wing-tank design, with overflow to a water reticulation sump. The control system will involve the automatic addition of clarified water for level control, a portion of which will be added prior to the engagement with the tertiary sizer.

A simplified process block diagram of the CHPP Module 3 process is presented in **Figure 3–21**.

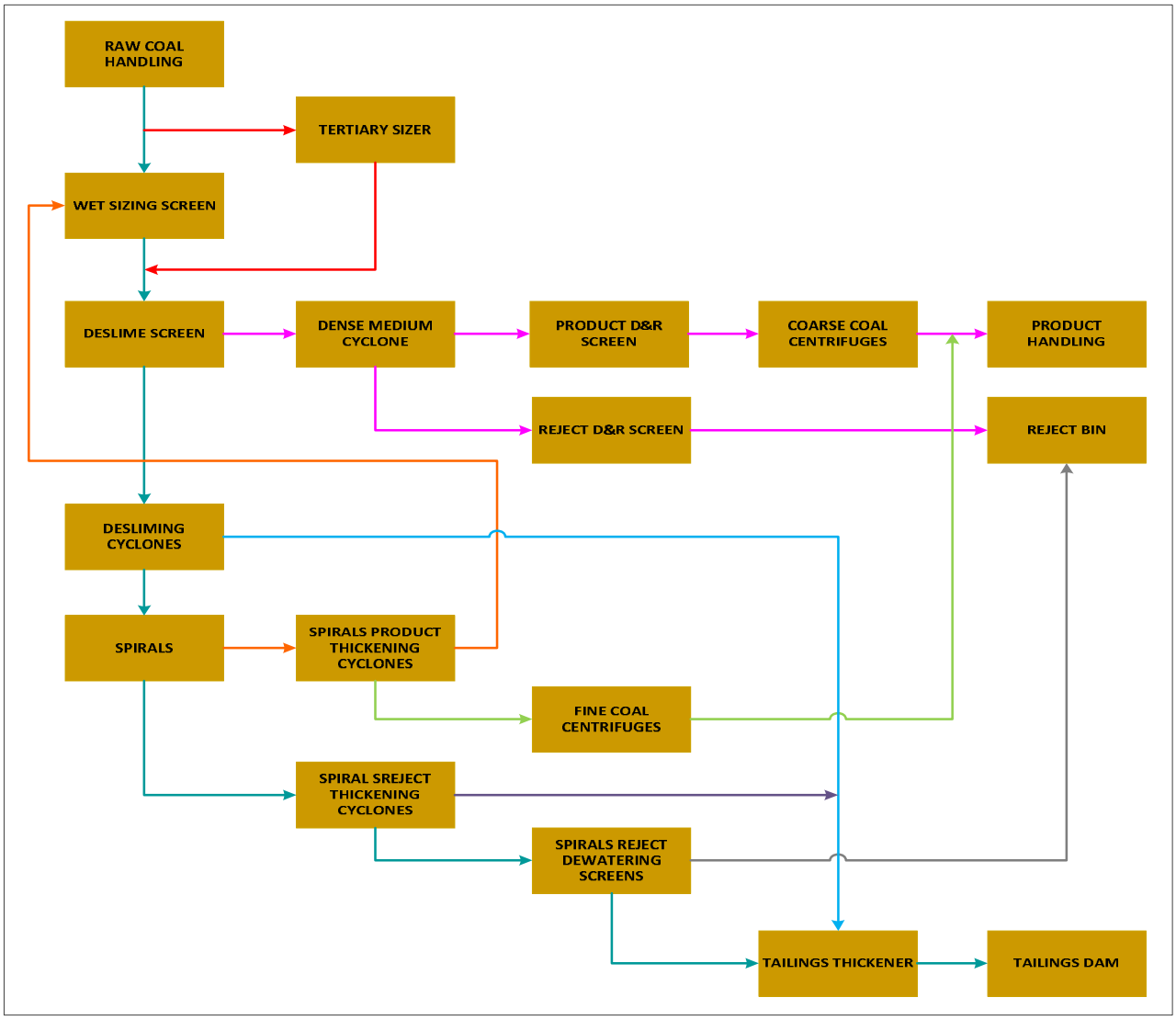

Figure 3–21 CHPP Module 3 Process Flow Overview

Coal Preparation Plant Building

The CHPP Module 3 building will be of similar layout to that of the existing CHPP Modules 1 and 2. Bays for CHPP Module 3 will be widened to allow for an extra deslime screen, compared to the singe screen arrangement in CHPP Modules 1 and 2. The Dense Medium Cyclone (DMC) reject screen will also be larger than the existing CHPP Modules (2.4m wide, as opposed to the existing 1.8m wide). An

overhead crane will be utilised, which will provide access to the DMC, classifying cyclones, magnetic separators, desliming screen exciters, and the product and reject screens. The overhead crane rails will be cantilevered out of CHPP Module 3's feed side of the building to allow access to the ground level.

Desliming

The raw coal and recirculating streams will be pumped to two desliming screens by two feed pumps. Hence, each desliming screen feed pump, pumps to a single screen. Each desliming screen feed box will discharge onto a 2.4m by 6.1m multi-slope desliming screen. High flow rate sprays will assist the desliming operation and water will be collected in the desliming screen underpan and piped to the desliming cyclone feed sump. Material screens in the screen underpan will prevent oversized material from entering the desliming cyclone and spiral circuits. The material will discharge from the desliming screens and be flushed into the dense medium cyclone feed sump.

Two deslime screens will increase the overall drainage capacity. The existing CHPP Modules use a single 3.6m wide screen. However, CHPP Module 3 will utilise two 2.4 m wide screens, which will significantly increase the drainage area.

Coarse Coal Circuit

Product coal will overflow from the dense medium cyclone and discharge directly to screen feed boxes which will distributed onto two 2.4 m by 6.1 m multi-slope product drain and rinse screens. Product coal will then discharge from the end of each product screen into two product centrifuges for dewatering. Reject coal and medium will underflow from the dense medium cyclone into a feed box which will distribute onto the 2.4 m by 6.1 m multi-slope reject drain and rinse screen. Rejects material will be discharged directly onto the new rejects conveyor. Due to the processing of higher tonnage rates, the larger 2.4 m wide screen will improve the drainage capacity, and lower the bed depth. Material drained from the product coal and reject on the first section of each screen will be returned directly to the DMC feed sump. An overview of the coarse coal circuit configuration is shown in **Figure 3–22**.

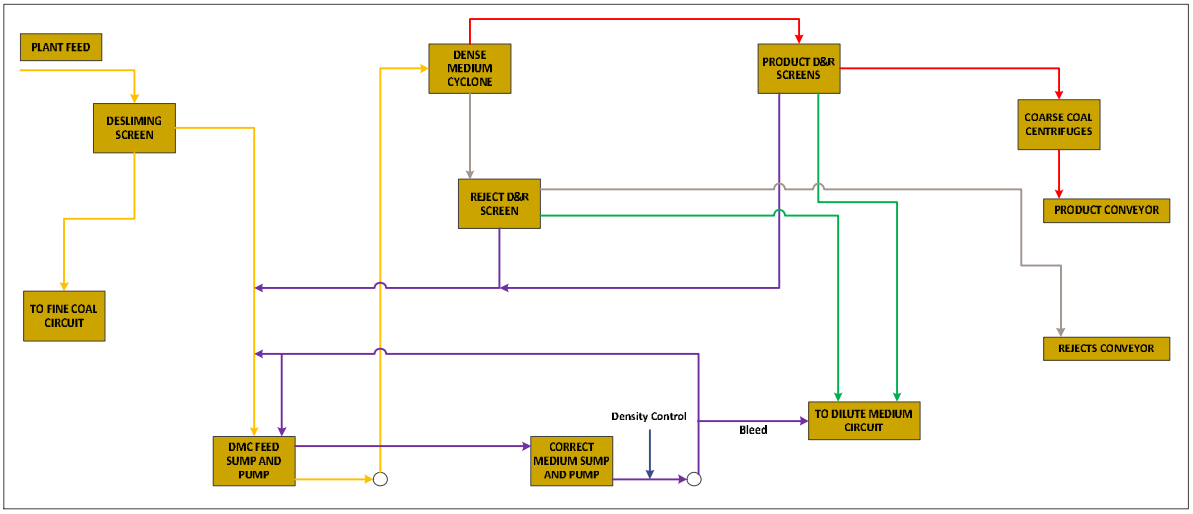

Figure 3–22 Coarse Coal Circuit Overview

Coarse Product Dewatering

The coarse coal product from the product coal drain and rinse screens will report to two horizontal basket centrifuges for dewatering, that is each product screen will feed one product centrifuge. The product coal will discharge directly onto the new product conveyor. The centrifuge effluent will drain to the centrifuge effluent sump from where it will be pumped to the dilute medium sump for recovery of any adhering magnetite.

Return Water System

The return water decanted from the ITSF will be pumped via a dedicated pump and pipe to the Pond Return Dam or Raw Water Dam 2. The new pump will be located at the same location as the existing return water pump. There will be sufficient electrical supply available for the new pump at the tailings dam.

Process Water System

The process water addition requirements for CHPP Module 3 will be shared with the existing CHPP Modules 1 and 2 using the existing process water system.

Fire System & Dust Suppression

A combined fire, washdown & dust suppression reticulation system will be provided around the new CHPP Module 3. The source of water for this system will come from the existing fire water tank and pump system by means of a tie-in point to the existing system. The fire protection system for the CHPP Module 3 will be developed on the philosophy of early fire detection, emergency warning and taking a pro-active response to an emergency fire situation.

The fire protection system will consist of the following:

- an existing fire water and wash down tank with electric and diesel fire water pumps;
- a wash down, fire water and dust suppression pipeline servicing CHPP Module 2 and materials handling facilities;
- fire hydrants appropriately spaced around the buildings according to relevant Standards, Statutory and Local Council requirements;
- standard 19 mm diameter by 36 m long hose reels along conveyor gantries spaced at 30 m intervals on alternate sides of conveyors;
- portable fire extinguishers consisting of dry chemical powder, carbon dioxide and wet chemical types installed in designated areas of the site as per relevant Standards, Statutory and Local Council requirements;
- addressable manual call points located at conveyor access points; and
- sub-fire indicator panels with automatic detection and alarm system for fault detection in the CHPP Module 3 control room.

Washdown water will be provided along the elevated conveyors in transfer stations and in the CHPP Module buildings at each floor adjacent to each set of stairs. All washdown water will be supplied from

the fire water system. Washdown water will generally be provided through 25 mm hoses located along the conveyors in the transfer stations and preparation plant. The pressure requirements for washdown hoses will be the same as that for fire hoses and hydrants.

Dust suppression sprays will be provided at the RoM dump hopper for dust suppression during dumping of raw coal into the bin. Dust suppression sprays will also be provided at appropriate transfer points in the raw coal handling system. Based on best industry practice the flow rates at the transfer points will be 0.05 % of the transfer capacity.

Dust suppression of the product stockpiles will be achieved via heavy duty water sprayers.

A new fire fighting and washdown system will be constructed at the planned TLF, and comprise a tank, electric and diesel fire water pumps.

Coal Washing Requirements

Table 3–15 identifies the existing and the planned production capacities through the CHPP Modules 1, 2 and 3 over the life of the revised Project at a combined production rate of 7.5 Mtpa. The 7,500 hrs per year that the CHPP Modules 1, 2 and 3 will operate are based on 349 days per year, seven day roster at a 90% availability.

Table 3–15 CHPPs 1, 2 and 3 Processing Rates at 7.5 Mtpa

Date From	Date To	Production Rate (Product)	Production Rate (ROM)	CHPP	CHPP Capacity	Hrs/Yr
2013	2017	4.8 Mtpa	9.6 Mtpa	CHPP 1	740 tph	
				CHPP 2	540 tph	
2017	2029	7.5 Mtpa	15.0 Mtpa	CHPP 1	740 tph	
				CHPP 2	540 tph	
				CHPP 3	750 tph	

Note: * = CHPP 3 will be capable of operating at full capacity and may do so later in the revised Project's life.

3.7.4 Tailings Management

The current tailings strategy that is being utilised on-site involves progressive construction of in-pit tailings cells as part of the dump design. This approach will continue to be practised for the revised Project, with the concept of utilising out-of-pit tailings dams being unfavourable. Tailing management for the revised Project has been deisnged in accordance with the waste heirarchy and the and the tailings management principles set out in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (DME 1995c). By adopting the ITSF strategy, there is no requirement to constuct above ground tailing storage facilities therefore reducing the disturbance footprint of the revised Project.

By constructing an ITSF, a portion of the dumping volume is displaced, and as a result, a quantity of the excavated material has to be hauled a greater distance than under an out-of-pit tailings management regime. Currently, three ITSFs have been constructed and certified within the North Pit

of the Mine. These are namely ITSF 1, ITSF 2/1 and ITSF 2/2. Current estimates have identified that these stoarges will reach capacity in 2014 which equates to approximately 1.4 Mm^3.

Work is currently progressing with a design of ITSF 3 which is planned be located at the junction between the North and Centre Pits of the Mine. Preliminary designs have shown that the likely storage capacity available for this ITSF is in the order of 3.8 Mm^3. The combined storage capacity for these nominated ITSFs will have sufficient storage capacity until approximately mid-2017 at the current production rate of 4.8 Mtpa of product coal. On completion of mining within the Centre Pit, the tailings management strategy plans to backfill the Centre Pit's residual void with tailings, which possesses two distinct advantages. It provides additional tailings storage capacity without displacing dumping volume and allows partially backfilling a void which under an out-of-pit tailings management regime would have ordinarily not been backfilled. ITSF's will be operated in conjunction with each other, all with decant areas constructed to reclaim water for use in the CHPPs to ensure their operational life is as long as practically achievable.

The availability of the Centre Pit void in terms of timing is slightly beyond when additional tailings storage is required. Therefore, a fourth ITSF is likely to be required prior to the Centre Pit's residual void being available. The logical place for ITSF 4 is at the south eastern end of the Centre Pit. Currently, the progression of mining within the Centre Pit in a southerly direction using an west to east stripping orientation. Once mining reaches the southern extent of the Centre Pit, the mining strips will then be re-oriented to run strips north to south as mining progresses in a westerly direction to consume the remainder of the Centre Pit reserves. With this change in mining direction, it leaves the last southerly strip mined as a potential void. This void could partially be backfilled by the next north-south mining strip. However, this situation will conveniently create an opportunity to construct a new ITSF. This ITSF can essentially be made as large as is required. Despite this fact, consideration will be given to the available dumping volume that exists in the immediate area for the remainder of the Centre Pit waste. The current out-of-pit dump design has taken this into consideration and the likely tailings storage volume that can appropriately be attributed to ITSF 4 is in the order of 7.9 Mm^3.

