TRANSITIONAL PROGRESSIVE REHABILITATION AND CLOSURE PLAN

JEEBROPILLY COAL MINE

PREPARED FOR
NEW HOPE GROUP
on behalf of JEEBROPILLY COLLIERIES PTY. LTD.

17 MAY 2024

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Cover Page

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AEP	Annual Exceedance Probability
ARD	Acid rock drainage
CCAP	Community Consultation and Awareness Program
DES	Department of Environment and Science
DGV	Default guideline values
CHPP	Coal handling and preparation plant
EA	Environmental Authority
EC	Electrical Conductivity
EMOS	Environmental Management Overview Strategy
EPA	Environmental Protection Agency
EP Act	*Environmental Protection Act 1994*
ERA	Environmentally relevant activity
FoS	Factor of safety
FPC	Foliage projective cover
GDE	Groundwater dependent ecosystems
IA	Improvement areas
ICC	Ipswich City Council
LOD	Land outcome document
ML / MLs	Mining lease / mining leases
MM	Management milestone
MTI	Medical Treatment Injury
NHG	New Hope Group
NNP	Net neutralisation potential
NUMA	Non-use management area
PLA	Priority Living Area
PMLU	Post-mining land use
PoO	Plan of Operations
PRCP	Progressive Rehabilitation and Closure Plan
RA	Rehabilitation areas
RDPO	Rosewood District Protection Organisation
RE	Regional ecosystems
REMP	Receiving Environment Monitoring Program
RM	Rehabilitation milestone
ROM	Run-of-mine
RUSLE	Revised Universal Soil Loss Equation
SEP	Stakeholder Engagement Plan
TDS	Total dissolved solids
TSF	Tailings storage facility
TSS	Total suspended solids
WQO	Water quality objectives

1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by New Hope Group (NHG) to develop a Progressive Rehabilitation and Closure Plan (PRCP) for the Jeebropilly Mine (the Project) in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act).

This PRCP is applicable to mining leases (MLs) ML4705, ML50082, ML50093, ML50133, ML4577, ML4711, ML4689, ML7186, ML4690, ML4677, ML50132, ML4710. The current version of the environmental authority (EA), EPML00826713 for the Project took effect on 8 February 2024 and was issued to Jeebropilly Collieries Pty. Ltd. (Jeebropilly Collieries)

The EA authorises the environmentally relevant activity (ERA) of mining black coal (ERA 13) under Schedule 3 of the Environmental Protection Regulation 2019. The EA does not specifically list any ancillary or notifiable activities.

2 Scope and objective

The purpose of this PRCP is to describe how progressive rehabilitation will be carried out at the Project. The PRCP has been developed in accordance with the requirements of the Progressive Rehabilitation and Closure Plan Guideline (DES 2021) (the PRCP Guideline), which states that the PRCP must include a rehabilitation planning part and a rehabilitation schedule part.

Rehabilitation Planning part:

The purpose of the rehabilitation planning part of the PRCP is to support and justify the development of the proposed PRCP schedule. This part must detail how progressive rehabilitation and closure will be carried out over the entire Project site and on both a rehabilitation area basis and improvement area basis. The key components of the rehabilitation planning part for the Project are:

- community consultation information (refer Section 3.2);
- post-mining land use (PMLU) and/or non-use management area (NUMA) determination (refer Section 3.3 and Section 3.4);
- rehabilitation and management methodology (refer Section3.5);
- risk assessment (refer Section 3.6); and
- a monitoring and maintenance program (refer Section 3.7).

Rehabilitation Schedule part:

The rehabilitation schedule is a required element of a PRCP. Once approved, the schedule becomes a legally binding and enforceable instrument with which the Project must comply. The schedule must include:

- nomination of either a PMLU or NUMA for all land within the relevant resource tenures, including land uses for undisturbed land;
- identification of when land becomes available for rehabilitation or improvement;
- rehabilitation or management milestones to achieve the PMLU or NUMA outcomes;
- milestone criteria that demonstrate when each milestone has been completed;
- completion dates for each milestone to be achieved; and
- any conditions considered necessary or desirable.

The administering authority may impose a condition on a draft PRCP schedule or a PRCP schedule if it considers the condition is necessary or desirable (section 4.2 of the PRCP Guideline). Two deemed conditions are to be included in all PRCP schedules in accordance with section 206A of the EP Act. The first condition states that when carrying out a relevant activity under the PRCP schedule, the holder must comply with a requirement stated in the EA relevant to carrying out the activity.

The second condition states that the holder must comply with the following matters stated in the schedule:

- each rehabilitation milestone and management milestone, and
- when each rehabilitation milestone and management milestone is to be achieved.

3 Project planning part

3.1 Project planning

3.1.1 Project description

Jeebropilly coal mine is located in southeast Queensland in the West Moreton Coalfield, approximately 55 km southwest of Brisbane, 18 km west of Ipswich City, and 10 km southeast of Rosewood (Figure 1).

At peak supply production, the Project produced approximately 1 Mtpa of product coal. Coal was loaded onto trains and transported to the Port of Brisbane via the Ebenezer Rail Loop.

Mining activities ceased in December 2019 and coal materials have been removed from the site. In 2020 the coal handling and preparation plant (CHPP) was demolished and removed from site, along with other ancillary plant and equipment. The retained run-of-mine (ROM) laydown area, CHPP slabs, hardstand areas and adjacent offices, and other laydown areas are included within a landholder agreement for retained infrastructure (see Appendix H). The current Project layout is shown in Figure 2.

3.1.1.1 Mining tenements

The Project comprises 12 MLs covering approximately 1,446 ha (Table 1) as shown in Figure 3 with an approximate total area of disturbance of 1,119 ha. Jeebropilly Collieries Pty Ltd, a wholly owned subsidiary of NHG is the authorised holder of the EA and the MLs associated with the Project. The Project has been in existence since 1982 when Jeebropilly Collieries Pty Ltd purchased an existing open cut operation located on ML4577 from Rylance Collieries Pty Ltd. The mine has since expanded to cover the MLs listed.

3.1.1.2 Expired mining leases

It should be noted that ML4577, although listed in the EA, expired in 2005. Historical mining disturbance occurred within the southern portion of ML4577 between 1970 and 1982 with no subsequent disturbance on this ML by Jeebropilly Collieries. Although this ML expired in 2005, it is still within the Project EA and has been included within this PRCP.

3.1.1.3 Notifiable activities

While not listed specifically on the EA, the Plan of Operations (Jeebropilly Collieries 2021) lists several notifiable activities as occurring on the site during mining operations; these are listed in Table 2.

Table 1: Jeebropilly mining leases

Mining Lease	Granted	Expired	Area (ha)		Description / Site Activities
			Lease	Surface	
ML4677	9/12/1982	30/06/2024	112.63	112.63	Rehabilitation area (Wash Plant Pit)
ML4689	20/06/1985	30/06/2024	94.38	94.38	Rehabilitation area (Wash Plant Pit)
ML4690[1]	2/06/1985	30/06/2024	113.33	107.82	Administration, Haul road, rehabilitation, workshop
ML4705	18/12/1986	30/06/2024	6.90	6.90	Historic CHPP operations/laydown
ML4710	10/08/1989	31/08/2030	201.48	191.54	Care and maintenance, Co-disposal area
ML4711	12/10/1989	31/10/2030	96.40	94.54	Former co-disposal area, rehabilitation
ML7186	22/07/1993	31/07/2023	142.80	142.80	Mining operations (7186 pit), rehabilitation, co-disposal area
ML50082	6/10/1994	31/07/2023	39.05	34.46	Haul road, co-disposal area
ML50093	2/02/1995	30/06/2024	42.49	42.49	Historic mining operations (Wash Plant Pit)
ML50132[2]	26/08/1999	31/07/2024	502.67	319.32	Historic mining operations, rehabilitation (Jeebropilly North Pit and Underpass Pit)
ML50133	26/11/1998	30/06/2024	92.15	91.60	Rehabilitation, water storage (former void)
ML4577[3] (expired)	30/03/1975	25/10/2005	69.69	-	Legacy mining disturbance
		Total	1,445.9	1,238.5	

[1] PFL17 lies within the boundaries of ML4960, it has been decommissioned and removed with the EA surrendered in 2020
[2] ML50132 was partially surrendered in 2021
[3] ML is included in the EA but expired in 2005

Table 2: Notifiable activities on site

Site	Notifiable activity	Lot on Plan	ML
Former co-disposal areas	24. Mine Wastes	Lot 198 on CP904433	ML4689
Former co-disposal areas	24. Mine Wastes	Lot 196 on CC3467	ML4711
Former co-disposal areas	24. Mine Wastes	Lot 197 on CC3467	ML4711
Former co-disposal areas	24. Mine Wastes	Lot 303 on CC114	ML4711
Fuel farm diesel (C1) storage Oil (C2) storage	29. Petroleum product or oil storage	Lot 207 on CP904433	ML4690
Former co-disposal areas	24. Mine Wastes	Lot 213 on CH3132 Lot 217 on CH3132 Lot 208 on CC3467	ML7186 ML4711 ML50082 ML4710

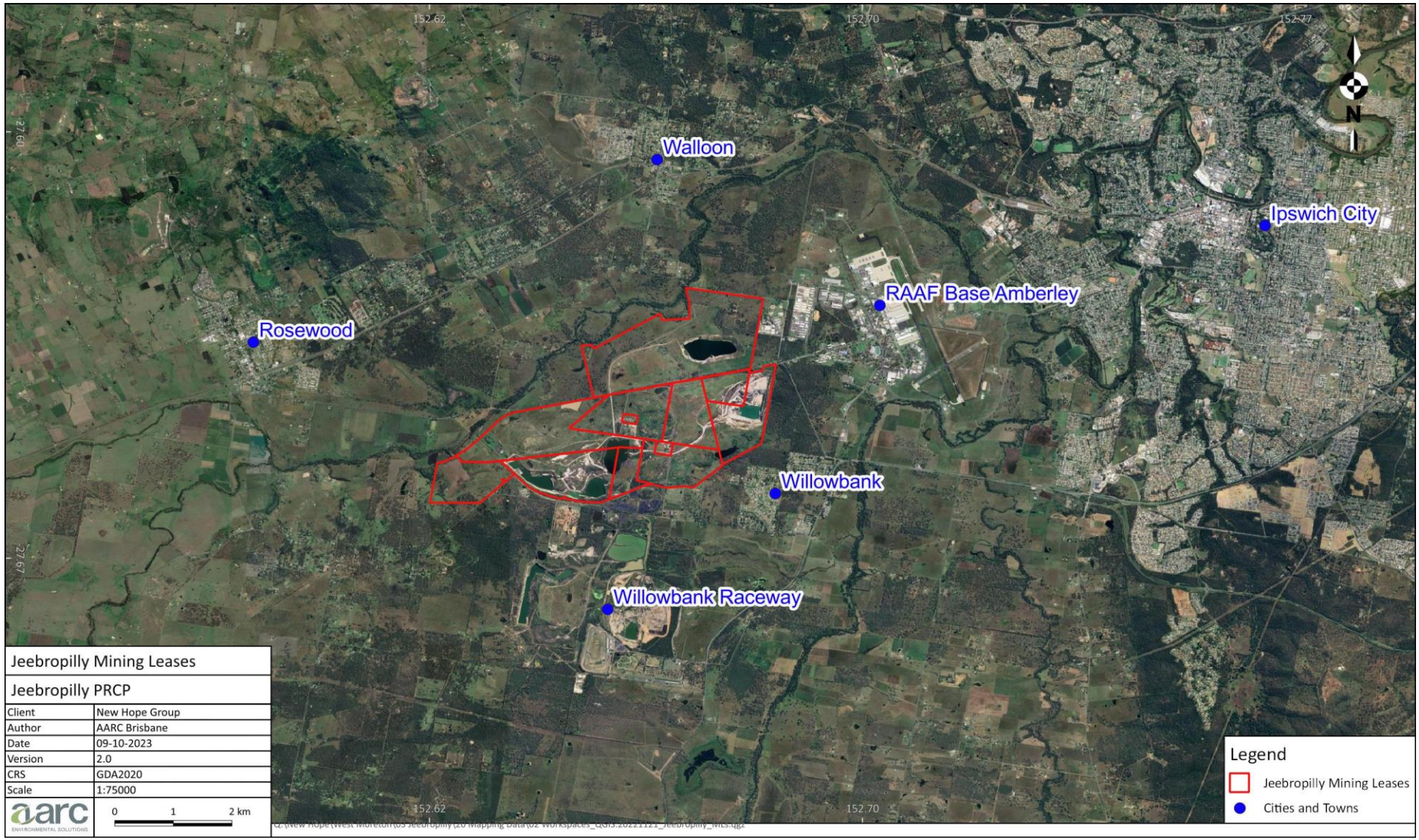

Figure 1: Jeebropilly Project locality

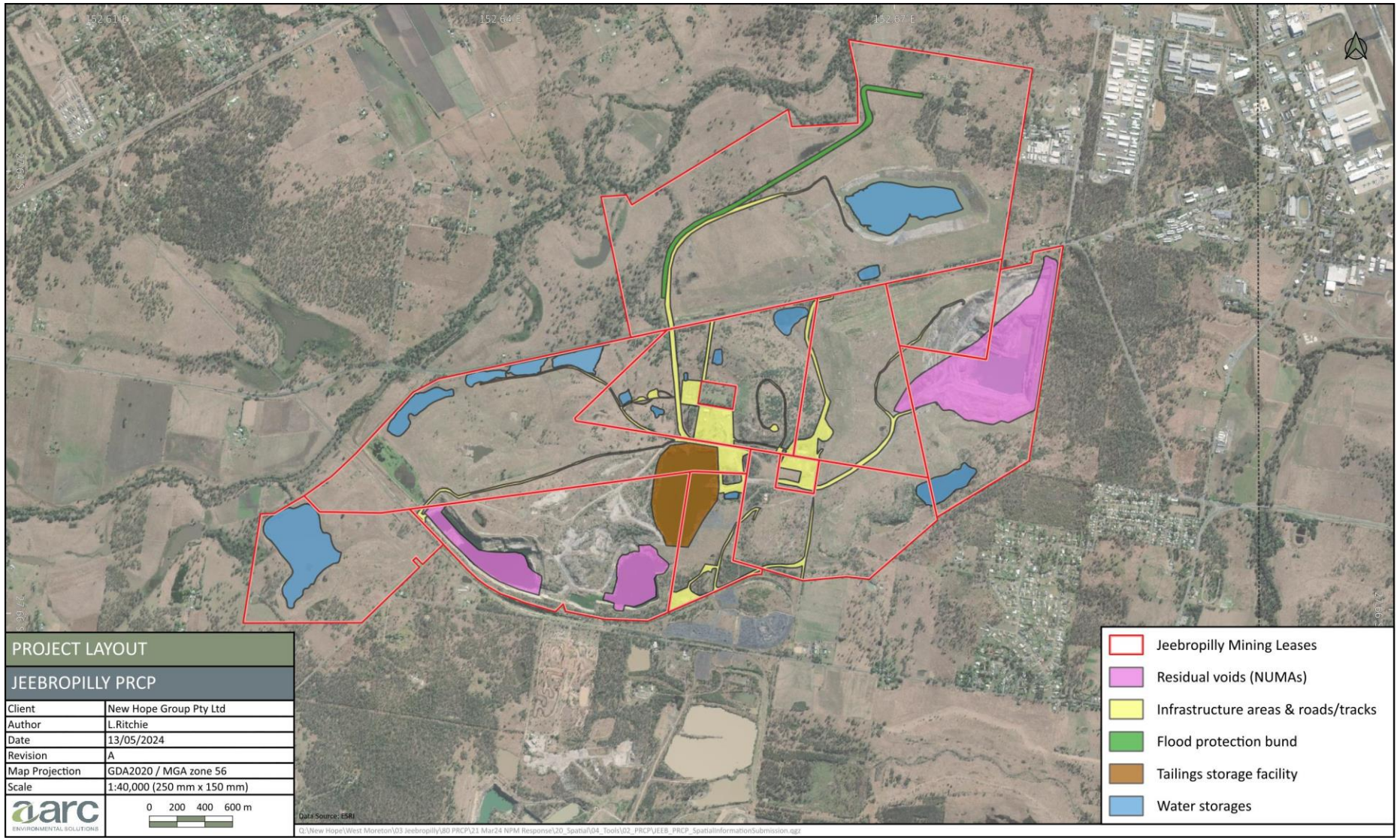

Figure 2: Project layout

Figure 3: Jeebropilly mining leases

3.1.1.4 Resource tenements

The resource exploration permits and licences that overlap, or are adjacent to the Project, are listed in Table 3 and shown in Figure 4.

Table 3: Regional resource exploration permits

Authorised holder name	Permit number	Location description
Moonie Pipeline Company Pty Ltd	PPL 1	The pipeline runs from Moonie to Brisbane through the Project area
Within Energy Pty Ltd	EPG 2026	Surrounding the Project area on the north, south and west sides and overlapping the northern MLs
The Austral Brick Co. Pty Ltd	EPM 28268	Approximately 7.5 km southwest of the Project area

3.1.1.5 Historical mining operations

Underground and open cut mining operations have taken place at the Project site with underground mining occurring within the northeast corner between 1930 and ceasing in 1964; and open cut mining occurring between 1971 and ceasing in 2019. Table 4 provides an indicative timeline of mining operations.

Underground mining

A study conducted by Moreton Geotechnical Services Pty Ltd (2007) determined that underground mining occurred in several areas in the northeast of the Project site (Figure 5 and Figure 6) at operations known as Amberley No. 1 Colliery, Moorefield No. 3 Colliery (formerly Amberley No. 2), Moorefield No. 4 Colliery, and Lawriefield Colliery (formerly Coalfields Colliery) (Figure 7). Longwall mining methods were employed at Moorefield No. 4 Colliery while all other locations employed bord and pillar methods.

The Jeebropilly North Open Cut mine is understood to have encountered the western side of the some of these underground operations. The Mt Elliott underground mines (Figure 8) also employed bord and pillar and longwall methods. It is understood that these underground operations, where they impinged on the current leases were removed by the 'Jeebropilly Mt Elliott open cut' pits (Figure 9).

Open cut mining

The open cut mining operations employed multi-level blasting and earth moving (truck/shovel) methods with backfilling of the voids with rock and progressive rehabilitation occurring in several areas.

The open cut mining operations commenced in approximately 1971 by Rylance Collieries within the now expired ML4577 and moved west into ML4677. Operations were conducted over the remaining Mt Elliott underground reserves before being taken over by Jeebropilly Collieries in 1982.

By 2007, eight open cut pits existed across the Project site with a maximum depth between 30 m and 80 m. The Initial (Pit 2) and Jeebropilly (1990–1995) (Pit 4), Underpass Pit (Pit 9) open cut pits have been completely backfilled. All other voids have been partially backfilled leaving the current configuration comprising ML7186 and Wash Plant Pit as residual voids. An additional pit commenced operations in 2015 (Pit 9), and all remaining mining operations ceased in 2019 (refer Table 4).

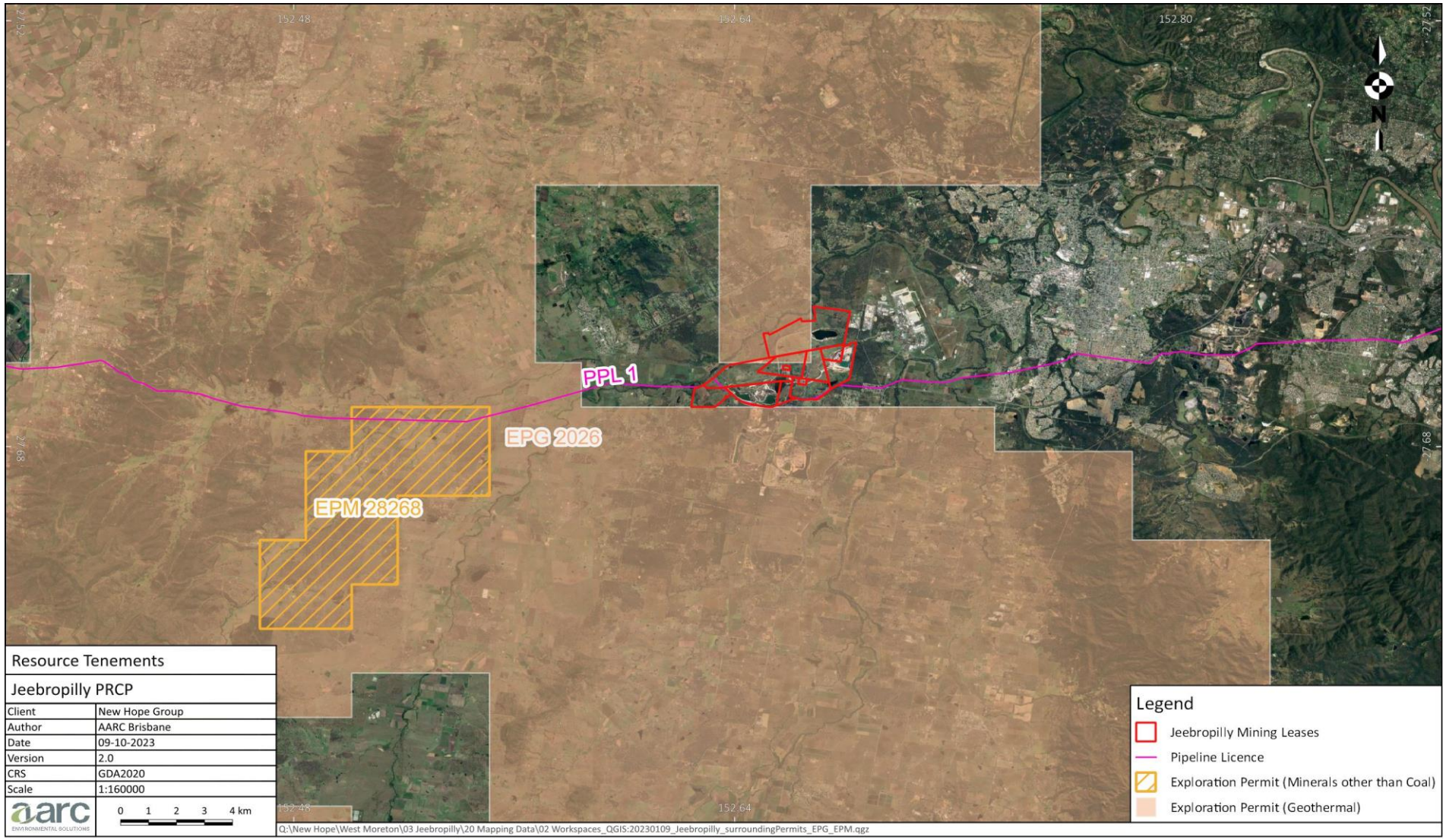

Figure 4: Proximate tenements and exploration permits

Table 4: Timeline of mining operations

Name		Mining years (commenced–finished)	Mining Lease	Description / mining history
Jeebropilly Mt Elliott open cut (south)[1]	Pit 1	1971–1982 1983–1988	ML4677	Mining operations started in Pit 1 moving southwest.
Jeebropilly Initial open cut	Pit 2	1986–1987	ML4690	Mining commenced at Pit 2 in 1986 and was mined out within two years.
Jeebropilly open cut	Pit 3[2]	December 1987–May 2000	ML4710 ML7186 ML50082 ML4690	On the western side of ML4690, Pit 3 was commenced and progressed west through ML4710 before moving south into ML7186. A TSF was constructed in the residual void of Pit 3 in 2000 and used for the remaining life of the mine.
Jeebropilly open cut	Pit 4	1990–1995	ML4711	Mining commenced at Pit 4 soon after Pit 3 and was completed by 1995. The void was divided into two co-disposal areas and filled with reject material from the CHPP.
Jeebropilly West open cut	Pit 5	August 1999–July 2000	ML50133	Pit 5 was completely mined out within 18 months. By 2004 the pit was partially back filled and allowed to fill with water from the Bremer River. The residual void has since been renamed Gieger Lagoon.
Jeebropilly North open cut	Pit 6	March 2000–2007 2015–2018	ML50132	Mining commenced at Pit 6 in 2000 and at Pit 7 in 2002. In 2007 the mine was placed into care and maintenance for approximately 12 months before recommencing mining at Pit 7. Mining at Pit 6 was recommenced from 2015. Most of Pit 7 has been backfilled.
Jeebropilly Wash Plant open cut	Pit 7	November 2002–February 2007 2007–2019	ML4689 ML4677 ML50093	
Jeebropilly Mt Elliott open cut (north)	Pit 8	November 2003–September 2005	ML50093	Mining commenced at Pit 8 in 2003 through an area of previous underground mining.
Underpass Pit	Pit 9	2015–2019	ML50132	Mining commenced at Pit 9 from 2015 and finished in 2018.

[1] Mining at the Jeebropilly Mt Elliott open cut pit commenced in 1971 by Rylance Collieries Pty Ltd
[2] Pit 3 is assumed to include ML7186 western residual void

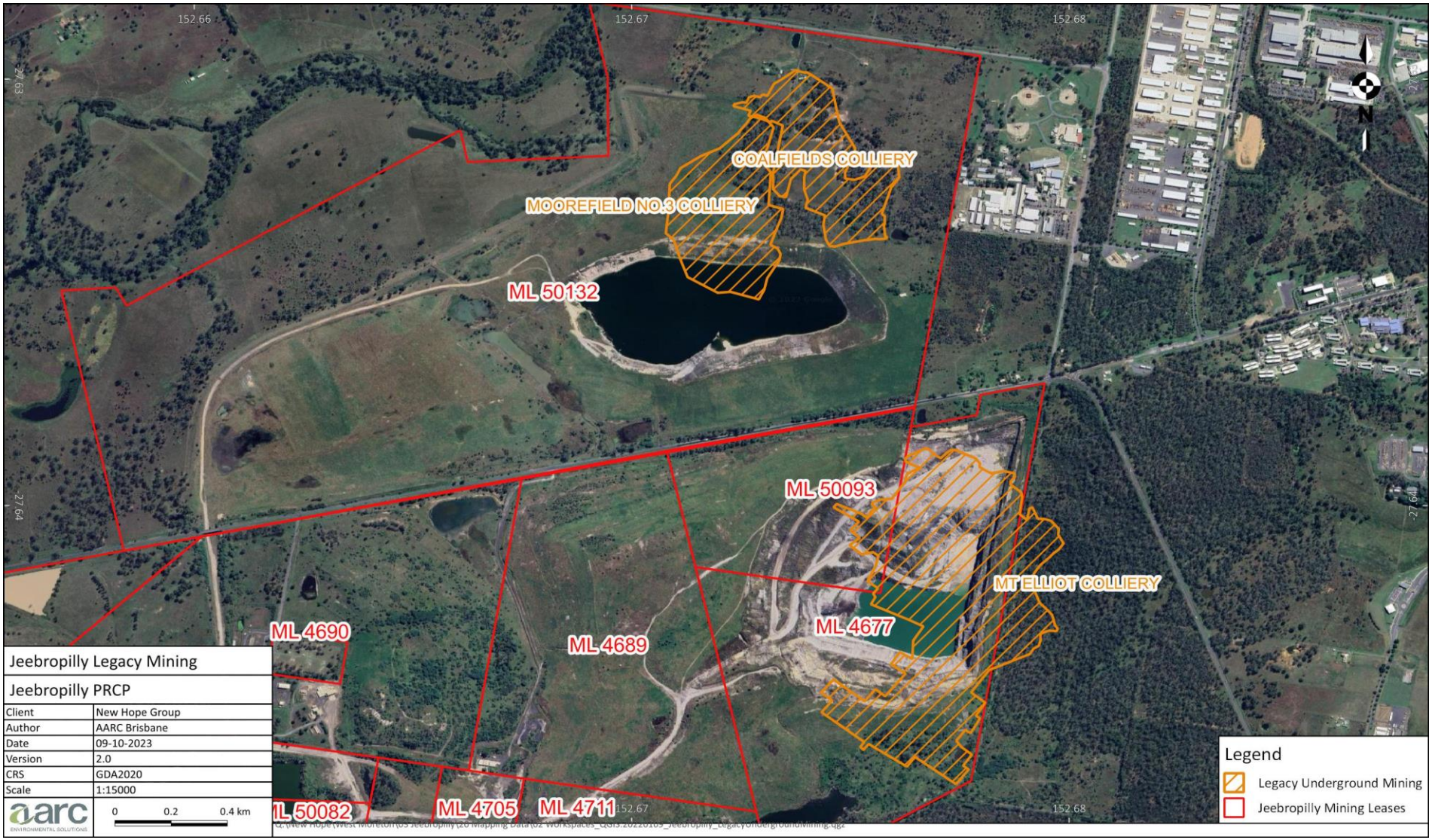

Figure 5: Legacy underground mining overview

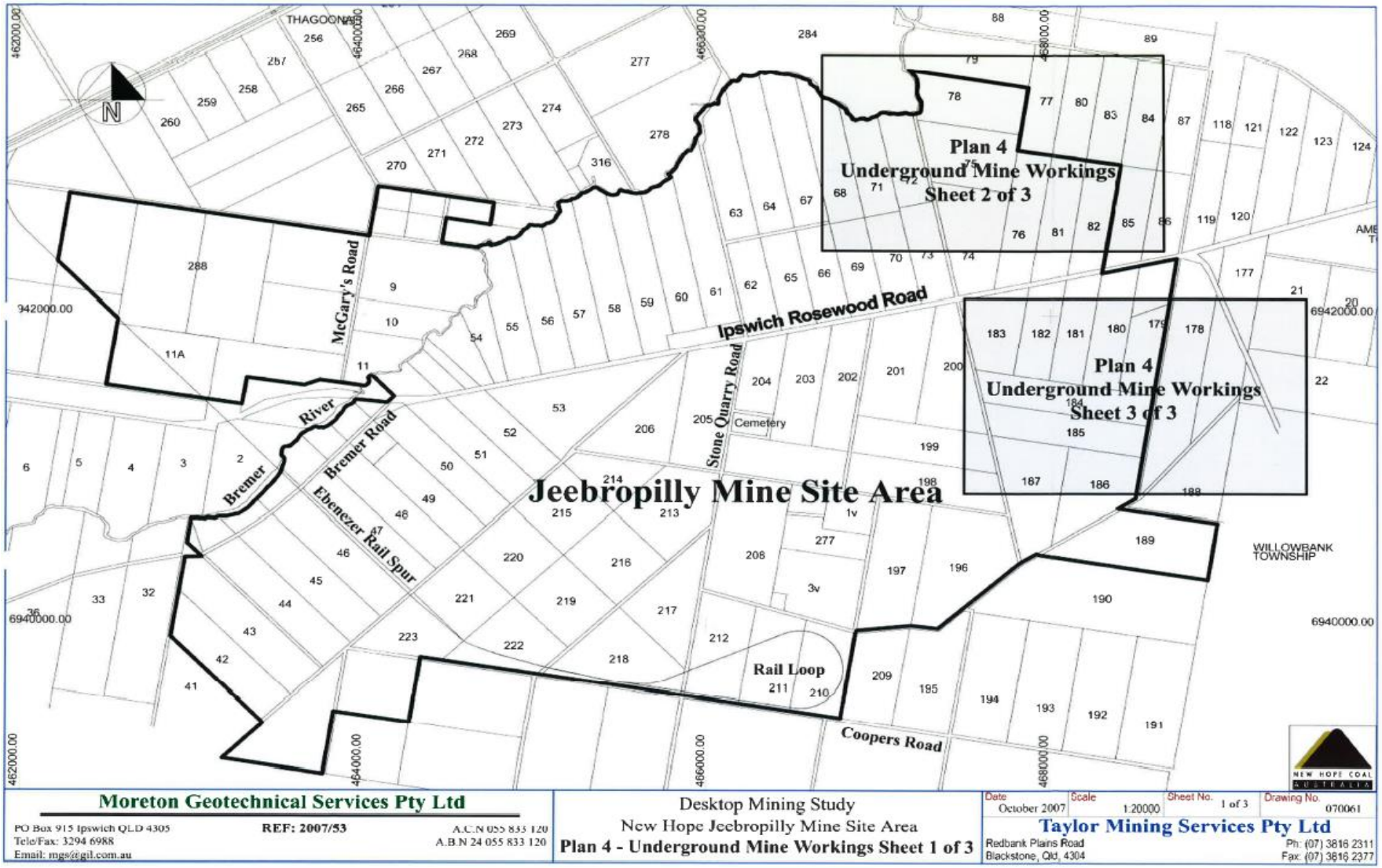

Figure 6: Underground mine workings – key map (sheet 1 of 3)

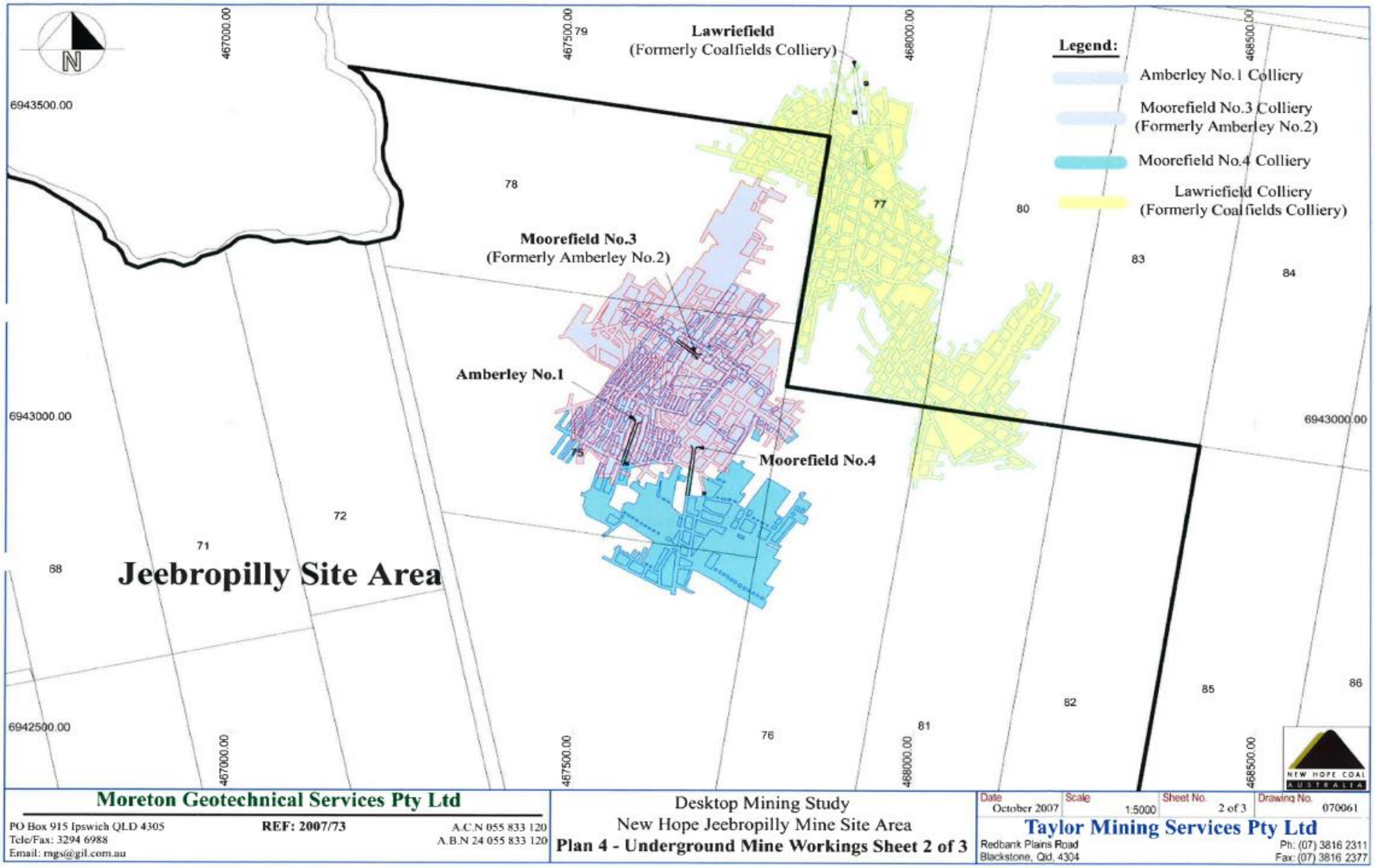

Figure 7: Underground mine workings - sheet 2 of 3

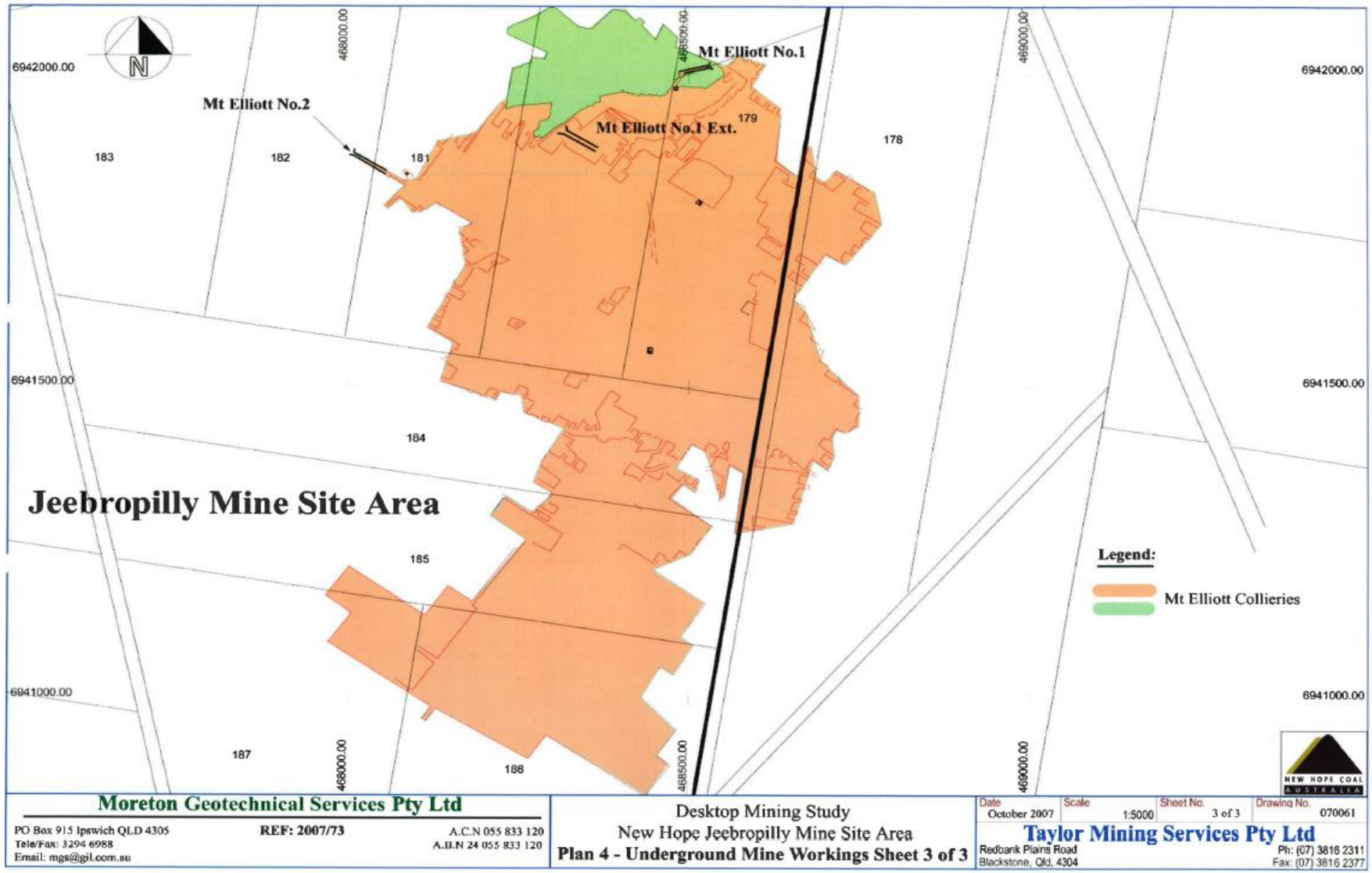

Figure 8: Underground mine workings - sheet 3 of 3

Figure 9: Jeebropilly open cut workings

3.1.2 Climate

The climate data presented in Figure 10 has been sourced from SILO (DES 2022a). The climate of the region is described as subtropical with warm wet summers and mild, dry conditions in winter. The warmest months are November to February. Average temperatures range from 20.0°C to 34.9°C in January to 7.0°C to 23.5°C in July (Ipswich weather station ID 040101). Average annual rainfall for the area is 885 mm with a wet season that generally aligns with the November to March period and accounts for over 65% of the region's annual average rainfall.

Evaporation records from SILO indicate an annual average evaporation (Class A Pan) of approximately 1,669 mm; approximately twice the average rainfall (Figure 10).

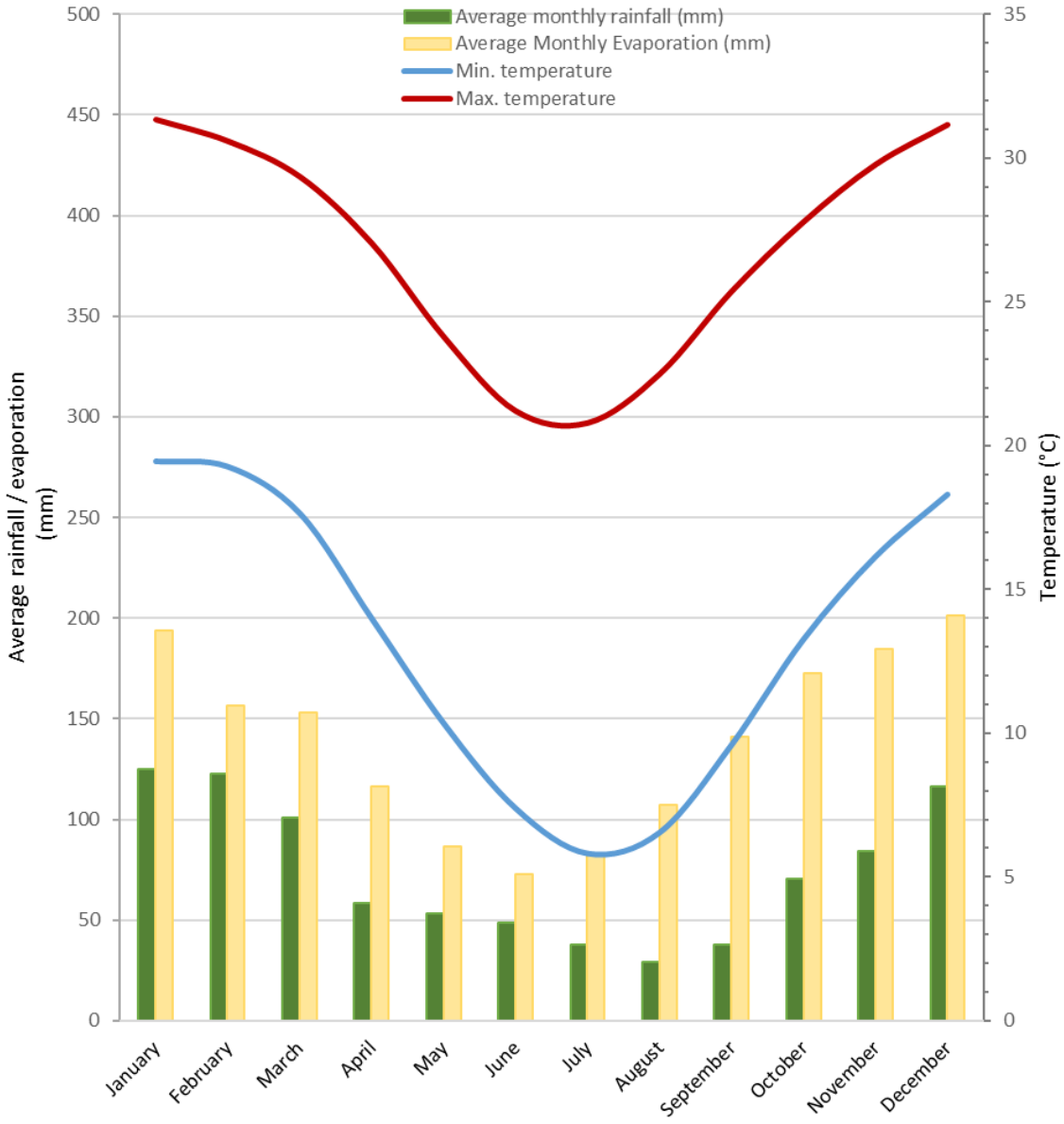

Figure 10: Project regional average monthly rainfall and evaporation

In Australia, climate change is generally expected to result in a shift towards more arid conditions, warmer temperatures, and reduced rainfall. According to the Queensland Government (2019), rainfall in southeast Queensland is predicted to decrease due to climate change. By 2050, median annual rainfall is projected to decrease by:

- 5% under a low emissions scenario (with emissions reduced from 'business as usual'); and
- 13% under a high emission, or 'business as usual' scenario.

Long-term climate projections predict that conditions will become warmer, with hotter and more frequent hot days. Rainfall events are predicted to become more intense, and tropical cyclones are predicted to become less frequent but more intense.

3.1.3 Geological setting

The Jeebropilly coal deposit forms part of the Walloon Coal Measures, with the bedrock comprised of sedimentary rocks including sandstone, shale, siltstone, and coal (Table 5). These Middle Jurassic deposits occur in both the Surat Basin and West Moreton Basins, and are generally found with shallow dips in relatively undeformed strata.

In the southwest of the Project site, the Walloon Coal Measures are close to the surface, however, are overlain by Tertiary rocks (sedimentary claystone, siltstone, sandstone, and volcanic basalt) in the south and east of the Project site. In the west and north of the Project site, adjacent to the Bremer River, the Walloon Coal Measures are overlain by Quaternary alluvium (clay, silt, sand, and gravel). A major feature of the Walloon Coal Measures within the Project site is the Warrill Creek Syncline (downward fold) that extends north to south through the middle of the site. The regional dip of the site is approximately 3° to the south.

Nineteen coal seams were identified in the Project area (Figure 11) with the lower 13 being of economic interest. The seams are approximately 1–2 m thickness with the lowest ten seams at an interval of approximately 50 m. The upper three seams of interest are at approximately a 15 m interval and are separated from the lower 10 seams by approximately 20 m of sandstone.

The coal occurs in horizons which are commonly referred to as:

- Amberley's;
- A Series;
- B Series;
- C Series;
- D Series; and
- E Series.

Table 5: Summary of geological units in the Project area

Strata Description	Age	Lithology	Thickness (m)
Alluvium	Quaternary	Unconsolidated gravel, sand, silt, and clay	> 20
Colluvium	Pliocene Pleistocene	Slope wash, clay, scree and soil	10
Basalt	Palaeocene–Miocene	Vesicular and amygdaloidal	> 30
Unnamed sediments	Palaeocene–Miocene	Claystone, sandstone and minor magnesium	15
Walloon Coal Measures	Middle Jurassic	Shale, siltstone, sandstone, coal seams and minor limestone	225
Marburg formation	Low Jurassic	Interbedded sandstone, siltstone, mudstone, conglomerate and minor coal seams	825

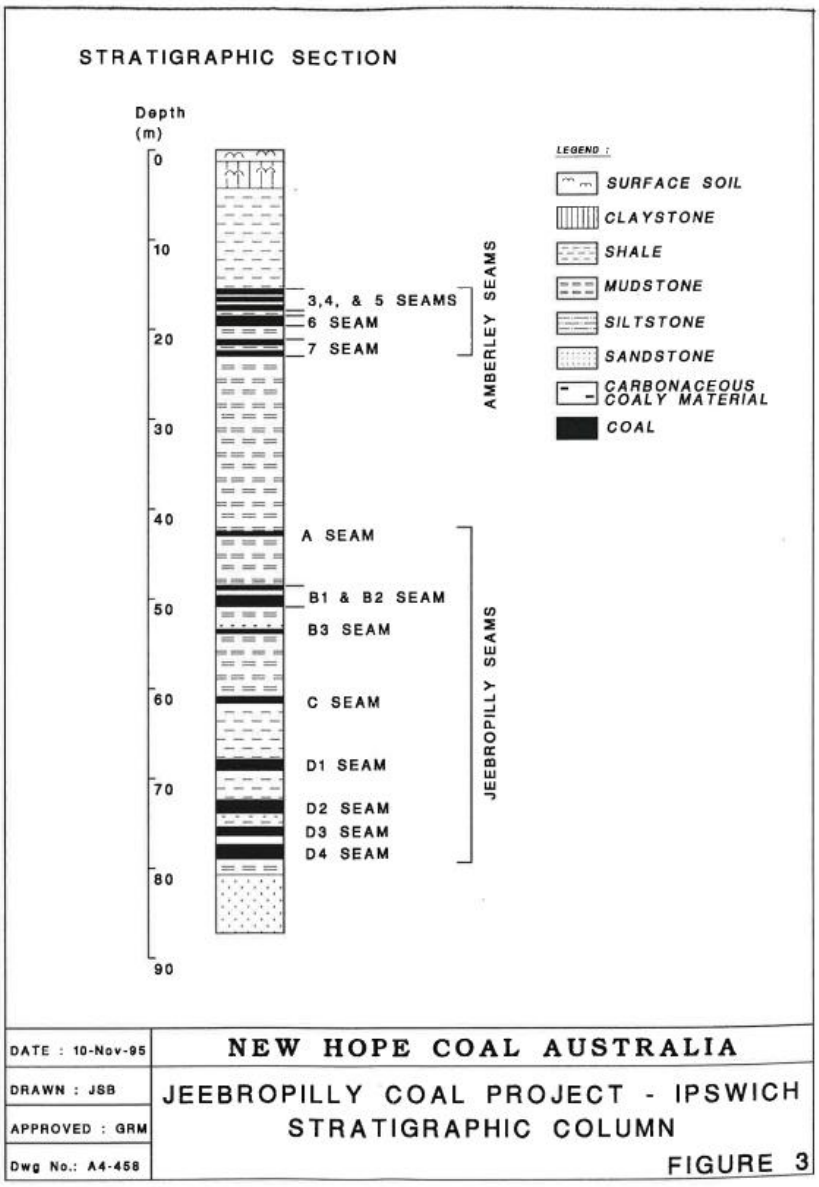

Figure 11: Stratigraphic section (Ison Environmental Planners 1996)

3.1.4 Topography and surface hydrology

3.1.4.1 Topography

Much of the Project site is situated on the alluvial plain of the Bremer River which includes some slopes rising to the south (Ison Environmental Planners 1996). Average slope gradients in the area are approximately 5% but ranges between 2-10%. Several ephemeral gullies drain northwest towards the Bremer River.

3.1.4.2 Hydrology

The Project is located within the Brisbane River Basin with the dominant water system, the Bremer River, being the second largest tributary of the Brisbane River. The catchment area is approximately 2,031 km^2 with a stream network of approximately 4,425 km in length. The headwaters of the Bremer River are in the Little Liverpool range, southwest of the Project site. The Bremer River drains into the Brisbane River, northeast of the Project, near Moggill. The Project is located within the Bremer River sub-catchment which consists of lowland fresh water systems of slow flowing streams. The streams have slight gradients and river substrates comprising cobbles, gravels, sand, silt, and mud in varying compositions.

A 1996 Environmental Management Overview Strategy (EMOS) detailed the surface hydrology for the area (Ison Environmental Planners 1996). Several ephemeral streams and drainage lines located within the MLs drain north and west towards the Bremer River. The Project site drains to the Bremer River either directly or via wetlands and farm dams. A small area to the east of the Project site drains to Warrill Creek and areas to the south drain to Ebenezer Creek (Figure 12). As per the Information Sheet ' Voids in flood plains' (DES 2020), relevant watercourses are those with a stream order of 4 or higher according to the Strahler stream order classification. Only the Bremer River is considered a watercourse under this classification. All other streams across the site are therefore considered to be non-watercourses (BMT 2023b).

The Bremer River floodplain encroaches both the western end and the central northern boundary of ML4710. A flood protection bund was installed to protect the mine operations area from several flood events without adverse impacts to nearby properties. This bund was constructed on the western boundary of the Project within MLs (ML50133 and ML4710). A majority of the bund was removed in 1996 and the adjacent flood plain restored to pre-mining levels. The remaining bund in ML4710 provides a safety barrier along the Ipswich Rosewood Road which borders the ML. A similar flood protection bund was constructed to the south of mining within the Jeebropilly North area (ML50132).

Water within region of the Project site has historically been used for stock watering and fodder crop irrigation within the flood plain. At the time of the 1996 EMOS report, downstream uses of the Bremer River included fodder crop irrigation and industrial uses, including power station cooling. It was determined that the mine would not affect flooding levels or surface water quality.

3.1.4.3 Site water quality

The most recent water quality monitoring for all existing water storages occurred between 2019 and 2022. Analysis results are summarised in Table 6 and monitoring locations are shown in Figure 13. The results are compared to the EA onsite water storage contaminant limits (EA Table 8.0) derived from the ANZECC and ARMCANZ (2000) stock water quality guidelines.

The results show that:

- Most retained water storages are moderately alkaline ranging between pH 7.6 to pH 11.
- Between 2019 and 2022, eight sites showed exceedances in electrical conductivity, with most sites indicating a reduction in electrical conductivity (EC) values over time. Mine-affected water storages generally indicated higher EC values.
- Sulphate was above contaminant trigger levels at Farm Dam A1 (JW02) in 2021, Southern Sediment Dam (JW07) in 2020, and Farm Dam A2 (JW57) in 2020. The 7186 West void (JW53) exceeded the sulphate trigger limit in all monitoring events except October 2019 and July 2020. Monitoring was not conducted at this site in 2022.
- No sites indicated fluoride exceedances in either 2019, 2021 or 2022 monitoring events. Results from December 2020 show exceedances in fluoride at Southern Sediment Dam (JW07), Jeebropilly West (JW24) and the Co-disposal Void (JW51). In July 2020, only one site (Southern Sediment Dam (JW07)) showed a fluoride exceedance.
- Aluminium was elevated in two sites between 2019 and 2022. JWS (JW55) showed exceedance in April 2021 (5.7 mg/L) and August 2021 (14 mg/L); and Farm Dam A2 (JW57) showed an exceedance in October 2019 (6.62 mg/L).
- No exceedances were noted at any site for arsenic, cadmium, cobalt, copper, lead, nickel or zinc.

With the exception of 7186 West void (JW53), water quality data indicates that surrounding rehabilitated landforms are not currently producing saline runoff. The continued elevated sulphate and EC levels at 7186 West void (JW53) may be indicative of its connection to Permian groundwater systems, or subsurface flows through unrehabilitated overburden.

Based on the available water quality data, retained water storages, with the exception of 7186 West void (JW53), are generally considered suitable for stock watering.

