

Assessment Report 94

**Assessment method:
Supplementary Environmental Report**

**Finniss Lithium Project BP33 Underground Mine
Core Lithium Ltd
April 2022**

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It describes the outcomes of the NT EPA's assessment of the Finniss Lithium Project BP33 Underground Mine proposed by Core Lithium Ltd.

This assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts on the environment.

In accordance with section 65 of the EP Act the assessment report is for the Northern Territory Minister for Environment to consider when making a decision about whether to approve the action under the EP Act.



Dr Paul Vogel AM
NT EPA Chairperson

8 April 2022

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Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act) for the Finnis Lithium Project BP33 Underground Mine (proposal).

Core Lithium Ltd (proponent) proposes to design, construct, operate, rehabilitate and close an underground lithium mine at the BP33 deposit within mineral leases ML32074 and ML32346 at Section 1 Hundred of Parsons and Section 2746 Hundred of Hughes, NT (2873 Cox Peninsula Road, Cox Peninsula).

The NT EPA assessed the proposal using the Supplementary Environment Report assessment method, with a 25 business day public consultation period. The assessment was carried out in accordance with the requirements of the EP Act and Environment Protection Regulations 2020. The NT EPA examined the potential significant direct, indirect and cumulative impacts on the environment.

In the course of the assessment the NT EPA examined potential significant impacts on the following five environmental factors;

1. terrestrial environmental quality
2. terrestrial ecosystems
3. hydrological processes
4. inland water environmental quality
5. community and economy.

The proposal is the second proposed mine (the proponent's Grants Lithium Project is the first), on the Cox Peninsula which lies between Darwin Harbour and Bynoe Harbour. The proposal is within the Darwin Coastal Bioregion in the wet-dry tropics of the Northern Territory. Environmental values which require protection from the proposal include downstream waterways that drain into Bynoe Harbour via the Charlotte River, groundwater that flows down gradient and is accessed by groundwater dependent vegetation and other users, land and soil which sustain vegetation and habitat for fauna, and community values that relate to maintaining the current ecosystem condition and participating in decision-making processes.

The proposal would remove about 101 ha of habitat and generate waste associated with mining. The environmental risks associated with the proposal are limited by the restricted scope of activities, the mine design and approach which includes offsite processing, backfill of mine waste in underground voids, and the short mine life.

The NT EPA concluded that the proposal can be implemented and managed in a manner that is environmentally acceptable and recommends that environmental approval be granted subject to the conditions recommended in Appendix 1. This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for Environment (Minister) for consideration in deciding whether to grant an environmental approval.

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1. Introduction

This assessment report provides advice and recommendations of the Northern Territory Environment Protection Authority (NT EPA) to the Minister for Environment (Minister) on completion of the NT EPA's environmental impact assessment of the Finnis Lithium Project BP33 Underground Mine (proposal). The proposal is to design, construct operate, rehabilitate and close an underground mine at the BP33 lithium deposit on the Cox Peninsula.

The NT EPA has prepared this report in accordance with section 64 of the *Environment Protection Act 2019* (NT) (EP Act). As prescribed by regulation 156 of the Environment Protection Regulations 2020 (EP Regulations), the purpose of this report is to:

- assess whether the proposal is likely to meet the environmental objectives
- assess the potential significant environmental impacts of the proposal
- make recommendations for avoiding, mitigating and managing those impacts
- advise the Minister as to the environmental acceptability of the proposal.

This report must assess the potential environmental impacts and risks of the proposal and whether there are any significant residual impacts remaining after all reasonable measures to avoid and then mitigate and manage the risks have been taken.

This assessment report and the draft environmental approval (Appendix 1) are provided to the Minister for consideration in deciding whether to grant an environmental approval for the proposal. Matters taken into account during the assessment are tabulated in Appendix 2. An environmental impact assessment timeline is provided at Appendix 3.

1.1. Proponent

The proponent is Core Lithium Ltd (Australian Company Number 146 287 809), an Australian company listed with the Australian Securities Exchange. Its primary focus is development of the Finnis Lithium Project, comprising the Grants Lithium Project (GLP), the proposal and a number of other prospective lithium resources.

1.2. Location and context

The proposal is located 2.5 km southwest of the Cox Peninsula Road on Section 1 Hundred of Parsons and Section 2746 Hundred of Hughes, about 33 km west of Berry Springs and 28 km south of Darwin.

The proposal is on, and surrounded by, undeveloped Crown land for about 6 km in all directions, and is not incorporated into any local government area. An existing track and intersection with Cox Peninsula Road would be widened and upgraded to provide site access.

Unlike other mines, the proposal is relatively close to the Northern Territory's largest population centres of Darwin and Palmerston. However, with the nearest residence at 13 km from the proposal and the nearest community (Belyuen), 15 km to the northwest, residents are unlikely to be directly impacted by mining activities.

Mining exploration is the main land use in the surrounding area with rural residential living, recreation and tourism comprising the other main land uses across the Cox Peninsula. Previous shallow open pit mining of the BP33 deposit and surrounding areas is evident from remnant ground disturbance, tracks and small pit lakes.

The proposal is within the Darwin Coastal Bioregion in the wet-dry tropics of the Northern Territory, which are characterised by two broad seasons, a cool/warm dry season and a warm,

humid wet season. The climate is strongly seasonal and most rainfall occurs over three months of the year. Environmental values which require protection from the proposal include downstream ephemeral waterways that drain into Bynoe Harbour via the Charlotte River, groundwater that flows down gradient and is accessed by groundwater dependent ecosystems and other users, land and soil which sustain native vegetation and habitat for fauna, and community values that relate to maintaining the current ecosystem condition, participating in decision-making processes and supporting ecologically sustainable development.

2. Proposal

2.1. Description

The proposal is to design, construct, operate, rehabilitate and close an underground mine at the BP33 lithium deposit on the Cox Peninsula, including to haul the mined ore in trucks approximately 7.5 km along an internal haul road to the GLP for processing. The disturbance footprint is 101 hectares (ha) of native vegetation.

Ore processing, tailings disposal and transport of the concentrated product to Darwin Port for export was assessed by the NT EPA in Assessment Report 89; is approved under the GLP Mining Management Plan and Mining Authorisation granted under the *Mining Management Act 2001* (MM Act); and is therefore excluded from the proposal scope and the NT EPA's assessment of the proposal.

Table 1 describes the key components of the proposal and **Figure 1** shows the mine site footprint and layout. A detailed description of the proposal is provided in section 2 of the Supplementary Environmental Report (SER). **Figure 2** shows the proposal in relation to the GLP. **Figure 3** shows a cross section of the underground mine components.