The advent of ITSF 4 provides sufficient storage capacity up to mid-2023. Subsequent to this arrangement, the Centre Pit's residual void will be utilised for tailings storage. Based on the four ITSFs, combined with the use of the Centre Pit void as ITSF5, there is sufficient capacity to hold the tailings produced by the revised Project. **Table 3–16** shows the estimated volumes for tailing storage, with **Figure 3–23** showing the location of the ITSFs.

The design of all future ITSFs will be prepared in accordance with good engineering practice and consistent with the standards required for structures of the assessed hazard category as set out in *the Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DEHP 2012) published by the administering authority.

The principal aspects of design for the proposed Tailings Dams are as follows:

- geotechnical stability for embankment;
- containment requirements; and
- emergency spillway requirement.

The ITSF embankment will be formed by a single construction material. This material comprises excavated mine waste derived from the open cut mining operation within the operating pit. The mine waste will comprise sandstone, siltstone, mudstone and shale, from the Acland/Sabine sequences of the Walloon Coal Measures. These sequences are closely bedded, and typically highly to moderately weathered. This material has been assessed and adequately meets the design parameters for the construction of the ITSF embankment. Based on the observed conditions of the existing ITSF (ITSF 1, ITSF 2/1 and ITSF 2/2), which have been formed using mine waste material, the stability of the containment walls has proven to be stable.

For regulated dams, a minimum available storage capacity referred to as Design Storage Allowance (DSA) is defined. This capacity is a constraint applying to the operating phase of the dam. The DSA is calculated utilising the "method of deciles" as described in the Manual, with the DSA being equivalent to the excess storage required as at 1 November of each year that is filled by process inputs, in addition to runoff from the design critical wet period. The design risk for assessment of the design critical wet period for a 'significant' hazard is taken as an annual exceedance probability (AEP) of 0.05 (1 in 20 years). It is proposed that the DSA to be based on an AEP of 0.10 (1 in 10 years). Therefore, the adopted criterion exceeds requirements and achieves a conservative condition.

The design for the spillway is to be undertaken in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DEHP 2012), with a design spillway criteria for a 'significant' hazard dam being equivalent to a critical design storm possessing an AEP of 0.001 (1 in 1,000 years).

The design of the ITSF 3 has been prepared by specialist consulting engineering services company, ATC Williams Pty Ltd, and the relevant design report and engineering credentials has been supplied to the administering authority. ITSF 3 has sufficient tailings storage capacity to 2018. Future in-pit tailings facilities, ITSF 4 and ITSF 5, will be designed by a suitably qualified engineering firm and require design and construction certification. These in-pit tailings facilities during their operational phases will also be annually inspected by a suitably qualified engineer and reported to the administering authority.The tailings from the CHPP have a particle size distribution of P80 < 250µm and are pumped as a thickened tailings slurry to the ITSF; 45 to 55% of the slurry is solid material and the remainder is water. In these facilities the solids settle and consolidate, expressing contained process porewater into the free standing water ponds in the ITSF. The process water contained in the tailings slurry that enters the ITSF is likely to have a low EC due to the water being sourced from the raw water process supply that has a TDS of 160 mg/L. The tailings porewater is therefore likely to have an EC of 160 mg/L to 1,600 mg/L. The potential for process porewater within the tailings to have an adverse effect on the local groundwater resource is expected to be low as the groundwater TDS in the study area is 1,364 mg/L to 7,030 mg/L with an average of 4,320 mg/L.

The tailings porewater is unlikely to increase in concentration. The free standing water in the ITSF ponds is subjected to ongoing changes from the addition of tailings slurry and the effects of dilution from rain and evapoconcentration from ongoing evaporation. Over 10 years, surface water measurements in the ITSF have remained neutral to moderately alkaline due to the acid neutralsing capacity within the spoil and alkalinity in the process water. Similarly, TDS concentrations in the ITSF ponds has been consistent over the life of the Mine. TDS measurements in the ITSF ponds in

February 2012 and August 2013 were 1,863 and 1,800 mg/L respectively. These TDS concentrations are considered to be indicative of higher TDS values that may be expected in the ITSFs because the weather patterns experienced from February 2012 to August 2013 have had below average rain and less potential for diltion. The ITSFs have sufficient freeboard so they will not overtop directly to the environment (**Section 5.13.4**) and will not have any effect on water quality in Lagoon Creek.

Further detail on the water management strategies are provided in **Section 3.9.2** and in the ITSF Management Plan in **Appendix J.1**.

LEGEND

- Towns and Localities
- Mining Tenements
- In-pit Tailings Storage Facility
- Roads

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Figure 3-23 - Location of In-Pit Tailings Storage Facilities (ITSF)

Scale 1:40,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 16/07/2013 Path: \\skmconsulting.com\BNEProjects\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130423_NewHope_ProjectDescription_Figure3-23_LocationOfInPitTailingsStorageFacility.mxd

Table 3–16 Tailings Requirements and Storage Capacities for the revised Project

Tailings Requirements for the period 2013 to 2029*	
RoM Tonnes Washed	185 Mt
Product tonnes Produced	96 Mt
Reject Tonnes	89 Mt
Proportion of Reject that are fine tailings	30%
Tailings Tonnes Produced	26.7 Mt
Tailings Density #	1.3 t/m^3
Tailings Volume Produced	20.5 Mm^3
Tailings Storage Capacities	
Remaining tailings storage capacity ITSF 1 and 2	1.4 Mm^3
Design Capacity for ITSF 3	3.8 Mm^3
Estimated Design Capacity for ITSF 4	7.9 Mm^3
Estimated Available Volume for Centre Pit Void	8.6 Mm^3
Total Current Estimated Storage Capacity Available	21.7 Mm^3

Typical underflow densities at 25-30% solids = 1.15-1.18 t/m3. After settling and water is removed, assume 50% solids, therefore density = 1.3 t/m3.

* Note that tonnages above include coal mining and processing that will occur from 2013 until commencement of the revised Project

Water Usage

The volume of water required to be imported to the revised Project site for use for coal washing purposes and dust suppression on-site, varies depending on a range of factors including rainfall/runoff and groundwater inflow within the active mine pits. However, based on long term data, the average water usage for the revised Project is summarised in the **Table 3–17**.

Table 3–17 Site Water Usage

Type of Water Usage	**Water Use (L/RoM tonnes)**
Wash Plant Usage	**550**
Pit Dust Suppression Usage	45
Return Water + Groundwater + Rain Collection	- 375
Raw Water Requirements	220

Although, over the short term the net water imported onto the revised Project site will fluctuate, the long term water usage is approximately 220 L/RoM tonne. The revised Project will produce approximately 15 Mt of RoM coal each year. This equates to a water requirement of approximately 3.3 Gl/yr. Coal washing activities will be conducted in the order of 7,500 hrs per year. The quantity of water required for the revised Project will be via the WWRF, with current take or pay contracts available for up to 5.5 Gl/yr.

3.7.5 Coarse Reject Management

Coarse rejects are currently conveyed from the CHPP Modules 1 and 2 to a reject bin. The coarse rejects are then hauled by trucks to the closest operational overburden dump for disposal via encapsulation. The current coarse reject disposal practice will be identical for operation of the CHPP Module 3. Coarse rejects are normally produced at a rate of 35 % of the RoM coal feed.

The CHPP Module 3 will discharge coarse reject material onto a 1,000 mm wide reject conveyor CV-751 complete with a weighscale for plant balancing. The conveyor will discharge into a new 300 t reject bin located on the RoM pad in the vicinity of the new RoM dump hopper. The new reject bin will include an overflow chute to discharge excess material into a bunker.

In summary, up until 2018, coarse rejects will continue to be disposed of using the current method, which involves being transported back to the advancing dump face within the mine pit. Post 2018, there is likely to be some additional volume available for dumping this material in the South Pit's residual void. This void will be partially backfilled by a subsequent box-cut. However, there is likely to be additional void space that remains, and therefore, it is proposed that the remainder of this void be utilised as a longer term coarse reject disposal strategy. The advantage of utilising this void for coarse reject disposal is that it reduces the haulage distance of having to transport the material to the advancing dump face in the southern resource areas, which importantly reduces operating costs and greenhouse gas production.

Post 2023, there will be a total of four ITSFs that will have reached their maximum storage capacity. Current tailings capping trials have shown that the coarse reject material is suitable for the initial capping layer of these dams. Therefore, an opportunity exists to progressively cap these dams utilising the coarse reject material throughout the revised Project's life cycle.

3.7.6 Materials Handling Facility

The product coal stockpile pad will be the main distribution point for the transport of the revised Project's product coal by road and rail. As part of the CHPP Precinct, it will receive product coal from the CHPP Modules 1, 2 and 3. The majority of the blending and sizing of coal products for customer specifications will occur on the product coal stockpile pad. The new MHF highlighting the existing and new infrastructure is shown in **Figure 3–24**.

LEGEND

- Towns and Localities
- Roads
- Cadastre
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area

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Figure 3-24 - Materials Handling and Stockpiling Arrangement

Scale 1:9,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 21/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130821_NewHope_ProjectDescription_Figure3-24_StockpileArrangement.mxd

Stockpiling

The existing product stacking conveyors, CV-801 and CV-802 will each discharge onto a new transfer conveyor. These two new conveyors running parallel to each other will transfer product from CHPP1 and CHPP2/CHPP3 respectively to the new MHF to the south west of the existing mine surface area. The new MHF will consist of two parallel stacking lines with an overall capacity of 200,000 tonnes live capacity in four stacking locations. Local water sprays will be provided for dust suppression.

Products from CHPP1 and combined CHPP2/CHPP3 will pass through a transfer tower, enabling either CHPP product to be directed to either line via outside running stacking conveyors, then to either of two travelling, luffing stackers, one per stacking line.

Individual stockpiles will be built up by chevron stacking product from successive CHPP processing campaigns, each batch of product overlaying the previous until full.

The southern stacker would have the capability to slew in order to stack product off the stacking line in emergency situations. As required, coal can be retrieved by mobile machinery from the emergency stack and directed to the road bin.

Reclaim

When built, complete stockpiles will be reclaimed by scraper chain portal reclaimers, one per stacking line. Product reclaimed from the stockpiles is transferred by either of two centre running conveyors to a road bin. From here, product coal will discharge into trucks for transfer to the TLF.

Reclaiming of chevron stacked product combining several CHPP campaigns will afford a high degree of product blending. Generally, each stockpile would be fully reclaimed and railed as a campaign and each train consignment is sampled during loading and then tested to confirm quality. Reclaimed product would be at final specification so that stockpiling at the port and ship loading can be done with a higher degree of consistency.

As a general rule, stockpiles would be reclaimed individually, that is, reclaimers would operate independently rather than simultaneously. The reclaim rate of a single reclaimer would be >1500 tph, a rate which steadily maintained is sufficient to guard against train loading delays.

3.7.7 Train Loadout Facility

Side tipping trucks will discharge product coal into a bunker similar to that presented in **Photograph 3-1**. The reclaim feeder will discharge product coal onto an enclosed 1,200 mm train loading bin feed conveyor. This conveyor will include a weighscale for throughput control and an automated sampling system for product quality monitoring.

The conveyor will discharge into two 2,000 t steel train loading bins. These bins will have volumetric style discharge with the loading mass into the wagons controlled by an automated train loading system. This system can control the quantity loaded per wagon by comparing empty and loaded wagon weights with the coal discharged from the bin using strain gauges within the bin structure. The benefits of this system are that trains are loaded to the optimum for best utilisation as well as preventing overloaded wagons. Maximum train loading rate would be approximately 2,500 tph.

The train loading arrangement will also include a veneering system that seals the exposed coal at the top of each loaded wagon to reduce the potential for dust emissions during transport along the rail system.

The train loading bins will be located over a concrete bunker to contain spillage and excess water will be pumped to an adjacent handling facility.

Photograph 3-1 Example Reclaim Bunker

3.7.8 Mine Industrial Area

The revised Project will require the following infrastructure to be upgraded within the MIA to facilitate mining at the higher production rate.

A conceptual layout of the upgraded MIA for the revised Project is presented in **Figure 3–25**. The majority of the upgraded facilities are planned to be constructed and assembled on-site using masonry and prefabricated framing with some building elements being manufactured off-site.

Administration/Bathhouse Building

The existing low set brick veneer building currently provides offices for approximately 40 staff and lockers and ablution facilities for 250 staff with a sealed car park adjacent to the building that caters for staff and visitors. An additional 135 staff will be required for the mine expansion of up to 7.5 Mtpa.

The office component of the building contains a reception area, offices, training rooms, crib rooms and a pre-start area. The additional staff numbers will primarily be for operations with minimal increases in administration staff. As such, expansion of the building is required to accommodate for an additional ablution and locker facilities and a training/pre-start room.

The building will be extended by approximately 300 m^2 to provide additional showers, toilets and clean & dirty lockers for the additional 135 operational staff. The extension to the building will be constructed in accordance with the National Construction Code of Australia 2011.

Carpark

The existing sealed car park is currently not fully utilised. An extension of the carpark will be required for an additional 60 vehicles. This will be sufficient to cater for the 80 additional vehicles expected as a result of the additional 40 person shift change over.

Heavy Vehicle Workshops

The existing Heavy Vehicle Workshop comprises a concrete slab foundation, steel portal frame construction and consists of two large vehicle bays with two overhead cranes, four small vehicle bays, welding bay, lube storage and warehousing area which incorporates a mezzanine level with offices. This current configuration services the truck and grader fleet and other mobile plant and equipment.

The fleet for the revised Project will involve the replacement over time of the smaller 180 t Rear Dump Trucks for the larger 220 t Rear Dump Trucks. The loaders will also be upgraded to the larger 900 kW Wheel Loaders. The current number of four smaller workshop bays is considered to be sufficient to cater for the 20 bulldozers and loaders required for the revised Project based on a service ratio of 1:7.

The truck fleet will be expanded to approximately 27 vehicles. The current two large workshop bays will not be sufficient to cater for the increase, and based on a service ratio of 1:7, an additional two heavy vehicle workshop bays will be required. The workshop will consist of a concrete slab foundation, steel portal frame construction with a metal roof and wall claddings, similar to the current workshop configuration. The new workshop expansion will include extra maintenance bays, overhead crane, roller doors to one side and suitable vehicle clearances. The services will be plumbed into the potable water supply, sewerage systems, power supply, fire management system and will possess appropriate storm water management controls. The building will comply with the National Construction Code of Australia 2011. A new lube storage area will also be constructed to service the new workshop bays.