Figure 12: Surface hydrology

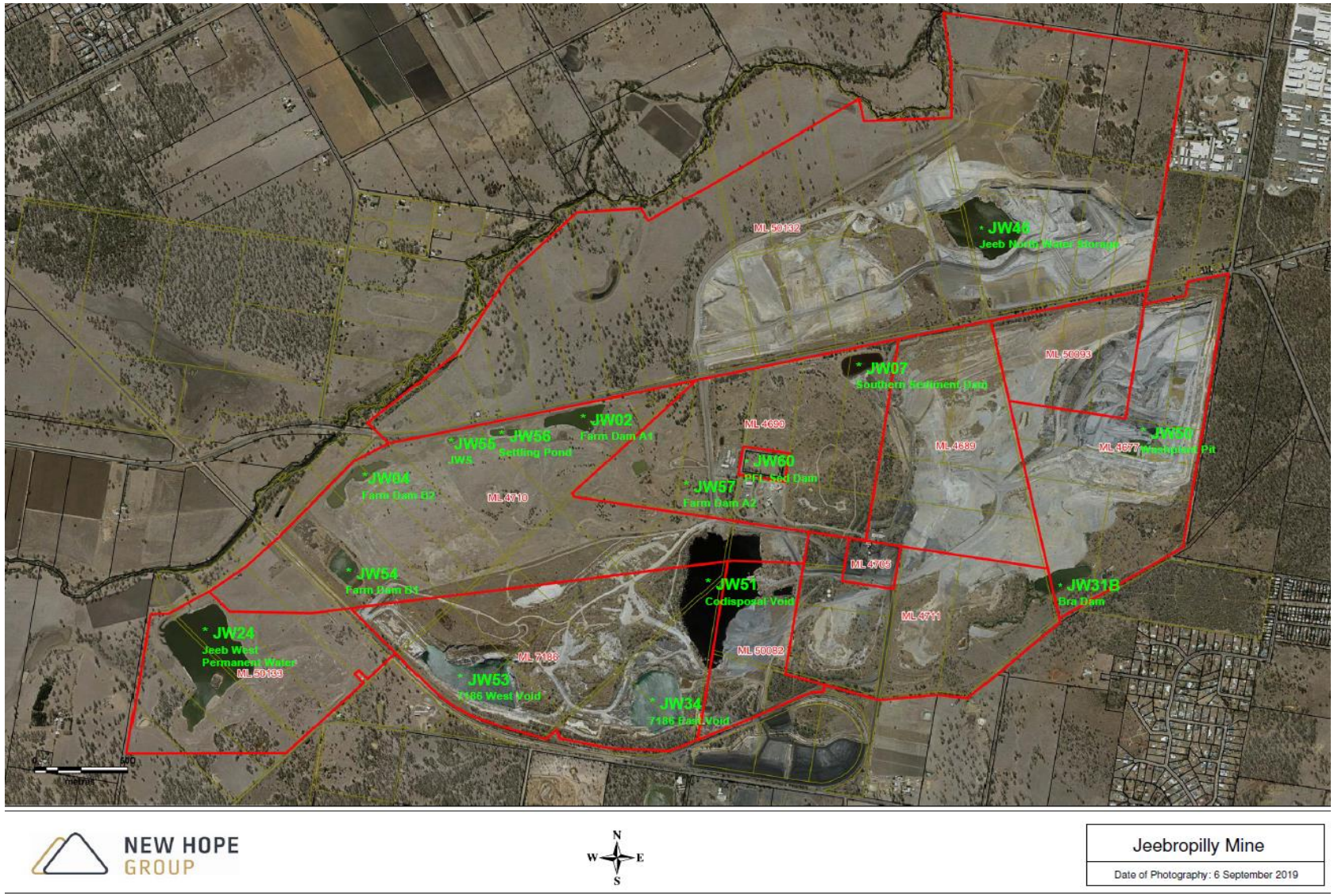

Figure 13: Surface water quality monitoring locations

Table 6: On site surface water quality monitoring results (2019–2022)

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Farm Dam A1	JW02	Oct-19	9.62	4,980	179	1.1	2.4	0.01	<0.0001	0.005	0.006	0.002	0.009	0.007
		Dec-19	9.78	10,300	376	1.6	1.94	0.024	<0.0001	0.006	0.004	<0.001	0.009	0.007
		Jul-20	9.4	8,100	340	0.7	0.68	0.009	< 0.0002	0.004	0.003	0.003	0.009	< 0.005
		Dec-20	11	33,000	830	1.1	0.27	0.042	< 0.0002	0.003	< 0.001	< 0.001	0.005	< 0.005
		Apr-21	8.2	1,600	130	< 0.5	4	0.003	< 0.0002	0.002	0.006	0.001	0.005	0.024
		Aug-21	8.8	2,100	1,400	< 0.5	1	0.002	< 0.0002	0.002	-	< 0.001	0.004	0.01
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-
Farm Dam B2	JW04	Oct-19	9.06	2,750	112	0.9	2.65	0.005	<0.0001	0.004	0.004	0.001	0.010	<0.005
		Dec-19	9.53	4,300	119	1.4	2.68	0.01	<0.0001	0.005	0.005	0.002	0.012	0.010
		Jul-20	9.8	5,700	83	1.4	0.35	0.018	< 0.0002	0.003	0.002	< 0.001	0.01	< 0.005
		Dec-20	-	-	-	-	-	-	-	-	-	-	-	-
		Apr-21	7.9	290	<5	< 0.5	0.39	0.002	< 0.0002	< 0.001	0.003	< 0.001	0.003	< 0.005
		Aug-21	-	-	-	-	-	-	-	-	-	-	-	-
		Jun-22	8.3	600	38	< 0.5	1.7	0.001	< 0.0002	0.001	0.003	< 0.001	0.004	0.006

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Southern Sed Dam	JW07	Oct-19	9.09	5,720	437	1.5	0.81	0.008	<0.0001	0.002	0.004	<0.001	0.003	<0.005
		Dec-19	9.32	7,280	538	2	1.54	0.016	<0.0001	0.003	0.004	0.001	0.003	0.006
		Jul-20	9.2	5,700	380	2.1	0.87	0.007	< 0.0002	0.002	0.002	< 0.001	0.003	< 0.005
		Dec-20	9.7	11,000	1,100	2.9	0.84	0.028	< 0.0002	0.002	0.003	0.001	0.003	0.007
		Apr-21	8.5	2,800	240	0.7	1.6	0.006	< 0.0002	0.003	0.006	0.003	0.004	0.015
		Aug-21	9	3,500	260	0.9	0.34	0.003	< 0.0002	0.001	-	< 0.001	0.002	< 0.005
		Jun-22	9.2	1,900	430	0.6	0.17	0.001	< 0.0002	< 0.001	0.003	< 0.001	0.002	< 0.005
Jeeb West	JW24	Oct-19	8.4	196	4	0.1	0.19	0.002	<0.0001	<0.001	0.001	<0.001	0.002	<0.005
		Dec-19	9.14	212	3	0.2	0.15	0.001	<0.0001	<0.001	0.002	<0.001	0.001	<0.005
		Jul-20	7.3	220	< 5	< 0.5	0.29	0.001	< 0.0002	< 0.001	0.001	< 0.001	0.003	< 0.005
		Dec-20	8.8	230	< 5	5.4	0.33	0.002	< 0.0002	< 0.001	0.002	< 0.001	0.002	< 0.005
		Apr-21	7.7	150	< 5	< 0.5	0.99	0.001	< 0.0002	< 0.001	0.003	< 0.001	0.003	0.005
		Aug-21	9.2	170	< 5	< 0.5	0.66	0.001	< 0.0002	< 0.001	-	< 0.001	0.003	0.007
		Jun-22	7.6	100	< 5	< 0.5	3.8	< 0.001	< 0.0002	0.002	0.005	< 0.001	0.006	0.01

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Bra Dam	JW31B	Oct-19	9.61	1,430	33	0.6	0.4	0.005	<0.0001	<0.001	0.004	<0.001	0.001	<0.005
		Dec-19	10.0	1,990	38	0.8	1.33	0.012	<0.0001	0.002	0.009	0.002	0.002	0.007
		Jul-20	8.8	1,100	69	< 0.5	0.53	0.002	< 0.0002	< 0.001	0.004	< 0.001	0.002	< 0.005
		Dec-20	9.3	2,000	70	1.5	0.28	0.009	< 0.0002	0.001	0.003	< 0.001	0.002	0.005
		Apr-21	8.8	970	36	< 0.5	< 0.05	0.006	< 0.0002	< 0.001	0.002	< 0.001	0.002	< 0.005
		Aug-21	9.1	1,000	24	< 0.5	0.4	0.003	< 0.0002	0.001	-	< 0.001	0.002	0.007
		Jun-22	8.1	440	35	< 0.5	0.15	0.002	< 0.0002	0.001	0.003	< 0.001	0.002	< 0.005
7186 East Void	JW34	Oct-19	9.12	5,430	508	0.9	0.11	0.01	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005
		Dec-19	9.17	5,860	523	1	0.04	0.01	<0.0001	<0.001	0.002	<0.001	<0.001	<0.005
		Jul-20	9	5,800	520	1.2	< 0.05	0.01	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
		Dec-20	9.2	5,400	650	1.2	< 0.05	0.012	< 0.0002	< 0.001	0.001	< 0.001	< 0.001	< 0.005
		Apr-21	9.2	5,800	490	0.8	0.25	0.012	< 0.0002	< 0.001	0.003	< 0.001	0.001	< 0.005
		Aug-21	9.1	5,500	550	0.9	0.16	0.012	< 0.0002	< 0.001	-	< 0.001	< 0.001	0.007
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Jeeb North	JW46	Oct-19	8.86	3,820	327	0.7	0.11	0.004	<0.0001	<0.001	0.003	<0.001	0.001	<0.005
		Dec-19	8.89	4,160	355	0.7	0.06	0.004	<0.0001	<0.001	0.002	<0.001	0.001	<0.005
		Jul-20	8.8	3,600	330	0.8	< 0.05	0.004	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
		Dec-20	9.2	4,000	360	0.9	0.06	0.005	< 0.0002	< 0.001	< 0.001	< 0.001	< 0.001	0.009
		Apr-21	9.2	3,200	310	0.5	0.27	0.005	< 0.0002	< 0.001	0.003	< 0.001	0.001	< 0.005
		Aug-21	9	3,200	320	0.5	0.09	0.005	< 0.0002	< 0.001	-	< 0.001	< 0.001	< 0.005
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-
Wash Plant Pit	JW50	Oct-19	8.88	10,800	45	0.8	0.1	0.009	0.0001	0.001	0.002	<0.001	<0.001	<0.005
		Dec-19	9.07	15,400	92	1.4	0.05	0.01	0.0001	<0.001	0.005	<0.001	<0.001	<0.005
		Jul-20	9	6,200	100	1.2	< 0.05	0.005	< 0.0002	< 0.001	0.003	< 0.001	< 0.001	< 0.005
		Dec-20	9	6,700	170	1.2	0.23	0.008	< 0.0002	< 0.001	0.002	< 0.001	< 0.001	< 0.005
		Apr-21	9	4,300	110	0.6	0.11	0.008	< 0.0002	< 0.001	0.004	< 0.001	< 0.001	< 0.005
		Aug-21	8.9	4,400	120	0.6	0.82	0.008	< 0.0002	< 0.001	-	0.001	0.002	0.044
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Co-disposal Void	JW51	Oct-19	9	4,540	382	1.4	0.36	0.01	<0.0001	0.002	0.008	<0.001	0.003	<0.005
		Dec-19	9.13	5,280	408	1.7	0.19	0.013	<0.0001	0.002	0.004	<0.001	0.002	<0.005
		Jul-20	9.3	5,300	430	1.9	0.25	0.013	< 0.0002	< 0.001	0.003	< 0.001	0.001	< 0.005
		Dec-20	9.2	7,400	660	2.2	0.57	0.019	< 0.0002	< 0.001	0.003	0.001	0.001	0.006
		Apr-21	9.2	6,000	430	1.3	0.09	0.016	< 0.0002	< 0.001	0.003	< 0.001	0.001	< 0.005
		Aug-21	9.1	5,700	440	1.5	0.14	0.015	< 0.0002	< 0.001	-	< 0.001	0.002	< 0.005
		Jun-22	9	1,800	140	0.5	0.24	0.006	< 0.0002	< 0.001	0.003	< 0.001	0.001	< 0.005
7186 West Void	JW53	Oct-19	9	9,470	974	0.8	0.26	0.01	<0.0001	0.001	0.003	<0.001	0.002	<0.005
		Dec-19	8.99	9,930	1,050	0.8	0.02	0.01	<0.0001	<0.001	0.002	<0.001	0.001	<0.005
		Jul-20	9	10,000	1,000	0.7	< 0.05	0.011	< 0.0002	< 0.001	0.002	< 0.001	0.002	< 0.005
		Dec-20	9.1	8,400	1,300	1.1	2.1	0.013	< 0.0002	0.001	0.003	0.001	0.001	< 0.005
		Apr-21	9.1	1,0000	1,100	0.7	0.14	0.012	0.0003	< 0.001	< 0.001	< 0.001	0.001	< 0.005
		Aug-21	9	9,600	1,200	0.7	0.1	0.011	< 0.0002	< 0.001	-	< 0.001	0.001	0.011
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Farm Dam B1	JW54	Oct-19	-	-	-	-	-	-	-	-	-	-	-	-
		Dec-19	-	-	-	-	-	-	-	-	-	-	-	-
		Jul-20	-	-	-	-	-	-	-	-	-	-	-	-
		Dec-20	9.4	6,500	270	1.6	0.52	0.027	< 0.0002	0.002	0.001	< 0.001	0.006	< 0.005
		Apr-21	-	-	-	-	-	-	-	-	-	-	-	-
		Aug-21	8.4	420	7.5	-	1.7	0.002	< 0.0002	0.001	-	< 0.001	0.005	0.013
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-
JWS	JW55	Oct-19	-	-	-	-	-	-	-	-	-	-	-	-
		Dec-19	-	-	-	-	-	-	-	-	-	-	-	-
		Jul-20	-	-	-	-	-	-	-	-	-	-	-	-
		Dec-20	-	-	-	-	-	-	-	-	-	-	-	-
		Apr-21	8.3	830	130	< 0.5	5.7	0.002	< 0.0002	0.006	0.007	0.002	0.012	0.019
		Aug-21	8.7	1,100	85	< 0.5	14	0.003	< 0.0002	0.009	-	0.005	0.015	0.039
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
Settling Pond	JW56	Oct-19	9.45	4,150	90	1.2	0.83	0.01	<0.0001	0.003	0.002	0.001	0.007	<0.005
		Dec-19	9.58	6,720	299	1.6	1.56	0.022	<0.0001	0.004	0.005	0.003	0.008	0.010
		Jul-20	9.9	6,900	42	1	0.78	0.012	< 0.0002	0.011	0.003	< 0.001	0.008	0.011
		Dec-20	-	-	-	-	-	-	-	-	-	-	-	-
		Apr-21	8.8	2,700	280	< 0.5	0.15	0.002	< 0.0002	< 0.001	0.003	< 0.001	0.002	< 0.005
		Aug-21	10	3,200	330	0.6	0.16	0.005	< 0.0002	< 0.001	-	< 0.001	0.002	< 0.005
		Jun-22	-	-	-	-	-	-	-	-	-	-	-	-
Farm Dam A2	JW57	Oct-19	8.75	7,410	544	1.2	6.62	0.011	0.0002	0.007	0.011	0.004	0.011	0.023
		Dec-19	9.61	5,610	381	1.1	3.72	0.012	<0.0001	0.005	0.006	0.002	0.005	0.010
		Jul-20	10	11,000	230	0.9	0.18	0.038	< 0.0002	0.004	0.004	< 0.001	0.014	< 0.005
		Dec-20	9.3	14,000	2,000	1.9	0.61	0.038	< 0.0002	0.002	< 0.001	< 0.001	0.004	< 0.005
		Apr-21	9.3	2,800	330	< 0.5	0.5	0.003	< 0.0002	0.002	0.006	< 0.001	0.003	0.006
		Aug-21	9.2	4,700	560	1.6	4.1	0.008	< 0.0002	0.007	-	0.003	0.008	0.016
		Jun-22	10	320	5.7	< 0.5	0.71	0.002	< 0.0002	0.002	0.004	0.001	0.003	< 0.005

Site		Quality characteristic	pH	Electrical Conductivity	Sulphate	Fluoride	Aluminium	Arsenic	Cadmium	Cobalt	Copper	Lead	Nickel	Zinc
		Unit	**pH Unit**	**µS/cm**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
		Contaminant Limit[1]	**4–9[2]**	**5,970**	**1,000**	**2**	**5**	**0.5**	**0.01**	**1**	**1**	**0.1**	**1**	**20**
PFL Sed Dam	JW60	Oct-19	-	-	-	-	-	-	-	-	-	-	-	-
		Dec-19	-	-	-	-	-	-	-	-	-	-	-	-
		Jul-20	7.6	360	11	< 0.5	0.17	< 0.001	< 0.0002	< 0.001	0.001	< 0.001	0.002	< 0.005
		Dec-20	8.5	280	7.3	0.7	0.16	0.002	< 0.0002	< 0.001	0.002	< 0.001	0.001	< 0.005
		Apr-21	7.9	360	17	< 0.5	0.08	0.002	< 0.0002	< 0.001	-	< 0.001	0.001	< 0.005
		Aug-21	-	-	-	-	-	-	-	-	-	-	-	-
		Jun-22	8	440	38	< 0.5	0.06	< 0.001	< 0.0002	< 0.001	0.001	< 0.001	< 0.001	<0.005

1 Contaminant limits are based on the ANZECC and ARMCANZ (2000) stock water quality guidelines

2 Page 4.2 – 15 of ANZECC and ARMCANZ (2000) 'soil and animal health will not generally be affected by water with pH in the range of 4–9' – unfiltered total measurements must be taken and analysed

3.1.4.4 Jeebropilly West (Gieger Lagoon)

The Jeebropilly West pit lake (also referred to as Gieger's Lagoon) forms the remnants of a residual void that has been partially backfilled and allowed to fill with water from local catchment area runoff and occasional inundation from the Bremer River. Hydrological connectivity with the Bremer River occurs during Q100 flood events.

In early 2023, an aquatic ecology assessment of Geiger's Lagoon was undertaken by BMT. The study aimed to characterise the aquatic ecosystem of the lake and compare to similar landforms and the adjacent Bremer River.

At the time of sampling, the lake was thermally stratified with the upper boundary of the thermocline occurring at approximately 5 m. Conductivity was relatively consistent throughout the water column and was within the water quality objectives (WQOs) for the Bremer River and livestock guidelines. Measurements for pH, temperature and dissolved oxygen were higher in the upper layer of the water column compared to the lower layer (BMT 2023a). pH measured 8.0 in the upper layer and 7.0 in the lower layer and dissolved oxygen measured below the guideline values at a majority of sites (except at most surface sites) and was anoxic in the lower layer. Turbidity was also consistent throughout the water column and ranged between 20–25 NTU, which exceeded the WQO of 5 NTU. As temperatures cool, stratification becomes unstable and mixing of poor quality water from lower layers of the water column can impact water quality and aquatic ecosystems.

Samples were also sent to the laboratory from two locations and the results compared with the WQOs from Schedule 1 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2022 (EPP) for lowland freshwaters of the Bremer River catchment, the default guideline values (DGVs) from ANZG (2018) for the toxicants ammonia, nitrate and dissolved metals/metalloids, and release trigger values (for metals/metalloids, nutrients, hydrocarbons and fluoride) specified in Condition E4 of the Project EA.

Key observations from the analysis results include:

- Total suspended solids (TSS) ranged between 8 to 16 mg/L, which slightly exceeded the EPP WQO of 6 mg/L.
- Sulphate and calcium concentrations were within the livestock guideline values.
- Dissolved metals and metalloids were mostly below ANZG (2018) DGVs and EA criteria. The exceptions to this were dissolved copper which exceeded the DGVs in surface samples, and dissolved iron levels which exceeded the DGVs in all samples.
- Total metals and metalloid concentrations were within livestock guideline values.
- Total nitrogen concentrations exceeded the EPP WQO and DGV throughout the water column.
- Ammonia concentrations exceeded the EPP WQO and DGV within the middle and lower water column. All other forms of nitrogen, such as nitrate, nitrite and NOx, met the WQOs for the Bremer River Basin and livestock guideline values.
- Total phosphorus and reactive phosphorus concentrations exceeded EPP WQOs and DGV throughout the water column.
- No hydrocarbons were detected in samples (i.e. all samples were below the laboratory limit of reporting).

The water quality recorded in the lake is typically reflective of the water quality of the Bremer River which is not unexpected given the connectivity of the lake and the river during high flow conditions. Gieger Lagoon had elevated levels of dissolved copper and dissolved iron, detected in recent Receiving Environment Monitoring Program (REMP) monitoring (BMT 2022). Overall, water quality in Gieger Lagoon was determined to be relatively good.

A total of 20 macroinvertebrate taxa from 13 orders was recorded from the lake, which was lower than the 47 taxa across 18 orders from the Bremer River recorded during the 2022 REMP. Additionally, 381 fish from 14 species were recorded in the lake with 187 being native fish comprising 11 species. The remaining 194 fish comprised three introduced species. Introduced fish species numerically dominated Gieger Lagoon, which is

typical of lake and stream environments in eastern Australia. The introduced species have also been recorded in the Bremer River, albeit in lower abundance and not always over consecutive surveys. One macro-crustacean and turtle species were also recorded during the survey.

Gieger Lagoon supports aquatic macroinvertebrate communities dominated by cosmopolitan and pollutant tolerant taxa. The richness and abundance of aquatic macroinvertebrates was lower in the lagoon compared to the Bremer River (BMT 2022). These differences may be due to differences in habitat structure, water quality in the lower water column, and fundamental differences in hydrology (BMT 2023a).

The aquatic ecology report is provided in Appendix F.

3.1.5 Regional hydrogeological setting

The Clarence Moreton Basin defines the regional hydrogeological setting of the Project area (Raiber *et al*. 2016). Within the basin, alluvium and volcanic rocks are the major aquifers used for groundwater extraction. At the regional scale, the Walloon Coal Measures are generally classified as an aquitard, characterised by poor water quality and low water yields, given the compacted and interbedded nature of shale, siltstone, and coal within the measures (Raiber *et al.* 2016, 2017; Underschultz *et al.* 2018). Recharge rates to the Walloon Coal Measures are considered very low at less than 10 mm/year or less than 1% of rainfall. A comparison of regional registered bores surrounding the Project site shows poor groundwater presence and development within the Walloon Coal Measures, with most wells screened in alluvial or Tertiary zones, and few bores screened within the Walloon Coal Measures (refer Figure 14).

Yields from the Walloon Coal Measures and alluvials vary with location. For the Walloon Coal Measures on the margins of the Warrill Creek Syncline along the Bremer River, where sediments become coarser, weathered, or fractured, the measures are capable of artesian flow to surface, at times emerging as springs or seeps on the banks of the Bremer River. These seeps are likely capable of delivering a baseflow to the river. Seepage and permanently damp areas can be observed northwest of Jeebropilly and downstream near Walloon Gauge; associated with coal seams and Walloon Coal Measures outcrops (Raiber *et al.* 2016, See.Built.Earth 2024).

Quality also varies across both aquifers given the natural variability of materials. Figure 15 and Figure 16 present water quality ranges (95^{th} and 5^{th} percentiles) of both the Wallon Coal Measures and the alluvial aquifers within the Clarence Moreton Basin based on data from the Bioregional Assessment Program (2015). The statistics highlight the variability of water quality across the bioregion for both aquifers, with water quality ranging from fresh to moderately/highly saline, a chloride range indicating different rainfall recharge and residence times, sulphate levels between fresh in the alluvials, and fresh to 800 mg/L in the Walloon Coal Measures, and the background presence of dissolved zinc (See.Built.Earth 2024).

Given their unconfined nature, the flow direction of the alluvial aquifers will likely align with surface water drainage flows. The regional groundwater flow direction of the Walloon Coal Measures is considered to be broadly eastward (Figure 17) based on the structural control of the Warrill Creek Syncline, the location of the Project site on the margins of the broader geological structure and the known influence of faulting (refer Section 3.1.3). The main source of recharge for the Walloon Coal Measures is the Main Range Volcanics in the Great Dividing Range with the highly permeable Cenozoic basalt plugs also providing recharge to the basin. Groundwater recharge occurs through various mechanisms including rainfall and surface water recharge.

The detailed hydrogeology of the Project site is described in Section 3.5.5.1 and by See.Built.Earth (2024).

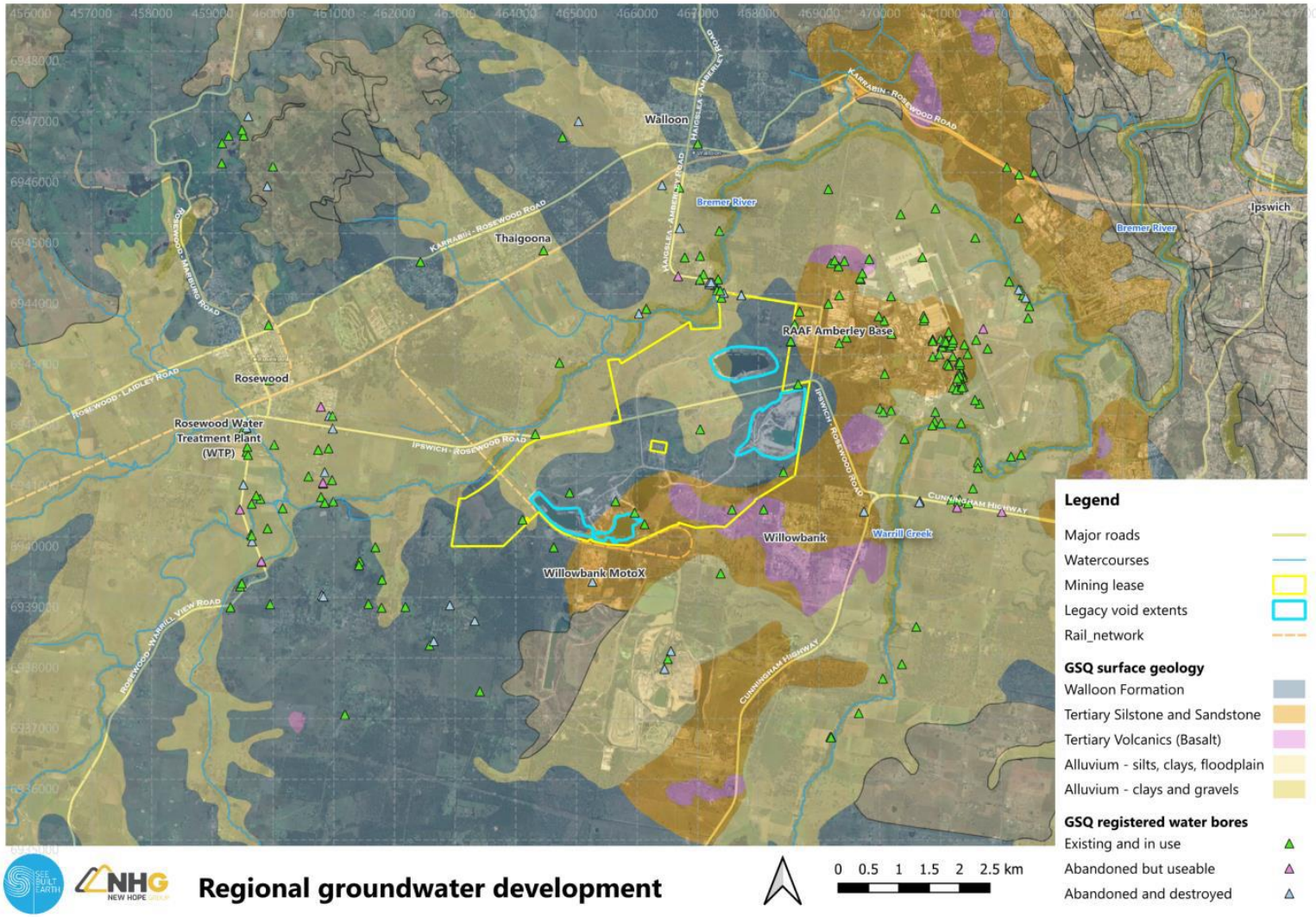

Figure 14: Registered water bores with geology (See.Built.Earth 2024)

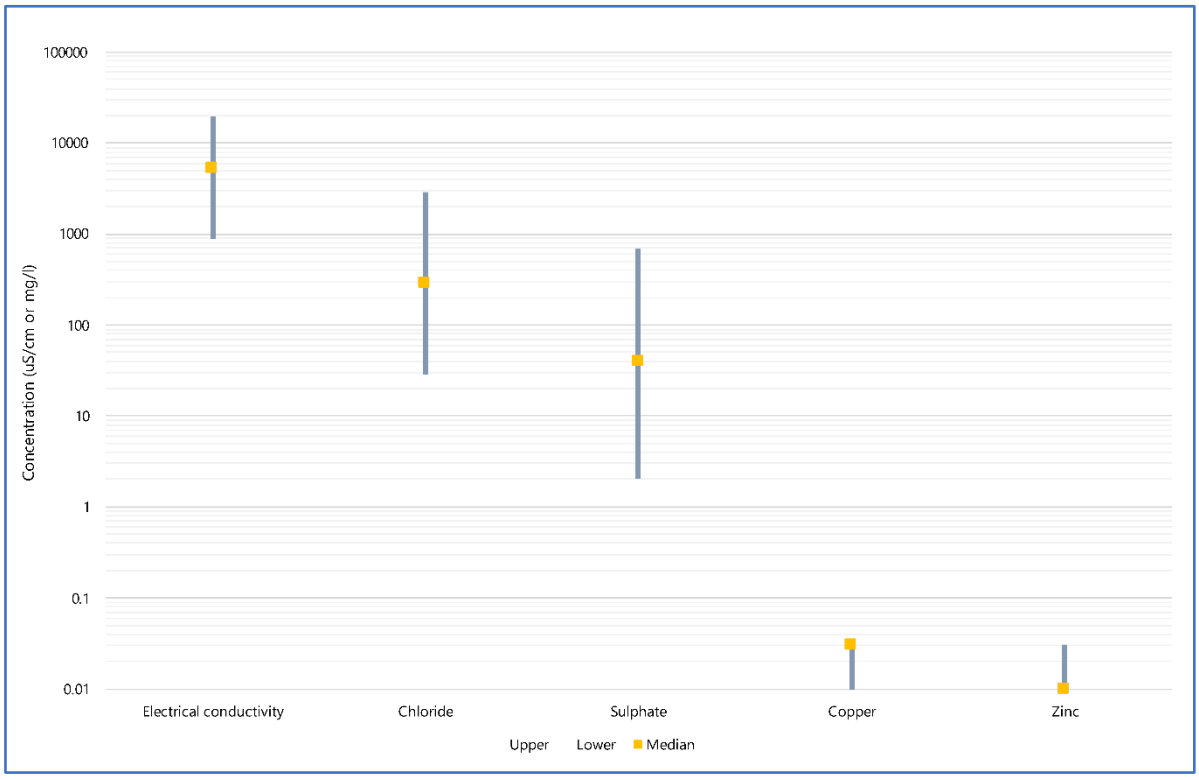

Figure 15: Water quality range statistics, Walloon Coal Measures, 95th and 5th percentiles

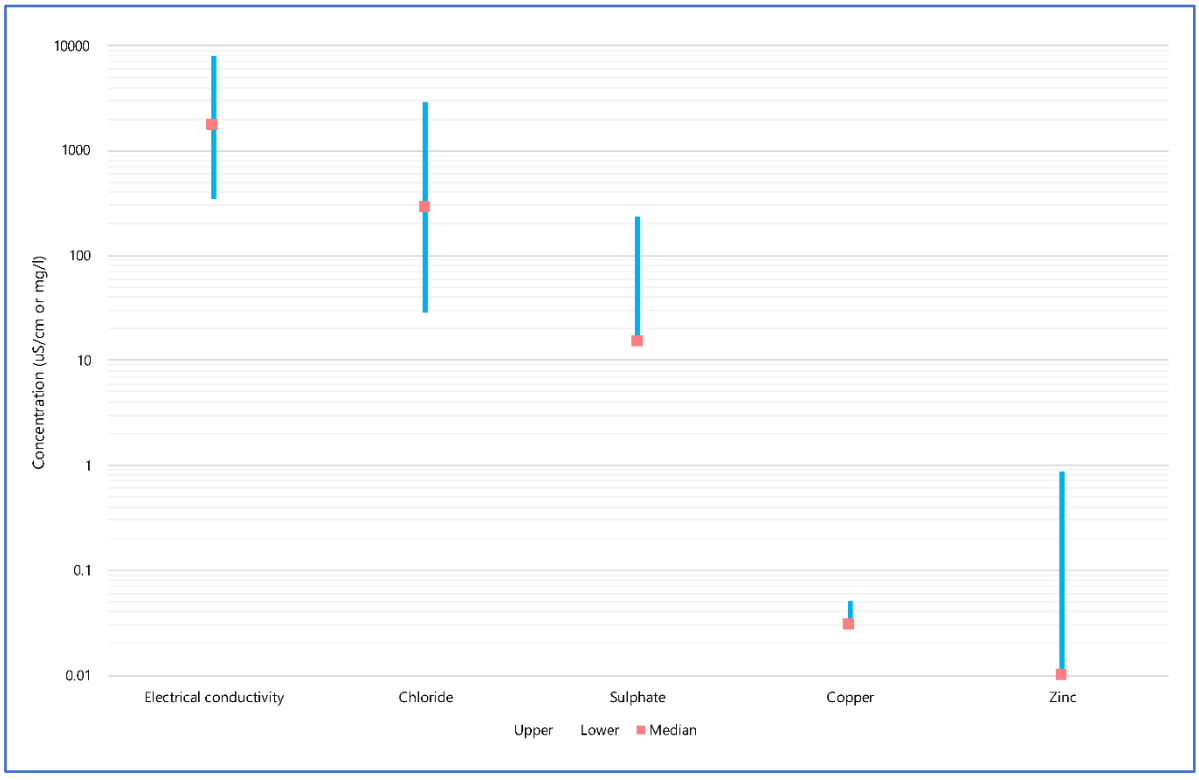

Figure 16: Water quality range statistics, alluvial aquifers, 95th and 5th percentiles

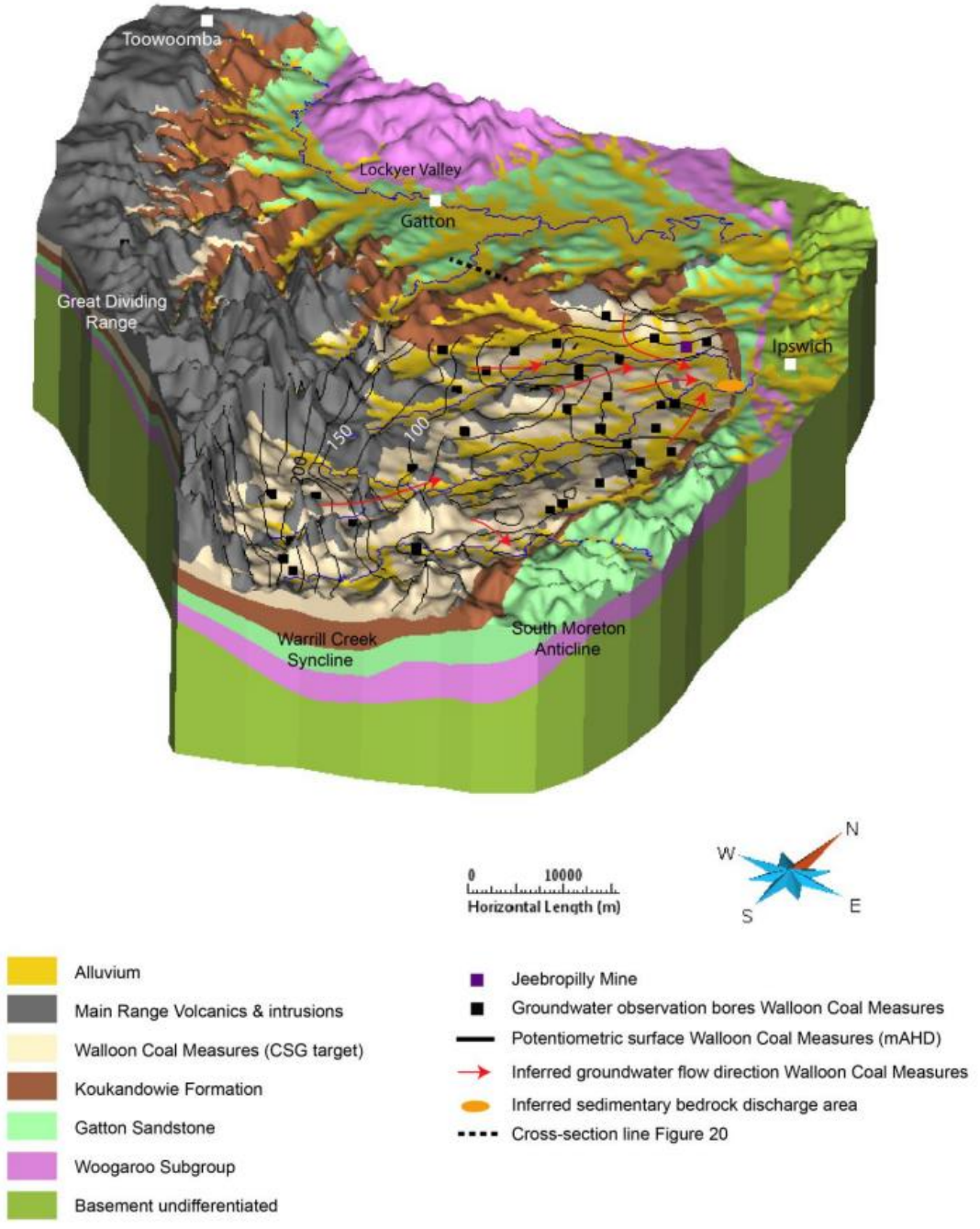

Figure 17: Three-dimensional geological model of the Bremer River Basin (Raiber et al. 2016).

3.1.6 Land and soil

3.1.6.1 Pre-mining land use

Historically, regional and local land uses comprised agriculture and cattle grazing (Telfer *et al*. 1998). Other important land uses identified in the Bremer River catchment at the time included mining, quarrying, rural residential and urban developments, State Forest and recreation and nature reserves.

At the time of the commencement of open cut mining in 1971, the Project area had been extensively cleared by past land use practices. The pre-mining land use within and surrounding the Project area consisted of moderate intensity cattle grazing on a mixture of native and introduced pasture grasses. The average slope of

the pre-mining landscape was 5%, varying between 2–10%, with several ephemeral waterways draining north and west to the Bremer River.

The Project site holds a rich history of mining undertaken prior to the acquisition of the mine by Jeebropilly Collieries in 1982. Underground mining commenced at the Project site between 1930 and ceased operations in 1964 when the underground resource was economically exhausted. Open cut operations commenced in 1971, directly over the remaining Mt Elliott resources and underground mining operation, and progressed in a westerly direction through ML4677. Nine pits commenced over the life of mine, with the final pit ceasing operations in 2018 (see also Section 3.1.1.5).

There is no evidence that, regionally, legacy underground mining operations have impacted the ability to undertake existing and post-mining land uses either on the Project site or neighbouring properties.

3.1.6.2 Underlying landholders

Freehold land within the Project area is owned by Tetard Holdings, a wholly owned subsidiary of Jeebropilly Collieries Pty Ltd. Several land parcels are owned by the Queensland Government; being the reserve land parcels on ML4711. Below the depth plans are located on the eastern and western sides of ML50132 and encompass all of ML4677. Easements and Lands Lease parcels are also located along the southern end of the Project area (Figure 18) and cross the MLs just north of Jeebropilly West (e.g. Geiger's Lagoon on ML50133).

3.1.6.3 Sensitive receptors

Jeebropilly Collieries Pty Ltd own the land and surface rights to a majority of the land within the Jeebropilly MLs, as well as several surrounding properties. The surrounding properties were retained for mining purposes to act as a buffer zone or leased to local parties for grazing purposes.

The main sensitive receptors proximate to the Project include:

- Willowbank township – located approximately 3 km southeast of the Project site;
- Rosewood township – located approximately 4 km northwest of the Project;
- Walloon township – located approximately 3 km north of the Project; and
- Ipswich city – located approximately 6 km to the northeast of the Project.

Willowbank township was the only location identified as a sensitive receptor within the Jeebropilly Plan of Operations (Jeebropilly Collieries 2021). The Amberley RAAF base is also immediately east of the Project site, however, is not considered to be a sensitive receptor as per the definition in the EA.

Figure 18: Underlying tenure

3.1.6.4 Land capability assessment

Ison Environmental Planners (1996) conducted a land capability assessment of the Project site. They found no areas of Class I or II land. A reasonable proportion of the land to the north of the Ipswich Rosewood Road was determined to be Class III defined as suitable for agricultural uses with moderate restrictions for cultivation. The majority of land to the south of the Ipswich Rosewood Road, being the sloping lands consisting of shallower soils or duplex soils with shallow A horizons, were identified as Class VII land capability, with an increasing proportion of Class VI land to the west and closer to the Bremer alluvium (Figure 19).

3.1.6.5 Soil landscapes

A 1987 soil survey (Bostock 1987), and a 1991 and 1995 soil survey and analysis conducted by Ison Environmental Planners determined the soil landscape and chemical and physical properties for the Project site.

Table 7 details the profile descriptions of the soil types throughout the Project area including the typical soil type, and stripping depth.

3.1.6.6 Soil assessment

Soil samples were evaluated for soil erodibility and dispersion potential for each identified soil profile within the Project site. The soil chemistry of these sites was also analysed to identify properties adverse to plant growth and to determine any potential treatment required of reject materials. These were assessed using key soil characteristics including pH, EC, chloride, and the principle exchangeable cations (calcium, magnesium, sodium, and potassium).

Overall, topsoils from the Project site are of varying pH, moderate salinity, are non-sodic to moderately sodic – resulting in moderate to high erodibility soils; as well as having varying potential to supply nutrients. Subsoils from the Project site vary across soil landscapes and soil depth.

Land stability

Soil erodibility, the susceptibility of soil to become detached and transported by erosive agents such as wind and water, is dependent on the mechanical, chemical, and physical characteristics of the soil and is independent of other factors influencing soil erosion, such as topography and land use (DSITI 2015).

All soil samples were non-sodic to moderately sodic, with sodicity tending to increase with depth. Salinity values ranged between 210–2,870 ppm and exchangeable sodium potential between 3.6-24.3%.

Soil chemistry

The topsoils on the Project site typically increased in pH with increasing depth such that surface soils were commonly pH 3.8 (very strongly acidic) increasing to pH 7.8 (near neutral) for deeper soils. Although the pH was not deemed to be sufficiently acidic to be a potential direct impact to plant growth, it was identified that there may be a need to ameliorate soils with lime or dolomite to increase soil pH.

The salinity of topsoil was low to moderate and considered within the tolerance levels of all but the most sensitive crops. It was therefore deemed that salinity would be unlikely to affect growth of species used during rehabilitation. The salinity of the soil did increase the with increasing depth, becoming moderate to high at all sampled locations.

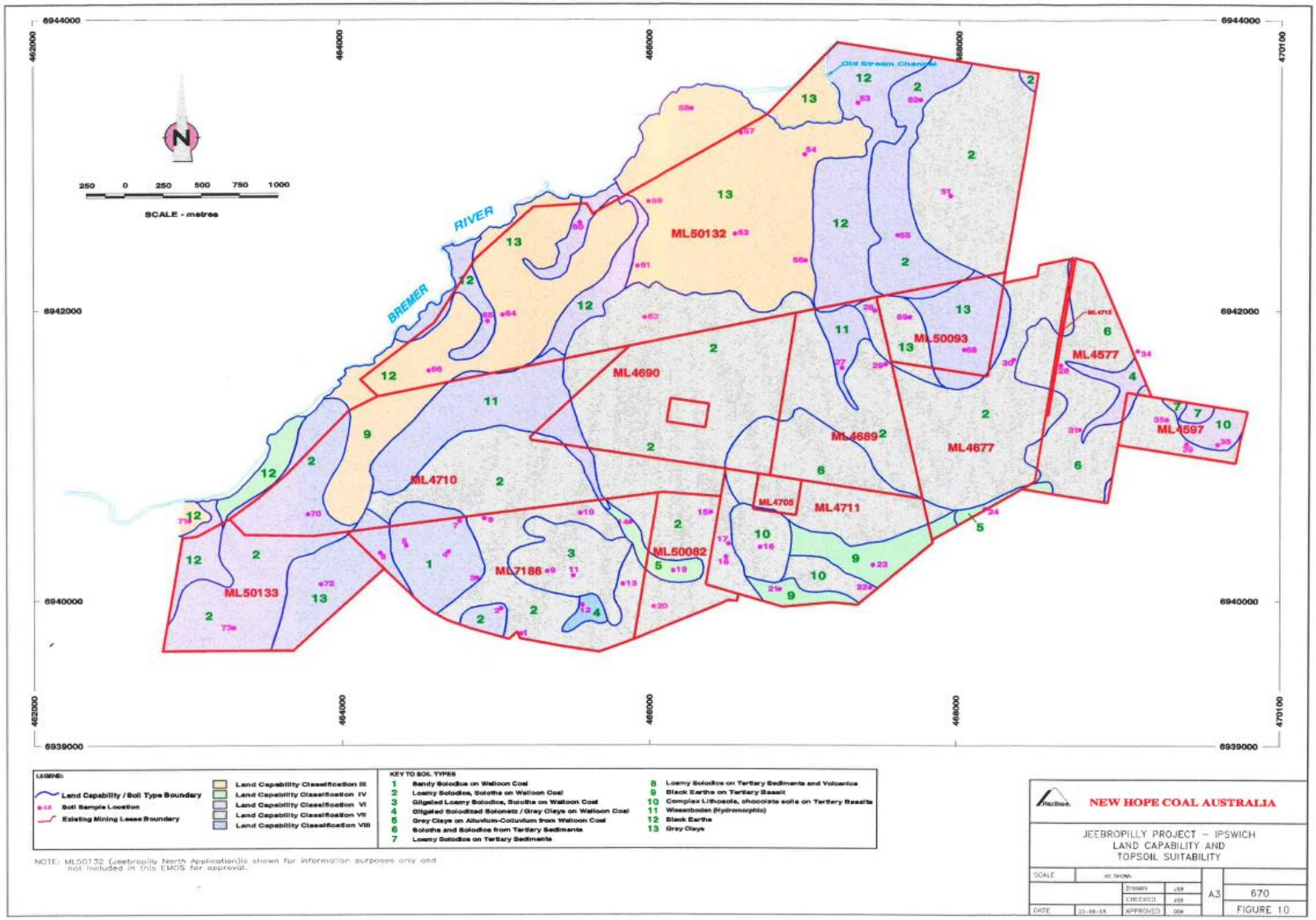

Figure 19: Land capability assessment (Ison 1996)

Table 7: Site soil profile description

Name	Stripping depth (mm) (average)	Type	Soil horizon description	Soil chemistry	Vegetation	Slope	Mining Lease
Sandy solodics on Walloon Coal	100–150 (120)	Duplex soils: Dy 2.32, 2.42	A1: brown to grey-brown fin sandy loam (50–120 mm) A2: bleached fine sandy loam (100–150 mm) B: grey-brown medium clay	B horizon subsoils contain moderate levels of soluble salts and high exchangeable sodium. It is highly erodible and unsuitable for use as topsoil.	Predominantly *Eucalyptus tereticornus* (blue gum) open forest	3–4%	ML7186
Loamy solodics	100–150 (120)	Duplex soils: Dd 1.33, 1.43, 2.43 Dy 2.42, 2.43	A1: dark grey-brown sandy clay loam to clay loam fine sandy (50–150 mm) A2: bleached sandy clay loam to clay loam fine sandy (100–200 mm) B: dark grey-brown to brown light-medium clay	The A horizons are suitable for topsoil use and the B horizon is a neutral to alkaline pH.	Eucalypt open forest dominated commonly dominated by *Eucalyptus crebra, E. molucana,* and *E. tessellaris*	1–5%	ML50133 ML50132
Loamy solodics, soloths on Walloon Coal	70–150 (100)	Duplex soils: Dy 2.2, 2.32, 2.43 Db 1.33	A1: brown to grey-brown fine sandy clay loam to clay loam (70–150 mm) A2: bleached fine sandy clay (150–200mm) B: grey-brown, brown or light yellowish brown medium clay	A horizons are suitable for topsoil use. B horizon is moderately high in salts and high in exchangeable sodium and is unsuitable for use as topsoil	Eucalypt open forest dominated commonly dominated by *Eucalyptus crebra* (narrow-leaf ironbark)	3–5%	ML4689 ML7186
Gilgaied loamy solodics, soloths on Walloon Coal	50–100 (80)	Duplex soils: Dy 2.31, 3.32	Soils are similar to the other loamy duplex however, A horizons can be 50 mm thick. Soil contains characteristic gilgai microrelief 100 mm deep and 3–4 m wide.	-	Mixed eucalypt open forest, and Acacia understory, and regrowth is often abundant	-	ML4577 ML7186

Name	Stripping depth (mm) (average)	Type	Soil horizon description	Soil chemistry	Vegetation	Slope	Mining Lease
Gilgaied solodised solonetz/grey clays on Walloon Coal	100–120 (110)	Duplex soils: Dy 2.32 Grey clays: Ug 5.2	A1: grey-brown clay loam (100–120 mm) A2: sporadic bleached horizon at the base of the A1 horizon B: grey-brown medium clay	The top 100 mm is suitable for use as topsoil. The B horizon contains high levels of salt and exchange sodium making it susceptible to erosion and is unsuitable for use as topsoil	Characteristically *Melaluca tamariscina irbyana* (swamp tea tree) with minor *E. tereticornia, E. crebra* and *Acacia leuocalyx*	-	ML7186
Grey clays on alluvium-colluvium from Walloon Coal	100–350 (200)	Grey clays: Ug 5.2, 2.25	A1: grey-brown or black light-medium clay (100–350 mm) with sporadic bleach at the base B: grey-brown to grey medium to heavy clay	A horizon is suitable for topsoil use. The B horizon is moderately high in sale and unsuitable for topsoil use	Commonly *E. tereticornis* (bluegum), *E mollucana* (gum-topped box), *E. melanophoia* (silver leaf ironbark) and *E. tessellaris* (carbeen)	1–3%	ML50133 ML50132
Soloths and solodics from tertiary sediments	70–150	Duplex soils: Dy 2.31, 2.32, 2.41, 2.42 Db 1.31, 1.41 Dr 2.31, 2.41	A1: grey-brown fine sandy loam to clay loam (100–200 mm) with sporadic bleach at the base B: mottled red, yellow, or grey-brown acid clay	A horizons are suitable for topsoil use however, the B horizons are sodic and unsuitable for topsoil use	Typically a mixed open forest of *E. crebra, E. tereticornis, E. tessellaris,* and *E. mollucana*	3–7%	ML4577 ML4597 ML4715
Loamy solodics on tertiary sediments and volcanics	300–450 (400)	Duplex soils: Dy 3.22 Db 1.13	A: dark brown or black loam to clay loam (300 mm deep) B: brown or yellow brown medium clay	The A horizon (to 300 mm) is suitable for topsoil use, however, the B horizon is sodic and unsuitable for use	*E. tereticornis* and *E. tessellaris* on slopes and *E. tereticornis* and *E. crebra* on slopes	-	ML4597
Loamy solodics on alluvia from tertiary sediments	250–300 (270)	Duplex soils: Dy 2.32 Db 1.42	Similar to properties of the loamy solodics directly overlaying tertiary sediments, however, have a shallow horizon (20 mm thick)	-	-	-	ML4597

Name	Stripping depth (mm) (average)	Type	Soil horizon description	Soil chemistry	Vegetation	Slope	Mining Lease
Black earths on tertiary basalts	100–200 (150)	Black clays: Ug 5.1	A1: Self mulching medium clay (0–100 mm) A2: black medium-heavy clay (200–450 mm) B: dark grey heavy clay	B horizon is high in sodium and unsuitable for topsoil use	-	3–6%	ML4711
Complex lithosols, chocolate soils on tertiary basalts	100–200 (150)	Northcote: Ug 5.1	This soil is 3 m deep with a uniform clay content (> 50%) with little variation in colour (up to 1.2 m).	Strongly acidic at the surface and mildly acidic at depth.	Much of this region was used for cultivation with *Sorghum bicolor* (Forage Sorghum)	-	ML50133 ML50132
Wiesenboden (Hydromorphic)	80–100 (100)	-	Broad shallow gilgai depressions approximately 200 mm below the mounds. A1: greyish-brown clay loam to loamy clay B: grey-brown medium clay	These soils are very strongly acidic at depth and the soil becomes yellower at depth due to the high water table or standing groundwater.	*Melaleuca* woodland is typical	-	ML50133 ML50132

3.1.6.7 Areas of regional interest

The Jeebropilly Mine is located completely within the Northern Planning Unit of the Ebenezer Regional Industrial Area. This area has been designated by the Ipswich City Council for industrial development.

The Project is also situated within the southeast Queensland Priority Living Area with several areas of regional interest surrounding the site (Figure 20). This includes Priority Agricultural Areas and Strategic Cropping Land. The closest State Development area is the Bromelton State Development Area located approximately 30 km to the southeast of the Project.

3.1.6.8 Existing rehabilitation

During the Project's operational period, significant progressive rehabilitation works were undertaken on backfilled mine areas (Figure 21). This includes an area of approximately 734 ha of uncertified rehabilitated land of which approximately 400 ha has been actively grazed for over 15 years.

In its current state, the majority of the Project site has been subject to either active rehabilitation to a defined end land use or has been subject to voluntary vegetation growth.

Exploration has not been undertaken at Jeebropilly for at least ten years with no further exploration planned. Exploration disturbance has undergone rehabilitation including grouting and collars cut off below ground level. All other known exploration disturbance within the Jeebropilly MLs has been mined out or rehabilitated.

