INITIAL ADVICE STATEMENT

ESMERALDA GRAPHITE PROJECT

PREPARED FOR
Qld Aus Graphite Pty Ltd

8 July 2025

aarc
ENVIRONMENTAL SOLUTIONS
APEM Group

BRISBANE OFFICE
164 Wharf Street
Spring Hill QLD 4000
P +61 7 3217 8772

E info@aarc.net.au
AARC.NET.AU

ABN. 71 620 818 920
ACN. 620 818 920

Document Control

Project Name:	**Esmeralda Graphite Project**
Report Title:	Initial Advice Statement
Client:	Qld Aus Graphite Pty Ltd
Project Manager:	Gareth Bramston

Version	Comments	Author	Reviewer	Date
Draft issued for client review		AA	GB	03/04/2025
Final issued to client		AA/LM	GB	06/05/2025
Final re-issued to client		JM	HL	27/06/2025
Final re-issued to client		JM	HL	08/07/2025

This document is the property of AARC Environmental Solutions Pty Ltd ('AARC') and all rights are reserved in respect of it. This document has been prepared for the exclusive use of AARC's client and may not be reproduced or disclosed in any manner whatsoever, in whole or in part, without the prior written consent of AARC. AARC expressly disclaims, to the maximum extent permitted by law, all responsibility for or liability arising from the use of this document by any third party. This document has been prepared subject to the instructions and scope of work agreed to with AARC's client. Any opinions or judgements expressed herein are based on our understanding and interpretation of current regulatory standards relevant to the specific needs of the client and should not be construed as legal opinions or legal advice. Information provided by the client while instructing AARC has been assumed to be correct and complete, and, where this report relies on field information, the condition of the assessed area as at the time of conducting any field assessment. AARC assumes no liability or responsibility for any inaccuracies or omissions outside of AARC's direct control. AARC makes no statement, representation or warranty about the accuracy or completeness of information relating to items not visible, accessible, or able to be inspected at the sites at the time of the site visits

Table of Contents

List of Figures

List of Tables

Executive summary

An Initial Advice Statement (IAS) has been prepared for the Esmeralda Graphite Project (the Project) in accordance with Part 4, Subdivision 2, section 27AB of the State Development and Public Works Organisation Act 1971 (SDPWO Act).

This IAS has been prepared for the key purposes of:

- providing the Coordinator General with sufficient information to support an application for declaration as a Coordinated Project requiring an Environmental Impact Statement (EIS) under the SDPWO Act; and
- providing sufficient detail to enable advisory agencies and other stakeholders to have effective input into establishing a Terms of Reference where an EIS is approved for the Project.

Key approvals being sought through the EIS process under the SDPWO Act include an environmental authority (EA), progressive rehabilitation, closure plan (PRCP), and mining tenure. Approvals for downstream activities, including refinement and processing in Townsville, will be sought separately.

The Project has satisfied Commonwealth Government environmental checks as part of a submission under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and has been declared "not a controlled action" and therefore will not require additional Federal approvals.

The Project is a proposed open cut graphite mine, located on light grazing land approximately 70 km south of Croydon, Queensland, Australia. The proponent is Qld Aus Graphite Pty Ltd, a wholly subsidiary of Graphinex Pty Ltd. At full production the Project will provide employment for approximately 113 people.

The Project will mine up to 3.5 million tonnes per annum of Run-of-Mine ore over a mine life of approximately 50 years. Graphite ore (~ 6% total graphite) will be trucked to the mineral processing plant for stockpiling and concentration via conventional flotation methods. Concentrate will then be trucked to a separate facility in Townsville for refinement and distribution. Graphinex plans to commence construction of the Project in 2027 – subject to relevant approvals being granted.

Graphite is recognised as a 'critical mineral' by both the Queensland and Commonwealth Government, reflecting its strategic importance and limited global availability. Local production of graphite will aid the state's renewable energy transition. Furthermore, the advancement of this project will contribute significantly to establishing a sustainable, long-term supply of high-grade graphite, essential for a wide range of renewable energy applications including electric vehicles. This initiative aligns with broader national and state objectives to secure vital resources for the emerging green economy and enhance energy independence. The development and emergence of a domestic critical minerals industry, complete with downstream processing, strongly aligns with government policies and plans regarding critical minerals, including:

- Queensland Energy and Jobs Plan;
- Queensland New Industry Development Plan – Queensland Battery Industry Strategy 2024-2029;
- Queensland Critical Minerals Strategy 2023; and
- Contributing to the mining and production of graphite – identified as a critical mineral in the Mineral Resources Regulation 2013 (Qld), and the Australia's Critical Minerals List.

The scope of the proposed Coordinated Project declaration includes:

- the mining and processing activities within the mining lease application areas;
- a proposed transport corridor located within the southern mining lease application area; and
- development and use of services and infrastructure associated with the mining activity including water supply, power, accommodation, and transport.

An assessment via Environmental Impact Statement (EIS) is anticipated for the following reasons:

- The Project will exceed EIS trigger criteria, including by removing more than 2 million tonnes per year of ROM ore (3.5 Mtpa).
- There will be social and economic impacts as a result of the Project proceeding.
- There is uncertainty around possible environmental impacts, including where additional modelling and assessment will be necessary.
- The Project may contribute to cumulative impacts.

The EIS assessment pathway will ensure input from stakeholders, and the general public is considered at all stages of assessment and approval, and that a comprehensive environmental impact assessment process is undertaken.

This Initial Advice Statement includes a description of proposed project activities and an initial assessment of existing environments values (including land, ecology, surface water, groundwater, air, noise, social, and cultural heritage), potential impacts and likely mitigation. Only limited impact assessment information was available at this stage of Project development. Potential impacts are likely to include the disturbance and removal of vegetation, impacts on surface water and groundwater values, an increase in noise and dust in the Project area, and an increase in workforce demand in the north-west Queensland region. The Environmental Impact Statement will include a comprehensive assessment of all project elements and environmental impacts and determine appropriate mitigation and management measures.

Should it proceed, the Esmeralda Project will undoubtedly contribute directly to the long-term economic prosperity of the region. Key strategic benefits are summarised as follows:

- the Project will provide secure and long-lasting skilled employment opportunities in a regional location during construction and operation;
- there will be significant investment at a regional and state level because of the Project, including through downstream processing facilities and further development of domestic value-adding industries;
- the project will generate economic, employment, and income benefits for the state and all stakeholders. Including royalty and payroll tax payments to the Queensland Government; direct and indirect increases in employment and economic stimulation in the region.

Given the remote location of the Project, barriers to establishing the Project include the costs and time spent undertaking environmental, technical, and survey work to support approval applications, funding and developing project-specific infrastructure, approval and tenure processes, complex interpretations of environmental values, and gaining access to a secure and reliable water supply.

Due to the Project complexity and importance as a source of highly desirable resources, as well as its potential impacts on an economic, social, and environmental level, the Proponent considers the criteria for a Coordinated Project declaration – requiring an EIS under the SDPWO Act, and as outlined in Section 27(2)(b) of the SDPWO Act – have been met. This includes that the Project:

- has complex approval requirements, involving local and state governments;
- has strategic significance to the locality, region and state, including for the infrastructure, economic and social benefits, capital investment and employment opportunities it may provide;
- has significant on-site and offsite infrastructure requirements including for the provision of electricity, product transport and workforce accommodation; and
- will require detailed environmental impact assessments.

1 Introduction

This Initial Advice Statement (IAS) has been prepared in accordance with Part 4, Subdivision 2, section 27AB of the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

1.1 Background

The Esmeralda Project is a proposed open cut graphite mine, located on light grazing land approximately 70 km south of Croydon, Queensland, Australia (Figure 1). The Project proposes mining of the Esmeralda Granite unit and on-site concentration of graphite ore. The Project will mine up to 3.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) ore over a mine life of approximately 50 years. The targeted resource is comprised of a globally significant deposit, currently reporting 25 Mt of graphite, making it the 3rd largest deposit in the world. Extracted graphite ore (~ 6% total graphite) will be trucked to the mineral processing plant for stockpiling and concentration via conventional flotation methods. Concentrate will then be trucked to a separate facility in Townsville for refinement and distribution. Graphinex plans to commence construction of the Project in 2027 – subject to relevant approvals being granted.

Graphite is recognised as a 'critical mineral' by both the Queensland and Commonwealth Government, reflecting its strategic importance and limited global availability. Local production of graphite will aid the state's renewable energy transition, and the Commonwealth governments goals of unlocking a critical mineral industry in Australia. Furthermore, the advancement of this project will contribute significantly to establishing a sustainable, long-term supply of high-grade graphite, essential for a wide range of renewable energy applications. This initiative aligns with broader national and state objectives to secure vital resources for the emerging green economy and enhance energy independence.

This Project, and the development and emergence of a domestic critical minerals industry, complete with downstream processing, strongly aligns with government strategies regarding critical minerals. By facilitating development of battery technology, the Project will directly facilitate renewable energy linked industries including electric vehicles. Government strategies supported by the Project include:

- Renewable Energy and Jobs Act 2024;
- Clean Economy and Jobs Act 2024;
- Queensland New Industry Development Plan – Queensland Battery Industry Strategy 2024-2029;
- Queensland Critical Minerals Strategy 2023; and
- Contributing to the mining and production of graphite – identified as a critical mineral in the Mineral Resources Regulation 2013 (Qld), and the Australia's Critical Minerals List.

Given the remote location of the Project, barriers to establishing the Project include the costs and time spent undertaking environmental, technical, and survey work to support approval applications, funding and developing project-specific infrastructure, approval and tenure processes, complex interpretations of environmental values, and gaining access to a secure and reliable water supply.

The Proponent considers the criteria have been met for a Coordinated Project declaration - requiring an Environmental Impact Statement (EIS) under the SDPWO Act. This includes that the Project:

- has complex approval requirements, involving local, state and Commonwealth governments;
- has strategic significance to the locality, region, State, and Commonwealth, including for the infrastructure, economic and social benefits, capital investment and employment opportunities it may provide;
- has significant infrastructure on-site and offsite requirements including for the provision of electricity, product transport and workforce accommodation; and
- will require detailed environmental impact assessments.

This IAS has been prepared for the key purposes of:

- providing the Coordinator General with sufficient information to support an application for declaration as a Coordinated Project requiring an Environmental Impact Statement (EIS) under the SDPWO Act; and
- providing sufficient detail to enable advisory agencies and other stakeholders to have effective input into establishing a Terms of Reference where an EIS is approved for the Project.

Key approvals being sought through the EIS process under the SDPWO Act include an environmental authority (EA), progressive rehabilitation and closure plan (PRCP), and mining tenure. Approvals for downstream activities, including refinement and processing in Townsville, will be sought separately.

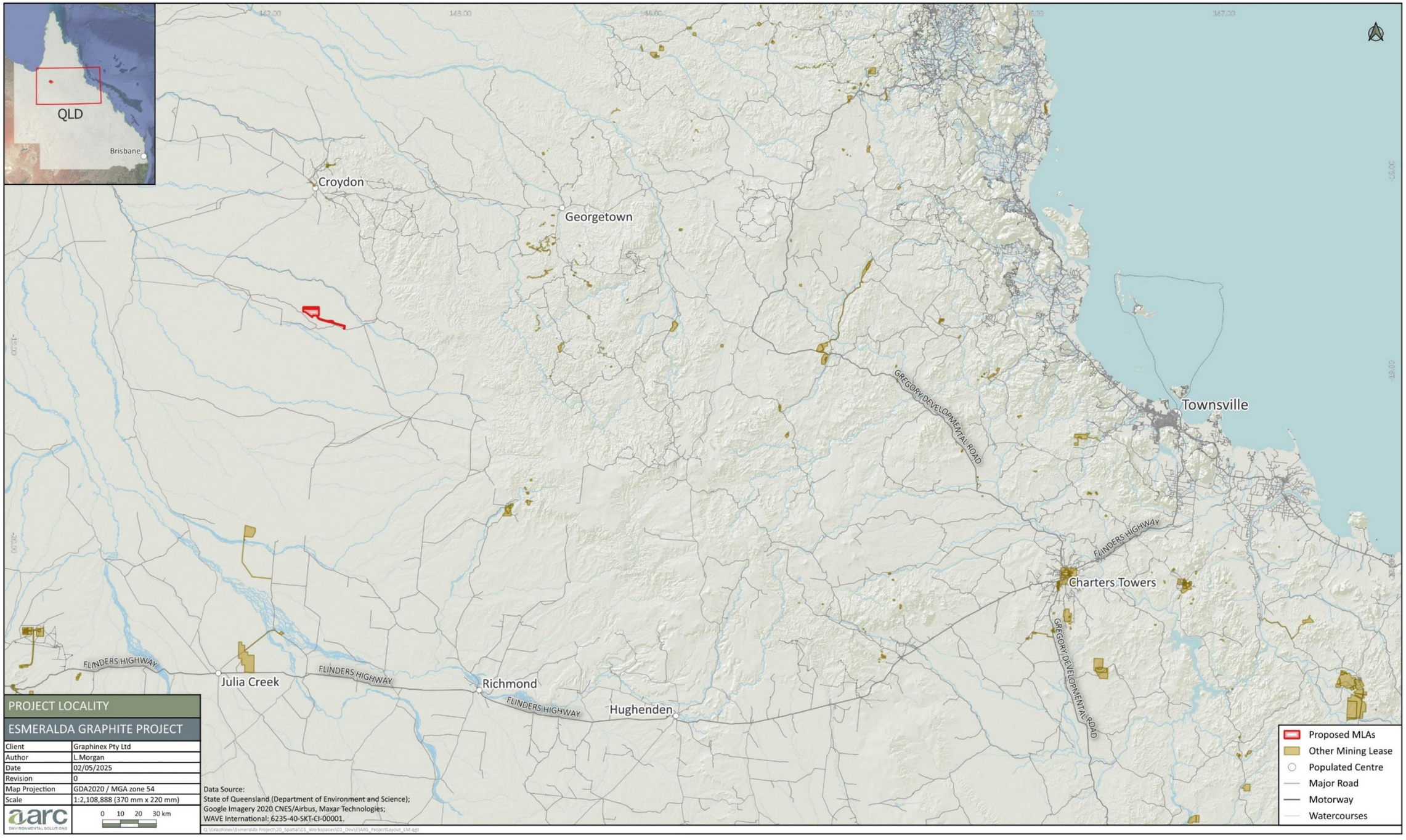

Figure 1: Project location

1.2 Purpose and Scope

The proponent considers that the Project meets the requirements for declaration as a Coordinated Project under the SDPWO Act. This is primarily due to the complex nature of the approvals required to enable the mine development; and the strategic significance of the Project including economic and social benefits, capital investment and employment opportunities.

Additional considerations which support an application for determination as a Coordinated Project include:

- determination and assessment of flood plains and surface water values in the Project region;
- complex interpretations and assessment of impacts on sensitive groundwater aquifers, and requirements for dewatering to enable mining; and
- the facilitation required for the emergence of a critical minerals industry in the region which does not yet have graphite projects.

The scope of the proposed coordinated project declaration includes:

- the mining and on-site processing activities within the MLA areas;
- a proposed transport corridor located with the southern mining lease application area; and
- development and use of services and infrastructure associated with the mining activity including water supply, power, accommodation, and transport.

An assessment via Environmental Impact Statement (EIS) is anticipated for the following reasons:

- The Project will exceed EIS trigger criteria, including by removing more than 2 million tonnes per year of ROM ore (3.5 Mtpa).
- There will be social and economic impacts as a result of the Project proceeding.
- There is uncertainty around possible environmental impacts, including where additional modelling and assessment will be necessary.
- The Project may contribute to cumulative impacts.

The EIS assessment pathway will ensure input from stakeholders and the general public is considered at all stages of assessment and approval, and that a comprehensive environmental impact assessment process is undertaken.

This IAS has been prepared for the key purpose of:

- providing the Coordinator General with sufficient information to support an application for declaration as a Coordinated Project requiring an EIS under the SDPWO Act;
- providing sufficient detail to enable advisory agencies and other stakeholders to have effective input into establishing a Terms of Reference where an Environmental Impact Statement is approved for the Project; and
- providing an overview of the Project to the general public.

2 Proponent

The Proponent for the Project is:

Qld Aus Graphite Pty Ltd.
Level 4, 10 Eagle St, Brisbane, Queensland, 4000
ABN: 21 656 523 965
ACN: 656 523 965

Qld Aus Graphite Pty Ltd is a wholly owned subsidiary of Graphinex Pty Ltd (Graphinex) and is the registered entity proposing to carry out the Project. All permits and licenses of the proposed Project are to be issued and held by the entity. Graphinex Pty Ltd is a private Australian company based in Brisbane, Queensland, and was founded in 2021. The executive team has a suite of experience in development of mineral projects in Australia.

The Proponent has the financial and technical capacity to complete an EIS and has recruited an experienced and proficient team to deliver the required works. As part of the application for a coordinated project, the Proponent will provide financial and technical capability statements to the Coordinator General separately to this document.

The Proposed team of technical experts to support the EIS:

- Surface water studies: Engeny
- Water supply and modelling: Engeny
- Functional design report for diversion works: Engeny
- Storage Dams and Tailing structures: Wave International
- Groundwater modelling and assessments: Hydrogeologist
- Waste rock characterisation studies: RGS
- Noise and vibration: AARC Environmental Solutions
- Terrestrial and Aquatic Ecology: AARC Environmental Solutions
- Air quality and GHG: Katestone
- GDEs: 3D Environmental
- Road Transport: Burchills
- SIA: Think
- Indigenous CH assessments: Tagalaka
- Non-Indigenous CH assessments: Converge

Graphinex has strong support for equity funding from strategic shareholders with capacity to fund the project, including for the approvals process and environmental assessment pathway which will rely on a suite of technical assessments. The proponent's strategic shareholders have successfully secured funding and operated mines and energy infrastructure projects globally. The project economics provide for a compelling investment case for both debt and equity financiers. It is the intent of the Proponent to own and operate the Project.

Graphinex has no current or historical records of proceedings against them under Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources. Graphinex has adhered to its regulatory responsibilities regarding its exploration activities and has not been the subject of any environmental legal proceedings that that have resulted in fines or prosecution.

3 Approvals

Given the scale of the Project, a myriad of approvals are required from Commonwealth, State and Local Government departments and agencies, in accordance with relevant legislation. The Proponent has determined that an EIS assessment pathway as a coordinated project would be appropriate. Therefore, the Project will further require Terms of Reference (ToR) relevant to the Project to be developed to define the manner in which an EIS should be prepared.

3.1 Commonwealth approvals

A referral for the Project was lodged to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The referral considered the potential of the Project to impact on Matters of National Environmental Significance (MNES). MNES potentially relevant to the Project included listed threatened species and communities and listed migratory species.

Public notice for the referral was open from the 20th March 2025 to the 2nd April 2025. A submission was received during this period regarding ecological considerations, and the Proponent prepared and submitted a scientifically supported response. The referral process and content provided by the Project is available through the EPBC public portal.

On 23rd June 2025, a decision on the referral was made, determining that the Project is not a controlled action and therefore no further assessment or approval under the EPBC Act is required.

3.2 State and local approvals

Graphinex is seeking a coordinated project EIS declaration under the SDPWO Act. This will enable the Office of the Coordinator-General to provide a coordinated assessment approach for navigating the myriad of local, state and commonwealth approvals.

Approval of the Project requires a site-specific Environmental Authority (EA) application for a new resource activity under the *Environment Protection Act 1994* (EP Act), which will be prepared for the Project and lodged with the Queensland Department of Environment, Technology, Science and Innovation (DETSI). Simultaneously, a Progressive Rehabilitation and Closure Plan (PRCP) will be lodged with DETSI – presenting the detail on Project's rehabilitation methods and planning. The PRCP will include milestones for progressive rehabilitation, in addition to success criteria and completion dates.

The Project also requires approval of two Mining Lease (ML) applications, which will be lodged with the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (DNRMMRRD), under the *Mineral Resources Act 1989* (MR Act).

The Proponent will develop a Cultural Heritage Management Plan under the *Aboriginal Cultural Heritage Act 2003*. This will be formally registered through the Queensland Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism.

A summary of likely Federal, State and Local Government regulatory approval processes has been presented in Table 1. Additional approval requirements may be identified during the EIS process and will be detailed as necessary.

The Croydon Economic Development Strategy (2023) indicates that the local council is aware of the strong graphite deposits identified within the local government area, noting that "Croydon is well positioned to support the development of the critical minerals industry" and that resource exploration and mining are positive drivers of economic growth for the region. Therefore, resource projects such as the Esmaralda Project are consistent with the current regional and economic plan for the Croydon local government area.

Table 1: Likely Regulatory Processes

Legislation	Administering Authority	Approval Trigger	Approval Type*	Within Scope of EIS[1]
Aboriginal Cultural Heritage Act 2003	Queensland Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism	Where an EIS is required, a CHMP must be in place and approved under Division 2 of Part 7 of the ACH Act as a pre-requisite to the grant of any lease, licence, permit, approval or other authority required under any Act for the Project.	A Cultural Heritage Management Plan (CHMP) will be developed for the Project.	No
Environmental Offsets Act 2014	Department of Environment, Tourism, Science and Innovation (DETSI)	The project may result in significant impacts to Prescribed Maters including Matters of State Environmental Significance (MSES)	Approved offset delivery plan	Yes
Environmental Protection Act 1994	Department of Environment, Tourism, Science and Innovation (DETSI)	Conducting an Environmentally Relevant Activity (ERA) that is a resource activity or resource project will trigger a site-specific EA and PRCP application. The site-specific EA application is required to assess impacts on environmental values and include detailed information regarding the proposed exercise of underground water rights (i.e. the taking of associated water). The PRCP application will address rehabilitation planning requirements and propose milestones for completion of progressive rehabilitation over the life of the mine.	Site specific EA application Progressive Rehabilitation and Closure Plan (PRCP)	Yes
Explosives Act 1999 *Explosives Regulation 2017*	Resources Safety and Health Queensland (RSHQ)	The use, storage, and movement of explosives for the Project.	Licences and/or permits are required, necessary to possess, store and use explosives.	Yes
Fisheries Act 1994	Department of Primary Industries (DPI)	Constructing or raising waterway barrier works within fish habitats; or building works in fish habitat areas.	Approval required for any waterway barrier works within bed and banks of major streams and building works in fish habitat areas, outside Project mining tenure.	No

Legislation	Administering Authority	Approval Trigger	Approval Type*	Within Scope of EIS[1]
		An approval is not required for waterway barrier works within waterways inside the mining tenure due to an exemption of mining activities from the *Fisheries Act 1994*.		
Forestry Act 1959	DPI	The Proponent is required to consider whether approvals are required under the *Forestry Act 1959* to interfere with state owned quarry or forestry material, unless authorised under other legislation.	The written consent of the State.	No
Water Act 2000 (Water Act) *Great Artesian Basin and other regional aquifers (GABORA) Water Plan 2017* *Gulf Water Plan 2007*	Department of Local Government, Water and Volunteers (DLGWV)	The Water Act underground water management framework requires resource tenure holders to: • undertake baseline assessments of water bores; • prepare baseline assessment plans; • prepare underground water impact reports; and • establishes make-good obligations for resource tenure holders. The Project may require taking or interfering with overland flow water, water in a watercourse or groundwater.	Water allocation or licence for taking or interfering with water 'Make good agreements' if/as necessary Underground Water Impact Report	Yes
Water Supply (Safety and Reliability) Act 2008	DLGWV	Dams requiring a Failure Impact Assessment	The Project may require the completion of a Failure Impact Assessment for Project dams as part of the EIS.	Yes
Mineral and Energy Resources (Common Provisions) Act 2014 (MRECP Act)	Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRRD)	Use of a public road for a 'notifiable road use', including: • use of a public road, within an authorised area for a resource activity; or • use of a public road at more than the relevant haulage threshold rates, being 50,000 t per year on a State-controlled road or 10,000 t per year on another public road, if the haulage relates to transporting minerals that were mined, released by mining, or processed on land in an authorised	Notify public road authority of intention to carry out a notifiable road use at least 10 business days prior to proposed start.	No

Legislation	Administering Authority	Approval Trigger	Approval Type*	Within Scope of EIS[1]
		area for a resource authority under the *Mineral Resources Act 1989*		
Mineral Resources Act 1989 (MR Act)	DNRMMRRD	A mining lease is required for the mining of minerals, critical minerals, or coal.	Mining Lease grant.	No
Nature Conservation Act 1992 (NC Act) *Nature Conservation (Plants) Regulation 2020*	DETSI	Clearing of protected plants, including in high and non-high-risk areas on the Flora Survey Trigger Map.	A clearing permit may be required.	Yes
Nature Conservation Act 1992 (NC Act) *Nature Conservation (Animals) Regulation 2020*	DETSI	Tampering with an animal breeding place that is being used by a protected animal to incubate or rear the animal's offspring.	A Species Management Plan or Damage Mitigation Permit may be required.	Yes
Planning Act 2016 *Planning Regulation 2017*	DSDIP Local Council	Development approvals pursuant to the Planning Regulation 2017 may be required for operational works required outside of the mining lease. This may include road upgrades.	Development permit.	No

Legislation	Administering Authority	Approval Trigger	Approval Type*	Within Scope of EIS[1]
State Development and Public Works Act 1971	Department of State Development and Infrastructure (DSDI)	Where the Project is declared a Coordinated Project by the Coordinator General and the EIS assessment process is determined.	Coordinator General's evaluation report and conditions.	Yes
Strong and Sustainable Resource Communities Act 2017	Department of State Development, Infrastructure and Planning (DSDIP)	The act governs FIFO arrangements, workforce, discrimination, and assessment of social impacts.	Coordinator General's evaluation report and conditions.	Yes
Transport Infrastructure Act 1994	Department of Transport and Main Roads (DTMR)	Upgrades to existing transport corridors.	Construction works will require approval for road works/road access works in a State controlled road under the Transport Infrastructure Act.	Yes
Vegetation Management Act 1999	DNRMMRRD	Clearing of regulated vegetation.	Should any impact on MSES occur which is unavoidable, environmental offsets will be required to mitigate any significant residual impacts to MSES.	Yes

[1] *If declared a coordinated project requiring an EIS under the SDPWO Act, the Coordinator-General may apply conditions for the entirety of the Project as part of a consolidated approvals approach.*

3.3 Environmentally Relevant Activities

Environmentally Relevant Activities (ERAs) include resource activities or other activities as defined by the EP Act. Prescribed ERAs and resource activities are specified in Schedules 2 and 3, respectively, of the *Environmental Protection Regulation 2019* (EP Regulation). Potentially applicable ERAs for the Project are listed in Table 2.