Warehouse

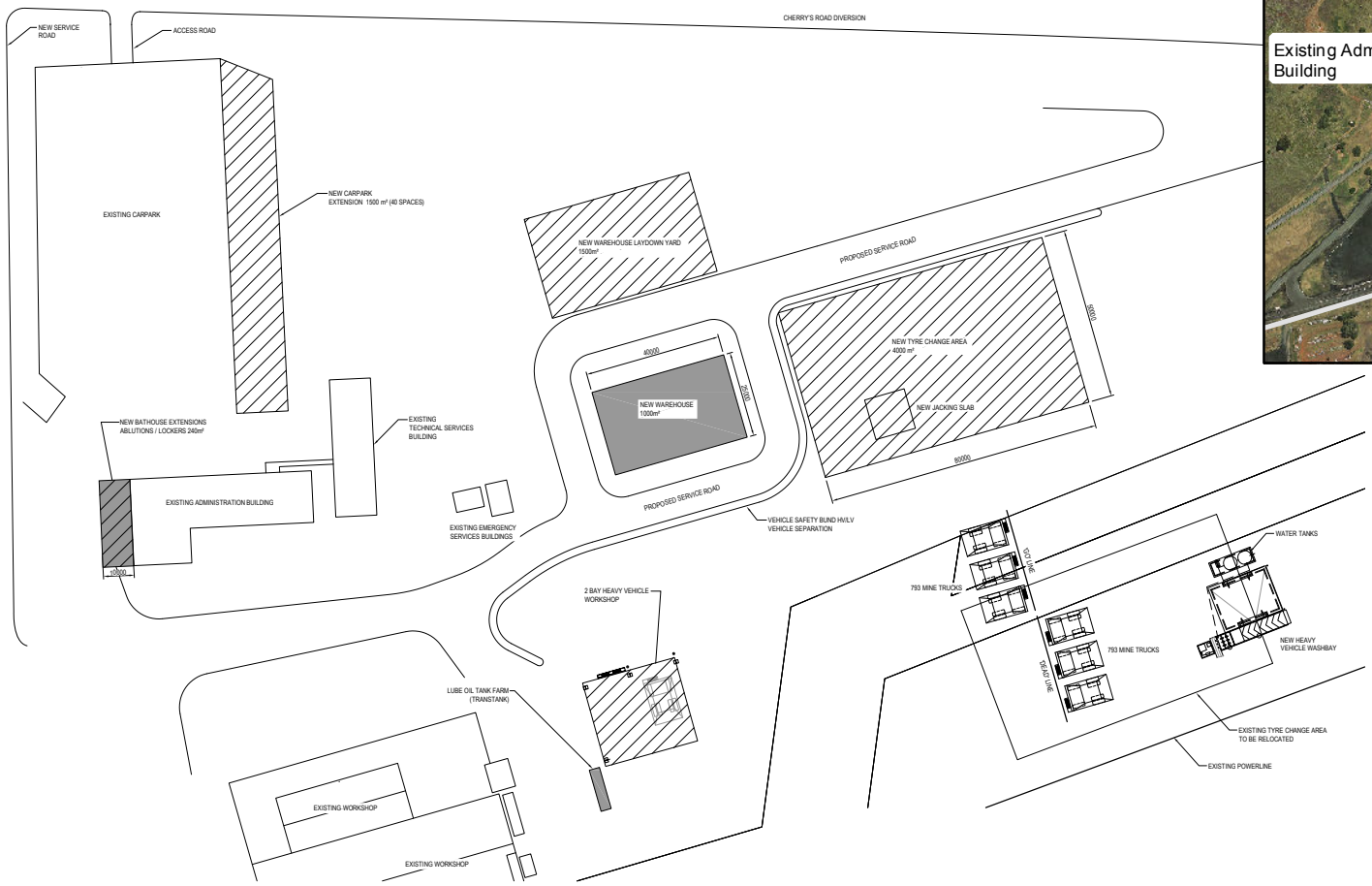
The current warehouse is not adequate to meet the needs of the revised Project. A new warehouse of approximately 1000 m^2 is planned to be constructed. A secure lay down area of approximately 1500 m^2 will be provided that is directly linked to the warehouse.

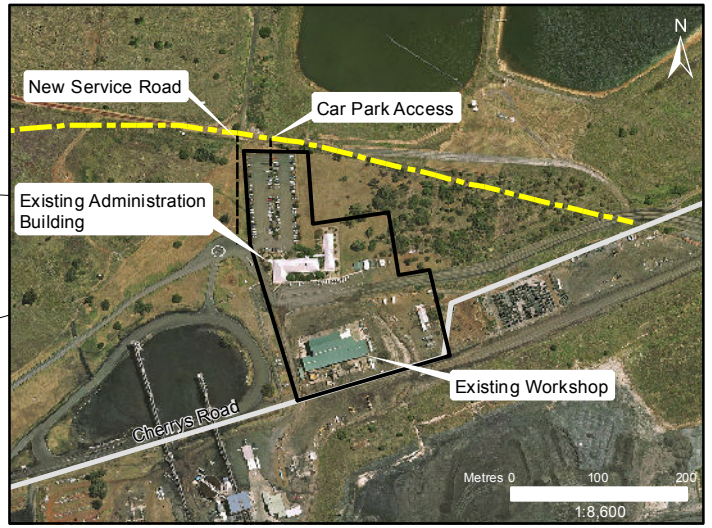
Wash Bay

A new wash bay is to be constructed to the west of the proposed new workshop (currently used as tyre storage) that can cater for 220 t class trucks. All water supply and waste water services will be provided to cater for this new facility.

Tyre Change

A new tyre change area of approximately 4,000 m^2 with a new concrete jacking slab will be provided to the north of the current tyre storage facility.





LEGEND

- New MIA
- Jondaryan-Muldu Road Diversion
- Roads

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NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-25 - MIA Conceptual Layout

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 21/08/2013 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\01_SEIS\03_ProjectDescription\130821_NewHope_ProjectDescription_Figure3-25_MIAConceptualLayout.mxd

3.7.9 Equipment and Material Volumes

Most equipment involved with general construction will be sourced from external contractors and is likely to involve various types of earthmoving equipment, cranes, a water truck, and an on-site concrete batching plant.

The majority of the raw materials required for construction will be sourced off-site preferably from local suppliers. Certain specialist items may need to be imported from elsewhere in Queensland, interstate or overseas. Where possible, NAC will source construction material, such as basalt, from the Study area.

In general, construction material will be supplied to the revised Project site on an as required basis, and as a consequence, there will be minimal long term storage requirements during the construction phase. All dispersible material stored on the revised Project site will possess suitable storm water management controls to minimise the potential of adverse downstream impacts.The indicative types and quantities of construction materials required for the revised Project are shown in **Table 3–18**.

These materials will be mainly associated with the construction of the new CHPP Module 3 and associated mining infrastructure such as the new MHF and mining infrastructure area.

Table 3–18 Construction Phase Material Types and Quantities

Construction Material	Estimated Quantity
Steel	4,600 tonnes
Concrete	18,000 m^3
Haul Road Base (gravel)	1, 500,000 m^3
Prefabricated buildings	200 m^2
Rail Track	8 km
Water pipeline	28 km
Conveyor Belting	11 km

Fuel used during the construction phase will be stored in bunded facilities complying with Australian Standard *AS 1940-2004: The storage and handling of flammable and combustible liquids*. Contractors will be responsible via contractual arrangements for the servicing of their equipment and the appropriate management of their waste products. Minor maintenance will be conducted on-site at the Mine's workshop.

Licensed waste contractors will be utilised for general and regulated waste removal. NAC will ensure all construction sites are left in an appropriate manner.

3.8 Associated Infrastructure Requirements

3.8.1 Sewerage Treatment

The existing package Sewage Treatment Plan (STP) 1 is operating at capacity to cover 460 equivalent persons and is planned to remain in operation for the Mine. Treated effluent from STP 1 drains to the existing Sediment Dam (SD) 1. NAC's current EA allows for the use of water from SD 1 for dust suppression purposes. To date, this practice has not been a common occurrence due to the minimal discharge from STP 1 and the normally low water levels of SD 1.

NAC will require construction and operation of a new STP, namely STP 2 for the revised Project. The capacity of STP 2 is expected to be up to 250 equivalent persons. Any reuse or disposal of treated sewage effluent will be governed by the revised Project's EA to ensure protection of the health and wellbeing of people and the environment on and off the revised Project site.

3.8.2 Power Supply

Preliminary assessments indicate that the relocation and rebuilding of the existing 33 kV power line may be the most efficient option. Oakey has recently received a power upgrade and now possesses a 110 kV power line, which will facilitate the revised Project's upgraded power requirements. The preferred line route is illustrated in **Figure 3–26**.

NAC is in discussions with Ergon Energy to assess the revised Project's power requirements and NAC's future role as a 'high voltage' customer. Importantly, NAC must relocate and rebuild the existing domestic 11 kV power line which supplies Acland and the surrounding areas to ensure continuity of supply for the remaining domestic and agricultural users. The 11 kV power line is dual feed ring main.

The Mine's current power requirement is 5 MW/5.7MVA per annum. A high level design demand calculation has estimated the power demand to increase to 12.6 MVA per annum based on 7.5 Mtpa full production. During the construction phase, the CHPP Modules 1 and 2 will be the revised Project's main power consumers until the CHPP Module 3 is fully integrated into the coal production process.

The new power supply system is required to integrate with the Mine's power reticulation network. Some existing 11 kV and 33 kV lines will be removed as part of the mine expansion. The 11 kV network will be augmented so that power supply to local consumers is not affected. Underground cable will be installed in areas where the placement of an overhead line could impede traffic.

Ergon Energy Network

NAC is currently a 'low voltage customer' in terms of its network connection. As a low voltage customer, all high voltage (HV) assets are owned, operated and maintained by Ergon Energy and revenue metering is located at each main LV switchboard. The increase in load for the revised Project will require that NAC becomes a 'high voltage customer'. As part of the transition to a high voltage customer, NAC has determined that all loads will be supplied by the 33 kV system.

33kV Reticulation

All mine loads are to be fed from the 33 kV system. Any loads that are currently supplied from the 11 kV system and are still required for the revised Project will be diverted to the 33 kV system. The 33 kV Acland coal feeder line is currently owned and maintained by Ergon Energy. This feeder line originates in the Oakey Zone Substation with NAC being the only customer on the overhead line. The feeder line is predominately an overhead line for the 23.1 km route to the existing CHPP Modules 1 and 2. There is a 2.1 km section of cable for the underground traverse through the army base immediately north of Oakey.

The existing 33 kV overhead line enters MLA 50232 along the Oakey-Cooyar Road. The overhead line then traverses west along Acland Road before turning north along Acland-Muldu Road to the CHPP Modules 1 and 2.

Currently the 33 kV overhead line supplies power to substations feeding the Pond Return Pumps, and Out-of-Pit Tailings Pumps along the Acland-Muldu Road. The line then splits via two pole-mounted reclosers adjacent to CHPP Modules 1 and 2. One recloser supplies power to 33/0.433 kV substations at CHPP Modules 1 and 2 and the other recloser provides power to the workshop 33/0.433kV substation. The workshop substation supplies the MIA, the Wetalla terminal valve and controls, the truck weighbridge, as well as a number of pumps.

The 33 kV overhead line is extended from the intersection of the Acland and Oakey-Cooyar Roads, around the northern side of MLA 50232 and down the Cherry Road easement. A new OHL/cable termination pole would be installed near the existing WB14 supply transformer PE12007. The installation of underground cabling to supply the MIA will not impede any MIA traffic movement. The power cable would terminate at a new 33 kV metering point substation located near the existing CHPP Modules 1 and 2 pole-mounted reclosers. The reclosers would be removed following installation of the permanent HV metering point substation. The proposed arrangement includes a local isolation point for when Ergon Energy personnel require access to the metering unit.

The power supply would be distributed to the CHPP Precinct and the TLF area via a new 33 kV Switchroom Building located beside the new HV metering point. The building would house 33 kV switchgear and auxiliary equipment.

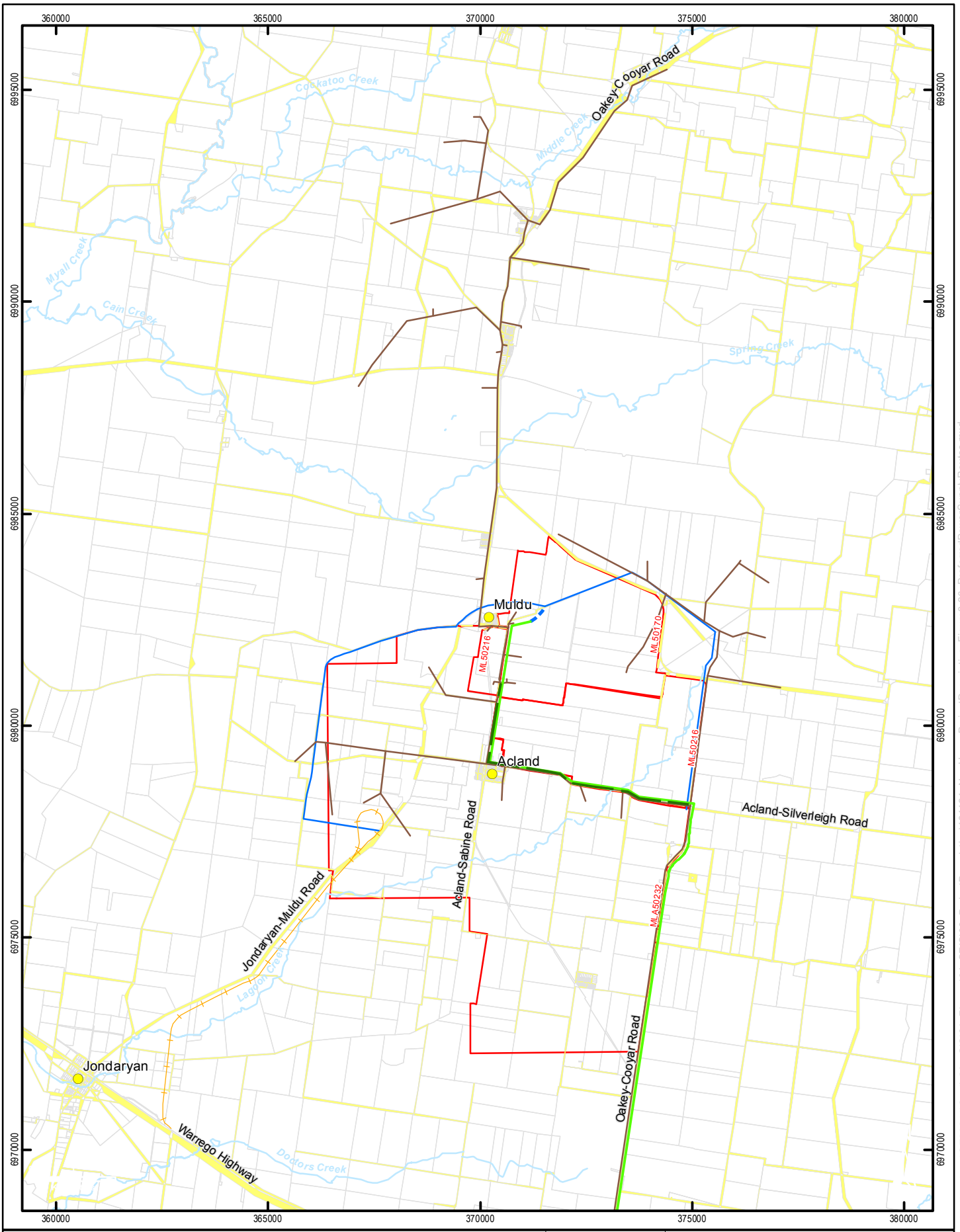
Power would be distributed to the TLF area via a new 11 km 33 kV overhead line installed along the realigned Jondaryan-Muldu Road. The proposed installation would use underground cable for the first 300 m from the new 33 kV switchroom so that access to any rail or other loading facilities would not be impeded by an overhead line.