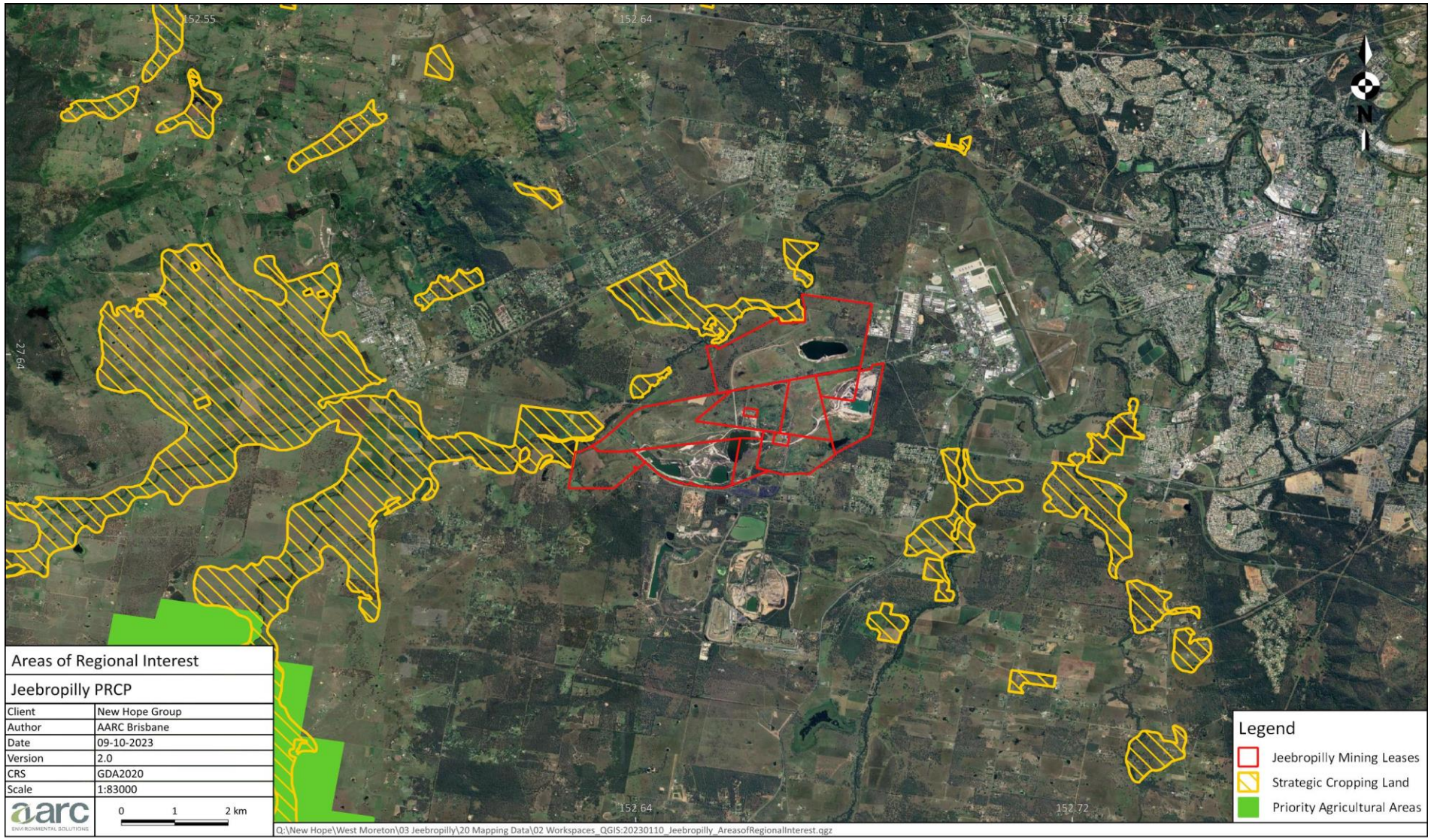

Figure 20: Areas of regional interest

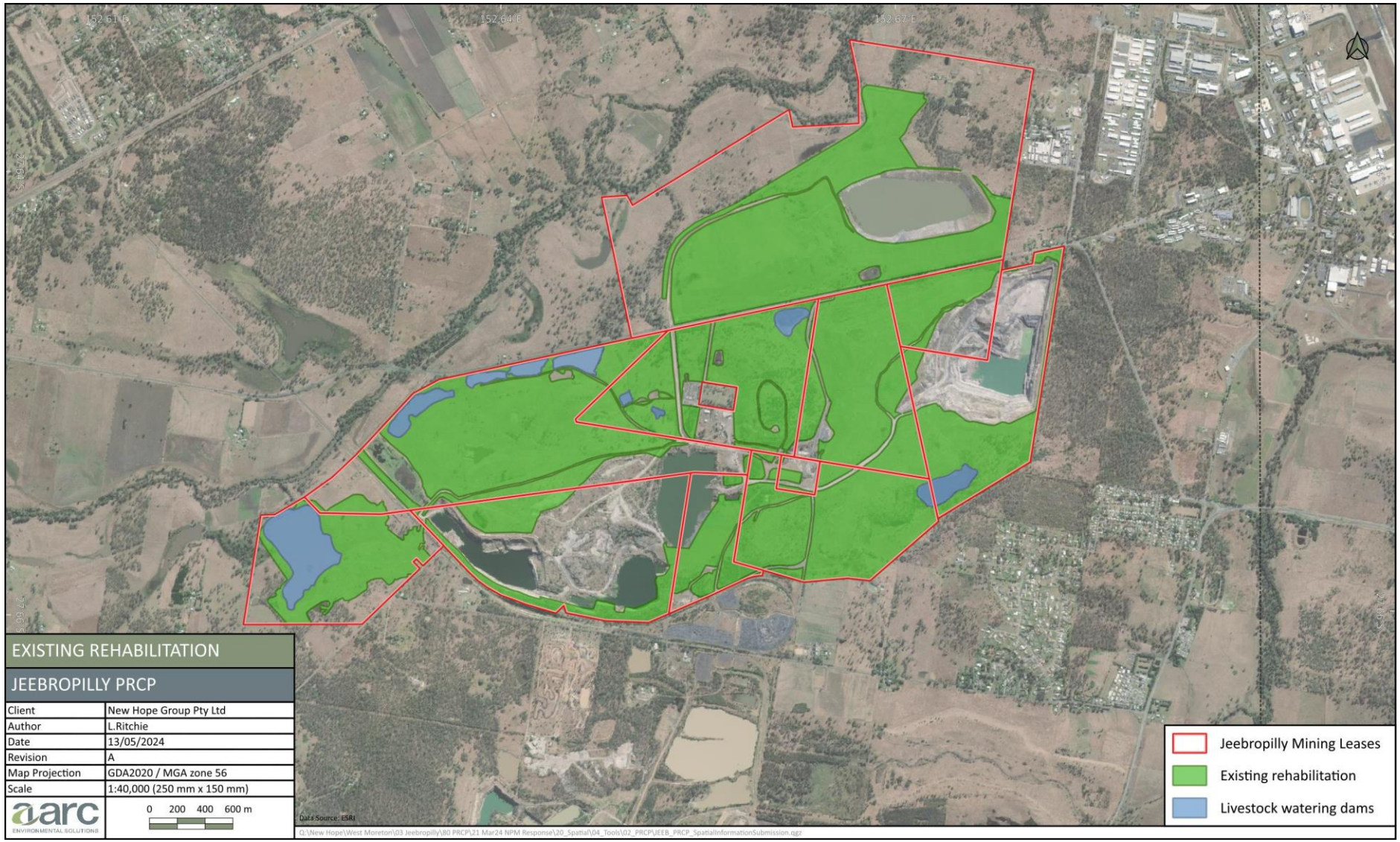

Figure 21: Existing rehabilitation areas

Jeebropilly North Pit

Mining ceased in the Jeebropilly North lease area in December 2019. Since then, the north, east and south walls have been profiled to between 18°–21°. These slopes had a growing medium applied and were seeded prior to that year's wet season. Under the PRCP, further reprofiling works are to be undertaken on the North Pit slopes to achieve a more acceptable grazing slope gradient of 14°, thereby negating any unusable residual void and retaining a water body. The total area encompasses approximately 27 ha.

Underpass Pit

The Underpass Pit was a small pit in which mining was completed in mid-2017. Approximately 810,000 lcm of fill was required to reinstate it to its current final landform which comprises a small 10° slope in the south to tie into the adjacent topography of the Ipswich Rosewood Road corridor, with the remainder of the area backfilled to a flat (less than 2% slope) landform and revegetated, suitable for cattle grazing. This area has been fully rehabilitated and only requires monitoring and maintenance.

Wash Plant Pit residual void

The Wash Plant Pit is the largest void at the site, with mining activities being completed in August 2019. The void has a significant spoil dump located to the immediate west and south, the outer batter and top of which have been rehabilitated. In 2020, significant rehabilitation works had been conducted around this void (shaping, biosolids applied and seeding). The remaining eastern and southern highwalls comply with the required high wall slopes in the EA and already have a safety berm in place, as such no further work will is required to be carried out on these highwalls. The final void for the Wash Plant Pit will encompass an area of 58 ha, provided for within the pre-approved NUMA allowance for the Project as detailed at Section 3.4.2.

ML7186 residual voids

The ML7186 voids comprise two mining areas – the eastern area which was mined during the 1990s and the western area which was mined until 2012. There is a significant area of largely unrehabilitated spoil located to the immediate north of the voids. The ML7186 area has a maximum permitted residual void surface area of 28 ha (Schedule C, Table 2.2 of the Jeebropilly EA). The 7186 voids are to be reprofiled with slope angles generally at less than 17° and a total surface area of 28 ha.

Jeebropilly West residual void

The rehabilitation of an open cut mining area known as Jeebropilly West, situated on the western side of ML50133 has resulted in an area of actively grazed pasture and the formation of a pit lake. Hydrological connectivity with the Bremer River and the pit lake is occurs during a Q100 flood event and the catchment includes several first order drainage channel. A recent aquatic ecology assessment (BMT 2023) characterised the water quality of the pit lake as having slightly elevated turbidity (approximately 25 NTU), neutral to slightly alkaline pH (7–8 pH units), and low dissolved oxygen levels in the lower water column. Electrical conductivity was relatively low, at approximately 250 µS/cm. Regarding the PMLU for this water storage, the water quality was within the livestock guideline values.

Management of the residual voids is discussed further at Section 3.5.11.

Rehabilitation methods

Rehabilitation methods for the Project were outlined in the 2019–2020 Jeebropilly Plan of Operations (PoO). Although specific rehabilitation methods have not been detailed for each domain, rehabilitation across the site typically consisted of:

- A detailed landform design was developed, taking into consideration the final land use, relevant conditions and agreements, stability and material availability.

- Bulk earthworks were undertaken to reprofile to the final landform (truck/shovel or dozer push).
- If required, soil ameliorants were applied (e.g. lime, gypsum).
- Topsoil or other growing medium was spread on the reprofiled landform; in many areas, composted biosolids was used. Where biosolids were used the material was spread and then disc-ploughed into the top 200 mm of the soil profile.
- Contour drains/drop structures/other drainage structures were installed as required to direct runoff from the final landform.
- A pasture seed mix (see Section 3.5.5.9) was spread and the area revegetated to a grazing land use. The seed mix and application rate varied depending on several factors that included season, slope, soil characteristics.

Previously proposed rehabilitation criteria

In 2004, a field survey was conducted to propose acceptance criteria for rehabilitated land to a grazing PMLU (BTEQ 2004). Ten random sites were selected across a prescribed analogue site at Lot 566 on CH31740 and a 20 m x 20 m plot was used to establish a representative example of grazing land. The acceptance criteria determined from this field survey included the four acceptance criteria detailed in Table 8.

Table 8: Early proposed rehabilitation acceptance criteria (grazing land use)

Acceptance criteria	Description	Monitoring
1	Foliage projective cover (FPC) of monitoring rehabilitation sites is at or above 70% understorey FPC.	Biennial monitoring of randomly selected plots within mine rehabilitation areas proposed for the "grazing outcome" and the analogue site using methods described in section 3 of the BTEQ (2004) report.
2	Standing Dry Matter to be within +/- 10% of the analogue sites production rate over a period of 12 months.	Biennial monitoring of randomly selected plots within mine rehabilitation areas proposed for the "grazing outcome" and the analogue site using methods described in Campbell and Hacker (2002).
3	Grazing species diversity on the mine rehabilitation sites to be on average within +/- 20% of the analogue site.	Biennial monitoring of randomly selected plots within mine rehabilitation areas proposed for the "grazing outcome" and the analogue site using methods described in section 3 BTEQ (2004) report.
4	Erosion rates of the mine rehabilitation areas, as determined by the Revised Universal Soil Loss Equation (RUSLE) (Renard et. al. 1994), to be within +/- 10% of the rates of the analogue site.	Biennial monitoring of randomly selected plots within mine rehabilitation areas proposed for the "grazing outcome" and the analogue site using methods described in Renard et. al. 1994.

Rehabilitation monitoring

Rehabilitation monitoring has been undertaken at Jeebropilly North, Jeebropilly West, Mt Elliott, ML4710, and ML7186 between 2005 and 2008 to determine the success of rehabilitation against the criteria detailed in Table 8. The areas monitored consisted of historic and recent rehabilitation sites compared to the previously defined analogue site. No rehabilitated site complied with all acceptance criteria over any rehabilitation monitoring period. In some cases, acceptance criteria provided for a maximum value, and those rehabilitation areas that performed better than this upper limit were recorded as not meeting the criteria. The acceptance criteria were, therefore, determined to be unsuitable for future rehabilitation monitoring. Further monitoring was not conducted as alternative land uses (e.g. industrial land uses) were then being investigated and would have resulted in re-disturbance of the rehabilitated areas. Monitoring was limited to visual inspections and photographic records without comparisons to monitoring criteria.

Biosolids application

Based on available information from Resource Recovery Management Pty Ltd (RRM), between 2018 and 2020, dewatered cake biosolids were applied to various areas on site that were assessed and considered to have a Class 3 Land Classification (Table 9). The land capability assessment determined that moderate to severe limitations were posed by soil salinity in these areas. The selected sites were deemed suitable for biosolids application and presented minimal restrictions and risks to the environment or public health.

The soils on site were demonstrated to be alkaline with moderate to severe sodicity and salinity, and were deficient in major plant nutrients. It was determined that these soils would require considerable amelioration to provide effective growing conditions. The dewatered cake biosolids were applied at agronomic rates to meet projected fertiliser requirements. These rates were below the recommended application rates for the specific biosolids to mitigate any risk of excess contaminants or nutrients entering the environment.

Biosolids were sourced from various waste water treatment plants in southeast Queensland. They were classified in accordance with Queensland's licence criteria as 'Restricted Use 2' making them suitable for use in agricultural and land rehabilitation.

A key consideration for the application of biosolids is the proximity of application sites to surface water resources. Buffer zones were used to ensure no risk of contamination to surface waters on site. The buffer zone requirements included:

- a 5 m buffer zone from internal roads;
- a 10 m buffer zone from retained dams; and
- avoiding spreading biosolids on adjacent vegetation, beyond bottom contour drains, and non-cultivated drainage lines.

Table 9: Biosolids application information

Site	Application period	Total area (ha)	Application rate (dt/ha)	Total wet tonnes
Wash Plant Pit - North Batter	1/6/18–30/6/18	26.7	120 (wet tonnes/ha)	3,200
Wash Plant Pit (Area 4 & 5)	01/05/19–01/06/19	44.7	90 to 100 (wet tonnes/ha)	4,000–4,400
Wash Plant Pit (Area 6)	16/4/19–10/5/19	29	15.25	3,193.8
Wash Plant Pit (Area 7)	15/4/19–23/4/19	13	13.64	1,106.2
Jeebropilly North (Area 9)	25/6/19–27/6/19	13	13.15	1,143
Jeebropilly North (Area 11, 13 & 9a)	30/3/20–3/4/20	25.5	18.01	3,138.7
Jeebropilly North (Area 12 & 9a)	2/3/20–4/3/20	21.5	18.22	2,562.3
Jeebropilly North (Area 10 & 11)	27/4/20–1/5/20	23.5	16.36	2,748.4
Jeebropilly North (Area 11)	08/5/20	5.1	14.36	528.3
Wash Plant Pit (Area 16, Haul Roads, WP Batter)	27/5/20–4/6/2020	18.4	14.85 (WP Batter) 16.59 (Area 16 and Haul Roads)	1,647.3
Total	-	**220.4**	-	**23,082–23,482**

Historical rehabilitation trials

Rehabilitation trials were undertaken on the Project site and included:

- an audit of tree planting program – Jeebropilly Mine ML4690 (Bird 1992);
- an Inception report – Rehabilitation trials Big Hill spoil dump Jeebropilly (Envirosciences Pty Ltd 1994);
- an assessment of revegetation and landform trials on New Hope Colliery Holdings (HLA-Envirosciences Pty Limited 1995); and
- a tree planting trial undertaken by East Coast Tree Farms to determine the suitability for pulpwood production (ECTF 1999).

No details on the outcome or future use of these trials across the Project site has been determined from available data.

3.1.7 Flora and fauna

Limited information was available within historical field studies to determine the pre-mining ecological values of the Project area. A current desktop search of pre- and post- clearing regional ecosystems (REs) was conducted to determine the distribution of vegetation on the Project site.

From the available information, where present, vegetation prior to mining consisted primarily of eucalypt woodland, with a sparse understorey of wattle species. The dominant species in these areas included Narrowleaved ironbark (*Eucalyptus crebra*), Broad-leaved ironbark (*E. moluccana*) and Blue Gum (*E. terticornis*) (Ison Environmental Planners 1993; Ison Environmental Planners 1995; NHG 2014).

A small community dominated by swamp tea tree (*Melaleuca irbyana*) was present on the southern boundary of the site. This community type is now protected under Australian Government legislation but was not listed at the time the area was mined.

The Bremer River banks supported a typical creekbank community of weeping bottlebrush (*Callistemon viminalis*), River She Oak (*Casuarina cunninghamiana*), some Forest Red Gums (*E tereticornis*) and Matrush (*Lomandra multiflora*). These areas have remained largely undisturbed by mining (New Hope Group 2014).

The vegetation clearing that occurred pre-mining resulted in a fragmented habitat with limited connectivity through the Project area. The main wildlife values of the site included:

- corridor of riparian vegetation along the Bremer River;
- stream bank vegetation and permanent pools within the Bremer River providing habitat for aquatic species; and
- food and habitat trees for koalas.

As a direct consequence of the simplified vegetation in the area, the pre-mining density and diversity of fauna was limited primarily to mobile species with wide forage preferences.

3.1.7.1 Wetland habitats

A current desktop search of WetlandMaps (2019) identified a palustrine wetland to the west of the mining lease boundaries near Bremer River. Palustrine wetlands can provide nesting sites for birds, roosting sites for bats, food sources for migratory species, and filtration of the water moving through them by removing contaminants and nutrients.

A riverine wetland was identified on the western side of the Project site, fringing the Bremer River. The WetlandMaps (2019) database indicates that the wetland area encompasses the natural channel of the river and the immediate riparian vegetation.

3.1.7.2 Field surveys

Several field surveys were undertaken for the Project and include information on flora species identified on site. No previous fauna studies have been identified in previous technical reports. Listed below are the studies that included vegetation analysis:

- Vegetation and soil survey: Mining lease MLA 868 Ipswich (Bostock 1987);
- Vegetation and soil survey: MLA 870, south of Moonie pipeline (Bostock 1988);
- Vegetation and soil survey: MLA 870, Third Section, ca 43 ha (Bostock 1988);
- Jeebropilly Project, Rosewood, West Moreton Coalfield soil survey, analysis and evaluation (Ison Environmental Planners 1991); and
- Soil survey and analysis – Jeebropilly Mine extension (MLD 156 and 157) (Ison Environmental Planners 1995).

3.1.7.3 Flora

Remnant vegetation

A desktop search of the Version 12.0 Queensland Government Vegetation management regional ecosystem mapping (DES 2022b) was conducted. This identified eight (8) pre-clearing REs on the Project site; listed in Table 10. The distribution of pre-clearing REs in the vicinity of the Project is shown in Figure 22. The desktop study identified high value regrowth on site and the three remaining RE occurrences within ML50132; being RE 12.3.3, RE 12.3.8 and RE 12.9–10.7.

Table 10: Pre-clearing remnant regional ecosystems with current listings

Regional ecosystem	Short description	VM Class (2023)	Biodiversity status (2023)
12.3.18	*Melaleuca irbyana* low open forest on alluvial plains	Endangered	Endangered
12.3.3	*Eucalyptus tereticornis* woodland on Quaternary alluvium	Endangered	Endangered
12.3.7	*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp*. fringing woodland	Least concern	Of concern
12.3.8	Swamps with *Cyperus spp., Schoenoplectus spp*. and *Eleocharis spp.*	Of concern	Of concern
12.8.17	*Eucalyptus melanophloia +/- E. crebra, E. tereticornis, Corymbia tessellaris* woodland on Cainozoic igneous rocks	Least concern	No concern at present
12.9–10.11	*Melaleuca irbyana* low open forest on sedimentary rocks	Endangered	Endangered
12.9–10.27	*Corymbia citriodora subsp. variegata* and/*or E. moluccana, E. tereticornis, E. crebra* open forest with *Melaleuca irbyana* understorey on sedimentary rocks	Endangered	Endangered
12.9–10.7	*Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp.* and *E. melanophloia* woodland on sedimentary rocks	Of concern	Of concern

Terrestrial flora species

Several field surveys were conducted throughout the Project area that contain information regarding flora species observed on site. The information from these studies has been presented in Table 11.

Aquatic flora species

No aquatic flora species were noted during field surveys.

3.1.7.4 Groundwater dependent ecosystems

No groundwater dependent ecosystems (GDEs) were identified in previous surveys. A current desktop search identified a potential GDE (moderate confidence) on the western boundary of ML50132 (Figure 23). This area is outside of any surface disturbance that occurred onsite.

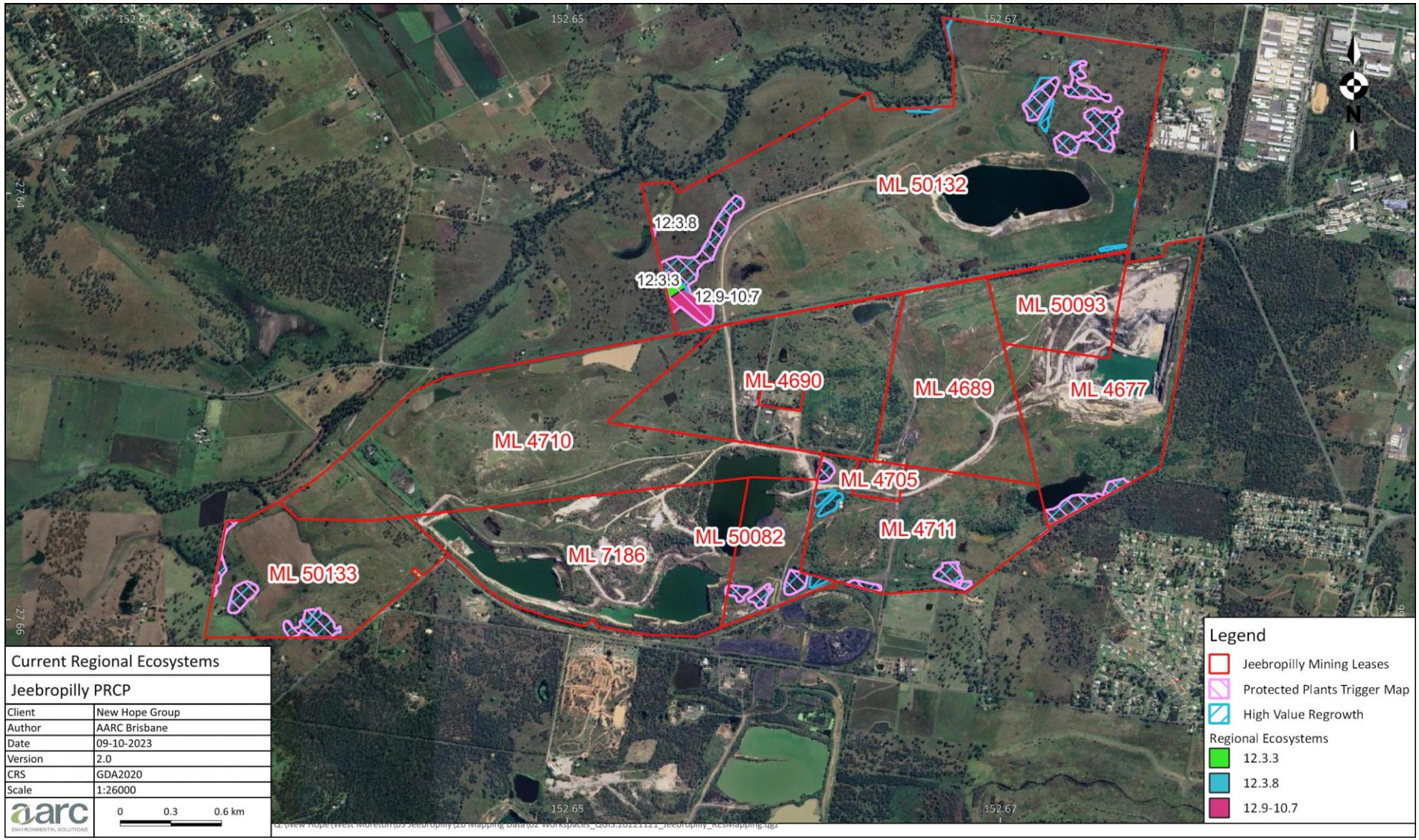

Figure 22: Current regional ecosystem mapping and high value regrowth

Table 11: Terrestrial flora on site

Study / report	Findings	Mining lease
Vegetation and soil survey: Mining lease MLA 868 Ipswich (Bostock 1987)	• 110 species of plants were identified on site including 16 trees, 7 ferns, 87 herbs and grasses. • Several introduced plant species were also identified including 18 herbs, 6 grasses and 3 trees. • Pasture with a mixture of native and introduced grasses, legumes and weedy herbs. • *E. crebra* woodland with sparse understory of grasses and herbs. • Areas of low lying ground with standing groundwater or high water table had dominant tree species of *E. tereticornis* and *E. moluccana* with the ground cover dominated by *Juncun* and *Cyperus* species, *Carex appressa* and some grasses. • *Melaluca tamarascina irbyrana* woodland was present with an understory of weedy herbs, grasses, sedges and rushes.	ML4710
Vegetation and soil survey: MLA 870, south of Moonie pipeline (Bostock 1988);	• 71 plant species were identified in the survey area including 8 tree species. • Several introduced plants were recorded including 1 tree, 5 grasses and 14 herbs. • 15 ha of improved pasture (previously Sorghum) now dominated by *Dichanthium aristatum* (Angleton Grass), *Cynodon dactylon* (Blue Couch). • 10 ha of unimproved pasture depauperate woodland/pasture with scattered *Eucalytpus* species and sparse understory of weeds and grasses. • No rare or endangered species were noted.	ML4711
Vegetation and soil survey: MLA 870, Third Section, ca 43 ha (Bostock 1988)	• 68 species of plants were identified on site including 15 small to large tree species and 16 grasses. • 23 introduce species were recorded including 1 tree, 6 grasses, 1 sedge, and 15 herbs and shrubs. • 16 ha of eucalypt woodland in tertiary basalt hill and ridge with the dominant tree species *E. melanophloia, E. tereticornis* and *E. crebra. T*he understory was Acacia species with Kangaroo Grass (*Themeda triandra*). • Unimproved grassland with a mixture of native and introduced grasses and pasture weeds. • No rare or endangered species were noted.	ML4711
Jeebropilly Project, Rosewood, West Moreton Coalfield soil survey, analysis and evaluation (Ison Environmental Planners 1991)	The dominant vegetation type was eucalypt open forest which dominant by *E. crebra, E. tereticornis,* or *E. melanophloia.* In other areas the vegetation community was dominated by *M. irbyana.*	ML7186
Soil survey and analysis–Jeebropilly Mine extension (MLD 156 and 157) (Ison Environmental Planners 1995)	Most of the vegetation was cleared or where uncleared, selected logging had taken place. The dominant tree species was *E. tereticornis,* being replaced by *E. moluccana* with few *E. melanophloia* in higher areas. The highest areas had *E. crebra* woodland. The Bremer River banks supported a typical creekbank community of weeping bottlebrush (*Callistemon viminalis*), river she oak (*Casuarina cunninghamiana*), some Forest Red Gums (*E tereticornis*) and matrush (*Lomandra multiflora*). These areas have remained largely undisturbed by mining. This area was considered extensively degraded by agricultural activities and the landscape highly modified by grazing, cultivation, and fire.	ML50133 ML50132

Figure 23: Groundwater dependent ecosystems

3.1.7.5 Fauna observations

Terrestrial fauna species

No terrestrial fauna studies were undertaken at the site, some evidence of the use of *E. tereticornis* by koalas was noted during field surveys, however, the trees occurred mostly on heavily cleared areas with few trees remaining.

Fauna surveys were conducted in 1987 (Ison and Associates 1987 in Ison Environmental Planners 1993) along the Ebenezer Rail Loop. The species identified as either directly or indirectly (through field marks and scats), are listed in Table 12.

Table 12: Fauna species identified along the Ebenezer Rail Loop

Scientific name	Common name	Locality
Amphibians		
Limnodynastes peronii	Striped Marsh Frog	Marshlands, natural pools, farm dams
Mammals		
Macropus giganteus	Grey Kangaroo	Sandy soil hill forest
Trichosurus vulepcula	Common Brushtail Possum	Riverbank
Birds		
Anas superciliosa	Black Duck	Sandy soil hill forest, farm dam
Ardea noveahollandiae	White-faced Heron	Marshlands
Ardeola ibis	Cattle Egret	Marshlands, farm dams, flood plain open eucalypt forest
Corvus orru	Australian cow	Floodplain open eucalypt forest, sandy soil hill forest
Dacelo gigas	Kookaburra	Floodplain open eucalypt forest
Elanus notatus	Black Shouldered Kite	Sandy soil hill forest
Eurystomus orientalis	Dollarbird	Sandy soil hill forest
Gallinula tenebrosa	Dusky Moorhen	Marshlands, farm dams
Gymnorhina tibicen	Black Backed Magpie	Floodplain open eucalypt forest, sandy soil hill forest
Halcyon sancta	Sacred Kingfisher	Riverbank
Manorina melanocephala	Noisy Miner	Floodplain open eucalypt forest, sandy soil hill forest
Ocyphaps lophotes	Crested Pigeon	Floodplain open eucalypt forest
Platalea regia	Royal Spoonbill	Marshlands
Porphyrio porphyrio	Swamp Hen	Marshlands, farm dams
Threskiornis molucca	White Ibis	Marshlands

Scientific name	Common name	Locality
Trichoflossus chlorolepidotus	Scaly-breasted Lorikeet	Floodplain open eucalypt forest
Trichoflossus haematodus	Rainbow Lorikeet	Floodplain open eucalypt forest, riverbank, sandy soil hill forest
Vanellus miles	Spur-winged Plover	Marshlands

Aquatic fauna species

No aquatic fauna species were noted in past field studies or reports for the Project site.

3.2 Community consultation

For the period that the Project was operational, NHG maintained a strategy of open communication with the community, including hosting community meetings to provide input into environmental and operational performance and address rehabilitation objectives and progress at the Project site. NHG combined stakeholder engagement programs and consultation for all of their mine sites within the West Moreton region.

Throughout the life of the Project, many NHG employees were members of the local community and involved in community activities, fundraisers and volunteering. NHG has actively supported the region by investing time and money to support community organisations such as sporting clubs, regional industry associations, charities and festivals and events.

3.2.1 Existing stakeholder and community consultation plan

NHG currently operates under a Stakeholder Engagement Plan (SEP) (Appendix C) specifically developed for the Jeebropilly Mine Closure Project and that meets the requirements of section 126C(1)(c)(iv) of the EP Act, as well as the PRCP Guideline. The plan describes the stakeholder engagement process, engagement objectives, and how feedback is managed. A stakeholder analysis has also been undertaken to identify and categorise stakeholders by their level of influence and level of interest in and/or concern about the Project.

The SEP was developed to be a practical tool for effective stakeholder engagement on rehabilitation and closure matters and establishes the engagement objectives described in Table 13.

Community engagement has been undertaken primarily through Community Consultation and Awareness Program (CCAP) meetings, with additional communication materials released as required. The community has been updated on matters including rehabilitation and management methods, progressive rehabilitation and closure timeframes. In the CCAP meetings, community members have had the opportunity to raise issues and make comments on all aspects related to the Project. Details of community consultation activities have been recorded in a stakeholder engagement database.

Table 13: Stakeholder engagement objectives

Objective	Description
Operate an open and transparent engagement process.	The stakeholder engagement methodology adopts an open and transparent approach to informing stakeholders of the objectives and activities for the Project.
Be responsive to stakeholders.	Stakeholder ideas, issues and opportunities are to be identified and documented through established communication channels and face-to-face consultation. All contact will be managed via a stakeholder contact database. This approach will involve an open, two–way process. NHG will acknowledge receipt of stakeholder feedback and 'close the loop' with stakeholders at the end of a consultation period by informing them as to how their input has been considered.
Disseminate information in a timely manner.	Information is to be disseminated taking into account the time stakeholders will need to understand it and respond appropriately. Information dissemination will be timely in order to manage any misinformation or rumours that may arise.
Remain accountable to stakeholders.	NHG will demonstrate integrity and be accountable to stakeholders during engagement processes and commitments will be made in good faith. Accountability will occur through the reporting of outcomes, periodic evaluation of the engagement process and the achievement of objectives.

3.2.2 Historical stakeholder and community engagement

NHG's previously owned New Oakleigh mine site and the Jeebropilly mine site are both located within the West Moreton region, and stakeholder and community engagement programs were conducted simultaneously to address concerns across both sites. The community consultation process included:

- ongoing meetings of the existing community consultation group;
- presentations to individual community groups;
- one-on-one meetings;
- newsletters; and
- maintaining information on the NHG website.

The first community consultation event was held in 2001, primarily to help facilitate the ML application (ML50175) to extend the New Oakleigh West mining area. At the same time, any issues regarding the Jeebropilly Mine site, including rehabilitation and final land use, were discussed. Subsequent meetings were held throughout 2003 and 2004 with the Rosewood District Protection Organisation (RDPO) and with representatives of Ipswich City Council. This consultation phase ceased in early 2005.

A new format for community meetings was established in February 2006. Meetings were held quarterly until late 2007 when they were changed to a six-monthly frequency. Additional community groups and the then Environmental Protection Agency (EPA) were invited to attend. Groups that were invited and attended at least one meeting have included:

- EPA;
- RDPO;
- Ipswich City Council;
- Willowbank residents/representatives;
- West Moreton Landcare;
- Rosewood High School;

- Ashwell State School;
- Rosewood Ambulance;
- Moreton Border News;
- Rosewood Chamber of Commerce;
- Cabanda Aged Care;
- Community Bank; and
- Society for Growing Australian Plants.

Between 2006 and 2008, a variety of issues were raised regarding rehabilitation and closure planning, including residual void parameters and dimensions, and rehabilitation matters generally. Between 2019 and 2022, several community notices were sent out to relevant stakeholders to address further rehabilitation works undertaken at the Jeebropilly site.

Several community consultation and information sessions were also undertaken for residents of the Willowbank area which included information pertaining to Project operations, potential impacts, environmental monitoring, and rehabilitation and closure. These sessions provided the community with opportunities to provide input into final land use outcomes and present concerns to NHG. These engagement sessions were conducted on:

- 14 September 2009;
- 14 February 2011;
- 24 February 2014;
- 23 February 2015;
- 29 February 2016; and
- 26 February 2018.

3.2.3 Stakeholder and community consultation register

NHG actively engaged with the community prior to the implementation of the PRCP legislation in 2019 and has demonstrated that many of the issues raised in consultation meetings have been considered in rehabilitation planning. Consultation activities were undertaken in accordance with the SEP (refer Appendix C). CCAP meetings were the primary means for community consultation and were held until September 2017 when the format was changed following declining attendance. The consultation format then moved to open, periodic, drop-in sessions.

The SEP is included as Appendix C, however, it should be noted that, given the advanced stage of rehabilitation at the site, future consultation will be limited to actions such as responding to stakeholder inquiries and providing information on rehabilitation progress as deemed appropriate.

A register of community consultation activities since commencement of the SEP in 2011 is provided in Appendix D.

3.3 Post-mining land uses

This section of the PRCP describes and discusses the PMLUs proposed for the Project as required by section 126C(1)(d) of the EP Act. In accordance with the Queensland Government's objectives defined in the *Mined land rehabilitation policy* (Queensland Government 2018), the general rehabilitation goals for the Project are to leave the area safe, stable, and in a state that does not cause environmental harm and is able to sustain an agreed PMLU.

Further, established site-specific goals for the Project include:

- minimising the loss of pre-existing agricultural land value by reinstating, where feasible, grazing lands at a similar capability to that existing prior to mining;
- where this cannot be achieved, catering for alternative uses that provide a similar, or greater value to the value able to be generated from the land prior to mining, and that is aligned with alternative land uses identified by local authority planning and development schemes; and
- minimising or avoiding the potential for post-mining lands having no or little value to the area or region.

3.3.1 Land outcome documents

3.3.1.1 EA (EPML00826713)

The current EA (EPML00826713) includes certain rehabilitation and closure requirements for the Project at Conditions C11 through C22. Requirements include:

- Development of a closure plan (Condition C11) to include:
  - soils information;
  - an erosion and sediment control plan;
  - design objectives for rehabilitation of disturbed areas;
  - details of rehabilitation methods to be used;
  - landform design criteria consistent with proposed future land uses;
  - success criteria for disturbed areas including revegetation success rates; and
  - rehabilitation indicators and monitoring programs.
- Requirements for progressive rehabilitation (Conditions C14 and C15), including historic disturbances, along with the following criteria:
  - reshaping to a stable landform not subject to slumping;
  - minimising the potential for erosion;
  - re-establishing surface drainage lines;
  - use of suitable topsoil;
  - use of vegetation species and establishment of a density cover consistent with the proposed future land use; and
  - removal of infrastructure from site.
- Maintenance of rehabilitated areas (Conditions C16 and C17) to ensure erosion control measures are effective, plants show growth, and weed infestations are controlled. The rehabilitated land is required to be capable of withstanding normal disturbances such as fire or seasonal flooding.
- Rehabilitation landform criteria (Condition C18) specified in Table 2.0 - Final Land Use and Rehabilitation Approval Schedule (reproduced below as Table 14).
- Criteria for areas being rehabilitated to a grazing pasture land use related to comparison with a defined analogue site (Condition C19).
- Residual void criteria (Condition C20) specified in Table 2.2 – Residual Void Design (reproduced below as Table 14).
- Infrastructure removal criteria (Condition C21).
- A requirement to undertake an assessment and review of landform criteria, rehabilitated mine outcomes and void management outcomes and submit a report to the administering authority describing those outcomes (Condition C22).

Table 2.0 of the EA (reproduced here as Table 14) identifies 'post-mine land descriptions' of 'water storage' and 'grazing'. While these constitute viable PMLUs based on references within the PRCP Guideline, the guideline also recognises that a water storage PMLU must have some purpose; for example the PRCP Guideline refers to a PMLU of 'water storage facility for livestock'. Apart from references to two specific MLs within Schedule C - Table 2.2 Residual Void Design of the EA, there are no references to specific locations for PMLUs.

Total disturbance areas related to specific disturbance types are indicated at Table 14 (Table 2.0 from the EA). The intent of drafting at the time the tables in Schedule C of the EA were developed was more to provide a description of the physical outcome rather than describing a land use as defined by the current PRCP legislation and Guideline and, as such, the EA is somewhat unclear as to the intended PMLU under the current legislative vernacular. Greater clarity as to the planned outcomes for the Project, at the time of introduction of the PRCP legislative amendments, is considered to be provided by virtue of other land outcome documents (LODs), as discussed in the following sections.

Table 14: Final land use and rehabilitation approval schedule (EA Table 2.0)

Disturbance type	Disturbance area (ha)	Pre-mine land description	Post-mine land description	Pre-mine land classification	Post-mine land classification	Analogue site identification
Mine Pit / Voids	97	Grazing	Water Storage	3–8	8	-
Recontoured spoil area	950	Grazing	Grazing	3–8	6–8	Lot 566 on CH31740
Water Supply Dams	31	Grazing	Water Storage	3–8	8	-

Table 15: Residual void design (EA Table 2.2)

Void identification	Void high wall – maximum competent rock slope	Void low wall - maximum incompetent rock slope	Maximum void surface area (ha)
ML7186	47–65°	17–21°	28
Jeebropilly North			20

3.3.1.2 Closure Plan and Plans of Operations

The 'closure plan' (NHG 2014, Appendix F) referred to by condition C11 of the Project EA meets the requirements of an LOD as defined by section 750 of the EP Act. A Mine Closure Plan dated February 2014 was previously developed and submitted to the administering authority. The Mine Closure Plan relates to rehabilitation generally, and references the land uses (descriptions) identified in the EA as well as providing an analysis of alternative PMLUs – specifically industrial development options - given existing local authority and regional planning strategies (refer Section 3.3.2). Rehabilitation methods are summarised, however, completion criteria for the nominated PMLUs of water storage and grazing are not provided on the basis that alternative PMLUs were being considered at the time of drafting of the Mine Closure Plan. The Mine Closure Plan specifies the general locations of residual voids and PMLUs as 'domains' within which these occur; but does not specify footprint areas.

The Mine Closure Plan does make reference to the Wash Plant Pit being backfilled however, it is understood that a proposal to create an underpass connection between Jeebropilly North and Wash Plant pit was being investigated at the time of drafting of the Closure Plan which would have facilitated this option. However, the underpass connection proposal never eventuated.

Condition C11 of the EA includes a footnote that the requirements of the condition "*may be satisfied by inclusion of this information within the required Plan of Operations*". Relevant Plans of Operations were submitted in 2018 for the period 1 August 2018 to 31 December 2020 and, finally and post-completion of mining, in December 2021; described as a Plan of Operations as well as a post-operational Site Based Management Plan (pursuant to condition A5). It should be noted that the final Plan of Operations/Site Based Management Plan assumes the same PMLUs discussed in the 2018 Plan of Operations but provides no additional detail. Given the EA allowance to provide for "future land use(s) of the site" (condition C11(c)), it is considered that the Plans of Operation provided subsequent to the 2014 Mine Closure Plan provide the greatest clarity as to the intended outcomes to which the final stages of mining operations at Jeebropilly were targeted. The intended outcome is described at Section 4.1 of the 2018–2020 Plan of Operations (Appendix I), which states:

> *The specific requirements and landform required by the proponent for the land to be suitable for the proposed industrial land-use is summarised in the Wash Plant Pit Industrial Area Concept Plan V2.0 (NHG 2017) which was submitted to EHP in July 2017…*

Other early approval documents which allude to land use intent for the Project are summarised in Table 16.

Table 16: Historic approval documents referencing residual voids

Document	Author, date	PMLU, NUMA references
Jeebropilly EMOS	Ison Environmental Planners, 1993	Disturbed areas include residual voids and back fill areas. The post-mining landform will also permit …. other appropriate land uses determined by the landowners. Several voids are described as remaining post-mining as back filling of the residual voids is not economical and would make mining non-viable. Only a small portion of the residual void would remain as a water storage for stock and fauna due to the final proposed location. The locations were determined to be on ML 7186 and ML 50082, also identified as containing the tailings reject disposal site.
Impact Assessment Study MLA 7186	Ison Environmental Planners, 1993	The final void will be used either for containment of tailings or as a water storage structure.
Jeebropilly EMOS	Ison Environmental Planners, 1994	Disturbed areas include residual voids and back fill areas. The post-mining landform will also permit …. other appropriate land uses determined by the landowners. Only a small portion of the residual void would remain as a water storage for stock and fauna due to the final proposed location. The locations were determined to be on ML 7186 and ML 50082, also identified as containing the tailings reject disposal site. An additional final void is described for stock water on ML4677 with a capacity of 1 Mm^3.
EMOS - Jeebropilly Mine Extension New MLA in MDL 157 and 171	Ison Environmental Planners, 1996	The 1996 EMOS specifically relates to MLA 171 (Jeebropilly West on ML 50133) and MDL 157 (Jeebropilly North on ML 50132). Residual voids discussed as potential water storage structures subject to further assessment, with alternative beneficial land uses for all disturbed areas to be investigated. Water quality of the residual voids to be assessed to determine suitability for use.

3.3.2 Planning scheme conformance and existing land use

A review of Queensland land use mapping indicates that lands surrounding the Project consist predominantly of grazing lands with pockets of residential land occurring in association with nearby townships. The Project area lies wholly within the Ipswich City Council local government area and is subject to the provisions of the Ipswich City Planning Scheme 2006. Lands underlying the Project site are zoned as Regionally Significant Business Enterprise and Industry Areas; predominantly classified as regional business and industry investigation with a small area of special use (the cemetery) within ML4690.

Under the *Regional Planning Interests Act 2014* (Qld) and the Southeast Queensland Regional Plan 2009-2031, the Project site is located within the Southeast Queensland Urban Footprint and is part of the Ebenezer Regional Industrial Area; an area of approximately 5,800 ha to the south-west of Ipswich which has been designated by the ICC for industrial development (refer also Section 3.4.1). The whole of the Project area lies within the south-east Queensland Priority Living Area with several areas surrounding the Project site along the Bremer River also identified as Strategic Cropping Land.

The areas surrounding the Project are a mix of land uses including:

- rural – predominantly grazing and cropping;
- low density residential;
- defence – Amberley Air Base;
- recreational – Willowbank racetrack; and
- industrial.

3.3.3 Proposed post-mining land uses

For the purposes of this PRCP, and primarily as the EA clearly nominates a grazing land use for the majority of the site (those areas referenced as 'recontoured spoil areas' within Table 2.0 of the EA (refer Table 14), the proposed PMLUs have been constrained to 'low intensity cattle grazing' and 'retained infrastructure', as described in the following sub-sections. Along with the EA constraints, and for the purposes of the PRCP, the following are critical considerations in defining the specific locations for these PMLUs:

- the current non-operational status of the site, and the intent to move the site to surrender as quickly as possible;
- the current state of rehabilitation of the site; noting that there is approximately 800 ha of uncertified rehabilitated land across the Jeebropilly MLs, of which approximately 400 ha has been actively grazed for over 15 years (refer section 3.1.6.8); and
- the current landform / topography of the Project site which, as well as substantial areas of successful rehabilitation, also comprises functioning livestock watering dams, areas of unrehabilitated waste rock emplacements and residual voids.

The proposed PMLUs and final site design shown in Figure 24 and Figure 25 respectively, include a total projected area of low intensity cattle grazing of approximately 900 ha (including the co-disposal and TSF), a combined area of retained infrastructure of approximately 82.5 ha, 41.2 ha comprising the Jeebropilly West and Jeebropilly North water storages and 85.5 ha of residual voids approved as NUMAs (refer section 3.4).

As well as being consistent with the requirements of the EA, as required by Table 1 of Schedule 8A of the Environmental Protection Regulation 2019 (EP Regulation), the proposed PMLUs are:

- viable given the grazing land uses of land in the surrounding region;
- is consistent with how the land was used before a mining activity was carried out (section 3.1.6.1); and
- delivers a beneficial environmental outcome.

The proposed PMLUs are also considered to meet the expectations of the community (section 3.2) and the local planning scheme (section 3.3.2).

Low intensity cattle grazing

Given the land capability classification range of 6–8 nominated to the grazing post-mine land description assigned to the 'recontoured spoil area' (refer Table 14), this land description is considered to be equivalent to a PMLU of low intensity cattle grazing. Noting the comments at Section 3.3.2 in relation to increasing urbanisation in the region, this land use still largely aligns with regional and local land uses.

With respect to land use outcomes, condition C19 requires grazing pasture land outcomes to achieve a self-sustaining vegetation with projective cover, species composition and species distribution (similar to an analogue site located on a specific land holding no longer accessible to the EA holder), as well as some measure of productivity. This is addressed further at Section 3.5.3.

Retained infrastructure

The majority of infrastructure now existing on site is subject to a landowner agreement and is to be retained on site. This was considered as an option within the EA (condition C21). Retained infrastructure components nominated for retention to support the grazing PMLU and to be transferred to the landholder upon surrender, and detailed in the landholder agreement (see Appendix H) include:

- the workshop, fuel farm, store and associated facilities;
- administration buildings, offices and ablutions blocks;
- septic systems;
- concrete slabs/levelled pads for the CHPP;
- ROM pads (to be stripped of carbonaceous material);
- concrete slab/levelled pads for an historic coal to liquids plant;
- services – potable water, power, communications;
- existing and functioning livestock watering dams;
- water management pipelines;
- sealed roads, access tracks and haul roads; and
- fencing and security installations.

Water storages

The pre-approved NUMAs (refer Section 3.4.1) include two residual void areas that have been rehabilitated to water storages suitable for, and already functioning as, livestock watering dams; specifically the Jeebropilly West void water storage (refer also Section 3.1.4.4) and the Jeebropilly North void water storage. The suitability of the rehabilitated Jeebropilly West and Jeebropilly North voids as livestock watering points demonstrates an approach to minimise the extent of NUMAs associated with the Project and therefore a specific PMLU type has been nominated. From a rehabilitation perspective, some additional reshaping of the highwalls of Jeebropilly North are required to meet low intensity cattle grazing PMLU requirements.

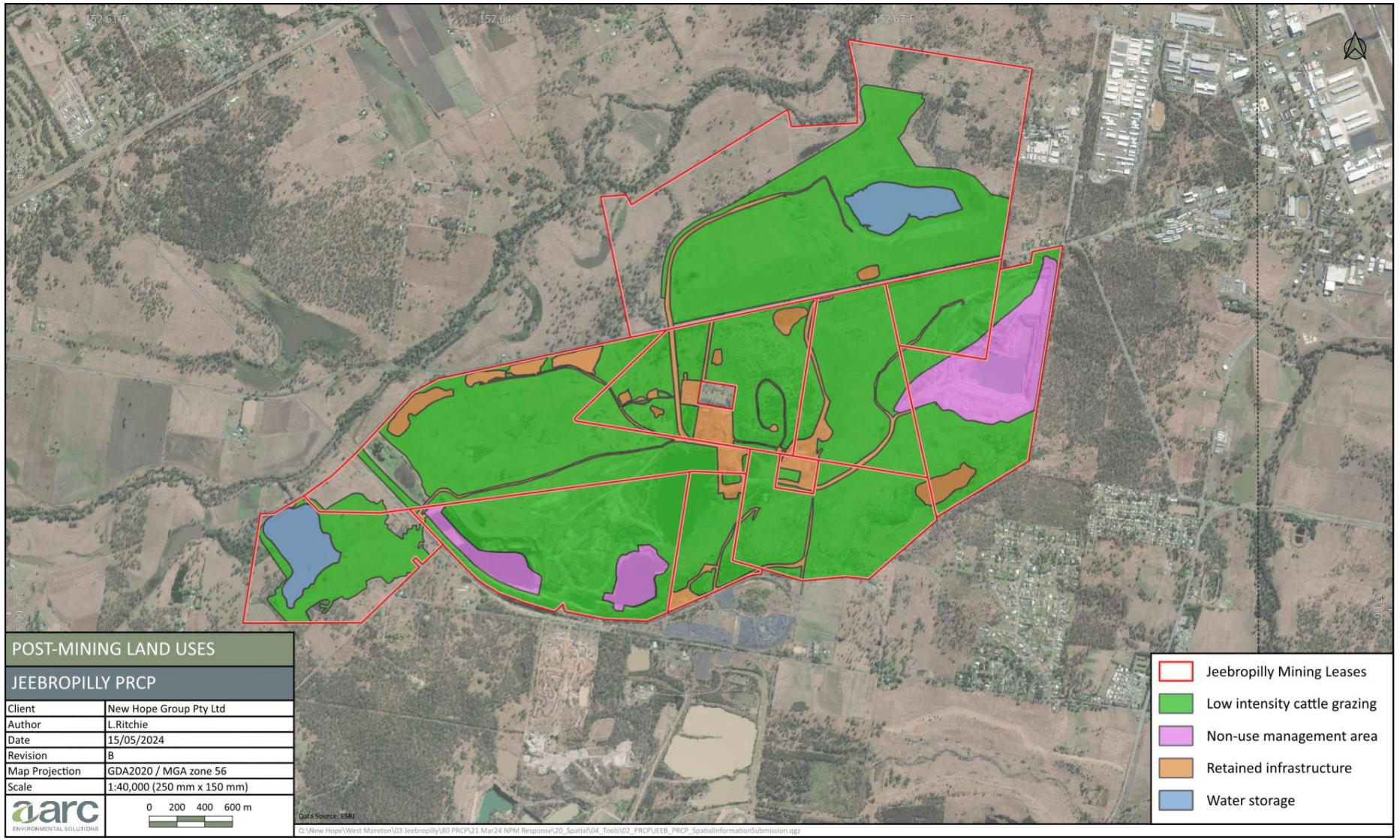

Figure 24: Jeebropilly PMLUs and NUMAs

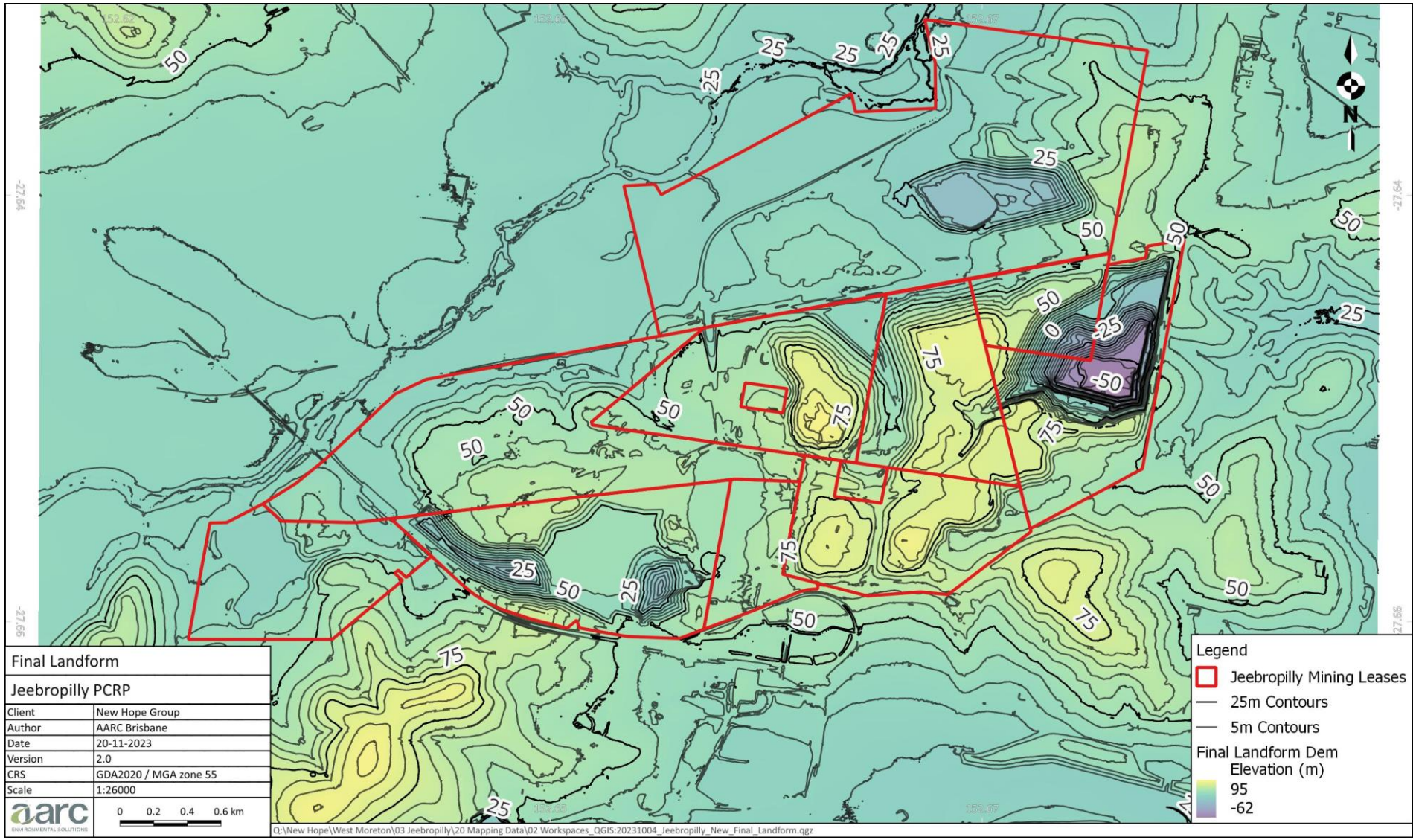

Figure 25: Site final design

3.4 Non-use management areas

3.4.1 Residual voids

A NUMA is an area of land that cannot be rehabilitated to a stable condition after all rehabilitation activities have been carried out (DES 2021). The transitional provisions of the PRCP Guideline state that:

> *Where a NUMA has been pre-approved and is being translated into the PRC plan, the EA holder is not required to:*
>
> - *justify the proposed NUMA*
> - *provide evidence to support the justification of the NUMA*
> - *go through the Public Interest Evaluation process*
> - *comply with the prohibition of voids located within a flood plain having to be rehabilitated to a stable condition.*

3.4.2 Pre-approved NUMAs

As outlined at Section 3.3.3, the following are critical considerations in defining the specific locations for the NUMAs:

- the current non-operational status of the site, and the intent to move the site to surrender as quickly as possible, means that there are no feasible or practical alternatives to modify the locations of mining voids, and few options to minimise their footprint;
- the existing residual voids have been subject to multiple approval processes over time, each of which has assessed the potential for environmental harm to arise, along with the sensitivity of the environment surrounding the residual mining voids; and
- no environmental harm has been observed or recorded resulting from the residual voids in their current state.

Relevant LODs for the Project are identified and discussed at Section 3.3.1. The following are relevant to a determination of the residual voids as NUMAs:

1) For the Project, condition C20 of the EA recognises a residual void outcome for the Project; requiring that residual voids must comply with rehabilitation outcomes noted as:

    a) *residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than environmental harm caused by the existence of the residual void per se, and subject to any other condition of this authority; and*

    b) *residual void design must comply with Table 2.2 – Residual Void Design.*

2) Table 2.0 of the EA identifies a number of approved disturbance types including 'Mine pit / voids' and 'water supply dams', both having a post-mine land classification of 8; defined as land being unsuitable for either cultivation or grazing. EA Table 2.2 identifies two areas; ML7186 and ML50132 (Jeebropilly North) as contributing to the residual void disturbance area, allocating 20 ha within ML7186 and 28 ha within ML50132.