Table 2: Potentially applicable ERAs

Environmentally Relevant Activity	Description
Schedule 2 of the EP Regulation	
7(3)(6)(d) Chemical manufacturing	Manufacturing, in a year, the following quantities of inorganic chemicals, other than inorganic chemicals to which items 1 to 4 apply — more than 100,000 t
8(3)(1)(c) Chemical storage	Chemical storage (the relevant activity) consists of storing more than 500 m^3 of class C1 or C2 combustible liquids under AS1940 or dangerous goods class 3.
14(3)(2)(a) Electricity generation	Generating electricity by using a fuel, other than gas, at a rated capacity of 10 MW electrical to 150 MW electrical.
31(2)(a) Mineral processing	Processing, in a year, the following quantities of mineral products, other than coke (a) 1,000 t to 100,000 t.
33(1) Crushing, milling, grinding or screening	Crushing, milling, grinding or screening (the relevant activity) consists of crushing, grinding, milling or screening more than 5,000 t of material in a year.
63(3)(1)(b)(i) Sewage Treatment	Operating a sewage treatment works at a site that has a total daily peak design capacity of more than 100 but not more than 1500 equivalent persons.
Schedule 3 of the EP Regulation	
21 A mining activity	A mining activity that is an ineligible ERA, other than a mining activity mentioned in items 9 to 20

3.4 Notifiable activities

Activities that have been identified as likely to cause land contamination are required under Schedule 3 of the EP Act to be listed as notifiable activities. Any person undertaking these notifiable activities must notify DETSI, and the land is recorded on the Environmental Management Register (EMR). Potential notifiable activities listed under Schedule 3 of the EP Act relevant to the Project are provided in Table 3.

Table 3: Potential notifiable activities

Notifiable activity	Notifiable activity description
Schedule 3 of the EP Act	
7 Chemical Storage	Storing more than 10 t of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
24 Mine wastes	a) Storing hazardous mine or exploration wastes, including, for example, tailing dams, waste rock or waste rock dumps containing hazardous contaminants; or b) Exploring for, or mining or processing, minerals in a way that exposes faces, or rleases groundwater, containing hazardous contaminants.
29 Petroleum product or oil storage	Storing petroleum products or oiL: c) In above ground tanks: a. for petroleum products or oil in class 3 in packaging groups 1 and 2 of the dangerous goods code – more than 2,500 L capacity; or b. for petroleum products or oil in class 3 in packaging groups 3 of the dangerous goods code – more than 5,000 L capacity; or c. for petroleum products that are combustible liquids in class C1 or C2 in Australian Standard AS 1940, 'The storage and handling of flammable and combustible liquids' published by Standards Australia – more than 25,000 L capacity.
37 Waste storage, treatment or disposal	Storing, treating, reprocessing or disposing regulated waste including operating a sewage treatment facility with onsite disposal facilities.

4 Nature of the proposal

4.1 Scope of the Project

The Project proposes mining of the Esmeralda Granite unit and on-site concentration of graphite ore. The Esmeralda deposit typically comprises 70m of weathered overburden, overlaying approximately 150m thickness of granite hosted ore.

The graphite mineralisation at the project is hosted in predominantly hydrothermally altered light grey, fine to medium-grained porphyritic biotite granite. The updated resource post 2024 drilling is 434 Mt at 5.83% Total Graphitic Carbon (TGC), assuming a 3 % TGC cutoff, comprising 173 Mt Indicated and 261 Mt Inferred (Inferred mostly in the satellite and around the edges of the main Indicated pit area.

The Project proposes to construct and operate an open cut graphite mine, producing up to 3.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) ore over a mine life of approximately 50 years. Mining is proposed via conventional truck and excavator methods, to a depth of 280 m below ground level. Ore extraction necessitates the implementation of controlled blasting techniques. Mine construction is scheduled to span 18 months, with mining ramping up to 3.5 Mtpa ROM over the first three years. The Project presents significant opportunity for additional resource development and operational life extension within the MLAs.

Excavated overburden and non-ore-bearing material will be deposited in out-of-pit waste dumps located adjacent to the mining void. The majority of waste movement will occur within the first 18 years of the mine life, with a total of 143.8 Mt estimated to be moved over the entire 50-year production life of the Project.

Graphite ore (~ 6% total graphite) will be trucked to the on-site mineral processing plant for stockpiling and concentration via conventional flotation methods. The processing method includes an initial crushing and milling circuit that liberates the graphite in 300-micron product. Ore is then fed to a flotation circuit consisting of rougher and flotation stages. A combination of standard flotation reagents will be used such as diesel, sodium silicate and MIBC. Flotation tailings produced from the mineral processing circuit will be transferred to one of three purpose designed storage facilities, to be constructed in stages over the production life of the mine.

Graphite concentrate produced at the mine will subsequently be loaded into containers and transported by truck to Townsville to a separate facility for downstream refinement and distribution. Local and state-controlled roads provide access to the Project and will be needed for transport of product, equipment, material and reagents and personnel.

Other infrastructure necessary to support project operations will include:

- mine access, tracks and haul roads;
- on-site solar array and energy storage system with back-up diesel generation;
- on-site accommodation facility, ablutions, sewage treatment plant, airfield;
- water management infrastructure including a permanent watercourse diversion, flood levee, dams, drains, bunds, pipes and pumps;
- mine infrastructure areas including mine offices, bathhouse, crib rooms, warehouse/stores, workshop, fuel storage, refuelling facilities, wash bay, laydown area, effluent and liquid waste storage;
- ROM and product stockpiles and product loading area; and
- power, water and other minor plant and equipment.

The Project MLAs will incorporate the infrastructure listed above. Other ancillary infrastructure may be relied upon; however, these are not proposed as part of this Project approval. This may include future transmission lines, or water pipelines for water sharing.

Project infrastructure within the MLAs are shown in Figure 2 and Figure 3.

The Project is expected to support a construction workforce of approximately 100 and an operational workforce of up to 113 personnel at peak production.

The nearest local town is Croydon, a historic gold mining town located some 70 km to the north. The town is a popular with tourists who utilise accommodation at the caravan park, the local hotel, service station, café and supermarket. Where practical, the Project will offer local employment and support the Croydon community, including through local procurement of goods and services.

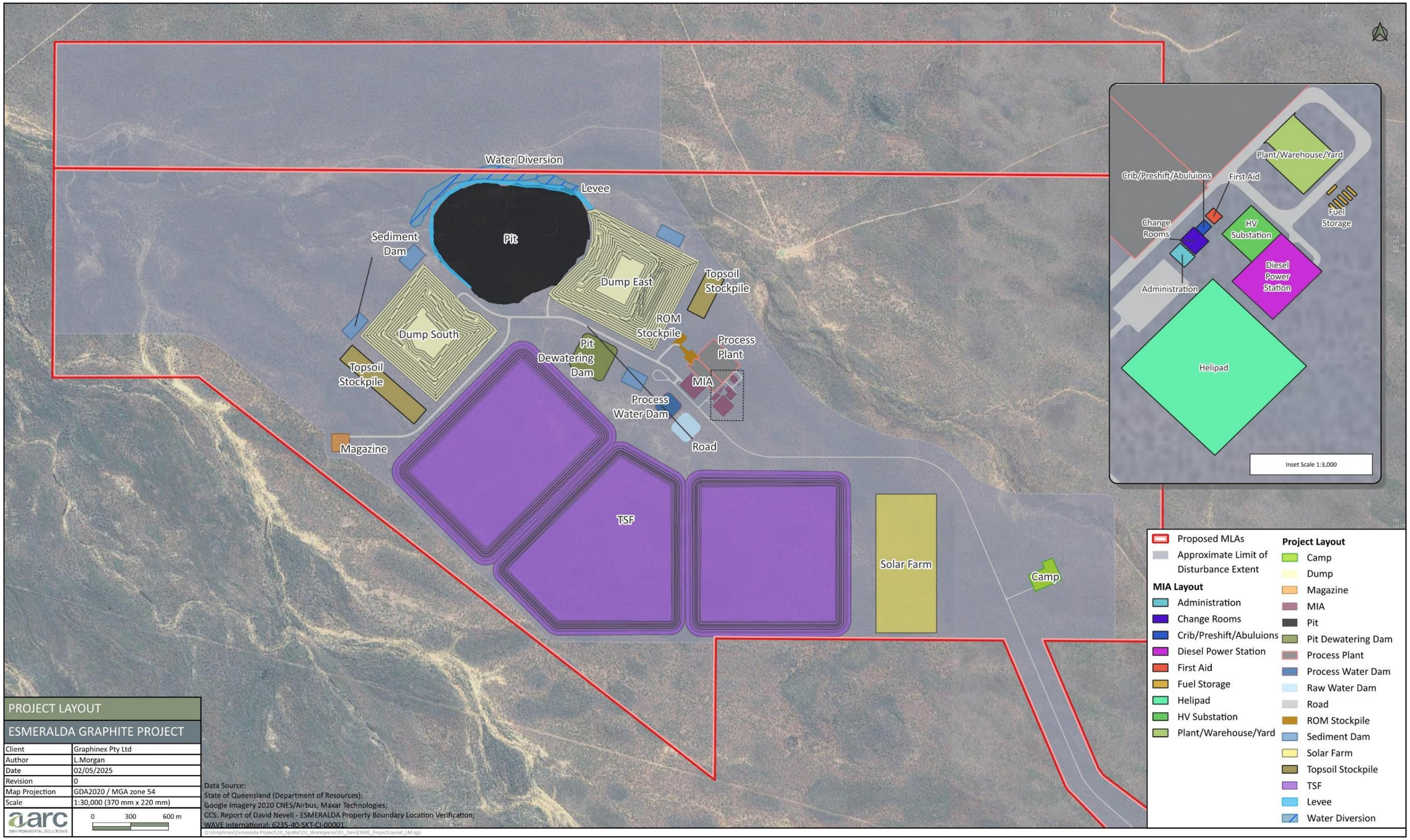

Figure 2: Conceptual project layout – mining and processing area

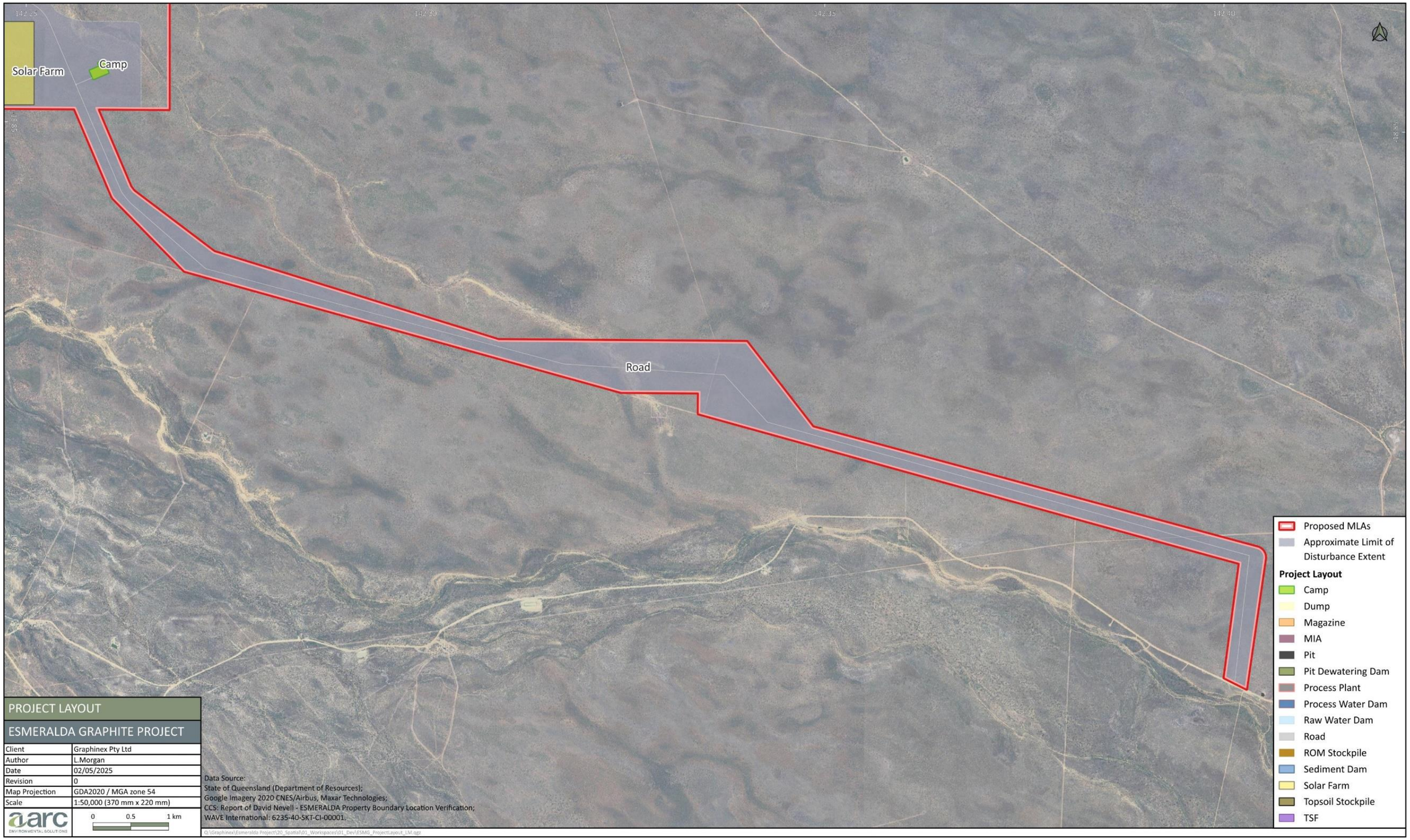

Figure 3: Conceptual project layout – transport corridor

4.2 Land use

4.2.1 Existing land use

The Project area is located within the Gulf Savannah natural resource management (NRM) region. The Project area is located within an existing pastoral property. Land within and surrounding Project is designated as 'Rural' zone under the Croydon Shire Planning Scheme 2019.

The land in the study area is currently used for low-intensity cattle grazing of native vegetation. No historical mining has occurred in the underlying or surrounding Project area. Exploration drilling has been conducted as part of resource definition and for the development of groundwater monitoring bores.

The Esmeralda Prospect Road is a local council road providing access to local properties and the southern boundary of the MLAs.

There are no protected areas near the Project. The Tagalaka National Park (also listed as Littleton Resources Reserve), the Rungulla National Park and several Nature Refuges (state protected areas established under the NC Act) are located within 100 km of the Project. The Esmeralda Nature Refuge is located approximately 40 km to the east of the Project (Figure 4).

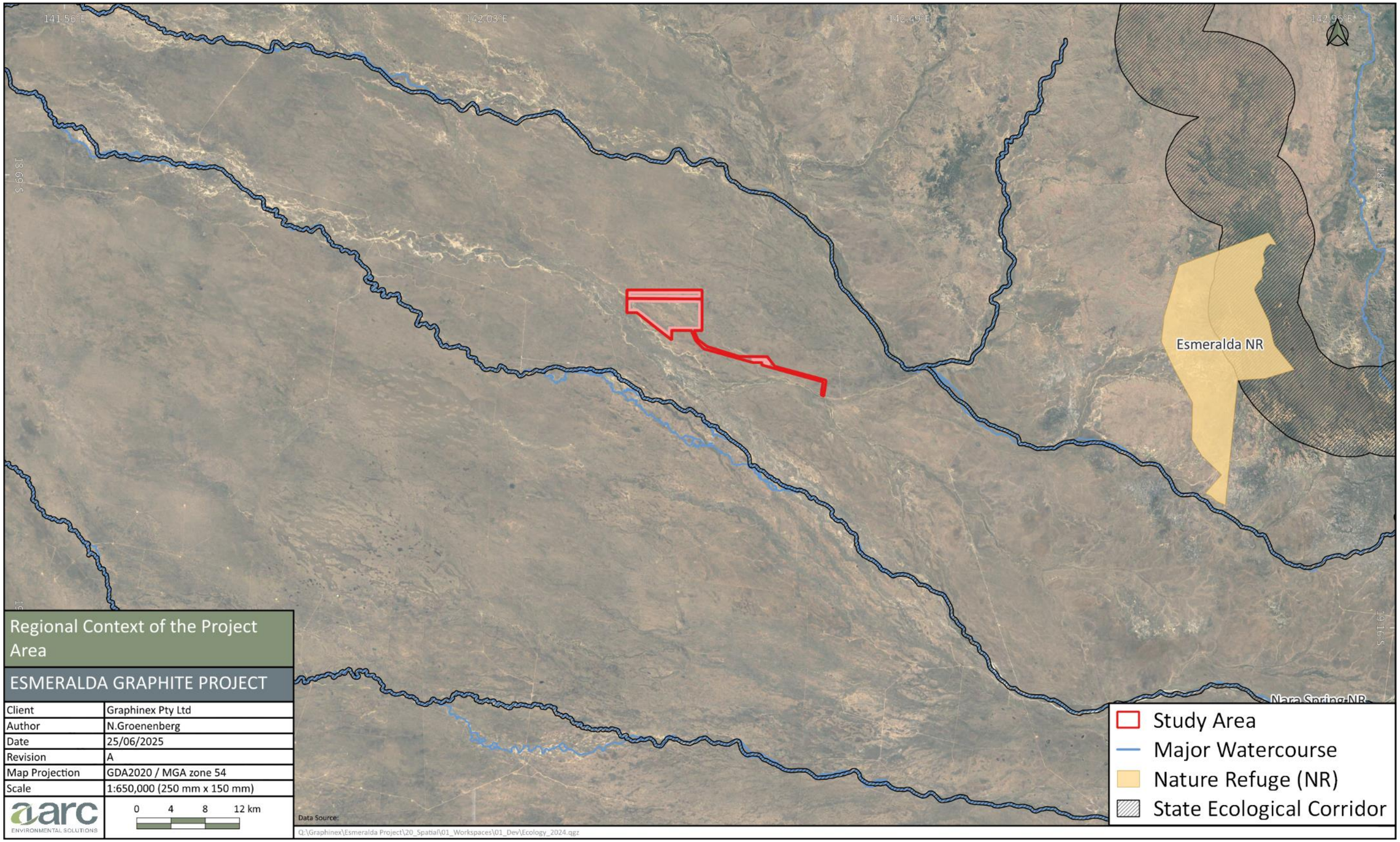

Figure 4: Nature refuge

4.2.2 Intended land use

The intended land use will be mining and associated infrastructure / activities. Within the MLAs this will include:

- a mine pit, waste rock dumps, low grade ore stockpile and tailings dams;
- mine access, tracks and haul roads;
- on-site solar array and energy storage system with back-up diesel generation;
- on-site accommodation facility with capacity for total workforce, ablutions, sewage treatment plant, airfield;
- water management infrastructure including a permanent watercourse diversion, flood levee, dams, drains, bunds, pipes and pumps;
- mine infrastructure areas including mine offices, bathhouse, crib rooms, warehouse/stores, workshop, fuel storage, refuelling facilities, wash bay, laydown area, effluent and liquid waste storage;
- ROM and product stockpiles and product loading area;
- power, water and other minor plant and equipment; and
- airfield.

Outside of the MLAs, there are a number of key services that may be utilised including:

- road networks;
- future power distribution infrastructure;
- the Port of Townsville or suitable alternative;
- temporary accommodation and services offered from local towns such as Croydon; and
- suitable local airfields.

4.2.3 Land tenure

Mining activities proposed for the Esmeralda Project will occur within two MLAs covering a total area of approximately 4,517 ha. Applications for the Mining Leases have been submitted, and are titled ML 100430, and ML 100431. The MLAs are entirely located within a single landholding, described in Table 4 and Figure 5. The proponent has completed negotiations with property owners in relation to occupancy and/or ownership rights and subsequently acquired the property underlying the Project MLAs. A land compensation agreement has been signed off by the underlying landowner. Discussions have commenced with the Office of the Deputy Director-General Lands to subdivide the pastoral lease and separate the titles.

Lot 75 Plan SP273198 is also a registered forest management area (MUID: CY1AESM01), pastoral holding type. Accordingly, consultation with the DPI will be undertaken as an interested party during the EIS process. Furthermore, as a Lands Lease property, consultation will also be undertaken with the DNRMMRRD as an interested party during the EIS process.

Table 4: Underlying and adjoining land tenure

Lot	Plan	Tenure	Local Government Area	Name
Underlying				
75	SP273198	Lands Lease	Croydon Shire	-

Lot	Plan	Tenure	Local Government Area	Name
Adjoining				
3881	3881PH1911	Lands Lease	Croydon Shire	-
-	-	Road Parcel	Croydon Shire	Esmeralda Prospect Road

In the process of delineating the boundaries of the Project MLAs, it was identified that the location of boundaries between Lot 75 on SP273198 and Lot 3881 on PH1911 were inconsistent with the QSIC Foundation Dataset (DCDB) (Cottrell Cameron & Steen Surveys 2025). Survey plans, aerial imagery, Land Commissioners Correspondence and sketches were reviewed to determine a corrected boundary of Lot 75 on SP273198 and Lot 3881 on PH1911 (Figure 5). Consultation will be undertaken to correct this boundary in the relevant databases.

The Project access route is in proximity to stock route 395CROY. Transport management will be required when this stock route is in use. Consultation will be undertaken with local government and relevant stakeholders to determine frequency and duration of use and facilitate open communication for Project development.

The Project MLAs also intersects or adjoin the resource exploration tenure identified in Table 5 and Figure 6. Mining, processing and access will occur within the proposed Production MLA, which is located within exploration permit for minerals (EPM) 28274 held by Graphinex, and EPMs 27818 and 27195 held by Moho Resources Ltd, and EPM 25210 held by IGO Newsearch Pty Ltd. Graphinex has a signed contract with these parties to acquire the relevant tenements.

One unnamed road parcel (ID: QLDRXXR14198614187551426000) underlies EPM 28274, however is not overlain by the proposed Project MLAs.