Table 1 Proposal key components

Component	Details
Mine life	55 months (4 years 7 months) including 6 months of construction 44 months operations and 5 months of rehabilitation.
Mine product	Spodumene (lithium bearing ore).
Total resource recovery	2.09 million tonnes (Mt).
Annual production	1 Mt ore mined per year (1.42% Li).
Mining method	Underground sublevel open stope with pillar support; ten production levels; drilling and blasting, ore removal by excavator and loader.
Mining depth	Approximately 320 m below surface.
Disturbance area	100.9 ha including 88 ha mine site, 12.5 ha haul road (7.3 km long x 13 m wide) and 0.4 ha water pipeline corridor.
Mine infrastructure	Site access road, administration offices, employee facilities, laydown and storage areas, workshop, fuel storage and refuelling areas, internal haul roads; water storages, pumps and pipelines; drainage and sediment basins, run of mine pad, stockpiling areas, waste rock dumps, box cut and safety bund, portal and decline, ventilation, return air raise (RAR), explosives storage.
Transport to GLP	Ore transported in trucks to the GLP via a 7.5 km internal haul road.
Proposal related components that were assessed separately under the GLP (excluded from this proposal)	<ul style="list-style-type: none"> Ore processing at the GLP processing plant to produce lithium concentrate (5.5% Li) Tailings disposal at the GLP Tailings Storage Facility (TSF)

Component	Details
	<ul style="list-style-type: none"> • Transportation of concentrated product from the GLP along public roads to Darwin Port • Upgrade of Observation Hill Dam (OHD) for water supply.
Water demand	~2.62 million litres (ML)/day for haul roads and underground dust suppression, and ablutions/facility operations.
Water sources	Water sourced from OHD and underground mine dewatering.
Water storage capacity	<ul style="list-style-type: none"> • Raw water dam (RWD) 6.25 ML • Mine settling dam (MSD) 156 ML.
Water management	<ul style="list-style-type: none"> • Controlled release of excess water from MSD to ephemeral drainage line to the south of the mine site during the wet season (subject to issue of a Waste Discharge Licence (WDL) under the <i>Water Act 1992</i>) • Land irrigation over an area of approximately 20 ha may be required to manage excess water during BP33 construction phase • Excess water pumped to the GLP pit void. Forecast up to 60-180 ML/month based on current water balance.
Power supply	Onsite diesel power generation.
Mine waste management	<ul style="list-style-type: none"> • Waste rock dump 1 (WRD1) will temporarily store weathered waste rock material from the box cut for 5.5 years, prior to being used as backfill after completion of mining (25 m high) • Waste rock dump 2 (WRD2) will temporarily store transitional and fresh waste rock material from the underground mine, prior to being progressively returned to underground stopes (10 m high).
Rehabilitation and final landform	<ul style="list-style-type: none"> • Underground void to be progressively backfilled with waste rock as each level is completed • Box cut portal and shaft vents plugged with concrete • Box cut to be backfilled with overburden • Removal of all mine landforms and surface infrastructure • Reinstatement to a final landform similar to pre-mining conditions • Rehabilitation of the site with native vegetation species consistent with surrounding undisturbed land.
Workforce	60 personnel during construction 125 to 150 personnel during operations.
Hours of operation	24 hours per day, 7 days per week.
Capital investment value	\$33.79 million