From email correspondence received 7 May 2024, the administering authority's view is that Table 2.0 and Table 2.2 of the EA should be interpreted such that a sum total of 128 ha, comprising the 'Mining Pit/Voids' and 'Water Supply Dams' disturbance types referenced in Table 2.0 of the EA, constitute approved 'water storages (NUMA)' under the EA. From Table 2.2 of the EA, 28 ha of this total is allowable within ML7186, 20 ha is allowable within the Jeebropilly North void (ML 50132) and 80 ha can consist of 'water storages (NUMA)' of unspecified location. The administering authority further considered that these water storages could constitute "the Wash Plant Pit, or any other combination of other voids/dams, including additional areas of ML7186 and the Jeebropilly North voids".

The pre-approved NUMAs are summarised and described in Table 17.

Table 17: Description of proposed pre-approved NUMAs

EA interpretation	Pre-approved area (ha)	Applicable ML	NUMA description
Allocated water storage (NUMA)	28	ML7186	Comprises the '7186 West' and '7186 East' voids (28 ha)
Allocated water storage (NUMA)	20	ML50132	Comprise the Jeebropilly North void (20 ha)
Unallocated water storage (NUMA)	80	All Project MLs	Comprises the Jeebropilly West void and Wash Plant Pit void to a maximum area of 80 ha

The pre-approved NUMAs include residual void areas that have been rehabilitated to water storages suitable for, and already functioning as, livestock watering dams; specifically the Jeebropilly West void water storage (refer also Section 3.1.4.4) and the Jeebropilly North void water storage, noting that some additional reshaping of the highwalls of Jeebropilly North are required to enable these to meet low intensity cattle grazing PMLU requirements. The intended use of the rehabilitated Jeebropilly West and Jeebropilly North voids as livestock watering points demonstrates an approach to minimise the extent of NUMAs associated with the Project by creating functional PMLUs.

For the voids located within ML7186 and ML4677/ML50093 (Wash Plant Pit), further reshaping earthworks are required to stabilise these areas and contribute to the adjoining cattle grazing PMLU. For the ML7186 voids this includes buttressing the highwall as well as regrading earthworks on the low wall and, similarly for the Wash Plant Pit, the regrading of some of the upper low-wall sections (principally the northern low-wall).

Section 3.3.2 identifies the government strategies and planning schemes relevant to the site. Under the *Regional Planning Interests Act 2014* (Qld) and the Southeast Queensland Regional Plan 2009-2031, the Project site is located within the Southeast Queensland Urban Footprint and is part of the Ebenezer Regional Industrial Area; an area of approximately 5,800 ha to the south-west of Ipswich which has been designated by the ICC for industrial development (refer also Section 3.4.1). The whole of the Project area lies within the south-east Queensland Priority Living Area with several areas surrounding the Project site along the Bremer River also identified as Strategic Cropping Land. The site exists within the Regionally Significant Business Enterprise and Industry Areas zone of the Ipswich City Council Planning Scheme and is surrounded by a mix of land uses including:

- rural – predominantly grazing and cropping;
- low density residential;
- defence – Amberley Air Base;
- recreation – Willowbank racetrack; and
- industrial.

While beyond the scope of control of this PRCP, the zoning of the site, the clear intent of local and state government planning strategies indicates that significant potential exists for alternative uses to be identified and implemented for the NUMAs in the future.

3.4.3 Residual void hydrology and water quality

Since the cessation of mining, the residual voids (7186 East, 7186 West and Wash Plant Pit) have retained water through a combination of incident rainfall, runoff within the residual void catchment area and groundwater interception (including sub-surface flows from spoil dump infiltration).

A void hydrology study was completed in 2024 (See.Built.Earth 2024) and the findings detailed at Section 3.5.11.2. Groundwater quality has also been assessed as part of the same study and is discussed at Section 3.1.4.3 and Section 3.5.5.1. Recent water quality data has been provided at Table 6.

3.5 Rehabilitation management methodology

3.5.1 Rehabilitation objectives

In Queensland, mine rehabilitation is required under the EP Act. Amendments to the EP Act in late 2018 implemented key elements of the State Government's Mined Land Rehabilitation Policy (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a PMLU (section 111A of the EP Act).

These three objectives are the general rehabilitation goals for all areas disturbed by mining in Queensland.

3.5.2 Rehabilitation areas and improvement areas

To facilitate the development of a PRCP schedule that satisfies the requirements of the PRCP Guideline, discrete rehabilitation areas (RAs) and improvement areas (IAs) have been defined for the Project. As defined within the EP Regulation 2019:

- an RA is an area of land in the PMLU to which a rehabilitation milestone (RM) for the post-mining use relates; and
- an IA is an area of land in the NUMA to which a management milestone (MM) relates.

RAs and IAs have been nominated for the various areas of disturbance associated with the Project considering both the type of disturbance type and the proposed RAs/IAs and PMLUs and are shown in Table 18 and Figure 26.

Table 18: Nominated rehabilitation and improvement areas

RA / IA	Mine Domain / Rehabilitation Area	Description / inclusions	PMLU/NUMA
RA1	Open cut disturbance areas	• ML7186 out-of-pit waste rock emplacement (to be partially utilised for void rehabilitation) • Rehabilitated land (not certified) • Exploration areas • In-pit waste rock emplacements / backfilled residual voids • Out-of-pit waste rock emplacements	Low intensity cattle grazing
RA2	Flood protection bund	• Existing flood protection infrastructure	
RA3	Waste disposal area / Tailings storage facility	• Tailings storage facility	
RA4	Co-disposal facility	• Rehabilitated co-disposal area	
RA5	Mine infrastructure areas / Retained infrastructure	• workshop, fuel farm, store and associated facilities • existing administration buildings, offices and ablutions blocks; • existing septic systems; • existing concrete slabs/levelled pads for the CHPP; • existing ROM pads (to be stripped of carbonaceous material); • existing concrete slab/levelled pads for the historic coal to liquids plant; • existing services – potable water, power, communications; • existing and functioning livestock watering dams; • existing water management pipelines; • existing sealed roads, access tracks and haul roads; and • existing fencing and security installations.	Retained infrastructure
RA6	Residual void water storage	• Water filled residual void rehabilitated to allow safe access for stock and with a water quality suitable for livestock watering	Water storage
IA1	Residual voids	• Highwall, lowest low wall and final void remaining from open cut disturbance after reshaping to the final landform	Water storage (NUMA)

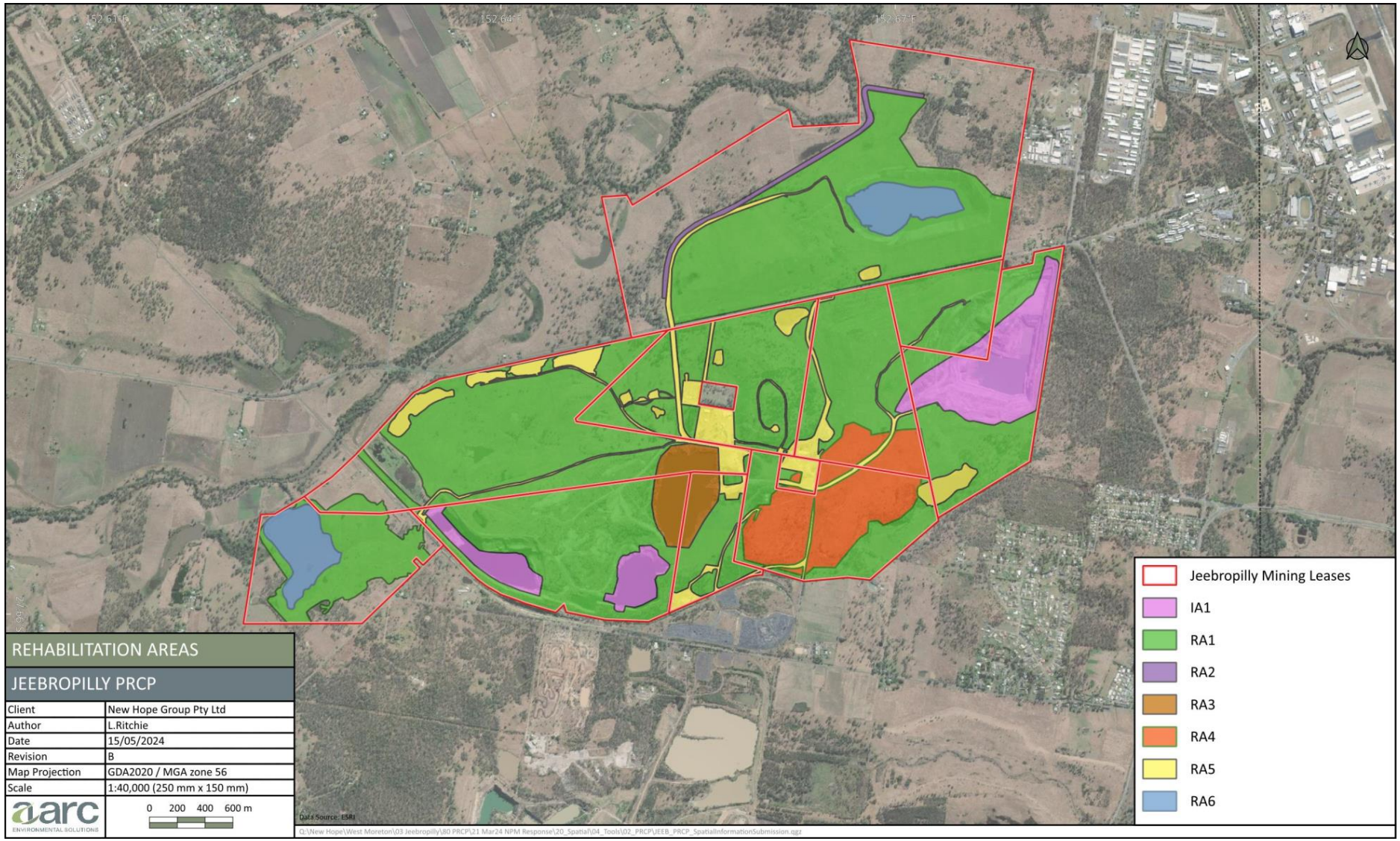

Figure 26: Project rehabilitation and improvement areas

3.5.3 Rehabilitation and management milestones

The nominated RMs and MMs and their applicability to the various RAs and IAs are outlined in Table 19, and the rehabilitation and management approaches described in detail in Sections 3.5.5 through 3.5.11. It should be noted that not all RMs are applicable to all RAs, although all MMs are applicable to the single IA.

3.5.3.1 Milestone criteria development

Critical to assessing the success of rehabilitation and improvement outcomes is the definition of milestone criteria. In accordance with the PRCP Guideline, milestone criteria are used to demonstrate the completion of a specific milestone and should be appropriate for achieving the milestone and facilitate achieving subsequent RMs/MMs. Milestone criteria are preferably specific, measurable, achievable, realistic and timely. The final milestone criteria should:

- be outcome-based (linked to the end land use);
- be flexible to adapt to changing circumstances;
- be able to evolve as the mine life progresses;
- include metrics suitable to demonstrate that rehabilitation is trending positively;
- undergo periodic review; and
- include a measurement approach that details how the criterion will have been met (CoA 2016, ANZMEC & MCA 2000).

Milestone criteria have been identified for the Project that provide a clear definition of milestone completion for each rehabilitation and improvement area. The milestone criteria demonstrate the completion of progressive rehabilitation steps and events. Completion criteria for each RA/IA will be used as the milestone criteria for the final milestone in the proposed schedule, and will demonstrate achievement of the land to a safe and stable condition at surrender.

Conditions C15 to C21 of the EA, reproduced below, provide some guidance with respect to indicators and completion criteria.

> *C15* *For applying condition (C14), rehabilitation must commence on those areas previously disturbed by mining activities, apart from those areas currently being actively utilised for extraction of any borrow material, within three (3) months after the completion of any mining activities in those areas. Rehabilitation of disturbed areas includes slopes, borrow pits, stockpile storage areas, and sedimentation basins in a manner such that:*
>
> a) *all disturbed land is reshaped to a stable landform and is not subject to slumping;*
> b) *the potential for erosion is minimised;*
> c) *the surface drainage lines are re-established;*
> d) *suitable topsoil is reinstated on areas where revegetation is possible;*
> e) *suitable vegetation species and density of cover are established which is consistent with the surrounding undisturbed areas or the site's proposed future land use;*
> f) *the likelihood of environmental nuisance being caused by release of dust is minimised; and*
> g) *infrastructure is removed from the site.*
>
> *C16* ***Maintenance of rehabilitated areas***
>
> *Maintenance of any rehabilitated areas must take place to ensure —*
>
> a) *erosion control measures remain effective;*
> b) *plants show growth;*
> c) *any weed infestations are removed and prevented from recurring;*

d) *plants that have not taken, died or have become diseased are removed and disposed of appropriately and replaced as soon as practical;*
e) *significant plant losses are examined for possible causes; and*
f) *the rehabilitated land should be capable of withstanding normal disturbances such as fire or any seasonal flooding the area may experience*

C17 *Maintenance of these rehabilitated areas must continue until such time as the operator can demonstrate that the area has been successfully rehabilitated to a condition that will comply with Condition C16 and that rehabilitation works in the area are self-sustaining and no longer relies on the intervention of the person undertaking the activity.*

C18 ***Rehabilitation landform criteria***

All areas significantly disturbed by mining activities must be rehabilitated to the final land use description as defined in Table 2.0 – Final land use and rehabilitation approval schedule.

C19 ***Grazing pasture outcome***

Areas which are subject to progressive rehabilitation to a grazing pasture post-mine land description must comply with the following rehabilitation outcomes —

a) *self-sustaining vegetation with projective cover, species composition and species distribution similar to the analogue site identified in Table 2.0 – Final land use and rehabilitation approval schedule; and*
b) *a given measure of productivity (e.g. sustainable dry matter production, stock live weight gain) is similar to the analogue site identified in Table 2.0 – Final land use and rehabilitation approval.*

C20 ***Residual void outcome***

Residual voids must comply with the following rehabilitation outcomes —

a) *residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than environmental harm caused by the existence of the residual void per se, and subject to any other condition of this authority; and*
b) *residual void design must comply with Table 2.2 – Residual Void Design.*

C21 ***Infrastructure***

All infrastructure for the mining activities, including water storage structures must be removed from the subject land prior to mining lease surrender, except where otherwise agreed to in writing by the post-mining landowner.

3.5.3.2 Rehabilitation milestones

Indicators and completion criteria have been developed with respect to the findings of previous rehabilitation performance monitoring, and criteria proposed within the various LODs (defined at Section 3.3.1) to demonstrate:

- the productivity of the land (for agricultural PMLUs);
- the erosional and geotechnical stability of rehabilitated areas;
- acceptable water quality;
- engineering standards and certifications for retained infrastructure, where applicable; and
- remediation or listing of any lands subject to contamination.

The nominated rehabilitation milestone criteria are provided in Table 20.

Table 19: Rehabilitation milestone applicability to rehabilitation areas

Milestone reference	Description	Applicability					
		RA1 Open cut disturbance	**RA2 Flood protection bund**	**RA3 Tailings storage facility**	**RA4 Co-disposal facility**	**RA5 Retained infrastructure**	**RA6 Water storage**
RM1	Non-retained infrastructure decommissioning and removal	✓		✓	✓	✓	✓
RM2	Determination/ management of contaminated land status	✓		✓	✓	✓	
RM3	Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	✓	✓	✓	✓		✓
RM4	Capping installation			✓	✓		
RM5	Revegetation	✓	✓	✓	✓		✓
RM6	Achievement of surface stability	✓	✓	✓	✓	✓	✓
RM7	Achievement of target post-mining land use to safe and sustainable condition (low intensity cattle grazing)	✓	✓	✓	✓		
RM8	Achievement of target post-mining land use to safe and sustainable condition (retained infrastructure)					✓	
RM9	Achievement of target post-mining land use to safe and sustainable condition (residual void water storage PMLU)						✓

Table 20: Rehabilitation milestones and milestone criteria

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM1	RA1 RA3 RA4 RA5 RA6	Non-retained infrastructure decommissioning and removal	• All non-required services disconnected and removed • All concrete, bitumen and gravel roads removed (where not retained) to a depth of 1 m. • All operational pipelines drained and removed • All fencing that is not compatible with PMLU requirements removed • All non-retained buildings demolished and/or removed • All machinery and equipment decommissioned and removed • All surface water drainage infrastructure that is not retained in the final landform removed • All non-retained water management structures decommissioned • All rubbish removed
RM2	RA1 RA3 RA4 RA5	Determination/ management of contaminated land status	• Contaminated land assessment undertaken by an appropriately qualified person[1]. If required, a site investigation report including a site suitability statement/ management plan (as required) prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act; • Contaminated material either: o remediated in situ; o removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted; or o retained and managed under a site management plan (e.g. tailings)
RM3	RA1 RA2 RA3 RA4 RA6	Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	• All landform works completed to design specifications including installation of safety and drainage bunds • With the exception of areas rehabilitated prior to 2023, all slopes are to be less than 17° gradient (applicable to RA1 only): • Assessed as geotechnically stable by an appropriately qualified person[1] (applicable to RA1, RA2, RA3, RA4) • Prior to each rehabilitation event, soil health and suitability are assessed and documented by an appropriately qualified person[1], and a recommendation made for ameliorants to ensure sodicity, salinity, pH and fertility levels are suitable to achieve the relevant PMLU (applicable to RA1 and RA3) • Records of ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person[1] (applicable to RA1 and RA3) • Ripping undertaken along the contour of slopes (applicable to RA1 and RA3): • ripping at 300 mm approximately 1 m apart

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM4	RA3 RA4	Capping installation	• Capping installed to design parameters including (applicable to RA3 only): o working cover and waste rock cover of approximately 3 m thickness; and • growth media or topsoil applied • Certification provided by an appropriately qualified person[1] confirms that capping layers have been implemented to design specifications (applicable to RA3 only)
RM5	RA1 RA2 RA3 RA4 RA6	Revegetation	• Completed seeding using a selection of species listed in Table 30: Typical pasture species list for grazing PMLU, ensuring a minimum of 3 x 3P (perennial, palatable, pasture) native species • Minimum seeding rate of 10 kg/ha • Records demonstrating species used, seeding rates, area sown, germination certificate, and seed origin
RM6	RA1 RA2 RA3 RA4 RA5 RA6	Achievement of surface stability	• Erosion classification[3] is comparable with erosion classifications from nearby equivalent land uses with similar landform parameters • No recorded erosion classifications[3] of 'Severe', where these cannot otherwise be demonstrated to be stable, or areas requiring continuous maintenance. • No active erosion present as demonstrated by no increase in erosion ratings over time • Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use
RM7	RA1 RA2 RA3 RA4	Achievement of target post-mining land use to safe and sustainable condition (Low intensity cattle grazing PMLU)	• Rehabilitation polygons have a median fractional vegetation cover greater than the first quartile of reference polygons for at least 85% of all sample times, as determined using the satellite-derived fractional vegetation cover method • No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at nearby equivalent land uses with similar landform parameters • Self-sustaining vegetation with projective cover, species composition and species distribution similar to nearby equivalent land uses with similar landform parameters • Relevant land capability Class 6 – 8 achieved
RM8	RA5	Achievement of target post-mining land use to safe and sustainable condition (Retained infrastructure PMLU)	• No built structures remain other than those that form part of a landholder agreement • Retained structures are in a state fit for use for the associated PMLU • Retained livestock water dams water quality parameters are below the 'low risk' trigger values for livestock drinking water defined in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000)

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM9	RA6	Achievement of target post-mining land use to safe and sustainable condition (residual void water storage PMLU)	• All water storages assessed as safe and stable by an appropriately qualified person[1] • Water storage water quality parameters are below the 'low risk' trigger values for livestock drinking water defined in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000)

1 Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature.

2 Consistently means that the criterion is met for a minimum of three consecutive years.

3 Erosion classification framework:

Erosion classification	Minor	Moderate	Severe
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.
Rills/ gully erosion (per standard 50 m transect)	< 15 rills and < 0.3 m deep	15–30 rills and < 0.3 m deep	> 30 rills and/or any > 0.3 m deep
Tunnel erosion	Absent	Absent	Present
Mass movement	Absent	Absent	Present

3.5.3.3 Management milestones

MMs are required for all IAs identified as a NUMA. These identify each significant event or step necessary to achieve best practice management of the area and to minimise risks to the environment.

The nominated MMs for the Project NUMAs (IA1) are outlined in Table 21, while the proposed milestone criteria are detailed in Table 22

Table 21: Management milestones applicable to improvement area IA1

Milestone reference	Description
MM1	Achievement of final landform design
MM2	Achievement of surface and safety requirements
MM3	Achievement of sufficient improvement

3.5.4 Rehabilitation milestone timeframes

RMs are required to be achieved as soon as practicable after land becomes available for rehabilitation. Land is considered to become available for rehabilitation at the completion of mining, except where land is being used for operating infrastructure or topsoil stockpiles, or is identified as being retained infrastructure post-closure.

RM timeframes for this Project have been developed with consideration for the size of the remaining RAs, the activities applicable to each milestone and interim rehabilitation activities that are scheduled to occur or anticipated to be required to achieve each milestone. Milestones that involve revegetation activities, including monitoring of revegetation, make provision for unfavourable growing seasons and unforeseen extreme events such as droughts or storms that could negatively impact vegetation establishment; requiring longer timeframes for the milestone to be achieved.

The nominated rehabilitation timeframes for scheduling purposes are shown in Table 23.

Table 22: Management milestone criteria

Management milestone	Applicable improvement areas	Milestone criteria	Nominated time frame (years)
MM1 -Achievement of final landform design	IA1	• Residual void slope criteria: o maximum slope for competent rock: 47–65°; and o maximum slope for incompetent rock: 17–21°; • An assessment undertaken by an appropriately qualified person[1], confirming that there is minimal risk of serious environmental harm to land, surface waters or any recognised groundwater aquifer post-mining. • Voids are assessed to be geotechnically stable by an appropriately qualified person[1]	3
MM2 - Achievement of surface and safety requirements	IA1	• Safety infrastructure established around the void, including the following: o adequate bunding in place; and o perimeter fencing and signage erected to prevent access to fauna and humans. • Bunding constructed to the following design criteria: o minimum base width of 4 m; o a minimum height of 2 m; and o located, where practicable, at least 10 m beyond the area potentially affected by any instability of the pit edge.	2
MM3 - Achievement of sufficient improvement	IA1	• Assessment by an appropriately qualified person[1] that no serious environmental harm in relation to groundwater will occur outside of the relevant tenure boundary. • Certification from an appropriately suitably qualified person[1] that the residual voids are not hazardous to humans and livestock/fauna	1

1 Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature.

Table 23: Proposed timeframes for RMs associated with each RA

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA1 RA3 RA4 RA5 RA6	RM1: Non-retained infrastructure decommissioning and removal	• Infrastructure decommissioning and disposal • Removal of plant and equipment not being retained	Low: few environmental impact risks associated with infrastructure decommissioning;	1	Some existing, to be removed, infrastructure will be required to support other rehabilitation activities (pipes, pumps, offices etc.). Decommissioning activities are considered low risk and expected to take approximately 1 year.
RA1 RA3 RA4 RA5	RM2: Determination/ management of contaminated land status	• Standard phase 1 assessment of contamination	Low: established process; use of appropriately qualified persons	1	Provide sufficient time for engagement of consultants, sampling, analysis and determinations.
RA1 RA2 RA3 RA4 RA6	RM3: Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	• Mobilisation of contractors • sequential dewatering of TSF and 7186 voids • bulk earthworks (North Pit, TSF and 7186 voids)	Moderate: environmental risks moderated given internally draining nature of relevant catchment areas; landform development works constrained to limited areas	3	Time allowance for engagement of contractors, mobilisation of suitable machinery/equipment to commence rehabilitation; sequential dewatering and drying of voids and the TSF for accessibility to undertake earthworks.
RA3 RA4	RM4: Capping installation	• Mobilisation of contractors • dewatering of TSF • bulk earthworks (TSF)	Moderate: consolidation status of TSF is unknown and may require additional drying time	2	After consolidation of the TSF, the land will be capped to design specifications. The timeframe assigned is 2 years.
RA1 RA2 RA3 RA4 RA6	RM5: Revegetation	• Revegetation with species consistent with the PMLU	Low: insufficient density and/or diversity of vegetation; erosion	1	The seeding and / or planting of suitable target species is classified as 'Low' risk. The assigned timeframe of 1 year allows time for vegetation establishment.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA1 RA2 RA3 RA4 RA5 RA6	RM6: Achievement of surface stability	• Vegetation monitoring and maintenance as required • Erosion monitoring	Moderate: vegetation failure; erosion	5	Achievement of target vegetation and erosion criteria is dependent on climatic conditions and soil preparation. Allowance is made for adverse climatic conditions such as droughts or storms that will negatively impact vegetation establishment and subsequently affect erosion outcomes. The timeframe also allows for repair and maintenance activities that may be required as a result. Given these factors and the 'Moderate' risk classification, the timeframe assigned is 5 years.
RA1 RA2 RA3 RA4	RM7: Achievement of target post-mining land use to safe and sustainable condition (Low intensity cattle grazing PMLU)	• Vegetation structure is consistent with analogue sites	Moderate: insufficient density/diversity of vegetation	10	Achievement of target revegetation criteria is dependent on climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the 'Moderate' risk classification, the timeframe assigned is 10 years.
RA5	RM8: Achievement of target post-mining land use to safe and sustainable condition (Retained infrastructure PMLU)	• Water quality monitoring • Erosion assessments • Safety assessment • Maintenance and repairs undertaken where required	Moderate: does not meet the requirements of the landholder agreement	1	Given the minimal active rehabilitation work required to be compliant with the landholder agreement, the timeframe assigned is 1 year.

Rehabilitation Area (RA)	Rehabilitation Milestones (RM)	Summary rehabilitation methodology	Risk level assigned	Proposed timeframe (years)	Justification for assigned timeframe
RA6	RM9	• Water quality monitoring • Erosion monitoring assessments • Safety assessment • Maintenance and repairs undertaken where required	Moderate: environmental risks moderated given internally draining nature of relevant catchment areas; landform development works constrained to limited areas	10	Some areas of steeper slopes. Achievement of target revegetation criteria is dependent on climatic conditions and soil preparation. Allowance is made for poor growing seasons and extreme events such as droughts or storms that will negatively impact vegetation establishment, and consequent maintenance actions that may be required. Given these factors and the 'Moderate' risk classification, the timeframe assigned is 10 years.

3.5.5 General rehabilitation practices

The rehabilitation practices used at any mining site inevitably evolve as a result of increasing knowledge gained from experience in the following areas:

- early rehabilitation successes and failures;
- weather, subsoils, soils, local flora and fauna and revegetation species; and
- site preparation, seeding practices, the maintenance and repair of previously rehabilitated areas and/or local agricultural practices.

For this reason, the rehabilitation practices outlined in the following subsections should not be interpreted as the precise method that will be used from this point on, but rather as a record of the current rehabilitation knowledge and intent at the time of writing; and with the expectation that rehabilitation practices will further evolve and develop from this point on. A description of the existing rehabilitation efforts at site is provided at section 3.1.6.8.

While rehabilitation objectives, performance indicators and completion criteria for the Project are detailed at sections 3.5.1 and 3.5.2, from the perspective of operational rehabilitation planning and practice, the following overarching principles are considered key:

- Ensuring that reshaped areas proposed for rehabilitation meet the required landform design principles, that prepared areas meet the rehabilitation design specification for the area, and that local site drainage has been considered and surrounding areas graded to minimise rainfall runoff from adjacent areas running onto prepared RAs.
- Topdressing materials, final surface preparation methods and soil amelioration activities have the objective of supporting vegetative growth.
- Revegetation species selection, seeding and/or planting methods, and fertiliser applications target rapid vegetative ground cover effective at mitigating soil erosion, during the period of initial revegetation when areas are most at risk.
- Ongoing monitoring and maintenance are used both to assess rehabilitated area performance against completion criteria as well as to provide feedback to, and update rehabilitation practices; and to identify maintenance or modification requirements such that RAs are proceeding along a trajectory towards the designated PMLU.

There will be circumstances when rehabilitation practices outside of those discussed within this PRCP are utilised. For example, discrete areas of steeper slopes, rehabilitation failures or other scenarios that may necessitate more intensive rehabilitation practices. These circumstances will be identified, assessed and rehabilitation activities planned for as required.

3.5.5.1 Hydrogeology

Status of groundwater at Jeebropilly

Groundwater occurrence, permeability and storativity are strongly restricted at the Project site given the prevalence of the Walloon Coal Measures across the site and is considered and experienced to be in the aquitard range of the Walloon Coal Measures a mass rock unit. Inflow rates remained low during mining (estimated at 0.001 L/s, TAFT 2019), and therefore limited potential for mining to interfere with neighbouring bores (see Section 3.1.5).

As evidenced by the various EMOSs prepared for the Project, as well as the Project EA, the lack of groundwater resources within the immediate vicinity of the site has been clearly recognised. Consequently, groundwater has not formed part of any environmental performance requirement.

Site groundwater domains

For the purposes of closure planning, See.Built.Earth (2024) defines three main domains for groundwater in the post-mining state of the Project:

1) Unconfined Alluvial aquifer zones hosted and defined by the extent and variability of the Bremer River Tertiary to Quaternary alluvial deposits and floodplains along the northwestern extent of the site. The alluvial aquifer consists of:

    - surficial clays and sandy clays between 5–15 m thick or irregular thicknesses of sands between 18–20 m in paleochannels; and
    - weakly cemented Early Tertiary sandstones, claystones, lenses of gravel, and sandy gravels from 1–6 m thick.

    Alluvial groundwater quality ranges from fresh to brackish (200 to 5,000 µS/cm), with yield ranges of less than 3 L/s to 25 L/s (Hollingsworth Consultants 1988a, b and c; Mackie Martin and Associates 1991b; Rust PPK 1994).

2) Confined Walloon Coal Measures zones consist of interbedded coal seams with silts, clays, and sand. The site forms a series of blocks cut by regular faulting, which can offset beds by up to 35 m and further restrict hydraulic conductivity and connectivity. The Walloon Coal Measures surround the site from the surface to approximately 225 m depth on the southern, eastern, and northern extents of the Project, and underlays the rest of the site below pit void areas, as well as the Bremer alluvials. The Walloon Coal Measures are generally of low yield and hydraulic conductivity, with minor inflow rates of less than 100 ML/year based on dewatering during mining (less than 0.3 ML/d) (Taft 2019) or 0.001 L/s). Quality varies from relatively fresh to saline depending on the seam location.

3) Unconfined backfill overburden zones (mine spoil) consist of a mix of overburden material from mining, including siltstone, sandstone, and claystone (Taft 2019). Particle size varies from boulder to clay. Materials are expected to have a reasonable porosity. They are unlikely to host true 'groundwater' and are more likely to allow water to be stored in pore spaces or to act as a throughflow medium. Several wells constructed in 2018 into the overburden identified yields of 0.5–1 L/s within the backfill.

Groundwater quality

Given the lack of a need to monitor groundwater as part of the mining operation, there is only a limited formal bore network and groundwater level and quality monitoring program.

A series of six wells were constructed in 2018 into Walloon Coal Measures and backfill zones in the southern part of the lease. There are no monitoring wells currently intersecting alluvial zones. There have been two monitoring events since construction in November 2018 (TAFT 2019); most recently in March 2024 for a recent groundwater assessment by See.Built.Earth (2024), which identified a further six wells, however, not all were able to be sampled due to bore conditions (Ground and Water Australia 2024).

The accessible groundwater network currently consists of 10 wells, two of which are only valid for groundwater level monitoring. Six wells are background wells for the Walloon Coal Measures to the south and east of the MLs, and two are located in backfill zones. The locations of bores are indicated in See.Built.Earth (2024).

The indicative pH results indicate that groundwater is neutral to slightly alkaline, with background wells in the Walloon Coal Measures being more alkaline than the backfill wells (See.Built.Earth 2024). Salinity remains relatively constant between 7,000 and 10,000 µS/cm across all bores, as does chloride, with the exception of bore 173693, indicating that bores are closely linked to rainfall. Background sulphate values range from not detected on the southern side of the lease to up to 1,000 mg/L on the eastern extent. Bores on the south indicate a dramatic drop in sulphate between the 2018 and 2024 sampling events. This may indicate a freshening from the low rainfall period between 2012-2020 and the higher rainfall period since, particularly over the 2023-24 summer (See.Built.Earth 2024).

The dissolved metals profile indicates:

- Aluminium, cadmium, lead, copper, and selenium are generally undetected or present.
- Manganese, iron, cobalt, and arsenic are present at low levels in the eastern background and backfill wells. Molybdenum is detected in the southern background wells.
- Zinc, boron and nickel are generally present across the field at low background and backfill wells levels.

Several wells show dramatic changes over the three-year interval, which may or may not be related to rainfall or other factors.

Groundwater yields and levels

A study of groundwater levels and yields by Elliot (2009) assessed up to 209 drillholes across and around the MLs. The results of the survey are mapped in Figure 27 along with Queensland geology mapping and faults as mapped by the New Hope Group. While the majority of drillholes are focused on the Underpass Pit area, visible trends include:

- higher yields are almost always associated with the alluvial zone within the MLs;
- there is a strong alignment for yields in a similar strike to the deposit fault framework, indicating a structural control on yield is likely;
- there is a lack of groundwater development around the Wash Plant Pit and the 7186 East and 7186 West voids where water levels also remain low. While this may be influenced by drilling locations, this correlates with yields; and
- higher yields are encountered around North pit, with this zone aligned with the development of farm dams on the northern extent near the edge of the alluvium.

The relative water levels of groundwater across site and downstream alluvials are plotted in Figure 28 to compare groundwater levels to each other, as well as landform elevation and other sources of water on site such as pit void storages. The chart shows:

- Alluvial groundwater lays at 5–6 m below the Bremer River base, similar to historical observations (Hollingsworth 1988c);
- all site-based wells lay above alluvial groundwater levels, with eastern wells remaining higher, and wells to the south and in backfill zones at near equivalent levels, suggesting an equilibrium of sorts between the confined Walloon Coal Measures to the south and the unconfined backfill zones, at or around the ML7186 voids storage level;
- a similarity in groundwater levels between alluvial groundwater and Jeebropilly North pit levels, suggesting a potential connection; and
- hydraulic separation of Wash Plant Pit to other pit storages and monitored groundwater.

Given that Bremer River flow is a primary recharge and freshening method for Jeebropilly alluvial aquifers, groundwater levels within the alluvial domain are strongly tied to river flow and, by association, to rainfall (See.Built.Earth 2024). The drier rainfall conditions that persisted from 1999 to 2006 and then from 2012 to 2020, resulted in a corresponding drop in alluvial groundwater levels. As rainfall increases in wetter conditions, alluvial groundwater levels also increase. Since 1965, groundwater levels have ranged between 20–22 mAHD down to 15–20 mAHD, with multiple declines and recoveries over the 60 years of monitoring (See.Built.Earth 2024).

On site, there are no current groundwater wells screened in alluvium. However, groundwater levels of the alluvial aquifer along the extent of the western ML have been monitored extensively in preparation and as part of managing mining impacts for Jeebropilly West, Jeebropilly North and parts of Pit 3. Historical monitoring locations and relative water levels (mAHD) of active monitoring between 1988 and 2004 are shown Figure 29, with some wells unimpacted by mining (likely hydraulically separate), some in a slow

decline but more recently demonstrating recharge, and a few bores closest to the alluvial pits reacting strongly in both decline and recovery. There were no adverse impacts to nearby private wells recorded during mining. Notably, Jeebropilly North continued mining after the cessation of alluvial aquifer monitoring in 2007, and water levels may have further recovered, aligned to observations in the regional downstream wells on the Bremer River at the Haigslea- Amberley Road (See.Built.Earth 2024).

Groundwater levels across the broader site are formed by the potentiometric pressures in the confined Walloon Coal Measures, which increase with mining over time, and the unconfined overburden backfill zones. The drill hole water level and yield study by Elliot (2009) provides some historical insight into in situ levels for the Walloon Coal Measures, particularly across the western and southern parts of the lease, with some touch points to the east (See.Built.Earth 2024).

The 2009 groundwater surface shows potentiometric pressure as broadly falling from the east to the west, in line with the topography of the site. Artesian flow is noted in the present Southern Sediment Dam region. There is some local variability in water levels likely associated with the multiple numbers of seams and possible water intersections, however, at times, this becomes much more pronounced in compartmentalisation. This is visible as localised highs or lows within the broader surface, with strong vertical gradient change over limited distances, suggesting the presence of hydraulic separation or vertical changes of each relative host seam being measured. Elliot (2009) in taking standing water level measurements, noted this in the field, remarking how water levels are relatively consistent over larger areas but may also change rapidly between certain drillholes.

Compared to known geology, these steep gradients or areas of localised change, are strongly associated with modelled geological reverse and normal faults, where an area of high or low occurs between closely spaced structures, and fault displacement/ faults act as flow barriers to create hydraulic separation between seams. The combined effect is as a series of geological blocks in the Walloon Coal Measures, where faults combine with the confinement and low hydraulic conductivity of the Walloon Coal Measures to create a groundwater environment of disconnected groundwater surfaces across blocks, varying based on the nature and relative height of the host seams within each block and the connectivity or separation between each geological block. The nature of the faulted blocks is particularly relevant as Jeebropilly lies on the margins of the Warrill Syncline, where faulting will arguably be more pronounced and weathering more developed where the Walloon Coal Measures are close to the surface.

Ground and Water Australia (2024) completed a sampling round in 2024 providing another snapshot in time following the progression of backfill domains across much of the site. The results, Figure 30, present a similar theme but changed groundwater surface to 2009. In the east of the lease, a higher groundwater elevation occurs as a localised zone persists in the in situ Walloon Coal Measures, with a rapid downward gradient towards the west indicating hydraulic separation through faulting or fault- based flow barriers. Towards the west, groundwater levels broaden and flatten given the extensive backfill zones across the western and central areas of the site; illustrating how groundwater responds to the unconfined groundwater conditions of the refilled overburden.

Given the current bore network, the groundwater surface is limited to the north of the lease, however, the projected surface suggests groundwater levels intersecting the Wash Plant Pit high on the pit wall from the south. This flies against observations of the Wash Plant Pit lake, where water levels generally remain much lower, at or around -50 mAHD, and suggests the faults shown at the southern extent of Wash Plant Pit are likely to create hydraulic separation and that water-bearing seams within the Wash Plant Pit are at much lower elevations (See.Built.Earth 2024).

Other learnings from the current groundwater surface information include:

- A likelihood of Walloon Coal Measures groundwater-surface water connections located:
    - Near the Bra dam, the Walloon Coal Measures are close to the surface and the topography is within a valley, along with the farm dams on the western extent of the lease.
    - Along the western farm dam alignments, likely linked to alluvials and backfilled zones as the dams sit at the contact.
    - Between the current TSF storage and 7186 void, where the TSF directly recharges the 7186 void. This recharge will be reduced when the TSF is removed and reshaped to the final closure landform.

- Likelihood of groundwater connection and/or interflow from backfill zones into Jeebropilly North, 7186 West and at lower elevations, Wash Plant Pit:
    - Jeebropilly North will likely receive contributions from alluvial aquifers and interflow from the extensive backfill catchment.
    - 7186 West will likely receive groundwater inflow from the Walloon Coal Measures from the south and backfill zones to the north.
    - Wash Plant Pit will receive minimal groundwater inflow when water storage elevations within the pit are very low (based on equilibrium).

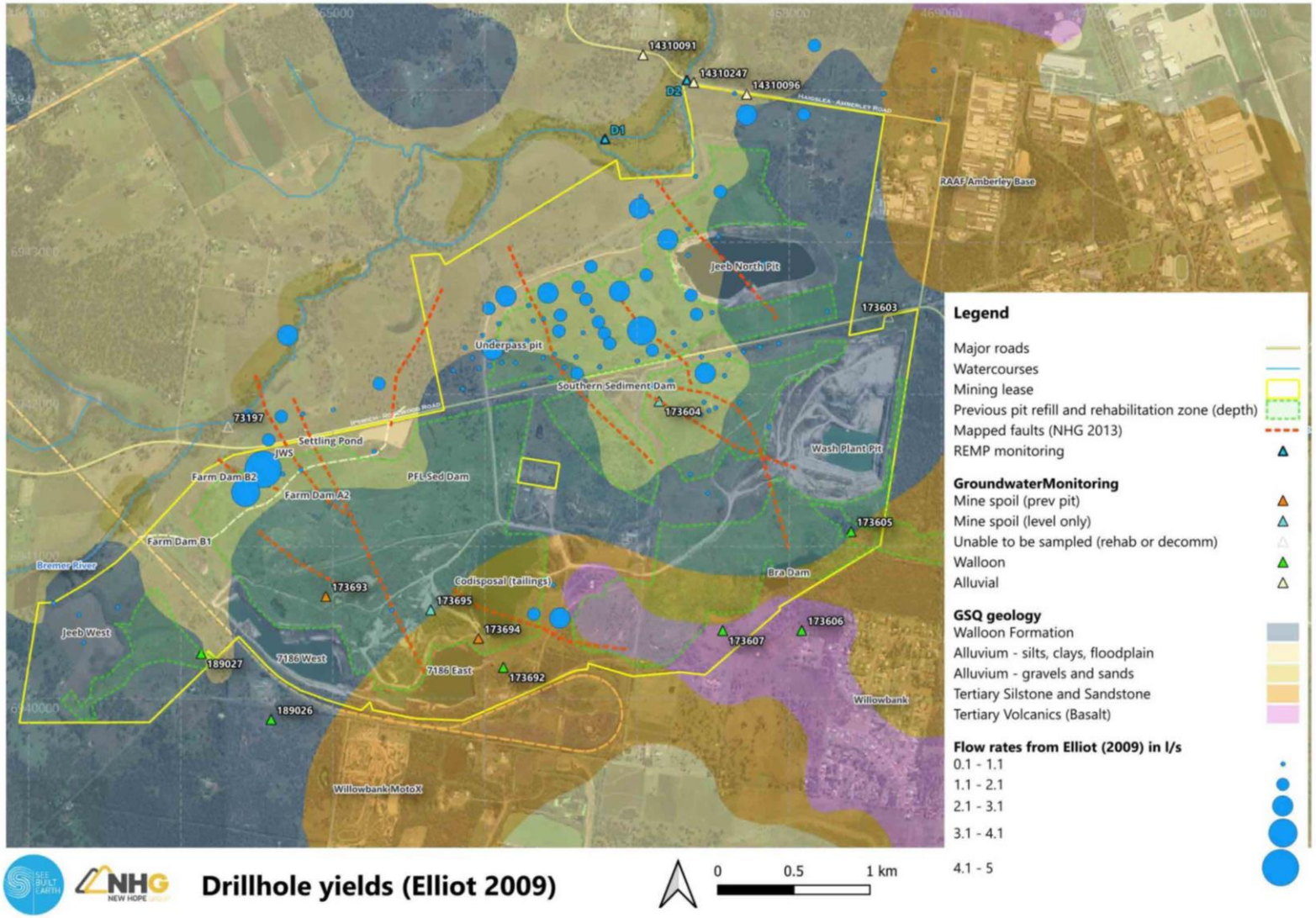

Figure 27: Measured drillhole yields (See.Built.Earth 2024)

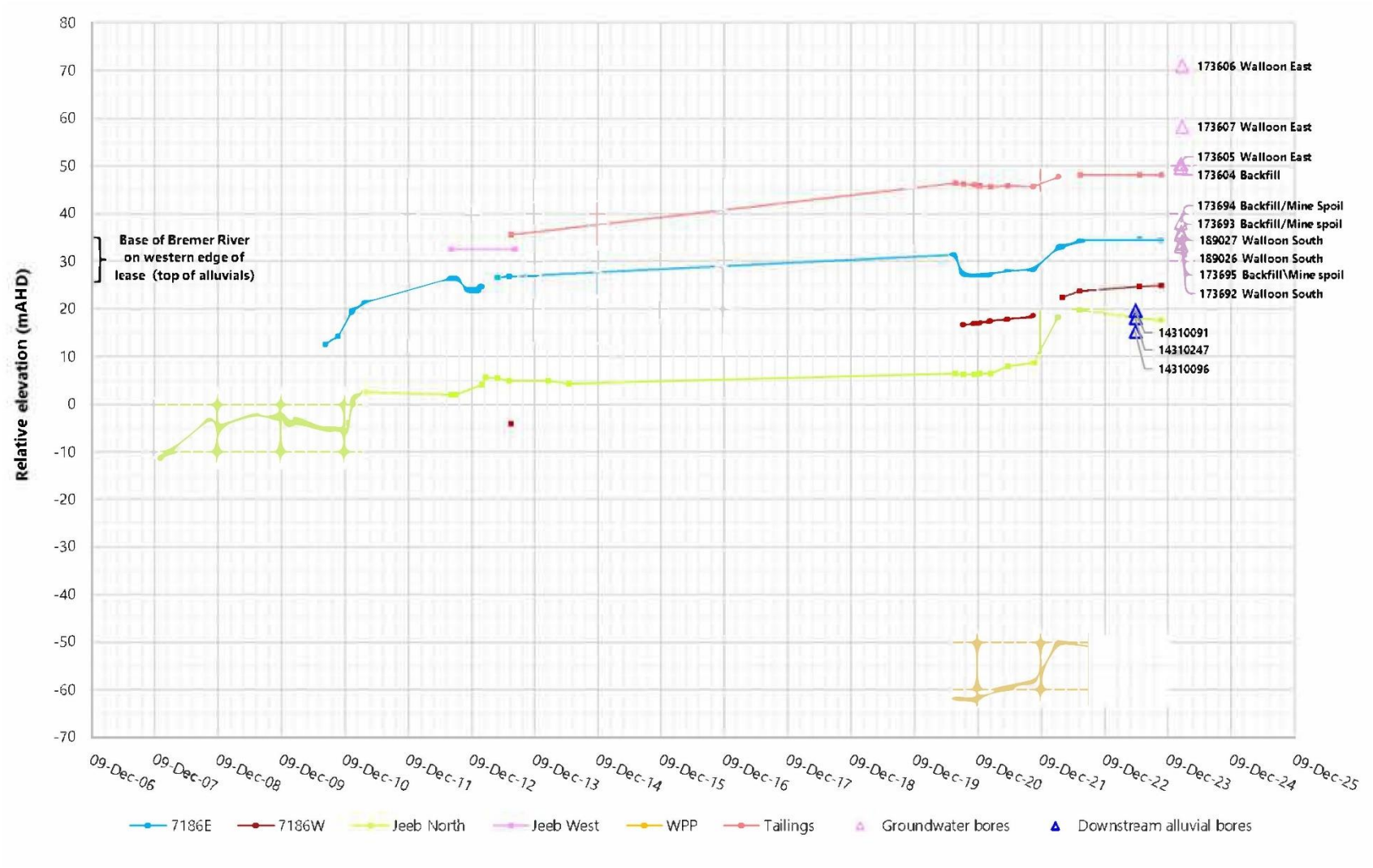

Figure 28: Groundwater, surface water and pit water levels (See.Built.Earth 2024)

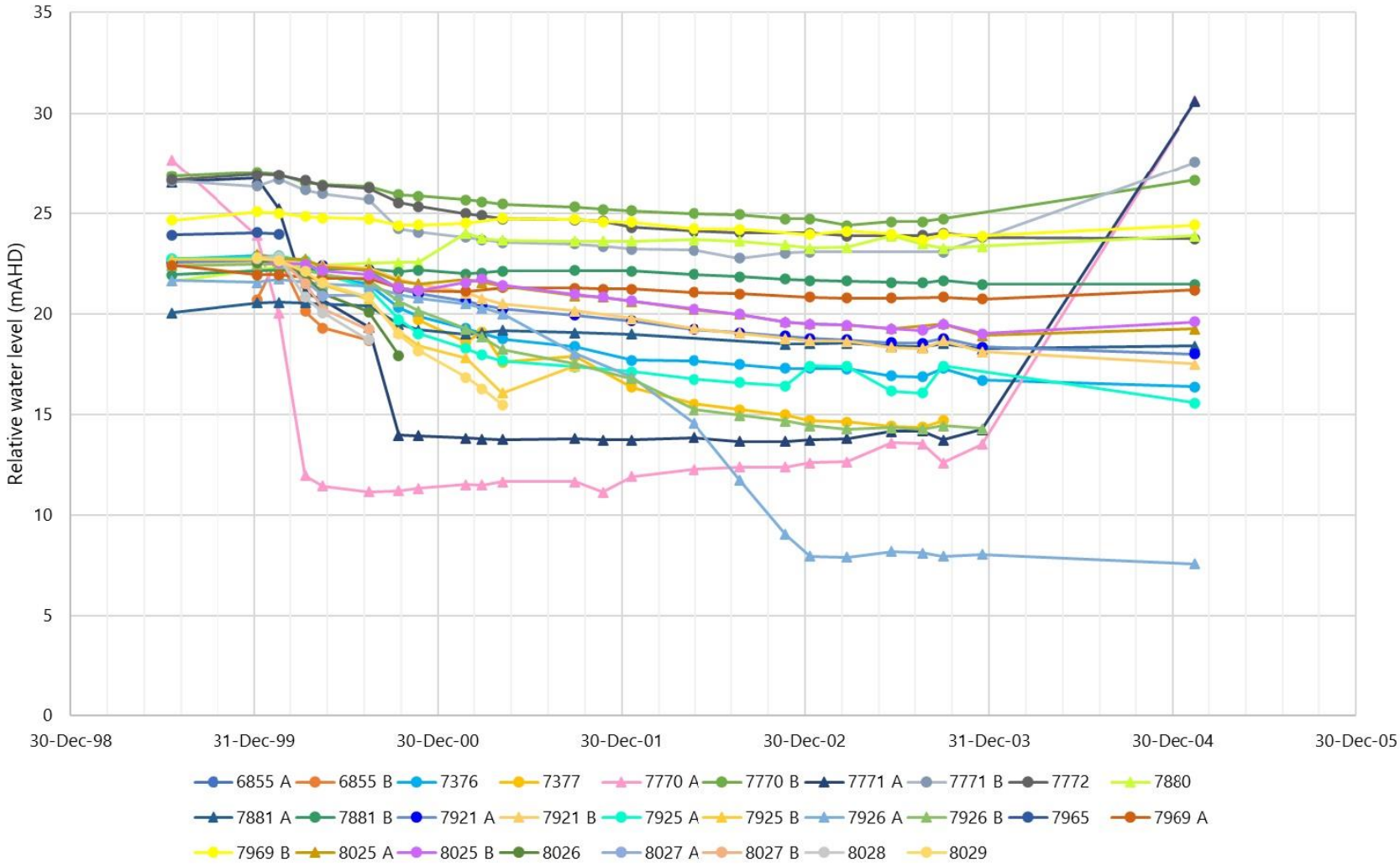

Figure 29: Historical alluvial groundwater levels (See.Built.Earth 2024)

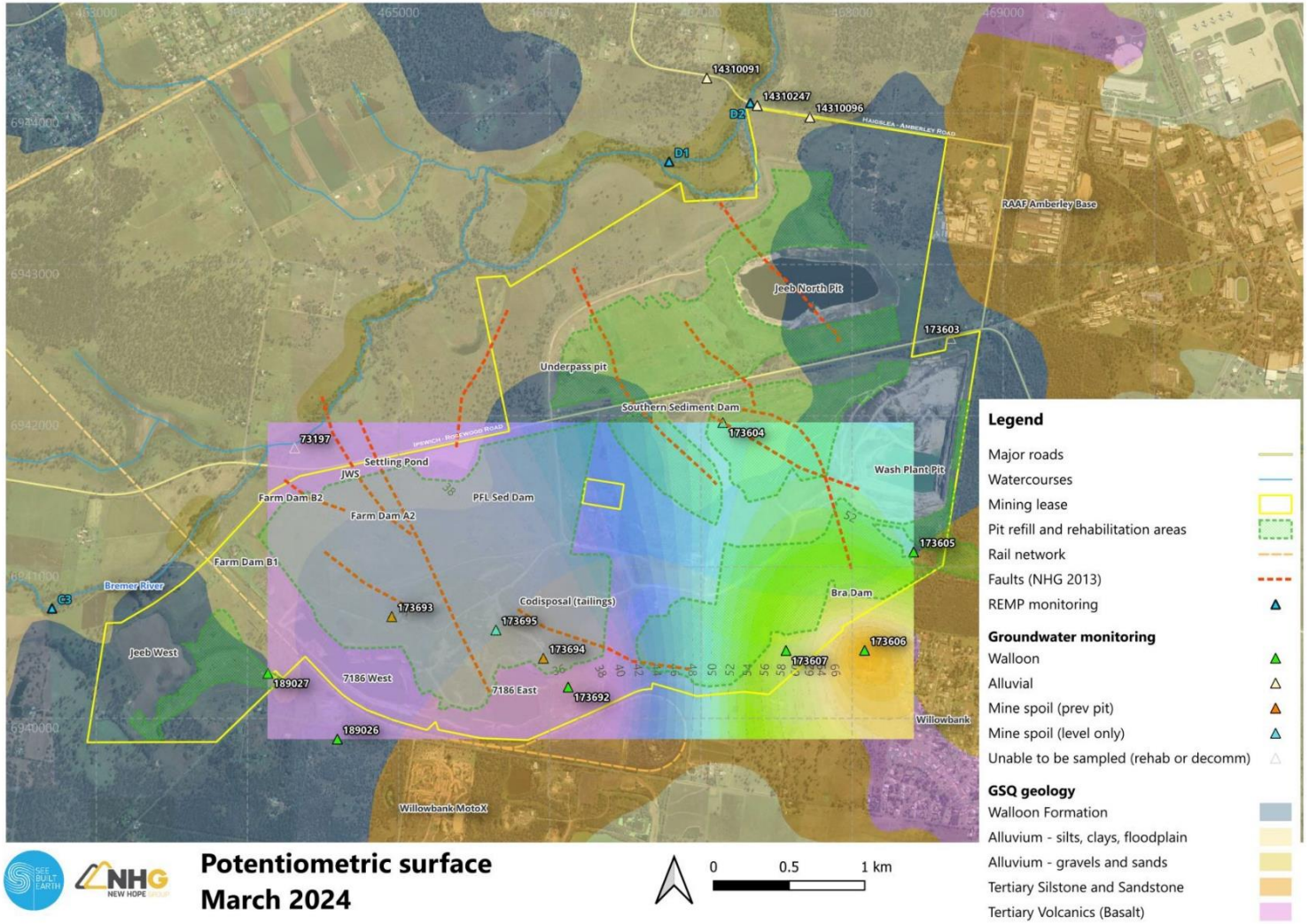

Figure 30: Groundwater potentiometric surface, March 2024 (See.Built.Earth 2024)

3.5.5.2 Flooding

Flood studies for the Project have been undertaken by BMT (2023b) to determine the regional and local flooding impacts in relation to the rehabilitation and final landform design of Jeebropilly. The regional flooding study (Figure 31) assessed long duration flooding emanating from the Bremer River catchment while the local flood study (Figure 32) assessed shorter duration flood events emanating from smaller catchments surrounding the residual voids (BMT 2023b). Flood modelling was simulated for 18%, 5%, 1%, and 0.1% Annual Exceedance Probability (AEP) flood events. The key findings are summarised as follows:

- The North Pit is not impacted by flooding from the Bremer River and is protected in all flood simulations by the flood protection bund while local flood flows discharge to the North Pit and do not impact the flood protection bund.
- The toe of the 'flood protection bund' mostly experiences velocities below 1.0 m/s with the south-west bend experiencing velocities up to 1.3 m/s (Figure 33). The north-eastern most bend (> 90° from north to east) however, experiences velocities up 2.9 m/s.
- The Wash Plant Pit and ML7186 East void are not inundated by regional flooding.
- ML7186 West void is inundated by regional flooding in all AEP events.
- Local flooding discharges across Ipswich Rosewood Road with no change in flood levels.
- Noting that the assessment conservatively assumes that all voids are at full capacity at the time of the modelled storm event, additional outflows from the ML7186 (namely 7186 West void) to the Bremer River result in increased water levels:
    - For the 0.1% AEP event, up to a 0.08 m increase occurs in the Bremer River. Ipswich Rosewood Road is also impacted up to 0.03 m. The flood extent is also expanded to the north (Figure 34).
    - For the 1% AEP event, up to a 0.04 m increase occurs in the Bremer River. Ipswich Rosewood Road is also impacted above 0.01 m. The flood extent is slightly expanded to the north.
    - For the 5% AEP event, lower than a 0.03 m increase occurs in the Bremer River with most changes between 0.01 m and 0.02 m.
    - No notable changes are observed from the 18% AEP event.
- The Water Management Plan (BMT 2022) states that the Wash Plant Pit will not overflow to Warrill Creek.