A new 110 kV substation was constructed in 2009 to reinforce the Oakey power supply network. The estimated maximum 3-phase fault level is therefore not expected to exceed 2 kA. The fault level is quite low and is considered to be not a key driver for primary equipment in the proposed supply arrangements for the revised Project.

11 kV System

An Ergon Energy 11 kV overhead line installed along Acland-Muldu Road supplies several pumping loads. The Water and Sewerage Treatment Plants, Southern Borefield and the existing pumping station are all supplied by the Ergon Energy 11 kV system.

Where mining activity progresses south of this plant, decommissioning and removal of some 11 kV circuits will be required. The installation of a short extension to the overhead line will be required to maintain power supply to local consumers. It is proposed that a 1.5 km section of overhead line be installed to connect the local consumers to the Nungil Road Feeder system.



LEGEND

- Towns and Localities
- Roads
- Rail Spur
- 11kV Existing OHL
- 33 kV Existing OHL
- 33 kV OHL to be Dismantled & Removed
- New 33kV OHL
- 33 kV Underground
- Mining Tenements
- Cadastre
- Easements

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-26 - Preferred Power Supply Routes

Scale 1:118,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 22/11/2013 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\01_SEIS\03_ProjectDescription\131121_NewHope_ProjectDescription_Figure3-26_PreferredPowerSupplyRoutes.mxd

Site Reticulation Arrangements

Power will be reticulated to CHPP Module 3 and the site amenities using underground cabling and a ring main unit (RMU) system. Typically, 33/0.433 kV transformers will be installed at strategic locations to supply site amenities, and low voltage power reticulated via underground cabling ducts to local distribution boards.

Minor modifications to the existing site power reticulation may include a new cable connection from the existing RMU feeding CHPP Module 2 to the new 33 kV Switchroom. This modification would create a ring feed for CHPP Modules 1 and 2 to improve the security of supply. The new workshop and additional MIA facilities will be supplied by upgrading the existing workshop transformer. This upgrade will remove the requirement for a new 33 kV substation to be established and new 33 kV reticulation system. The existing 1 MVA transformer is operating near capacity. Therefore, a replacement 2 MVA unit will be required to provide additional capacity to meet power demand of the existing and new loads.

The pumping loads along Acland-Muldu Road will be supplied via a cable connection from the new 33 kV Switchroom to the existing 33 kV overhead line. New 33 kV transformers and line fittings will be required for the Water Treatment and Sewerage Plants, and Southern Borefield, which are currently supplied at 11 kV.

Other Mine Loads

The existing mine fleet is all diesel powered. All other mine loads including crib huts, mine road lighting, telemetry and some pumps are powered by standalone diesel and/or solar generators. Additional power reticulation by new overhead line or underground cabling is not expected to be required for the revised Project.

3.8.3 Telecommunications

The revised Project will continue to use microwave links for external and internal telecommunications, with an opportunity to upgrade to fibre optic in the future. Due to the progressive and mobile nature of the mining operations, microwave communication will continue to be used internally for mine pit communications. A UHF radio system is used for mine vehicle communications. The revised Project will require relocation of a Telstra telephone exchange located along the Acland-Silverleigh Road. NAC is in consultation with Telstra to facilitate the relocation process. Some degree of upgrade may be required to Telstra's local off-site telecommunications network to handle the revised Project's additional communications traffic. The upgrade of Telstra's infrastructure should provide an opportunity for Telstra to improve local communications within the Study area.

The coverage of this exchange and any projected outages as a result of the relocation strategy will be closely monitored by NAC to minimise the revised Project's impacts to Telstra's telecommunication service within the region. NAC will continue to consult with Telstra in relation to these matters to determine a suitable strategy to prevent and minimise any disruptions. NAC currently uses fibre optic and telemetry communication systems between administration buildings.

3.8.4 Fuel Usage and Lubricant Storage

NAC will use self-bunded fuel tanks to store fuel and lubricants on the revised Project site. This storage arrangement is used successfully by the Mine and allows a high degree of operational flexibility in terms of location, which is important for a large project site with multiple and dynamic operational areas. As a result, fuel storage tanks will be positioned in semi-permanent locations within the revised Project site to suit the various operational areas and will be moved periodically to suit the progressive mine pit locations. All current and future fuel strorage sites will be listed on the Environmental Management Register (EMR) under the EP Act. As is currently practised, lubricants and waste oil will be appropriately stored in close proximity to the workshop facilities. Waste oil and other hydrocarbon products will continue to be appropriately managed with a preference for recycling with local contractors.

The main fuel usage at the Mine is diesel. A year-by-year fuel usage breakdown for mining operations and product coal haulage for the revised Project is presented in **Table 3–19**. The estimated fuel usage in **Table 3–19** is based on fuel consumption rates for current operations.

Table 3–19 Fuel Usage Breakdown

Year	Mining Operations (kL)	Product Haulage to TLF (kL)	Total Fuel Use (kL)
2017	26,947	0	26,947
2018	38,463	2,562	41,025
2019	40,114	2,814	42,928
2020	41,226	2,858	44,084
2021	45,475	2,813	48,288
2022	42,156	2,724	44,879
2023	45,274	1,854	47,129
2024	46,232	1,867	48,099
2025	45,354	1,872	47,227
2026	47,584	1,858	49,442
2027	33,310	1,836	35,146
2028	30,979	1,816	32,795
2029	36,313	1,796	38,109
Total	**519,427**	**26,670**	**546,098**

3.8.5 Revised Project Construction Activities

Construction will commence following the grant of the main environmental and mining approvals. The majority of the revised Project's construction activities will focus on the:

- CHPP Precinct and MHF;
- existing MIA;
- new TLF; and
- Jondaryan-Muldu Road.

Construction is planned to commence in 2015 with site setup and pre-construction activities. Construction of the CHPP Module 3, MHF, MIA, TLF and associated infrastructure will commence construction in the year 2015. The construction period is expected to be in the order of 26 months, with the majority of construction work occurring between 2015 and 2017. Construction of the associated infrastructure is proposed to be conducted between 6 am to 6 pm, Monday to Saturday with Sunday available for overtime on specialist tasks. Certain critical path activities such as large concrete pours or commissioning of plant and equipment may require 24 hr operation for a short period.

After construction, the contractors will be required to clear all construction waste and equipment. Any disturbed areas that are not proposed to be utilised during operational activities will be rehabilitated.

3.8.6 Pre-Construction and Mine Development

The pre-construction phase of the revised Project includes the collection of information required for the detailed design phase of the revised Project. Activities which will be carried out include:

- geotechnical investigations to assess ground conditions and enable detailed design of all infrastructure and structures associated with the revised Project;
- soil investigations to assess the potential for competent materials present on-site; and
- geological exploration activities, including continued drilling to further define the coal resources associated with the revised Project.

These activities will be carried out under existing approvals and managed under the NAC's Safety and Health Management System and Environmental Management System to ensure all health and safety and environmental risks are identified and managed.

Facilities and infrastructure associated with the mine includes the MHF, MIA, CHPP Module 3, water management infrastructure, road diversion and closures, a new TLF and upgrade of the power supply to the revised Project site. In general, the construction of this infrastructure will occur in three stages:

- site preparation;
- civil works; and
- building and construction works.

To manage and facilitate the construction of the revised Project infrastructure, temporary facilities, including offices, will be constructed close to the work centres such as the MIA. The facilities will be

located within the construction footprint or previously disturbed areas. Specific laydown and assembly areas will be identified in the contractor's construction management plan. Fuel used during the construction phase will be stored in bunded facilities within the construction lay down area.

3.8.7 Site Preparation

If required, the clearing of vegetation will be undertaken prior to infrastructure construction within the MHF, MIA, CHPP Module 3, TLF and rail spur and balloon loop areas. Once the vegetation has been cleared, topsoil will be stripped and stockpiled for use in rehabilitation. Site clearance will be staged to minimise the time of exposure of disturbed areas and degradation of topsoil. Plant and equipment involved in site clearance activities will include, but not be limited to excavators, dozers, graders and water carts. All site vehicles and equipment will be properly serviced and maintained. A detailed construction equipment list is provided in **Section 3.9.5**.

3.8.8 Civil Works

Civil works will generally occur early in the construction phase and will include, but not be limited to:

- civil earthworks, including piling and foundation construction;
- installation of permanent and temporary drainage and water storage structures;
- trenching and laying of reticulated services and any other underground pipelines and services;
- providing all weather pavements for all roads and vehicle parking;
- hard stand construction; and
- re-vegetating embankments, disturbed areas and open channel drains.

Hard stand areas will be constructed according to relevant design criteria, and include items such as building construction pads, hard stands for the CHPP Module 3, RoM pad, MHF, TLF, rail spur and balloon loop, car park areas, workshop areas.

Excavations will occur during construction for most infrastructure components of the revised Project. In particular, bulk earthworks will be undertaken within the TLF, rail spur and balloon loop and CHPP Precinct. Where the excavated material has properties suitable for engineering purposes, it will be used as bulk fill, road sub-base, construction material for lay down areas and foundations. Any non-competent material will be disposed of within the in-pit spoil dumps, according to the existing overburden management practices. The industrial buildings within the MIA will be steel framed on a concrete slab with steel sheeting clad exterior.

3.8.9 CHPP Module 3 and TLF Construction

The construction of the CHPP Module 3 will commence following completion of components of the civil works. Certain infrastructure components will be modularised units, utilising off-site fabrication and assembly.

The construction of the CHPP Module 3 is to be generally executed in the following phases.

- Phase 1 – The RoM bin earthworks commence along with the installation of the CHPP Module 3 and Thickener footings. Trenching and installation of conduits and cables is also carried out at this Phase.
- Phase 2 – The new product stockpile pad earthworks commence. The installation of the RoM Bin, CHPP Module 3, Thickener, and Reject Bin concrete begins.
- Phase 3 – The installation of the following plant and equipment is carried out:
  - concrete for remaining stations;
  - transformer yard and MCC footings;
  - conveyor trestles & Mag pit;
  - transformers;
  - plant feed pumping station and reject conveyor;
  - spiral reject dewatering station & all other conveyors;
  - services items such as tanks, flocculation system and air compressor stations; and
  - electrical items such as cables & instruments.
- Phase 4 - Pre-commission and commission CHPP Module 3 for production. The pre-commissioning and commissioning stages of the CHPP will involve a comprehensive testing program to ensure that all plant and equipment is working appropriately before the operation of the CHPP commences. In general, the duration of this stage is approximately up to 3 months. At the operational stage of the CHPP, a detailed maintenance schedule will be implemented for the life of the revised Project.

The TLF construction will, in general, be carried out in the following phases.

- Phase 1 – Earthworks commence on designed TLF area. The trenching and installation of conduits and cables will commence at this phase.
- Phase 2 – This phase will involve the installation of the following plant and equipment:
  - TLF Sump, conveyor trestles and in-ground concrete hopper;
  - TLF Bins, transformer and Motor Control Centre (MCC) Footing;
  - transformer and MCC;
  - bin feed conveyor;
  - chain feed and truck ramps; and
  - electrical items such as cables and instruments.
- Phase 3 - Pre-commission and commission TLF for operation. The pre-commissioning and commissioning stages of the TLF will involve a comprehensive testing program to ensure that all plant and equipment is working appropriately before the operation of the TLF commences. In general, the duration of this stage is approximately up to 3 months. At the operational stage of the TLF, a detailed maintenance schedule will be implemented for the life of the revised Project.

3.8.10 Material Volumes and Equipment

The majority of the raw materials required for construction will be sourced off-site preferably from local suppliers. Certain specialist items may need to be imported from elsewhere in Queensland, interstate or overseas. Where possible, NAC will source construction material, such as basalt, from the revised Project site and/or area.

In general, construction material will be supplied to the revised Project site on an as required basis, and as a consequence, there will be minimal long term storage requirements during the construction phase. All dispersible material stored on the revised Project site will possess suitable storm water management controls to minimise the potential of adverse downstream impacts. The indicative types and quantities of construction materials required for the revised Project are shown in **Table 3–20**.

These materials will be mainly associated with the construction of the new CHPP Module 3 and associated mining infrastructure such as the new MHF and mining infrastructure area.

Table 3–20 Indicative Construction Phase Material Quantities

Construction Material	Estimated Quantity
Steel	4,600 tonnes
Concrete	18,000 m^3
Haul Road Base (gravel)	1, 500,000 m^3
Prefabricated buildings	2,000 m^2
Rail Track	8 km
Water pipeline	28 km
Conveyor Belting	11 km

The indicative number and type of construction equipment required is shown in **Table 3–21**. As the construction activities are staged, not all equipment is expected to be in use throughout the construction period. Construction equipment will be serviced and maintained at the Mine's heavy vehicle workshop. Most equipment involved with general construction will be sourced from external contractors and is likely to involve various types of earthmoving equipment, cranes, a water truck, and an on-site concrete batching plant.