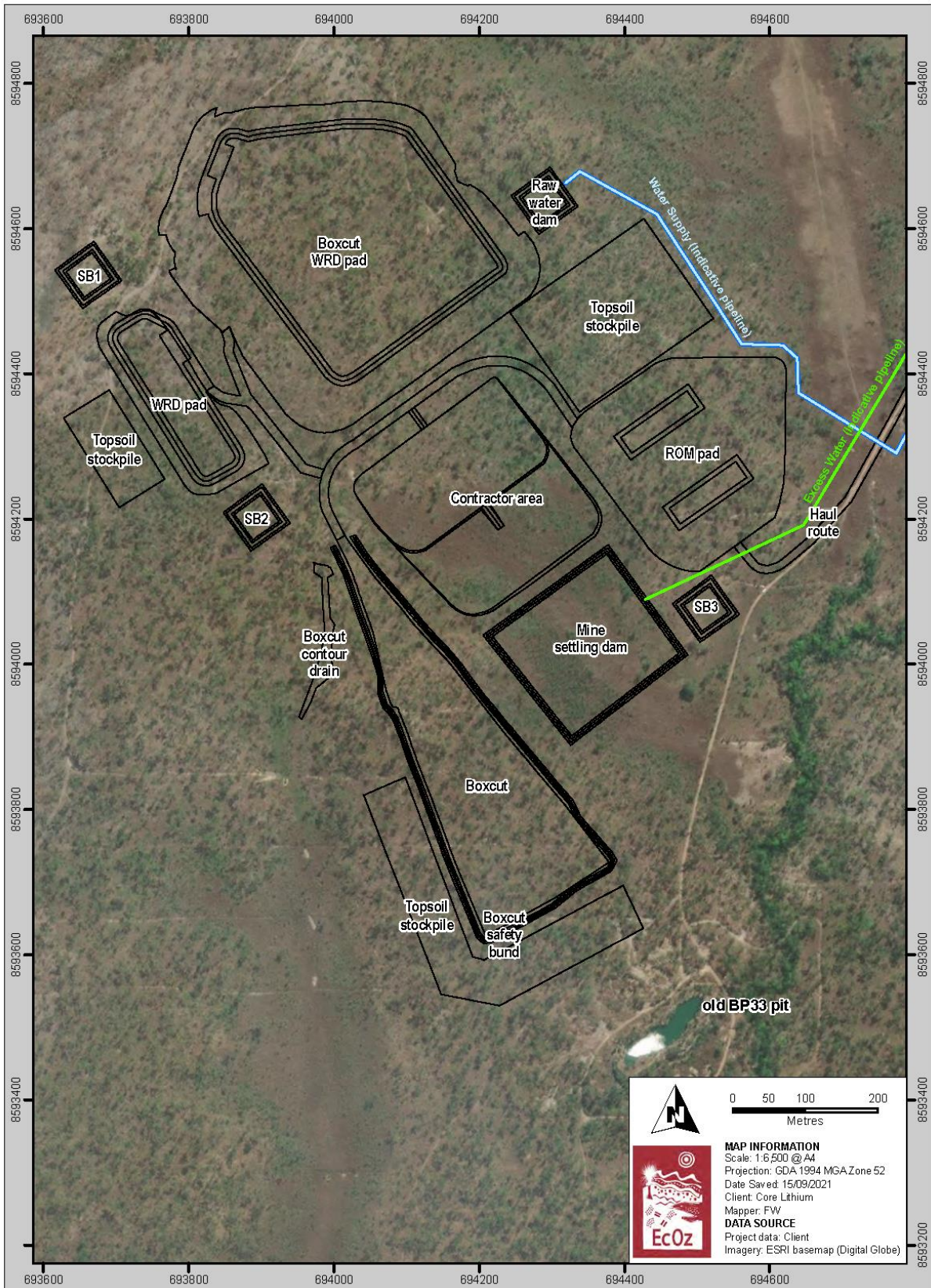


Figure 1 Mine site footprint and layout

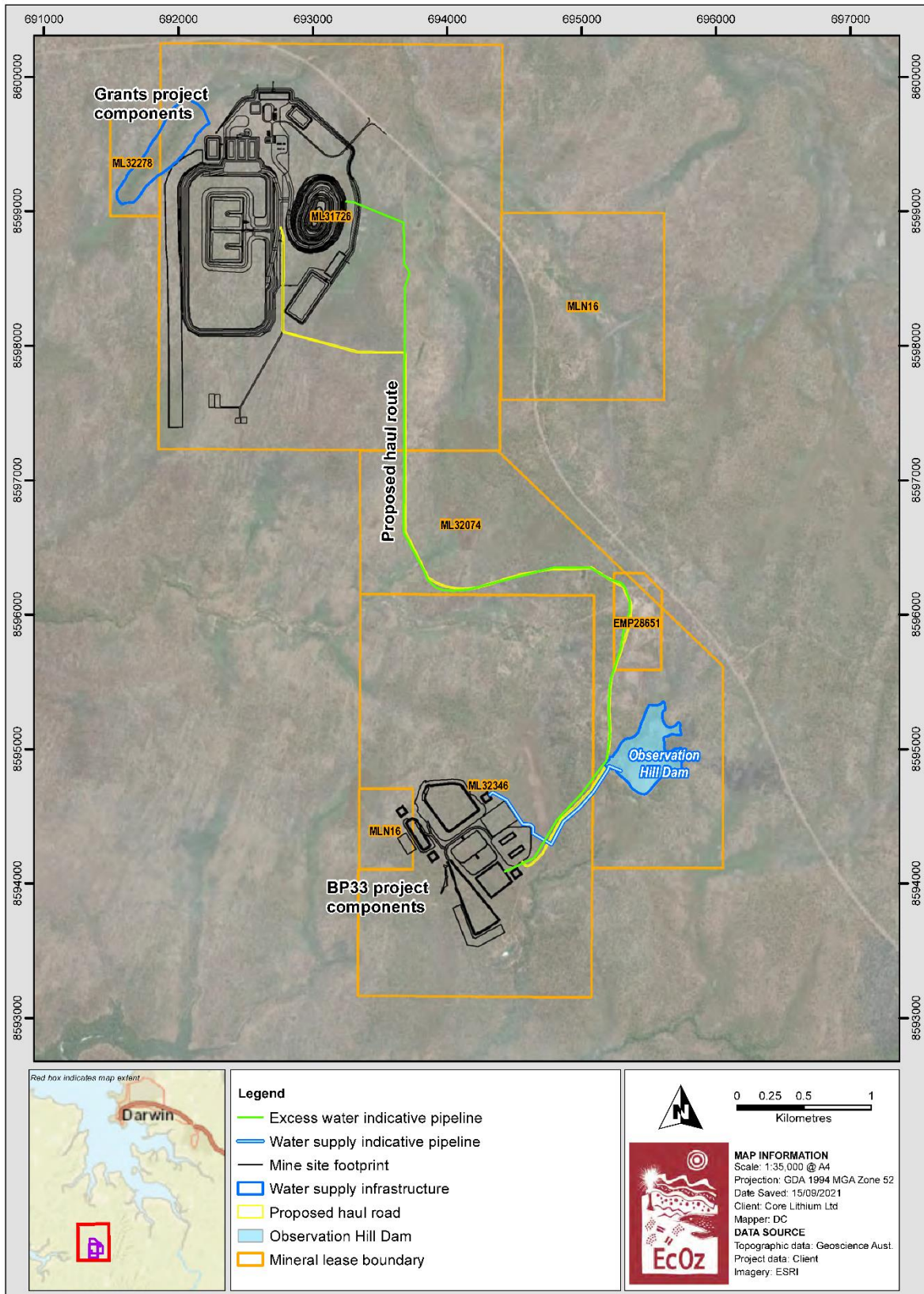


Figure 2 Map of haul route from proposal to Grants Lithium Project

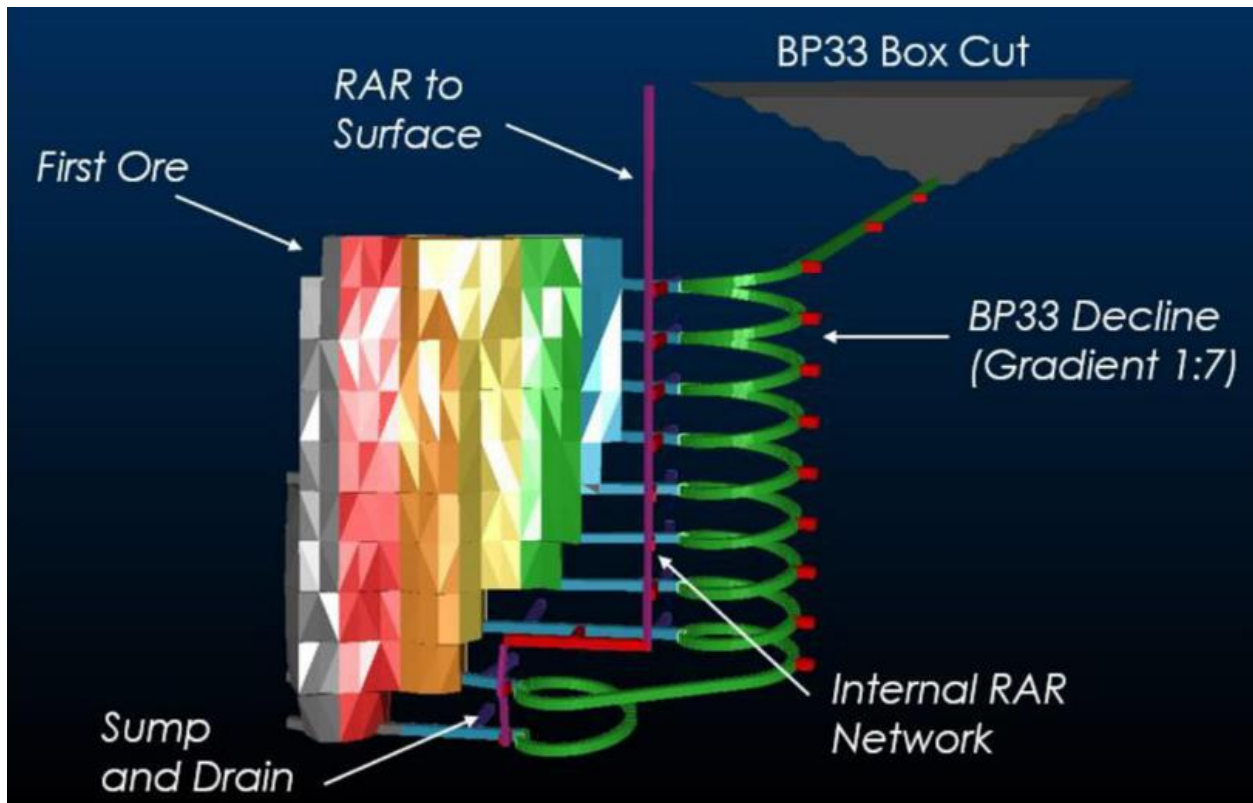


Figure 3 Underground mine layout showing the relationship between mine components

2.2. Interactions with Grants Lithium Project

The proponent would commence mining after the nearby GLP resource is exhausted. Ore mined from the proposal would be hauled to the GLP via an internal haul road for processing using existing plant and infrastructure. Tailings would be disposed in the integrated waste rock and tailings storage landform, which would be appropriately designed and sized to receive waste from the proposal in addition to the waste rock and tailings generated during mining of the GLP. The concentrated lithium product would then be loaded and dispatched in quad road trains for transfer to Darwin Port.