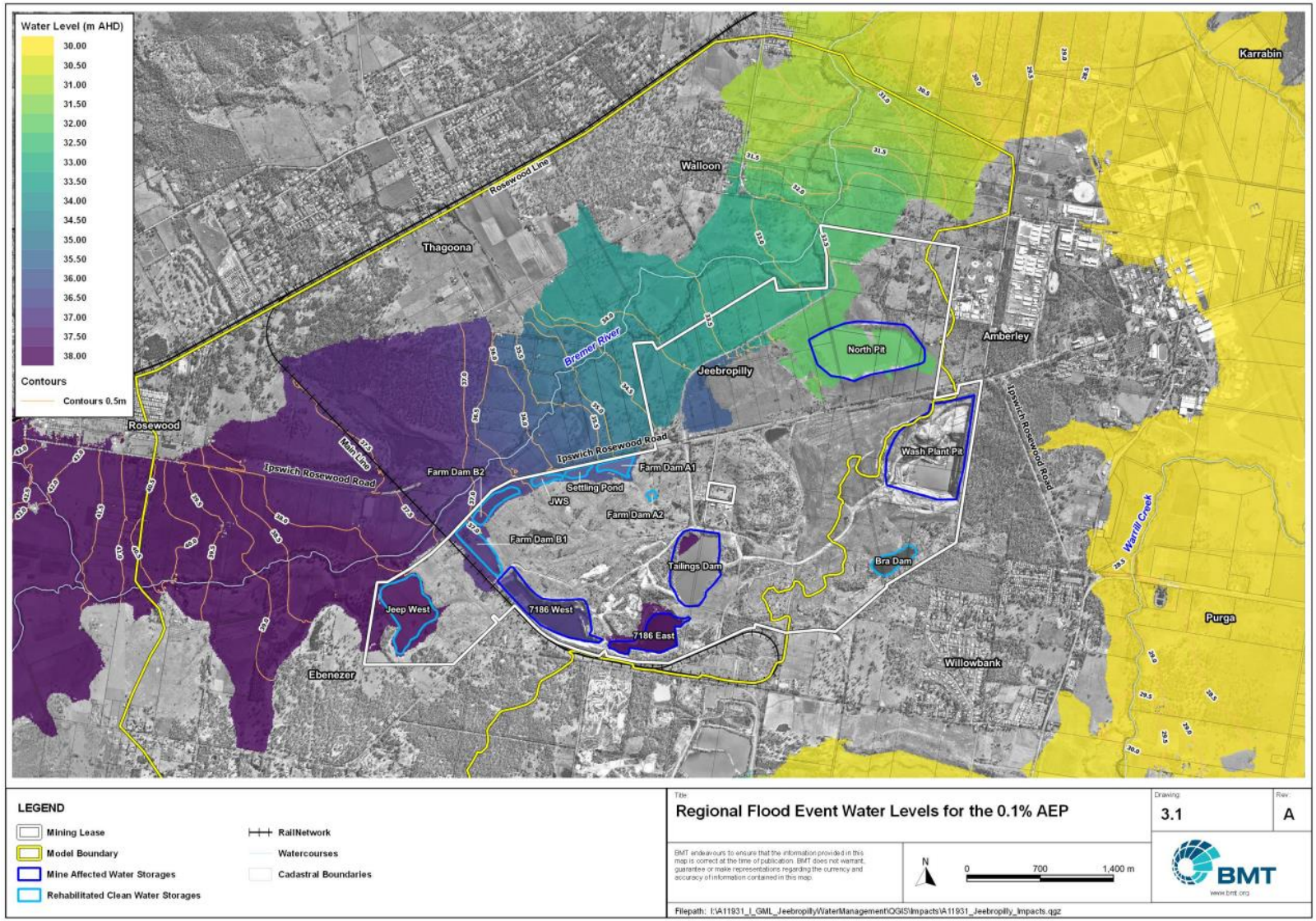

Figure 31: Regional flood modelling for the 0.1% AEP event (BMT 2023b)

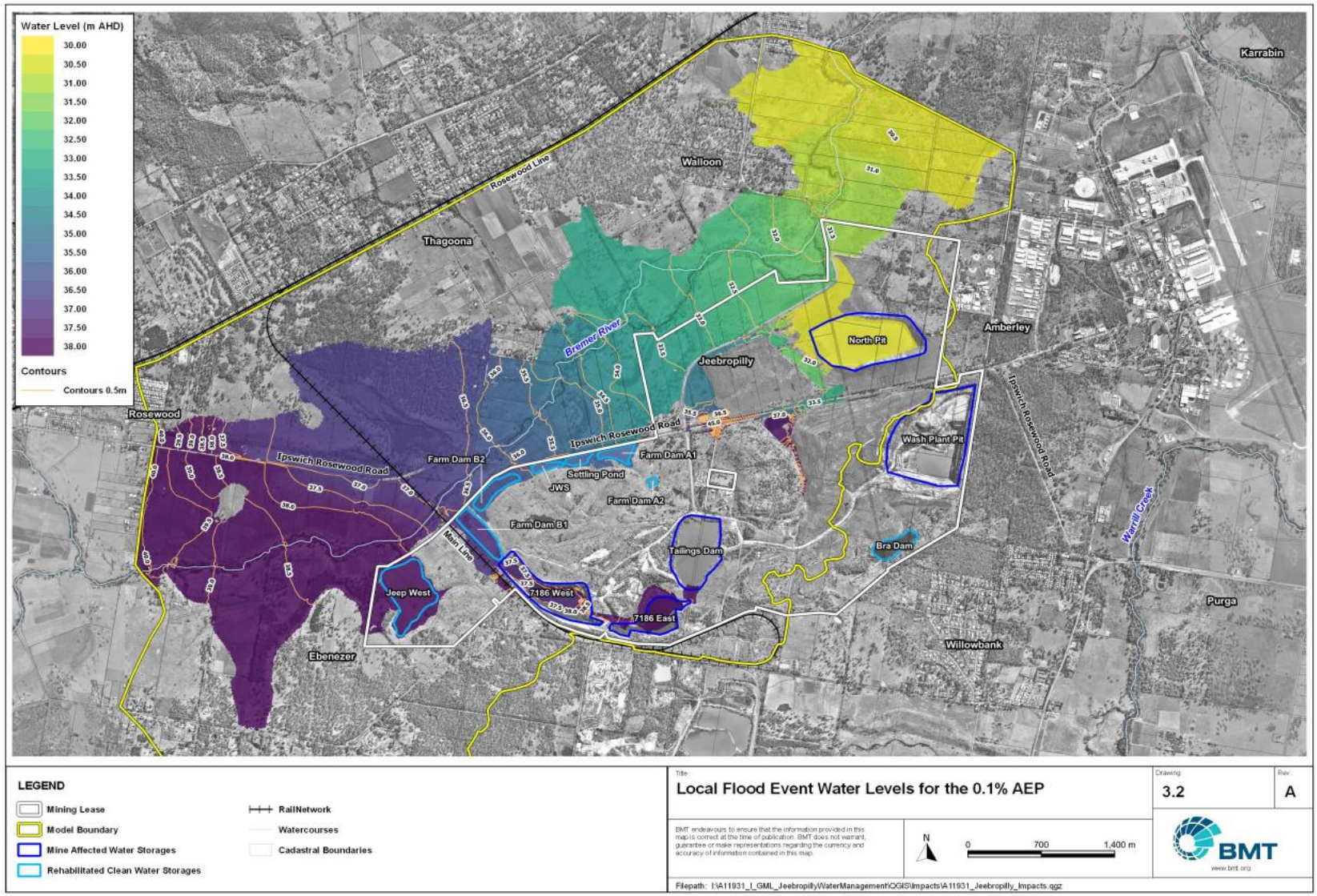

Figure 32: Local flood modelling for the 0.1% AEP event (BMT 2023b)

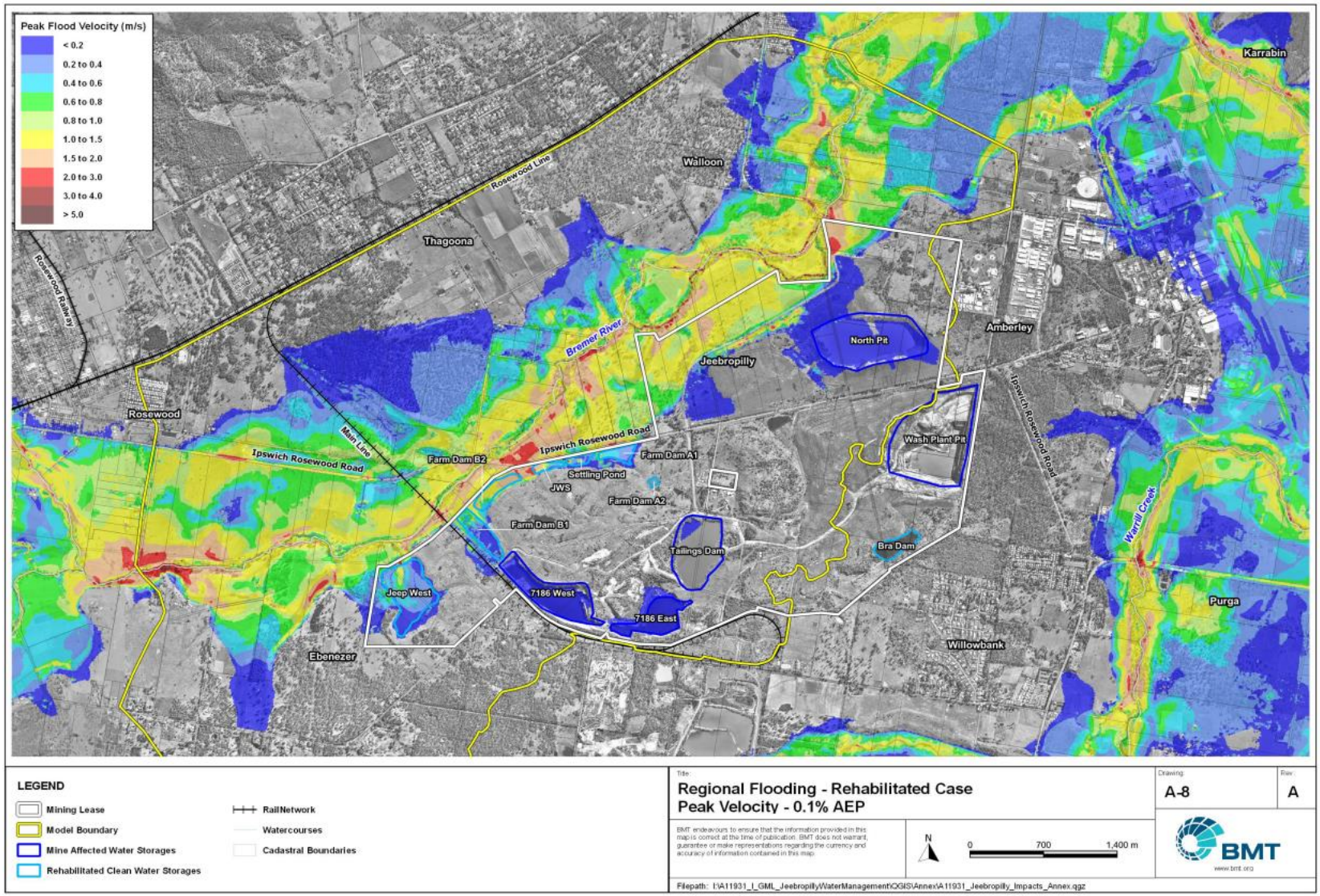

Figure 33: Regional flooding peak velocity for the 0.1% AEP event (BMT 2023b)

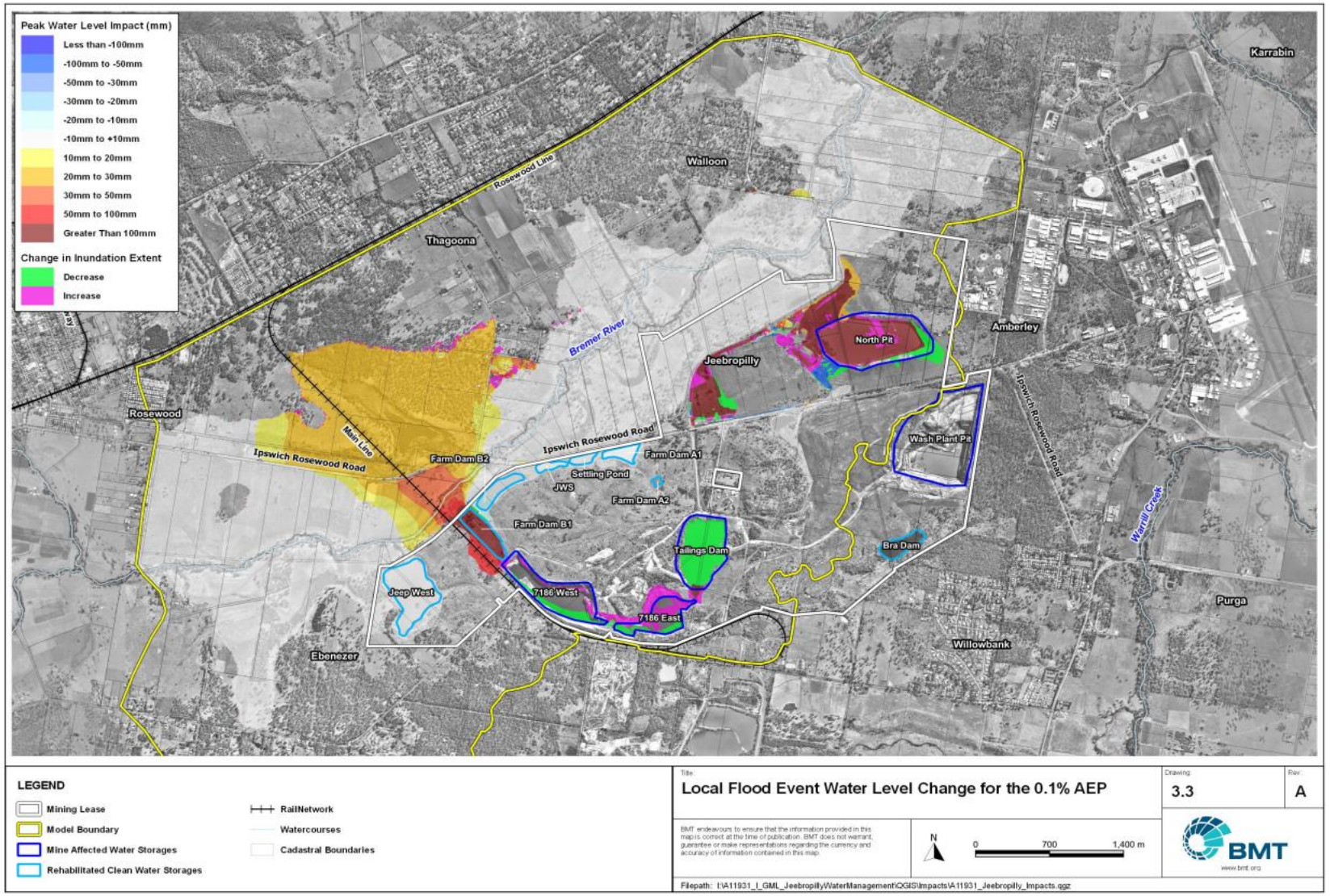

Figure 34: Local flooding water level change for the 0.1% AEP event (BMT 2023b)

3.5.5.3 Final landform design

The final landform design for the Project was based on the following key aspects:

- consideration of the existing, mostly rehabilitated, landform, and the types of RAs still requiring rehabilitation works to be undertaken;
- consideration of PMLU and NUMA requirements (e.g. slope, access, drainage etc.);
- consideration of the available materials on site and their proximity to areas requiring rehabilitation works to be undertaken (particularly relevant to bulk earthworks and capping materials);
- consideration of existing EA rehabilitation requirements; and
- Ensuring a viable drainage network is established.

Lidar data was available for the site from 2019 and, given that no operations had occurred since then, was considered to be an excellent basis for undertaking the landform design work.

A slope analysis of the existing landform was undertaken to ensure that the existing rehabilitation works were fit for the nominated PMLUs. Subsequently an iterative process was utilised whereby major earthworks were planned then assessed against the various PMLU requirements, drainage and EA materials, then iteratively modified until all criteria were considered to be met.

A further slope assessment was undertaken over the final landform design with the outcome that over 86% of the site will have slopes less than 10°. A further 8% of the site will have slopes between 10° and 15° Approximately 1.5% of the site, almost all comprised of the Wash Plant Pit highwalls, will have slope gradients in excess of 20°, but within the slope gradient criteria contained within the EA.

The existing rehabilitated area catchments will not be subject to any material change. Reshaping of the partially rehabilitated areas within ML7186 will result in improved definition of catchment areas and establishment of a principal drainage line extending from the northern extent of the tailings storage facility (TSF) to the south and then west to the ML7186 residual void area.

Buttressing of the 7186 West void highwall is intended to address geotechnical concerns given proximity to the mining lease boundary to the south. While geotechnical assessments have been undertaken in the past and indicate that the Wash Plant Pit highwall should meet long-term stability requirements, those assessments were undertaken prior to final completion of mining, and may not provide an adequate assessment of their final and current state. There is therefore considered to be a need for further geotechnical assessment of the Wash Plant Pit highwalls to properly assess stability in their final state.

Landform stability

An erosion assessment was conducted by KBR (2019) at locations south of the Ipswich Rosewood Road to determine the erosional risks of the batter slopes, namely at the Wash Plant Pit (Figure 35). The assessment used a topographic assessment, field investigation, laboratory analysis, and soil loss estimation (Revised Universal Soil Loss Equation (RUSLE)) to determine slope performance. The RUSLE equation, as outlined by the Best Practice Erosion and Sediment Control guideline (IECA 2008), requires the following five defined variables:

1) Rainfall erosivity factor (R);
2) Soil erodibility factor (K);
3) Topographic factor derived from slope length and slope gradient (LS);
4) Cover and management factor (C); and
5) Erosion control practice factor (P).

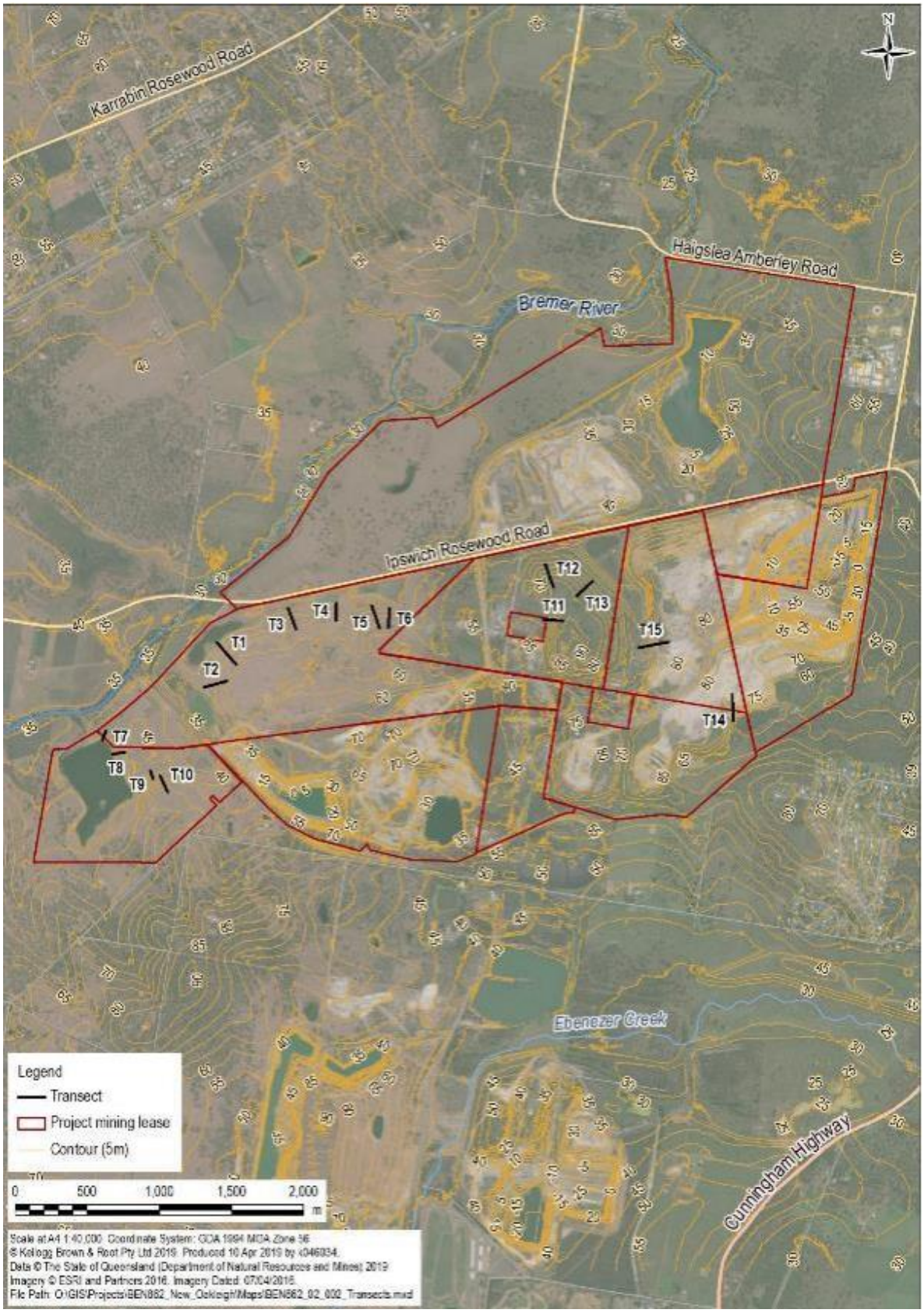

Figure 35: Erosion assessment transects

Annual soil loss rates (as tonnes per ha per year) were determined by applying the following equation:

$$Annual\ soil\ loss\ rate = R \times K \times LS \times C \times P$$

Results are provided at Table 24 and Table 25. 13 of the 15 transects assessed were located on rehabilitated areas that had been established for approximately 15 years or more; with two transects established within Wash Plant Pit. Results for Wash Plant Pit were then compared to results from the established transects and recommendations provided on the design and vegetation cover requirements appropriate to minimise soil loss and erosion.

Rilling was observed at one transect (T11) on a slope gradient of 32%. The rill found was approximately 600 mm wide and 250 mm deep, however, a high vegetation cover was observed within and surrounding the rill indicating erosional stability. Several other instances of erosion were noted at transects T1–T6 which was attributed to the sodic nature of the subsoils.

The laboratory results also indicated that a majority of sites were dispersive in nature with an Emerson Class of 2 or 3. The T12 transect returned an Emerson Class of 4 and is not considered a dispersive soil. The rehabilitated transects T1 and T6 were sodic (ESP > 6%) and the batters at Wash Plant Pit (T14 and T15) were strongly sodic (ESP > 20%). It was also determined that the rehabilitated areas (T1–T6) were generally non-saline and ranged from slightly acidic (pH 6.7) to alkaline (pH 8.9).

The rehabilitated slope profiles included a range of slope gradients (10–32%), soil types, land use (varying levels of grazing), landform age and direction. The Wash Plant Pit batter slopes ranged between gradients of 16.5% and 25%. The soil loss estimates on the rehabilitated slopes ranged between 4–50 t/ha/yr with a strong relationship between soil loss and vegetation cover. Where vegetation cover was ≤ 45%, the soil loss estimate was closer to 50 t/ha/yr compared to 13 t/ha/yr in areas where vegetation cover was ≥ 60%. This finding was irrespective of slope gradient.

The recommendations from this report determined that soil loss on batter slopes can be reduced to those similar on rehabilitated areas showing rates of soil loss of < 15 t/ha/yr (Table 24).

Table 24: Soil loss prediction for management batter slopes

Maximum slope	R factor	K factor	LS factor	C factor	P factor	Annual soil loss (A) t/ha/yr
16%	2906	0.026*	4.18 (55 m slope length)	0.06 (70% newly established grass cover)	0.8 (ripped to 300 mm)	15
18%			4.17 (45 m slope length)			15
20%			3.90 (35 m slope length)			14
25%			3.93 (25 m slope length)			14

* average K factor from transects T14 and T15

Table 25: General transect description and estimated soil loss

Transect	Average slope (%)	Average slope (V:H)	General site description	Soil description	Vegetation ground cover (%)	Annualised soil loss (A) t/ha/yr
T1	13	1:7.7	• Rehabilitated out-of-pit dumps in the central and western part of the Jeebropilly Mine site • Landform has been established for approximately 20 years • Area consists of open grazing land	Silty clay loam	30	50.2
T2	10	1:10		Clay loam sandy, sandy clay loam	50	9.8
T3	13	1:7.7		Silty clay loam	60	22.4
T4	17	1:5.9		Sandy loam, silty clay loam	45	52.5
T5	15	1:6.7		Light clay, sandy clay loam	35	49.0
T6	18	1:5.6		Sandy clay loam, silty clay loam, light clay	65	22.7
T7	14	1:7.1	• Rehabilitated out-of-pit dumps in the western part of the Jeebropilly Mine site • Landform has been established for approximately 15 years • Area consists of open grazing land	Light clay	60	11.4
T8	19	1:5.3		Sandy clay loam	50	22.0
T9	19	1:5.3		Sandy clay loam	70	10.7
T10	19	1:5.3		Sandy clay loam, light clay	65	14.5
T11	32	1:3.1	• Rehabilitated out-of-pit dump near the current site office • Landform has been established for approximately 30 years	Silty clay loam	90	21.3
T12	19	1:5.3	• Rehabilitated out-of-pit dumps near the current site office • Landform has been established for approximately 20–30 years • Area comprised of open grassland interspersed with several patches of mature woody vegetation (trees)	Light clay, clay sand	80	4.4
T13	16	1:6.3		Sandy loam, sandy clay	60	16.8
T14	18	1:5.6	• Contoured out-of-pit dump associated with the Wash Plant Pit	Sandy clay	0	-
T15	16.5	1:5.9		Sandy clay, sandy loam, loam	0	-

The following rehabilitation practices were suggested to reduce soil loss and erosivity of the landform:

- apply ameliorant (gypsum) to batters to reduce soil sodicity (where required);
- select saline tolerant species for revegetation;
- monitor vegetation establishment to determine additional management practices to achieve target 70% ground cover;
- monitor contour banks and slopes to ensure suitable performance and maintenance requirements;
- achieve 70% vegetation cover on all slopes;
- using machinery, rip the soil to a depth of 300 mm; and
- reduce slope length to:
    - 55 m for batters with average slope gradients up to 16%;
    - 45 m for batters with average slope gradients up to 18%;
    - 35 m for batters with average slope gradients up to 20%; and
    - 25 m for batters with average slope gradients up to 25%.

3.5.5.4 Water management

Key water storages are detailed in Table 26 and shown in Figure 36 along with corresponding catchment areas. The site water management balance schematic is shown in Figure 37.

Table 26: Mine-affected water storages

Water storage names and identification			Receiving storage/water	Maximum volume (ML)	Catchment area (ha)
7186 East	7186 East void	JW34	7186 West void	3,775	83
North Pit	Jeebropilly North	JW46	Internal to surrounding land	6,205	468
Wash Plant Pit		JW50	Warrill Creek	27,360	98
Tailings Dam	Co-disposal void	JW51	7186 East void	2,650	81
7186 West	7186 West void	JW53	Bremer River	4,480	53
			Total	**44,470**	**783**

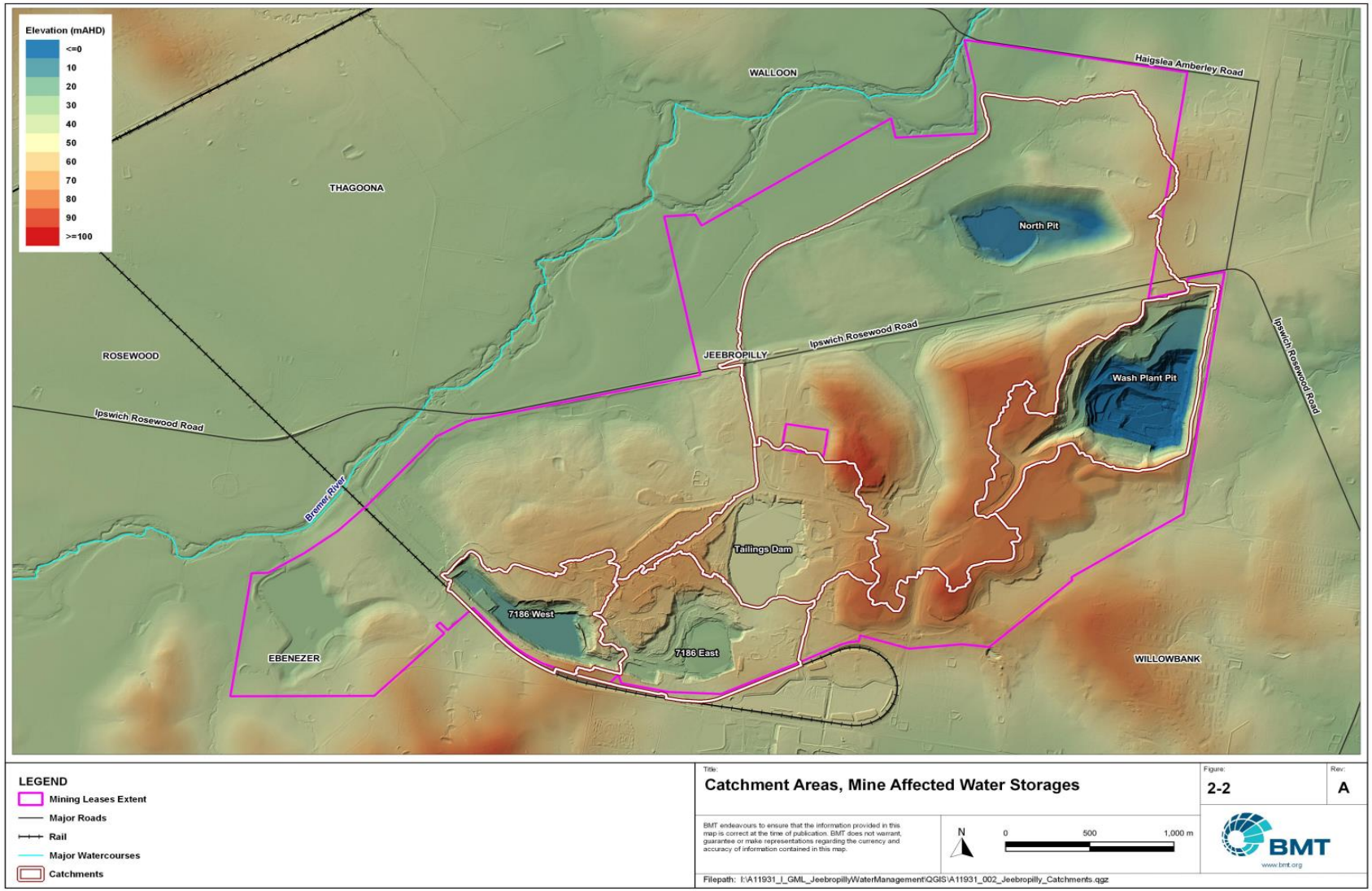

Figure 36: Water storage catchment areas (BMT 2022a)

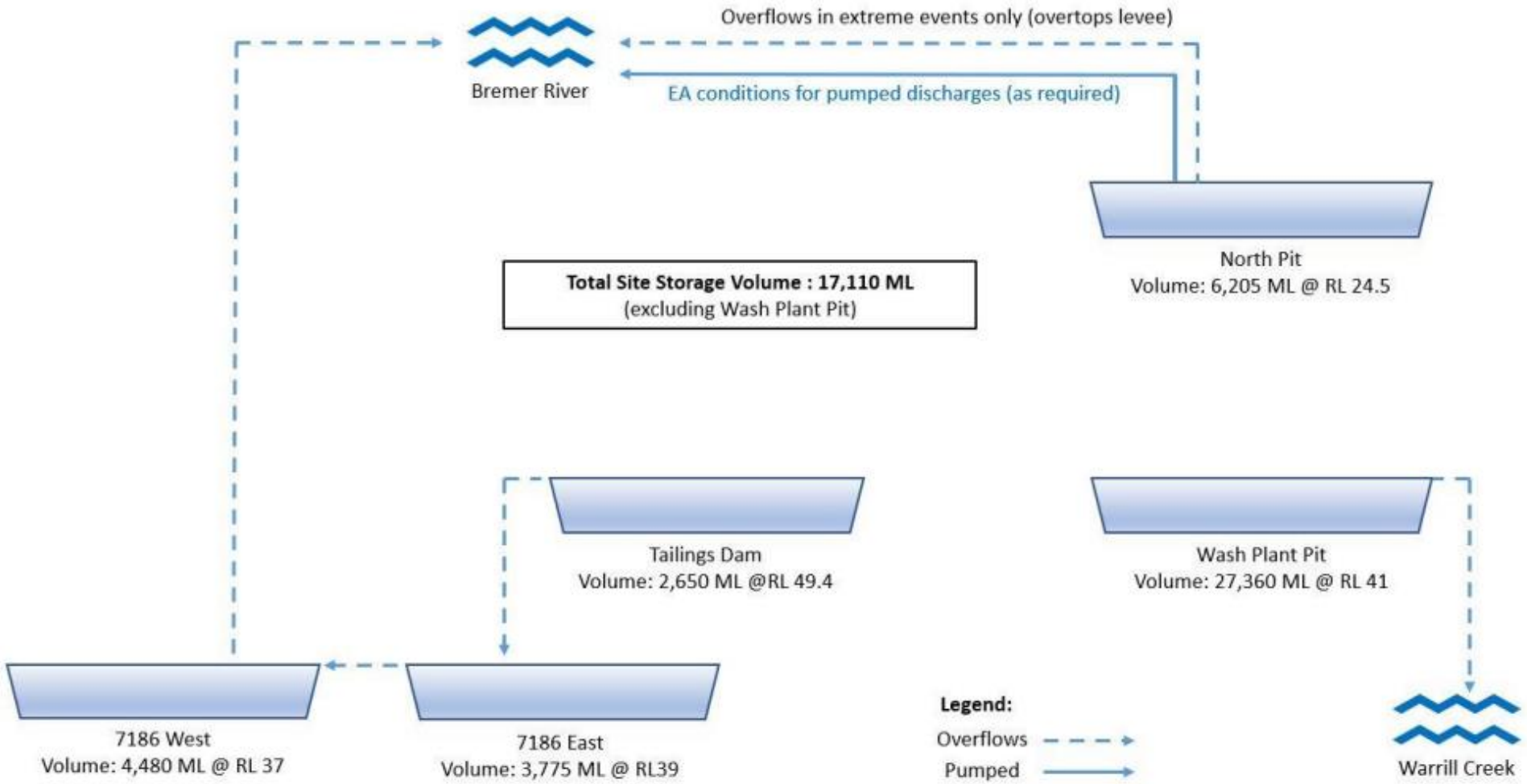

Figure 37: Site water management schematic

Water balance model

A site water balance model was provided as part of Project Water Management Plan (Epic Environmental 2023) using GoldSim software (version 14.0). This incorporated all major inflows and outflows on site including:

- inflows:
  - incident rainfall on storages;
  - catchment surface runoff and baseflows to storages; and
  - inflows from overflows between storages; and
- outflows:
  - evaporation losses from water storages;
  - evapotranspiration losses from the catchment;
  - outflows from overflows between storages; and
  - releases to the environment.

The model used a Monte Carlo assessment approach to forecast water storage conditions on site between July 2023 and July 2024 and simulated 1,000 random realisations of 123 possible climatic scenarios. The results showed a maximum total site storage of approximately 16,000 ML, equivalent to approximately 94% capacity (excluding the Wash Plant Pit). This is expected to have 1% chance of occurring. Although the site water storages are not expected to reach maximum capacity under the modelled scenarios, during very wet conditions, there is a predicted overflow (5% probability) from:

- North Pit: overflows are expected to overtop the main pit and flood surrounding land (potentially impacting Ipswich Rosewood Road);
- Tailings Dam (in its current unrehabilitated state): overflowing to 7186 East void; and
- 7186 East void: overflowing to 7186 West void.

The predictions for the North Pit indicate that there is up to a 5% probability it will reach full capacity (approximately 6,205 ML) and overflow to the surrounding catchment area. The expected overflows from the North Pit are generally less than 20 ML/day, however, during extreme wet weather events, could reach up to 200 ML/day. Based on historical weather events and current pit capacity, it is expected that overtopping would most likely occur during May.

No overflows are expected to occur from 7186 West void to the Bremer River, or from the Wash Plant Pit to Warrill Creek. It should be noted that the verification results in 7186 West void were underestimated, however, results from the modelling show that predicted maximum volume (2,860 ML) is well below the void maximum capacity of 4,480 ML.

Table 27 shows the recorded levels within each mine-affected water storage on site.

Table 27: Mine-affected water storage levels

Date	Mine-affected water storage volume (ML)					
	Jeeb North (JW46)	**Co-disposal Void (JW51)**	**7186 East Void (JW34)**	**7186 West Void (JW53)**	**Wash Plant Pit (JW50)**	**Site total (excluding Wash Plant Pit)**
27 May 2021	2,067	2,037	2,464	1,571	224	8,139
27 October 2021	2,135	2,007	2,495	1,653	278	8,291
23 March 2022	4,338	2,297	2,902	Not recorded[1]	876	Unknown
20 July 2022	4,778	2,383	3,036	2,274	1,106	12,471
23 July 2023	4,309	2,383	3,.095	2,416	695	12,898

1 Access restrictions prevent monitoring, recorded 2,106 ML on 12 April 2022 (following approximately 60 mm of additional rainfall)

3.5.5.5 Overburden waste characterisation

Waste characterisation of overburden and interburden materials at Jeebropilly was originally detailed in a report by Hollingsworth Consultants (1987). The major findings concluded that:

- most material samples were slightly to strongly alkaline;
- most samples had low salinity levels with only two showing moderate salinity;
- levels of nitrogen and phosphorous were generally low and potassium was low to marginal;
- the levels of calcium and sulphur were adequate to high and magnesium was very high;
- all samples had adequate to high levels of trace elements;
- all samples tested had a medium to high cation exchange capacity (CEC);
- with the exception of one sample, all samples were strongly sodic; and
- the calcium:magnesium ratio was less than or equal to 1.5 in all samples and less than 1 in a majority of samples, accentuating dispersive effects.

An overburden materials study was undertaken by Blain Johnson Pty Ltd in 1990 (Blain Johnson 1990), primarily to assess the suitability of overburden materials for dam embankment construction. Emerson Class number tests were performed to determine the potential dispersiveness of materials. Ten samples were analysed with seven being Class 1 or 2, one Class 4, and two Class 6. It was determined that the range of materials likely to have been used in construction and potentially rehabilitation works (i.e. clay, weathered siltstone/sandstone, gravel, sand) were moderately to highly dispersive.

Testing results indicated that overburden/interburden is unlikely to be acid producing, release significant salinity, and will not require special handling for acid rock drainage (ARD) or neutral drainage control (Ison Environmental Planners 1993; Hollingsworth Consultants 1987). Early sodicity testing indicated that overburden/ interburden materials would likely be strongly sodic and dispersive and may be subject to surface crusting and high erosion rates if placed on the surface of dumps and exposed directly to rainfall.

The objectives of disturbed land rehabilitation are to manage surface materials such that erosion is effectively mitigated through the establishment of vegetative covers or to adopt alternative controls where required. At Jeebropilly, a deficit of topsoil resources has resulted in a requirement to ameliorate overburden/interburden materials to a level sufficient to support plant germination and growth. For much of

the Project site, biosolids have been successfully utilised as an alternative topdressing medium. While contemporary rehabilitation monitoring is limited for the site, observations indicate that revegetation activities have been generally successful in establishing a strong vegetation cover that has provided a good level of erosion control. Consequently, the same rehabilitation methodology is proposed to be utilised for the remaining rehabilitation works required.

3.5.5.6 Tailings/rejects waste characterisation

The acid drainage potential for both coarse and fine reject tailings was assessed in a report titled 'Acid Drainage Potential of Jeebropilly Coal Samples' by CSIRO (1992). While only a limited number of samples were analysed, the main conclusion was that acid drainage from both fine and coarse reject tailings was unlikely and the capacity of the waste material to generate acid was low. Total sulphur content of the waste material was medium to low with the highest levels found in fines (0.6%) where the material was composed largely of organic sulphur (78%). The high pyritic sulphur (0.18%) occurred in the coarse rejects and made up 51% of the total sulphur content due to a high proportion of mudstone in the samples.

The samples analysed did show that potential acid production by oxidation of pyrite would likely be neutralised. However, it was also identified that acid generated from pyrite could potentially drain from the tailings without remaining in contact with alkaline components for a sufficient period to provide effective neutralisation. The NNP of the waste materials indicated a low likelihood of acid drainage.

3.5.5.7 Tailings storage facility cover design

With respect to reject materials from coal washing activities, the early stages of mining operations at Jeebropilly used the common method of placing coarse reject material into open cut voids and placing wet fines slurry into slimes dams or ponds for drying. Later operations combined both the coarse reject and fine tailings components into a single mix which was pumped wet into a mine void; providing a more uniform distribution of grain size and better compaction properties as the material settled. The old co-disposal areas at Jeebropilly have since been capped with at least 1 m of overburden spoil; then top soiled and revegetated.

A single remaining TSF exists and will require capping as part of final rehabilitation activities at the site.

Much of the Project site has already been backfilled and rehabilitated. A geotechnical report by Moreton Geotechnical Services (2007) detailed the backfill thickness that was used across the site and reported backfill depths which vary between 4 m and 81 m. Figure 38, Figure 39 and Figure 40 indicate the backfill depths across the site. Topsoil was placed after backfilling occurred, however, there is no indication of the depth of topsoil within historical rehabilitation reports. It has therefore been assumed that approximately 200 mm of topsoil was placed across the rehabilitated areas where resources were available. Where topsoil was not available for use in rehabilitation, biosolids were utilised as a growth media (see Section 3.1.6.8) and revegetated (see Section 3.5.5.9).

Further disturbance is to occur on the ML7186 waste rock dump to transfer materials to backfill the remaining TSF and reshape the ML7186 void. After backfilling and capping of the TSF occurs, the ML7186 waste rock dump will be reshaped, biosolids applied and revegetated. TSF design criteria are discussed further in Section 3.5.8.

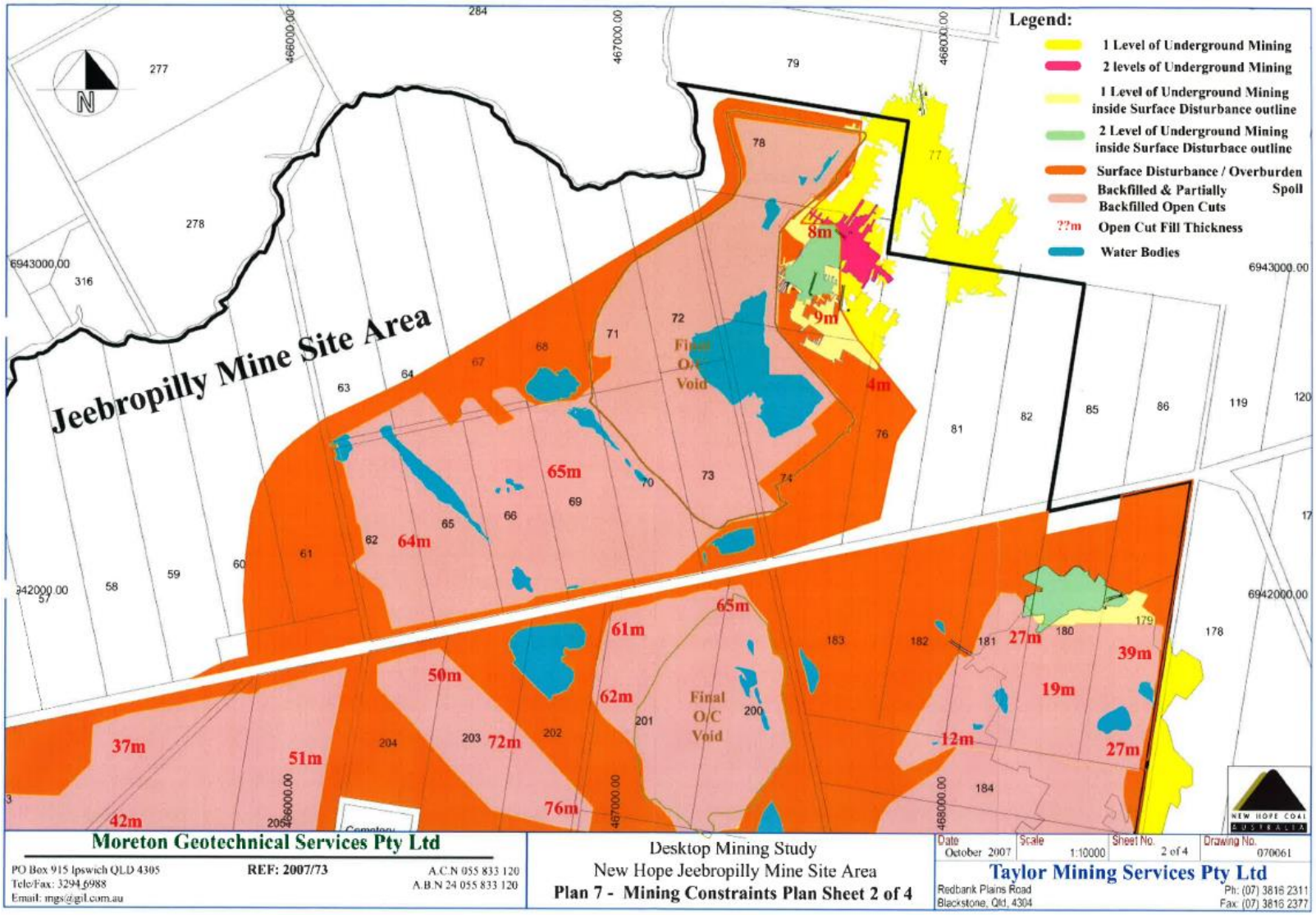

Figure 38: Jeebropilly Mine site backfill thickness (north)

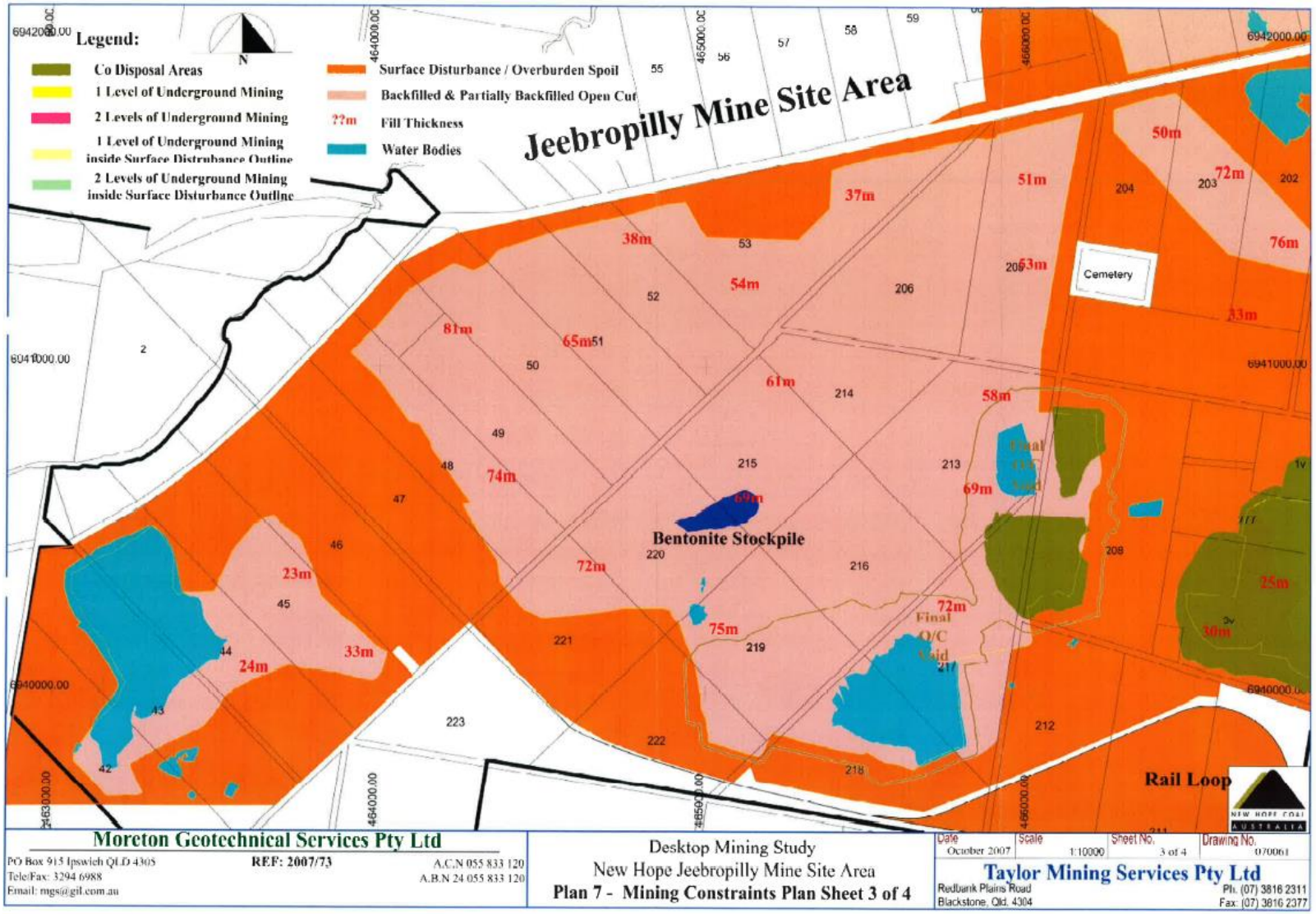

Figure 39: Jeebropilly Mine site backfill thickness (west)

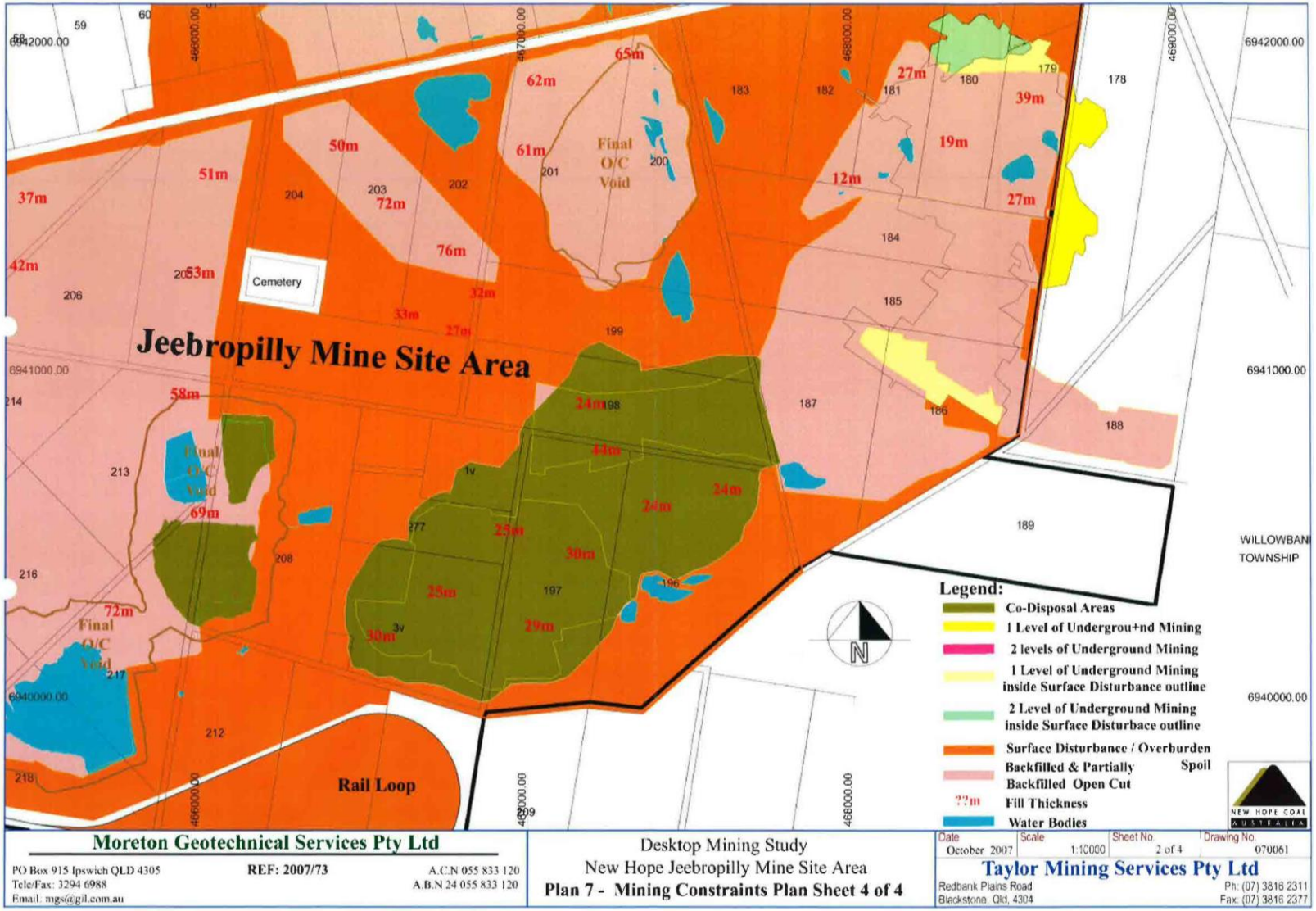

Figure 40: Jeebropilly Mine site backfill thickness (east)

3.5.5.8 Soil and capping material assessment

Materials balance

Development of the site final design for this PRCP (refer Figure 25), was based on utilising available site materials proximate to rehabilitation works areas. The most significant works are required in ML7186 for the 7186 void reshaping works, as well as for the TSF capping works. Overburden materials to be used have been identified in the remnant overburden dump located in ML7186 which exists in close proximity to both works areas. This will also allow this overburden dump to be more effectively reshaped and rehabilitated. Minor works proposed at Wash Plant Pit and Jeebropilly North Pit have been designed to balance cut and fill volumes and will not require any materials to be imported or exported apart from any required biosolids or other soil ameliorants. A summary of the material volumes required to achieve the design landform is provided in Table 28.