Table 5: Underlying and adjoining resource tenure

Tenure number	Tenure type	Name	Holder	Grant Date	Expiry Date
Underlying					
EPM 28274	Exploration Permit Minerals	Esmeralda	QLD Aus Graphite Pty Ltd	21 November 2023	20 November 2028
EPM 25210	Exploration Permit Minerals	Empress Springs 3	IGO Newsearch Pty Ltd	8 April 2014	7 April 2029
EPM 27818	Exploration Permit Minerals	Prospect	Moho Resources Limited	30 August 2021	29 August 2026
EPM 27195	Exploration Permit Minerals	Croydon 6	Moho Resources Limited	21 January 2020	20 January 2025
Adjoining					
EPM 28306	Exploration Permit Minerals	Clara River	Clara Resources Pty Ltd	9 May 2023	8 May 2026
EPM 28276	Exploration Permit Minerals	Warrigal Creek	Neoteric Resources Pty Ltd	24 February 2025	23 February 2030
EPM 28309	Exploration Permit Minerals	Prospect Road	Clara Resources Pty Ltd	12 May 2023	11 May 2026

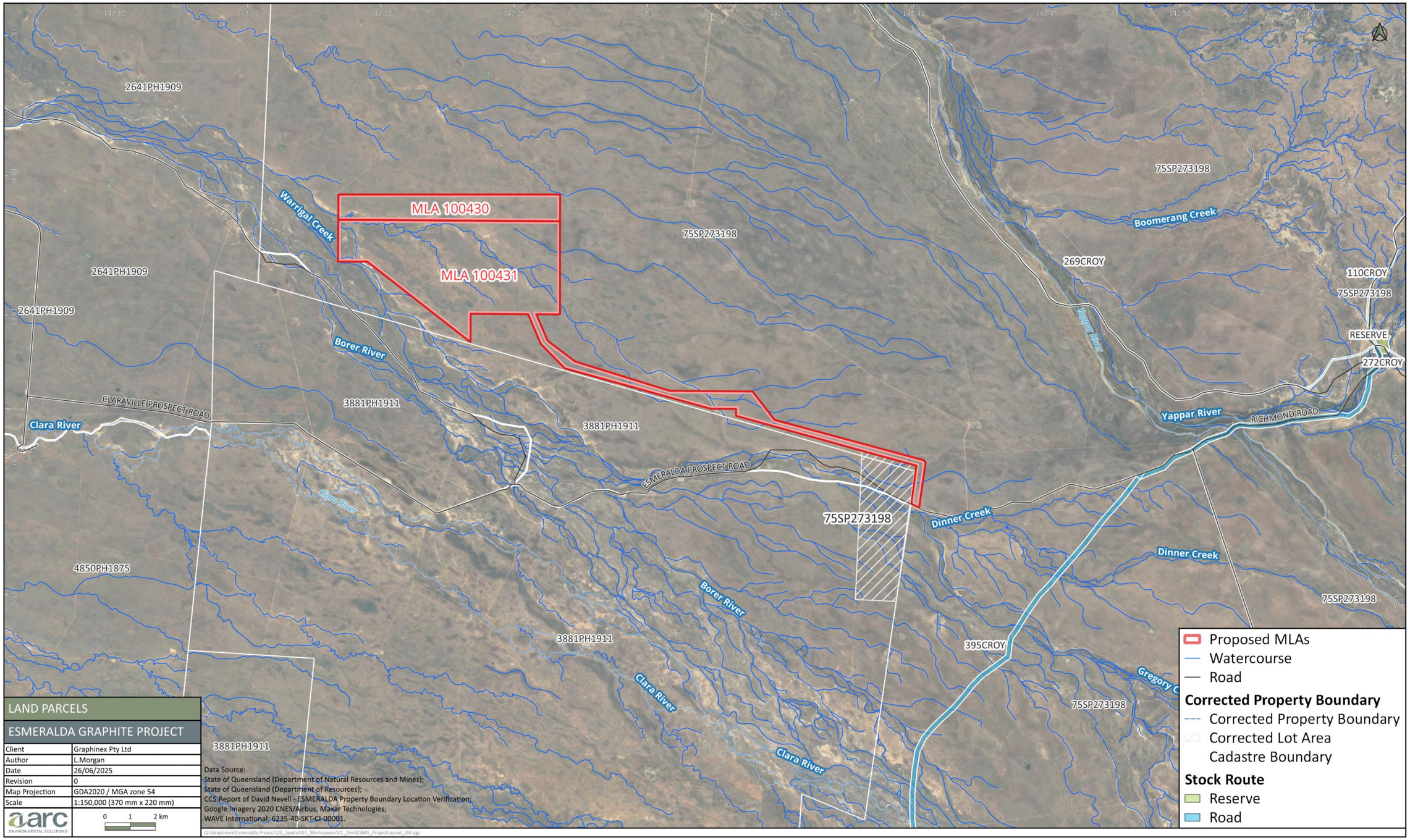

Figure 5: Underlying and adjoining land tenure

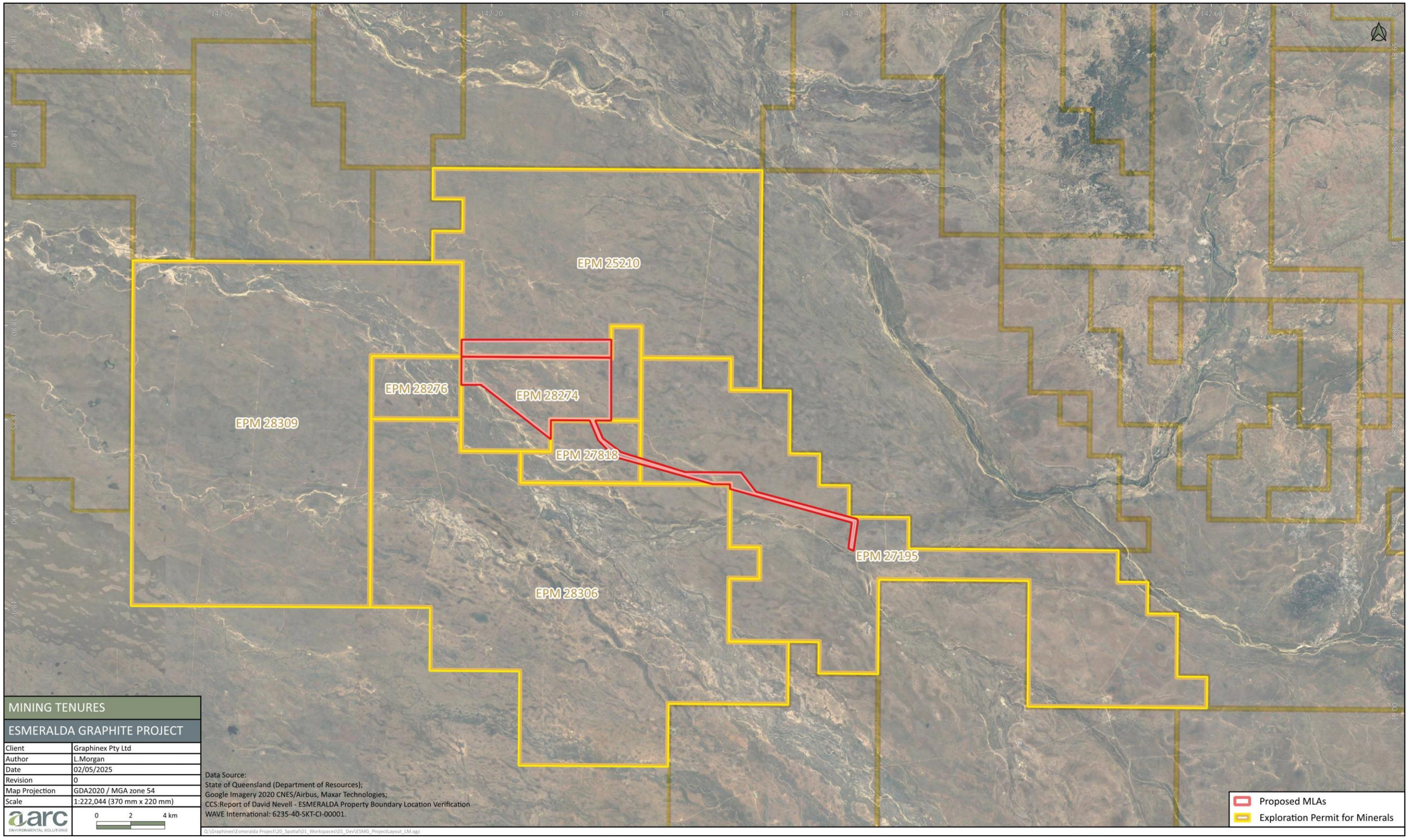

Figure 6: Underlying and adjoining resource tenure

4.3 Project need, justification and alternatives considered

4.3.1 Project justification

The proponent proposes mining of the Esmeralda Granite unit and on-site concentration of graphite ore. Graphite concentrate will be trucked to a separate facility in Townsville for further refinement and distribution to local and international markets.

Graphite is recognised as a 'critical mineral' by both the Queensland and Commonwealth Governments, reflecting its strategic importance and limited global availability. Advancement of this project will contribute significantly to establishing a sustainable, long-term supply of high-grade graphite in Queensland.

The properties of graphite, including its high thermal and electrical conductivity, make it a unique product, suitable for a wide range of applications including the production of battery anodes, production of electronic components, use in lubricants, nuclear technology, steel making, and other products. Graphite produced at the Project and refined in Townsville, is intended primarily for use as battery anode material. As such, local graphite production will ensure domestic supply security, enabling the manufacture of renewable energy products in Queensland.

The worlds current graphite supply is largely limited to overseas producers. No large-scale producing graphite mines are currently in operation in Australia. Limited opportunities exist for sourcing graphite interstate, with graphite reserves and resources restricted to Queensland, South Australia and Western Australia.

The Queensland Government's Critical Minerals Strategy (DNRMMRRD 2025) identifies the importance of developing a critical minerals industry in Queensland to take advantage of opportunities created by the energy transition and the new economy flowing from it. The strategy outlines the prioritisation of 'the exploration and extraction of [Queensland's] mineral resources, while fostering domestic innovation, investment, and sustainable practices'. The strategy also identifies the importance of moving quickly to seize the opportunity that has arisen in the critical minerals sector, including through 'a targeted approach and streamlining government processes'.

Recent global increases in the demand for critical minerals such as graphite has triggered the Queensland government to implement a goal to capitalise on the state's resource potential, in order to become a global leader in the production and exportation of the mineral. This will be achieved through partnerships forged between industry and government and build upon the mining expertise and downstream domestic processing potential in Queensland.

Consistent with the Queensland Government's Critical Minerals Strategy, and as a response to increased demand for graphite, the Project will directly facilitate the strategy, and other targets including for renewable energy as legislated in the Renewable Energy and Jobs Act 2024, and the Clean Economy and Jobs Act 2024, by developing a long-term extraction and processing stream for graphite within Queensland. The Project will also facilitate the development of the graphite industry in Australia and ensure long-term domestic supply of critical minerals by accessing the 3rd largest graphite deposit in the world complete with downstream processing. A newly proposed facility with significant production capacity will be developed in Townsville to process the majority of mined product.

The Project will also contribute to the federal Critical Minerals Strategy 2023-2030 (DISR 2023) by facilitating growth in the national production and exportation of critical minerals to meet global demands. Critical minerals are essential for the energy, transport, aerospace, defence, medical, automotive and telecommunications sectors, with additional manufacturing applications. The Australian government's vision is to become a global leader in critical mineral production by 2030, with the objectives to achieve a stable supply, expand sovereign capabilities, and grow regional economies (DISR 2023). Key strategic benefits of the Project are summarised as follows:

- the Project will provide secure and long-lasting skilled employment opportunities in a regional location during construction and operation;

- the Project will be a key player in achieving the progressive targets of the Queensland Government's Critical Minerals Strategy;
- there will be significant investment at a regional and state level as a result of the Project, including through downstream processing facilities and further development of domestic value-adding industries; and
- the federal Critical Minerals Strategy will rely upon the development of projects such as this to grow the Australian critical minerals industry and achieve the vision of becoming a global leader in critical mineral production by 2030.

4.3.2 Project alternatives

Alternatives to the Project have been investigated, however were not favoured ahead of the Esmeralda Project presented in this IAS. In terms of priority for graphite production in Australia, the Esmeralda deposit represents the largest, most accessible and well understood graphite deposit in the region. The current indicated resource of the Esmeralda deposit is approximately 25 Mt of graphite making it the 3rd largest deposit in the world. Other zones of mineralisation in the Project area hold future mining potential but require further resource definition and planning to confirm their suitability for economic mining.

Over the course of Project development, the Project design has considered several different mining and production scenarios of the Esmeralda deposit, which have been refined through ongoing feasibility studies:

- Analysis of varying mining methods and production scenarios, which have been refined through ongoing resource definition, numerous mine plan iterations, environmental impact considerations, and stakeholder engagement.
- Ongoing assessment of processing techniques to optimise recovery methods and product purity, while considering potential environmental impacts of different techniques.
- Various mine site water management scenarios have been assessed and subject to ongoing mine planning and environmental assessment to ensure impacts to watercourses and waterways in the vicinity of the planned drill sites and surrounds are minimised.

The Project design detailed in this IAS, including location and scale of the open-cut pit, has been informed by the resource definition process. The EIS process will include further assessment and analysis of the options considered, including analysis of key environmental considerations and justification of the final proposed Project description.

A 'do nothing' scenario has been assessed, whereby the Project does not proceed. At a minimum, the following consequences of this outcome are inferred:

- there will be a loss of skilled employment opportunity, including for 100 construction workers during Project development, and 113 operational workers over the life of the Project;
- a significant graphite resource will not be mined, resulting in the loss of mining royalties;
- significantly reduced state and federal capacity to develop and support an economy which mines and processes critical minerals domestically;
- there will be a loss of federal tax revenue; and
- there will be a loss of state revenue royalites.

4.4 Components, developments, activities and infrastructure that constitute the Project to be declared Coordinated

The proponent considers that the Project meets the requirements for declaration as a Coordinated Project under the SDPWO Act. This is primarily due to the complex nature of the approvals required for mine

development; and the strategic significance of the Project including economic and social benefits, capital investment and employment opportunities.

Project components warranting a coordinated project declaration include:

- the mining of graphite ore, and on-site processing activities resulting in graphite concentrate, occurring within the two mining lease application areas; the onsite process will involve:
    - feeding ore from a ROM pad into crushing station;
    - the sized ore will then be conveyed to SAG mill;
    - the fine ore is then pumped to the floatation circuit;
    - concentrate is then pumped to thickener circuit;
    - the thickened concentration is pumped tot the filters for further de-watering; and
    - then to ovens for final drying;
- a proposed transport corridor and all-weather road connecting the mine site to the Flinders Highway, located with the southern lease application area; and
- development and use of services and infrastructure associated with the mining activity including water supply, accommodation.

Other associated activities and infrastructure necessary to support graphite production include:

- construction of a mine infrastructure area (MIA) including mine offices, bathhouse, crib rooms, warehouse/stores, workshop, fuel storage, refuelling facilities, wash bay, laydown area, effluent and liquid waste storage;
- site preparation works that include clearing vegetation, removing topsoil, stockpiling, earthworks, and temporary drainage works;
- construction of a ROM pad for ore stockpiling and handling, tailings storage facilities for process waste disposal, product stockpile and loading area;
- installation of on-site solar array and energy storage system with back-up diesel generation;
- construction of an on-site workers accommodation facility, ablutions, sewage treatment plant and airfield; and
- developing water management infrastructure including a diversion, flood levee, dams, drains and bunds.

All project components remain the subject of continued design analysis and improvement throughout the EIS process.

Graphite concentrates produced at the mine through on-site processing will be transported to Townsville to a specialised facility for downstream refinement and distribution. The processing facility in Townsville will not be incorporated in the Project EIS.

The Townsville facility will operate in a similar manner to an approved demonstration facility located in Bohle, however with an anticipated annual throughput of 240,000 tonnes. The development of this facility will be assessed against the Townsville SDA Development Scheme, through the OCG. The assessment processes associated with a development application seeking a Development Permit for Material Change of Use of this nature is anticipated to take 6 – 12 months from lodgement to receipt of a decision. The proposed development will also require an Environmental Authority to operate, under the Environmentally Relevant Activity: ERA 31 – Mineral Processing (2)(b) – Processing more than 100,000 tonnes of mineral products (other than coke) in a year.

The refinery will involve the following processes:

- concentrate from site will be delivered in sea containers
- the concentrate will then be processed through a Spheroniser

- it will then be pumped to a caustic and acid wash process to remove impurities
- the product will then be coated and dry for final dispatch to market.

4.5 External infrastructure requirements

Outside of the MLAs, there are several key services that may be utilised including:

- transport of product, equipment, materials, reagents and personnel on public road networks;
- future power distribution infrastructure;
- potential water supply infrastructure;
- the Port of Townsville or suitable alternative;
- temporary accommodation and services offered from local towns such as Croydon; and
- suitable local airfields.

Each of these infrastructure requirements will be examined in detail in the EIS, including assessment of all feasible alternatives. Separate approvals will be sought for any off-lease development if required.

Several possible public road routes are being investigated for transport of graphite concentrate via road-train to Townsville. A transport assessment will be undertaken as part of the EIS to ensure suitability and safety of the route and minimisation of road traffic impacts.

4.5.1 Power supply

Power to the mine will be supplied by an onsite 10MW solar farm and associated 5MW / 35MWh energy storage system, or similar. Infrastructure for distribution will include transmission-lines and an onsite switching/substation located adjacent to the mine infrastructure area. Diesel power generation will be required to provide supply supplementary loading.

4.5.2 Water supply

Total water demand for the Project is the subject of ongoing evaluation and assessment, with initial estimates of between 1 and 2 GL per annum required for operations. Key water demands include water consumption in the process plant, water entrained in the tailings, water use for dust suppression, fire suppression water and potable water demand (treated on-site) for the camp and work areas. Preliminary groundwater assessment indicates that the Project may be able to source sufficient water supply from a combination of groundwater inflow into the open-cut pit, and groundwater dewatered adjacent to the pit. This is the preferred option as it is expected to provide a high quality and secure water supply in close proximity to Project operations, while enabling Project operations through dewatering. Groundwater assessment, monitoring, and modelling will be undertaken as part of the EIS to refine the groundwater context in the Project area, however initial estimates indicate that the water quantity may be approximately 1 – 1.5 GL per year. Under this strategy, Project bores within the MLAs would be used. Groundwater is discussed further in Section 6.3.2.

An alternate water supply source may be required to fulfill any water balance deficit for the Project. Several supply options are being investigated as part of the EIS including:

- surface water harvesting from Warrigal Creek , requiring access to available allocation under the *Water Resources (Gulf) Plan 2007*;
- additional groundwater supply from the Gilbert River Formation, requiring access to state reserve under the *Great Artesian Basin and Other Regional Aquifers (GABORA) Water Plan 2017*;
- access to water saved through remediation of open, flowing bores located in similar formations to the Project, under the GABORA Water Plan; and

- water trading with other licence holders.

It is noted that unallocated water licences cannot be granted where the drawdown on other water users exceeds 5 metres or where the cumulative drawdown on GDEs (springs) exceeds 0.4 metres. Assessment of this will be undertaken as part of the EIS and further modelling.

Infrastructure requirements for water supply will be defined through the EIS process. The final water supply solution will aim to minimise impacts on the environment and other users. Where the taking of water requires a licence under the *Water Act 2000* (Water Act), a separate licence application will be made. Given the preferred water supply option of on-site bores, off-site infrastructure is not expected to be required for water supply infrastructure. However, if it is necessary – including for remediation of open bores and pipeline development - additional approvals and landholder agreements may be required.

4.5.3 Downstream processing

Graphite concentrate produced at the mine will be loaded into containers and transported by truck to Townsville to a specialist facility for refinement. The Townsville facility will produce battery anode material from the graphite sourced from the Project. This facility will be approved and developed separately to the approvals process for the Project outlined within this IAS.

4.6 Timeframes for the Project

The life of the Project operations is approximately 50 years, which includes construction of the site. An additional 10 years is estimated for final rehabilitation of the site. Should the project be approved, construction will commence in 2027 with production to follow in 12 – 18 months. Table 6 summarises the estimated timeframes of the Project.

Table 6: Project timeframes subject to approval

Approximate Timeframe	Project Phase
2024-2026	Mine planning, technical studies and approvals
2027	Construction (pre-strip, topsoil stockpiling, infrastructure and road development, waste/ overburden removal)
2028 - 2070	Mining and processing (ramping up to full production by 2030 - 3.5 Mtpa)
2070-2076	Mid-grade ore stockpile reclaim (plant feed from stockpiles after pit depletion)
2076-2086	Final site rehabilitation and monitoring (estimated 10-year post-mining period)

4.7 Construction and operational processes

4.7.1 Construction processes

Construction activities will occur ahead of operations and are expected to span 12 to 18 months. Construction activities will include:

- development of roads and tracks;
- construction of mine infrastructure areas, including workshops, offices;
- construction of the ROM stockpile area and product loading area;

- construction of water management infrastructure including sediment traps, dams, the diversion, bunds, levees, pumps and pipes;
- construction of power plant and distribution infrastructure;
- construction of an on-site workers accommodation facility, ablutions, sewage treatment plant and airfield;
- procurement and transport of equipment, the process plant, buildings and infrastructure to the site;
- construction of the process plant and one of three tailings dams; and
- construction of other associated infrastructure.

4.7.2 Operations

The Project will operate as an open cut graphite mine, producing up to 3.5 Mtpa of ROM ore over a mine life of approximately 50 years. Mining is proposed via conventional truck and excavator methods, to a depth of 280 m below ground level.

Ore extraction necessitates the implementation of controlled blasting techniques. Mining rate will ramp up to 3.5 Mtpa ROM over the first three years and remain relatively consistent thereafter. The Project presents significant opportunity for additional resource development and operational life extension within the proposed MLAs.

Excavated overburden and non-ore-bearing material will be deposited in out-of-pit waste dumps located adjacent to the mining void. The majority of waste movement will occur within the first 18 years of the mine life, with a total of 143.8 Mt estimated to be moved over the entire 50-year production life of the Project.

Graphite ore (~ 6% total graphite) will be trucked to the mineral processing plant for stockpiling and concentration via conventional flotation methods. The processing method includes an initial crushing and milling circuit that liberates the graphite in 300-micron product. Ore is then fed to a flotation circuit consisting of rougher and flotation stages. A combination of standard flotation reagents will be used such as diesel, sodium silicate and MIBC. Flotation tailings produced from the mineral processing circuit will be transferred to one of three purpose designed storage facilities, to be constructed in stages over the production life of the mine. A process flow diagram is included as Figure 7.

Graphite concentrate produced at the mine will be loaded into containers and transported by truck to Townsville to a separate facility for refinement and distribution.

It is noted that there will be radiation sources on-site, associated with mineral processing activities mainly relating to instrument recording processes. These devices are commercially available and will be managed by a radiation safety officer (RSO).

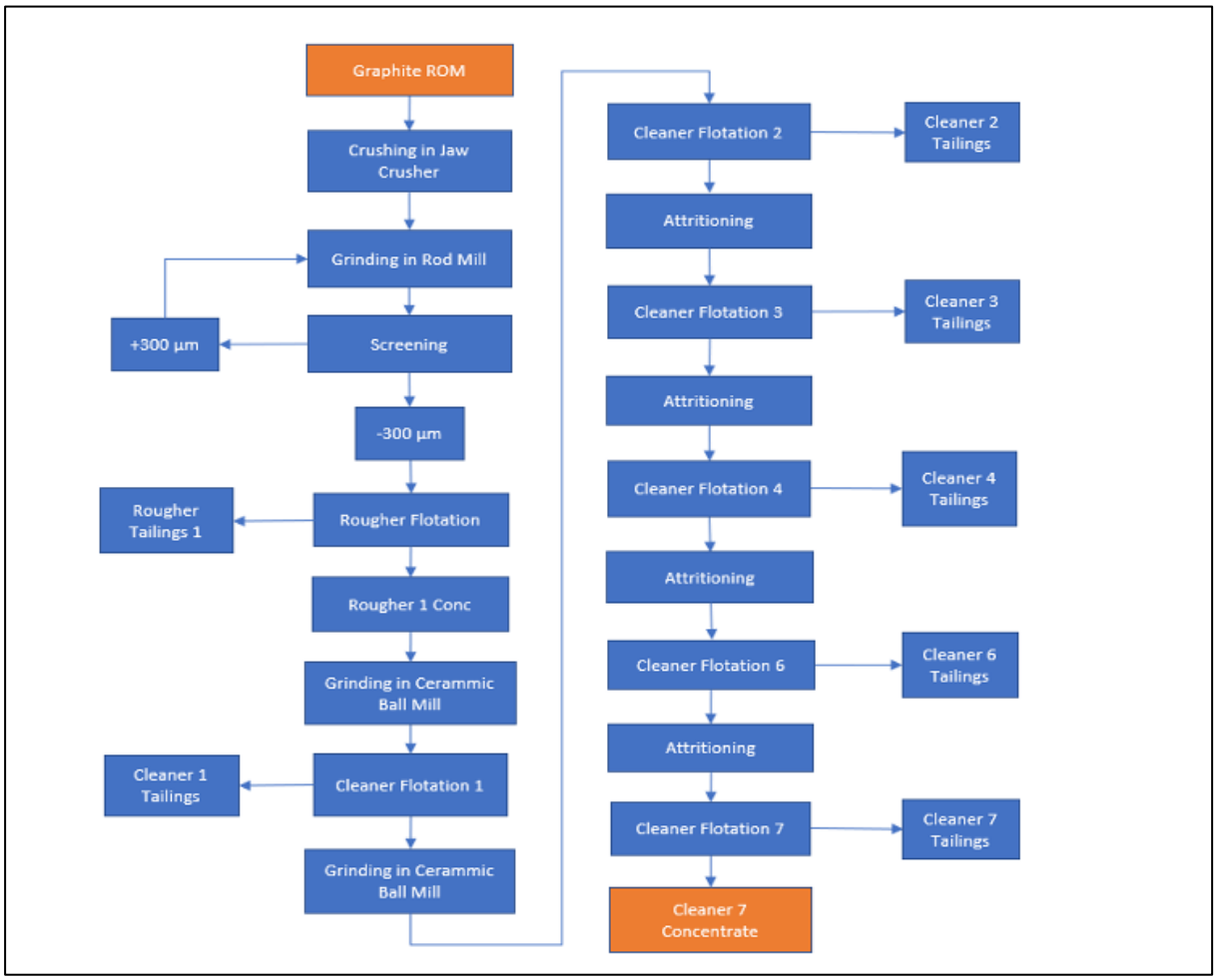

Figure 7: Flotation Block Flow Diagram

4.7.3 Rehabilitation

Rehabilitation will occur progressively over the mine life, as land becomes available for reclamation. Progressive rehabilitation will focus on areas of waste rock dumps and tailings cells during operations, with the remainder of rehabilitation to occur post-mining over an estimated 10-year period. Final landforms will be re-shaped, topsoiled and revegetated to ensure safe, stable and non-polluting landforms post-mining.