The proponent included truck movements associated with the transportation of products from the GLP in the proposed traffic volumes for the proposal.

The GLP was assessed by the NT EPA in June 2019 at the level of an Environmental Impact Statement (EIS) under the *Environmental Assessment Act 1982* (repealed). In April 2020, the proponent sought to alter the GLP to accommodate processing and export of ore mined from a number of nearby ore deposits (including BP33) associated with the Finnis Lithium Project tenements. The NT EPA's assessment of the altered proposal concluded that the environmental significance had not changed, and that the recommendations made in Assessment Report 89 for the GLP adequately addressed the potentially significant environmental impacts; therefore, further assessment was not required.

For the purpose of the NT EPA's environmental impact assessment of the (Finniss Lithium Project BP33 Underground Mine) proposal, the scope is limited to the potential significant impacts associated with activities up to and including the transfer of ore to the GLP. Activities and impacts that occur following receipt of ore at the GLP are not within the scope of this assessment.

2.3. Justification for the proposal and alternatives

The proponent stated the proposal is justified because of the benefits that would be provided to the community and economy throughout its implementation, including:

- direct economic benefit from local employment through creation of about 60 jobs during construction, and 125-150 jobs during operation, and contracting to local businesses
- proposed underground mining methods would provide a cost effective, high level of resource recovery without the surface impacts associated with alternative open-cut mining methods, which would generally result in an increased disturbance footprint and waste volumes
- the strategic use of existing GLP mine infrastructure to support the extraction and processing of an accessible lithium resource is a logical and an economical use of land and water resources
- additional economic and net production benefits to Australia and the NT through payment of taxes and royalties, distribution of local community sponsorship funds, and positive contributions to regional NT, local business and household incomes.

The proponent considered the potential for alternatives to the proposal and its components, including to the mining method, mine waste management, site layout, haul route, water sources and power supply; as discussed in further detail in section 4 of the referral and section 3 of the SER.

The proponent considered different mining methods for mining the BP33 deposit including use of conventional open-cut methods and found that the proposed underground method would be the most economical and result in reduced environmental impacts when compared with alternative methods. It also considered the feasibility of backfilling mine waste to the underground void compared to surface disposal in a permanent waste rock dump and determined that backfilling is preferred and aligns with NT EPA guidance and expectations and reduces the volume of surface mine waste.

If the proponent chose not to proceed with the proposal, the identified employment, royalties and other economic benefits would not be realised at this time.

The proposal is justified primarily to facilitate the ongoing development of the Finnis Lithium Project, and to increase the life of the GLP by providing additional material to be processed into concentrate product.

3. Strategic context

Global demand for lithium is estimated to increase from 305,000 t lithium carbonate equivalent (LCE) in 2020 to 724,000 t by 2023. Recent growth in global demand has been driven by the use of lithium in rechargeable batteries, for electronic devices, electric vehicles and storage of renewable energies such as wind and solar.¹

The Finnis Lithium Project contains current lithium reserves of 15 Mt at 1.3 % lithium oxide (Li₂O). The proponent has received authorisation for, and commenced construction of, the GLP component of the Finnis Lithium Project. If the proposal is approved, it would be the second

¹ Department of Industry, Science, Energy and Resources. 2021. Lithium – Resources and Energy Quarterly – December 2021. Office of the Chief Economist, Australian Government, Canberra. <https://publications.industry.gov.au/publications/resourcesandenergyquarterlydecember2021/index.html>

lithium mine in the NT, after the GLP, and may provide a range of direct and indirect economic benefits to the local area, the region and the Territory.

The proposal is identified in the Territory Critical Minerals Plan (2019), which notes the increased global demand for critical minerals such as lithium and aims to position the strategic importance of the Territory in the production, processing and manufacturing of critical minerals.²

4. Statutory context

4.1. Overview

The proposal requires assessment by the NT EPA under the EP Act. The NT Minister for Environment is the approval authority.

The proposal also has a number of separate regulatory approval and reporting requirements. It is the responsibility of the proponent to obtain all approvals and meet reporting obligations that may be required. These may include, but are not limited to:

- approval of a mining management plan (MMP) and grant of a mining authorisation under the MM Act
- grant of a waste discharge licence under the *Water Act 1992*
- obligation to report information about greenhouse gas emissions under the *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

A range of other approvals may be required under NT legislation, including bore work permits, permits to work within a road reserve, approvals for the transport and storage of explosives, and approvals for onsite wastewater management. The proponent is required to identify and meet its obligations under other legislation.

Section 92 of the EP Act (Environmental approval to prevail over other statutory authorisations) sets out the effect of the environmental approval in relation to other statutory authorisations. The NT EPA acknowledges that the recommended conditions in Appendix 1 may require that the proponent prepare and submit management plans and reports that may also be required by other statutory decision-making processes, and is mindful that there may be some level of environmental regulatory overlap. However, it considers that the proponent may choose to develop the relevant plans and reports to meet requirements under one or more statutory authorisations e.g. the Water Management Plan required to be submitted to the DEPWS CEO under the recommended conditions in Appendix 1 could potentially also be provided to the mining regulator to meet requirements under the MM Act.

4.2. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the following information in accordance with regulation 157 of the EP Regulations:

- referral information
- SER
- submissions received in relation to the referral information and SER.

² Department of Industry, Tourism and Trade. 2019. The Territory critical minerals plan. Northern Territory Government. Darwin. https://industry.nt.gov.au/data/assets/pdf_file/0009/681174/nt-critical-minerals-plan.pdf

The NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act including consideration of:

- the objects (EP Act, section 3)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)
- the environmental decision-making hierarchy (EP Act section 26)
- the waste management hierarchy (EP Act section 27)
- ecosystem-based management
- impacts of a changing climate.

Refer to Appendix 2 for further detail about matters that the NT EPA has taken into account during its assessment.

5. Consultation

The NT EPA published the referral for comment between 10 July 2020 and 10 August 2020. Two public submissions were received, including one from the Environment Centre NT and one from a private individual. Eight submissions were received from NT government authorities. The NT EPA considered the submissions received in relation to the referral information in making its decision to require a standard environmental impact assessment by the SER method.

The NT EPA published the SER for comment between 16 November 2021 and 20 December 2021. No public submissions were received. Six submissions were received from NT government authorities. The NT EPA considered the submissions received in relation to the SER in making this assessment report. The issues raised in submissions are discussed in more detail in section 6 below.

The NT EPA consulted with, and invited submissions from, the proponent and statutory decision makers who may have a view on the draft environmental approval. Submissions were received from the proponent, the NT Controller of Water Resources and a delegate of the Minister for Mining and Industry. The NT EPA considered the submissions in finalising its recommendation to the Minister.