Table 28: Rehabilitation and materials balance

Void/ mining area	Fill quantity (m^3)	Push quantity (m^3)	Material source
Jeebropilly North Pit	There will be a balanced push/ fill in steeper areas to achieve the design slope		In situ dozer push
Wash Plant Pit	There will be a balanced push/ fill in steeper areas to achieve the design slope		In situ dozer push
7186 Void	6,060,000m^3	928,000 m^3	ML7186 waste rock emplacement and in situ dozer push
Tailings storage facility	730,000 m^3	-	ML7186 waste rock emplacement

Ameliorant requirements

The remaining stockpiled topsoil volumes at the Jeebropilly site are essentially exhausted following completion of the North Pit RAs. As an alternative, Jeebropilly Collieries Pty Ltd have utilised biosolids supplied by a third-party contractor as well as other ameliorants (e.g. gypsum), where agronomic recommendations suggest this; to effect a suitable growth medium (see also Section 3.1.6.8). The use of biosolids in mine rehabilitation at Jeebropilly has been undertaken as far back as the 1980s, and more recently to rehabilitate Wash Plant Pit, Underpass Pit and the Jeebropilly North mining areas. Biosolids have also been successfully utilised at the Chuwar and New Oakleigh rehabilitation projects which were previously part of the West Moreton operations of NHG.

During the rehabilitation process for each biosolids application area, the top 200 mm of the soil profile is sampled and analysed at representative sites to develop appropriate biosolids and ameliorant application rates. Application rates used previously at Jeebropilly are typically approximately 100 t/ha of biosolids and 5 t/ha of gypsum (to address sodicity). Once biosolids have been applied, the top 200 mmm of the surface is disc-ploughed.

Table 29 shows the approximate volumes of biosolids required to complete rehabilitation of the remaining disturbed areas at the Project site (including areas which have previously been rehabilitated and require disturbance for fill). Due to the significant population density of southeast Queensland, significant volumes of biosolids are available. Most biosolids are used in land application in agricultural areas to the west of Brisbane to improve nutrient values and yield. As such, biosolids are readily available when required. Gypsum is also readily available from local suppliers in both recycled and mined forms.

Table 29: Ameliorant application requirements

Ameliorant	Typical application rate (t/ha)	Approximate total volume required (t)
Biosolids	100	17,200
Gypsum	5	860

3.5.5.9 Revegetation

The key objective of a revegetation plan is to ensure that a self-sustaining vegetation community is established. The selected plant species aim to conform to the nominated PMLU.

Topsoil use

Topsoil management for the Project was detailed in the 1993 and 1994 EMOS (Ison Environmental Planners 1993 and 1994). Following appropriate surface preparation including recontouring, construction of erosion control structures and landform regrading, topsoil preparation included:

- placing topsoil to a depth of a minimum of 100 mm, with greater quantities in critical areas (average of 150 mm);
- areas compacted during placement were ripped to approximately 300 mm at no greater spacing than 1 m; and
- ameliorants were applied for pasture establishment (see section 3.1.6.8 and 3.5.5.5).

Seed mix and application

To maximise revegetation success, revegetation activities will be scheduled during early spring before the heavy wet season rainfall begins. This will allow for optimal growing conditions and enable establishment of vegetation prior to periods of high erosion potential during the wet season. Seeding may also occur during the summer months, depending on rainfall.

Seed stocks will be checked for viability upon purchase and sown as soon as possible. Seeding may occur by hand, tractor or aerially. Hand seeding is suitable for small areas up to 5 ha, tractor with a rear spreader attached is more suitable for larger areas, while aerial seeding may be used on long or steep slopes (e.g. highwalls).

The seed mix included at Table 30 has been based on past sowings. The list is indicative only and is subject to change based on seasonal outlook, availability, and ongoing assessments of rehabilitation performance. All species listed are suited to the southeast Queensland climate and site-specific environmental conditions.

Only one historical rehabilitation report for the Project detailed seed mix sourcing and details for plants and seeds. No current technical reports detail seed mix sourcing, however, for future revegetation at the Project site, all species will be sourced, where possible, from local suppliers in the Ipswich and surrounding regions.

Table 30: Typical pasture species list for grazing PMLU

Common name	Scientific name
Native Millet	*Panicum decompositum*
Sahara Couch	*Cynodon dactylon*
Bambatsi Panic	*Panicum coloratum var. makarikariense*
Floren Bluegrass	*Dichanthium aristatum*
Sabi	*Panicum maximum 'Sabi Panic'*
Queensland Blue Grass	*Dichanthium sericeum*
Wynn Cassia	Chamaecrista rotundifolia 'Wynn'
Callide Rhodes	*Chloris gayana*
Green Panic	*Penicum maximum*
Blue Couch	*Cynodon dactylon*
Kangaroo Grass	*Themeda triandra*
Crowngrass	*Paspalum scrobiculatum*
Siratro	*Macroptilium atropurpureum*
Tinaroo	*Tinaroo glycine*

3.5.5.10 Quality assurance / quality control

Quality assurance and quality control activities are included at various stages of the rehabilitation process. These activities typically include:

- development of rehabilitation/restoration plans for all discrete rehabilitation activities;
- ground survey control of RAs to ensure landform design criteria are achieved;
- testing of surface spoil to assess suitability and ameliorant requirements;
- monitoring of recently rehabilitated areas post-seeding to ensure germination; and
- monitoring of rehabilitation activity outcomes.

After rehabilitation is established, regular monitoring (see Section 3.7) will be undertaken at a frequency that matches the age and state of the rehabilitation, preferably late in the wet season to provide a better indication of species richness within ecosystems. Methods employed are detailed at Section 3.7.

3.5.6 Overburden dumps (RA1)

Almost all of the overburden dumps associated with the Project have undergone rehabilitation as described at Section 3.1.6.8. The GHD (2010) geotechnical report found that in-pit dumps at Jeebropilly were stable and had been constructed using:

- 15 m high dump lifts;
- 35° natural rill slopes; and
- 15 m to 30 m wide benches or face ramps.

The low overall final slope gradients coupled with flat floor dips (despite the presence of very weak tuff in the floor) have maintained stable dump slope performance.

The principle area of overburden that has not been completely rehabilitated, and that will be disturbed as part of the residual void rehabilitation works, is the waste dump area located within ML7186. As described at Section 3.5.11, this area will undergo reprofiling to both buttress the remaining southern highwall as well as reshape the northern low wall side; aiming to conform to the adjacent natural topography to the south and north. Both highwall and low wall slope gradients have been planned to a maximum of 17°. As no further topsoil is available on site for rehabilitation, biosolids or other suitable growth media will be applied to the surface prior to seeding and revegetation.

No significant works are proposed for any of the other overburden areas on site which will remain subject to monitoring and maintenance activities until certification or surrender.

3.5.7 Flood protection bund (RA2)

A flood protection bund surrounding the north boundary of the Project was installed to provide mine flood protection and prevents inflows from the Bremer River. The bund has been designed to a 1% AEP flood event. A site inspection in 1999 by the then Department of Natural Resources determined that the flood protection bund was not considered a levee bank under the provisions of the *Water Resources Act 1989.* The flood protection bund has been revegetated and is both accessible and trafficable to cattle and aligned with the grazing PMLU nominated for this area. A recent hydrological assessment (BMT 2023b) determined that the flood protection bund was preferred to be retained than removed – either partially or wholly. As discussed in section 3.5.5.2, the flood protection bund will not overtop in either the local or regional 0.1% AEP flood events (BMT 2023b).

Along the western boundary of ML4710, a second flood protection bund was used to prevent flooding overflow from on site water storages to the adjacent road. This area has been revegetated and forms part of the grazing PMLU. Given that this is currently operating in accordance with the assigned PMLU, no further rehabilitation works are proposed. The bund will be subject to rehabilitation monitoring activity.

3.5.8 Tailings and co-disposal areas (RA3, RA4)

The Jeebropilly site contains two co-disposal areas as shown in Figure 2. The disposal of coarse rejects and fine tailings has occurred across the site using two methods:

1) The initial, conventional disposal method of dumping coarse reject material in stockpiles and placing the wet fine slurry into slime dams or ponds. This method was used between 1987 and 2002 within Pit 4 (Jeebropilly open cut 1990–1995) and the southern end of Pit 1 (Jeebropilly Mt Elliot open cut); and is referred to as the co-disposal area. The co-disposal area has been capped and rehabilitated (Section 3.5.8.2).

2) Later operations at the Jeebropilly site combined both coarse rejects and fine tailings into one slurry which was pumped to the eastern side of Pit 3 (Jeebropilly open cut 1987–2000); and was referred to as the TSF, although strictly a co-disposal operation. Co-disposal provides the benefit of a forming a material having a greater strength then a tailings-only disposal facility; making capping of the facility easier at closure. The addition of flocculant to the slurry in the CHPP assisted in settlement of the fines fraction and improved consolidation of the settled matrix. The TSF remains only partially rehabilitated.

3.5.8.1 Tailings storage facility rehabilitation (RA3)

The TSF was the primary coarse and fine coal reject facility at Jeebropilly for the Project's final 20 years of operation. This area was previously a mine void which was progressively backfilled using reject materials, consolidating to a level approximately 4 m below the void crest. The TSF holds approximately 2 m of 'free' decant water. The southern end of the TSF, approximately 7 ha, was subject to rehabilitation works after late 2019.

For the proposed 3 m cap depth, approximately 730,000 m^3 of material will be required to cap and shape the TSF area. The required materials will be sourced from the spoil dump directly to the west of the TSF in ML7186. The rehabilitation process will involve dewatering (to the east ML7186 void), and then capping using low ground pressure dozers spreading material in 500 mm lifts to achieve the planned 3 m depth of cap. The area will be shaped to become a free-draining landform with runoff directed to the south into the ML7186 void. The area will have growth medium (biosolids) and seed applied to achieve a grazing PMLU.

3.5.8.2 Co-disposal rehabilitation (RA4)

Previous rehabilitation of the co-disposal area is described at 3.5.5.7. This RA will remain subject to monitoring and maintenance activities until certification or surrender.

3.5.9 Mine infrastructure (RA5)

Mining activities ceased in December 2019 and all coal products have been removed from the site. In 2020 the CHPP was demolished. The retained ROM pad, CHPP area slabs, hardstand areas and offices) and laydown areas are included within a landholder agreement for retained infrastructure (Appendix H), which also includes the following plant, equipment and facilities:

- workshop, fuel farm, store and associated facilities;
- existing administration buildings, offices and ablutions blocks;
- existing septic systems;
- existing concrete slabs/levelled pads for the CHPP;
- existing ROM pads (to be stripped of carbonaceous material);
- existing concrete slab/levelled pads for the historic coal to liquids plant;
- existing services – potable water, power, communications;
- existing water management structures, including functioning livestock watering dams associated fixed pumps and pipelines;,
- existing sealed roads, access tracks and haul roads; and
- all existing fencing and security installations.

3.5.9.1 Functioning livestock watering dams

The retained infrastructure RA includes a number of functioning livestock watering dams which at closure will comprise the following (refer Figure 41):

- Farm Dam A1;
- Farm Dam A2;
- Settling Pond;
- JWS;
- Farm Dam B1;
- Farm Dam B2;
- Southern Sediment Dam;
- Stock Dams 1 to 4;
- Bra Dam.

Farm Dam B1 is not generally considered as having been disturbed by mining activities as this low lying area appears to exist in its pre-mining state, hence its exclusion from the majority of figures and the landholder agreement. While there is some evidence of resource activity in this area it appears to be minor and surficial.

3.5.10 Water storages (RA6)

As described at Section 3.3.3, two pre-approved NUMAs comprising residual void areas, have been rehabilitated to form water storages suitable for, and already functioning as, livestock watering dams. These storages Figure 41 and comprise the Jeebropilly West void water storage and the Jeebropilly North void water storage. The suitability of the rehabilitated Jeebropilly West and Jeebropilly North voids as livestock watering points demonstrates an approach to minimise the extent of NUMAs associated with the Project and therefore a specific PMLU type has been nominated. From a rehabilitation perspective, some additional reshaping of the highwalls of Jeebropilly North are required to meet low intensity cattle grazing PMLU requirements.

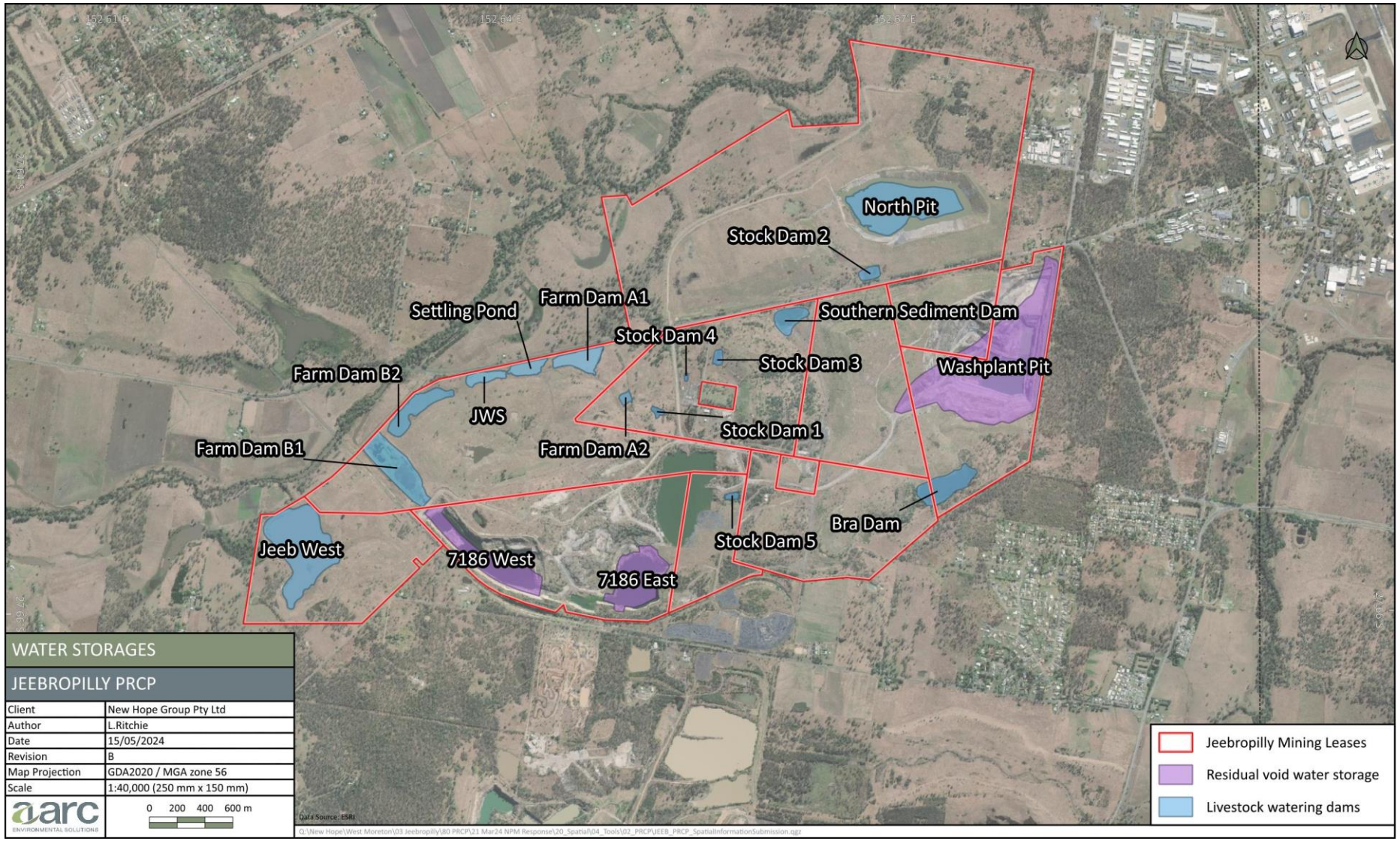

Figure 41: Project livestock watering dams and livestock water storages (Jeebropilly West and North)

3.5.11 Residual voids (IA1)

3.5.11.1 Pit slope design criteria

Residual void design criteria are detailed in the Project EA at condition C20, which requires the residual void design to comply with *Table 2.2 – Residual Void Design* (reproduced here as Table 31). It should be noted that Jeebropilly North, while previously proposed as a residual void, is now proposed to have all remaining highwalls reprofiled to a slope gradient of less than 14°; suitable for grazing purposes, and will retain water of a suitable quality for stock watering. Jeebropilly North is therefore no longer considered as a void within the context of previous EA drafting.

Similarly, Geiger's Lagoon at Jeebropilly West (ML50133) comprises a remnant pit (Pit 5) that has been rehabilitated and now comprises an actively grazed landform and water storage area (refer Section 3.1.4.4).

In summary, the remaining defined residual voids are the Wash Plant Pit and the ML7186 voids.

Table 31: Residual void design (EA Table 2.2)

Void Identification	Void High Wall – maximum slope competent rock slope (°)	Void Low Wall – maximum slope incompetent rock slope (°)	Maximum Void Surface Area (ha)
ML7186	47–65	17–21	28
Jeebropilly North			20

An assessment of 2019 Lidar data suggests that maximum overall highwall slope gradients range to approximately 49° at Wash Plant Pit (with total highwall heights greater than 100 m) to approximately 56° at the ML7186 void (total wall heights of approximately 30 m to the water level at time of Lidar survey); generally in compliance with EA requirements.

A 'Review Report on Geotechnical Design Criteria - West Moreton Operations' (GHD 2010) determined factors of safety (FoS) for the pit slopes (Table 32) using a stability analysis of the surrounding strata. It was recommended that pit slopes with an estimated final height of 100 m (applicable to Wash Plant Pit) maintain an FoS of 1.30 which provides allowances for limited geotechnical data as well as the range of findings from previous disparate technical studies.

Relevant to Wash Plant Pit, GHD (2010) recommended that residual void highwall slope gradients should be limited to 65° with 23 m of aggregate bench width over at least two benches. Summarised average (overall or toe to crest) slope angles for various FoS are listed in Table 32; noting that the overall angle can be achieved through varying combinations of benches, bench widths, and batter slope angles.

Table 32: Average pit slope angle and factor of safety - Jeebropilly

Slope height	FoS = 1.20	FoS = 1.30	FoS = 1.40
70 m	70°	67°	63°
85 m	60°	57°	53°
100 m	52.5°	50°	47°
Slope function>	Temporary	Final pit wall	Lease boundary

GHD also recommended a higher target FoS to maintain stability and safety close to areas with public access (i.e. lease boundaries); applicable to the highwalls of both Wash Plant Pit and the ML7186 voids.

The GHD (2010) geotechnical report found that, for Wash Plant Pit, current margins of safety are:

- 1.95 FoS for the near surface Tertiary slope excavated to 45°; and
- 1.36 FoS for 70° pit slopes on coal bearing strata.

Thes results were noted as consistent with the good observed stability of the highwall experienced to date. The report also determined that there was no significant risk of toppling or wedge failure for current and planned orientations in Wash Plant Pit; and that the top 16 m of weathered material has acceptable stability conditions at 35°.

Based on these findings, no further works are proposed associated with the highwall at Wash Plant Pit.

While complying with EA design criteria, the ML7186 void is proposed to be reprofiled, by first dewatering and then buttressing the southern high wall with materials from the adjacent dump to the north in ML7186. Once all required material has been extracted, the 7186 void low walls will be reshaped; also to a final angle of approximately 17°.

Further geotechnical assessments will be used to confirm the final FOSs of the residual voids.

3.5.11.2 Void hydrology

See.Built.Earth (2024) has been engaged to undertake a pit void water balance model for the Project's principal retained voids in order to address PRCP Guideline requirements. The methodology used is based on the principles of a mass water balance and the Rational equation for rainfall-runoff derivation as per industry standard practice (Queensland Government 2022, Konikow 2020, Fetter 1994, Domenico, P.A. and F.W. Schwartz, 1990, Freeze and Cherry 1979).

The water balance model structure builds from a conceptual hydrogeological model of the Project site (including technical system information and observed behaviour for interpretation), as well as available data. The model utilises known pit geometry as a storage curve, with volumes and elevations to model the lake within the pit. Variables include the key driving forces of rainfall, the catchments reporting and their nature, evaporation (from a variable evaporation surface), groundwater inflows or losses, flooding or other applied rules appropriate to the void system. The approach adapts long-term rainfall records to capture a wide range of rainfall trends and events possible for the site. Factors or conditions rules are applied consistently across the life of the model to ensure validity and consistency over time.

The analytical model enables transparency, flexibility and interoperability to enable alignment to conceptual models and ensure robust calibration across simple to moderately complex systems. Current and changed paradigms are tested through different scenarios or future climate change states based as Long Paddock (Queensland Government 2024) forecasts out to 2090, including lower probability scenarios for extreme dry or wet conditions. The approach is objective and seeks to ask questions as to system response and can be tailored to incorporate any type of pit and a wide range of conceptual model settings across all parts of the water cycle. The approach is a useful fit for modelling pit void systems. The final version (post-calibration) of the water balance is not intended to directly simulate actual levels (in contrast to projection modelling) but to test the response of the system to the range of potential future conditions.

For Jeebropilly, each pit (Jeebropilly North, Washplant Pit, 7186 East and 7186 West) is modelled separately given the differences in variables, geometry, and the conceptual model of each pit. Each pit model has been constructed in accordance with relevant specific settings and has undergone a separate and reasoned calibration process to mimic recorded pit responses to water levels over time. Jeebropilly West has not been included in this modelling exercise given the period of time that this void has been rehabilitated (approximately 20 years) and operating as a functioning livestock watering dam.

Pit geometries and storage curves

Pit geometry was developed using the final pit void surveys supplied by New Hope Group. To create the void model, pit shapes were sliced at 1 m RL intervals using the 3D software Vulcan to derive the surface area at each elevation, and the void space was estimated by applying a 1 m unit to the surface area. The volume of each slice was calculated as the midpoint volume between the slice above and below to allow for pit slope and berms. Images of each pit shell, and pit storage to volume curves are provided in the 'Water assessment and performance report' (See.Built.Earth 2024). A summary of pit volumes, depths and full supply level is provided in Table 33.

Table 33: Summary of void geometry

Pit void	Capacity before spill (ML)	Water level range (mAHD, base to crest)	Pit depth (m)	Full supply level (mAHD)
Jeebropilly North	6,392 to FSL 8,721 to flood bund	-38 to +30	0 to 62 (pit crest) 0 to 68 (flood bund crest)	22.5
Washplant Pit (WPP)	27,269	-65 to 41	0 to 106 (pit crest)	41
7186 East	3,989	-24 to 40	0 to 64 (pit crest)	39
7186 West	4,470	-5 to 40	0 to 45 (pit crest)	37

Given that all void final depths go below sea level (i.e. a negative reduced level (mAHD)), for the purposes of the model, pit RL was transformed and related instead to pit depth. The respective volumes for each void model, including the relationship between pit RL and pit depth, along with void-specific model considerations/assumptions, are available in the 'Water assessment and performance report' (See.Built.Earth 2024). For quality assurance purposes, calculated volumes were cross-checked to those derived for seasonal water management planning (Epic 2024).

Model structure construction

The void mass balance applies a daily time step application of mass flow change, creating a rolling change in storage or flows over the period of the water balance as:

- Initial starting volume + mass inflows/gains – mass outflows/losses = change in storage (including overflow if storage capacity is reached or dry to zero if reached).

Key model parameters:

- Voids are defined using a volume and surface area table, where elevation, mine RL, pit depth, volume, and pond surface area (water surface) are relationship are established.
- The model was run for the period from 1 July 1942 through to 1 January 2024 with:
  - rainfall data sourced from Amberley AM (BOM station 040004) for the period from 1 July 1942 to 1 January 2024 (80 year record); and
  - evaporation data sourced from the University of Queensland Gatton site based on monthly averages per day (unless rainfall on a day reduces evaporation).
- Water inputs as sources of inflow or gains to the balance are added as follows:
  - rainfall is applied over the course of the model by date, starting with initial basic losses and runoff factors, adjusted to be reasonable for catchment, landscape/infrastructure, soils and vegetation;
  - initial values may be applied to the conceptual model for other potential inflows, such as groundwater gain; and

    - given the tendency of the Project area for large, multiday events, an additional factor for rainfall or runoff events of a certain magnitude was applied, where relevant, to reflect increasing runoff rates or loss reduction.
- Water outputs as sources of outflow or loss to the balance are added as follows:
    - Evaporation is applied by average BOM monthly rates at a daily rate, applied to the daily surface area of the pit lake (calculated from the storage curve). Evaporation is factored by whether the day is wet or not, and then also factored based on average daily pan evaporation for each month. With ongoing solar radiation and shallow depths, it is expected pit lakes may a slightly higher evaporation rate the potential to maintain thermal mass compared to pan arrangements, and prolonged sun and win exposure.
- The model runs each day and calculates volume change per day and the correlating impact to storage and pit lake level for the next day, and so on, for each iteration. The model checks on total volume per day to identify if spill occurs, or the model empties, and to limit model values accordingly.
- The starting level of the model is usually selected to be within common ranges of pit water levels experienced to date.

Initial settings are usually conservative, and updated and adjusted to achieve acceptable calibration in later stages. Generally, calibrated settings are used for all scenarios, unless there is a major change to the conceptual model planned for closure (e.g. the TSF and 7186 East voids), where the closest fit to calibrated values is also able to represent the proposed change.

Model scenarios

The voids modelled are proposed to remain as landforms at closure, requiring an assessment of fate under changing climate circumstances to review for potential impacts and implications.

Scenarios and changes for future conditions and climatic changes are sourced from the Queensland Government Future Climate (2024) for the Ipswich Local Government Area, using Representative Concentration Pathway (RCP) 4.5 (given the rising commitments to reduced carbon where emissions stabilise around 2060). The projections forecast a probability based range of changes to evaporation and rainfall rates at key time snapshots of 2030, 2050, 2070 and 2090.

Scenarios selected and modelled in the Jeebropilly pit void water balance assessment include:

- Base case: an extrapolation of similar conditions experienced to date.
- 50th percentile (mean): changes for rain and evaporation in 2030, 2050, 2070, 2090.
- As a measure of potential extremes bounds: 90^{th} / 10^{th} percentile scenarios in 2090, including:
    - wetter/lower evaporation; and
    - Drier/higher evaporation.

In how these changes are applied into the model:

- Evaporation: updated tables by month were developed applying the average daily change.
- Rainfall: change to annual rainfall depth is allocated to rainfall days as recorded over the record, as a ratio of the total weight of rainfall for the year (i.e. weighted increase to recorded rainfall events relative to their significance to simulated events).

The expected variations to rainfall and evaporation from climate change for the Project site are summarised in (See.Built.Earth 2024).

In terms of magnitude changes to the system; in average scenarios, it is anticipated that evaporation will increase in the order of 20% in a given year and rainfall will reduce by 5-10%. Bounding scenarios in the wet

or dry extreme scenarios indicate evaporation may increase by up to 35-50%, and rainfall either increase or decrease by 25%.

Calibration

The key control in construction of a model reflective of pit lake systems is to set ranges of parameters based on the framework and known dynamics of the system: physical space and geometry, reasonable factor ranges representative of the setting, and honouring of system conceptual models and observations, such as likely groundwater contribution, nature of catchments, and ensuring the model simulates as a reasonable proxy to level and behaviour observations. To ensure integrity, factors and calibration settings are applied consistently across the length of the model: there is no unique adjustment of parameters over time, and the model must be able to mimic observed level responses over time to reach calibration.

A successful calibration for each Jeebropilly pit lake was achieved; calibration charts are provided in See.Built.Earth (2024).

The process of calibration also brings learnings about the system and quantification of different water balance components. For the Project site, the calibration process helped identify:

- Jeebropilly North:
  - an interchangeable baseflow between Jeebropilly North and the alluvial aquifers of approximately 2.5 L/s dependent on pit water level to surrounding groundwater level (45 m depth); and
  - a likely condition of saturation in large multi-day rainfall events where losses become minimal and rates of water reporting to the pit increase substantially.
- Washplant Pit:
  - a likely minor groundwater inflow to Washplant Pit of 2 L/s when pit lake depths fall below 15 m.
- 7186 East:
  - baseflow of 4 L/s in the current state when pit lake levels fall below 45 m from the TSF pond and related catchment; then simulated to fall to 2 L/s at closure when the current TSF catchments are changed.
- 7186 West:
  - baseflow of 7 L/s when pit lake levels are below 40 m depth, which may reduce to 5 L/s with reduced inflow into 7186 East in post-closure states.

Final models parameters applied to all scenarios are detailed in See.Built.Earth (2024).

Model outcomes

Model outcomes for each of the pit voids are summarised in Table 34 and Figure 42, Figure 43, Figure 44 and Figure 45.

Table 34: Summary of void model outcomes (See.Built.Earth 2024)

Pit void	Scenario outcomes	Containment outlook	Risk positions and options to increase certainty
Jeebropilly North Figure 42	Water levels generally persist throughout all scenarios largely as a factor of groundwater environment and large backfill catchment.	Base case and 2050 near the pit crest in very wet sequential seasons. Potential for 2090 extreme wet scenarios to near or exceed pit crest, however, any void water will be contained by the flood bund.	Low risk of environment harm given pit void remains contained and water quality improves with rainfall.
Washplant Pit Figure 43	Water level remains low in all scenarios, ranging between the current 15 m depth up to 20 m depth. Potential for pit to dry at times in 2090 extreme dry scenarios.	All scenarios achieve containment. Negligible risk of overflow or contamination given surrounding Walloon Coal Measures geology and likely bounding fault.	Negligible risk of releases and environment harm as pit lake remains at low levels in all scenarios, catchment is limited and appears hydraulically separate. Confirmation of groundwater levels and quality around pit would be useful in the longer term to test or confirm conceptual model.
7186 East Figure 44	Water levels persist in all scenarios, ranging between 45–60 m depth. Pit is heavily impacted in the 2090 extreme dry scenario with reduced levels however, does not dry out.	All scenarios achieve containment. 2090 extreme wet scenario nears the pit crest in very wet sequential seasons, however, any overflow likely able to be contained by 7186 West.	Moderate risk in closure able to be addressed in time as model heavily reliant on settings of catchment and groundwater from TSF catchment in post-closure environment. If overflow does occur, will be contained by 7186W. Increased certainty may be gained through: • installation of pit water level loggers to test runoff and groundwater behaviour; and • trial of changes (such as rehabilitation of the TSF and catchment) with review of conceptual model.
7186 West Figure 45	Levels are far less responsive to rainfall than 7186 East given smaller catchment area Water levels persist in all scenarios, ranging between 30–40 m depth 2090 extreme dry scenario shows pit lake is maintained at lower levels as a groundwater sink	All scenarios achieve containment	Low to moderate risk in closure given co-reliance on TSF catchment and 7186 East leakage and assumptions of changes to 7186 West. Increased certainty may be gained through: • installation of pit water level loggers to test runoff and groundwater behaviour; and • trial of changes (such as rehabilitation of the TSF and catchment) with review of conceptual model.

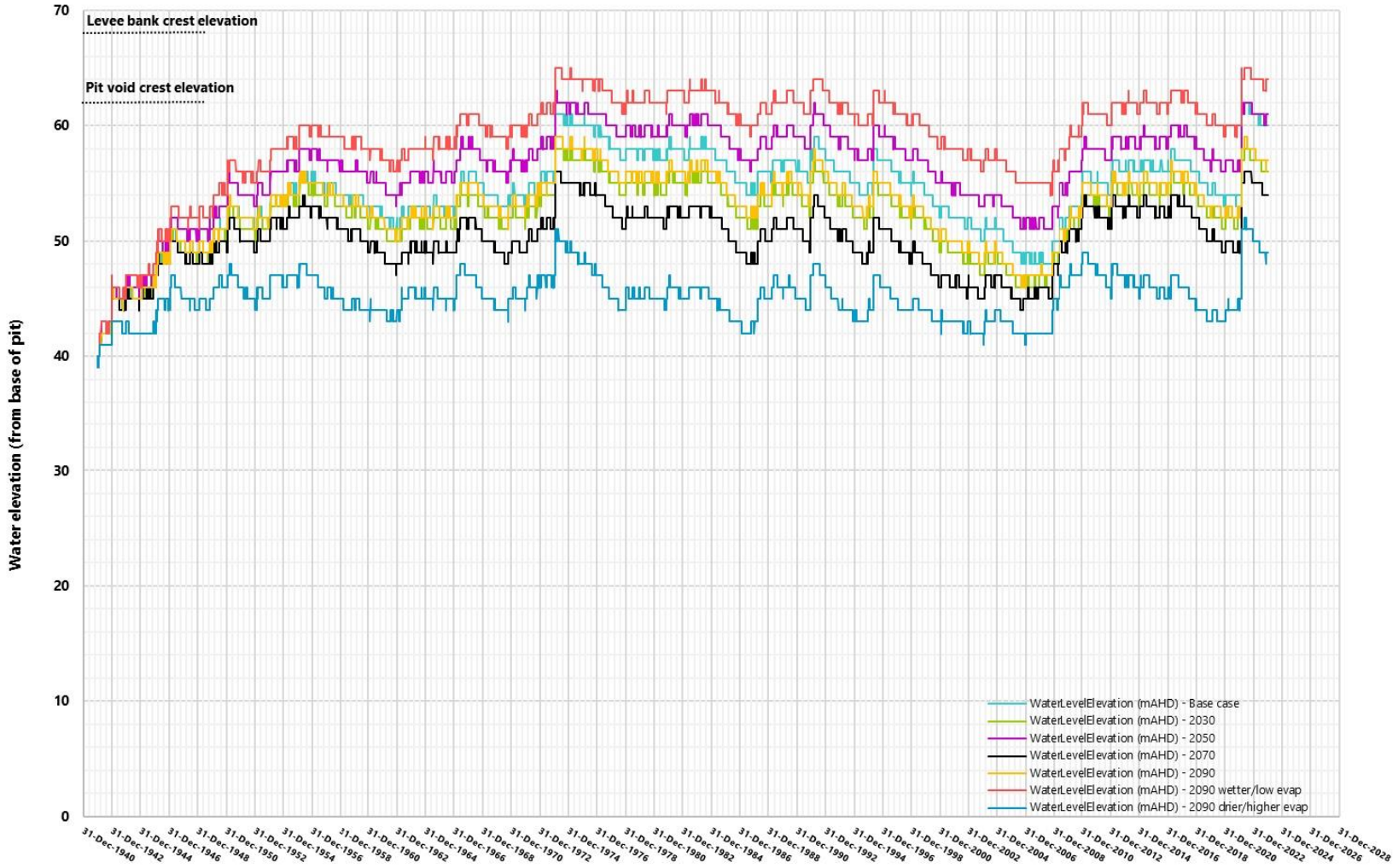

Figure 42: Jeebropilly North pit water balance simulation outcomes (See.Built.Earth 2024)

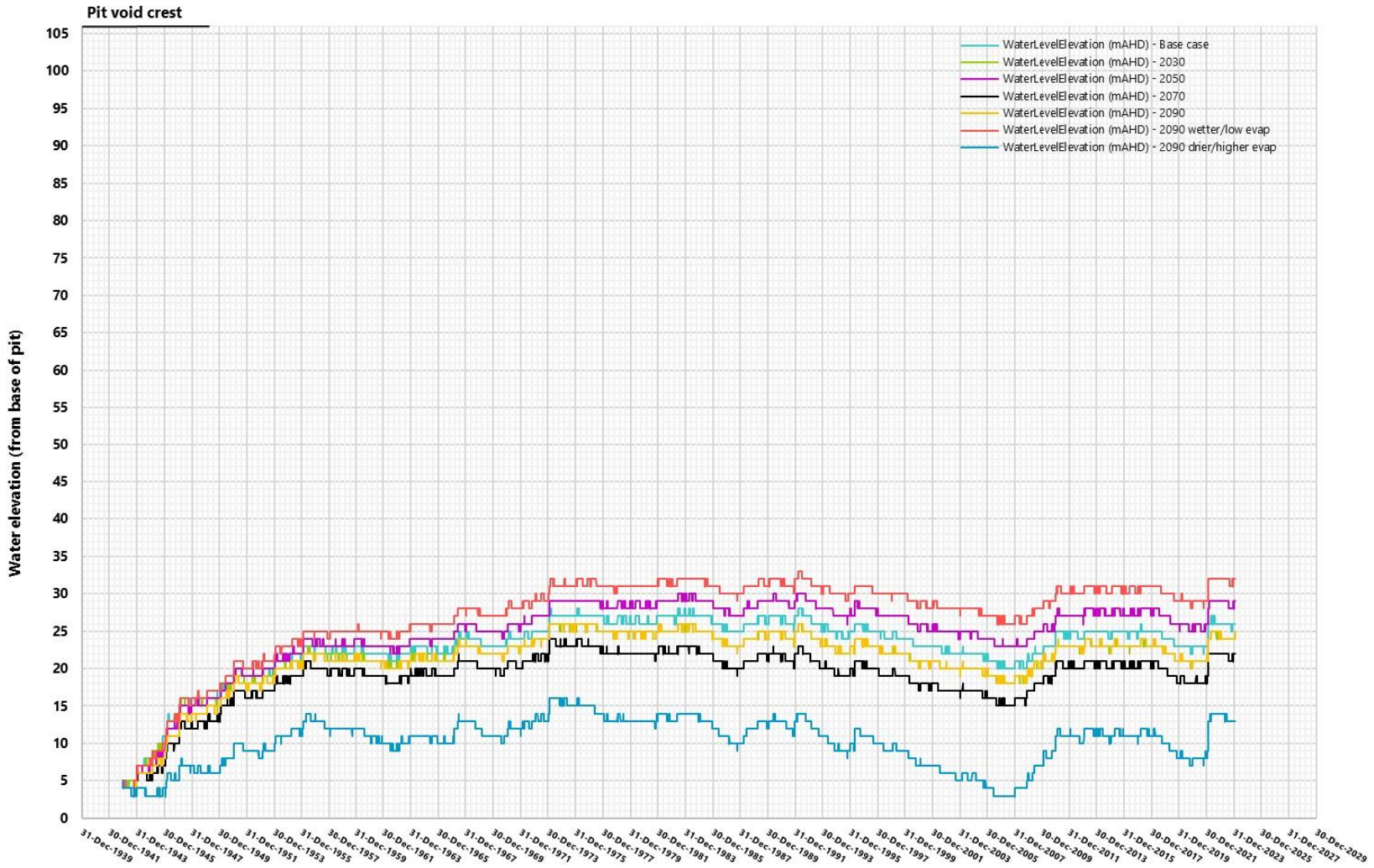

Figure 43: Washplant Pit water balance simulation outcomes (See.Built.Earth 2024)

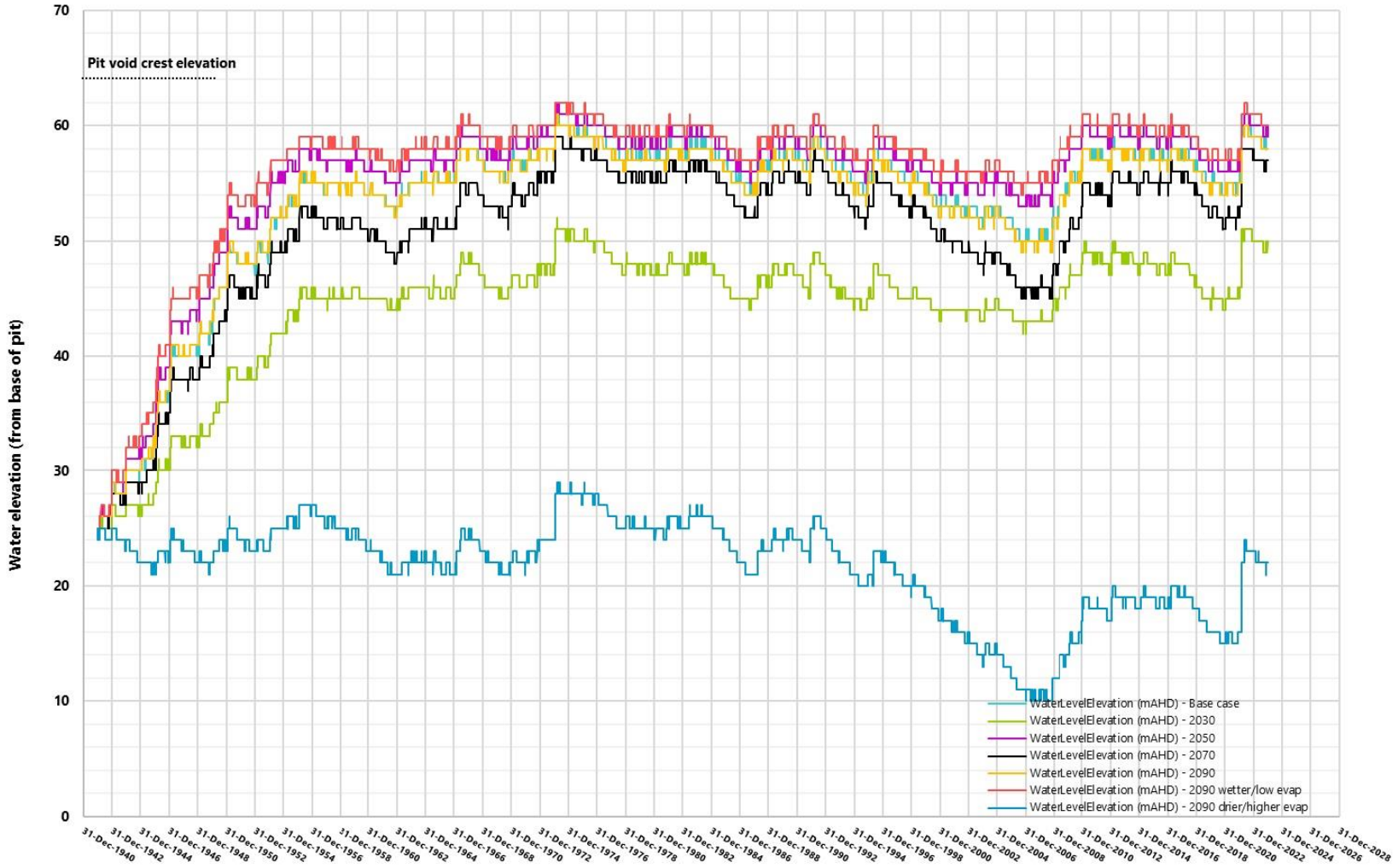

Figure 44: 7186 East void water balance simulation outcomes (See.Built.Earth 2024)

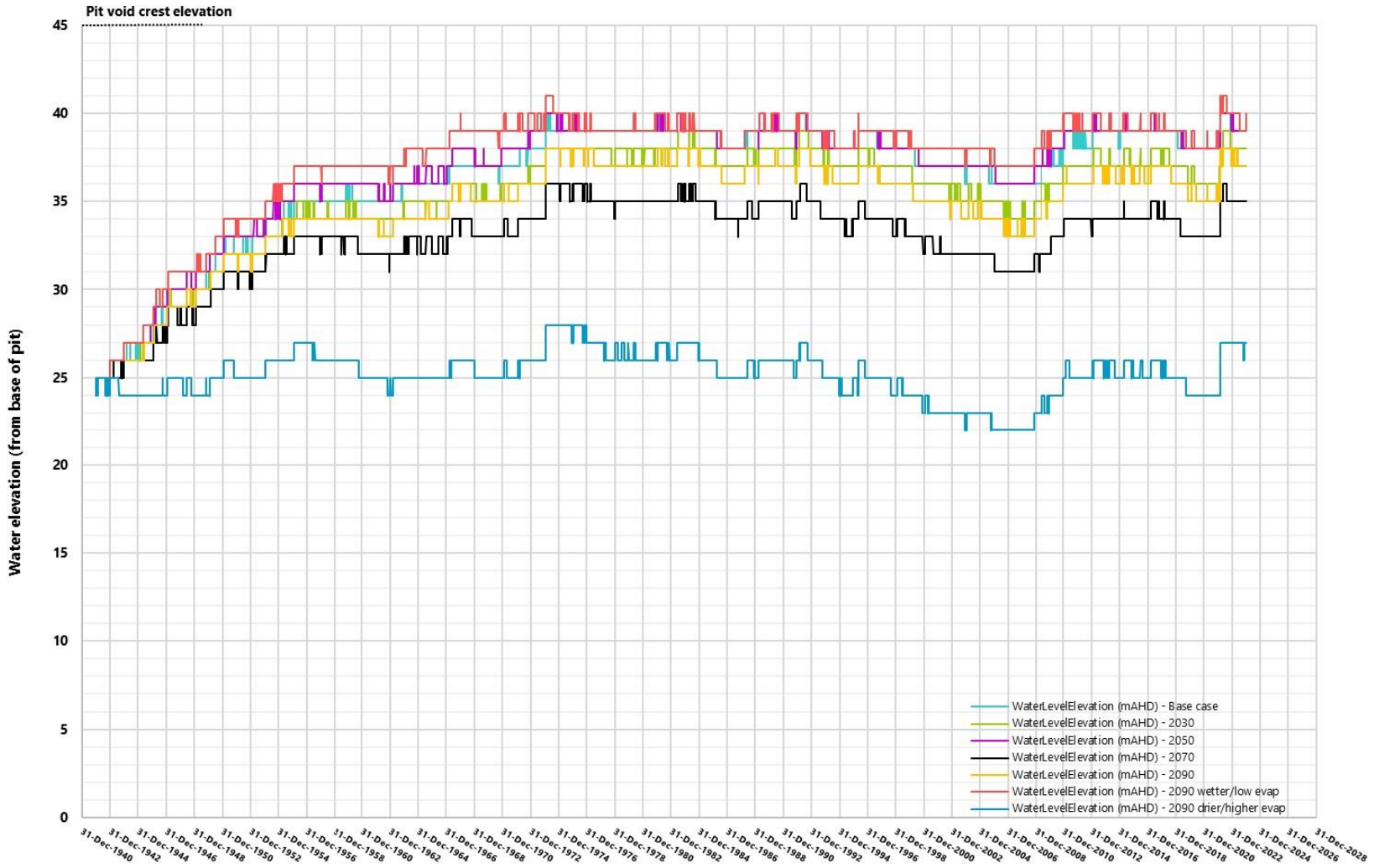

Figure 45: 7186 West void water balance simulation outcomes (See.Built.Earth 2024)

3.6 Risk assessment

3.6.1 Risk assessment requirements

Section 126C(1)(f) of the EP Act requires the PRCP to identify the risks, for each PMLU and NUMA, of a stable condition not being achieved and how the applicant intends to manage or minimise the risk.

A risk assessment has been carried out in accordance with the following standards:

- AS/NZS ISO 31000:2018 Risk management - Guidelines; and
- HB203:2012 Managing environment-related risk.

3.6.2 Risk assessment process

Any risk assessment needs to be undertaken with consideration of the scope, context and criteria relevant to the assessment. For this risk assessment, the following scope and purpose was discussed and agreed to:

> *The purpose of this risk analysis is to identify the risks of a stable condition for land not being achieved for the agreed PMLUs nominated, and the approach to be taken by the Project to manage and minimise the risks identified.*

For this risk assessment, risk scenarios (or 'threats') were identified and considered for each rehabilitation and improvement area associated with the Project. The causes attributable to each risk scenario were documented as well as the potential impacts. Existing controls were noted, defined as those reasonably expected to be in place for a Project of this nature and having appropriate and contemporary management systems. Each risk scenario was then assessed with respect to health, safety, the environment and compliance against the risk assessment schema outlined in section3.6.3.

3.6.3 Risk assessment schema

Risks specific to the rehabilitation of the Project were classified using the risk classification schema described below. The risk assessment schema used is comparable to those used widely within the mining industry and comprises the following components:

- a control effectiveness ranking (Table 35) used for assessing the operational controls that have been utilised or would be expected to be in place for a Project of this type;
- a likelihood classification descriptors table (Table 36); and
- a consequence classification descriptors table (Table 37) intended to guide a consistent assessment of consequence; noting that while only safety, environment and compliance risk types have been assessed, other impact type descriptors may influence the consequence ranking.

Following a consensus determination of likelihood and consequence, the risk level was determined using the matrix shown in Table 38. For any risks classified as 'significant' or above, mitigation and management measures were identified and documented. Mitigation and management measures were also documented for some lower-level risks.

Table 35: Control effectiveness ranking

Control Rank	Description	Guidance
C1	Substantially effective/adequate design	Controls are considered adequately designed and are operating effectively on almost all occasions
C2	Mostly effective/adequate design	Controls are considered adequately designed and are operating effectively on most occasions
C3	Inadequate design/partially effective	Controls are considered inadequately designed or are only operating to partial effectiveness on most occasions
C4	No controls/ineffective	There are no controls designed or the existing controls are operating ineffectively on all occasions

Table 36: Likelihood of exposure to the hazard

Level of Risk Probability	Explanation
5 – Almost certain	Likely to occur in most circumstances multiple times in a year
4 – Likely	Will probably occur in most circumstances every 1-3 years
3 – Possible	Might occur at some time over a 3-10 year period
2 – Unlikely	Could occur at sometime within a 10-50 year timeframe and has occurred in industry
1 – Rare	May only occur in exceptional circumstances within a 50-100 year timeframe

Table 37: Consequence classification descriptors

Impact types	Consequence Scale				
	Negligible (1)	**Minor (2)**	**Moderate (3)**	**High (4)**	**Catastrophic (5)**
Financial impacts (includes damage)	Less than $100,000	$100,000–$1M	$1–$10M	$10–$30M	Greater than $30M
Reputation	Isolated complaints	Local community issue with limited stakeholder involvement	Local community issue with political involvement. Local media coverage	State/local community issue with key stakeholder attention. National Media coverage	Withdrawal of Stakeholder support e.g. includes significant national or international media coverage
Legal / compliance	Breach of approval, permit, licence or legislation which is administrative. No regulatory action taken	Breach of approval, permit, licence or legislation with likely penalty less than $5,000 Civil settlement or court order less than $10,000	Breach of approval, permit, licence or legislation with likely penalty $5,000 to $10,000 Civil settlement or court order $10,001 to $100,000	Breach of approval, permit, licence or legislation with likely penalty $10,000 to $100,000 Civil settlement or court order $100,001 to $1 Million Prosecution of Personnel/Manager with potential criminal conviction Significant interruption to a site (e.g. temporary suspension of 'licence to operate' a site)	Breach of approval, permit, licence or legislation with likely penalty $100,000 or more Civil settlement or court order greater than $1 Million Prosecution of Directors/Officers with potential criminal conviction or jail. Loss of 'licence to operate' a site
Health	Exposure to health hazard/agent (subjective symptoms) with potential to result in first aid treatment	Exposure to health hazard/agent reversible health impairment	Exposure to health hazard/agents (exceeding OEL) with the potential to result in days lost due to OII and/or PI >30%	Exposure to health hazard/agents (significantly exceeding OEL) with the potential to result in PI <30% or single fatality	Exposure to health hazard /agents (significantly exceeding OEL) with the potential to result in multiple single fatalities and/or PI <30% of more than one person

Impact types	Consequence Scale				
	Negligible (1)	**Minor (2)**	**Moderate (3)**	**High (4)**	**Catastrophic (5)**
Safety	First Aid Injury (FAI) Report Only included	Medical Treatment Injury (MTI) or Restricted Work Injury (RWI)	Lost Time Injury (LTI)	Single fatality	Multiple fatalities
Environment	Nil to minor remediation (typically a shift). No adverse impact on environment	Near-source confined and short-term reversible impact (typically <week)	Near-source confined and temporary reversible impact (typically a month)	Impact that is unconfined and requiring long-term recovery, leaving residual damage (typically a year)	Impact that is widespread, unconfined and requiring long-term recovery, leaving major residual damage (typically years)

Note: Health impact definitions used: Occupational Exposure Level (OEL); Occupational Injury/ Illness (OII); Permanent Impairment (PI)

Table 38: Risk level classification matrix

	Explanation		**Risk rating**				
			Negligible	**Minor**	**Moderate**	**High**	**Catastrophic**
Likelihood	Likely to occur in most circumstances multiple times in a year	**Almost certain**	M-5	H-10	H-15	E-20	E-25
	Will probably occur in most circumstances every 1–3 years	**Likely**	M-4	M-8	H-12	E-16	E-20
	Might occur at some time over a 3–10-year period	**Possible**	L-3	M-6	H-9	H-12	H-15
	Could occur at sometime within a 10–50-year timeframe and has occurred in industry	**Unlikely**	L-2	M-4	M-6	M-8	H-10
	May only occur in exceptional circumstances within a fifty-to-hundred-year timeframe	**Rare**	L-1	L-2	L-3	M-4	M-5

3.6.4 Risk assessment outcomes and management

Detailed risk assessment outcomes are provided in Appendix G. For the Project, a total of 42 individual risk scenarios were identified resulting in:

- no risk scenarios classified as 'extreme';
- six risk scenarios classified as 'high';
- 34 risk scenarios classified as 'medium'; and
- two risk scenarios classified as 'low'.

A summary of risk outcomes is shown in Table 39.

Table 39: Risk assessment outcomes

Area	Risk level				
	Low	Medium	High	Extreme	Total
Waste rock emplacements (including in-pit and out-of-pit spoil dumps)	0	8	4	0	**12**
Retained water storages	0	6	0	0	**6**
Residual voids	1	5	1	0	**7**
Tailings storage facility / co-disposal area)	0	9	1	0	**10**
Mine infrastructure (retained)	0	2	0	0	**2**
Legacy underground mining	0	2	0	0	**2**
Retained flood bunding	1	2	0	0	**3**
Total	2	34	6	0	**42**

3.6.4.1 High risk class

The six 'high' risks identified can be grouped into the following categories:

- safety (1)
- geotechnical risks (1);
- erosional risks (2);
- non-polluting risks (1); and
- sustainable PMLU (1).

3.6.4.2 Medium risk class

The 34 'medium' risks identified in the risk assessment can be grouped into the following categories:

- safety (6);
- geotechnical risk (5);
- erosional risk (10);

- non-polluting risks (8); and
- sustainable PMLU (5).

3.6.4.3 Risk categories

Safety

Safety risks relate to surface roughness and slope steepness in excess of that expected for the PMLU, as well as residual void access and potential failure of retained water storages. The risks to safety have been addressed within the milestone criteria (refer section 3.5.3.2 and 3.5.3.3). The PMLU landform design will be consistent with geotechnical design criteria. Safety risks in relation to site access have also been discussed and monitoring will be conducted to determine long-term safety from proposed bunding, fencing and signage.

Geotechnical risks

The principal geotechnical risks are considered to be related to the ML7186 highwalls. The ML7186 highwall is planned to be buttressed specifically for the purpose of mitigating the risk to public infrastructure located above adjacent and parallel to much of the existing highwall. As described in Section 3.5.5.3, the final landform design ensures that waste rock dumps have been, or will be reshaped to moderate slopes. Long established waste rock emplacements on site have shown no propensity to failure.

Erosional risks

Erosional risks identified are common to coal mine rehabilitation works with Queensland. While spoil materials have shown some dispersive characteristics, rehabilitation efforts have generally been successful in establishing sufficient ground and litter cover to provide resilience to erosive forces. While erosion remains a risk for future rehabilitation, established methods are available to manage this.

Non-polluting and geochemical risks

The potential for environmental harm arising from pollutant transfer relates primarily to TSS in waters draining from site consequent to the presence of dispersive soils. Rehabilitation efforts for disturbed areas as well as a well-established drainage system providing multiple levels of sedimentation is expected to effectively manage this risk.

Sustainable PMLU

The proposed final land use for the Project is predominantly low intensity cattle grazing. The site has a significant area of established rehabilitation which, although mostly ungrazed, would appear to be suitable for this purpose. Future rehabilitation efforts will be hampered by the lack of available topsoil however, the use of biosolids has previously been practised and deemed successful, and will continue to be utilised.

Management of pests needs to be ongoing, but is not considered to be any different to the management effort required for any grazing property located in the region.

3.7 Rehabilitation monitoring and maintenance

For the purposes of developing the rehabilitation schedule, RMs have been developed and proposed for the Project and clear definitions of milestone criteria have been developed for each rehabilitation milestone (refer Table 20 and Table 22). Assessment of rehabilitation against the milestone criteria will be incorporated into a rehabilitation monitoring and maintenance program for the Project, which is provided at Table 40.