All mine disturbance and infrastructure will be removed or rehabilitated at the end of the mine life, with the exception of infrastructure that can be retained by agreement to support the post-mining land use.

Rehabilitation will aim to return the land to a grazing Post Mine Land Use (PMLU) where possible. The land use of the final void will be assessed during EIS investigations. A Progressive Rehabilitation and Closure Plan (PRCP) for the Project will be developed in accordance with the requirements of the EP Act, to be submitted as part of the EIS.

The following sub-section outlines a high-level proposal of the Project rehabilitation strategy. This is subject to finalisation during the detailed mine planning phase and EIS process.

4.7.3.1 Rehabilitation strategy

Decommissioning and rehabilitation will occur according to milestones and completion criteria developed for the Project. Milestones must 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, placement of topsoil stockpiles or is identified as being retained infrastructure post-closure.

Mine infrastructure to be decommissioned will be demobilised, removed, have topsoil replaced, and the land rehabilitated to the final Post Mine Land Use (PMLU) as soon as practicable once the service life of the infrastructure has passed. Roads, water storages, and other Project infrastructure may be retained through agreement with the landowner.

Rehabilitation will aim to return the land to a grazing PMLU where possible. The land use of the final void will be assessed during EIS investigations; however it is not proposed that the void will be backfilled.

It is noted that the proposed pit location is intersected by an unnamed watercourse of stream order 3. This watercourse is proposed to be permanently diverted around the pit as part of Project development and retained post-closure and supported by a flood levee. According to State Government Guideline "Progressive Rehabilitation and Closure Plans ESR2019/4964", a PRCP schedule must provide for rehabilitation of a void that is wholly or partly in a 'flood plain'. It is understood that the meaning of 'flood plain' refers to land that is the same height as, or lower than, the level modelled as the peak water level for a relevant watercourse in a 0.1% AEP event. Only streams which are order 4 or higher are 'relevant watercourses'. The pit is located on land that is below the peak water level for a stream order 3, however there is distinct separation, during the 0.1% AEP event, between the land on which the pit is to be located and the peak water level for Warrigal Creek (stream order 4 or greater). A determination of the flood plain context in the Project area is required, as only flood water in the stream order 3 unnamed watercourse is expected to be relevant to any residual void in the final landform.

While it is not possible to clearly define the specific contributions of flow from different watercourses in each creek as the braided systems in the broader Project region include interaction between all flood plains, initial work has been undertaken to quantify potential contribution of flow from the Warrigal Creek and Yappar River (both stream order 4 or higher) to the unnamed watercourse during extreme flooding events. Initial estimates indicate that during 1% AEP flood events, approximately 24% and 1% of breakout flow to the unnamed watercourse may originate in Warrigal Creek and Yappar River respectively. Therefore, as much as 75% of flow does not originate from these watercourses. During 0.1% AEP flood events, approximately 36% and 6% breakout flow may be attributable to Warrigal Creek and Yappar River respectively. These estimates are likely conservative and an overestimation as not all flow intersects the Project site, and even less to the area adjacent to the open-cut pit location. Further detailed modelling will be undertaken by relevant experts, and include the use of LIDAR spatial data, and site-specific water monitoring – detailed further in Section 6.3.1. On-going consultation with DETSI and the OCG will be undertaken to resolve these complex interpretations during the EIS process.

Rehabilitation milestone timeframes will be developed with consideration of the size of the rehabilitation area, the applicable milestone activities and interim rehabilitation activities that are scheduled to occur or anticipated to be required before the area becomes available for rehabilitation. Milestones that involve revegetation activities, including monitoring of revegetation, will include provisions for unfavourable growing seasons and unforeseen extreme events such as droughts or storms that could negatively impact vegetation establishment. Including contingency for complex management requirements, and to develop a dataset supporting successful rehabilitation, it is expected that the rehabilitation of the Project site will conclude approximately 10 years after mining operations cease.

Whilst the proposed rehabilitation processes will be further defined in conjunction with the development of the PRCP, the general rehabilitation activities are likely to include:

- disconnection and removal of all infrastructure including buildings, machinery, equipment, road base, concrete slabs, water management structures, pipelines, and fences not part of a PMLU;
- topsoil is to be stripped and stockpiled to maximise the long-term viability of the growth media;
- investigation of potentially contaminated land and where necessary, remediation activities undertaken;
- landform development where reprofiling, reshaping and/or compaction works are required;
- revegetation involving topsoil application, ripping and seeding (or planting) and the application of soil ameliorants, as required;

- Any retained waste material stockpiles will be recontoured including grading and compaction to create stable landforms that are compatible with the surrounding landform. The geotechnical stability of waste rock dumps is to be assessed;
- tailings storage facilities rehabilitated;
- ongoing monitoring of the physical and chemical stability of rehabilitated areas; and
- certification of rehabilitated areas meeting and/or exceeding completion criteria (to be developed).

Rehabilitation indicators and visual observations gathered as part of an annual monitoring process will be used to identify any aspects of the rehabilitated area that are of concern or suggest rehabilitated land is at risk of not meeting the required PRCP completion criteria. These may include:

- evidence of active erosion;
- inadequate vegetation cover or growth;
- invasive weed or pest species;
- soil dispersion / instability; and
- soil infertility.

Following an annual monitoring process, areas of rehabilitation will be assessed for maintenance. An annual visual inspection of all rehabilitated areas will be undertaken to provide an overview of the status of the rehabilitation and identify any noticeable issues such as erosion or inadequate vegetation cover or growth. This information, along with monitoring results, will be used to inform the maintenance schedule.

Maintenance may include repairing areas of excessive soil erosion or undertaking supplementary plantings or seeding to increase floristic diversity and cover to assist in achieving completion criteria.

If issues re-occur, an investigation will be carried out to determine the reason and allow for remediation. Modification of rehabilitation methods and specifications may be required, and rehabilitation and maintenance planning updated accordingly.

4.8 Workforce requirements during construction and operation

The Project is expected to support a construction workforce of approximately 100 and an operational workforce of up to 113 personnel at peak production. The workforce is expected to represent a mix of local and remote workers. Remote workers will either drive-in-drive-out from North Queensland or may Fly-in-fly-out from more regional areas, including to and from Normanton, Cloncurry, or Mount Isa airports – before being bussed to site. Site access may be supplemented or facilitated by the development of an on-site airfield, with specifications at a minimum consistent with those outlined by the Royal Flying Doctor Service (RFDS n.d.). Workers would then be bussed to on-site accommodation.

Due to the remote location of the mine, the work force will be accommodated in an on-site accommodation village. There are no alternate accommodation options available within a safe daily driving distance. The accommodation village will be sized to accommodate the full workforce required for construction and operation. Detailed designs will be completed as part of the EIS. Due to limitations on available skilled workforce in regional communities within 125 km of the Project, driven by low population and a local industry which is largely agriculture-based, it is expected that the majority of the Project workforce will be sourced externally. Notwithstanding this, in accordance with the *Strong and Sustainable Resource Act 2017* (SSRC Act), and in the interest of positive social stewardship, the Project will ensure the following standards are met to reduce potential impacts on local communities:

1) The Project will ensure that the workforce is not comprised of 100% FIFO;

2) The Project will provide equal opportunities in recruitment of workers from local communities; and

3) The Project will undertake a social impact assessment.

The SSRC Act is discussed further in Section 6.8.

4.9 Economic indicators

The Project PFS has been completed, and a more detailed BFS will commence in the 3rd quarter of 2025. The PFS assumptions were that the mining operations would be conducted by a contractor model, with the contractor supplying all the required plant and maintenance facilities as part of their contract. The cost build for mining then included a rate for material moved including operating and capital costs. Wave internation completed a preliminary site concentrator layout which was then costed to deliver a capital cost for the owner. The estimated total mining plant capital spend without replacement is approximately $55.3 million and mining specific infrastructure is $9.9 million. A 30-year mining plant purchase capital, replacement capital, salvage including 15% contingency is estimated to be approximately $244.7 million.

Capital expenditure for key Project components is summarised in Table 7, with the sum expenditure across Phase 1 and Phase 2 totalling $666.4 million.

Table 7: Capital expenditure

Component	**Phase 1** **(30 ktpa CPSG)**	**Phase 2** **(100 ktpa CPSG)**
Mine development	$55.3 m	
Tailings management	$17.2 m	
Concentrator	$133.4 m	$215 m
Indirect	$72.6 m	$105.7 m
Contingency	$39.1 m	$28.1 m
Total:	**$317.6 m**	**$348.8 m**

Deferred capital cost items have been included in financial modelling but are not considered as development capital include tailings storage facility (TSF) wall lifts and new cells, creek diversion, and plant sustaining capital. These are summarised in Table 8.

Table 8: Deferred capital costs

Component	**Value (LOM)**
Tailings Storage Facility	$156 m
Sustaining Capital (total)	$411.3 m

Growth in the mining sector will assist local economies through employment, procurement of goods and services and capital investment. The Esmeralda Project will undoubtedly contribute directly to the long-term economic prosperity of the region. Key strategic benefits are summarised as follows:

- the Project will provide secure and long-lasting skilled employment opportunities in a regional location during construction and operation;

- there will be significant investment at a regional and state level because of the Project, including through downstream processing facilities and further development of domestic value-adding industries;
- the project will generate economic, employment, and income benefits for the state and all stakeholders including royalty and payroll tax payments to the Queensland Government; direct and indirect increases in employment and economic stimulation in the region.

Local industries which can support the Project and be engaged through local procurement practices include:

- electrical services;
- labour hire;
- engineering and construction;
- cultural heritage; and
- food and other ancillary services.

The Project may be supported by government initiatives, including tax schemes and funding which would enhance Project outcomes and may streamline development; however, the Project is not expected to rely on these initiatives to determine Project viability.

The significant increase in demand for graphite supports the economic viability of the Project. The value adding process of downstream refinement further entrenches the Project as feasible as a strategic process, however graphite could be exported economically without further refinement and therefore the Project is not dependent on the downstream processing facility for viability.

4.10 Financing requirements and implications

Capital expenditure will be funded via a mix of debt and equity and operating expenditure will be funded through operating cash flows as per normal commercial requirements.

Graphinex has strong support for equity funding from strategic shareholders with capacity to fund the project, including for the approvals process and environmental assessment pathway which will rely on a suite of technical assessments. The proponent's strategic shareholders have successfully secured funding and operated mines and energy infrastructure projects globally. The project economics provide for a compelling investment case for both debt and equity financiers. It is the intent of the Proponent to own and operate the Project.

5 Location of key project elements

5.1 Local context

The Project area is remotely located with the Gulf Savannah natural resource management (NRM) region. The Project area covers approximately 4,444 ha within a single grazing property.

The Project area landscape is flat with minor changes in elevation ranging between 120 m and 140 m Australian Height Datum (AHD). Braided river systems dissect plains of low woodland vegetation supporting low intensity cattle grazing.

Public infrastructure is limited to sealed and unsealed roads providing access to local stations.

5.2 Regional Context

The Project is positioned 70 km south of Croydon, within the Croydon Shire Council Area, in the northern Mining District of Georgetown. The regional towns of Georgetown and Normanton are located 145km north-east and 170km north-west respectively.

Croydon is located approximately halfway between Normanton and Georgetown on the Gulf Development Road. The town is a popular with tourists who utilise accommodation at the caravan park, the local hotel, service station, café and supermarket. Where practical, the Project will offer local employment and support the Croydon community, including through local procurement of goods and services.

The Croydon area has a population of 215 (ABS 2021) and functions as a rural base. The primary land use in the Croydon Shire is beef cattle production.

The Croydon Economic Development Strategy (2023) indicates that the local council is aware of the strong graphite deposits identified within the local government area, noting that “Croydon is well positioned to support the development of the critical minerals industry” and that resource exploration and mining are positive drivers of economic growth for the region. Therefore, resource projects such as the Esmaralda Project are consistent with the current regional plan for the Croydon local government area.

6 Environmental considerations

6.1 Land

6.1.1 Land use

The Project area is located within the Gulf Savannah natural resource management (NRM) region. The Project area is located within an existing pastoral property. Queensland Land Use Mapping classifies the study area as 'Grazing Native Vegetation' (DNRMMRRD 2024). Land within and surrounding the Project is designated 'Rural' zone under the Croydon Shire Planning Scheme 2019.

The land in the study area is currently used for low-intensity cattle grazing of native vegetation. No historical mining has occurred in the underlying or surrounding Project area. Exploration drilling has been conducted as part of resource definition for the Project and for the development of groundwater monitoring bores.

The Project has an Agricultural Land Classification of Class C2 (Queensland Guidelines for agricultural land evaluation 2015). This land is considered suitable for grazing native pastures, with or without the introduction of pasture, and with lower fertility soils than C1. The Project is not located within Strategic Cropping Areas (SCA), Strategic Environmental Areas (SEA), Priority Agricultural Areas (PAA) or Priority Living Areas (PLA).

The Esmeralda Prospect Road is a local council road providing access to local properties and the southern boundary of the MLAs.

6.1.2 Topography

The topography of the Project area is generally flat to gently undulating, with elevations ranging between 120 m and 140 m Australian Height Datum (AHD). Braided river systems dissect plains of low woodland vegetation across the Project site. Figure 8 depicts the Project topography.

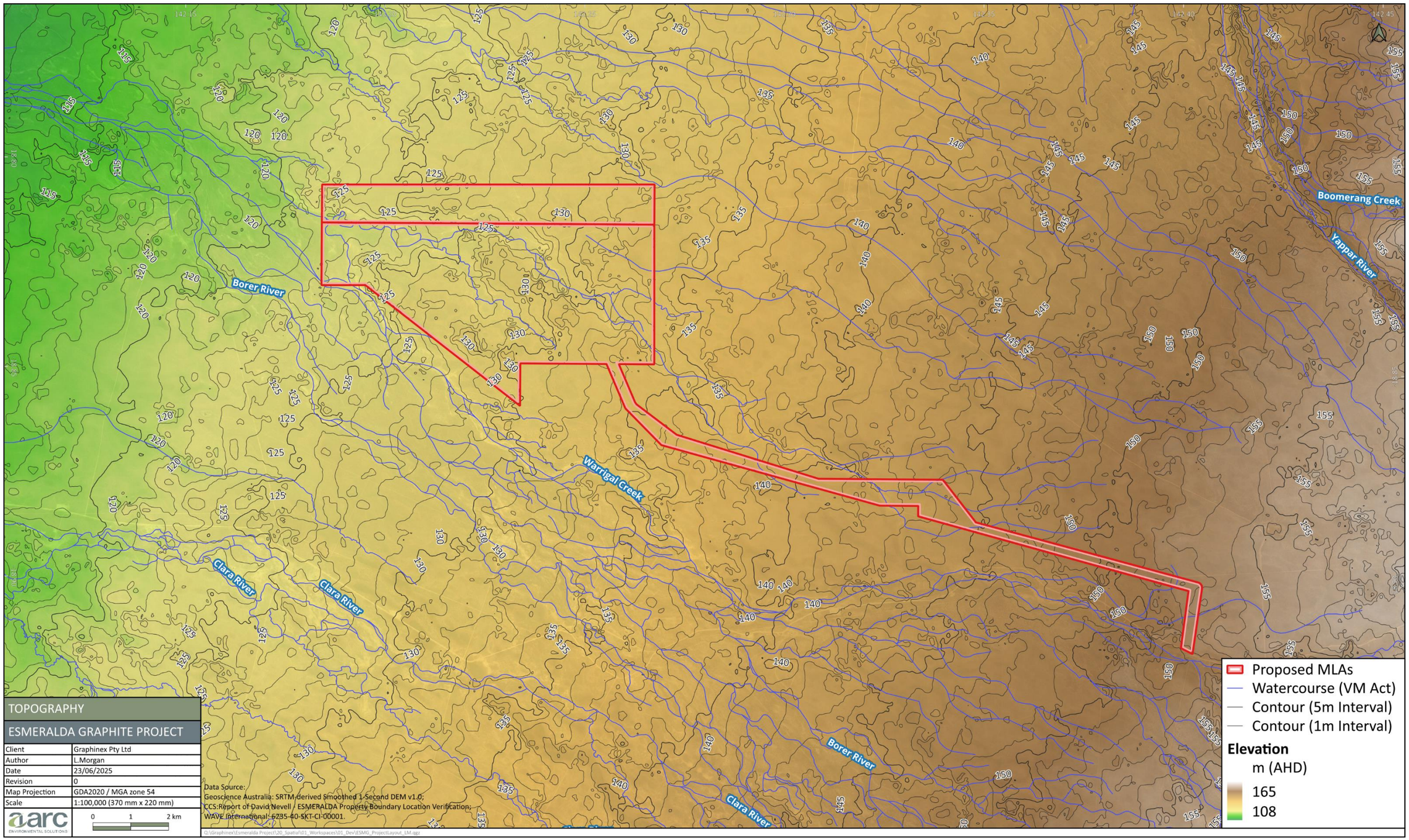

Figure 8: Topography of the project area

6.1.3 Soil

The Atlas of Australian Soils (broadscale national mapping at 1:1,000,000 scale) describes the Project Area being majority deep sandy mottled yellow earths on very gently undulating alluvial plains. Numerous sandy rises and shallow sandy stream beds are also described from the southern area of the transport corridor, while the western edge of the mine area includes yellowish brown earthy sands on stream levees, small flood plains and infilled channels.

A detailed soil assessment will be undertaken as part of the EIS to determine site-specific soil characteristics, including stability, permeability, and geochemistry. This assessment will inform Project design, including rehabilitation and management outcomes.

Acid sulphate soils are not expected to occur due to the topography (i.e. not below 5 m AHD), soil characteristics, and distance from a coastline.

6.1.4 Geology

The entire Esmeralda project area is concealed under Cainozoic and Mesozoic cover sequences. These Cainozoic sediments are underlain by the Mesozoic sediments of the Carpentaria Basin consisting of sandstone, siltstones, and shales of the Gilbert River Formation.

A major unconformity exists between the Mesozoic sediments and Proterozoic basement. The Carpentaria Basin is comprised of Early Cretaceous to Middle Jurassic age, fluvial to shallow marine dominated sediments. The basement is currently mapped as “unknown basement” and is interpreted to be the Esmeralda Supersuite granites.

Previous drilling in the area suggests that the cover sequence consists of flat laying laminated and cross bedded siltstone, claystone, and coarse sandstones. Logging of drill core has stated these sediments had alternating porous and non-porous horizons and differing strengths. According to historic drill holes, this sequence is approximately 50 - 70 m thick across the project area.

6.1.5 Visual amenity

The Project is located approximately 70 km south of Croydon, in a regional location dominated mostly by cattle grazing. Sensitive receptors are extremely sparse and are primarily limited to homesteads. There are no receptors associated with large numbers of viewers or well-used tourism or recreational facilities.

The closest homestead is approximately 5 km from the Project MLAs, with all other sensitive receptors greater than 10 km from the Project (Figure 9).

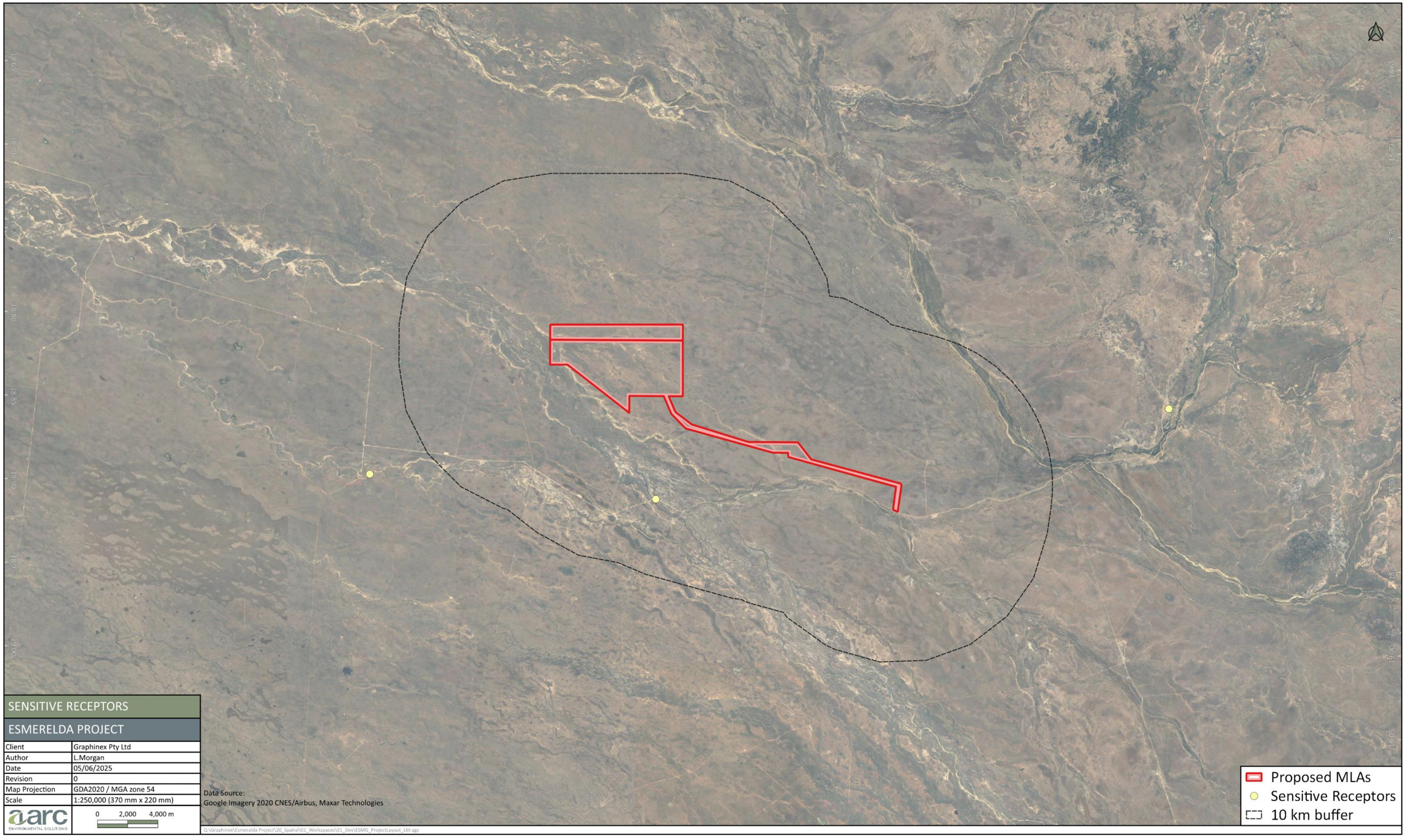

Figure 9: Sensitive receptors

6.1.6 Potential impacts to land values

Direct land impacts will include land disturbed (excavated or compacted) for construction and operation of the mine, within the MLAs. The exact nature and extent of direct land disturbance areas will be assessed and described during the EIS process.