Table 3–21 Indicative Equipment List for Construction

Type of Equipment	Indicative Number in Construction Fleet
Road Train	6
Body Trucks	4
Articulated Dump Trucks	4
Road Header	1
Rock Bolting Machine	1
Bulldozer	3
Excavator	4
Backhoe	2
Grader	3
Scraper	2
Roller Compactor	2
Water Trucks	4
110t Outrigger Crane	1
Rough Terrain Crane	1
Franna Crane	4
Elevated Work Platform	6
Scissor Lift	6
Air Compressor	2
Welder	5
Winches	2
Bitumen Sprayer	1
Concrete Pump	2
Concrete Trucks	6
Generator Set – Diesel	4
Ballast Train	1
Tamping Machine	1
Grinding Machine	1

Fuel used during the construction phase will be stored in bunded facilities and will comply with Australian Standard *AS 1940-2004: The storage and handling of flammable and combustible liquids*. Contractors through contractual arrangements will be responsible for the servicing of their equipment and the appropriate management of their waste products. Minor maintenance will be conducted on-site at the new maintenance workshop.

3.8.11 Transport of Plant and Equipment

The construction phase of the revised Project will mainly involve the transport of infrastructure components, building materials, oil, fuel and mining equipment. The revised Project's construction phase will take approximately 26 months during which time there will be fluctuations in actual transport requirements. The current mining operations will continue during the revised Project's construction phase. In general, heavy vehicle access to the revised Project site will be via the Jondaryan-Muldu Road from the Warrego Highway.

Construction equipment will be transported by road to the revised Project site on standard or over dimensional loads. Large items of mining equipment that cannot be divided into smaller components and the larger CHPP equipment requiring construction off-site will be transported on State roads under the appropriate permit and where necessary, accompanied by safety escorts. The majority of the plant and equipment transported is likely to originate from Brisbane or interstate. Other items of plant and equipment may be purchased in a 'used' state, and therefore, the point of origin may be variable. Deliveries during construction will be limited to items such as mining equipment, building supplies, fuel, concrete, steel, and items for the CHPP Module 3, TLF, MIA, administration buildings and sundry plant. There will be multiple deliveries of fabricated items and equipment. An indication of the specific item, material type and estimate of the number of loads required for the revised Project is presented in **Table 3–22**.

Table 3–22 Indicative Plant and Equipment List

Item	Material Type	Indicative No. of Loads
ROM Bin	Platework	10
RE-Wall	Concrete Panels	20
Sizers	Equipment	6
Feeder Breaker	Equipment	3
Screens	Equipment	7
Structural Steel	Steelwork	80
MCC	Equipment	5
Surge Bin	Platework	5
TLF Bin	Platework	20
Conveyors	Steelwork	70
Thickener	Equipment	14
Feeders	Equipment	10
Centrifuges	Equipment	2
Conveyor Drives	Equipment	8
Conveyor Belt	Equipment	5

Item	Material Type	Indicative No. of Loads
Overhead Crane	Equipment	2
Chutes & Underpans	Platework	38

Note: The above list is not an exhaustive list of components for the upgrade and will increase by approximately 15-20% in the number of loads. The location from where all the materials are to be transported is subject to change during later stages of this project and would be determined by the tender procurement process.

3.9 Water Management

3.9.1 Water Supply

Water supply for the project will primarily be sourced from on site storages. In the instance that on site sotrages are not able to meet the projects water demands, external water supply sources will be used.

A maximum external water supply allocation to the Mine of 5,650 ML/ year is available from off site sources. The major source is via a long term contract to the year 2055 with the TRC to purchase up to 5,500 ML per annum of Class A+ recycled water from the WWRF. Class A+ is the highest class of recycled water for non-drinking purposes in Queensland. The duration of this supply contract is well beyond the projected life of mine. The 45 km pipeline and infrastructure was constructed in 2009 and is fully operational. When pumping from the Wetalla pipeline, water is currently received at the rate of 340 cum/hr.

A second water source is minor and involves an agreement to receive 150 ML per annum (MLpa) from the Oakey Reverse Osmosis Plant. This water is received under a beneficial re-use of a waste product approval and is taken to assist the TRC with water management at its Oakey Reverse Osmosis Plant.

In addition to the water sources noted, an additional 1,321 MLpa of licensed capacity is available from the Helidon (Precipice) and Marburg (Hutton) aquifers via a series of groundwater bores. Current allocation from Helidon is 710 MLpa and from Marburg the allocation is 271 MLpa. This capacity is available as an emergency supply of process water, subject to successful future renewal of licenses.

Potable water originates from basalt aquifers and is sourced from licensed groundwater bores on-site and treated by a Reverse Osmosis Treatment Plant on-site. Current average consumption of potable water on site is approximately 16 KL/day, which equates to 6 MLpa. Current maximum treatment plant capacity is 22 kL/day, or 7 MLpa.Future use is projected to increase to a maximum of 50 MLpa.

Mine Water Use

The Mine's current process water demand and the revised Project's future process water demand at a production rate of 7.5 Mtpa are outlined in **Table 3–23**. The process water demand varies depending on a range of factors including rainfall/runoff and groundwater inflow within the active mine pits.

NAC will continue to recycle water from its ITSFs to supplement the CHPP Precinct's water requirements and will implement improvements in tailings processing to reduce water use by the CHPP Precinct.

The revised Project's water requirements for dust suppression will be periodically supplemented by rainfall runoff captured in water management structures, such as the sediment and environmental dams and from operational mine pit areas.

Table 3–23 Current Mine and Future Project Raw Water Demands

Water Supply Activity		Current Usage (approx) (ML/ year)	Future Usage (2021) (approx) (ML/ year)
Operation of the CHPPs	(~550 L/RoM tonne)	5 280	8 250
Wash down of machinery			
Fire suppression			
Shower and ablution use			
Dust suppression (~ 45 L/RoM tonne)		432	675
TOTAL USAGE		5 712	8 925
Estimated recovery Tailings Storage Facilities (50%)		2 860	4 125
Estimated water collected at site (rainfall runoff & groundwater inflows)		475	1 500
TOTAL NET WATER USAGE (~220 L/RoM tonne)		2 545	3 300

Water Demand for Mining

The amount of water used for dust suppression on haul roads cannot be reliably measured. However, a good estimate is available from water truck logs. For calendar year 2012, the records indicate that a volume of approximately 500 ML was expended on watering haul roads. This is roughly equivalent to 45 L/RoM tonne.

Water Demand for the CHPP

The CHPP processing schedule is derived from the mine plan. The net consumption of 220 litres/tonne plant feed. Using this consumption with the projected ramp up production over the life of the revised Project, the net water consumption for the CHPP is presented in **Table 3–24**.

Table 3–24 Net Water Consumption for the CHPP

Year	CHPP Schedule *	CHPP Water Consumption ‡
2014	9,600	2,112
2015	9,600	2,112
2016	9,600	2,112
2017	9,600	2,112
2018	13,746	3,024
2019	**15,150**	**3,333**
2020	15,150	3,333
2021	14,985	3,297
2022	14,592	3,210

Year	CHPP Schedule *	CHPP Water Consumption ‡
2023	14,592	3,210
2024	14,592	3,210
2025	14,592	3,210
2026	14,086	3,099
2027	9,728	2,140
2028	9,728	2,140
2029	9,728	2,140

** CHPP Precinct feed tonnes per annum (x1000) ‡ Net water consumption (MLpa)*

There is little requirement for dust suppression sprays at the CHPP product handling area as the plant product discharges at a free moisture content of between 7% to 9%. In addition, an important physical characteristic of the Acland-Sabine Sequnce coal's high hardness level, which results in a low fines content when compared to the majority of coals currently mined in Queensland. Any water consumed at the CHPP for dust suppression is included in the overall CHPP consumption stated above.

Process Water Requirements

The revised Project will produce approximately 15 Mt of RoM coal each year. Although, over the short term the net water imported onto the revised Project site will fluctuate, the long term predicted water usage is approximately 220 L/RoM tonne. This equates to a water requirement of approximately 3,300 MLpa. This quantity is substantially less than the current 5,650 MLpa available by the WWRF take or pay contract and Oakey Reverse Osmosis Plant.

3.9.2 Water Management

Water Management Principles

As a minimum, the surface water management philosophy for the revised Project will involve the:

- diversion of clean water away from disturbed areas;
- capture and adequate treatment of water that may be potentially discharged off site to ensure it complies with the current Mine's water discharge limits;
- protection of infrastructure and mining areas from flooding using flood bunding;
- design and construction of all water management structures using practical hydraulic parameters based on an appropriate risk based rainfall event, catchment size, slopes, discharge design and soil types;
- preferential use of water stored in on site storages as a supplemental water source for coal washing and other activities to minimise the likelihood of offsite water discharges;
- beneficial recycling of water for activities, such as dust suppression;
- recycling of water from the ITSFs to reduce water consumption for coal washing purposes;
- temporary or permanent bunding of all significant quantities of hydrocarbon and chemical products stored on site;
- use of spill capture and retention devices for refuelling and similar areas;

- treatment of oily water areas using an oil-water separator;
- minimisation of disturbance to an operational minimum for safe operation;
- revegetation of disturbed areas no longer required for operational use to promote progressive rehabilitation; and
- sealing of high use areas to reduce degradation.

Chapter 5 provides detail on surface water management for the revised Project.

Water Management Infrastructure

Water from the WWRF is supplied to the revised Project site via a pipeline and delivered to the Process Water Dam (PWD) 1 within the Mine site. PWD1 takes water from WWTF, Oakey RO plant, some on-site bores, Environment Dam 1 and direct rainfall. Water from PWD1 gravitates to a pump station from where it is supplied to the CHPP Precinct. PWD2 acts as additional storage capacity for PWD1. Between PWD1 and PWD2 there is a balance pipe with an isolation valve that allows water flow in either direction depending on the level. Overflows from PWD1 are received by PWD2 and can be pumped from PWD2 back to PWD1.

PWD1 supplies the site fire water tank, which in turn via a trunk main supplies the CHPP fire water system and fire water ring main.

The Pond Return Dam is the second source of water supply to the CHPP. The Pond Return Dam receives water recycled from the ITSFs, PWD2, Environmental Dam 2 and 4, Sediment Dam 1, and some groundwater bores. The water captured in Sediment Dam 1 consists of overflows from the CHPP area and treated effluent from the Sewerage Treatment Plants. Water from the ITSF's and Sediment Dam 2 is also pumped to PWD2, where it provides make up water to the CHPP via pumps to the Pond Return Dam and P WD1.

Runoff from infrastructure and disturbed areas is captured in the Environment Dams and Sediment Dam 2. Water from Environmental Dam 1 can be pumped to PWD1. Water from Environmental Dam 2 and Environment Dam 4 is pumped to the Pond Return Dam. Water from Environment Dam 3 is pumped to Sediment Dam 2. Water balance modelling indicates that the existing Environment Dams and Sediment Dam 2 are of sufficient capacity to manage the additional infrastructure area associated with the expansion.

Rainfall and groundwater that collects in the South Pit is dewatered to Sediment Dam 2. The Centre and Northern Pits are dewatered to the ITSFs. A new Sediment Dam, Sediment Dam 3 will be constructed to manage the rainfall and groundwater that collects in the new Willaroo, Manning Vale East and Manning Vale West Pits. Water from Sediment Dam 3 may be recycled back to the CHPP Precinct via the Pond Return Dam or alternatively used for dust suppression purposes.

Dust suppression demands are typically supplied by the In Pit water, Sediment Dams, ITSFs and the Pond Return Dam.

All Environmental Dams have the potential to overflow off-site through licensed discharge locations. To date, off-site water releases have been rare. Minor releases have occurred during recent high rainfall wet seasons. Discharge volumes have been insignificant in comparison to the volume of water

flowing within Lagoon Creek at the time of release (i.e. as the receiving environment). NAC must ensure all off site water discharges comply with the Mine's prescribed statutory limits for water releases.

Figure 3–27 provides a schematic of the water management system. The current and future water management infrastructure is summarised in **Table 3–25**.

Table 3–25 Water Management Infrastructure

Structure	Size	Location
Existing Water Management Infrastructure		
Environmental Dam 1	126 ML	Northwest mining lease boundary area (ML50170).
Environmental Dam 2	232 ML	Downstream of the tailings dam, southwest mining lease boundary area (ML50170).
Environmental Dam 3	45 ML	Southern mining lease boundary (ML50216)
Environmental Dam 4*	110 ML	Southwest mining lease boundary area (ML50216), captures surface water runoff from the centre pit's disturbance area.
Sediment Dam 1	97 ML (including 16 ML of sediment)	Near the product coal haul road exit, western mining lease boundary area (ML50170).
Sediment Dam 2	62 ML	Near the South Pit's out-of-pit dump (ML50216)
Process Water Dam 1	136 ML	North of the main administration area, adjacent the main access to the Mine (ML50170).
Process Water Dam 2	175 ML	Immediately east of Process Water Dam 1 (ML50170)
Tailings Dam (Out-of-pit) TSF 1 – Stage 1 & 2	2,550 ML (of tailings)	Western mining lease boundary area (south of the RoM stockpile area) (ML 50170). – Stage 1 is under rehabilitation.
Tailings Dam (In-pit) IPTSF 1	2,800 ML (of tailings)	Within the North Pit (ML 50170)
Tailings Dam (In-pit) IPTSF 2-1	3,320 ML (of tailings)	Within the North Pit (ML 50170)
Tailings Dam (In-pit) IPTSF 2-2	3,400 ML (of tailings)	Within the North Pit (ML 50170)
Tailings Dam (In-Pit) TSF 3	TBA (under construction)	Within the Centre Pit (ML50216)
Return Water Dam	300 ML	Upstream of Environmental Dam 2, western mining lease boundary area (ML50170).
Lagoon Creek Flood Bund	Approx. 3 m high and 3 km in length	Between Lagoon Creek and the South Pit area (ML50216).

Structure	Size	Location
Revised Project Water Management Infrastructure		
Environment Dam 5 Manning Vale West	250 ML	Southwest of Manning Vale West final pit extent
Environment Dam 6 Manning Vale East	250 ML	South of Manning Vale East final pit extent
Environment Dam 7 Willeroo	350 ML	Southeast of Willaroo final pit extent
Sediment Dam 3 Manning Vale East Pit	160 ML	North of Manning Vale East Pit
Sediment Dam 4 Willaroo Pit	130 ML	North of Willaroo Pit
Lagoon Creek Flood Levee 2	Approximately 3.5 m high and 1.5 km in length	Between Lagoon Creek and the Manning Vale East Pit area
Lagoon Creek Flood Levee 3	Approximately 3.5 m high and 2 km in length	Between Lagoon Creek and the Willeroo Pit area

*will become Sediment Dam 5 in the revised project.