6. Assessment of key environmental factors

6.1. Overview

The NT EPA identified that the proposal has the potential to have a significant impact on environmental values associated with five environmental factors (Table 2).

Table 2 Key environmental factors³

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
LAND	Terrestrial environmental quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.

³ [NT EPA Guide to Environmental Factors and Objectives.](#)

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
WATER	Hydrological processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
	Inland water environmental quality	Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
PEOPLE	Community and economy	Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.

The NT EPA considered other environmental factors during its environmental impact assessment; however, the impact on those factors was not considered to be significant.

In considering the key environmental factors and the recommended conditions in Appendix 1, the NT EPA took into account other statutory decision-making processes that can avoid or mitigate the potentially significant impacts of the proposal on the environment.

6.2. Terrestrial environmental quality

6.2.1. Environmental values

Land and soils on and surrounding the proposal support Eucalyptus open forest on well drained low hills and rises, and riparian vegetation on seasonally waterlogged drainage systems and alluvial plains. Land and soils would also provide a potential pathway for contamination of surface water that flows into Bynoe Harbour via the Charlotte River, and for groundwater in the Burrell Creek Formation through mobilisation of sediment and contaminants from the proposal.

Soils are slightly acidic, non-saline, non-sodic and non-dispersive; likely have poor structure, limited water-holding capacity and may be susceptible to erosion.

The landforms and soil structure in the proposal area are relatively intact, with evidence of minor disturbance from previous mining, extraction and exploration activity. Successful rehabilitation of land disturbed by the proposal is likely to require soil amelioration to increase the physical and chemical fertility of the soil, consistent with the post-mining land use.

6.2.2. Investigations and surveys

The following investigations and surveys were used to inform the NT EPA's assessment of the potential impacts on terrestrial environmental quality:

- Finnis Lithium Project BP33 Underground Mine, Geochemical characterisation report (Appendix A of the referral supporting document) (Environmental Geochemistry International 2020)
- Finnis Lithium Project BP33 Underground Mine, Ecological assessment (Appendix B of the referral supporting document) (EcOz Environmental Consultants 2020)

- Finnis Lithium Project BP33 Underground Mine, Static Geochemical Testing of Mine Wastes & Ore (Appendix H of the supplementary environmental report) (Environmental Geochemistry International 2021).

Information contained in both the referral supporting document (sections 3.2, 3.18, 5.2, 5.3 and 8) and the SER (sections 2.3 and 8) was also used to inform the assessment.

6.2.3. Consultation

Matters raised during consultation relating to potentially significant impacts on terrestrial environmental quality include:

- the requirement for land disturbed by mining activities to be rehabilitated to minimise the risk of land and soil stability impacts post-closure
- the potential for long-term degradation of land and soil quality in the event of unsuccessful rehabilitation and/or extended periods of care and maintenance and/or unplanned closure
- the potential for contamination due to seepage from mine waste or chemical spills.

6.2.4. Potentially significant impacts

Potentially significant impacts on the quality of surrounding soil and land could occur as a result of:

- mine rehabilitation not being properly carried out due to unplanned closure, extended periods of care and maintenance, or poor execution;
- soil contamination from chemical spills or leaks.

The potential for impacts on water quality as a consequence of soil erosion and acid and/or metalliferous drainage (AMD) are addressed in section 6.5 of this report.

6.2.5. Avoidance and mitigation

The proponent's application of the management hierarchies⁴ includes measures to avoid and mitigate potential significant impacts on terrestrial environmental quality:

- Backfill mine waste to underground stopes and box cut on completion of mining
- Mine closure and rehabilitation in accordance with a Mine Closure Plan (MCP) consistent with the principles and approaches provided by the Integrated Mine Closure: Good Practice Guide (ICMM 2019).
- Implementation of an Erosion Sediment Control Plan (ESCP) that complies with the International Erosion Control Association (IECA) 2008 Best Practice Erosion and Sediment Control.
- Chemical handling, storage and use in accordance with Australian Standard AS1940 Storage and handling of flammable and combustible liquids and the Dangerous Goods Act 1998.

Mining Management Act 2001 (MM Act)

The proposal will require approval of a MMP (which includes a MCP) and grant of a mining authorisation by the mining regulator ((currently the Department of Industry, Tourism and Trade (DITT)) under the MM Act. The MM Act has a number of objectives which provide for the

⁴ Environmental decision-making hierarchy and Waste management hierarchy (EP Act sections 26 and 27)

protection of the environment from the impacts of mining activities through implementation of environmental standards consistent with best practice in the mining industry.

The proponent's strategy for rehabilitation and closure of the proposal would be reviewed by the mining regulator as part of the Mining Authorisation process. The geotechnical and geochemical stability of the rehabilitated landform would also be considered during assessment of the application for a mining authorisation, MMP and MCP.

The proposed design and the appropriateness of the rehabilitation methods would be verified by the mining regulator, consistent with the MM Act and mining regulator internal guidelines as part of the MMP review process. The MMP review process by the mining regulator would consider land and soil quality, mine closure and rehabilitation requirements and would generally be consistent with the NT EPA's environmental objective for terrestrial environmental quality.

Rehabilitation measures

The proposed mine rehabilitation measures include removing all mining waste landforms, returning all fresh and transitional waste rock material underground, plugging the portal and vent shaft and backfilling the box cut, surface contouring and topsoil spreading, and rehabilitating the site with native vegetation species.

6.2.6. Assessment of impacts to environmental values

The NT EPA considered that the key environmental value for terrestrial environmental quality likely to be impacted by the proposal is the quality of land and soils.

Potential impacts associated with soil contamination due to the handling, storage and use of chemicals are not considered to be significant and would be regulated under the MM Act.

Significant impacts to land and soil quality may occur if the proponent's rehabilitation and mine closure is not conducted as planned or is delayed. The NT EPA considers that the rehabilitated proposal must:

- designed, constructed, operated, rehabilitated and closed in an ecologically sustainable manner.
- be physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/non-contaminating and capable of sustaining an agreed post-mining land use; and
- not result in unacceptable liability to the Territory.

The NT EPA has recommended a condition requiring that the proponent develop and implement an MCP that is consistent with contemporary best practice guidance, and considers that this would ensure there are no unacceptable long-term impacts or ongoing liabilities for the community or the government at the end of the proposal, in line with the principles of ecologically sustainable development.

The MCP approval process and activities associated with closure and rehabilitation of the proposal would be managed and regulated under the MM Act, as confirmed by the mining regulator in its submissions on the referral and the SER.

A mining security is required under the MM Act to prevent, minimise or rectify environmental harm caused by mining activities, and the NT EPA considers that this could be adequately assessed and regulated by the mining regulator. However, the NT EPA acknowledges that a decision about whether an environment protection bond would be required under section 86 of the EP Act, consistent with section 129(8) of the EP Act, is ultimately the Minister's responsibility.