Indirect impacts to land values from the Project may include:

- reduced productive land for agricultural use due to site development for a resource activity;
- emissions or releases resulting in land or water contamination;
- built infrastructure or landforms impacting visual amenity, including in a final landform;
- transport and traffic related impacts from public road use including increased traffic count and potential proximity to stock routes;
- enhanced erosion and sediment / soil loss from removal of vegetation and development in waterways.

Project operations, including mineral processing, will result in the production of waste streams, including tailings. On-site management will include suitably designed tailings storage, including for where tailings are classified as potentially acid forming. Tailings management is considered a critical matter, whereby the Project will undertake all reasonable and practical steps to reduce the risk, likelihood, and impact on environmental values.

The Croydon Economic Development Strategy (2023) indicates that the local council is aware of the strong graphite deposits identified within the local government area, noting that “Croydon is well positioned to support the development of the critical minerals industry” and that resource exploration and mining are positive drivers of economic growth for the region. Therefore, resource projects such as the Esmaralda Project are consistent with the current regional and economic plan for the Croydon local government area.

The EIS will assess direct and indirect impacts of the Project on all land values. The EIS will include a comprehensive soil and land suitability assessment, visual amenity study and transport assessment.

6.1.7 Management and mitigation measures

Management and mitigation measures will be proposed in the EIS to reduce potential impacts to land values. These may include:

- minimising direct land disturbance;
- implementation of effective erosion and sediment control practices;
- implementation of topsoil handling and preservation procedures; and
- progressive rehabilitation.

Ongoing waste stream characterisation as part of Project development will determine the composition of waste streams and associated management requirements to reduce the potential for environmental impacts.

A Progressive Rehabilitation and Closure Plan (PRCP) will be developed for the Project and will inform the strategies and outcomes of the Project from commencement until surrender of the site. This is discussed in Section 4.7.3.

6.2 Ecology

Terrestrial and aquatic ecology assessment of the Project area has been undertaken for the EIS. Three surveys covering different seasons and weather conditions were completed in August and November 2024, and

February 2025. These surveys covered the Project bounds of the MLAs, with additional focus on the proposed disturbance footprint extent.

The survey timing was consistent with the 'Terrestrial Vertebrate Fauna Survey Guidelines for Queensland V4.0' (Eyre et al. 2022) to account for temporal and seasonal changes in faunal assemblages while avoiding the hottest and coldest months.

6.2.1 Flora

6.2.1.1 Flora species

A desktop assessment of conservation significant flora species records was undertaken for the Project. No threatened flora species, listed under the *Nature Conservation Act 2006* (NC Act) or the EPBC Act, have previously been recorded within the Project area, based on database searches conducted at the time of survey.

A total of 71 native flora species were confirmed during the field surveys, representing 27 families and 54 genera. The dominant family group was Poaceae (15 species), with Leguminosae (12 species) and Myrtaceae (9 species) also prominent. The dominant family groups demonstrate the overall composition of the vegetation communities surveyed, with the ground layer being the most diverse.

No threatened or near threatened species listed under the NC Act or EPBC Act were identified in the Project area, despite multiple targeted surveys by suitably qualified ecologists across seasons.

6.2.1.2 Threatened ecological communities

The EPBC Act Protected Matters Search Tool identified only one Threatened Ecological Community (TEC) with the potential to occur within the Project area being 'The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin'. The TEC is associated with springs within the Great Artesian Basin area that are the natural surface discharge points of aquifers in the Triassic, Jurassic and Cretaceous sedimentary sequence of the Great Artesian Basin (DCCEEW 2024b).

No springs, active or inactive, have been mapped within 30 km radius of the Project area (DNRMMRRD 2024). Field surveys confirmed that there are no natural discharges of groundwater within the Project area. This includes springs, mound springs, mud springs, boggomoss springs, spring pools or groundwater seeps. Consequently, no vegetation associated with the above-mentioned TEC has been identified within or surrounding the Project area during the surveys.

The Project has been determined as "not a controlled action" by DCCEEW (refer Section 3.1) and therefore further assessment of MNES is not expected to be undertaken.

6.2.1.3 Regional Ecosystems

The Queensland Government regulated vegetation map identifies all vegetation within the study area as remnant vegetation listed as Least Concern under the VM Act (Figure 10).

Field studies verified that the Project area supports remnant vegetation consisting of nine vegetation communities, all of which are 'Least Concern' under the VM Act (Figure 11 and Figure 12). The vegetation communities (VC) associated with the Project area are characterised as:

- River Red Gum woodland with Weeping Tea-tree fringing sandy, seasonal channels (VC1) within the north section of the Project area. This VC is generally consistent with RE 2.3.26b. VC1 has a sparse ground layer, primarily dominated by Handsome Lovegrass (*Eragrostis speciosa*). On average, live ground cover typically ranges from 14.4% to 19.2% of the total area, while bare ground accounts for 25% to 49%, and organic litter comprises 37% to 61%.
- Broad-leaved Paperbark low woodland on alluvial plains (VC2) is present throughout the Project area. This VC is generally consistent with RE 2.3.29b. The ground cover is primarily dominated by Handsome

Lovegrass, Mountain Wanderrie (*Eriachne mucronata*), and *Schizachyrium crinizonatum*. Bare ground comprised 15% to 22% and organic litter covered 53% to 57% of the ground layer.

- Broad-leaved Paperbark low open woodland with emergent Long-fruited Bloodwood on broad sand sheets (VC3) is widely distributed throughout the Project area, becoming more prominent in the west and along the transport corridor. This VC is generally consistent with RE 2.5.14a. The ground layer is dominated by Handsome Lovegrass, Golden Beard Grass (*Chrysopogon fallax*), *Schizachyrium crinizonatum*, and (*Setaria surgens*). On average, live ground cover comprised of 14% to 31%, while bare ground equalled to 6% to 35% and organic litter 42% to 80%.
- Gulbarn low open woodland on broad sand sheets (VC4) is widely distributed throughout the Project area with a large portion being in the west and centre. This VC is generally consistent with RE 2.5.17b. The ground layer is dominated by *Schizachyrium crinizonatum* and Handsome Lovegrass, with an average live ground cover of 7% to 69% and bare ground cover of 8% to 65%.
- Long-fibred Paperbark open woodland with occasional Bloodwood on sandy deposits plains (VC5) is primarily found in the southern section of the Project and within the transport corridor. This VC is consistent with RE 2.5.28a. The ground layer is dominated by *Schizachyrium crinizonatum* and Handsome Lovegrass, with Firegrass (*Schizachyrium fragile*) and Golden Beard Grass. On average, live ground cover accounted for 4.4% to 15% of the total area, with bare ground ranging from 8% to 12% and organic litter covering 77% to 84% of the total area.
- Mixed paperbark open woodland with *Terminalia* spp., Smoothed-leaved Quinine and dense shrub layer (VC6) is a shrubby vegetation community aligning with RE 2.3.29a. The ground layer is primarily composed of *Schizachyrium crinizonatum*, with live ground cover accounting for 6.8% of the total area. Bare ground makes up 65%, while organic litter covers 28% of the area.
- Coolibah low open woodland with Gulbarn on alluvial plains (VC7) has been identified in three areas across the Project, all of which were along watercourses and adjacent to RE 2.5.17b (VC4). This VC closely aligns with RE 2.3.42a. The ground layer is mostly large patches of bare ground and tussock grasses, with live ground cover ranging from 11% to 52% and bare ground covered between 31% and 82%. The ground layer of this community has scattered shallow depressions that temporarily fill with water following rain events
- Torulosa Wattle woodland with occasional emergent Corymbia sp. (VC8) is found in southwest part of the transport corridor. This VC is consistent with RE 2.5.18a. The ground layer is dominated by Firegrass, with occasional *Aristida ingrata*. On average, live ground cover comprised 6% of the total area, while bare ground covered 27%, and organic litter accounted for 67% of the total area.
- Seasonal swamp with Broad-leaved Paperbark woodland in shallow closed depressions (VC9), aligns with RE 2.3.55a, with the exception of River Red Gum, which was not observed in the areas visited during field surveys, and therefore may align more with RE 2.3.51. The ground layer is dominated by tussock grasses and organic litter, with some areas of bare ground scattered throughout. This area has been mapped as a wetland under the VM Act.

A summary of regional ecosystems is provided in Table 9.

It is noted that government mapping is generally considered to be of broader detail than the ground truthing ecosystem process and therefore there are minor levels of discrepancies over extents and classifications. This is due to the government mapping often relying on spatial data and including combined areas for possible regional ecosystems where there is uncertainty. The ground truthing process undertaken by AARC therefore provides the greatest degree of confidence in the actual composition of vegetation in the Project area.

Table 9: Ground truthed regional ecosystem summary

Regional Ecosystem	Conservation Status	Biodiversity Status	Area (ha)
2.3.26b	Least concern	Of concern	76.4
2.3.29a	Least concern	No concern	9.5

Regional Ecosystem	Conservation Status	Biodiversity Status	Area (ha)
2.3.29b	Least concern	No concern	468.8
2.3.42a	Least concern	Of concern	52.5
2.3.51	Least concern	No concern	37
2.5.14a	Least concern	No concern	1688.1
2.5.17b	Least concern	No concern	1770
2.5.18a	Least concern	No concern	107.9
2.5.28a	Least concern	No concern	262.9

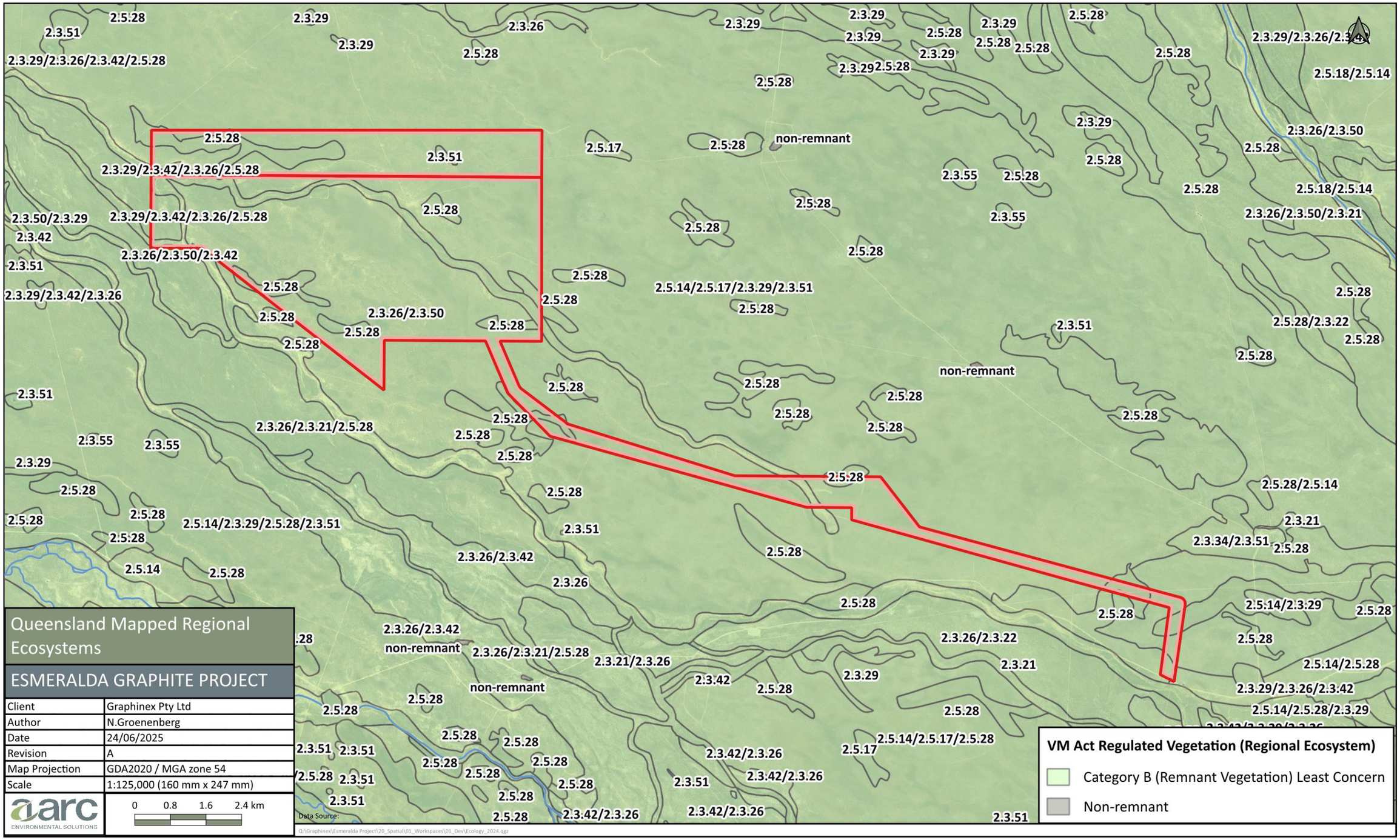

Figure 10: Queensland mapped regional ecosystems

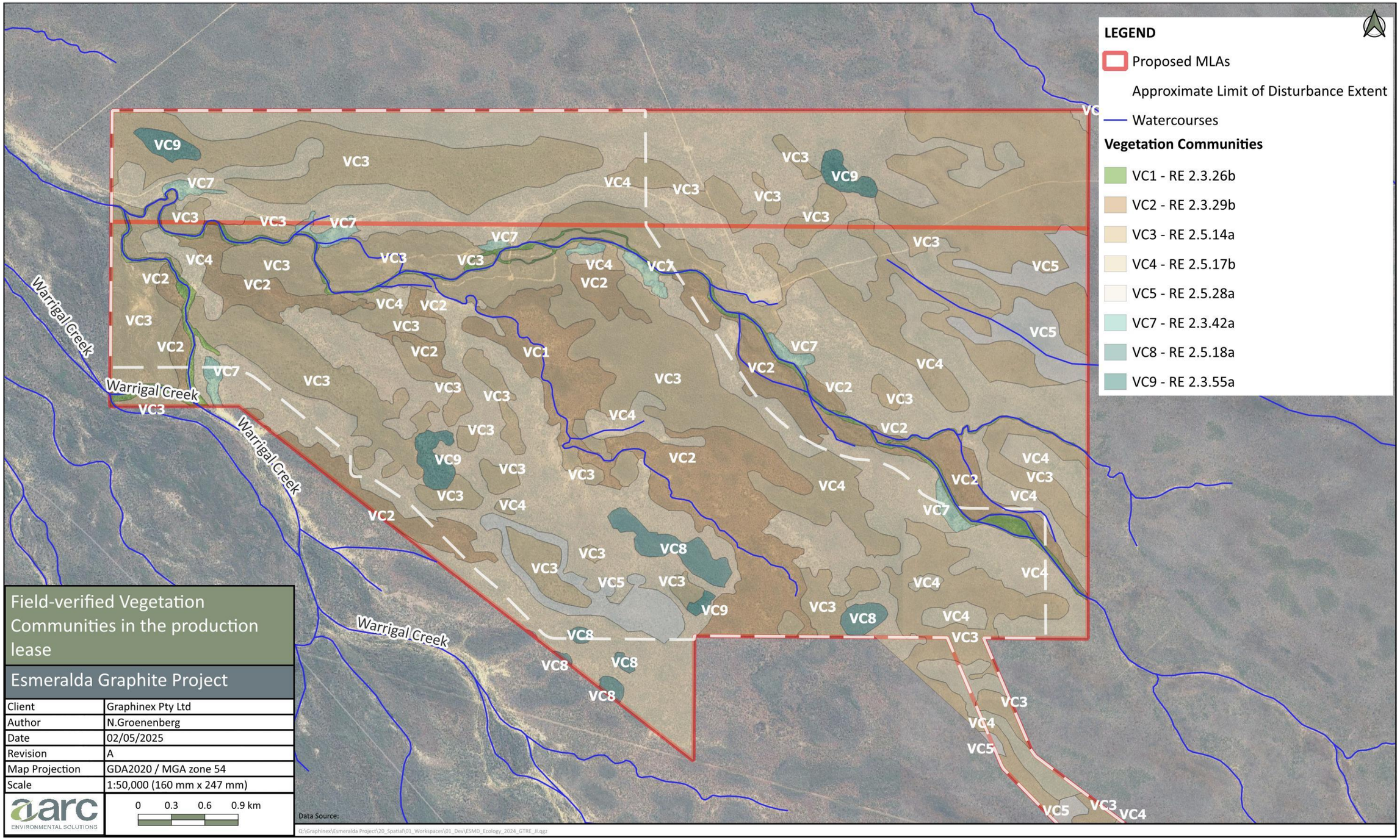

Figure 11: Ground-truthed vegetation communities – mining and processing area

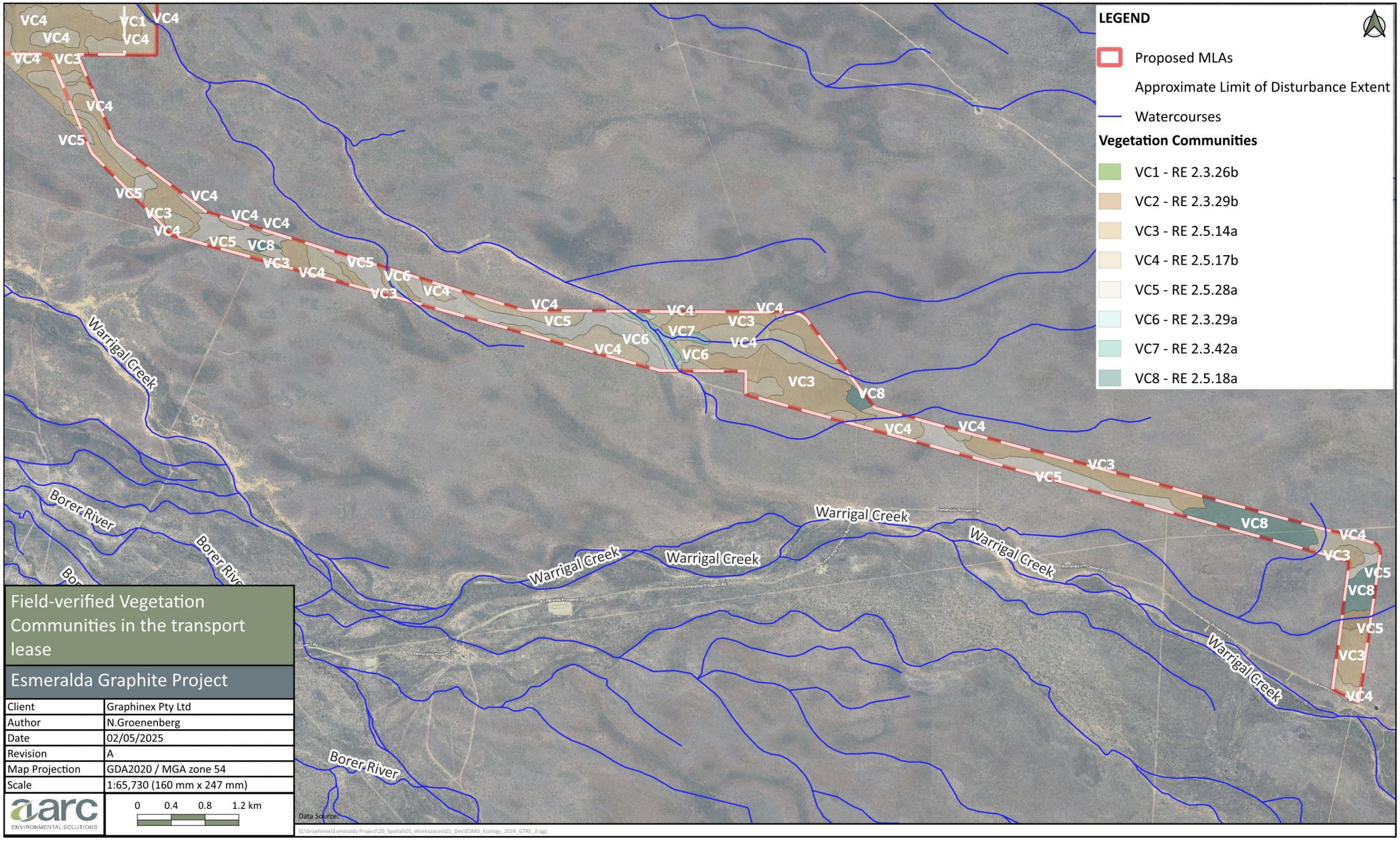

Figure 12: Ground-truthed vegetation communities – transport corridor

6.2.2 Fauna

A desktop assessment of conservation significant fauna species within a radius of 100 km of the Project area identified listed fauna species of conservation significance (threatened and/or migratory), of which 12 species have been assessed to potentially occurring within the Project area, with the remainder classed as unlikely to occur. The 12 species and their corresponding status under the NC Act and EPBC Act are presented in Table 10:

Table 10: Conservation significant fauna species

Common Name	Scientific Name	NC Act Status	EPBC Act Status
Common Sandpiper	*Actitis hypoleucos*	SL	NL
Fork-tailed Swift	*Apus pacificus*	SL	Mi
Sharp-tailed Sandpiper	*Calidris acuminata*	V	V
Red-necked Stint	*Calidris ruficollis*	SL	Mi
Gouldian Finch	*Chloebia gouldiae*	E	E
Latham's Snipe	*Gallinago hardwickii*	V	V
Painted Honeyeater	*Grantiella picta*	V	V
Glossy Ibis	*Plegadis falcinellus*	SL	NL
Black-throated Finch (White rumped subspecies)	*Poephila cincta cincta*	E	E
Australian Painted Snipe	*Rostratula australis*	E	E
Common Grenshank	*Tringa nebularia*	E	E
Marsh Sandpiper	*Tringa stagnatilis*	SL	NL

NC Act: CR: Critically Endangered; E: Endangered; V: Vulnerable; NT: Near Threatened; SL: Special Least Concern.
EPBC Act: E: Endangered, V: Vulnerable, NL: Not Listed, Mi: Migratory.

Likelihood of occurrence was determined by the potential for habitat to occur within the Project area, or where records exist within 50 km of the Project site.

Specific targeted surveys were carried out by expert ecologists to assess species presence and habitat values of these species. A total of 144 native vertebrate species were identified during the field surveys, comprising six amphibians, 25 reptiles, 100 birds and 13 mammals (nine of them confirmed micro-bat species).

Two bird species of conservation significance, the White-throated Needletail (*Hirundapus caudacutus*), listed as Vulnerable and migratory under the EPBC Act, and the Fork-tailed Swift (*Apus pacificus*), listed as migratory under the EPBC Act, were identified during the field surveys.

Five introduced fauna species have been recorded in the Project area through the detection of scats, tracks, sensor camera detection and/or direct observation. The five species are:

- Cane Toad (*Rhinella marina*);
- Dingo (*Canis lupus dingo*);

- Feral Cat (*Felis catus*);
- Cows (*Bos taurus*); and
- Feral Pig (*Sus scrofa*).

Three of the introduced species, the Feral Cat, the Feral Pig and the Dingo, are listed as a restricted matter under the Biosecurity Act 2014. However, none of the species are listed as a prohibited matters. These species are also identified in the Croydon Shire Biosecurity Plan 2019 (GCB&AI 2019).

6.2.3 Aquatic ecology

An aquatic ecology survey was completed in February 2025 following substantial rainfall across the region. Standard aquatic ecology methods were adopted to survey vertebrate and invertebrates aquatic species in the ephemeral waterways within and surrounding the Project.

No conservation significant aquatic fauna were identified in the survey. Habitat observations, water, sediment and invertebrate data collected during the survey collectively indicate an aquatic ecosystem consistent with highly ephemeral streams in regional Queensland. Turbidity, dissolved aluminium, total nitrogen, and hydrocarbons were elevated relative to aquatic ecosystem guidelines, assumed to be reflective of land use practices and the flow conditions at the time of the survey. Observations of grazing impacts were evident at some sites and was reflected in the elevated turbidity and total nitrogen (which is predominantly organic nitrogen forms).

An unnamed waterway transects part of the Project area and is mapped as moderate and low risk from waterway barrier works for fish passage. A small section of Warrigal Creek transects the Project MLA, and this section is mapped as high risk from waterway barrier works for fish passage.

6.2.4 Potential impacts to ecological values

Direct impacts to ecology will include land disturbed (excavated or compacted) for construction and operation of the mine, within the MLAs. A summary of regional ecosystem areas within the total current proposed disturbance footprint is provided in Table 11, and shown in Figure 13.