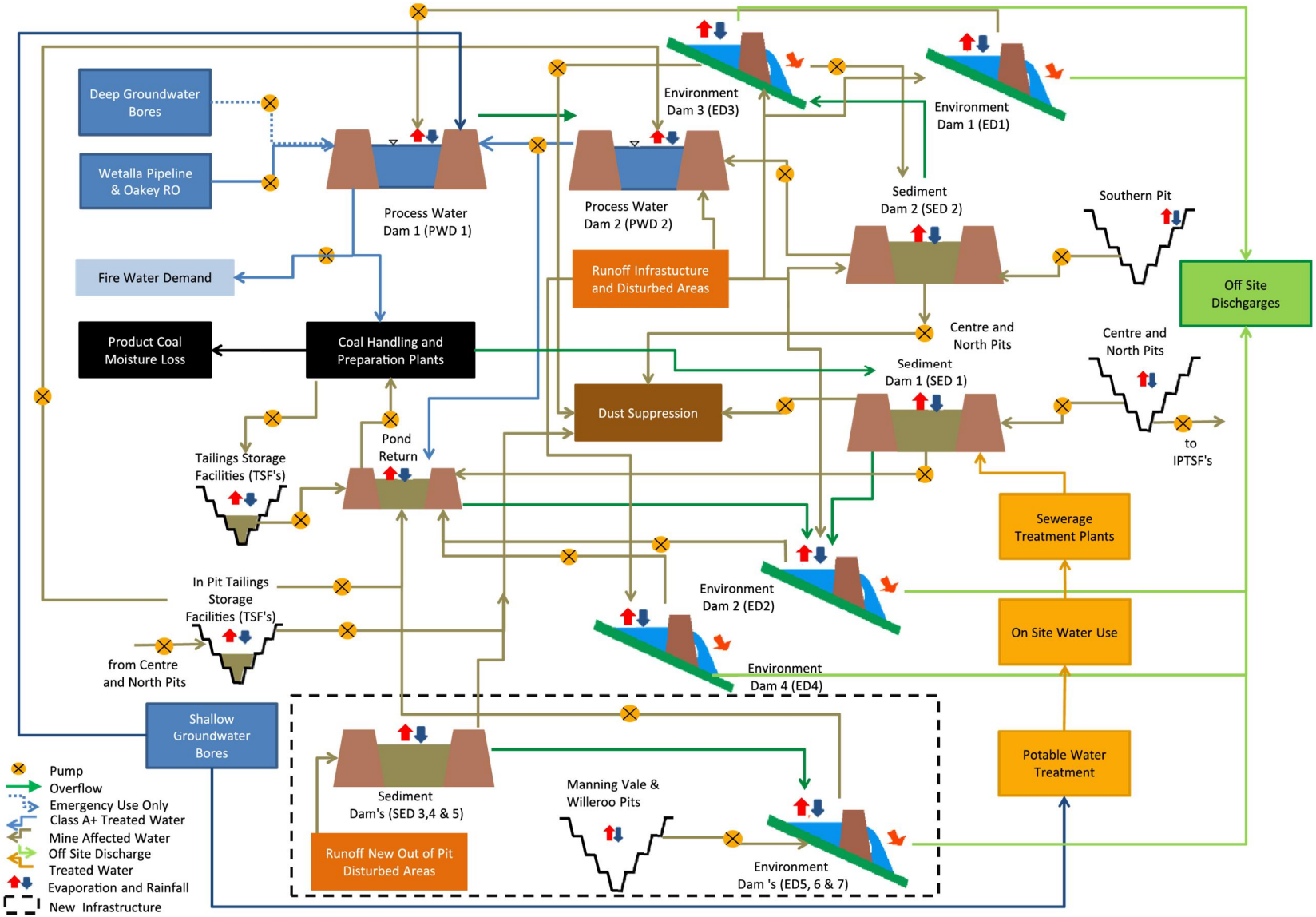


Figure 3–27 Water Management System Schematic

The site water management infrastructure is discussed in additional detail in **Chapter 5**.

NAC has prepared a Water Resource Management Plan (WRMP) to include the management of the mining activities and infrastructure within MLA 50232. The WRMP will be implemented as part of the revised Project's future Plan of Operations and is presented in **Appendix J.4**.

NAC may utilise existing farm dams, and as required, design and construct diversion drains to ensure efficient operation of the revised Project's overall water management system. Specialised water management systems will be implemented in all areas storing significant quantities of hydrocarbons and chemicals to minimise the potential for downstream impacts.

The stockpile pad areas will be constructed by a contractor and are expected to possess a compacted clay base to minimise infiltration and be armoured with a suitable material to maximise their longevity. Surface water runoff from these areas will be directed to a sediment dam for treatment before possible release off-site under discharge criteria outlined in the revised Project's EA.

In the design phase, the sediment dam will be over sized to reduce the risk of discharge and increase the residence time for sediment treatment. In addition, water management practices, such as the preferential use of water captured in the sediment dam, will be put in place to further minimise the risk of off-site discharge. NAC will develop other strategies to ensure all discharges are compliant with the discharge criteria outlined in the revised Project's EA.

3.9.3 Groundwater Supply

As discussed in **Section 3.9.1**, the use of the treated water from the WWRF for mining activities has discontinued NAC's current reliance on the localised groundwater resources.

However, NAC will continue to maintain the existing licensed Helidon and Marburg Sandstone bores as an emergency backup water source in the event of a failure of the WWRF pipeline. These bores will be run periodically for maintenance purposes. NAC's will maintain its two basalt water bores as a water source for the Potable Water Treatment Plant (PWTP).

3.9.4 Flood Design Criteria

All new water storages will be designed, inspected during construction and certified at completion by a Registered Professional Engineer. As a minimum, NAC will be required to demonstrate that all storages comply with the (formerly) DERM's *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, February 2012, and the new ITSF, TSF 4 and TSF5, complies with the EPA's *Code of Environmental Compliance for Environmental Authorities for High Hazard Dams containing Hazardous Waste*.

Construction of the revised Project water storages will be conducted by a qualified contractor and will require strict supervision to ensure the engineering design properties (structural and hydraulic) for the dam are achieved prior to commissioning. Sufficient clay material possessing suitable geotechnical properties for construction of the dam walls and basaltic material for armouring of spillways are available within the revised Project site. Some minor quantities of other construction materials may need to be sourced off-site. NAC has previously managed the successful construction and operation of engineered structures for the current operations such as TSF 1 for Stages 1 and 2.

A flood levee will be constructed to protect the new infrastructure and all active mine areas on MLA 50232 from Lagoon Creek flood events and will be designed and constructed to manage a Probable Maximum Flood (PMF) rainfall event. The flood bund will be a fully engineered structure and will be constructed using compacted clay lifts and top soiled and grass covered to minimise the potential for erosion. The levee will be constructed in accordance with the (formerly) DERM's *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams,* 2012.

All water management structures associated with the new infrastructure will be designed and constructed to manage a 1 in 10 year AEP rainfall event and will possess appropriate engineering design criteria and/or comply with the appropriate Australian Standards to ensure environmental protection, regulatory compliance and efficient operation.

3.9.5 Potable Water Treatment

The current PWTP will continue to service the existing operations at a delivery rate of 16/26 kL (average/maximum daily volume). The PWTP is supplied water from two licensed water bore tapping into basalt aquifers under a 160 ML per annum licensed allocation.

Assessments suggest that potable water is likely to involve the upgrade or duplication of the existing PWTP and reticulation to the new infrastructure on ML50170. The existing water supply bores will be adequate for the proposed PWTP upgrade.

Potable water will be regularly monitored to test the water quality. Potable water production will continue to comply with the *Australian Drinking Water Guidelines* as published by the National Health and Medical Research Council and the Agriculture and Resource Management Council of Australia and New Zealand (1996). The revised Project's potable water will be used for human use, including drinking, hygiene and sanitation.

3.10 Coal Transportation

3.10.1 System Overview

The operational phase of the revised Project will mainly involve the periodic on-site transport of general supplies such as workshop oil and fuel. The occasional transport of new and replacement mining equipment may also be required from time-to-time. A comprehensive traffic and transport assessment has been prepared and is located in **Chapter 13**.

Transport off-site during the operational phase of the revised Project will mainly involve the increased haulage of product coal by rail and the removal of waste materials by licensed waste contractors. This procedure will be in accordance with the Waste Management Plan (WMP) for the revised Project located in **Appendix J.13**.

NAC's planned coal production rates compared to its existing operations of 4.8 Mtpa are presented in **Table 3–26**.

The main efficiencies for the revised Project's planned scenarios for coal transport off-site are:

- the significant increase in the use of rail transport;
- the use of existing Jondaryan-Muldu Road that traverses to the east of the Manning Vale West resource area as an internal haul road; and
- the closure of the JRLF.

Table 3–26 Planned Production Destinations

Transport Method	Destination		Current Operation (Mtpa)	Revised Project (Mtpa)
Rail	Export	QBH, Brisbane	4.60	7.30
Road	Domestic	SE-Queensland and N-NSW	0.20	0.20

At full production 7.5 Mtpa will be transported to Brisbane via the Western Rail System. Queensland Bulk Handling (QBH) at the Port of Brisbane will receive up to 7.5 Mtpa for export overseas. The rail and port capacity has been selected to match the maximum production capacity of 7.5 Mtpa in the event that the domestic market retract. On average at the proposed rail tonnage, an average of 11 trains will travel to Brisbane each day.

3.10.2 Rail Transportation

The maximum number of trains per week from current operations at the Mine is fifty-three. Currently, the main constraint on the number of trains that can be loaded at the JRLF is the turnaround rate at the facility. The design of the JRLF means that the train is taken into the siding, the locomotives are then uncoupled and taken to the other end of the train and re-coupled. In the meantime, the next train waits on the passing loop close to Oakey as there is insufficient room for the next train to stand by at the JRLF. The coal stockpiles located at the JRLF are of sufficient length to enable the whole train to be loaded without having to move forward. Generally, two or three loaders are used and the loading time is up to 60 minutes.

Each train has two locomotives positioned at the front. These type 2300 locomotives have two stroke diesel engines with rudimentary silencers. A retrofit program is continuing with most units having already been fitted with turbochargers. The fitting of turbocharges enables the engines to develop more power and operate at a reduced exhaust noise. The trains are currently made up of approximately 41 wagons with a total train length of approximately 651 m. The maximum axle load for the western rail corridor is approximately 15.75 t (this figure is restricted by the configuration and load limits of rail size, formation and bridges, many of which are timber structures). Therefore, the maximum gross wagon weight is approximately 63 t. The maximum payload per train is 1,940 t.

The maximum allowable train speed along the western rail corridor is 80 km/h with lower speed restrictions in certain areas, especially on the Toowoomba range section where 30 km/h speed restrictions apply. The rail line is a single line whereby trains pass each other via passing loops at various locations along the line. The allowable length of each train is restricted by the length of passing loops. Future capacity increases will require upgrades to the rail infrastructure.

NAC is planning to construct a new 8 km rail spur and balloon loop for the revised Project. The will involve the total decommissioning of the JRLF to improve the efficiency and safety of coal transport off-site as the revised Project's coal delivery rates rise beyond those existing for a production rate of 4.8 Mtpa. **Figure 3–1** depicts the new rail spur and balloon configuration and alignment along with at grade/grade separated rail crossing locations. The maximum number of trains per week from the revised Project will be up to eighty. Upgrades to the Western Rail Line may be required to facilitate the increase in number of trains associated with the revised Project. Discussions between NHG and Queensland Rail will continue with regard to infrastructure and logistics associated with any required upgrades.

The new rail spur and balloon loop for a large portion of its route is planned to run immediately adjacent the existing Jondaryan-Muldu Road reserve, and will require the following actions that may affect the public during the construction and operational phases:

- closure of the JRLF;
- construction of a passive rail crossing where the rail spur line crosses Childs Road near its intersection with the Jondaryan-Muldu Road; and
- construction of a passive rail crossing where the rail spur line crosses the Jondaryan-Sabine Road near the entrance to the former JRLF.

The JRLF for the Mine is located at a siding loop near Jondaryan off the Western Rail Line. Trains are currently loaded with coal at the Mine by front end loaders from adjacent stock piles and transported by trucks travelling approximately 17 km from the Mine along the Jondaryan-Muldu Road to the JRLF. Since the release of the EIS for the original proposal, NAC has been assessing several options for product transportation.

As a result of this assessment, the preferred product transportation alternative is to construct a new 8 km rail spur and balloon loop from a junction with the Western Rail Line at Jondaryan travelling northeast to the western extremity of the MLA 50232 as depicted in **Figure 3–1**. The balloon loop will be equipped with a TLF involving automated remote loading facilities rated at approximately 3,000 t per hr. The TLF will operate on a seven day, 24 hr basis. Train operations will also occur on a seven day, 24 hr basis.

Larger product volumes can be transferred via rolling stock in comparison to individually loaded trucks. The system improves efficiency because the product is handled once before transfer from the mine, compared to twice under the current arrangement where the JRLF is involved in the handling process. The product coal can be watered once to minimise dust during transit and no open stockpiles will not need to be managed at the TLF. The JRLF would be progressively decommissioned if the revised Project is implemented.

Track Design

The preferred rail spur route branches off the Western Rail Line near the JRLF location and heads north crossing Sabine, Childs and McKays Roads. The rail spur then travels along the eastern side of Jondaryan-Muldu Road to MLA 50232's southwestern boundary. The rail spur consists of a single track to the start of the balloon loop whereby a turnout is proposed for the arrival track. Wide track centres are required to cater for the rail grading and earthwork batters.

At the main rail line junction, the track will be on a level grade from the Western Rail Line for approximately one kilometre. At this location, the rail line starts to rise to achieve a level of RL 392 m at Lagoon Creek. Lagoon Creek is an ephemeral creek and at times is subject to flooding. Therefore, the rail line is proposed to be 2 m above the existing surface level near Lagoon Creek. The radius at the junction with the Western Rail Line for the eastern connection will be a minimum of 550 m to cater for a maximum train speed of 80 km/h. The minimum radius on the rail loop and arrival track will be 300 m with a maximum speed of 25 km/h around the rail balloon loop.

The standard requirement for the rail corridor width will be a minimum of 20 m from the track centreline to the boundary fence and widened as required for earthwork batters in deep cuttings and high embankments. In some locations, the toe of the batter falls outside the 20 m offset from the track centreline to the fence. As a result, the boundary will be widened at these locations.

At this stage, there are no plans to upgrade the narrow gauge Western Rail Line to dual gauge. If the Western Rail Line is upgraded in the future to dual gauge, the rail spur and balloon loop could be upgraded to standard gauge subject to the preferred type of rolling stock. The Western Rail Line is not electrified, and therefore, there is no requirements for the rail spur and balloon loop to be electrified at this stage.

Track Construction

NAC is currently using Aurizon (formally known as QR National Pty Ltd) for its coal haulage and the rail movements of the proposed rail line will have to meet Aurizon standards with the following infrastructure attributes:

- train lengths of 700 m;
- track structure suitable for 20 t axle loads at 80 km/h; and
- grade limited to 2 % to reduce earthworks and structure costs.