The NT EPA considers that, based on the information presented in the referral and SER, the proponent’s commitments, and advice from the mining regulator, it is likely the rehabilitation and closure of the proposal could be implemented in a manner that avoids or minimises significant environmental impacts and liabilities. The NT EPA has recommended conditions requiring that its objectives for mine closure are met and that the proponent submit an environmental performance report. The environmental performance report is required to demonstrate that the environmental achievements and outcomes in the referral, SER and environmental approval are met, including reporting on predicted impacts compared to actual impacts. .

6.2.7. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on terrestrial environmental quality values. In doing so, the NT EPA has considered whether reasonable conditions could be imposed, or whether other statutory decision-making processes could ensure the NT EPA’s factor objective is likely to be met. The NT EPA assessment findings are presented in Table 3.

The NT EPA has also taken into account the objects and principles of the EP Act in assessing whether the residual impacts will be meet its environmental factor objective and whether reasonable conditions can be imposed (Appendix 2).

Table 3 Summary of assessment for terrestrial environmental quality

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Impacts on land and soil quality due to a delay or failure to rehabilitate the proposal.	The proponent would be required to prepare a MCP consistent with contemporary best practice guidance to manage closure and rehabilitation to meet the mining regulator’s requirements under the MM Act. This would support achievement of the NT EPA’s objective for terrestrial environmental quality.	Regulated through recommended conditions: Condition 2: Action implementation and closure. Condition 3: Mine Closure Plan. Regulated by other statutory decision-making processes under the MM Act: Mining authorisation, MMP and MCP.

6.2.8. Conclusion against the NT EPA objective

With the implementation of the proponent’s commitments, recommended conditions identified in Appendix 1, and regulation under the MM Act, the NT EPA considers that the proposal could be conducted in such a manner that its objective for terrestrial environmental quality is likely to be met.

6.3. Terrestrial ecosystems

6.3.1. Environmental values

The proposal is located within the Darwin Coastal Bioregion which is characterised by eucalypt forest and woodlands with tussock and hummock grass understorey⁵. Native vegetation with low weed density covers the proposal footprint and surrounding area, and there is minimal disturbance from previous mineral exploration and extraction activities.

Vegetation surveys undertaken by the proponent identified four vegetation communities within the disturbance footprint that are well represented and not considered to be rare or threatened at a regional scale. No threatened ecological communities are present. Targeted field surveys of *Typhonium praetermissum* and *Stylidium ensatum* were undertaken at an appropriate time of year using appropriate methods with an adequate survey effort to detect the species, as verified by the DEPWS in submissions made in relation to the referral and SER.

Significant and sensitive vegetation types⁶ occur within the proposal footprint (wetland drainage systems) and downstream along an ephemeral creek (riparian vegetation) that flows in a south-westerly direction for about 2.5 km before joining the estuarine reaches of the Charlotte River where mangrove communities occur.

Surveys undertaken identified 3.6 ha of riparian vegetation along the ephemeral creek downstream from the proposal as a potential groundwater dependent ecosystem (GDE), based on the persistence of pools late into the dry season and the presence of species known to access groundwater within 20 m of the land surface. The area is mapped as moderate terrestrial GDE potential on the Bureau of Meteorology GDE Atlas⁷.

The NT Herbarium's modelling and mapping of potential habitat indicated two threatened flora species are likely to occur within the proposal footprint:

- the annual herb *S. ensatum* (Endangered – *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Endangered - *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act))
- the perennial geophyte *T. praetermissum* (Vulnerable - TPWC Act).

According to advice in the DEPWS submission on the referral, ten threatened fauna species may occur within a 10 km radius of the proposal.

6.3.2. Investigations and surveys

Several flora and fauna investigations and surveys have been undertaken by the proponent in and around the proposal area since 2019. These consist of:

- a flora and vegetation survey of the proposal area by EcOz Environmental Consultants, from the 28 November and 13 December 2019.
- a desktop threatened species assessment of the proposal area by EcOz Environmental Consultants in 2019.
- a targeted survey of suitable *T. praetermissum* habitat in and surrounding the proposal footprint by EcOz Environmental Consultants in February 2020.

⁵ Under the Interim Biogeographic Regionalisation for Australia (IBRA): [Darwin Coastal bioregion](#).

⁶ Wetlands, riparian vegetation and mangroves as defined in the [NT Planning Scheme Land Clearing Guidelines](#) (DEPWS 2021).

⁷ BoM 2021. [Groundwater Dependent Ecosystems Atlas](#)

- a targeted survey of suitable *S. ensatum* habitat in and surrounding the proposal footprint by EcOz Environmental Consultants in July 2020.

The surveys were undertaken generally in accordance with the standards set out in the NT EPA Guidelines for Assessment of Impacts on Terrestrial Biodiversity (2013).

6.3.3. Consultation

Matters raised during consultation relating to potentially significant impacts on terrestrial ecosystems include:

- the potential for vegetation impacts from proposed irrigation of mine affected water
- the requirement for native vegetation species used in rehabilitation to be local to the area
- the adequacy of the proposed pre-clearing fauna inspection and relocation program
- potential riparian vegetation degradation from changes to the hydrological regime, including groundwater drawdown and alteration of surface flows
- the requirement for targeted surveys for *T. praetermissum* and *S. ensatum*
- whether deferral of detailed measures to manage impacts on flora and fauna to regulatory processes under the *Mining Management Act 2001* would be appropriate.

6.3.4. Potentially significant impacts

Terrestrial ecosystem values have the potential to be impacted through:

- loss of native vegetation from land clearing, in particular:
 - *S. ensatum* habitat
 - *T. praetermissum* habitat
- habitat degradation or loss from the introduction or spread of weeds
- habitat degradation or loss due to altered hydrological regimes.

6.3.5. Avoidance and mitigation measures

The proponent has proposed the following measures to minimise impacts on terrestrial ecosystems:

- avoidance through proposal design to minimise clearing and avoid direct impacts on significant and sensitive vegetation
- development and implementation of a Vegetation Clearing Procedure to clearly detail the areas to be cleared, methods for clearing and verification requirements
- pre-clearing inspections to identify and relocate fauna
- monitoring of groundwater drawdown impacts on riparian vegetation and groundwater dependent ecosystems and rehabilitation of impacts
- implementation of weed hygiene procedures for vehicles and equipment coming onto, or returning to, the site for earthmoving to prevent the introduction and spread of weeds
- rehabilitation of the proposal in accordance with a MCP requiring the establishment of self-sustaining native vegetation with species composition comparable to that of surrounding ecosystems.

6.3.6. Assessment of impacts to environmental values

The NT EPA notes that in designing the proposal, the proponent has applied the management hierarchies, including through minimising the operational and post-closure disturbance footprint by using existing infrastructure at the GLP, and using underground mining methods with progressive backfill of waste, followed by land rehabilitation.

Loss of native vegetation and habitat from land clearing

The proponent conducted targeted surveys for the following threatened plants:

- *S. ensatum*
- *T. praetermissum*.

The surveys were undertaken at an appropriate time of year, with adequate survey effort using appropriate methods, and did not detect either of the species, indicating that they are unlikely to occur in the proposal footprint. Based on advice received from the DEPWS Flora and Fauna Division, the NT EPA considers that the proposal would not cause significant direct or indirect impacts to any local populations of these species.