Table 11: Regional ecosystem disturbance

Regional Ecosystem	Disturbance area (ha)
2.3.26b	45.3
2.3.29a	9.5
2.3.29b	350.6
2.3.42a	41.5
2.3.51	26.3
2.5.14a	1206.1
2.5.17b	1063
2.5.18a	101.1
2.5.28a	198

Depending on the finalised layout of Project infrastructure, the Project may result in impact to small areas totalling approximately 14.5 ha of mapped VM Act wetlands. The Project will also impact regulated vegetation within a defined distance from various watercourses. This impact will be quantified following finalisation of watercourse definition. For any determination of significant residual impact, these will be considered an impact on MSES requiring offsetting. Wetlands are discussed further in Section 6.3.1.1.

Indirect impacts to ecology values from mining are typically associated with:

- spills or release of contaminants affecting ecosystem health;
- emission of dust or other contaminants to air with potential to deposit within the surrounding ecosystem;
- fauna vehicle strike associated with increased traffic on roads;
- drawdown of groundwater levels may impact dependant terrestrial and aquatic ecosystems;
- introduction of weeds and pests; and
- enhanced erosion and sediment / soil loss impacting ecosystems.

The Project area includes low levels of development, and regional ecosystems are largely intact. It is therefore not expected that connectivity will be impacted by the Project footprint, and ecosystem function and wildlife movement will be sustained by the ecosystem largely unimpeded.

The Project may impact small sections of waterways mapped as low, moderate, or high risk of waterway barrier works for fish passage. It is not anticipated that these impacts will be significant.

The EIS will assess direct and indirect impacts of the Project on all ecological values. Comprehensive assessment of terrestrial ecology, aquatic ecology and groundwater dependant ecosystems will be included in the EIS.

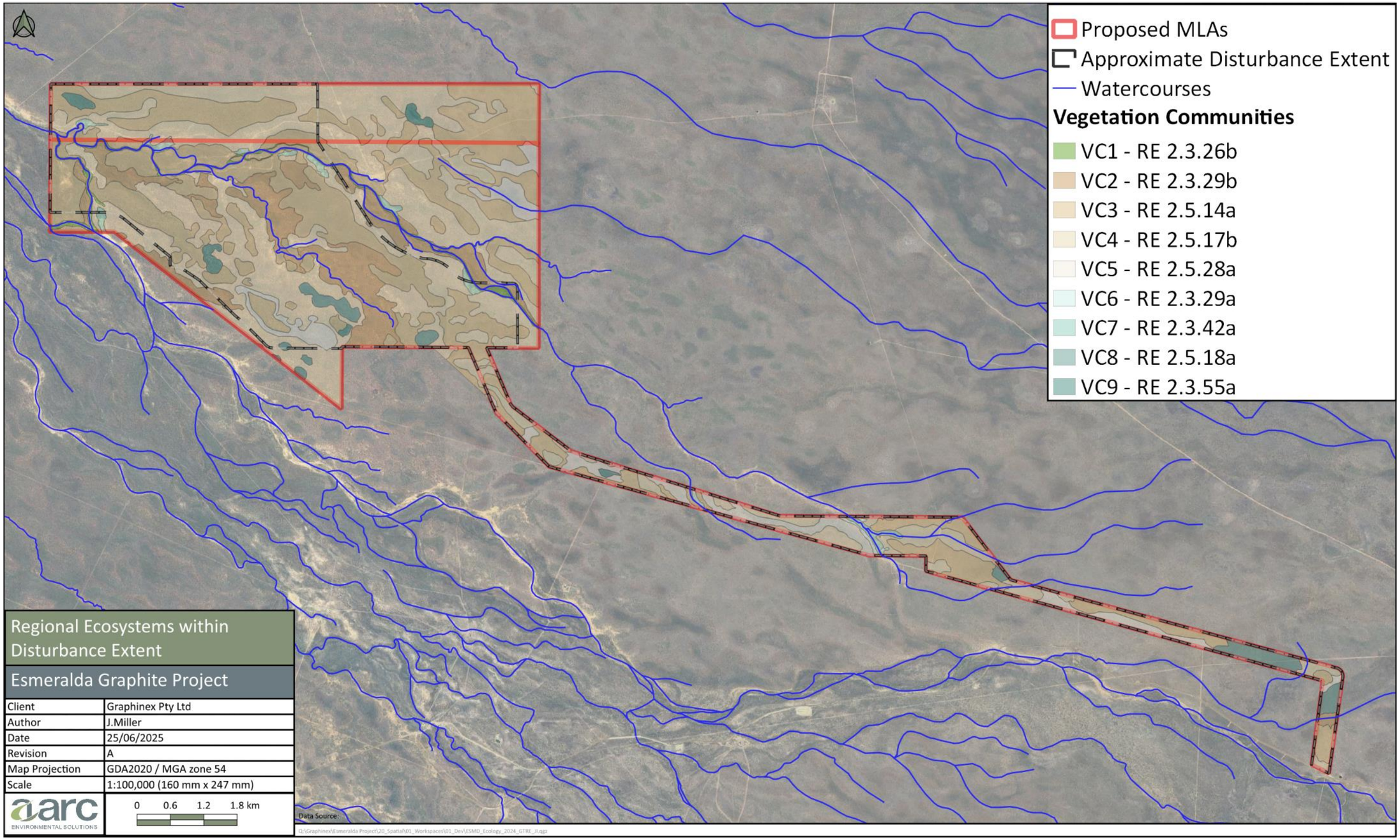

Figure 13: Regional ecosystems within disturbance footprint

6.2.5 Management and mitigation measures

The proponent will manage direct and indirect impacts of the Project. Management and mitigation measures may include:

- minimising direct land disturbance;
- implementation of effective erosion and sediment control practices;
- implementation of an effective water management system designed to prevent the release of contaminants;
- implementation of topsoil handling and preservation procedures;
- progressive rehabilitation; and
- developing and implementing weed and pest control measures.

Where impacts to MSES are unavoidable, the Project will develop an offset strategy in accordance with the Environmental Offsets Regulation 2014, and Queensland Environmental Offset Policy (EPP/2015/1658).

Works undertaken within the Project MLA bounds are exempt from requiring a development permit under the *Planning Act 2016*, including for waterway barrier works. However, development will be undertaken consistent with guidelines such as the SDAP Code 18 – Waterway Barrier Works Guidelines, and where possible, waterway barrier works obstructing fish passage will be avoided or minimised.

6.3 Water

6.3.1 Surface water

The project is located within the Gulf Water Plan (2007) management area, regulating management of surface water and overland flow.

The Project is located within the Norman Drainage Basin in north-west Queensland, which encompasses an area of 50,667 km^2 and only contains the Norman River sub-catchment areas (DETSI 2023). The Norman River is approximately 420 km in length, originating in the Gregory Range (200 km south-east of Croydon) and flowing in a north-westerly direction to eventually discharging into the Gulf of Carpentaria.

The Norman River is joined by three major tributaries, the Carron, Clara and Yappar Rivers. The Project is situated between the Clara and Yappar Rivers, approximately 7 km north of the Clara River and 8 km south-west of the Yappar River, at its closest point. The Yappar and Clara Rivers are declared high ecological value waters, as the biological integrity of the water in these systems is effectively unmodified or highly valued.

The Warrigal Creek, a 5^{th} order stream that converges with the Clara River, is situated to the south of the Project. The Warrigal Creek originates approximately 50 km south-east of the Transport ML boundary, flowing north-west before converging with the Borer River and flowing into the Clara River, approximately 45 km north-west of the Project ML boundary. Several unnamed tributaries of the Warrigal Creek also traverse the Project area. Periods of flow in the Warrigal Creek and its tributaries are restricted to significant rainfall events in the wet season events between the months of December to late March.

Watercourses and wetlands are detailed in Figure 14.

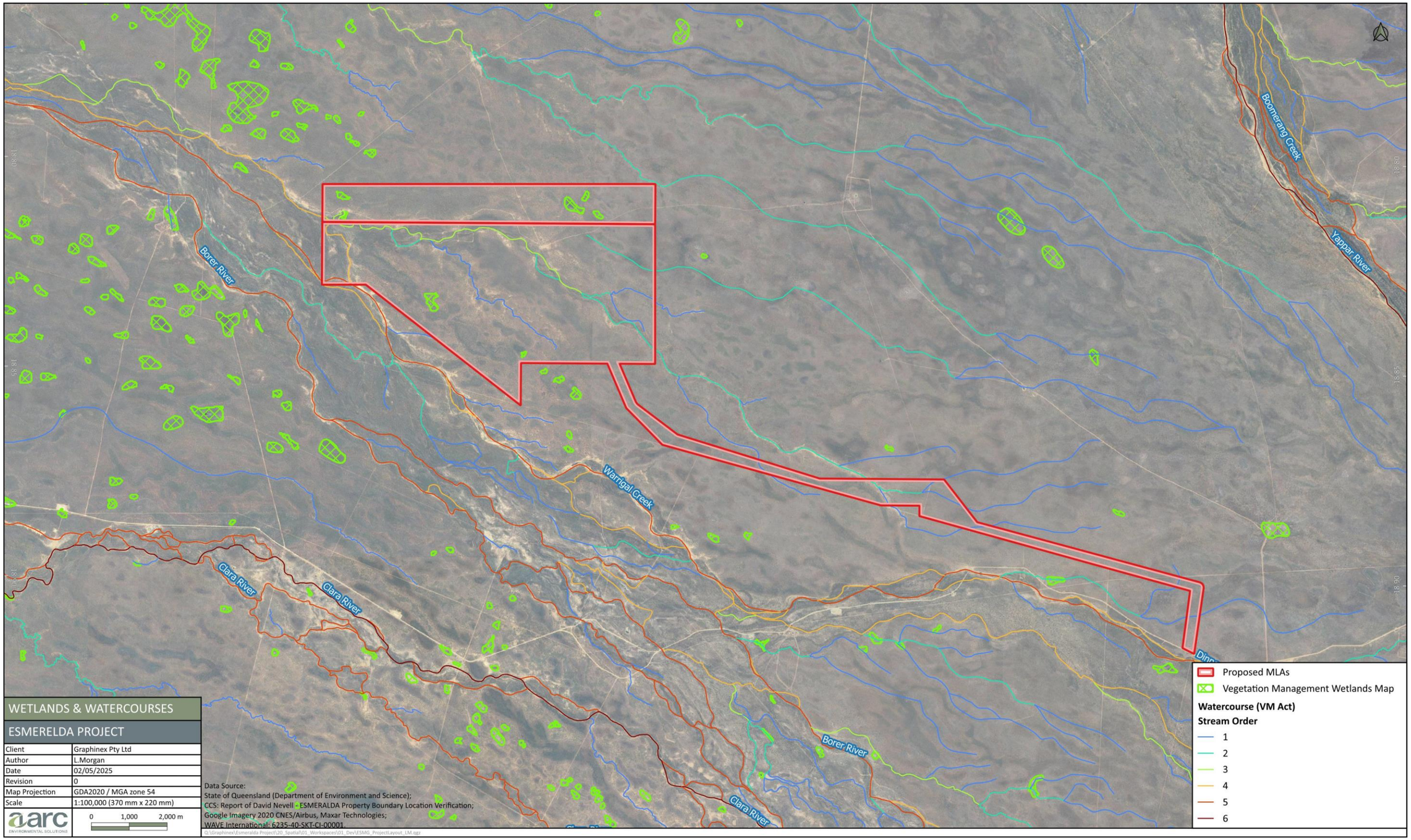

Figure 14: Watercourses and wetlands

6.3.1.1 Wetlands

No high ecological significance wetlands were identified within a 150 km radius surrounding the Project. The nearest Ramsar Wetland to the Project is Bowling Green Bay, which is located approximately 470 km south-east of the Project at its nearest point. The second nearest Ramsar Wetland to the Project is the Coral Sea Reserves (Coringa-Herald and Lihou Reefs and Cays), which is located approximately 720 km north-east of the Project at its nearest point.

Queensland wetland mapping for the Project area identifies vegetation types potentially containing wetland REs (palustrine and riverine). Three ephemeral swamps areas (mapped as VM Act wetlands) have been identified through terrestrial and aquatic ecological surveys (Figure 14). Targeted surveys described these communities as:

- seasonal swamps with Broad-leaved Paperbark woodland in shallow closed depressions (VC9);
- the ground layer is primarily comprised of tussock grasses, sedges, and organic litter, interspersed with patches of bare ground; and
- the tree canopy is primarily dominated by Broad-leaved Paperbark with occasional emergent Long-fruited Bloodwood, located in a shallow depression that occasionally hold water following rainfall.

6.3.1.2 Flooding

The 'rain-on-grid' modelling approach was used to assess flooding for the Project where the model was used to simulate rainfall excess and simulate watershed and channel hydraulics for the whole catchment including the breakout flooding interactions.

A range of storm durations were simulated to determine the peak flow (critical duration) in the waterways within the Project area for 1% and 0.1% Annual Exceedance Probability (AEP) flood events. Water surface mapping for the 0.1% AEP flood design event is shown in Figure 15. The flooding extent is from the unnamed waterway which is classed as being a stream order 3 or less that transects part of the Project site.

As part of the EIS and Project development, additional flood modelling will be undertaken for final landforms and climate change scenarios, and will assess the requirements of flood management structures such as levees. The modelling will include detailed hydrological modelling for the relevant catchments that will assess design event hydrology and produce flood hydrograph inputs for the hydraulic model. The hydraulic model will assess flooding and associated impacts for the Project. An URBS (Unified River Basin Simulator) hydrologic model of the entire catchment may be developed and calibrated with actual data monitored from high flow events in the relevant streams. This will be used to validate and derive design flood hydrographs. It is anticipated that modelling will be further supported by a LIDAR scan of the full Project area, providing extremely detailed landform inputs.

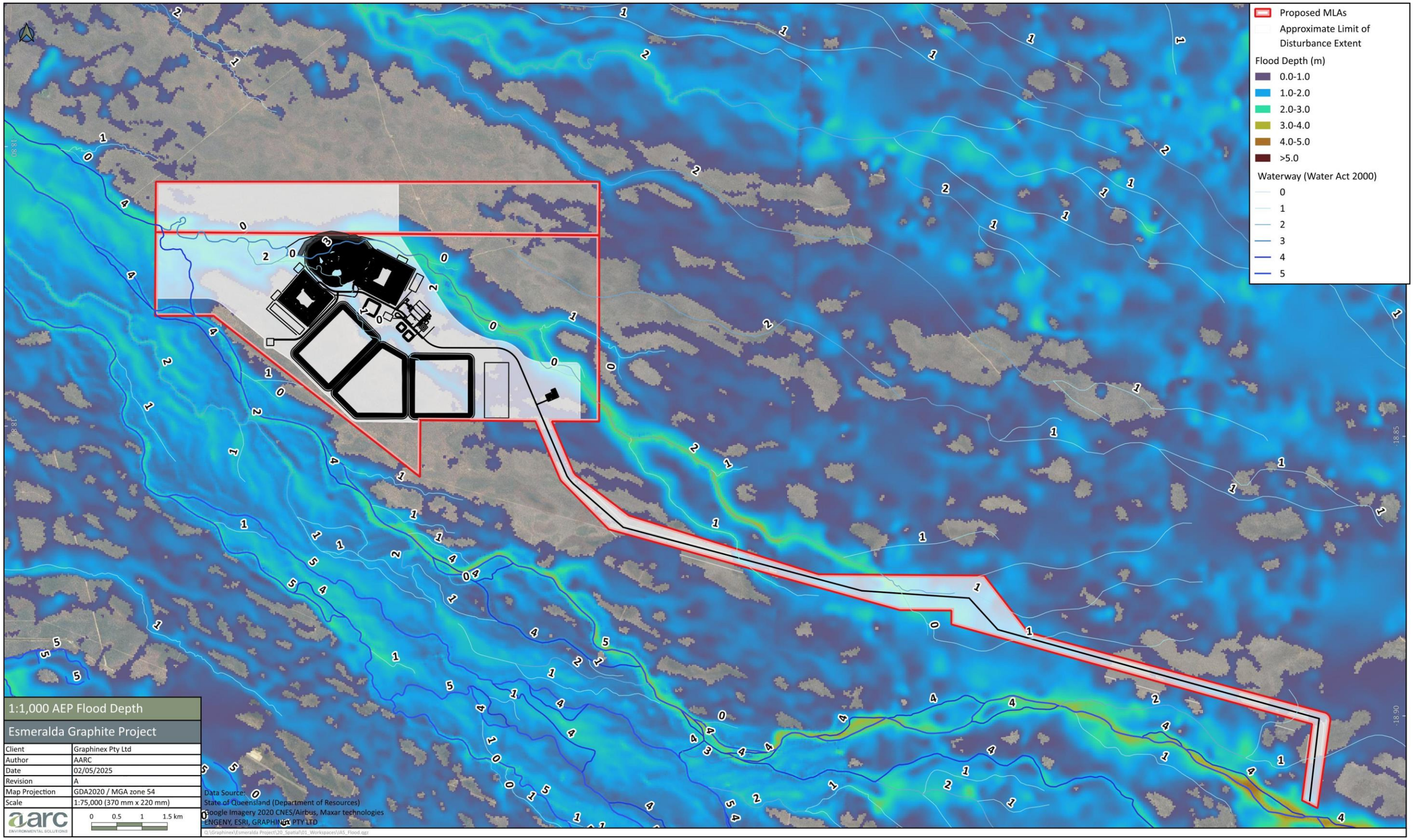

Figure 15: 0.1% AEP Flood Extent

6.3.1.3 Surface water users

No surface water entitlements exist within 50 km of the Project area. The nearest surface water entitlement is located approximately 93 km downstream from the Project, sourcing from the Flinders River. The details of the entitlement are presented in Table 12.

Table 12: Surface water entitlements

Authorisation Number	Property (Lot/Plan)	Water Plan	Water Entity	Amount
608014	1/SP329449	Gulf	Flinders River	28,880 ML/year

6.3.1.4 Potential impacts to surface water values

Potential direct impacts to surface water from the Project may include disturbance of natural overland flow paths and waterways required for Project development through the development of Project infrastructure such as levees and diversions. The exact nature and extent of direct impacts to surface water values will be assessed and described during the EIS process, however it is expected that it will include direct impacts to the unnamed waterway which transects the Project area.

The Project is not adjacent to the high ecological value waters of Clara River and Yappar River, and therefore direct impacts are not expected. Further surface water modelling and assessment will determine whether indirect impacts are likely.

Impacts on surface water users are not expected, as the nearest surface water entitlement is located 93 km from the Project area, sourcing water from the Flinders River.

Indirect impacts to surface water values may include:

- changes to the geomorphology and hydrology of receiving waterways associated with direct impacts in upstream catchments such as diversions and levees;
- reduction in natural flows associated with harvesting from local waterways, if required for Project water supply;
- spills or release of contaminants affecting surface water values, including from release of mine-affected water;
- drawdown of groundwater aquifers from the development of the pit, which may impact on surface water features such as waterways and wetlands; and
- enhanced erosion and sediment / soil loss from vegetation removal and Project development impacting water values.

Additionally, flood management structures may alter the flooding regime of the unnamed stream order 3 waterway, and adjacent landscape. A flood levee will be part of the final landform for the Project and minimise surface water incursion into the open-cut pit. The extent of any potential impacts on environmental values will be assessed through detailed modelling as part of the EIS.

6.3.1.5 Management and mitigation measures

The proponent will manage direct and indirect impacts of the Project. Management and mitigation measures will follow the mitigation hierarchy, whereby the Project will first try to avoid and minimise impacts. Measures may include:

- minimising direct land disturbance with considered design of the Project footprint;

- implementation of effective erosion and sediment control practices such as drains and vegetation management;
- implementation of an effective water management system designed to prevent the release of contaminants, maximise water recycling and minimise demand for external water supply;
- diversion of natural waterways and overland flow around mining activities to sustain flow;
- effective containment of mine affected water to prevent risk of release of contaminants;
- construction of suitably designed levees, bunds and drains to ensure flood protection of people and infrastructure;
- progressive rehabilitation of disturbance areas; and
- implementation of effective water quality and receiving environment monitoring programs.

Where practicable, the Project infrastructure has been sited with consideration of the modelled flooding extent, to minimise the potential impacts to safety and operations, while reducing the need for flood management structures which may impact environmental values. Where relocating Project infrastructure has not been viable, including the necessary location of the open-cut pit, flood management structures such as levees will be required. The design of flood management structures will be finalised during the EIS process, with the aim to provide for safe operations while minimising impacts to environmental values.

A water allocation or licence for taking or interfering with water under the Water Act is expected to be required for the Project, including taking or interfering with overland flow water, water in a watercourse, or groundwater.

6.3.2 Groundwater

The Project is located within the Great Artesian Basin and Other Regional Aquifers (GABORA) Water Plan area (2017), regulating groundwater management within associated aquifers such as the Gilbert River Formation.

Groundwater bores have been installed in the Project area (Figure 16) for monitoring and baseline assessment, with additional bores to be installed for ongoing monitoring and assessment of the groundwater context.

6.3.2.1 Groundwater conceptualisation

The project mining area is located within basement intrusive rocks, these basement rocks are overlain by the Carpentaria Basin, a sedimentary basin that was deposited between the Cretaceous and Jurassic time periods. The Carpentaria Basin strata are overlain by a covering of unconsolidated Quaternary alluvium, and by semi-consolidated Tertiary sediments. The weathered profile is present within the Carpentaria Basin strata across the entire project mining area where it extends to depths of between 15 m to 30 m below ground level. Locally, the Tertiary sediments and the Carpentaria Basin strata have also been altered by weathering. With the exception of a basement fault, there does not appear to be any significant regional scale faults mapped within overburden sequence (Carpentaria Basin or Quaternary / Tertiary sediments).

The Quaternary alluvium is described as a clay, silt, sand, and gravel deposits that form active flood plain alluvium deposits. The alluvium is mapped along Warrigal Creek and along the unnamed tributary that extends through the project mining area.

The Claraville Beds are described as poorly consolidated clayey quartzose sand and sandy mud, and minor gravel. The Claraville Beds are referred herein as Tertiary sediments. The Tertiary sediments unconformably overlies the Cretaceous and Jurassic strata. The thickness of Tertiary sediments is approximately 10 m over the project mining area. The base of Tertiary sediments is generally located above the base of weathering. Initial data collected from monitoring bores in the formation indicate the Tertiary sediments to be dry.

The Cretaceous / Jurassic strata locally comprise the Gilbert River Formation. The Cretaceous / Jurassic strata, whilst not mapped at the surface, occurs within the study area and for tens and hundreds of kilometres beyond the study area boundary. The Gilbert River Formation is generally regarded as a moderate to high permeability

formation and a regional aquifer. The Gilbert River Formation aquifer supports numerous pastoral users for livestock (beef cattle) watering. The two existing monitoring bores that target the Gilbert River Formation confirm it is sub-artesian in the project mining area. Artesian conditions are likely to occur in the aquifer further to the west, south-west and to the north-west. The observed groundwater elevation within the Gilbert River Formation is approximately 113 mAHD which provides a good correlation to the regional dataset. Data from the Gilbert River Formation monitoring bores shows that EA ranges between 803 uS/cm and 1298 uS/cm; and pH is generally between 8.76 and 9.25.

The cover sequence in the project mining area is underlain by Mesoproterozoic aged igneous and metamorphic basement rocks, and Permian aged igneous intrusive rocks. These basement rocks are laterally extensive and are expected to occur to a significant depth. The basement rocks host the orebody proposed to be mined as part of the project. The basement rocks are typically intersected at a depth of 50 mbgL or an elevation of approximately 70 mAHD. Hydrogeologically, the basement rock would be expected to behave as an aquiclude or aquitard. Fracturing (due to faulting or structural controls) may locally increase permeability and porosity of the basement rocks.

Preliminary groundwater inflow rates have been estimated at approximately 3 ML to 3.5 ML per day. The majority of this inflow is associated with the Gilbert River Formation. The basement strata (which hosts the ore body) is not expected to contribute significantly to these groundwater inflow rates. There is uncertainty associated with the preliminary inflow estimates, which will be refined as part of detailed groundwater impact assessment work undertaken as part of the EIS.