NAC's proposed rail spur will be constructed to meet Aurizon track type 60-3 where a standard track formation consists of:

- 600 mm sub-ballast capping layer;
- 250 mm nominal ballast depth from the underside of the sleeper to the top of the finished formation;
- concrete sleepers, spaced at 685 mm centres;
- continuously welded rail;
- 60 kg/m rail section; and
- Standard Pandrol e-clip (e2003), with associated rail pads and insulators.

Embankment bulk fill will be sourced from the Mine. Queensland Rail (QR) Ltd specifies that this material shall have a liquid limit not greater than 70% and a plasticity index not greater than 50%. The bulk fill material will have a California Bearing Ratio (CBR) >30.

The following material will be used as bulk fill:

- free-draining material;
- dispersible clays; and
- decomposed granite.

Earthworks will be constructed to the latest QR standards for a non-electrified track. For the concept design, batter slopes are proposed at a slope of 1 in 2. This slope is subject to further geotechnical investigation at the detailed design phase. A nominal top 600 mm capping layer has been adopted in accordance with the standard QR drawings. For flood mitigation, the edge of the earthworks will be no lower than the Q100 flood level.

Once all approvals are obtained an indicative timeframe for construction and commissioning is around two years in total. This period allows for:

- 12 to 15 months to construct the earthworks, assuming that bulk fill material is sourced and hauled from the mine site;
- three to four months to construct the track, assuming a ballast train will be used; and
- up to five months to install rail systems and the loading facility.

Associated Infrastructure

The loading of trains is proposed to be in an anti-clockwise direction around the rail loop and will involve the use of an overhead loading bin. The TLF will be located on a straight section of track on level grade. The orientation of the control room towards the north avoids facing the rising or setting sun. The loading rate of the bin will be approximately 3,000 t per hr.

Childs Road will remain open with a proposed at grade level crossing. An ALCAM Assessment has been undertaken for this proposed grade crossing. The ALCAM Assessment is provided in **Appendix G.8.4** which contains further detail on the appropriate level crossing measures required for this at grade crossing. Further analysis of the impacts from predicted traffic movement is presented in **Chapter 13**. As depicted in **Photograph 3-2**, Childs Road is a formed dirt road and would be classified as a local public road. In general, traffic using this road is infrequent and there is unrestricted alternate access into this area via the Jondaryan-Sabine Road.

Photograph 3-2 Childs Road at the rail crossing (view to the east)

It is also proposed to make McKays Road a no-through road by curtailing it on both sides of the rail spur. This road is not commonly used by the public. Alternate access to Jondaryan-Muldu Road will be available via the Jondaryan-Sabine Road. **Photograph 3-2** shows the view west along McKays Road.

Photograph 3-3 Western view along McKays Road proposed to be closed to through traffic

A passive level crossing on the bitumen sealed Jondaryan-Sabine Road near the existing JRLF may also be constructed since the road use is infrequent and seasonal. A similar passive level crossing is located nearby on the Western Rail Line.

Photograph 3-3 shows the western view and the approximate location of the proposed passive level crossing. The first power pole shows the approximate location of the proposed passive level crossing.

Photograph 3-4 Western view along Jondaryan-Sabine Road

A continuous maintenance access road will be provided alongside the rail corridor. This arrangement is to enable access to signalling and trackside equipment and for train crews to inspect their trains.

Land Acquisition

NAC will initiate discussions on the preferred acquisition process with QR Limited at the appropriate time. Since the rail loop encroaches on MLA 50232, approval to subdivide and construct the rail infrastructure needs to be obtained by NAC prior to the rail corridor being leased to QR Limited or operated privately by NAC.

The management of the rail spur and balloon loop will be carried out under the provisions of the *Transportation Infrastructure Act 1994*. QR Limited's standard workplace health and safety and industrial rail management provisions will be adopted.

To minimise the property impact, the rail line corridor runs adjacent to the boundary with Jondaryan-Muldu Road until it reaches land owned by NAC where the track curves into the balloon loop and TLF. In total, one private property will be impacted by the rail line corridor and the land required for the rail corridor has been minimised in accordance with design standards. NAC continues to consult with the potentially affected landowner to ensure a satisfactory arrangement for land access is achieved.

3.10.3 Port Capacity

QBH is a subsidiary of NHCL and operates a bulk handling facility at the Port of Brisbane. QBH's bulk handling facility has undergone an extensive upgrade and possesses a nominal capacity of 12 Mtpa. This recent upgrade will be adequate to manage NAC's future annual export requirements and proposed timeframe for the revised Project.

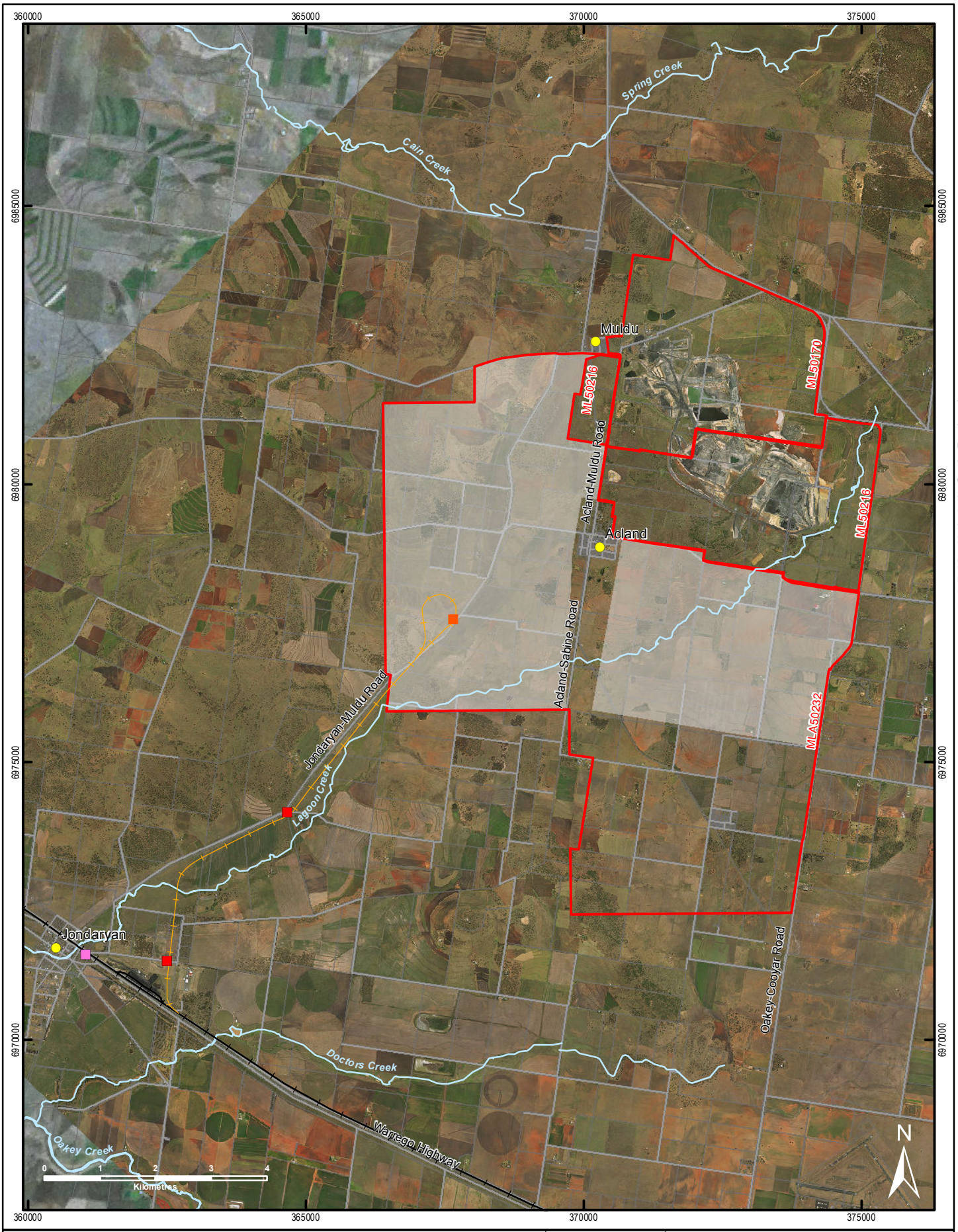
3.10.4 Road Transportation

A total of up to 200,000 t of product coal will be transported by road from the revised Project site to domestic customers in Southeast Queensland. This coal haulage is managed separate of NAC's business.

With regards to internal coal transportation, the existing Jondaryan-Muldu Road that traverses to the east of the Manning Vale West resource area will be closed to the public and used as an internal haul road connecting the CHPP Precinct with the TLF as shown in **Figure 3–19**.

The remainder of the Jondaryan-Muldu Road will be accessible to the public and will be diverted at the junction of the MLA 50232 to the west of the Manning Vale West resource area to accommodate for mining operations.

An internal haul and service road will be constructed linking the Willeroo resource area to the RoM Pad and CHPP Precinct. This access road will require a crossing over Lagoon Creek. The proposed location of this internal haul road is presented in **Figure 3–19**. NAC will ensure that all relevant approvals are in place prior to this activity being undertaken. Other new haul and internal service roads will be constructed on an as required basis, and where possible, will utilise existing tracks within the Study area.



LEGEND

- Towns and Localities
- Train Loadout Facility
- At Grade / Grade separated Rail Crossing
- Level Crossing
- Roads
- Rail Spur
- Western Rail Line
- Cadastre
- Mining Tenements
- Mining Tenements (MDL Area)
- Proposed Extent of Surface Rights Area

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-28 - Rail Corridor

Scale 1:90,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

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3.11 Decommissioning and Closure

3.11.1 Jondaryan Rail Loadout Facility

In February 2012, the NHG announced a commitment to move the JRLF to a location on the new ML providing approval is given for the revised Project. An assessment has been conducted for the revised Project to quantify potential impacts for the new rail spur and balloon loop and associated infrastructure.

Subject to all statutory approvals being received in 2015, the new rail spur and balloon loop, TLF and MHF will be constructed over an estimated two year period with completion in approximately 2017. Therefore, decommissioning of the JRLF will commence in 2018 and is expected to be completed in 2019. Based on the current schedule of works, it is not expected that the TLF and the JRLF will be in joint operation. The existing JRLF site will be returned to its original land use, namely grazing.

Decommissioning of the JRLF is proposed to be conducted between 6 am to 6 pm, Monday to Saturday with Sunday available for overtime on specialist tasks. The JRLF Decommissioing Management Strategy is presented below in **Table 3–27**. The corresponding JRLF Item Number is depicted in **Figure 3–29**.

Table 3–27 JRLF Decommissioning Management Strategy

JRLF Item No.	JRLF Item	Proposed Management Strategy
1	Existing Rail Spur	▪ This rail infrastructure will be retained in its current form. This will be used by Aurizon as a siding.
2	Coal Stockpiles	▪ All product coal stocks will be gradually removed. This action will be coordinated with the commissioning of the TLF at the revised Project site. ▪ The stockpile base material (coarse rejects) will be removed and buried in-pit at the Mine or other suitable site. ▪ A phase one contaminated land assessment will be completed within the former stockpile area. ▪ Topsoil or a topsoil substitute will be applied to the former stockpile area. ▪ The former stockpile area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former stockpile area.
3	Weigh Bridge	▪ The weigh bridge infrastructure will be removed. ▪ A phase one contaminated land assessment will be completed within the former weigh bridge area. ▪ Topsoil or a topsoil substitute will be applied to the former weigh bridge area. ▪ The former weigh bridge area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former weigh bridge area.

JRLF Item No.	JRLF Item	Proposed Management Strategy
4	Workshops,STP and Sheds	▪ The workshop and STP infrastructure will be removed. ▪ The concrete slabs will be removed and buried in-pit at the Mine or other suitable site. ▪ A phase one contaminated land assessment will be completed within the former workshop area. ▪ Topsoil or a topsoil substitute will be applied to the former workshop area. ▪ The former workshop area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former workshop area.
5	Sediment Dam and pumps and pipes	▪ The sediment dam will be retained for the treatment of runoff from the rehabilitated areas. ▪ All pumps and pipes will be retained. ▪ The sediment dam will be de-silted as required following completion of rehabilitation. De-silted material will be disposed of in-pit at the Mine or other suitable site.
6	Water bore	▪ Retain the bore for grazing and land management purposes
7	Crib Hut	▪ The crib hut infrastructure will be removed. ▪ A phase one contaminated land assessment will be completed within the former crib hut area. ▪ Topsoil or a topsoil substitute will be applied to the former crib hut area. ▪ The former crib hut area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former crib hut area.
8	Diesel Tank	▪ The diesel tank will be removed. ▪ A phase one contaminated land assessment will be completed within the former diesel tank area. ▪ Topsoil or a topsoil substitute will be applied to the former diesel tank area. ▪ The former diesel tank area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former diesel tank area.
9	Fences	▪ Retain the fences for grazing and land management purposes

JRLF Item No.	JRLF Item	Proposed Management Strategy
10	Hardstands/Roads	▪ The sealed access road into the area will be retained. ▪ All remaining tracks and dirt roads will be removed. ▪ A phase one contaminated land assessment will be completed within the former tracks and dirt roads. ▪ Topsoil or a topsoil substitute will be applied to the former tracks and dirt roads. ▪ The former tracks and dirt roads will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former tracks and dirt roads.
11	Car Park	▪ The car park will be removed. ▪ A phase one contaminated land assessment will be completed within the former car park area. ▪ Topsoil or a topsoil substitute will be applied to the former car park area. ▪ The former car park area will be ripped to treat compaction and improve infiltration. ▪ A suitable pasture seed mix will be sown within the former car park area.
12	Rattle grid	▪ The rattle grid may be retained.
13	Earthen Bunds	▪ The earthen bunds will be spread and used for on-site rehabilitation pruposes.
14	TEOM's	▪ The on-site TEOM will remain and be used for post decommissioning monitoring purposes.
15	Tree screening	▪ All tree screens will be retained.

LEGEND

- Western Rail Line
- Existing Rail Spur
- Proposed Rail Spur
- Roads
- Highway
- Cadastre
- JRLF Item
- Water Bore

NEW HOPE GROUP

SINCLAIR KNIGHT MERZ SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-29 - JLRF Decommissioning Strategy

Scale 1:7,500 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

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3.11.2 Mine and Associated Infrastructure

NAC in consultation with the Acland Pastoral Company (APC) and other applicable parties will review all infrastructure assets towards the close of the revised Project and assess which structures will be retained for the APC's agribusiness activities, sold for recycling or relocation, or disposed of as general or regulated waste. Recycling and re-use of the revised Project's redundant infrastructure using local contractors will be promoted by NAC.