The completion criteria for each PMLU will be used as the milestone criteria for the final milestone in the proposed schedule, which shows achievement of the PMLU to a stable condition at surrender. When the final RM applicable to the RAs is deemed to be satisfied, a final rehabilitation assessment will be undertaken before an application for either progressive certification or an ML surrender application is made.

Table 40: Rehabilitation milestone management and monitoring measures

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM1: Non-retained Infrastructure decommissioning and removal	Applicable to all infrastructure identified to be decommissioned/ removed from site. Considered to be met when the area can be transitioned to the next milestone.	Infrastructure decommissioned/ removed at closure will be subject to strict environment and safety planning requirements including completion inspections. A visual inspection(s) will be conducted to determine that no infrastructure remains that does not form part of a Landholder Agreement.
RM2: Determination / management of contaminated land status	Applicable to the water storages, waste rock dump areas, residual voids, mine infrastructure areas, and the TSF/co-disposal area (i.e. where notifiable activities have been carried out) and, at a minimum, involves the completion of a Phase 1 contaminated land investigation undertaken by an appropriately qualified person. Considered to be met when contaminated material has been placed removed from site, or remediated in situ, a validation report has been completed, and, if required, a site suitability statement has been prepared. Where required, remediation activities will be undertaken and recorded, and notifications completed.	A completed Phase 1 contaminated land investigation report, as well as any consequent reports where required. Visual inspection of potential sites or sources of contaminated material will be conducted, and samples collected as required. The contaminated land investigation will determine the presence of any contaminants. Remediation activities will be undertaken if required following consultation on appropriate remediation activities. A validation report will detail the remediation of contaminated land and, if required, a site suitability statement prepared by an appropriately qualified person that states that the land is suitable for use according to the nominated PMLU.
RM3: Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	Applicable to water storages, the residual voids, ML7186 out-of-pit waste rock emplacement, and TSF, where bulk earthworks and other grading are required to achieve target landform shape and drainage characteristics. Considered to be met when graded banks are installed and natural drainage is established and all other applicable disturbance areas have been reprofiled to suit the surrounding landform. Additionally, a geotechnical assessment will be conducted to confirm that long-term geotechnical stability has been achieved. Applicable to all areas requiring revegetation. Includes final profiling and application of topsoil materials, soil testing, and soil amelioration. Considered to be met when surface preparation activities have been completed and soil condition is conducive to plant germination and growth	Land based and/or remote sensing survey techniques will be employed to confirm that graded slopes meet design specifications. Additionally, visual inspections will be done to determine if any future maintenance/repair action is required. A geotechnical assessment will be conducted by an appropriately qualified person to confirm that long-term stability has been achieved for all relevant landforms. A soil assessment will be conducted by an appropriately qualified person prior to each rehabilitation event to determine soil suitability, and recommendations made for ameliorants where required. Records to include any ameliorants applied, including types, rates and timing of applications. Visual inspections and documentation of contour ripping, including depth, spacing and machinery used.

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM4: Capping installation	Applicable to the TSF. This includes filling with spoil material from the 7186 waste rock dump, topsoiling and reprofiling. RM4 is considered to be met when the area has been capped with sufficient material and achieves the target landform shape and drainage characteristics.	Land based and/or remote sensing survey techniques will be employed to confirm that graded slopes meet design specifications. Additionally, visual inspections will be done to determine if any future maintenance/repair action required. A geotechnical assessment will be conducted by an appropriately qualified person to confirm that long-term stability has been achieved for relevant landforms will determine when land can be transitioned to the next RM.
RM5: Revegetation	Applicable to all areas requiring revegetation. Includes seeding and/or planting of target revegetation species. Considered to be met when records demonstrate that seeding and/or planting of target species has been completed, with the understanding that remedial works such as reseeding or infill planting may be necessary to meet target vegetation completion criteria.	Survey of completed areas, and record of revegetation method retained. Records of seeded and/or planted species consistent with the species listed in Table 30: Typical pasture species list for grazing PMLU.
RM6: Achievement of surface stability	Rehabilitated areas to be assessed against all completion criteria developed with reference to analogue sites of similar characteristics and land use. Considered to be met when land can be transitioned to progressive certification.	Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.
RM7: Achievement of target post-mining land use to safe and sustainable condition (Low intensity cattle grazing)	Final milestone applicable to rehabilitated areas with a grazing PMLU. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	A Hazard and Safety Assessment will be undertaken by an appropriately qualified person. Recommendations for remedial works will be made where required, and remedial activities undertaken as soon as practicable. Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program.
RM8: Achievement of target post-mining land use to safe and sustainable condition (retained infrastructure)	Final milestone applicable to all areas nominated as retained infrastructure. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved.	Recommendations for remedial works will be made where required, and remedial activities undertaken as soon as practicable.

Rehabilitation milestone	Description / criteria	Proposed management / monitoring measure(s)
RM9: Achievement of target post-mining land use to safe and sustainable condition (residual void water storage)	Final milestone applicable to residual void water storages. Involves monitoring and remediation works if monitoring identifies risks to the final rehabilitation criteria being achieved. Considered to be met when all completion criteria have been achieved and land is safe, stable, does not cause environmental harm and can sustain the nominated PMLU.	A Hazard and Safety Assessment will be undertaken by an appropriately qualified person. Field surveys, drone and satellite data analysis as part of the rehabilitation monitoring program. Recommendations for remedial works will be made where required, and remedial activities undertaken as soon as practicable.

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Appendix A. PRCP Schedule

Post-mining land uses (PMLU)										
Rehabilitation area	RA1									
Relevant activities	Open-cut disturbance areas									
Total rehabilitation area size (ha)	782.5									
Commencement of first milestone: RM1	10/12/2025									
PMLU	Low intensity cattle grazing									
Date area is available	10/12/25	10/12/30	10/12/35	10/12/40	10/12/45					
Cumulative area available (ha)	651.4	782.5	782.5	782.5	782.5					
Milestone completed by	10/12/30	10/12/35	10/12/40	10/12/45	10/12/54					
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	651.4	782.5								
RM2	651.4	782.5								
RM3	651.4	782.5								
RM5	651.4	782.5								
RM6	651.4	651.4	782.5							
RM7			651.4	651.4	782.5					

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA2									
Relevant activities	Flood protection bund									
Total rehabilitation area size (ha)	9.6									
Commencement of first milestone: RM3	10/12/2025									
PMLU	Low intensity cattle grazing									
Date area is available	10/12/25	10/12/30	10/12/35							
Cumulative area available (ha)	9.6	9.6	9.6							
Milestone completed by	10/12/30	10/12/35	10/12/39							
Milestone Reference	**Cumulative area achieved (ha)**									
RM3	9.6									
RM5	9.6									
RM6	9.6	9.6								
RM7			9.6							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA3									
Relevant activities	Tailings storage facility									
Total rehabilitation area size (ha)	28.3									
Commencement of first milestone: RM1	10/12/2025									
PMLU	Low intensity cattle grazing									
Date area is available	10/12/25	10/12/30	10/12/35	10/12/40						
Cumulative area available (ha)	28.3	28.3	28.3	28.3						
Milestone completed by	10/12/30	10/12/35	10/12/40	10/12/48						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	28.3									
RM2	28.3									
RM3	28.3									
RM4		28.3								
RM5		28.3								
RM6			28.3							
RM7				28.3						

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA4									
Relevant activities	Co-disposal facility									
Total rehabilitation area size (ha)	78.9									
Commencement of first milestone: RM1	10/12/2025									
PMLU	Low intensity cattle grazing									
Date area is available	10/12/25	10/12/30	10/12/35							
Cumulative area available (ha)	78.9	78.9	78.9							
Milestone completed by	10/12/30	10/12/35	10/12/39							
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	78.9									
RM2	78.9									
RM3	78.9									
RM4	78.9									
RM5	78.9									
RM6	78.9	78.9								
RM7			78.9							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA5									
Relevant activities	Retained Infrastructure									
Total rehabilitation area size (ha)	82.5									
Commencement of first milestone: RM1	10/12/2025									
PMLU	Retained Infrastructure									
Date area is available	10/12/25	10/12/30	10/12/35	10/12/40						
Cumulative area available (ha)	82.5	82.5	82.5	82.5						
Milestone completed by	10/12/30	10/12/35	10/12/40	10/12/48						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	82.5									
RM2	82.5									
RM6		82.5								
RM8			82.5							

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	RA6									
Relevant activities	Residual Void Water Storage									
Total rehabilitation area size (ha)	41.2									
Commencement of first milestone: RM1	10/12/2025									
PMLU	Retained Infrastructure									
Date area is available	10/12/25	10/12/30	10/12/35	10/12/40						
Cumulative area available (ha)	41.2	41.2	41.2	41.2						
Milestone completed by	10/12/30	10/12/35	10/12/40	10/12/48						
Milestone Reference	**Cumulative area achieved (ha)**									
RM1	41.2									
RM3	21.2									
RM5	21.2	41.2								
RM6	21.2	21.2	41.2							
RM9		21.2	21.2	41.2						

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
2) Insert new columns to the blue table to match rehabilitation milestone dates.
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Post-mining land uses (PMLU)										
Rehabilitation area	IA1									
Relevant activities	Residual voids									
Total rehabilitation area size (ha)	85.5									
Commencement of first milestone: MM1	10/12/2027									
PMLU	Water storage (NUMA)									
Date area is available	10/12/27	10/12/30								
Cumulative area available (ha)	58.7	85.5								
Milestone completed by	10/12/30	10/12/35								
Milestone Reference	**Cumulative area achieved (ha)**									
MM1	58.7	85.5								
MM2		85.5								
MM3		85.5								

1) Insert new columns to the yellow table to include further rehabilitation milestone dates.
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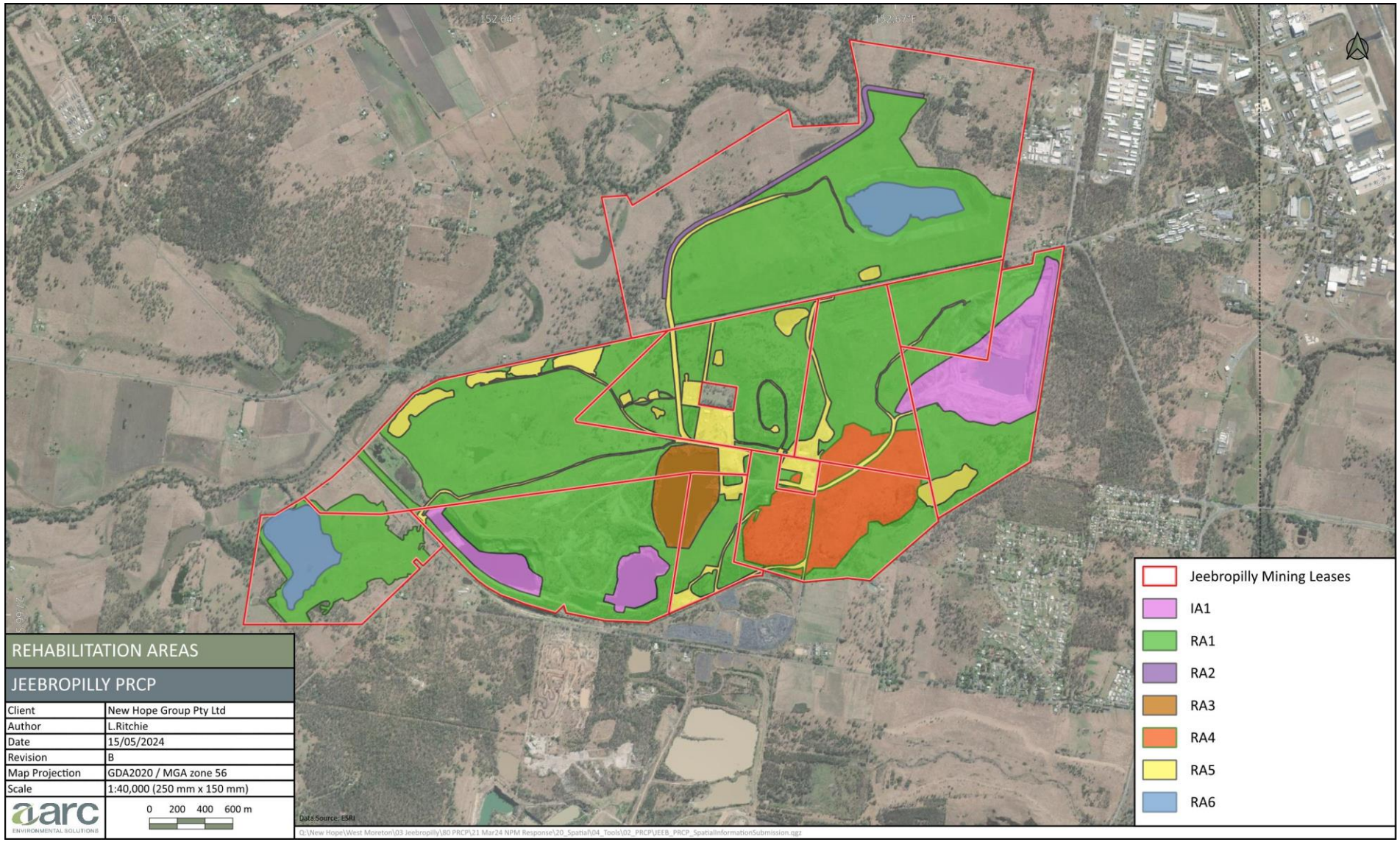
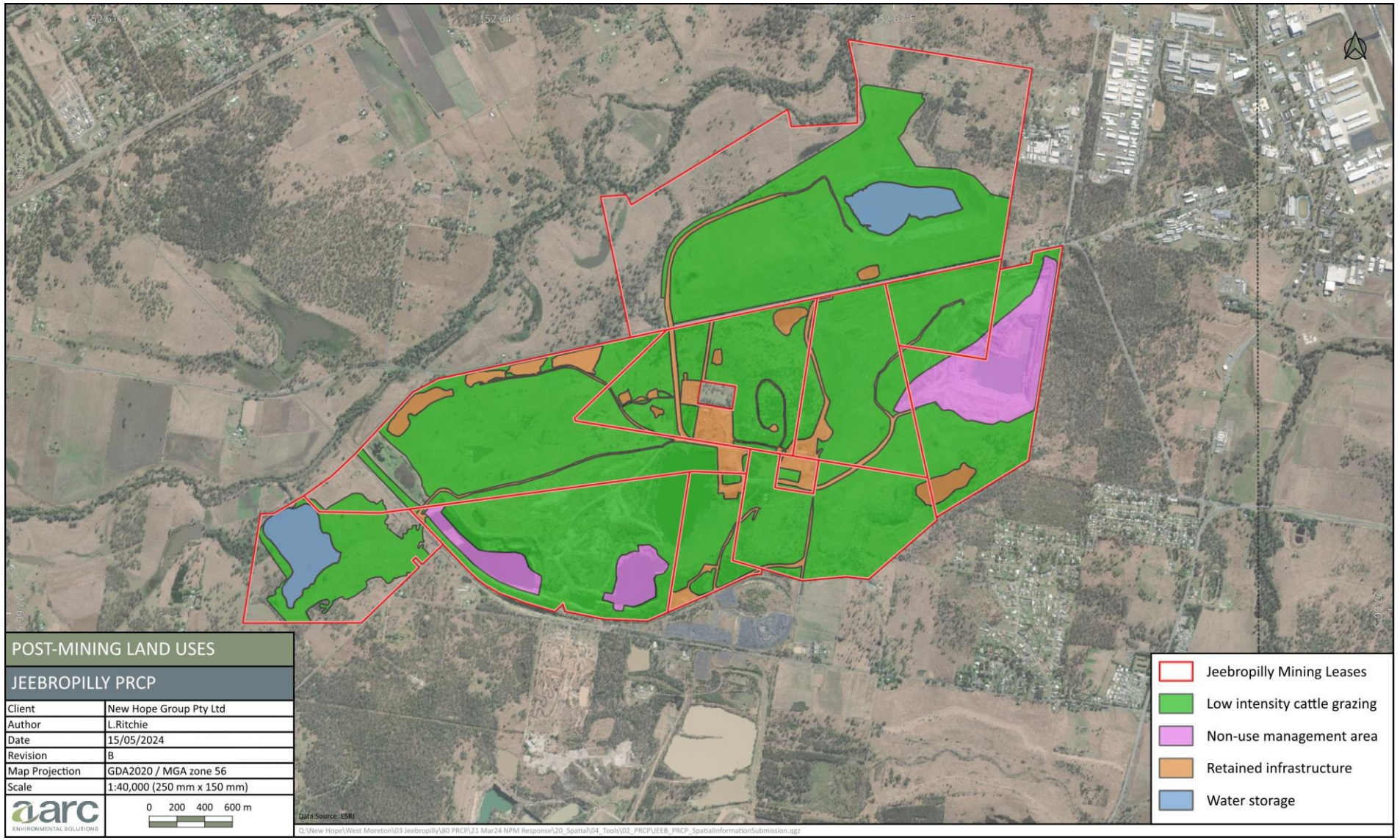
3) Insert new rows to the blue table to include additional rehabilitation milestone references.
4) Insert the relevant number in the "Milestone reference" column (i.e. RM1).

Appendix B. PRCP Reference Map and Final Site Design


Jeebropilly Mining Leases
IA1
RA1
RA2
RA3
RA4
RA5
RA6
REHABILITATION AREAS
JEEBROPILLY PRCP
Client
New Hope Group Pty Ltd
Author
L.Ritchie
Date
15/05/2024
Revision
B
Map Projection
GDA2020 / MGA zone 56
Scale
1:40,000 (250 mm x 150 mm)
0 200 400 600 m
Data Source: ESRI


POST-MINING LAND USES
JEEBROPILLY PRCP
Client New Hope Group Pty Ltd
Author L.Ritchie
Date 15/05/2024
Revision B
Map Projection GDA2020 / MGA zone 56
Scale 1:40,000 (250 mm x 150 mm)
0 200 400 600 m
Data Source: ESRI
Jeebropilly Mining Leases
Low intensity cattle grazing
Non-use management area
Retained infrastructure
Water storage

Appendix C. Stakeholder Engagement Plan

LOCAL STAKEHOLDER MANAGEMENT PLAN

JEEBROPILLY COAL MINE

PREPARED FOR
New Hope Group

October 2023

aarc
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Document Control

Project Name:	Jeebropilly Coal Mine
Report Title:	Local Stakeholder Management Plan
Client:	New Hope Group
Project Manager:	Stuart Ritchie

Version	Comments	Author	Reviewer	Date
Draft issued for client review		NW	SR	23 October 2023
Final issued to client				

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1 Introduction

The New Hope Group (NHG) is committed to developing and maintaining successful partnerships and working relationships with the people impacted both directly and indirectly by our operations. Good communication and stakeholder engagement is crucial to sustaining positive and enduring relationships based on trust and mutual benefit, and in turn building acceptance, support and a 'social licence to operate' within our communities.

To date, NHG has undertaken significant community and stakeholder engagement for their West Moreton mining operations. Stakeholder engagement has included interactive processes, in which stakeholders and the community have been engaged as active partners.

This Local Stakeholder Management Plan (LSMP) is targeted for residents within the vicinity of the Project potentially affected by social and environmental impacts, and includes:

- impacts management;
- consultation strategies; and
- complaints resolution.

The LSMP outlines NHG's approach to stakeholder engagement and community consultation with its near neighbours, as well as NHG's complaints handling process. The aim of the LSMP is to ensure that impacts and concerns raised by residents and their suggested mitigation measures are considered, by facilitating open communication and active complaint resolution.

1.1 Objectives

The key objectives of community consultation include:

- to ensure that the likely affected stakeholders are identified;
- to ensure that affected stakeholders are provided with enough information regarding Project closure and rehabilitation;
- determining stakeholder interest in the Project and the relevant impacts likely to be experienced;
- consideration of the views and insights of likely affected stakeholders to inform Project closure and rehabilitation;
- providing collaboration opportunities on the Project from construction to closure and rehabilitation;
- to help stakeholders understand mitigation and management measures implemented for impact reduction; and
- to provide ongoing consultation with relevant stakeholders where changes are made to rehabilitation, closure, and outcomes of the land for the Project.

2 Project Background

Jeebropilly coal mine is located in southeast Queensland in the West Moreton Coalfield, approximately 55 km southwest of Brisbane, 18 km west of Ipswich City, and 10 km southeast of Rosewood (Figure 1). The Project comprises 12 mining leases (MLs) covering approximately 1,446 ha that are held by Jeebropilly Collieries Pty Ltd, a wholly owned subsidiary of New Hope Group. Jeebropilly, including the then existing open cut coal mine, was purchased from Ryland Collieries Pty Ltd in 1982.

At peak supply production, the Project produced approximately 1 Mtpa of product coal. The coal was loaded onto trains and transported to the Port of Brisbane via the Ebenezer Rail Loop.

Mining activities ceased in December 2019 and coal materials have been removed from the site. In 2020, the CHPP was demolished and the remaining infrastructure is to be retained under a landholder statement. The retained run-of-mine (ROM), CHPP (slabs, hardstand areas and adjacent offices) and laydown areas are included within the landholder statement for retained infrastructure.

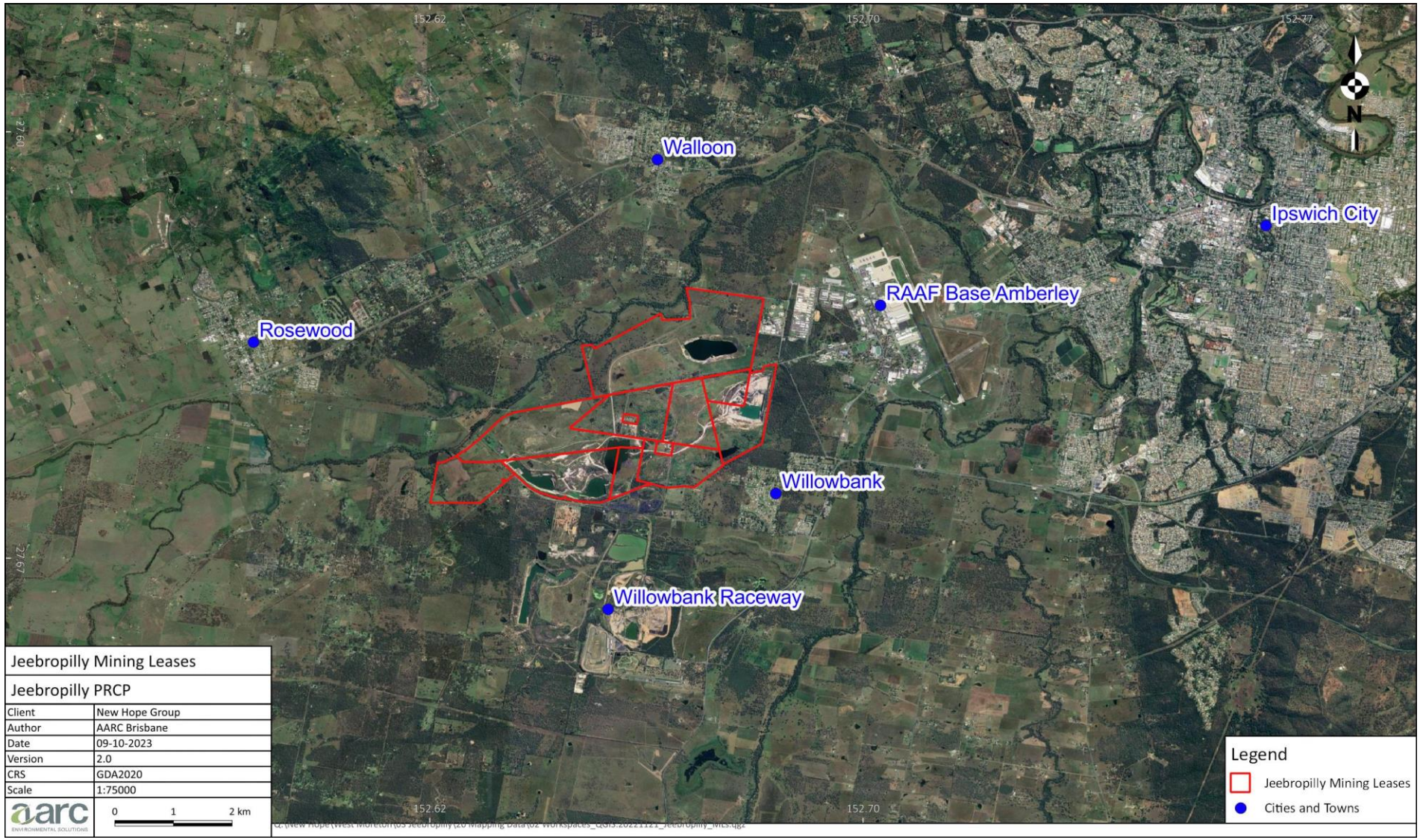

Figure 1: Project locality

3 Local stakeholder engagement

3.1 Engagement approach

NHG have undertaken engagement for the Jeebropilly Coal Mine and will seek to involve the local community during the rehabilitation phase of the Project where appropriate. In particular, NHG will seek to understand and address local community concerns about the environmental and social impacts of the Project's rehabilitation. A proactive and open approach to local community engagement has been undertaken throughout the operational phase of the Project, and future engagement will be undertaken where appropriate to inform rehabilitation and closure changes.

The following key principles will apply to all Project engagement and communication activities:

- a proactive approach to local stakeholder engagement will be applied;
- respect will be shown at all times;
- a two-way conversation between the NHG and local stakeholders will always be the objective;
- feedback to local stakeholders will be provided on how their input has informed decisions; and
- all significant contact with local stakeholders will be recorded on a register.

The key local stakeholder groups, their primary interests and the range of engagement mechanisms NHG will use throughout the closure Project are outlined in Table 1.

Table 1: Local stakeholder engagement mechanisms

Stakeholder group	Primary interest	Engagement mechanisms
Local landholders	• effects on farming practices and livelihoods • property acquisition and relocation • property values • access and connectivity • social networks and connections • dust, noise, light & amenity • traffic • vegetation clearing • weeds and pests	• individual meetings on affected properties • Personal telephone calls, letters, emails • Newsletters on a project milestone basis • Community information sessions where required • Site tours and neighbours open days
Resident Community	• Job and business opportunities • Community cohesion and social values • Dust and noise • Access to social services • Traffic and congestion	• Community information sessions • Newsletters on a project milestone basis • NHG website • Public site tours • Media releases and local media advertising

3.1.1 Engagement frequency and information

As mining has ceased at Jeebropilly and no further mining is proposed, the only site activities will be related to rehabilitation and closure phase; including decommissioning of infrastructure where not required for the PMLU. Consultation frequency will be determined on a case-by-case basis in relation to changes in rehabilitation and closure aspects of the Project. Regular or periodic consultation is not proposed for the Project.

Consultation methods may include information briefings, notices, mail drops, phone calls, emails, and community meetings. The actual method of engagement used will be determined based on the range of issues that might be of relevance, any perceived impacts and any preferred methods of communication suggested by

stakeholders. Stakeholders will be provided with information on engagement opportunities to allow all stakeholders the opportunity to participate.

Information that may be released to stakeholders may include, but will not be limited to:

- rehabilitation and closure timeframes;
- final landform and post-mining land uses;
- changes to the outcome of the land or rehabilitation of the site;
- any potential impacts from the Project;
- proposed mitigation and management measures; and
- retained infrastructure.

3.2 Reporting

NHG is focussed on ensuring a two-way conversation with stakeholders and the wider community and will actively seek feedback on the Project's impacts and benefits. Where possible, the Project team will be directly involved in engagement activities and conversations with stakeholders to encourage a responsive approach to feedback.

Community feedback has been used to monitor the effectiveness of Project mitigation strategies and action plans. If feedback indicates a need to adjust the mitigation strategies and action plans the following process will be followed:

- community feedback on the mitigation measure will be reviewed further to better understand the issue;
- feedback will be investigated further through discussions with stakeholders, community members, government agencies and other groups; and/or field investigations, further technical monitoring or data collection as required; and
- following the investigation, recommendations will be made regarding an appropriate course of action. If necessary, Action Plans will be updated as needed and communicated to the relevant personnel for implementation.

3.3 Complaint resolution

To facilitate open communication and active complaint resolution, it is important that local stakeholders are able to raise issues and complaints in a formal way. The Project will provide a contact point within NHG with whom local stakeholders can raise issues and concerns relating to the Project.

The NHG contact will be available to receive complaints and will ensure that all issues are conveyed to the appropriate area within NHG, including any personnel that may be onsite, in the event an issue relates to operational issues.

Concerns and issues raised will be recorded and responded to in a timely and consistent manner, and in accordance with regulatory standards and company policies. The following are key principles adhered to by NHG in responding to issues or concerns raised by local stakeholders:

- timeliness – complaints will be dealt with in a timely and efficient manner;
- sensitivity – ensure that both parties feelings and perspectives are respected;
- fairness and impartiality –parties will be afforded substantive and procedural fairness in the resolution process; and
- confidentiality – only parties directly involved in the complaint or those involved in decision making about outcomes will have access to information about the complaint.

3.4 Communication protocols

The following sections detail NHG's communication protocols for engaging with local stakeholders.

3.4.1 Local stakeholder protocols

When taking telephone or email enquiries from local stakeholders the process outlined in Figure 2 will be applied. This scheme has been adopted from the NHG New Acland Project.

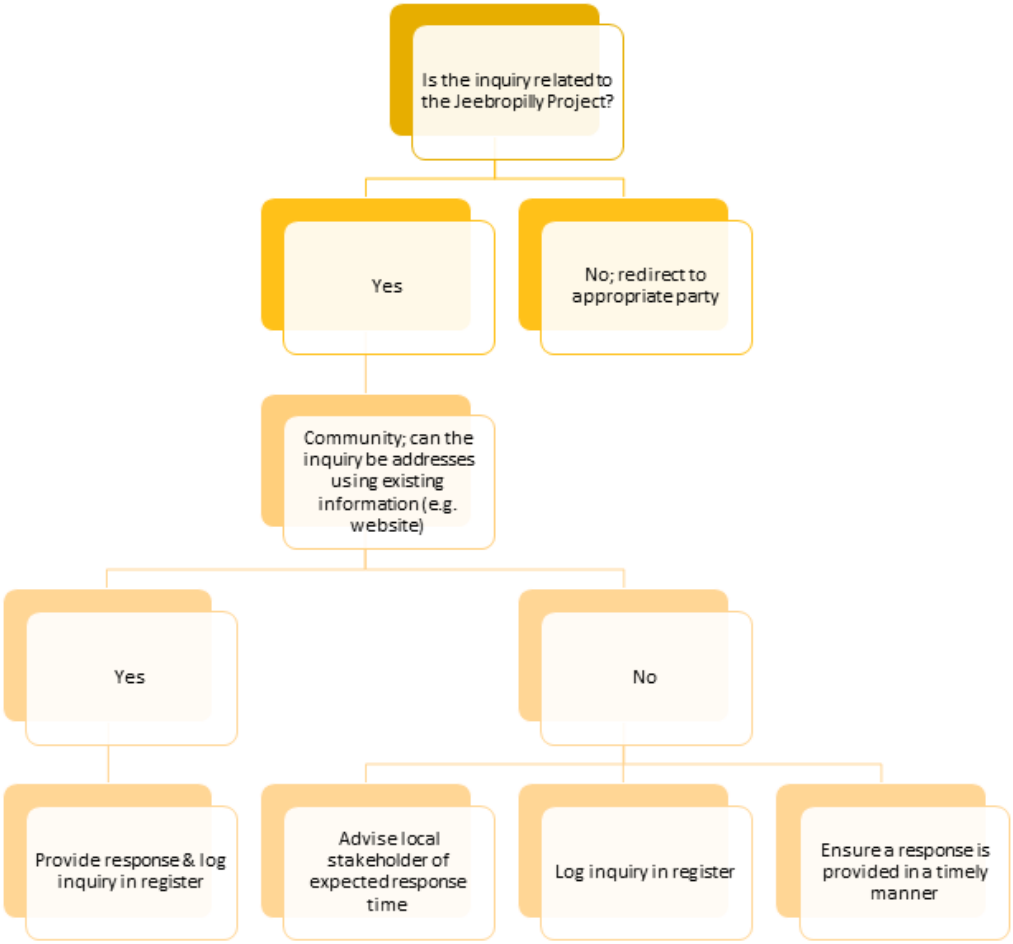

Figure 2: Telephone and email enquiries process

3.4.2 Landowner protocols

Management of local landowner relationships will be managed by NHG staff. Field staff will be provided with Record of Contact forms for times when informal contact is made. Discussions with landowners will be recorded in the Consultation Manager register.

4 Evaluation methods

It is important to continually monitor and evaluate the effectiveness of this LSMP to ensure impacts and concerns raised are considered and acted upon where appropriate.

4.1 Evaluation methods

A number of methods will be used to evaluate the effectiveness of the engagement program with local stakeholders. These methods include:

- **Register records**: Database records with an analysis of feedback forms submitted, website hits, telephone calls, incoming emails, tone of enquiries and key issues raised.
- **Benchmarking activities**: Benchmarking activities will be undertaken using questions on any feedback forms and activities to determine changes in local community attitude, knowledge and behaviours.
- **Informal feedback**: All significant informal feedback received from local stakeholders regarding consultation activities will be recorded in the revised Project database and reported and analysed.
- **Observations**: Team members will record their observations during local stakeholder engagement activities. These observations will detail what happened during the activity, who was involved and how they reacted. Team members will also record 'stand out moments' and quotes.
- **Media analysis**: Analysis of negative versus positive media coverage.

4.2 Evaluation criteria

The evaluation criteria for each objective are described in Table 2.

Table 2: Evaluation criteria

Objective	Method of evaluation	Key indicators
1. Inform local stakeholders of revised Project benefits and opportunities	• Database records • Benchmarking activities • Informal feedback • Observations • Media analysis	• Level of local stakeholder awareness of the revised Project • Information disseminated as per this strategy
2. Provide open, honest and timely communication with local stakeholders	• Database records • Benchmarking activities • Informal feedback	• Amount of communication with local stakeholders and its effectiveness • Local stakeholders satisfaction levels with the revised Project communication • Response times to local stakeholder enquiries
3. Engage local stakeholders to capture their views and ensure they are understood and considered in decision making where possible	• Database records • Benchmarking activities • Informal feedback • Observations	• Amount of feedback received and how it has been acted upon • How and if local stakeholder feedback is successfully communicated within NHG
4. Ensure early identification of potential local stakeholder issues and implementation of appropriate mitigation strategies	• Database records • Benchmarking activities • Observations	• How feedback has been acted upon • How local stakeholders have influenced Project decisions and mitigation measures

5 Contact

5.1 NHG project contact point

The NHG project contact point will be nominated prior to the commencement of the mining activities and contact details provided.

5.2 Corporate land and tenure team

The Corporate Land and Tenure team are based in the NHG offices in Brisbane. Contact details are as follows:

- **Email**: property@newhopegroup.com.au
- **Phone**: (07) 3418 0547

5.3 Corporate community team

The Corporate Community team are based in the NHG offices in Brisbane. Contact details are as follows:

- **Email**: community@newhopegroup.com.au
- **Phone**: (07) (07) 3418 0500 or 1800 882 142

5.4 Media enquiries

For media enquiries, contact details for New Hope's Media Team are as follows:

- **Email**: media@newhopegroup.com.au
- **Phone**: +61 7 3418 0558

Appendix D. Community Consultation Register

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
16/02/2011	New Hope (2) DERM ICC – Councillor Community Bank West Moreton Landcare RDPO (4)	CCAP meeting	Operational and planning update Flooding in West Pit Bremer River water quality monitoring results	Concern that final level of area remains below level of train line	New Hope aware of concerns and taking them into consideration in design of final landform
				Trees planted should not block view from rail line	New Hope aware but options limited due to imperative to gain best environmental outcome
				Weed trees along Rosewood-Marburg Rd	Local weed contractor engaged
				Plans for area north of Ipswich Rosewood Rd at Jeebropilly	Riparian project planned to re-establish vegetation along Bremer River immediately north of 7-mile Bridge
				Height of Wash Plant Pit Dump	Efforts being made to avoid raising it higher, but dependent on available dumping space
				Removal of Key Resource Area	No negative effect on current operations, but New Hope would prefer it was removed. New Hope representative happy to attend any meetings to determine the process for removing the KRA
22/06/2011	New Hope (3) DERM Ipswich & Lockyer Greens Local residents (4) RDPO (5)	CCAP meeting	Operational and planning update Introduction of new Senior Environmental Officer	What is the plant species mix	Provided

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
19/10/2011	New Hope (3) ICC – Councillor Local resident RDPO/Ipswich & Lockyer Greens RDPO (6)	CCAP meeting	Operational update Rehabilitation planning: Groundwater Study and Contaminated land Assessment are under way	Will dump height on western side be reduced	Yes, dumping is currently being carried out to facilitate backfilling the final void at the end of mining
15/02/2012	New Hope (3) DERM (2) ICC – Councillor RDPO (6) Local resident Ebenezer Against Mining West Moreton Landcare Cabanda & Community Bank RDPO/QLD Greens	CCAP meeting	Operational update Penalty Infringement Notice from DERM re surface water discharge in July 2011	Concern that rehabilitation will not occur in a timely manner and whether groundwater will be considered	No specific timeline for rehabilitation activities; closure studies (including groundwater) to be considered in developing Closure Plan
19/07/2012	New Hope (2) ICC – Councillor West Moreton Landcare RDPO (3) Local resident	CCAP meeting	Operational update: Trucks will be carting coal from Oakleigh to Jeebropilly for a few months after mining has ceased, rehabilitation activities will continue thereafter	Lack of rehabilitation planning updates in previous 5 months	Direct consultation with stakeholder groups planned in coming months; progress updates scheduled for coming meetings
				Request that the mine profile be similar to that of pre-mining, below railway height and that there be no residual void	Void will be made safe and stable. Stakeholder consultation will be taken into consideration in rehabilitation planning
17/10/2012	New Hope (3) ICC – Councillor	CCAP meeting	Operational update: Trucks will be carting coal from Oakleigh to Jeebropilly for a few months after	Lack of rehabilitation planning updates in previous 5 months	Direct consultation with stakeholder groups planned in coming months; progress updates scheduled for coming meetings

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
	West Moreton Landcare RDPO (5) Local resident		mining has ceased, rehabilitation activities will continue thereafter	Request that the mine profile be similar to that of pre-mining, below railway height and that there be no residual void	Void will be made safe and stable. Stakeholder consultation will be taken into consideration in rehabilitation planning
18/02/2013	New Hope (4) DEHP (2) Beaumont Bulk Haulage RDPO (4) Ebenezer Against Mining Local residents (4)	CCAP meeting	Rehabilitation update: approximately 1.5 Mm^3 of spoil returned to void since mid-August 2012; remaining coal stockpiles expected to be depleted by end of March; approximately 12-18 months of work required to complete backfill and reshape the site	Concern over course backfill near Rosewood	It will break down; rehabilitation needs to work to a process
				Questions over what will happen with excess fill and topsoil	No excess fill expected and there was enough topsoil
				Question about a Government publication regarding restoration and rehabilitation	The final state of the land would depend heavily on the area's zoning and that a balance was required between what was in place previously and what the council is aiming to have in the future
22/05/2013	New Hope (2) Local resident RDPO (7)	CCAP meeting	Rehabilitation update: approximately 500 km^3 of material returned to void; approximately 12-15 months of work required to complete backfill and reshape the site	Query about whether it was still the company's intention that there be a consultative approach to the final landform design	Confirmed that this was the case
28/08/2013	-	CCAP meeting	Rehabilitation update: 800 km^3 of material returned to void since May 2013	—	—
02/10/2013	New Hope (4) West Moreton Landcare ICC – Councillor Local resident RDPO (5)	CCAP meeting	Rehabilitation update: 800 km^3 of material returned to void since May 2013	Enquiry as to whether all the available spoil would be used up	By the end of the rehabilitation work close to no spoil would remain, and the landform would be close to the previous form.

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
19/02/14	New Hope (2) DEHP ICC – David Pahlke West Moreton Landcare Local residents (2) RDPO (8)	CCAP meeting	Project update: total of approximately 3.5 Mm^3 of material returned to void, approximately 0.5 Mm^3 still to be returned; bulk earthworks to be complete by end of 2014, additional work thereafter mainly on drainage; site has been split into three planning areas based on distinct catchments/areas of disturbance. Each area has specific issues to be addressed and planning will happen in a staged sequence – Western Area then the Normanton Area then the Eastern Area. Agreement to change the frequency of meetings from quarterly to three meetings per years	Support (from Paul Kennedy) for using Normanton Dump to back fill the current void. Any lowering of the dump height might reinstate the view of a number of residents along Blake's Rd	—
				Concern over anecdotal evidence that electrical transformers had been left underground in some workings	New Hope aware of issue (identified in contaminated land assessment). No information on exact location, monitoring for potential contamination continues
25/06/14	New Hope (3) ICC – Councillor West Moreton Landcare RDPO (7) Local residents (4)	CCAP meeting	Project update: total of approximately 3.5 Mm^3 of material returned to void, approximately 0.5 Mm^3 of still be returned; total volume required to backfill void adjusted from 4M m^3 to 4.5M m^3 due to minor change in design; 1,000 m^3 of purchased topsoil stockpiled for when land becomes available	What grass species are being used in rehabilitation; what trees will be planted	Seed mix provided; required to re-establish 30ha of native ecosystem, looking at an area of Brigalow regrowth east of Rosewood-Marburg Rd
				Potential for biological control of Cats Claw Creeper that is being run by SEQ catchments	Will look into possibility of utilising the program as part of weed control work. UPDATE: no active weed management being undertaken at Oakleigh East until rehab concept has been decided as it may end up being cleared as part of rehabilitation works

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
15/10/2014	New Hope (4) ICC – Councillor West Moreton Landcare Local resident RDPO (8)	CCAP meeting	Project update Rehabilitation planning: overview of conceptual rehab plan presented and discussed. Plans are concept level, nothing has been decided	Query about timing for topsoiling	Stockpiled topsoil will be spread this week, seeding is intended soon after
18/02/2015	New Hope (2) West Moreton Landcare ICC – Councillor RDPO (9)	CCAP meeting	Rehabilitation update: additional 6 ha topsoiled and seeded in November; full activity to recommence in March; main earthworks at Oakleigh West to be completed by August 2015; demolition of tunnels at Oakleigh East to commence in March/April	Query about the success of November seeding	Strike rate good although it looks yellowish. Siratro/Glycene coming through, potentially from seeds in topsoil
				Query about erosion at North Pit	Conceptual plan includes work to stabilise the area; sediment does not leave the site; not worth undertaking repairs until final rehabilitation plan has been settled
24/06/2015	New Hope (2) ICC – Councillor West Moreton Landcare RDPO (5) Local residents (3)	CCAP meeting	Project update: full activity recommenced in March 2015; bulk earthworks to be completed July 2015; Oakleigh East Building demolition and tunnel rehabilitation to commence shortly; Conceptual Rehabilitation Plan is being reviewed	Concerns over use of biosolids regarding smell and build up of contaminants/medical compounds	Not using worst smelling grade, spreading to stop if wind direction is towards a nearby sensitive receptor, biosolids must be incorporated into the ground within 24 hours as a measure to control odour. No chance of accumulation at the rates being applied
				Concern over anecdotal evidence that electrical transformers had been left underground in some workings	New Hope aware of issue (identified in contaminated land assessment). No information on exact location, monitoring for potential contamination continues
14/10/2015	-	Information letter	Biosolids being used in rehabilitation works	—	—

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
21/10/2015	New Hope (2) ICC – Councillor West Moreton Landcare RDPO (3) Local residents (3)	CCAP meeting	Project update: bulk earthworks at Oakleigh West complete; drainage lines established; biosolids to be used at Oakleigh West starting in the following week for 4-5 weeks; Conceptual Rehabilitation Plan for Oakleigh East is being reviewed; workshop hosted at New Oakleigh focused on rehabilitation techniques	Rehabilitation of tunnels and potential for subsidence	New Hope engages Moreton Geotechnical Services (used by ICC) who provide independent expert advice on how to rehabilitate tunnels and shafts. Each tunnel is inspected and an individual plan for rehabilitation is developed.
				Query about what is being done with the bund to the west of Rosewood-Marburg Rd	It will be removed.
				Face of Oakleigh North Pit	The face will be rehabilitated to be made stable, then revegetated.
				Are there going to be any “Rosewood Scrub” species re-established at New Oakleigh	New Hope is required to re-establish 30 ha of native ecosystem. New Hope is looking at supplementary planting of existing areas of regrowth and some “Rosewood Scrub” species will be included. For previous planting New Hope has sought input from local experts, including Martin Bennet and Arnold Rieck on appropriate species to include.
16/03/2016	New Hope (2) RDPO (6) Local resident	CCAP meeting	Project update: Biosolids were not applied due to issue with EHP paperwork	Request for confirmation of intention to use biosolids in rehabilitation	Confirmed intention to use biosolids in rehabilitation, although smaller volume than originally.
				Concern over water seepage along Urry Rd	Confirmed that it is believed to be a natural seep that originates somewhere north of Urry Rd. Salt levels consistent with local groundwater.

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
				Request that bunds along Rosewood-Marburg Rd and Urry Rd be removed	Most have been removed and the dirt used elsewhere. There is no current plan to remove the remainder.
				Concern over old tyres still on site	The old tyres will be disposed of according to legal requirements
				Concern over diesel spill from several years ago	Any potential contamination will be dealt with before the rehab will be signed off.
				What is the plan for rehabilitation at Oakleigh East, with particular reference to the overburden dump at Normanton?	No decisions had made at the time as New Hope still considering options for rehabilitation. One option includes taking the dump down and using it to backfill the void. A number of issues need to be considered in this decision including re-disturbing areas that are well rehabilitated and the impact on near neighbours if we were to go back into that area. UPDATE: the spoil dump has been removed and used to backfill the Normanton void
				Concern over erosion along Blakes Rd. Request to use wattles interplanted with other species to help stabilise the banks	Confirmation that there is significant erosion in the rehabilitation in that area. Will need to be addressed as part of the final rehabilitation design. Stated that revegetation will be key to minimising erosion and controlling sediment. New Hope is considering all alternatives.

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
				Request that "Rosewood Scrub" species be planted in the gully lines re-established at Oakleigh West	There are no current plans to plant trees in these areas. New Hope still needs to determine how the Native Ecosystem rehabilitation requirement will be met including the best place to establish these trees.
19/06/2016	RDPO	Email to Brad O'Reilly	—	Lack of consultation, specifically over plant species used in rehabilitation, and request that a suitably qualified expert on local plants and ecosystems be consulted before the next phase of rehabilitation	No response recorded
20/07/2016	New Hope (2) ICC – Councillor RDPO (6)	CCAP meeting	Project update: Biosolids application completed in May 2016; design work has commenced for final landform design options for Oakleigh East (rehab works to commence after August 2017)	—	—

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
16/11/2016	New Hope (2) RDPO (4)	CCAP meeting	Project update: Oakleigh West – stabilisation of main channel using soil binder; commenced aerial surveys investigating ongoing usage for erosion monitoring/vegetation density etc. Oakleigh east – site work ongoing to remove existing infrastructure; Design work has commenced for final landform options for Oakleigh East, there are a number of stakeholders/impacted parties who will be consulted – ICC waste transfer facility, Railway etc. Drainage is a key consideration	—	—
24/05/2017	New Hope (2) ICC – Councillor RDPO (5) West Moreton Landcare	CCAP meeting	Project update: Oakleigh West: physical rehab works complete, monitoring and maintenance ongoing; remaining infrastructure being tidied up; erosion and sediment control effective following significant flow event; aerial surveys ongoing Oakleigh East: Site work to remove existing infrastructure complete;	Concern over historic diesel spill	It was cleaned up at the time, a contaminated land assessment will be undertaken as part of closure process
				Concern over lack of tree cover for land to be suitable for grazing	To be assessed prior to commencement of grazing, expecting some natural germination of native tree species to occur similar to other sites
				Suggestion that AR/CT be engaged to avoid delays in sourcing native seed/seedlings	Agreed that AR/CT will be consulted when the design work has advanced sufficiently

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
20/09/2017	—	CCAP	Project update: Oakleigh West – workshop cleared out, equipment being progressively relocated from site; ongoing monitoring and management of erosion and sediment controls, vegetation establishment etc. Oakleigh East – removal of infrastructure, buildings etc. complete; sealing of underground shaft complete; detailed design work under way; closure planning continues	—	—
14/03/2018	—	CCAP drop-in session	Project update: rehabilitation progress, North Pit area concept design, drainage concept design; completion of detailed design at Oakleigh East scheduled for mid-late 2018; commencement of capping at North Pit tailings dam scheduled for late 2018; possible removal of remaining infrastructure at Oakleigh East scheduled for late 2018; commencement of bulk earthworks to backfill Normanton Put scheduled for early 2019	—	—
14/03/2018	—	CCAP meeting drop-in session	Project update: sealing of underground works at Oakleigh East complete; removal of infrastructure 95% complete; detailed design of final landform and drainage under way	—	—

Date	Attendees/representatives	Consultation type	Information topics	Issue raised by community	New Hope response
04/12/2018	—	CCAP meeting drop-in session	Project update: sealing of underground works at Oakleigh East complete; removal of infrastructure 95% complete; detailed design of final landform and drainage under way; tailings dam capping commenced	—	—
07/05/2019	—	CCAP meeting drop-in session	Project update: sealing of underground works at Oakleigh East complete; removal of infrastructure 95% complete; detailed design of final landform and drainage under way; tailings dam capping under way; Normanton void backfilling to commence mid-2019 (12-month duration); indicative timing of works	—	—
2020[1]	—	—	—	—	—

Appendix E. Rehabilitation Monitoring and Maintenance Program

REHABILITATION MONITORING PROGRAM

JEEBROPILLY COAL MINE

PREPARED FOR
NEW HOPE GROUP PTY LTD

15 MAY 2024

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Report Title:	Rehabilitation Monitoring Program
Client:	New Hope Group Pty Ltd
Project Manager:	Stuart Ritchie

Version	Comments	Author	Reviewer	Date
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1 Introduction

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by New Hope Group Pty Ltd (NHG) on behalf of Jeebropilly Collieries Pty. Ltd. to develop a Rehabilitation Monitoring Program (RMP) to guide the monitoring of rehabilitation performance for the Jeebropilly Coal Mine (the Project). This RMP is applicable to rehabilitation activities associated with Mining Leases (ML) ML 4705, ML 50082, ML 50093, ML 50133, ML 4577, ML 4711, ML 4689, ML 7186, ML 4690, ML 4677, ML 50132, and ML4710 in accordance with the Project's environmental authority (EA) (EPML00826713).

1.1 Purpose

The purpose of the RMP is to guide assessment of the condition of rehabilitated areas through the collection and comparison of quantitative data from rehabilitated and reference sites. Comparison of data from rehabilitated sites against reference sites and post land-use criteria is used to assess the performance of rehabilitation works.

The program has been designed to meet the rehabilitation goals, objectives, indicators and criteria defined in the Progressive Rehabilitation and Closure Plan (PRCP) for the Project (AARC 2023).

1.2 Scope

This RMP incorporates the following components to ensure sufficient data is collected to assess the progress of the Project's rehabilitation works over time against the identified completion criteria:

- a rehabilitation monitoring design that determines the progress of existing project rehabilitation through quantitative assessments;
- identification of existing reference and rehabilitation monitoring locations and, for all monitoring locations, ensure that adequate spatial and temporal coverage is established to address the RMP objectives;
- a specified frequency for monitoring events and an overall duration for the rehabilitation monitoring program;
- the definition of sampling methods that are repeatable and comparable over time and between different observers;
- analysis techniques suited to the field monitoring data being collected; and
- reporting on the progress of rehabilitation against the identified rehabilitation objectives and completion criteria for the Project.

1.3 Background

Jeebropilly coal mine is located in southeast Queensland in the West Moreton Coalfield, approximately 55 km southwest of Brisbane, 18 km west of Ipswich City, and 10 km southeast of Rosewood (Figure 1). The Project comprises 12 mining leases (MLs) covering approximately 1,446 ha that are held by Jeebropilly Collieries Pty Ltd, a wholly owned subsidiary of New Hope Group (Figure 2). Jeebropilly and the existing open cut coal mine, was purchased from Ryland Collieries Pty Ltd by Jeebropilly Collieries Pty Ltd in 1982.

At peak supply production, the Project produced approximately 1 Mtpa of product coal. Product coal was loaded onto trains and transported to the Port of Brisbane via the Ebenezer Rail Loop. Mining activities ceased in December 2019 and coal materials have since been removed from the site. In 2020 the CHPP was demolished with the remaining infrastructure to be retained under a landholder agreement (Figure 3). The retained Run-of-Mine (ROM) pad, CHPP (slabs, hardstand areas and adjacent offices) and laydown areas are included within a landholder agreement for retained infrastructure.