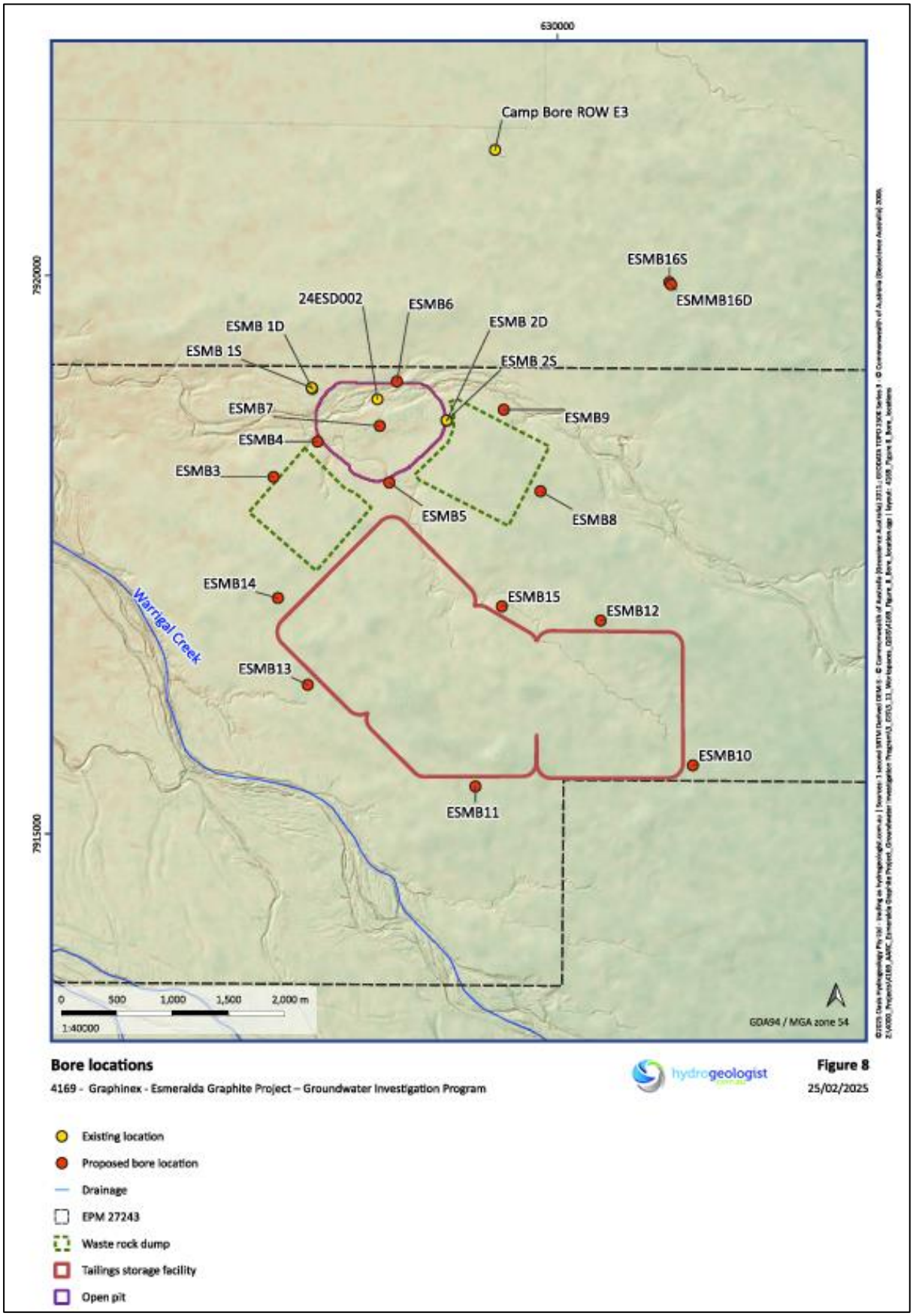

Figure 16: Groundwater monitoring bores

6.3.2.2 Existing groundwater users

There are 12 registered bores within 10 km of the project mining area with all bores drilled and constructed to take groundwater from the Gilbert River Formation. The salinity and yield of the surrounding registered bores is comparable to that intersected during groundwater drilling in the project mining area.

6.3.2.3 Groundwater dependent ecosystems

Database searches indicate the possible presence of terrestrial groundwater dependant ecosystems (GDEs) around the proposed mining area and further afield. These potential GDEs are generally linked to riverine / floodplain ecosystems. While government mapping generally indicates watercourse vegetation to have potential as GDEs, this is not considered to be an indication of actual groundwater dependency. GDEs will be determined through further assessment against by specialist GDE experts to quantify presence or absence.

The nearest publicly mapped spring is located more than 30 km from the project mining area. There are no surface expressions of groundwater within or near the Project.

6.3.2.4 Potential impacts to groundwater values

Surface construction activities will not intersect the groundwater table. However, construction activities will require a water supply, and a portion of this may be sourced from groundwater. In this instance, supply bore(s) would likely be installed within or adjacent to the open-cut pit footprint. This would serve to provide the necessary construction water supply and would provide advance dewatering prior to mining development. Development of the open-cut pit during operations to a depth of approximately 280 m below ground level will intersect the groundwater table and the Gilber River Formation. Groundwater inflow to the pit (and any out-of-pit dewatering) will result in a drawdown cone that will radially extend from the mine development.

Potential direct impacts to groundwater from mining include depressurisation and drawdown of aquifers occurring from excavation of the mining void. The exact nature and extent of direct impacts to groundwater will be assessed in detail as part of modelling and groundwater impact assessment and described during the EIS process.

Indirect impacts to groundwater values may include:

- reduction of groundwater resource available to existing groundwater users;
- changes to natural groundwater level with potential to impact groundwater dependent ecosystems (terrestrial and aquatic); and
- potential for contamination of groundwater aquifers from seepage or spills.

The Project groundwater impact assessment will be based on a robust understanding of local and regional groundwater conditions and will be supported by a complex numerical groundwater flow model that enables a detailed prediction of groundwater inflows and drawdown over time. Impacts to existing groundwater users, groundwater dependent ecosystems, and aquifers will be assessed in the EIS as part of the groundwater impact assessment for both operations and post-closure conditions. To quantify potential impacts to groundwater dependent ecosystems, the Project will assess the potential for drawdown from alluvium as part of the groundwater impact assessment.

Additional groundwater monitoring bores will be installed in the Project area, for ongoing assessment of the groundwater context, and to provide a baseline for future monitoring of potential impacts. Indicative locations of proposed bores are shown in Figure 16. These bores may also be installed for dewatering and water supply purposes.

6.3.2.5 Management and mitigation measures

The proponent will manage direct and indirect impacts of the Project. Management and mitigation measures may include:

- diversion of natural waterways and overland flow around mining activities;
- effective containment of mine affected water;
- monitoring of the health of groundwater dependant ecosystem, where identified;
- implementation of effective groundwater quality and level monitoring.

Groundwater inflow and any rainfall and run-off in the open cut pit will be managed by in-pit pumping and may be considered mine affected water. Any out-of-pit pumping via a network of dewatering bores would not be classified as mine affected water. Where possible, mine affected water will be re-used and re-cycled on-site as part of Project water supply. A detailed site water balance will be prepared to account for all water inputs and outputs and the necessary on-site storage and management infrastructure will de developed accordingly.

The Project may require taking or interfering with groundwater. A water allocation or licence under the Water Act is expected to be required. The MR Act allows holders of mining leases to take associated water. However, once the Environmental Authority and mining lease is relinquished post closure, any water take from the final void will need to be accounted for under a water allocation or licence.

6.4 Air

6.4.1 Air quality

The Project is located in a remote rural area of Northwest Queensland with existing air quality influences limited to local agricultural practices and seasonal vegetation burning. The closest known sensitive receiver to the Project is a homestead located approximately 5km south of the MLAs.

A baseline air quality assessment will be completed for the Project, with assessment against the relevant criteria for air quality values as defined in the *Environmental Protection (Air) Policy 2019* (EPP (Air)). The EPP (Air) provides objectives for air quality indicators (pollutants) which address health, the aesthetic environment, ecosystems and agriculture.

6.4.2 Potential impacts to air quality

The Project has the potential to increase dust emissions in the vicinity of the Project, primarily due to dust generation from the operation of mining equipment, blasting, hauling of ore and waste rock, and vehicle use on unsealed roads. Impacts during construction and rehabilitation stages are expected to be lower, as mining equipment and blasting are not expected to be utilised or undertaken, however may occur during operation of vehicles and disturbance of vegetation and soils. The extent and quantity of dust deposition will be assessed through detailed modelling as part of the EIS.

Considering the remote location of the Project, the risk of impacting air quality at sensitive receivers is low. The EIS will assess potential air quality impacts of the Project on sensitive receivers, ecosystem health and agricultural land use.

6.4.3 Greenhous gas emissions

The Project will directly contribute to Scope 1 greenhouse gases (GHG) emissions during the construction, operation and rehabilitation of the mine. Potential emission sources include:

- clearing of remnant vegetation;
- diesel fuel combustion in mining equipment, vehicles, and power generation; and
- gaseous emissions from the excavated geological strata.

Scope 2 emissions are not anticipated as all electricity is expected to be generated on site.

The following matters will contribute to Scope 3 emissions:

- transport of mineral products produced by the Project to Townsville;
- further refinement of graphite product at a separate facility in Townsville;
- employee transportation and commute; and
- construction materials used for the Project.

The production of graphite is expected to facilitate and enhance Australia's transition to renewable energy. By increasing the rate at which renewable energy generation replaces fossil fuel generation, positive consequential benefits are attributable the Project.

Greenhouse gas emissions will be quantified through a detailed assessment undertaken as part of the EIS, including where decarbonisation strategies may be enacted to reduce emissions.

6.4.4 Management and mitigation measures

6.4.4.1 Air quality

Assessment will be conducted to ensure that, with the inclusion of standard operating controls for dust suppression and gaseous emissions, the Project can be operated within the EPP Air Quality objectives at all sensitive places for the life of the operation. The Project will be designed such that it is unlikely to significantly impact:

- human health and wellbeing;
- health and biodiversity of ecosystems;
- aesthetics of the environment including odour, dust, visibility reducing particles or light; or
- agriculture activities.

The proponent will manage direct and indirect impacts of the Project. Management and mitigation measures may include:

- watering of unsealed roads, tracks and stockpiles;
- chemical surface suppressants;
- air quality monitoring programs to ensure protection of human health and wellbeing, ecology and agriculture.

6.4.4.2 Greenhouse gas

The EIS will investigate and commit to minimising GHG emissions through:

- continuous improvement approach through monitoring, managing, mitigating and reporting its Scope 1 emissions;
- implementing a decarbonisation plan;
- preferential use of renewable energy power sources (e.g. solar farm);
- minimising vegetation clearing to the required for safe operations;
- inclusion of energy efficiency in the selection criteria for equipment and contractors; and
- regular maintenance and inspection programs, use of local producers where practical to minimise transport.

A detailed emissions inventory and GHG Abatement Plan will be prepared as part of the EIS process.

6.5 Noise and vibration

The Project is located in a remote rural area of Northwest Queensland. The existing acoustic environment is typically quiet with influences from natural sources such as wind, birds, and insects as well as occasional noise from agricultural activities and vehicle movements. As detailed in Section 6.1.5 and Figure 9, the closest known sensitive receiver to the Project is a homestead located approximately 5km south of the MLAs.

A baseline noise and vibration assessment will be completed for the Project during the EIS, identifying relevant noise-sensitive receptors and assessing against the relevant criteria for protection of acoustic values as defined in the Environmental Protection (Noise) Policy 2019 (EPP (Noise)).

6.5.1 Potential impacts to noise and vibration levels

Noise emissions will be generated over the life of the Project, with the highest levels expected during the operation stage, resulting from material extraction, blasting, handling, and haulage. Key noise-generating sources associated with the Project would be the mobile mining equipment (i.e. excavators, haul trucks, loaders, and dozers). Although less significant, noise emissions would also be expected from the mineral processing plant and mine infrastructure area, the camp, the access road, and other small sources such as diesel-powered pumps and lighting plant. It is expected that noise generated during construction and rehabilitation will be lower than during operations and likely limited to the operation of vehicles and machinery. Blasting is not expected to occur during construction and rehabilitation, reducing the potential for elevated noise and vibration levels and associated impacts.

Considering the remote location of the Project, the risk of impacting the acoustic environment at sensitive receivers is low. The EIS will assess potential noise and vibration impacts of the Project on sensitive receivers and ecosystem health, including by assessing the operation stage which is expected to generate the highest noise and vibration levels.

6.5.2 Management and mitigation measures

The proponent will manage direct and indirect impacts of the Project. Management and mitigation measures may include:

- regular inspection and servicing of vehicles and equipment to ensure operation in accordance with specification; and
- monitoring of noise and vibration impacts at sensitive locations.

6.6 Traffic and transport

6.6.1 Existing road network

Access to the mine site from Townsville is provided by Richmond Road from Richmond, or Mittagong Road from Croydon, on the public road network (Figure 17). The existing road network is suitable for access and use by vehicles for cattle transport, mineral exploration, and access to rural homesteads.

Transport of graphite concentrate will be via road trains on public roads, including local and state owned, to a facility in Townsville for further refinement and distribution. It is expected that this route will be via Richmond Road to the south, linking up with the Flinders Highway to Townsville. The Flinders Highway is a sealed road connecting the coast to Cloncurry. Access off this road is mainly limited to dirt roads, these roads will require further upgrades as part of the project development, including improved pavement, drainage, crossings and access.

Based on projected production rates, there is expected to be approximately 10 heavy truck movements(Road Train capacity) per week on average, subject to domestic manufacturing and shipping schedules. Additional vehicle movement quantities for the delivery of materials and services to site, removal of waste, and transport of workforce (roster dependent), will be determined through further Project development.

Preferred transport routes for all aspects of the Project, including workforce, will be investigated during the EIS process, and include an assessment of impacts on traffic and infrastructure. The suitability and capacity of the transport routes will be assessed as part of a transport impact assessment undertaken for the Project.

6.6.2 Port of Townsville

A portion of graphite product from the Project may be exported to international markets. Use of the Townsville Port is preferred, subject to agreement with stakeholders including the Port of Townsville Port Authority. Alternate port options may also be considered as part ongoing planning and assessment.

It is expected that the full rate of graphite extraction will be processed downstream as part of the Townsville facility, whereby this product is then used domestically or potentially exported. Should the extraction rate exceed the capacity of the Townsville facility, including for circumstances such as temporary facility closure, export of the initial product may occur.

6.6.3 Air services

A number of regional aerodromes or airports may be considered for transportation of the non-local workforce. Transport options continue to be assessed as part of ongoing planning and assessment. Possible airport facilities include Normanton Airport, Cloncurry Airport, and Mount Isa Airport. Travel from the relevant airport would be by bus and determine which road network is used. The transportation calendar would be determined by the roster of the workforce.

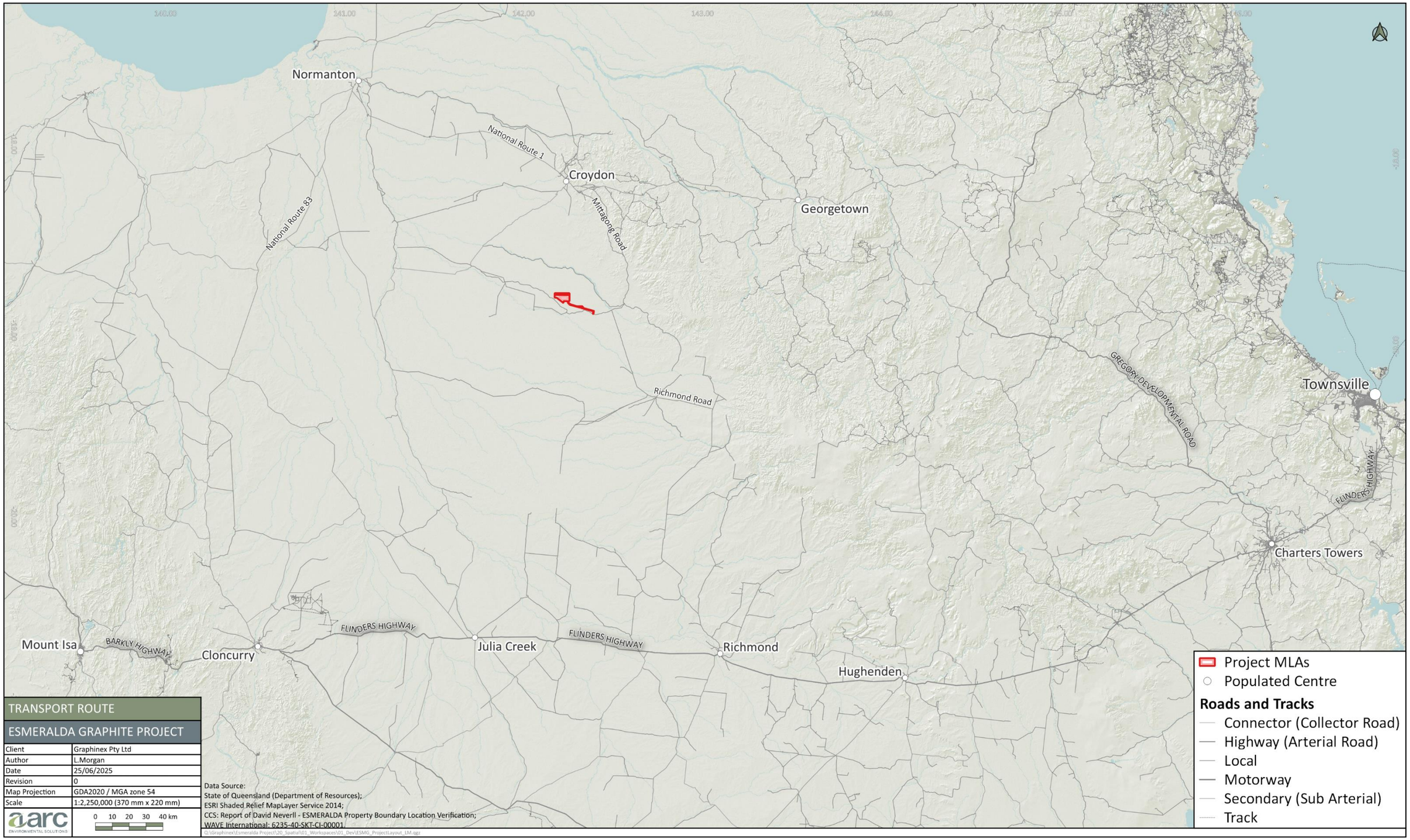

Figure 17: Transport network

6.6.4 Potential impacts to traffic and transport

A traffic impact assessment will be undertaken for the Project in accordance with the Guide to Traffic Impact Assessment (TMR 2017) and inform the EIS submission. This assessment will include consideration of the findings of community consultation, to ensure that stakeholders such as local government and state departments are consulted on Project matters such as planned transport routes.

Site access for workforce is expected to be by bus from the nearest suitable airport, with potential options including Normanton (serviced by Rex Airlines), Mount Isa, or Cloncurry. Airport selection will determine the subsequent preferred vehicle access route. Access may further be supplemented or facilitated by the development of an on-site airfield, with specifications at a minimum consistent with those outlined by the Royal Flying Doctor Service (RFDS n.d.). Workers would then be bussed to on-site accommodation.

Site access may be supplemented or facilitated by the development of an on-site airfield, with specifications at a minimum consistent with those outlined by the Royal Flying Doctor Service (RFDS n.d.). Workers would then be bussed to on-site accommodation.

The Project will utilise existing road networks to facilitate the transport of materials and goods for the Project, and movement of the workforce. The preferred transport route has not yet been finalised however it is likely that ore and deliveries will be via Richmond Road to and from Richmond to Townsville via the Flinders Highway. Final route selection will be determined as part of the traffic impact assessment, and ensure the potential impacts to traffic, transport, safety, and amenity are minimised.

Potential impacts of the Project may include:

- increased traffic for road users;
- increased potential for vehicle interaction and accidents, with consequential risk to human safety; and
- road surface damage or deterioration.

The traffic impact assessment will further determine the need for any road or intersection upgrades required for safe use.

6.6.5 Management and mitigation measures

The proponent may implement mitigation and management strategies including:

- the use of busses to transfer workers where possible;
- on-site accommodation of workforce to minimise road use and safety risk;
- community/road safety awareness training for all Project employees; and
- consultation with relevant regulatory authorities.

The traffic impact assessment undertaken as part of the EIS may make additional recommendations to mitigate and manage potential impacts, including:

- widening roads;
- upgrading intersections; and/or
- installing traffic management signage.

The use of an on-site airfield would reduce impacts on other airports by not increasing demand for use.

6.7 Waste management

Waste from the Project will be managed in accordance with the waste and resource management hierarchy from the Waste Reduction and Recycling Act 2011, which lists waste and resource management strategies in the order of most to least preferred option:

a) avoid unnecessary resource consumption;

b) reduce waste generation and disposal;

c) re-use waste resources without further manufacturing;

d) recycle waste resources to make the same or different products;

e) recover waste resources, including the recovery of energy;

f) treat waste before disposal, including reducing the hazardous nature of waste; and

g) dispose of waste only if there is no viable alternative.

Any hazardous waste would be removed from the site by a licenced contractor and disposed of or recycled at appropriate off-site facilities.

6.8 Social environment

The proponent will undertake a Social Impact Assessment (SIA) in line with statutory requirements, particularly the *Strong and Sustainable Resource Act 2017* and the Coordinator-General's 'Social Impact Assessment Guideline (March 2018).

In accordance with the *Strong and Sustainable Resource Act 2017,* the Project has identified all communities within a 125 km radius which have a population greater than 200 (Figure 18), which may be prioritised by the Project for workforce, services, and procurement opportunities. Given the remote location of the Project, only the township of Croydon meets the population and proximity criteria.

A preliminary assessment of the social environmental values of Croydon has been undertaken, with the following values identified:

- As of 2021, the population of Croydon was 296 people, with an Indigenous proportion of 28.6%.
- 34.1% of the population are employed in agriculture, while 35.7% are employed in public administration and safety (Croydon Shire Council 2023)
- Croydon has limited housing stock available, with empty lots the only publicly available listings at the time of the preparation of this IAS.
- Croydon Shire Council is seeking diversification in industries, including through mining, renewable energy, agriculture, cultural heritage, and tourism.

Consultation with the surrounding community and relevant stakeholders has commenced and will continue during the environmental and social impact assessment process. A comprehensive consultation program will ensure that relevant community members are made aware of the Project, its benefits, and its potential impacts. Ongoing consultation will ensure stakeholders are afforded the opportunity for input into Project development considerations and on issues of relevance through the EIS process.

From the findings of the SIA and community consultation, the Proponent will identify impacts from the Project (positive and negative) and subsequently develop mitigation and management strategies.

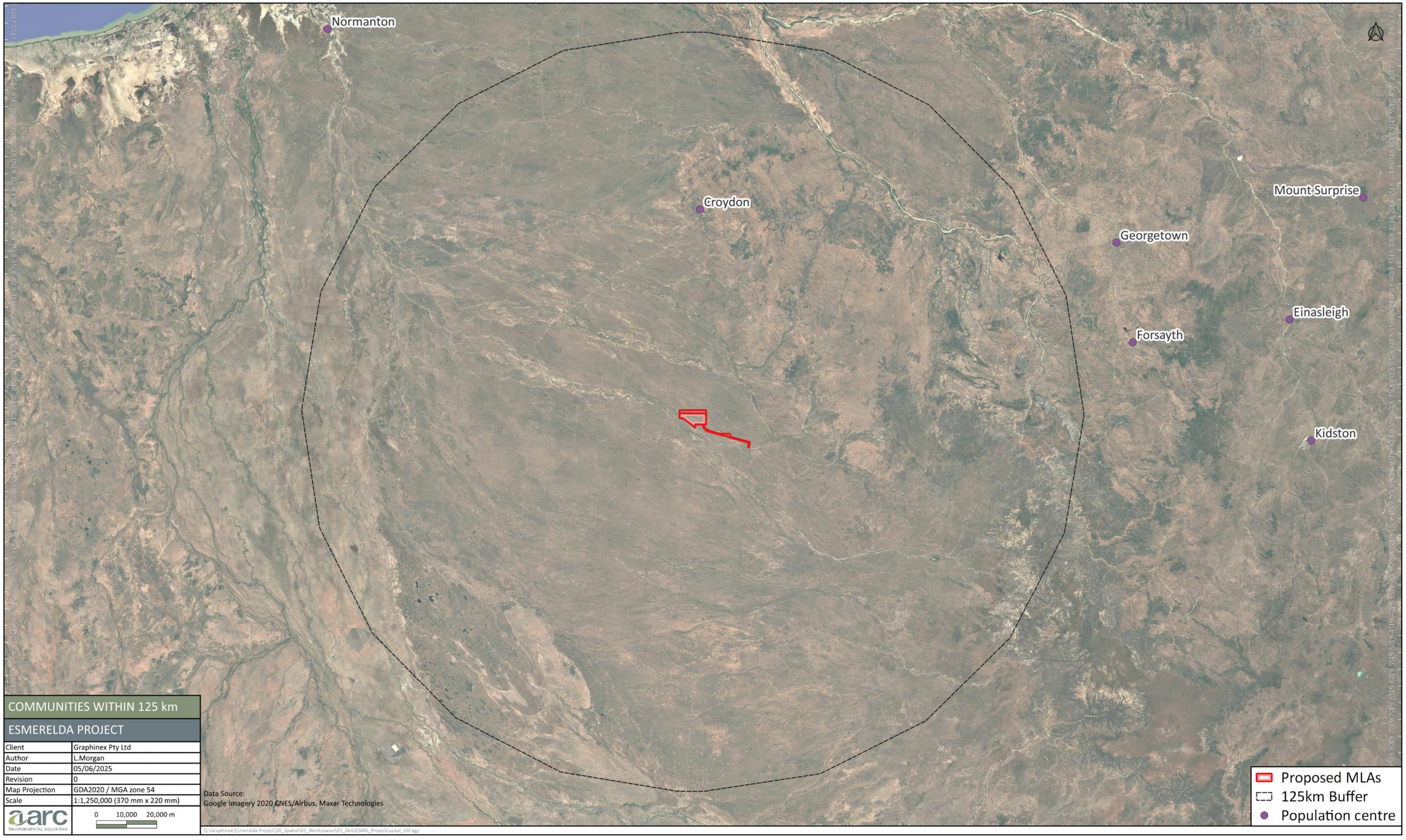

Figure 18: Communities within 125 km radius of the Project

6.8.1 Potential impacts to social and economic environment

The Proponent will seek to create and maintain employment and trade opportunities within the local townships. The Project will further generate royalties for Queensland, and where minerals are exported, the Project will generate revenue for Australia. The Project will support the goals of the Croydon Shire Council to diversify industry in the region, including through the emerging critical minerals industry.