The proponent concluded that the direct impact of a loss of 101 ha of habitat is not expected to have a significant impact because the disturbance area is considered to be relatively small compared to the regional extent (1,085 km² *S. ensatum*; 1,513 km² *T. praetermissum*)⁸ and the affected habitat types are well represented in the areas surrounding the proposal. The proponent also considered that habitat values within the disturbed area would be partially or fully reinstated post-closure as the disturbed areas will be backfilled and rehabilitated; however, depending on the level of rehabilitation success achieved, the NT EPA considers that the proposal would potentially result in some level of long-term or permanent reduction of habitat value within the disturbance footprint.

The DEPWS provided advice in its submission on the SER about the importance of the use of native species that are local to the area in revegetation of the site during the rehabilitation phase. The NT EPA considers that this could be regulated as part of the proponent's mine closure and rehabilitation required under the MM Act.

The NT EPA notes that the proponent will rehabilitate the proposal progressively as underground mining on each production level is completed and surface infrastructure is no longer required. Rehabilitation will be undertaken in accordance with a MCP developed by the proponent in accordance with contemporary best practice guidance that would be approved and regulated under the MM Act.

Advice from DEPWS in its submission on the referral stated that habitat within the disturbance footprint of the proposal is considered to be sub-optimal for seven of the ten threatened fauna species that are likely to occur within or immediately adjacent to the proposal. It concluded that the removal of a relatively small area of habitat is not likely to result in a significant impact to populations of any of those seven species.

In relation to the remaining three threatened fauna species that could be impacted by the proposal, the DEPWS advice stated that although there is potential for individuals to occupy the proposal area, the proposal poses a low risk to regional populations of those species due to the small area of suitable habitat being disturbed, compared to the regional extent.

⁸ DLRM 2016. Mapped distribution *Typhonium praetermissum*; and DENR 2016. Mapped distribution *Stylidium ensatum*. Northern Territory Government.

The NT EPA considers that the proposed vegetation clearing is not likely to result in a significant impact on regional populations of any of the threatened fauna species that may occur in or adjacent to the disturbance footprint.

Habitat degradation from the introduction or spread of weeds

One weed of national significance was recorded during the proponent's vegetation surveys, *Andropogon gayanus* (gamba grass); and a further four weed species of national significance are known to occur within the area, including *Jatropha gossypifolia* (bellyache bush), *Mimosa pigra* (Mimosa), *Hymenachne amplexicaulis* (olive hymenache) and *Parkinsonia aculeate* (Parkinsonia). *Cenchrus polystachios* (perennial mission grass), a declared weed species listed in the Darwin Regional Weed Management Plan 2015-2020 (DLRM 2015) was also identified during surveys. These species are considered to be highly invasive, and there is potential for project activities to introduce and increase the spread of weed species. However, legislative requirements under the *Weeds Management Act 2001* would ensure that impacts from the proposal on weeds are not significant.

The proposal footprint currently has low levels of existing weed infestation; however, gamba grass and perennial mission grasses are key weeds of concern. The proponent has committed to establishing a proposal-specific weed hygiene and ground disturbance procedure, and topsoil management practices to prevent the introduction of new species and the spread of weeds.

The NT EPA considers that the proponent has made reasonable and achievable attempts to avoid impacts to flora and vegetation and the proposed measures to minimise impacts are acceptable. The NT EPA considers that any residual impacts remaining after implementation of the proponent's commitments would not be significant.

Habitat degradation or loss of downstream riparian vegetation (and potential GDE) due to changed hydrological regimes

The NT EPA assessed changes to hydrological processes in section 6.4. The information below focuses on the proposal's potential impacts on downstream riparian and potentially groundwater dependent vegetation.

The proposal would alter the hydrology of the sub-catchment which discharges into the headwaters of Charlotte River, including through the combined effects of reduced downstream surface flows due to water extraction from OHD and groundwater drawdown from mine dewatering. Reduced water availability would potentially result in a decline in the health of, or a loss of, riparian and potentially groundwater dependent vegetation along a 4.5 km section of the ephemeral creek (Stream Order 1) downstream of the proposal. The SER stated that the closed structure of the riparian vegetation and observed persistence of surface pools in the dry season indicates the 3.6 ha community is likely to be a facultative groundwater dependent ecosystem (GDE) with a partial dependence on groundwater.

The NT EPA's assessment of the GLP (Assessment Report 89) concluded that significant impacts on downstream vegetation communities from the predicted changes in surface water flows due to water extraction from OHD were unlikely, considering that downstream riparian vegetation would likely be sufficiently resilient to tolerate reduced surface water flows for up to three years and that the vegetation would have the opportunity to recover at the end of the GLP when flows are restored.

The BP33 proposal would extend the duration of reduced surface water flows downstream of OHD from three years to seven years. The proponent's hydrological modelling predicted a 20-30% reduction in wet season flow in the ephemeral creek; however this reduced to <3% in the Charlotte River. Advice from the DEPWS Flora and Fauna Division indicates that any impacts on downstream riparian vegetation along the ephemeral creek from reduced surface flows are likely to be minor due to downstream sensitive riparian vegetation already being adapted to the highly

variable hydrology downstream of OHD. The NT EPA considers that the reduction in surface flows due to the proposal are (in isolation) not likely to cause a significant impact to downstream riparian vegetation.

Groundwater drawdown from the proposal has the potential to impact on water availability for groundwater dependent vegetation, depending on the reliance of that vegetation on groundwater and the depth at which it is accessed. Table 7-1 of the Referral Supporting Document lists the land units and vegetation associations comprising key vegetation species that may be potentially reliant to some degree on groundwater, located within the 5 m water table drawdown contour for the proposal, which include:

- Melaleuca mid open forest over tussock grassland
- Corymbia mid open woodland over tussock grassland.

The proponent's modelling of groundwater drawdown around the mine indicates that groundwater levels are likely to be below the depth accessible by riparian vegetation out to an approximate 1.5 km radius from the underground mine for approximately five years during mining operations and post closure. Uncertainty remains about the duration and extent of the potential impacts as the groundwater dependence of the community has not been confirmed.

The vegetation community in the potential terrestrial GDE identified during surveys in the downstream riparian zone do not include species of conservation significance and are considered to be widespread in the region. The NT EPA notes that a reduction in the health and/or a permanent loss of 3.6 ha of riparian GDE vegetation as a result of groundwater drawdown may be an unavoidable impact of the proposal, based on advice from DEPWS that the potential GDE would likely be lost if groundwater is not accessible for a period of five years.

The proponent prepared a draft Water Management Plan (WMP) to describe the approach and measures that would be taken to mitigate impacts of groundwater drawdown on the identified potential GDEs. The WMP includes a requirement for further surveys to improve certainty and define the boundary, area, structure and composition of potential GDEs, and annual monitoring at three sites to identify any changes to the health or extent of the potential GDE, and determine whether measures would need to be implemented following mine closure to restore habitat values.

DEPWS confirmed that a groundwater extraction licence under the *Water Act 1992* is not likely to be required for mine dewatering and therefore potential GDE impacts associated with groundwater drawdown would not be managed or regulated under that regulatory regime.