Transport requirements for the decommissioning phase of the revised Project will be minor compared to the other project phases and will mainly involve rehabilitation and infrastructure removal based tasks. Transport off-site during the decommissioning phase will involve the removal of infrastructure for re-sale or recycling and the removal of waste material by a licensed waste contractor.

Personnel working on the rehabilitation and decommissioning program will travel to and from the revised Project site based on their working arrangements, which are expected to be mainly day time hrs only. The maximum amount of people travelling to or from the revised Project site will be minimal compared to the other project phases. It is expected that the number of people involved in the decommissioning phase will be less than 50.

NAC in consultation with the APC will determine which former mine roads are to be retained for on-going access purposes. All roads not retained will be rehabilitated to the required standard outlined in the final rehabilitation and decommissioning plans.

NAC in consultation with the APC will determine which of the water management structures will be retained as water sources for future agricultural activities. NAC will ensure that all water management structures agreed for retention are operating in an acceptable manner and are maintained in a good condition. NAC envisages that a majority of the active water management structures will be retained for future useIn summary, a comprehensive assessment of waste will be undertaken in line with the waste management hierarchy to identify the most appropriate measures to manage the remaining waste on the revised Project site. Site infrastructure will generally be decommissioned and demolished in the line with the post mine land use agreement.

To ensure the decommissioning of the site's infrastructure is rehabilitated to a safe and acceptable standard the following will be completed.

1) Removal of infrastructure and unused or unwanted equipment. This removal phase will include all structural steel from the CHPP area, conveyor belts and frames, CHPP processing equipment, electrical cabling and associated instrumentation, portable administration buildings, mobile equipment, workshops and storage facilities. Any permanent buildings that cannot be removed intact will be demolished and removed or used for backfilling.
2) Collection and removal of all residual hazardous substances by a licensed regulated waste transporter. This collection phase will include contaminated packaging and containers, oils, tyres, paints and resins, recyclables and general waste. Radiation density sources will be isolated and removed by the appropriate licensed contractors.
3) Removal of all service infrastructure inclusive of power, water, and sewerage. Special attention will be given to the removal of fuelling facilities, workshops and vehicle service/parking areas.

4) Protective or supporting bunds and pads for pipelines and vehicle service/parking areas will be removed. The material will be tested for contamination before being used as general fill material.
5) Remove, recycle or bury of all concrete slabs, footings, associated with the CHPP processing equipment, administration buildings and workshops. This material will be used in backfilling operations where it will be covered with inert material before topsoiling and rehabilitation. Concrete that has been removed from areas where there have been fuels, greases, chemicals, and other hazardous substances stored, used and handled will be treated as contaminated material.
6) Preventing public access by removal or closure of access roads and tracks. Access tracks no longer required by the landowner or occupier will be rehabilitated to a beneficial end use.
7) Tailings storage facilities will have appropriate fencing, bunding or other protection measures provided. Warning signs will be provided as required for public safety purposes. It is envisaged these facilities as 'notifiable activities' and due to their physical characteristics (size and nature) will remain on the DEHP's EMR. NAC will ensure that it addresses its statutory obligations under the EP Act for all sites that remain on the EMR.
8) The stability of the dams will be enhanced (where necessary) by buttressing with inert rock material to create safe final slopes that are resistant to erosion and which may then be rehabilitated in accordance with the post-mine land use agreement.
9) A self-sustaining vegetation cover will be grown to provide long term stabilisation. Appropriate measures to assist vegetation growth may include topsoil covering, correction of pH, incorporation of organic mulches and fertilisers to encourage plant growth, irrigation, and protection of the vegetation area by utilising wind-breaks and other suitable means.

3.11.3 Rehabilitated Land

The stability of the final landform that remains after mining operations cease is critical to the successful rehabilitation of the revised Project site. Rehabilitated land will be monitored until monitoring data confirms successful achievement of the agreed rehabilitation performance criteria. NAC will continue this monitoring regime until the total disturbed area is fully rehabilitated and relinquishment of the revised Project's MLs can be completed. Over the revised Project's life, NAC may also seek progressive 'sign-off' on successfully rehabilitated parcels of land from the DEHP. NAC's rehabilitation activities will be designed to ensure the final agreed post mining land use and surrender of the revised Project's MLs are achieved. NAC will transfer the overall management of the revised Project site to the APC.

During the decommissioning phase, NAC will ensure all 'notifiable activities' conducted within the revised Project site will be investigated for in-situ soil contamination and as required under the EP Act, will either:

- be released from the DEHP's EMR;
- be remediated, confirmed by follow-up investigation(s), and released from the DEHP's EMR; or
- remain on the DEHP's 'EMR' with an agreed 'site management plan'.

The decommissioning and final rehabilitation of the revised Project is discussed in **Chapter 4**.

3.11.4 Environmental Offsets

NAC will ensure that the agreed State and Commonwealth offsets for the revised Project have suitable arrangements established for their permanent management in perpetuity. **Chapter 7** and **Appendix I** provides a detailed assesment of the State and Commonwealth offset requirements for the revised Project repectively.

3.11.5 Conceptual Mine Closure

A comprehensive land resource assessment has been undertaken for the revised Project and is presented in **Chapter 4**. This assessment includes the establishment of rehabiltiation performance criteria based on the revised Project's post mine land use of grazing. At the appropriate time, NAC will prepare a comprehensive mine closure plan. The mine closure will take into account the baseline environmental data that has been capture throughout the life of the revised Project, legal and cost implications, stakeholder involvement, closure criteria and costs and will document a closure action planning process.

In addition, the mine closure plan for the revised Project will broadly address the following four key objectives as defined in the *Strategic Framework for Mine Closure (Australian and New Zealand Minerals Energy Council & Minerals Council of Australia 2000).*

- To protect the environment and public health and safety by using safe and responsible closure practices;
- To reduce or eliminate environmental effects once the mine ceases operations;
- To establish conditions which are consistent with the pre-determined end land use objectives; and
- To reduce the need for long term monitoring and maintenance by establishing effective physical and chemical stability of disturbed areas.

3.12 Acland Management Strategy

In developing the Acland Management Strategy the following guiding principles were adopted:

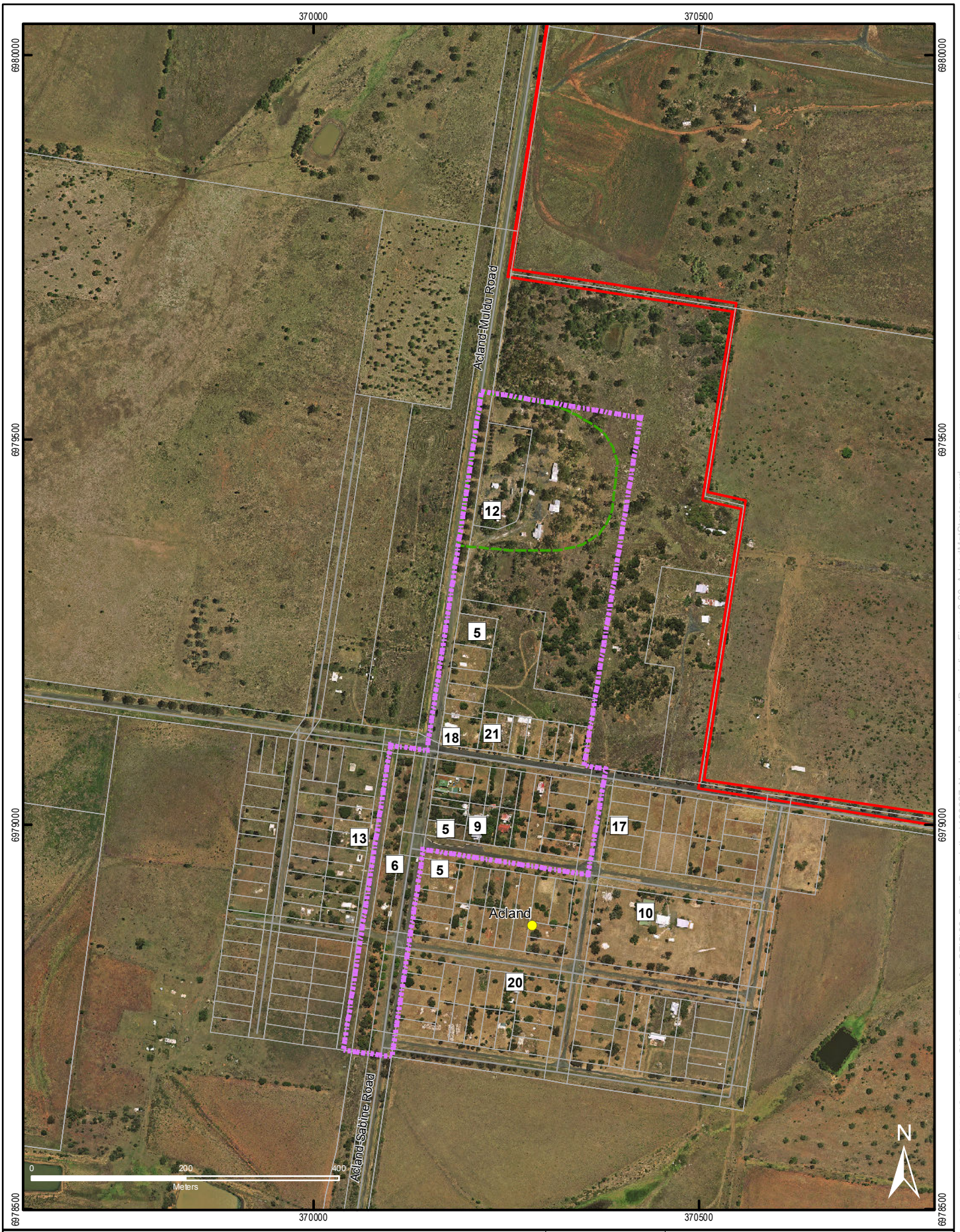
- remove dysfunctional buildings and infrastructure in a state of disrepair;
- tidy up and maintain land;
- retain items of local historical or heritage significance;
- enhance amenity of Tom Doherty Park and the Acland Community Hall; and
- meet legal obligations.

A summary of proposed management plans for each of the property types and structures in Acland currently owned by the NHG is provided in **Table 3–28**. The corresponding Acland Item Number is depicted in **Figure 3–30**. A comprehensive Acland No.2 Colliery Conservation Plan is located in **Appendix J.12**.

Table 3–28 Acland Management Strategy

Acland Item No.	Acland Item	Proposed Management Strategy
1	Roads into and surrounding Acland	▪ A communications strategy to inform local residents/users about the specific roads to be closed, timing, etc. will be developed and form part of a Road Closure Plan. The roads to be closed will be based on the Project Description. Similarly, separate communication strategies will be developed for the upgrade of the Acland-Sabine Road and the re-alignment of the Jondryan-Muldu Road.
2	Roads within Acland	▪ Unless necessary for the purpose of the Project, no road closures within Acland will be considered during the EIS process. Agreements will be negotiated with TRC regarding maintenance of the roads within Acland.
3	House slabs	▪ All house slabs will be removed and disposed of as per regulatory requirements. All blocks will be maintained accordingly to reduce the ingress of weeds, etc.
4	Remaining houses and buildings owned by the NHG	▪ Demolition or sale/donation of the houses for relocation. All former house sites will be tidied up and maintained after removal or demolition.
5	Contaminated land sites	▪ Buildings and other structures will be demolished. Under the Environmental Protection Act 1994, a Site-based Management Plan will be developed to fulfil the statutory requirements of the sites remaining on Queensland's Environmental Management Register (EMR).
6	Tom Doherty Park	▪ The park will be maintained in a sound condition, including grounds management, mowing, and weed management. The TRC and local RSL Branch will be consulted in relation to the proposed management actions.
7	War Memorial	▪ The War Memorial will be maintained in a sound condition, including periodic restoration works to address the effects of weathering over time. The local RSL Branch will be consulted in relation to the proposed management actions.
8	Current house blocks owned by the NHG	▪ This land will be appropriately maintained, including slashing, weed management and fencing as required.
9	Town Hall	▪ This building will be maintained in a sound working order. Upgrades will be considered for future amenity enhancements (i.e. to facilitate meetings and logistical requirements for large groups etc.).
10	School and associated structures	▪ The sale or donation of the main school building and the associated structure is the main option. The tennis court fencing may be donated and the slab will be removed and disposed of as per regulatory requirements. The school signage will be donated to the operators of the Jondaryan Woolshed or similar local historical organisation.

Acland Item No.	Acland Item	Proposed Management Strategy
11	Tennis wall	▪ This structure will be removed and disposed of as per regulatory requirements. The surrounding area will be appropriately tidied up following removal of the structure.
12	Acland No.2 Colliery	▪ This site will be managed via a Conservation Management Plan.
13	Windmill at 17 George Street	▪ This item will remain in-situ and will be appropriately maintained, including grounds management, mowing, and weed management.
14	Summerhill Hotel remains	▪ This item will be demolished and disposed of as per regulatory requirements. The former site will be appropriately maintained, including grounds management, mowing, and weed management.
15	Slaughter yard on Acland Muldu Road	▪ This item will remain in-situ and will be appropriately maintained, including grounds management, mowing, and weed management.
16	Butcher's Shop	▪ This item will be demolished and disposed of as per regulatory requirements. The former site will be appropriately maintained, including grounds management, mowing, and weed management.
17	Caretaker's residence	▪ This item will be demolished and disposed of as per regulatory requirements. The former site will be appropriately maintained, including grounds management, mowing, and weed management.
18	Disused telephone exchange	▪ Discussions will be held with the operators of the Jondaryan Woolshed or other relevant parties in relation to the possible donation of the item. Following removal, the former site will be appropriately maintained, including grounds management, mowing, and weed management.
19	Muldu Railway Station	▪ Discussions will be held with the local Historical Rail Society in Toowoomba, the operators of the Jondaryan Woolshed and/or other appropriate parties in relation to the donation of the Muldu Railway Station.
20	Miner's cottage	▪ This item will remain in-situ and will be appropriately maintained, including grounds management, mowing, and weed management.
21	St Jude's Church	▪ This item will be donated to appropriate applicants. The former site will be appropriately maintained, including grounds management, mowing, and weed management.
22	Town signage	▪ Town signage will remain in-situ.
23	Bottle trees	▪ These items will remain in-situ.



LEGEND

- Towns and Localities
- Roads
- Cadastre
- Mining Tenements
- Management Area
- Site Features
- Heritage Site

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 3-30 - Acland Management Strategy

Scale 1:6,500 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

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