The Project is expected to require a skilled workforce and directly support around 100 jobs during the construction phase and 113 jobs during the operation phase. The Project will increase the sustainability of Queensland's manufacturing industry, through long-term supply of high-grade graphite to the Townsville processing plant, essential for a wide range of renewable energy applications. Where local employment and procurement occurs, the Project will further support secondary industries and growth in the region.

Potential negative social and economic impacts include:

- an increase in demand for health, emergency and educational services;
- increase in regional demand for housing, where some of the Project workforce may choose to reside locally including in the township of Croydon; and
- amenity impacts such as an increase in dust and noise emissions (expected to be of low risk and magnitude given remote location of Project site).

While there may be some workers who currently reside locally or choose to relocate to the region, it is expected that the workforce will be accommodated within the on-site accommodation facility for the duration of rostered periods, to reduce road use, and given the limited housing stock available in Croydon. Therefore, significant impacts on housing demand are not expected.

Site access for the workforce is expected to be by bus from the nearest suitable airport, with potential options including Normanton (serviced by Rex Airlines), Mount Isa, or Cloncurry. Airport selection will determine the subsequent preferred vehicle access route. Access may further be supplemented or facilitated by the development of an on-site airfield, with specifications at a minimum consistent with those outlined by the Royal Flying Doctor Service (RFDS n.d.). Workers would then be bussed to on-site accommodation.

Site access may be supplemented or facilitated by the development of an on-site airfield, with specifications at a minimum consistent with those outlined by the Royal Flying Doctor Service (RFDS n.d.). Workers would then be bussed to on-site accommodation.

A finalised workforce roster arrangement has not yet been determined. Engagement with contractors will determine the preferred roster arrangement, with options including 2 weeks on and 1 week off, or 8 days on and 8 days off. Management rosters will be determined separately as required.

Due to limitations on available skilled workforce in regional communities within 125 km of the Project, driven by low population and a local industry which is largely agriculture-based, it is expected that the majority of the Project workforce will be sourced externally. Notwithstanding this, in accordance with the *Strong and Sustainable Resource Act 2017*, and in the interest of positive social stewardship, the Project will ensure the following standards are met to reduce potential impacts on local communities:

4) The Project will ensure that the workforce is not comprised of 100% FIFO;

5) The Project will provide equal opportunities in recruitment of workers from local communities; and

6) The Project will undertake a social impact assessment.

The SIA conducted as part of the EIS will comprehensively assess all relevant social and economic impacts of the Project. Furthermore, the SIA will establish achievable and realistic goals for local workforce employment and training opportunities. Limitations will include existing workforce capacity, relevant experience, and other projects in the wider region.

6.8.2 Management and mitigation measures

Opportunities to avoid and mitigate impacts by the Project will be determined through consultation with the surrounding community and stakeholders that has commenced and will continue during the EIA process.

The SIA will develop a Social Impact Management Plan (SIMP), which will establish targeted mitigation and management strategies and provide practical benefits to the community by developing action plans which relate to matters such as housing, community services, local industry, and local and indigenous employment. The SIA and corresponding SIMP will be presented in the EIS.

Mitigation and management strategies may include but not be limited to:

- processes for notification of local services and facilities of Project timeframes, including the likely workforce ramp-up for construction and operation;
- development of on-site health services and emergency response;
- development of a housing and accommodation plan, with the objective of ensuring the Project:
    - does not contribute to significant impacts on affordability and availability of housing and accommodation in local and regional communities; and
    - enhances worker wellbeing and does not place excessive burden on existing infrastructure, facilities and services used by local and regional communities;
- provision of Project information to relevant parties, and mediums for receiving community questions and complaints; and
- prioritisation of the recruitment of suitably skilled workers from local and regional communities.

6.9 Cultural heritage

The land on which the Project is situated is subject to a Native Title Determination, determined on 10 December 2012 (Tagalaka People #2 – Tribunal ID QCD2012/013). The relevant Native Title Representative Body is the Tagalaka Aboriginal Corporation Registered Native Title Bodies Corporation (RNTBC). The outcome of the Native Title Determination was that non-exclusive native title exists over the proposed MLAs.

Qld Aus Graphite Pty Ltd has an agreement with the Tagalaka People for their exploration permits. Qld Aus Graphite has entered into a negotiating protocol with the Tagalaka People and discussions have commenced about the proposed MLAs.

A search of the Cultural Heritage Database and Register identified no cultural heritage sites or artifacts in the underlying property or within the MLA boundaries (Figure 19). The closest identified cultural heritage value is a grinding groove approximately 14.6 km from the Project MLA.

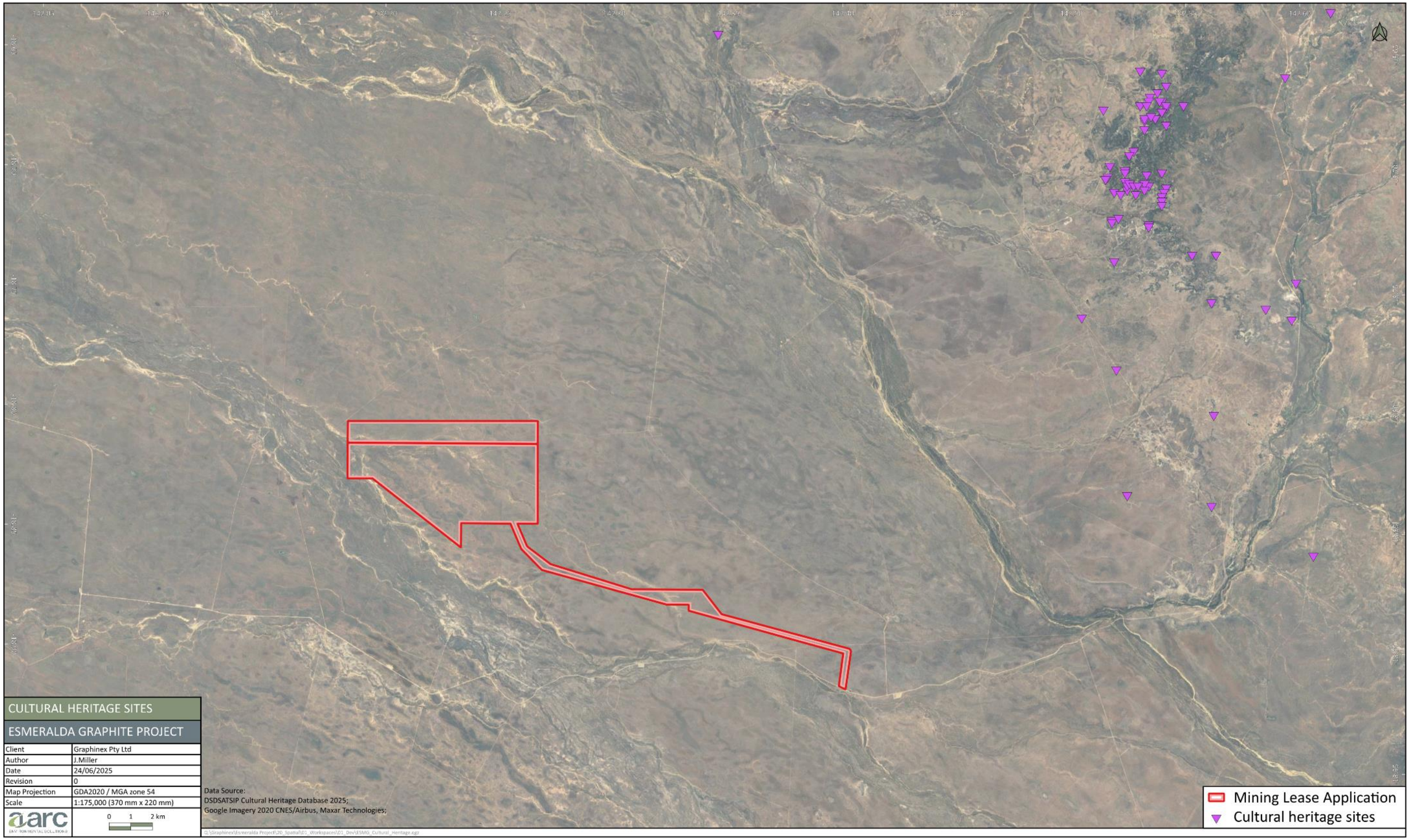

Figure 19: Cultural heritage sites

6.9.1 Potential impacts

No recorded cultural heritage values have been identified within or near the Project. Items of cultural heritage that have not been recorded within or near the Project area may be impacted by Project development activities, including by surface level disturbance associated with Project development and operation.

6.9.2 Management and mitigation measures

The Proponent will comply with the *Aboriginal Cultural Heritage Act 2003* and the supporting 'Duty of Care Guidelines' (DATSIP 2004) when undertaking activities within proposed Project MLs.

In accordance with Part 7 of the ACH Act, an approved CHMP will be developed for the Project. The CHMP will inform how the potential impact of the Project on Aboriginal cultural heritage will be managed. The Proponent will notify its intention to develop the CHMP in accordance with the ACH Act and will work with any endorsed Aboriginal parties to develop and seek approval of the CHMP as the approvals process continues.

Non-indigenous cultural heritage places or values have not been identified in the Project area, however if they are suspected to be present or identified during the EIS process, suitable management and mitigation measures will be developed and implemented.

6.10 Hazard and risk and health and safety

The EIS will incorporate a Hazard and Risk Assessment to detail and manage risks associated with the construction, operation, and decommissioning stages of the project, and to develop appropriate mitigation measures and strategies. The Hazard and Risk Assessment will consider both onsite and surrounding offsite risks to people, properties, and environmental values, including flooding and bushfires.

6.10.1 Potential impacts to health and safety

Natural events such as flooding, droughts and bushfires have the potential to cause significant damage and pose safety risk. These events have the potential to increase in severity and frequency as a result of climate change.

As detailed in Section 6.3.1 and Figure 15, there are watercourses in the Project region which are ephemeral and may be subject to flooding. Further assessment will be undertaken to determine which areas of the Project may be susceptible to flooding risks, and suitable management measures will be developed. It is anticipated that the majority of sensitive Project infrastructure, including the accommodation, processing facility, and tailings storage facilities, will be located outside of the extent of flooding or be designed in a manner that presents low risk to health and safety.

Bushfire mapping indicates that small patches of the Project area are designated "Medium Potential Bushfire Intensity" (Figure 20). This mapping is associated largely with riparian vegetation, particularly in waterways mapped as stream order 4 or above. No "High Potential" or "Very High Potential" Bushfire Intensity areas are mapped in the vicinity of the Project.

The Project has the potential to present risks to health and safety of the workforce and environment, including physical injuries and risk of contamination. These risks include:

- heavy vehicles interactions with light vehicles;
- an increase in dust levels and dust deposition;
- an increase in noise and vibration levels;
- blasting and associated risks including dust, noise, and vibration;

- geological instability;
- working at heights;
- worker fatigue;
- high temperatures; and
- interaction with wild animals.

Of particular importance to Graphinex is consideration of the additional potential risks as they pertain to on-site mineral processing. Risks from these activities include:

- spillages of hazardous substances and dangerous goods;
- the handling of bulk quantities of final processed mineral product;
- working near machinery operating at high temperature and pressure;
- an increase in noise and vibration levels; and
- worker fatigue.

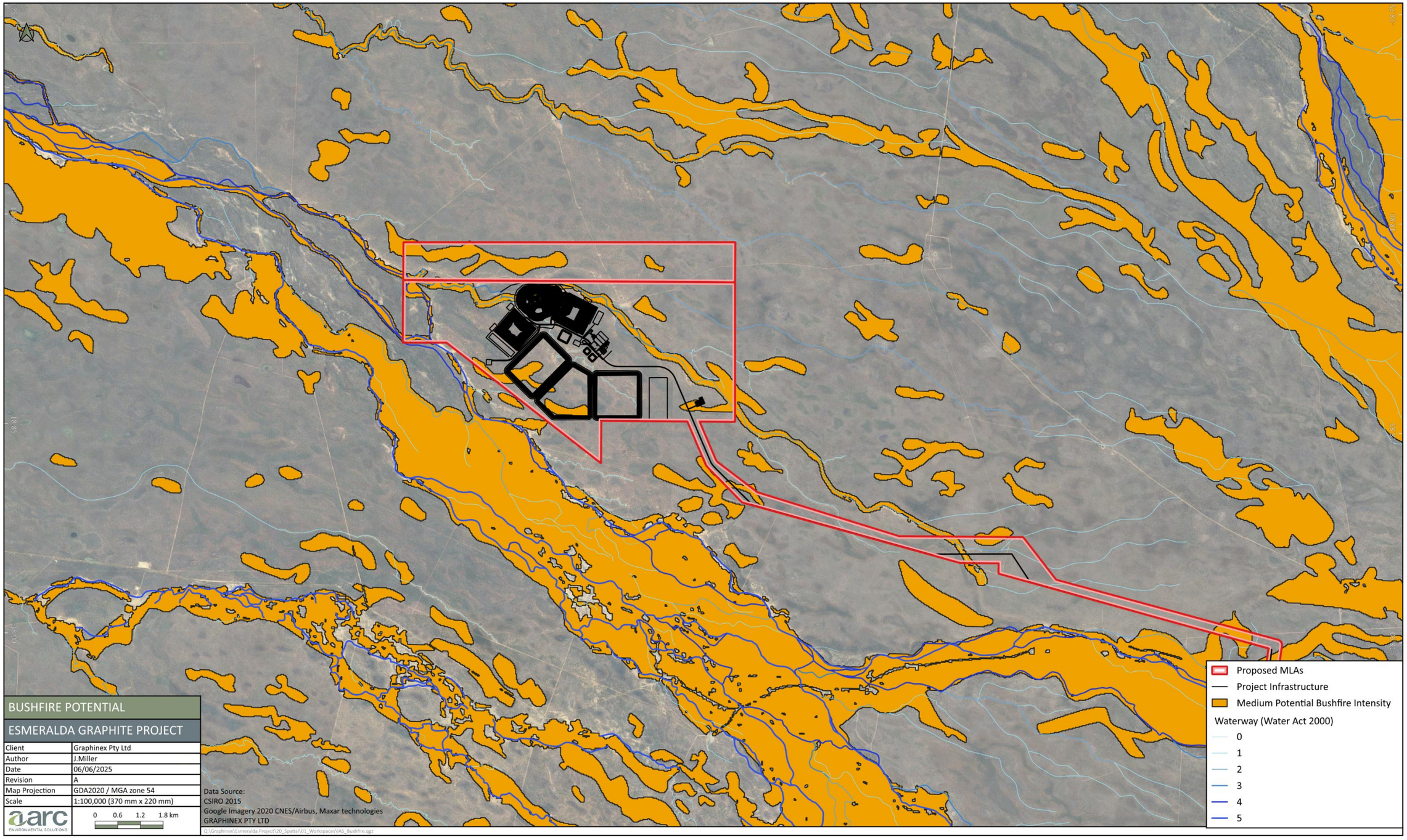

Figure 20: Regional bushfire potential mapping

6.10.2 Management and mitigation measures

Procedures to reduce identified risks to health, safety and the environment are likely to include but not be limited to:

- the operation of a site Health and Safety Management System (HSMS);
- equipment and vehicle operators will be trained to safely operate the equipment and respond to emergency systems;
- appropriate rostering of drivers, operators, and workers will reduce potential risks associated with fatigue;
- development and implementation of a fit for work program, and code of conduct policies;
- workers will be trained in the use of fire-fighting equipment such as extinguishers, and safe operation procedures to reduce bushfire risk;
- workers will have access to, and training in using, appropriate personal protective equipment (PPE), including masks against fine particulate matter such as dust;
- the transport and handling of dangerous goods and hazardous substances will be undertaken in accordance with relevant legislation and guidelines;
- chemical and hazardous substances will be stored in accordance with applicable standards; and
- the Project will ensure the presence of spill kits, training of site personnel, and development and implementation of appropriate handling procedures in the event of spillages.

The Project will assess risks and develop targeted mitigation and management measures for natural hazards including flooding and bushfires. An Emergency Response Plan, which will outline health and safety procedures and work in conjunction with emergency services to ensure the health and wellbeing of employees and contractors, will be developed. This will consider the effects of climate change, and how these may exacerbate potential risks, in the development of safety procedures. The findings of the Hazard and Risk Assessment process will directly inform this plan.

Diversions and levees may be required as management measures against flood risk to ensure safe operation of the Project. Modelling undertaken as part of the EIS will confirm the necessary extent and scope of any such measures and determine corresponding impacts to waterways and neighbouring land.

The mitigation and management measures identified above will be developed in accordance with the obligations legislated under the *Mining and Quarrying Safety and Health Act 1999* (MQSH Act), which regulates the operation of mines to protect the safety and health of persons at a mine site, and persons who may be affected by operations.

7 Consultation process

7.1 Community and stakeholder engagement

Consultation with the surrounding community and relevant stakeholders has commenced and will continue during the environmental and social impact assessment process. A comprehensive consultation program will ensure that relevant community members are made aware of the Project, its benefits, and its potential impacts.

Key stakeholder groups that have been consulted include, but are not limited to:

- directly affected stakeholders including underlying and adjacent landholders;
- government agencies including:
  - local council;
  - State departments such as the Department of Environment, Tourism, Science and Innovation, and the Office of the Coordinator General; and
  - the Federal Department of Climate Change, Energy, the Environment and Water; and
- first nations groups including the Tagalaka People.

Objectives of Project consultation have included the following principles:

- Ensure community members have understood the Project details, timing, and workforce arrangements so that discussions about impacts and benefits are meaningful.
- Provide community members with the opportunity to identify and assess potential social impacts.
- Ensure transparent and inclusive community engagement to facilitate the ongoing management and monitoring of potential social impacts.
- Ensure Project planning and delivery are informed by best practice outcomes supported by government agency input.
- Ensure post-mining land use is consistent with community expectations.
- Facilitate first nations input and guidance, including for the development of a CHMP.

Ongoing consultation through all stages of the EIS will be undertaken to ensure stakeholders are afforded the opportunity for input into Project development considerations on issues of relevance. Engagement activities to facilitate this may include but not be limited to:

- additional face-to-face engagement with interested and affected parties;
- written notices and communication;
- community engagement events;
- phone meetings; and
- an online portal or email address for submission of comments and questions.

To support these activities, ongoing review and maintenance of relevant documentation will be undertaken to address any comments and/or issues of concern from the stakeholders and community.

To further facilitate positive Project outcomes, additional stakeholders will continue to be identified and engaged throughout the EIS process and Project development, including local businesses, employment agencies to support future employment targets, and local community groups.

7.2 Engagement outcomes

The consultation undertaken by the Project to date has identified matters of interest for stakeholders, including:

- residual voids;
- designation of flood plains;
- ecological values including evaluation of matters of national environmental significance raised by the Tagalaka People; and
- sensitive aquifers, water supply, and the Great Artesian Basin.

These matters have been considered as part of Project development. This includes that the Project has undertaken additional ecological monitoring of the Project area in conjunction with the Tagalaka People, which enabled a scientific backed and first nation supported submission to DCCEEW with additional information. The Project will continue to be managed through comprehensive assessment as part of the EIS, and include detailed modelling and analysis undertaken by experts with relevant experience. Work will utilise input from community consultation and stakeholder engagement as a foundation. Where required, targeted mitigation and management plans will be developed to ensure that potential impacts on environmental values and matters raised through consultation are minimised.

8 References

AARC Environmental Solutions (AARC) 2025, *MNES Terrestrial Ecology Impact Assessment Report,* prepared by AARC for Graphinex Pty Ltd.

ABS (Australian Bureau of Statistics) 2021a, *2021 Croydon (Qld), Census All persons QuickStats| Australian Bureau of Statistics*, viewed March-April 2025, <https://www.abs.gov.au/census/find-census-data/quickstats/2021/SAL30760>.

ABS 2021b, *Socio-Economic Indexes for Areas (SEIFA), Australia 2021,* viewed March-April 2025, https://experience.arcgis.com/experience/32dcbb18c1d24f4aa89caf680413c741/#data_s=id%3AdataSource_12-187d549b75f-layer-11%3A161>.

Cottrell Cameron & Steen Surveys 2025, *Graphinex PTY LTD – Esmeralda Project Property Boundary Verification.*

Croydon Shire Council, 2019, Croydon Shire Planning Scheme – 2019, Croydon Shire, Queensland, viewed January 2025, < https://www.croydon.qld.gov.au/downloads/file/660/croydon-shire-planning-scheme-2019>.

DES (Department of Environment and Science) 2023a, *Land use mapping series,* Queensland Government, viewed May 2024, <https://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={BE30CE16-B1B9-48B1-BF21-DBE70597FA93}>.

Department of Environment, Science and Innovation 2014, *WetlandInfo: Flinders drainage basin - facts and maps*, Queensland Government, viewed November 2024, <https://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={F79B22E5-7BD4-44AF-98EB-AC1A46513EDD}>.

Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development (DNRMMRRD) 2024, Queensland Spatial Catalogue – Qspatial, State of Queensland, Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development, Brisbane. <http://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={40D75ED6-3959-41EB-A5C8E563FA5B66CA}>.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2024-2025, EPBC Act Protected Matters Report, Commonwealth of Australia, Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Environment and Heritage Protection (EHP) 2015, Biodiversity Planning Assessment Gulf Plains Bioregion v1.1. Summary Report, Department of Environment and Heritage Protection, Queensland Government.

Department of Natural Resources (DoR) 2023, Critical Minerals Strategy, State of Queensland, Department of Natural resources, Mines and Energy, Brisbane. <https://www.resources.qld.gov.au/__data/assets/pdf_file/0005/1726430/critical-minerals-strategy.pdf>.

Engeny Pty Ltd (Engeny) 2025a, Preliminary Flood Assessment – Esmeralda Graphite Project, prepared for Graphinex Pty Ltd.

Engeny Pty Ltd (Engeny) 2025b, Diversion Drain Concept Design – Esmeralda Graphite Project, prepared for Graphinex Pty Ltd.

Gulf Catchments Biosecurity & Agribusiness Innovation (GCB&AI), 2019, Croydon Shire Biosecurity Plan 2019, Queensland, <https://www.croydon.qld.gov.au/downloads/file/1284/croydon-biosecurity-plan-18112019-v3final>.

Measured Group Pty Ltd 2024a, Mineral Resource Estimate – Esmeralda Project, prepared for Graphinex Pty Ltd.

Measured Group Pty Ltd 2024b, Prefeasibility Study – Esmeralda Project, prepared for Graphinex Pty Ltd.

Hydrogeologist.com.au 2025, Groundwater Investigation Program – Esmeralda Graphite Project, prepared for Graphinex Pty Ltd.

Queensland Government 2018, Mined Land Rehabilitation Policy, Department of Environment and Heritage Protection Department of Natural Resources and Mines Queensland Treasury, Queensland Government.

Royal Flying Doctor Service n.d., Preparing an airstrip, <https://www.flyingdoctor.org.au/support-us/preparing-airstrip/>