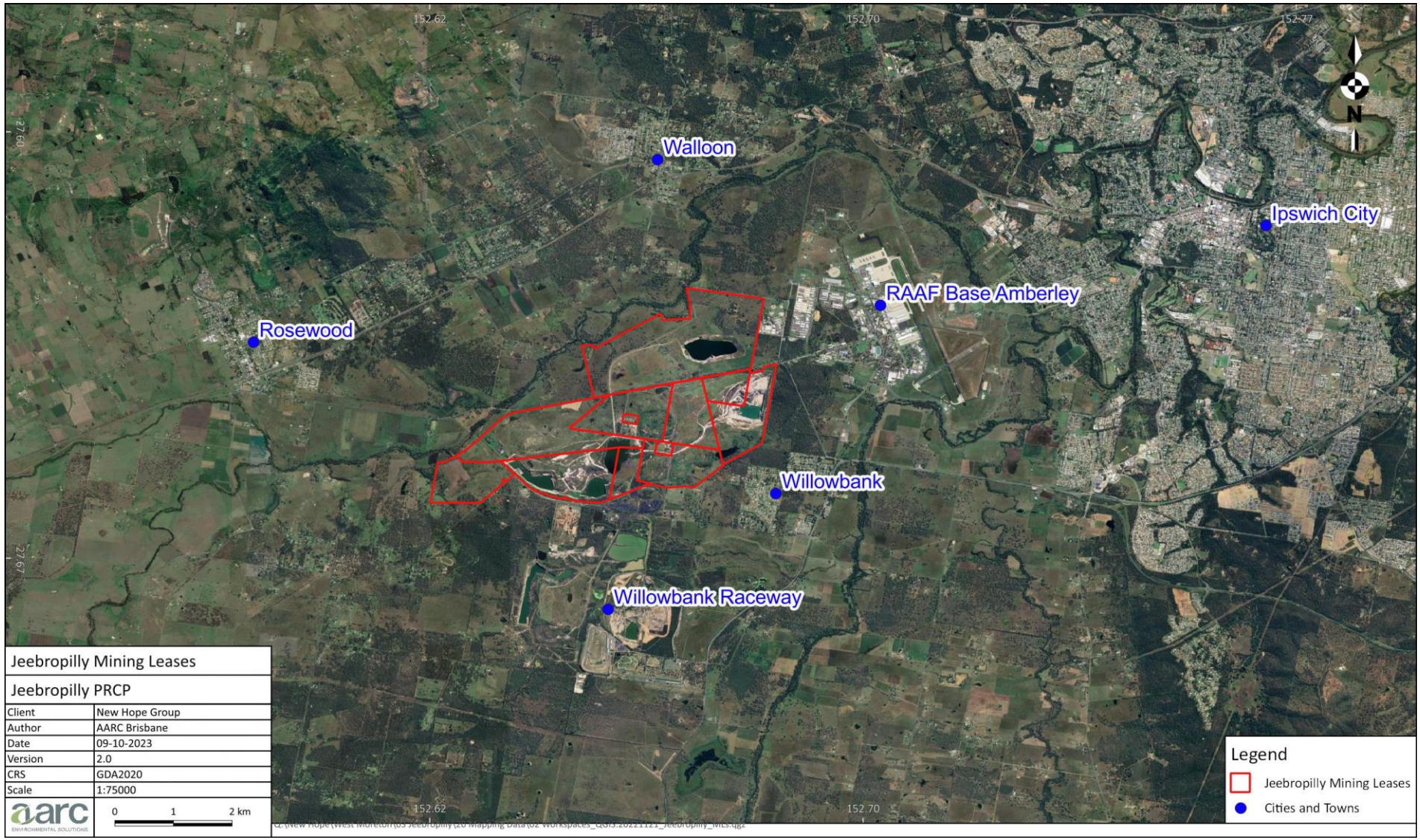

Figure 1: Project Locality

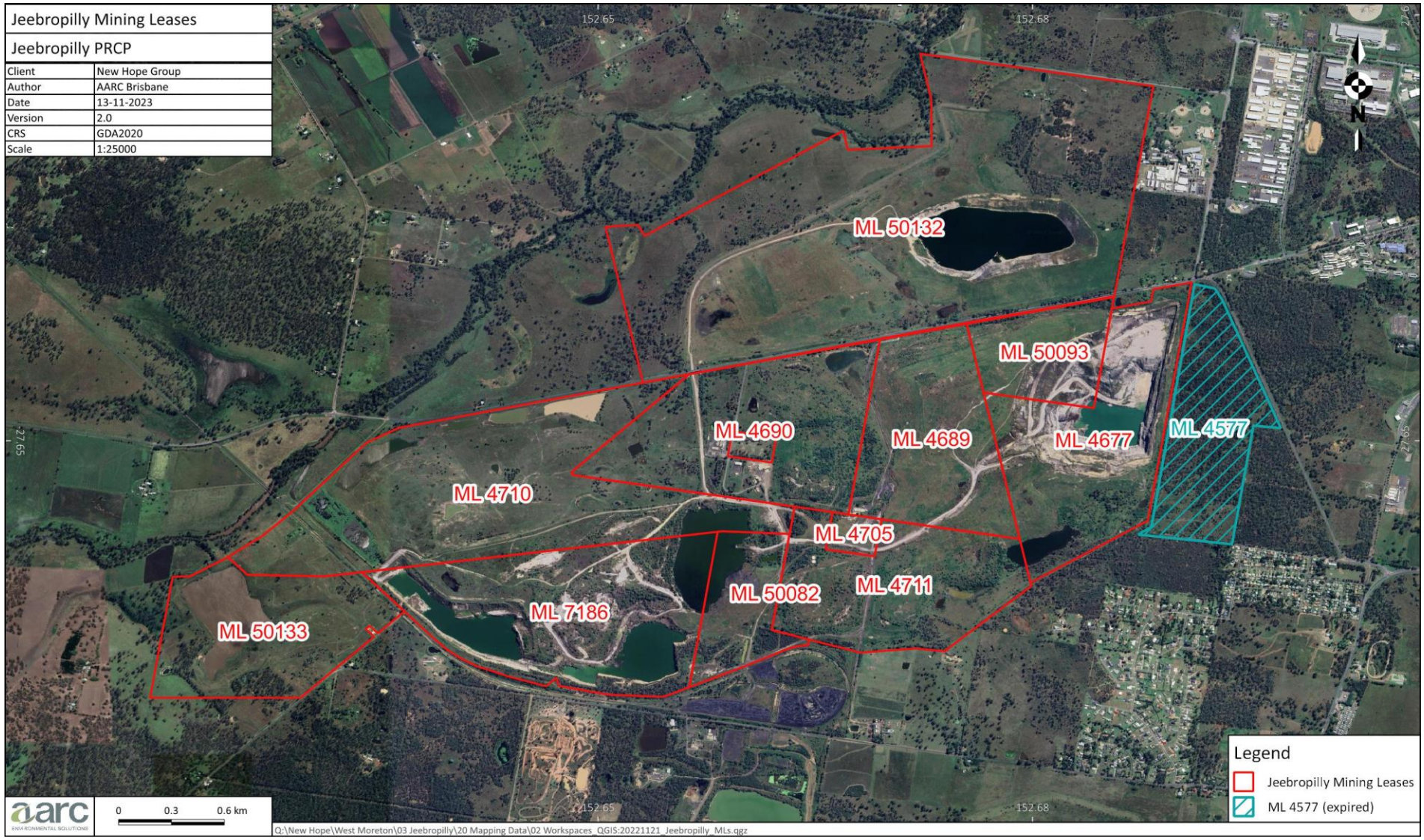

Figure 2: Project MLs

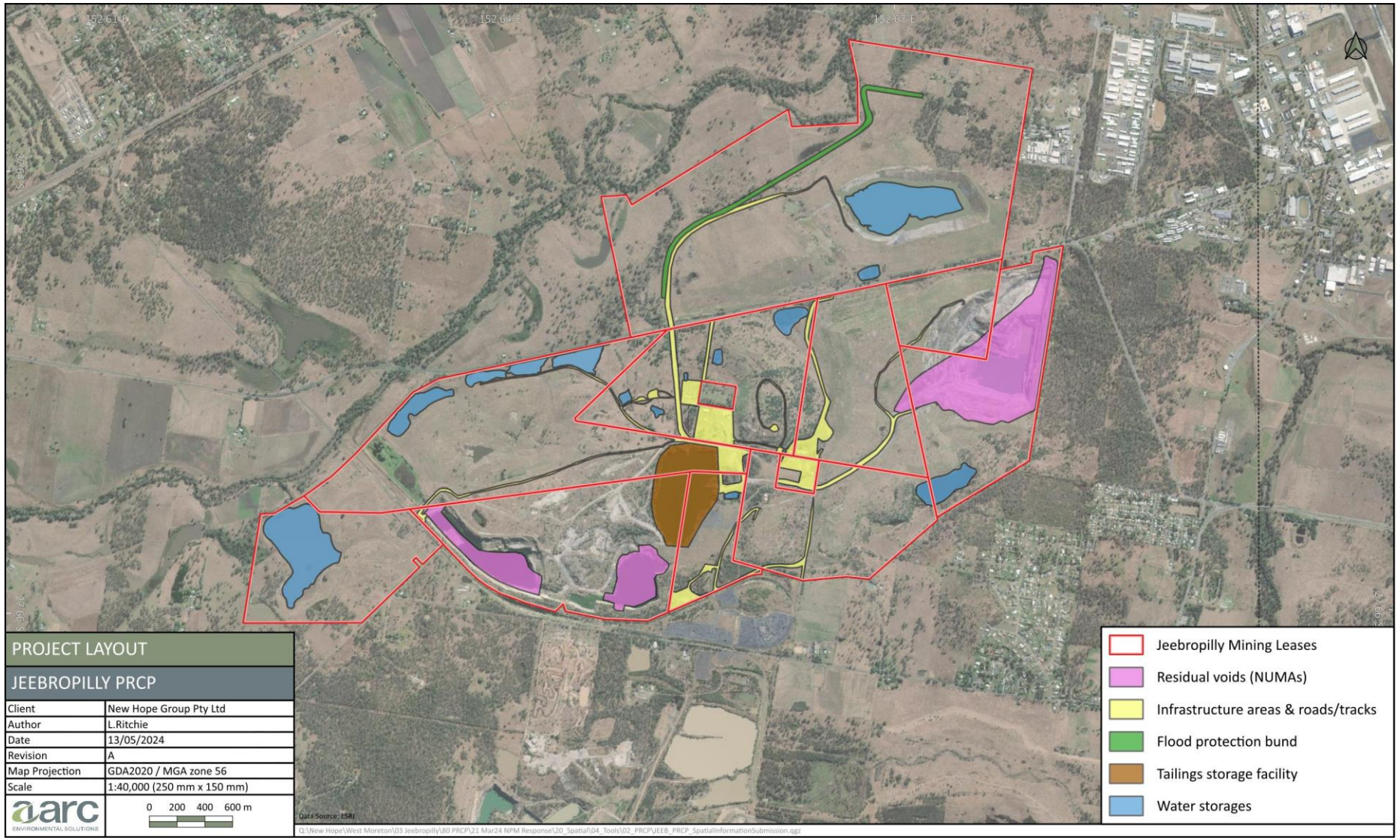

Figure 3: Project layout

To allow for the development of the PRCP, discrete rehabilitation areas (RAs) and improvement areas (IAs) have been defined for the Project. An RA is defined in the Environmental Protection Regulation 2019 as an area of land in the post mining land use (PMLU) to which a rehabilitation milestone for the post-mining use relates. An IA is defined in the EP Regulation as, for a non-use management area (NUMA), an area of land in the NUMA to which a management milestone for the NUMA relates. RAs and IAs have been nominated for areas of disturbance within the Project as shown in Figure 4, and summarised in Table 1.

Table 1: Rehabilitation and improvement areas

RA / IA	Mine Domain / Rehabilitation Area	Description / inclusions	PMLU/NUMA
RA1	Open cut disturbance areas	• ML7186 out-of-pit waste rock emplacement (to be partially utilised for void rehabilitation) • Rehabilitated land (not certified) • Exploration areas • In-pit waste rock emplacements / backfilled residual voids • Out-of-pit waste rock emplacements	Low intensity cattle grazing
RA2	Flood protection bund	• Existing flood protection infrastructure	
RA3	Waste disposal area / Tailings storage facility	• Tailings storage facility	
RA4	Co-disposal facility	• Rehabilitated co-disposal area	
RA5	Mine infrastructure areas / Retained infrastructure	• workshop, fuel farm, store and associated facilities • existing administration buildings, offices and ablutions blocks; • existing septic systems; • existing concrete slabs/levelled pads for the CHPP; • existing ROM pads (to be stripped of carbonaceous material); • existing concrete slab/levelled pads for the historic coal to liquids plant; • existing services – potable water, power, communications; • existing and functioning livestock watering dams; • existing water management pipelines; • existing sealed roads, access tracks and haul roads; and • existing fencing and security installations.	Retained infrastructure
RA6	Residual void water storage	• Water filled residual void rehabilitated to allow safe access for stock and with a water quality suitable for livestock watering	Water storage
IA1	Residual voids	• Highwall, lowest low wall and final void remaining from open cut disturbance after reshaping to the final landform	Water storage (NUMA)

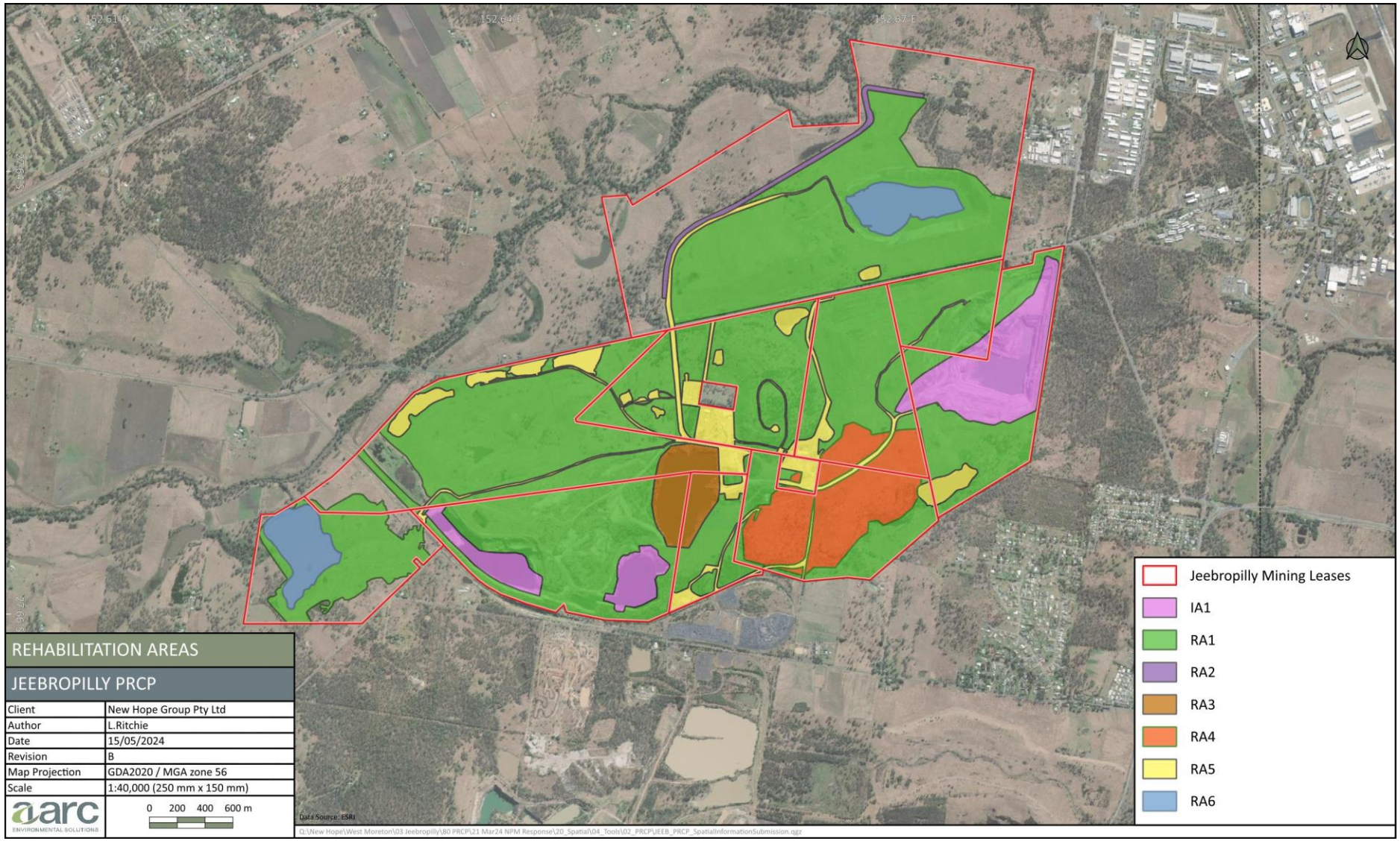

Figure 4: Rehabilitation areas

2 Rehabilitation requirements

In accordance with the Project's EA, NHG is required to undertake progressive rehabilitation of land disturbed by mining activities. These rehabilitation areas must be monitored at an appropriate frequency to demonstrate that site specific rehabilitation goals are likely to be achieved upon completion of the Project.

2.1 Environmental authority requirements

This RMP is intended to satisfy requirements prescribed in relevant conditions of the Project's EA which are:

C16 ***Maintenance of rehabilitated areas***
Maintenance of any rehabilitated areas must take place to ensure —

a) erosion control measures remain effective;

b) plants show growth;

c) any weed infestations are removed and prevented from recurring;

d) plants that have not taken, died or have become diseased are removed and disposed of appropriately and replaced as soon as practical;

e) significant plant losses are examined for possible causes; and

f) the rehabilitated land should be capable of withstanding normal disturbances such as fire or any seasonal flooding the area may experience.

C17 *Maintenance of these rehabilitated areas must continue until such time as the operator can demonstrate that the area has been successfully rehabilitated to a condition that will comply with Condition C16 and that rehabilitation works in the area are self-sustaining and no longer relies on the intervention of the person undertaking the activity.*

2.2 Final land use and rehabilitation

2.2.1 Pre-mining land use

Historically, land uses surrounding the Project site consisted predominantly of agriculture and cattle grazing (Telfer et al. 1998). Other important land uses identified in the Bremer River catchment at the time included mining, quarrying, rural residential and urban developments, State Forest and recreation and nature reserves.

At the time of the commencement of open cut mining in 1971, the Project area had been extensively cleared by past land use practices. The pre-mining land use within and surrounding the Project area consisted of moderate cattle grazing on a mixture of native and introduced pasture grasses. As a result of the historical grazing on the site, the land had been extensively cleared prior to mining and in areas where vegetation was not cleared, there was evidence of selective logging. The average slope of the pre-mining landscape was 5 %, varying between 2–10 %, with several ephemeral waterways draining north and west to the Bremer River.

The Project site holds a rich history of mining undertaken prior to the acquisition of the mine by Jeebropilly Collieries in 1982. Underground mining commenced at the Project site between 1930 and ceased operations in 1964 when the underground resource was economically exhausted. Open cut operations commenced in 1971 in the south-west corner of ML 4577 (now expired), directly over the remaining Mt Elliott resources and underground mining operation, and progressed in a westerly direction through ML 4677. Nine pits commenced over the life of mine, with the final pit ceasing operations in 2018.

2.3 Rehabilitation goals, objectives, indicators and criteria

In Queensland, mine rehabilitation is required under the *Environmental Protection Act 1997* (EP Act). Amendments to the EP Act in late 2018 implemented key elements of the State Government's Mined Land Rehabilitation Policy (Queensland Government 2018) which intends to ensure that, for land disturbed by mining activities:

- the land is safe and structurally stable;
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (section 111A of the EP Act).

Site specific rehabilitation objectives, indicators and criteria have been developed for the Project to assist in achieving these goals for each rehabilitation area, as outlined in the PRCP (AARC 2024).

Rehabilitation indicators provide measures of progress towards rehabilitation objectives. Milestone criteria are the standards which provide a clear definition of successful rehabilitation for each nominated milestone. Milestone criteria take the form of a set of measurable benchmarks against which the rehabilitation indicators can be compared to determine if objectives are being met. Rehabilitation is deemed successful when completion criteria for each rehabilitation goal and objective are consistently met.

The revegetation and landform completion criteria for disturbed and constructed landforms to meet post-mine land use prior to relinquishment are described in Table 2 and Table 3.

Table 2: Rehabilitation milestone criteria

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM1	RA1 RA3 RA4 RA5 RA6	Non-retained infrastructure decommissioning and removal	• All non-required services disconnected and removed • All concrete, bitumen and gravel roads removed (where not retained) to a depth of 1 m. • All operational pipelines drained and removed • All fencing that is not compatible with PMLU requirements removed • All non-retained buildings demolished and/or removed • All machinery and equipment decommissioned and removed • All surface water drainage infrastructure that is not retained in the final landform removed • All non-retained water management structures decommissioned • All rubbish removed
RM2	RA1 RA3 RA4 RA5	Determination/ management of contaminated land status	• Contaminated land assessment undertaken by an appropriately qualified person[1]. If required, a site investigation report including a site suitability statement/ management plan (as required) prepared and submitted in accordance with the provisions of Chapter 7, Part 8 of the EP Act; • Contaminated material either: o remediated in situ; o removed/transported to an approved landfill for disposal and waste tracking information recorded and submitted; or o retained and managed under a site management plan (e.g. tailings)
RM3	RA1 RA2 RA3 RA4 RA6	Landform development (reshaping, reprofiling, topdressing, contour ripping/discing, soil amelioration)	• All landform works completed to design specifications including installation of safety and drainage bunds • With the exception of areas rehabilitated prior to 2023, all slopes are to be less than 17° gradient (applicable to RA1 only): • Assessed as geotechnically stable by an appropriately qualified person[1] (applicable to RA1, RA2, RA3, RA4) • Prior to each rehabilitation event, soil health and suitability are assessed and documented by an appropriately qualified person[1], and a recommendation made for ameliorants to ensure sodicity, salinity, pH and fertility levels are suitable to achieve the relevant PMLU (applicable to RA1 and RA3) • Records of ameliorants applied and incorporated into surface, as recommended by an appropriately qualified person[1] (applicable to RA1 and RA3) • Ripping undertaken along the contour of slopes (applicable to RA1 and RA3): • ripping at 300 mm approximately 1 m apart

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM4	RA3 RA4	Capping installation	• Capping installed to design parameters including (applicable to RA3 only): o working cover and waste rock cover of approximately 3 m thickness; and • growth media or topsoil applied • Certification provided by an appropriately qualified person[1] confirms that capping layers have been implemented to design specifications (applicable to RA3 only)
RM5	RA1 RA2 RA3 RA4 RA6	Revegetation	• Completed seeding using a selection of species listed in **Error! Reference source not found.**, ensuring a minimum of 3 x 3P (perennial, palatable, pasture) native species • Minimum seeding rate of 10 kg/ha • Records demonstrating species used, seeding rates, area sown, germination certificate, and seed origin
RM6	RA1 RA2 RA3 RA4 RA5 RA6	Achievement of surface stability	• Erosion classification[3] is comparable with erosion classifications from nearby equivalent land uses with similar landform parameters • No recorded erosion classifications[3] of 'Severe', where these cannot otherwise be demonstrated to be stable, or areas requiring continuous maintenance. • No active erosion present as demonstrated by no increase in erosion ratings over time • Hazard and safety assessment completed by an appropriately qualified person[1] demonstrates hazards are consistent with the type and severity of hazards typical of the adjacent equivalent land use
RM7	RA1 RA2 RA3 RA4	Achievement of target post-mining land use to safe and sustainable condition (Low intensity cattle grazing PMLU)	• Rehabilitation polygons have a median fractional vegetation cover greater than the first quartile of reference polygons for at least 85% of all sample times, as determined using the satellite-derived fractional vegetation cover method • No prohibited invasive or restricted invasive plants, and weed cover is ≤5% (excluding exotic pasture grasses). Weed abundance is no greater than at nearby equivalent land uses with similar landform parameters • Self-sustaining vegetation with projective cover, species composition and species distribution similar to nearby equivalent land uses with similar landform parameters • Relevant land capability Class 6 – 8 achieved
RM8	RA5	Achievement of target post-mining land use to safe and sustainable condition (Retained infrastructure PMLU)	• No built structures remain other than those that form part of a landholder agreement • Retained structures are in a state fit for use for the associated PMLU • Retained livestock water dams water quality parameters are below the 'low risk' trigger values for livestock drinking water defined in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000)

Milestone reference	Applicable Rehabilitation Area	Performance indicators	Milestone completion criteria
RM9	RA6	Achievement of target post-mining land use to safe and sustainable condition (residual void water storage PMLU)	• All water storages assessed as safe and stable by an appropriately qualified person[1] • Water storage water quality parameters are below the 'low risk' trigger values for livestock drinking water defined in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000)

1 Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature.

2 Consistently means that the criterion is met for a minimum of three consecutive years.

3 Erosion classification framework:

Table 3: Management milestone criteria

Management milestone	Applicable improvement areas	Milestone criteria	Nominated time frame (years)
MM1 -Achievement of final landform design	IA1	• Residual void slope criteria: o maximum slope for competent rock: 47–65°; and o maximum slope for incompetent rock: 17–21°; • An assessment undertaken by an appropriately qualified person[1], confirming that there is minimal risk of serious environmental harm to land, surface waters or any recognised groundwater aquifer post-mining. • Voids are assessed to be geotechnically stable by an appropriately qualified person[1]	3
MM2 - Achievement of surface and safety requirements	IA1	• Safety infrastructure established around the void, including the following: o adequate bunding in place; and o perimeter fencing and signage erected to prevent access to fauna and humans. • Bunding constructed to the following design criteria: o minimum base width of 4 m; o a minimum height of 2 m; and o located, where practicable, at least 10 m beyond the area potentially affected by any instability of the pit edge.	2
MM3 - Achievement of sufficient improvement	IA1	• Assessment by an appropriately qualified person[1] that no serious environmental harm in relation to groundwater will occur outside of the relevant tenure boundary. • Certification from an appropriately suitably qualified person[1] that the residual voids are not hazardous to humans and livestock/fauna	1

1 Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods, or literature.

3 Monitoring program design and methodology

3.1 Monitoring program design

The RMP is designed to assess rehabilitation progress to effect acceptance of rehabilitation by the administering authority and to support surrender of the MLs. A key assessment will be the behaviour of rehabilitated areas in comparison with surrounding non-mind lands, or analogue sites.

3.1.1 Rehabilitation monitoring frequency and coverage

Rehabilitation will be monitored at a frequency appropriate to the stage that rehabilitation is at, generally with the survey period occurring post wet season, as monitoring at this time allows for more accurate identification of the species present and a clearer understanding of species richness on-site.

The rehabilitation monitoring program will be reviewed to ensure that data collection is achieved at sufficient spatial and temporal resolution to ensure statistically valid results.

3.2 Rehabilitation monitoring program

3.2.1 Analogue sites

Rehabilitation completion criteria, described for each mine domain, can be achieved by comparing a number of variables between rehabilitation areas and existing ecosystems (analogue sites) over time.

Pasture vegetation analogue or reference transects should provide sufficient replication to allow for statistical testing that is rigorous enough to determine differences between a reference site and rehabilitation values and demonstrate the achievement of completion criteria. It is recommended that a minimum of three transects be established within representative land use with similar landform parameters. The frequency and timing of monitoring of reference sites is to coincide with monitoring of rehabilitation areas. Where possible, reference sites should be chosen that replicate the anticipated slopes of rehabilitated areas. Results from reference sites will be used to compare and assess monitoring results obtained from rehabilitated site transects. Analogue sites will be recorded as GIS files, for replication.

Rehabilitation monitoring will aim to demonstrate that domain specific completion criteria have been continuously met for a period of three years before the rehabilitation is considered successful.

3.2.2 Rehabilitation sites

Rehabilitation sites will be determined through ground truthing of the Project area and where rehabilitation occurs. These areas will be compared to analogue sites.

3.3 Rehabilitation monitoring aspects

The following methods are employed at each monitoring site and described in detail in the following sections:

- permanent vegetation monitoring transects (ground cover monitoring and species richness);
- photographic monitoring;
- erosion monitoring;
- topsoil characterisation (every 2–3 years).

In conjunction with walking between transects, rehabilitation areas will be visually assessed to identify signs of fauna utilisation, noticeable issues such as erosion, vegetation cover deficiencies, or weed and / or pest infestations. Satellite imagery technology may also be employed. These observations are incorporated with the results of each rehabilitation progress report.

3.3.1 Vegetation monitoring

Vegetation monitoring will involve the collection of quantitative data for:

- ground cover percentage;
- canopy cover;
- species richness;
- woody stem density;
- recruitment; and
- weeds.

Each monitoring transect site is demarcated by a 50 m long transect and observations/ measurements are taken at each 5 m interval on either side of the transect, thereby representing an effective plot size of 50 m by 10 m. A plastic delineator post guide will be installed at each end of the transect to ensure the exact location of the permanent transect can be identified, ensuring robust sampling repetition.

The survey methodology outlined has been adapted based on information contained within the *BioCondition Assessment Framework* (Eyre et al. 2015), the *Vegetation Assessment Guide* (DoE 2013), and the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al. 2022).

3.3.1.1 Species richness

To measure species richness, all vascular plants occurring within 5 m of either side of the 50 m transect are recorded. Any species unable to be identified are collected for later identification. Species will be classified into one of the following six groups for reporting purposes:

- native pasture species;
- exotic pasture species;
- trees;
- shrubs;
- forbs; and
- noxious weeds.

This methodology is used to record species richness and the projective foliage cover on the transects to assess against milestone criteria. It should be noted that due to the pastoral nature of rehabilitation sites, the Projective foliage cover is inferred from the vegetation cover measured at each transect.

3.3.1.2 Ground cover

Ground cover monitoring involves the collection of quantitative data on average ground cover (percent) where the percentage of all types of ground cover within ten 1 m x 1 m quadrats is determined. Similar to the transect above, the quadrat shall be placed every 5 m on alternating sides of the transect, commencing at 0 m on the right and the final quadrat at 45 m. In each quadrat the total percentage ground foliage cover of each plant species and the percentage cover of bare soil, rock and organic litter is recorded.

Ground foliage cover incorporates native perennial grass cover, native annual grass cover, native forbs and other species, native shrubs (< 1m height), non-native grass, non-native forbs and shrubs, litter, rock, bare ground and cryptogams.

3.3.1.3 Pasture productivity

An assessment of pasture productivity will be undertaken to determine the achievement of the target PMLU. Pasture productivity within rehabilitated areas will be assessed using either manual measurements or satellite imagery. Measurements for pasture productivity should be undertaken at the end of the growing season. Manual measurements of pasture productivity will be undertaken in accordance with relevant industry guidelines. Pasture mass and height are common proxy measurement used for assessing pasture productivity.

To measure pasture mass:

1) a 30 x 30 cm quadrat will be established to measure sample sites;
2) a digital photograph is to be taken of the sample quadrat;
3) pasture is then cut to ground level and placed in a paper bag;
4) the paper bag is placed on a wet/dry balance and the mass is recorded;
5) the process is then repeated for a minimum of 15 sites across the paddock and up to 20 sites if the paddock has significant variability in cover; and
6) data collected is then used below to calculate the average pasture mass in kilograms of dry matter per hectare (kg DM/ha).

To measure pasture height using the ruler/stick method (Meat and Livestock Australia 2019):

1) a 1 cm thick dowel, 30 cm long is marked 0.5 cm from the bottom, then every 1cm along the stick. Note: readings between 0.5cm and 1.5cm will be recorded as 1cm, readings between 1.5cm and 2.5cm as 2cm etc.;
2) to measure the pasture, place the stick vertically on the soil surface at the point where the base of the stick landed;
3) slide a thumb down the stick until you touch a green leaf and record the cm;
4) measure the height from at least 50 sites chosen at random as you traverse the paddock. The best way is to throw the stick as you walk across the paddock; and
5) pasture mass is then estimated in kg dry matter DM/ha using the approximate relationship between pasture height and a kg DM/ha chart.

Pending the outcomes of the advancement of the use of remote sensing / satellite imagery currently being undertaken, pasture productivity may be estimated from the use remote sensing or satellite imagery. For example, the CSIRO in partnership with the Western Australian Government has developed a '*Pastures from Space*' program which will utilise satellite imagery to provide real-time data on green pasture biomass and feed on offer. The use of satellite imagery is beneficial in providing a site-wide analysis and comparative analysis with analogue sites.

3.3.2 Erosion monitoring

An erosion monitoring methodology has been developed by experienced AARC ecologists with consideration to relevant guidelines and research (Neldner *et al.* 2019, Eyre *et al*. 2017 and DSITI 2015). Erosion monitoring is to be conducted across all analogue and rehabilitation monitoring locations. Rehabilitation areas will be inspected

to assess the extent of erosion features and an erosion rating for each site will be determined. Erosion features or indicators may include wind or sheet erosion, erosion rills, gullies or tunnels, or signs of slumping.

Erosion at the survey sites is monitored through visual assessment over time. Assessment is undertaken by traversing the 50 m transects described in Section 3.3.1, and recording the number and average depth of any erosion features or rill lines. Table 4 is used to record and classify these observations. The overall classification of the erosion on each transect is determined by the higher classification attributed to either the number of rills/gullies or the average depth. For example, a transect may present only one or two rills but if these are recorded as being 25 cm deep, the transect will be classified as presenting a Moderate erosion classification.

Obvious cases of localised settlement which are not causing any subsequent erosion are not counted as instances of erosion.

Table 4: Erosion classifications

Erosion classification	**Minor**	**Moderate**	**Severe**
Sheet erosion	Shallow soil deposits downslope	Partial exposure of roots; moderate soil deposits downslope, etc.	Loss of surface horizons; root exposure, etc.
Rills/ gully erosion (per standard 50 m transect)	< 15 rills and < 0.3 m deep	15–30 rills and < 0.3 m deep	> 30 rills and/or any > 0.3 m deep
Tunnel erosion	Absent	Absent	Present
Mass movement	Absent	Absent	Present

It should be noted that the placement of the permanent transects may not be representative of the level of erosion across the entire rehabilitation area landforms. To compensate for this, general observations undertaken during the survey are also utilised in assessing rehabilitation performance. The location of any severe erosion outside the transect (i.e. tunnels, mass wasting, large gullies) is also recorded and marked with a handheld Global Positioning System (GPS).

The following information is recorded at each site:

- GPS reading of location;
- general description of type of erosion (gully [> 30 cm], rill line [<30 cm], circular failure, tunnelling etc.) and possible causes, refer to the glossary of terms for definitions of erosion types;
- depth of erosion;
- width of erosion;
- length of erosion;
- where eroded material is being deposited; and
- whether the erosion line is being stabilised by vegetation.

3.3.3 Soil monitoring

Topsoil sampling is to be undertaken where there is a need to identify and address any deficiencies in the chemical composition or exceedances in the metal composition of the soil that may be detrimental to vegetation health.

Soil monitoring involves the collection of topsoil samples from a maximum depth of 10 cm to obtain quantitative data on the chemical and physical properties of soil. Soil sampling methodology has been adapted from Monitoring and Sampling Manual Environmental Protection (Water) Policy 2009 (DES 2018). Soil sampling is conducted by collecting approximately 200 g samples with a clean non-metallic shovel and bucket every 10

m along the 50 m transect. The first sample is collected at 0 m. These five samples are mixed in the bucket. The final 200 g soil sample is taken from the mix and placed into plastic sample bag. Samples are sent to a NATA certified laboratory for analysis of indicators of soil nutrition and land contamination including:

- pH;
- electrical conductivity;
- soluble chloride;
- moisture content;
- Emerson aggregate stability test;
- exchange acidity;
- exchangeable cations (calcium, magnesium, potassium, sodium and aluminium);
- cation exchange capacity;
- calcium : magnesium ratio (Ca: Mg);
- exchangeable sodium percentage (ESP);
- total nitrogen, nitrite and nitrate;
- sulphate;
- extractable potassium and phosphorous (Colwell);
- total organic carbon and organic matter; and
- trace elements (arsenic, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel and zinc).

Soil moisture content shall be measured for interpretive purposes only and will not be assessed in determining rehabilitation performance.

Ideally, rehabilitation site data should reflect that of analogue sites, though data indicating a trajectory to meet performance criteria may be sufficient in supporting the chosen post-mining land use.

3.3.4 Photographic monitoring

Photographic monitoring provides a visual record of the vegetation, ground cover, erosion and general appearance of each analogue and rehabilitation site, allowing these sites to be compared over time (Eyre *et al.* 2015). A digital camera is used to take the photos so that a permanent record can be kept for each site. The process of taking the monitoring photos is as follows:

1) the person taking the photograph stands at the star picket which marks the beginning of the 50 m;
2) the camera is then aimed directly toward the end of the 50 m transect and a single photograph is taken;
3) the person then stands at the star picket which marks the end of the 50 m transect;
4) the camera is then aimed directly toward the start of the 50 m transect and a single photograph is taken;
5) steps 1 – 6 are repeated for all terrestrial monitoring sites; and
6) the digital photographs are then downloaded and stored for future reference.

3.3.5 Fauna observations

Observations of any fauna species or indicators of fauna presence (e.g., scats, tracks, or other signs of fauna activity) within or in the vicinity of the rehabilitation areas will be noted as part of rehabilitation monitoring.

3.3.6 Surface water monitoring

Surface water quality monitoring will be undertaken for the Project in accordance with the relevant receiving environment monitoring program or surface water monitoring program. Surface water monitoring will be undertaken by a competent person and will be in accordance with the latest edition of the administering authority's water quality sampling manual.

3.3.7 Groundwater monitoring

Groundwater quality monitoring will be undertaken in accordance with the relevant groundwater monitoring programs for the Project. Groundwater monitoring will be undertaken by a competent person and will be in accordance with the latest edition of the administering authority's water quality sampling manual.

3.3.8 Residual voids

Residual void monitoring will be undertaken to assist in determining the achievement of milestone criteria as detailed in Table 3.

4 Data analysis, interpretation and reporting

4.1 Laboratory analysis

All soil samples collected during rehabilitation monitoring will be sent to a NATA certified laboratory for analysis of the recommended parameters.

In the event that, any plants cannot be identified in the field, samples will be sent to the Queensland herbarium for identification.

4.2 Progress reporting

A rehabilitation report will be prepared following the collection of monitoring data to provide a detailed analysis of monitoring results and evaluate rehabilitation progress towards completion criteria. This ongoing evaluation will enable the early detection of unfavourable trends in measured indicators and identify any requirements for adaptive management practices to ensure rehabilitation success and certification in the long term.

4.2.1 Interpretation

Rehabilitation monitoring results will be analysed both categorically and temporally. Results obtained from rehabilitation sites will be compared to analogue sites from the same final land use vegetation community. Rehabilitation monitoring results will also be compared with historical data where possible to detect any trends over time. Common variables such as climatic conditions, seasonal variation and other event specific circumstances will also be considered in the analysis of rehabilitation data.

5 References

DES 2018, *Monitoring and Sampling Manual Environmental Protection (Water) Policy 2009*, Version 2, July 2018, Department of Environment and Science, Queensland Government, Brisbane.

DME 1995, Technical guidelines for Environmental Management of Exploration and Mining in Queensland, Department of Mines and Energy, Queensland, Brisbane.

DSITI 2015, Chapter 1: Introduction, in Soil conservation guidelines for Queensland, Department of Science, Information Technology and Innovation, Brisbane.

Eyre, T, Kelly, A, Neldner, V, Wilson, B, Ferguson, D, Laidlaw, M and Franks, A 2015, BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual, Version 2.2, Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane.

Eyre, T, Kelly, A and Neldner, V 2017, Method for the Establishment and Survey of Reference Sites for BioCondition, Version 3, Queensland Herbarium, Department of Science, Information Technology and Innovation, Brisbane.

Greig-Smith, P 1964, Quantitative Plant Ecology, Butterworths, London.Minerals Council of Australia 2016, Mine rehabilitation in the Australian minerals industry, prepared by Andrew Mattiskes, Minerals Council of Australia Sydney.

Neldner, V, Wilson, B, Dillewaard, H, Ryan, T, Butler, D, McDonald, W, Addicott E, and Appelman, C 2019, Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland, Version 4.0, updated March 2019, Queensland Herbarium, Department of Environment and Science, Brisbane.

Telfer D, D Carter, D Johnson and G Moller 1998, *State of the rivers, Bremer River and major tributaries: an ecological and physical assessment of the condition of streams in the Bremer River Catchment*. Brisbane, Department of Natural Resources, Resource Sciences Centre.

Appendix F. Provided technical studies

- BMT 2023, *Jeeb West Aquatic Ecological Assessment,* prepared for New Hope Group. Brisbane.
- BMT 2023, *Jeebropilly PRCP Flooding Assessment*, prepared for New Hope Group. Brisbane.
- Epic Environmental 2023, *2023 Water Management Plan,* report prepared for New Hope Group, Brisbane.
- GHD 2010, *Review report on geotechnical design criteria, West Moreton operations*, report prepared for New Hope Coal Australia by GHD, Brisbane.
- NHG 2014, *Mine Closure Plan Jeebropilly,* report prepared by New Hope Group (NHG), Brisbane.
- See.Built.Earth 2024, *PRCP Water Assessment and Performance, Jeebropilly Mine*, report prepared for New Hope Group by See.Built.Earth Pty Ltd., Brisbane.

Appendix G. Rehabilitation risk assessment

Risk Description				Risk Evaluation							Risk Rating				Count					
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Likelihood - Fre	Likelihood - Pro	Health	Safety	Environment	Compliance		Health	Safety	Environment	Compliance	E	H	M	L	Final Risk Rating	Management Effec
Waste rock emplacements (including in-pit and out-of-pit spoil dumps)																				
Safe																				
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to subsoil/ topsoil characteristics/availability, inadequate surface preparation, poor early germination, localised settlement, rock used for erosion control	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), rehabilitation monitoring, maintenance works.	P			Mi					M			0	0	1	0	M	
Slope steepness in excess of that expected for the PMLU	Inappropriate landform design, landform design restrictions	Safety hazard for personnel, stock and wildlife	Landform design criteria appropriate to PMLU, operational slope controls	P			Mi					M			0	0	1	0	M	
Stable - geotechnical risk																				
Significant slope failure	Excessive slope steepness, physical material properties, poor drainage, adverse rainfall event	Localised land impacts and downstream water quality impacts	Geotechnical analysis undertaken where appropriate, slope moderation, provision of adequate drainage infrastructure, rapid revegetation	U				Mi					M		0	0	1	0	M	
Stable - erosional risk																				
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Soil sampling and analysis conducted identifying dispersive soils, landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required, sediment controls during establishment.	P				Mo					H		0	1	0	0	H	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, sub-catchment delineation, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required	U				Mi					M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events and/or climatic sequences beyond design capacity	Localised land impacts and downstream water quality impacts	Downstream sedimentation controls, revegetation, monitoring and maintenance, drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, engineered flow channels	U				Mi					M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ vegetation disease/loss, climatic events, other	Localised land impacts and downstream water quality impacts	Soil sampling and analysis conducted, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required	P				Mo					H		0	1	0	0	H	
Non-polluting - geochemical risk																				
Acid and saline drainage generation	Adverse waste rock geochemistry	Revegetation performance impacts, downstream receiving environment water quality and dependent ecosystem impacts	Net neutralisation potentials (NNP) of samples indicating low likelihood of acid drainage occuring, low propensity for saline drainage generation, water quality monitoring and assessment	U				Hi					M		0	0	1	0	M	
Acid and saline drainage generation - impacts to groundwater	Adverse waste rock geochemistry	Groundwater impacts (incl. GDEs)	Limited capacity for surface drainage to recharge groundwater given void configuration (depending on iste location), NNP of samples indicating low likelihood of acid drainage occuring, low propensity for saline drainage generation, water quality monitoring and assessment	U				Hi					M		0	0	1	0	M	

Risk Description				Risk Evaluation							Risk Rating				Count					
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Likelihood - Fre	Likelihood - Pro	Health	Safety	Environment	Compliance		Health	Safety	Environment	Compliance	E	H	M	L	Final Risk Rating	Management Effec
Non-polluting - other environmental harm																				
Water quality of site drainage in does not meet quality criteria established for the PMLU	Inadequate landform design, erosion, land contamination, acid drainage from waste rock	Downstream water quality impacts - likely contaminant of concern being suspended solids	Soil testing and amelioration and prompt vegetation establishment, revegetation monitoring and management, landform design criteria, land contamination assessment and remediation, water quality monitoring program	P				Hi					H		0	1	0	0	H	
Sustainable - PMLU																				
Insufficient pasture productivity/diversity/density for the PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity	Ongoing grazing management, soil amelioration, pasture performance monitoring, revegetation timing	P				Mo					H		0	1	0	0	H	
Pests and weeds impact PMLU sustainability	Poor local, regional or site property management practices, weed invasion	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management	U				Mo					M		0	0	1	0	M	
Retained water storages **Safe (stable-geotechnical risk)**																				
Failure of retained water structures	Extreme rainfall events, poor construction materials/methods	Downstream hazard to public	Only minor stock dams or engineered water storages to be retained at closure	U			Mo					M			0	0	1	0	M	
Stable - erosional risk																				
Initial/ongoing gully, pipe and/or sheet erosion of embankments	Erodible construction materials, inadequate bank stabilisation, adverse weather events/overtopping	Localised land impacts and downstream water quality impacts	Embnakment/storage design addressing material issues, adequate/effective construction material amelioration, prompt vegetation establishment, monitoring and maintenanceas required, erosion and sediment controls during establishment.	U				Mi					M		0	0	1	0	M	
Non-polluting - geochemical risk																				
Water quality in retained storages not meeting PMLU water quality requirements (CoC being pH, salinity, heavy metals)	Adverse waste rock geochemistry	Livestock health, wildlife hazard, downstream receiving environment water quality and dependent ecosystem impacts	Net neutralisation potentials (NNP) of samples indicating low likelihood of acid drainage occuring, low propensity for saline drainage generation, water quality monitoring and assessment	U				Mo					M		0	0	1	0	M	
															0	0	0	0		
Non-polluting - other environmental harm																				
Water quality in retained storages not meeting PMLU water quality requirements (CoC being suspended solids)	Adverse geochemical characteristics of disturbed materials in catchment	Livestock health, wildlife hazard	No evidence of signficant adverse water quality in existing structures, contamination assessment, water quality assessment,	U				Mo					M		0	0	1	0	M	
Sustainable - PMLU																				
Insufficient catchment providing water supply for PMLU, or unsatisfactory water quality (see "non-polluting" assessment above)	In appropriate drainage design, or storage capacity	Retained storage not complementary to grazing PMLU	Site catchment and drainage design; water storages noted as being sufficient in capacity.	U				Mo					M		0	0	1	0	M	
Pests and weeds impact PMLU sustainability	Poor water quality, poor local, regional or site property management practices	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management, intensify monitoring and management measures as appropriate.	U				Mo					M		0	0	1	0	M	

Risk Description				Risk Evaluation						Risk Rating				Count					
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Likelihood - Fre	Likelihood - Pro	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	E	H	M	L	Final Risk Rating	Management Effec
Residual voids																			
Safe																			
Uncontrolled void overtopping	Extreme rainfall events beyond design capacity, insufficient water level monitoring	Increased hazard to humans and animals	Void water level monitoring, hydrological modelling, constructed to design criteria	U			Mi				M			0	0	1	0	M	
Cattle, humans or wildlife access to the residual void	Limited area available to reduce slope, insufficient warning signage and/or barriers controlling access to steep slope areas, fencing/bunding breaks, unauthorised access.	Falls, slips, trips impacting humans, livestock and wildlife. Livestock accessing void water for drinking	Signage, physical barriers, slope moderation, conduct a risk assessment of controls when designed and placed. Modify as required. Post closure monitoring	P			Hi				H			0	1	0	0	H	
Stable - geotechnical risk																			
Final void highwalls and low walls subject to significant slope failure	Excessive slopes, inadequate design, not constructed to design, inadequate drainage controls, adverse weather event	Localised land impact, potential impact to third party infrastructure in close proximity to highwalls.	Slope moderation, final landform design, maximum slopes subject to engineered design, assessment of construction materials by a suitably qualified person, provision of adequate drainage infrastructure, geotechnical assessment undertaken at closure. Certification by a suitably qualified expert that the final landform is stable and constructed according to design criteria. All steep slopes internally draining	P			Mi	Ne			M	L		0	0	1	1	M	
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of the low walls and high walls	Faults and fractures in the underlying geology, adverse weather events	Localised land impacts, water quality impacts (water contained within the pit)	Landform design in accordance with geotechnical assessment of the site, monitoring and management as required. All steep void slopes internally draining	P				Mi				M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of the low walls and high walls	Inadequate design, erodible topsoil and subsoils	Localised land impacts, water quality impacts (water contained within the pit)	Landform including highwalls and site drainage network to be constructed as designed. Monitoring of drainage network performance, prompt remediation. Certification by a suitably qualified person that the final landform is stable and constructed according to design criteria. All steep void slopes internally draining.	P				Mi				M		0	0	1	0	M	
Non-polluting - geochemical risk																			
Mine affected water contributes to natural groundwater body	Void long term water level is above natural groundwater level	Adverse water quality and dependent ecosystem impacts	Final void hydrological assessment shows final voids as a groundwater sink. Monitoring of pit water quality. Geotechnical/geochemical assessment, groundwater monitoring program	U				Mo				M		0	0	1	0	M	
Non-polluting - other environmental harm																			
Not applicable																			
Tailings storage facility/ co-disposal areas																			
Safe																			
Surface roughness (rockiness, depressions) in excess of that expected for the PMLU	Erosion gullies etc due to subsoil/ topsoil characteristics/availability, inadequate surface preparation, localised settlement, rock used for erosion control	Safety hazard for personnel, stock and wildlife	Surface preparation measures (initial), design specifications, monitoring, maintenance controls (pre-closure), risk assess controls when designed and placed and modify as required, post-closure monitoring.	P			Mi				M			0	0	1	0	M	

Risk Description				Risk Evaluation						Risk Rating				Count					
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Likelihood - Fre	Likelihood - Pro	Health	Safety	Environment	Compliance	Health	Safety	Environment	Compliance	E	H	M	L	Final Risk Rating	Management Effec
Stable - geotechnical risk																			
Differential settlement	Materials used for capping, capping methodology	Localised land impacts	Extended non-operational drying period, geotech testing, increased depth of capping material	P				Mo				H		0	1	0	0	H	
Stable - erosional risk																			
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Erodible topsoils and subsoils, adverse weather events	Localised land impacts and downstream water quality impacts	Adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and management as required.	U				Mi				M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Inadequate rehabilitation drainage capacity and/or design	Localised land impacts and downstream water quality impacts	Prompt revegetation, regular landform constructed to design parameters, monitoring, undertake repairs and maintenance as required, prompt remediation, sediment controls.	U				Mi				M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas	Adverse climatic events	Localised land impacts and downstream water quality impacts	Drainage network design with acceptable design standards for drainage structures, avoidance of flow concentration, engineered flow channels, effective revegetation techniques, rehabilitation monitoring and management as required	U				Mi				M		0	0	1	0	M	
Initial/ongoing gully, pipe and/or sheet erosion of rehabilitated areas (medium-long term risk)	Rehabilitation failure/ revegetation disease, climatic events	Localised land impacts and downstream water quality impacts	Landform design moderating slope, adequate/effective subsoil and topsoil amelioration, prompt revegetation establishment, revegetation monitoring and assessment, modify rehabilitation methods and techniques to improve the likelihood of revegetation success on rehabilitated slopes, undertake repairs and maintenance as required.	U				Mo				M		0	0	1	0	M	
Non-polluting - geochemical risk																			
Acid and saline drainage	Adverse geochemical characteristics, inadequate design	Impacts to groundwater and GDEs, downstream water quality impacts	Design specification (water shedding), Net neutralisation potentials (NNP) of samples indicated that it is unlikely for acid drainage to occur, low propensity for saline drainage generation, water quality monitoring and assessment	U				Hi				M		0	0	1	0	M	
Sustainable - PMLU																			
Insufficient pasture productivity or density/diversity of vegetation in PMLU	Weather, poor soil characteristics, poor management practices impacting germination, vegetation establishment and PMLU density/diversity metrics	Insufficient pasture productivity, habitat unsuitable for native fauna	Ongoing grazing management, soil amelioration, pasture performance monitoring	U				Mi				M		0	0	1	0	M	
Pests and weeds impact PMLU sustainability	Poor local, regional or site property management practices, weed invasion	Increased risk of not achieving designated PMLU	Pest and weed management practices, monitoring programs to allow early detection and management	U				Mo				M		0	0	1	0	M	
Insufficient resources onsite available to undertake rehabilitation activities	Shortage of resources	Increased risk of not achieving PMLU	Landform design takes into account available material resources	U					Mo				M	0	0	1	0	M	
Mine infrastructure (retained) **Safe**																			

Risk Description				Risk Evaluation							Risk Rating				Count					
Risk Scenario/Threat Title	Causes (Triggers / Indicators)	Impacts (Consequences)	Existing Controls	Likelihood - Fre	Likelihood - Pro	Health	Safety	Environment	Compliance		Health	Safety	Environment	Compliance	E	H	M	L	Final Risk Rating	Management Effec
Doesn't meet the requirements of the landholder agreement	Insufficient maintenance of infrastructure,	Not fit for use	Monitoring and maintenance and/or repair or removal (as required)	U					Mi					M	0	0	1	0	M	
Stable - geotechnical risk																				
Potentially contaminating infrastructure to be retained	Land, surface water or groundwater contamination	Retained infrastructure results in environmental harm	Contamination assessments and management	U				Mo					M		0	0	1	0	M	
Legacy underground mining																				
Safe (stable-geotechnical risk)																				
Subsidence arising from shaft, tunnel collapse	Legacy mining operations underlying the MLs and occuring between 1930-1964	Land subsidence and sinkholes	Legacy mining operations have been mapped in across the MLs, no evidence of subsidence across the Project site, open-cut disturbance removed most of the underground workings	U				Mi					M		0	0	1	0	M	
Non-polluting - other environmental harm																				
Interaction of groundwater with lagacy underground mining disturbance	Legacy mining operations underlying the MLs and occuring between 1930-1964	Groundwater quality impacts,	Site inspections, water monitoring	U				Mo					M		0	0	1	0	M	
Retained flood bunding																				
Safe																				
Failure of retained flood protection bunding	Extreme flood events, adverse weather conditions	Risk of drowning of personnel, stock or wildlife during flood events	Retained bund design. Ensuring no personnel or stock access to areas protected by retained levees during flood events	R			Hi					M			0	0	1	0	M	
Stable - geotechnical risk																				
Flood bund failure	Structure failure, landform not constructed to design, physical material properties, adverse rainfall event,	Flood and overtopping of the retained Jeeb North Void	Retained bund design, geotechnical assessment undertaken at closure.	R				Mo					L		0	0	0	1	L	
Stable - erosional risk																				
Initial/ongoing gully, pipe and/or sheet erosion of embankments	Erodible construction materials, inadequate bank stabilisation, adverse weather events/overtopping	Localised land impacts and downstream water quality impacts	Embnakment/storage design addressing material issues, adequate/effective construction material amelioration, prompt vegetation establishment, monitoring and maintenanceas required, erosion and sediment controls during establishment.	U				Mi					M		0	0	1	0	M	
Non-polluting - geochemical risk																				
Not applicable															0	0	0	0		
Non-polluting - other environmental harm																				
Not applicable															0	0	0	0		
Sustainable - PMLU																				
Not applicable															0	0	0	0		
															0	0	0	0		
End of record															0	6	34	2		42

Appendix H. Landholder agreement

Agreement between Jeebropilly Collieries Pty Ltd and Tetard Holdings Pty Ltd regarding infrastructure to be retained at the end of the tenure for the Jeebropilly Coal Mine.

Parties

Jeebropilly Collieries Pty Ltd (ABN 88 010 319 954)

and

Tetard Holdings Pty Ltd (ABN 12 010 152 262)

Recitals

- Jeebropilly Collieries Pty Ltd operates the Jeebropilly Coal Mine under Environmental Authority EPML00826713.
- Tetard Holdings Pty Ltd is the registered owner of the land containing mining infrastructure within the Jeebropilly Mine tenure (i.e. is the underlying landowner).
- Tetard Holdings Pty Ltd will utilise the specified infrastructure in the ongoing management and use of the land post-mining and requests that it be retained in-place at the end of the tenure.

Tetard Holdings Pty Ltd and Jeebropilly Collieries Pty Ltd agree that the following infrastructure as described below is to be retained after the mining tenure ends:

- Livestock watering dams (as shown in **Figure 1)** will be retained in a safe and stable condition as they are valuable resource for grazing activities. Dams generally contain water of appropriate quality for stock watering and are currently being used for that purpose. Livestock watering dams across site will store rainwater and surface runoff during wet seasons, providing a vital source of water during dry spells. This will help sustain livestock and help reduce the strain on natural water sources such as the Bremer river,
- All water pumping infrastructure and pipelines will be retained as it is beneficial to grazing operations to transfer water between paddocks;
- All services – potable water, power, communications will be retained to support the homestead;
- All access tracks, roads and park up areas will be retained to provide access to and around the site;
- All administration office buildings will be retained for multiple uses including offices, dry storage areas or will be converted to staff quarters;
- All ablutions blocks, septic tanks and other wastewater infrastructure will be retained to provide an ablution facility for personnel or homestead;
- Heavy Vehicle Workshop, warehouse and other associated infrastructure will be retained and used for farm equipment storage, work area or as dry storage areas;
- Fuel storage infrastructure will be retained to provide fuel storage for farming equipment;

- The existing concrete slabs and levelled pads in the CHPP area and the coal to liquids plant, the CHPP laydown area and the existing ROM pad area (noting all remaining carbonaceous material to be stripped prior to surrender of tenure) will be retained to provide park up area for farm equipment or used as cattle holding areas; and

- All existing fencing and security installations to be retained to allow for livestock protection and confinement. Additionally fencing and security installations will aid in preventing unauthorised access across site.

Tetard Holdings Pty Ltd commits to undertake all necessary land management activities including weed and pest management on land within the Jeebropilly Mine tenure.

With effect from the date of execution by all parties below, this agreement is intended to replace the previous agreement of the same title between the parties, dated 6 November 2019.

EXECUTED by Jeebropilly Collieries Pty Ltd

In accordance with section 127 (1) of the Corporations Act 2001

.....	.....
Signature of Director	Signature of Company Secretary
Robert Bishop	Dominic O'Brien
Full Name of Director	Full Name of Company Secretary
13/05/2024	13/05/2024
Date	Date

EXECUTED by Tetard Holdings Pty Ltd

In accordance with section 127 (1) of the Corporations Act 2001

.....	.....
Signature of Director	Signature of Company Secretary
Robert Bishop	Dominic O'Brien
Full Name of Director	Full Name of Company Secretary
13/05/2024	13/05/2024
Date	Date

Figure 1: Livestock Watering dams and Mine Infrastructure areas to be retained