The NT EPA considers that uncertainty remains regarding the extent to which the potential GDE depends on groundwater and therefore the significance of any potential impacts of drawdown, and is supportive of the proponent's commitments to monitor the potential GDE and undertake measures to restore habitat values post closure in the event that impacts occur. The NT EPA also notes the potential for cumulative impacts to water availability for the potential GDE from the combination of reduced surface water flow and groundwater availability.

The NT EPA notes that there is residual uncertainty about the duration, magnitude and extent of potential impacts to GDEs from groundwater drawdown (both in isolation and cumulatively with reduced surface flow). The NT EPA considers that GDE impacts may be unavoidable due to the need to dewater inflows to the underground mine; however, the potential loss of up to 3.6 ha of potential GDE habitat is not considered regionally significant.

The NT EPA considers, based on the advice of DEPWS, that the proposed measures to monitor GDE impacts are technically and practically feasible, and has recommended a condition requiring that a GDE Management Plan be implemented, and monitoring be undertaken to detect any loss of GDE habitat and validate the proponent's modelled predictions in the SER. The NT EPA notes

that the proponent committed to account for and rehabilitate any impacts on GDE/riparian vegetation from cumulative changes in hydrology as part of the final closure of the site.

The NT EPA has determined that the impact of drawdown on GDEs can be adequately managed and regulated through the recommended conditions in Appendix 1, implementation of the proponent's commitments and regulation under the MM Act, to meet the NT EPA's objective for terrestrial ecosystems.

6.3.7. Summary of factor assessment and recommended regulation

The NT EPA has considered the potential significant impacts of the proposal on terrestrial ecosystem values. In doing so, the NT EPA has considered whether reasonable conditions could be imposed, or whether other statutory decision-making processes could ensure the NT EPA's factor objective is likely to be met. The NT EPA assessment findings are presented in Table 4.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

Table 4 Summary of assessment for terrestrial ecosystems

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Loss of native vegetation from land clearing	The disturbance area does not have significant qualitative value compared to surrounding vegetation in the mining lease. Implementation of the Vegetation Clearing Procedure and MCP to avoid and minimise impacts, means impacts are not considered significant and are likely to meet the NT EPA's objective for terrestrial ecosystems.	Recommended condition 1: Limitations and extent of action. Regulated by other statutory decision-making processes under the MM Act: Mining authorisation, MMP and MCP.
Habitat degradation or loss from the introduction or spread of weeds	The proponent has proposed mitigation measures in the Referral and SER to manage indirect impacts of weeds on vegetation. Environmental outcome likely to meet the NT EPA's objectives for this factor, subject to regulation under the Weeds Management Act and MM Act.	Regulated by obligations under the <i>Weed Management Act 2001</i> . Regulated by other statutory decision-making processes under the MM Act: Mining authorisation, MMP and MCP.
Habitat degradation or loss due to altered hydrological regimes	The Water Management Plan contains measures to avoid, minimise and mitigate the impact of proposal activities on surface and groundwater, and potential GDEs. Residual impact can be regulated through conditions, so the	Regulated through recommended conditions: Condition 4: Inland waters. Condition 6: Groundwater dependent ecosystems Regulated by other statutory decision making processes under the MM Act:

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
	environmental outcome is likely to meet the NT EPA's objective for terrestrial ecosystems.	Mining authorisation, MMP and MCP.

6.3.8. Conclusion against the NT EPA objective

With the implementation of the proponent's proposed management measures and recommended conditions identified in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objective for terrestrial ecosystems is likely to be met.

6.4. Hydrological processes

6.4.1. Environmental values

Surface water

The proposal is located in the Charlotte River catchment of Bynoe Harbour which lies within the Finnis River Drainage Basin and is largely intact. A minor ephemeral watercourse (Stream Order 1) receives overflow from OHD and flows towards the southwest, discharging into a tidal inlet of the Charlotte River approximately 2.5 km downstream, and ultimately into Bynoe Harbour. Surface drainage in the proposal area usually ceases to flow in April or May each year, with some small pools remaining into the dry season. Surface water supports sensitive and significant vegetation types within and downstream of the proposal area such as riparian vegetation, permanent and seasonal wetlands, and mangrove communities.

The proposal is within both the Darwin Rural Water Control District (2019) and Fog Bay Area (1998) beneficial use areas declared for surface water and groundwater management purposes; there are no Water Allocation Plans or Water Management Zones covering the proposal area. Beneficial uses of surface water consist of agriculture, aquaculture, public water supply, environment, cultural, industry, rural stock and domestic, and mining and petroleum activity.

Groundwater

The proposal overlies the Charlotte River sub-catchment of the Burrell Creek Formation, which is a marginal fractured rock aquifer with typical bore yields of less than 0.5 L/s and higher yields up to 3.5 L/s occurring where drilling intersects fracture zones or quartz veining. Groundwater flow is towards the southeast, reflecting the topographic gradient with groundwater moving from higher elevations in the north-west to lower elevations along the drainage line in the southeast of the proposal.

The proponent has conducted groundwater monitoring at seven locations in and around the proposal footprint since 2020. Monitoring results indicate groundwater levels in the fractured Burrell Creek Formation bores ranged from 4.5 m to 9.8 m below ground level (BGL) in the late dry season, and rose to approach ground level due to wet season recharge by late January. The proponent's groundwater investigations indicate a hydraulic conductivity range of 0.003 – 0.08 m/day in rock with negligible fracturing, whereas bores that intersected fractured rock showed an increase in hydraulic conductivity ranging from 0.27 – 2.6 m/day.

There are six registered groundwater bores within 10 km of the proposal. The closest groundwater bore located 2.5 km north of the proposal was drilled in 1984 as a potential water supply bore for previous mining operations at OHD, and is not currently in use. The next closest

bore is located 4.6 km south of the proposal on the Fog Bay Road and was drilled in 2020 to provide a domestic water supply.

Potential impacts to groundwater dependent vegetation are discussed in section 6.3.

6.4.2. Investigations and surveys

The proponent undertook a number of investigations and surveys relevant to hydrological processes:

- Finniss Lithium Project BP33 Underground Mine Surface hydrology and flood inundation modelling (Appendix C to the referral) (Surface Water & Erosion Solutions 2020).
- Finniss Lithium Project - BP33 Lithium Prospect Preliminary Groundwater Assessment, (Appendix D to the referral) (Groundwater Enterprises 2019).
- Finniss Lithium Project – BP33 Underground Mine Water Balance Modelling Report (Appendix A to the SER) (WRM Water & Environment 2021).
- Finniss Lithium Project BP33 Groundwater Modelling Report Final Version 3.0. (Appendix B to the SER) (CloudGMS, 2021).
- Finniss Lithium Project BP33 Groundwater Investigation Report, Groundwater Enterprises, 2020 (Appendix L to the SER).

6.4.3. Consultation

Matters raised during consultation relating to potentially significant impacts on hydrological processes include:

- a recommendation that the proponent engage with the DEPWS Water Resources Division to understand its obligations under the *Water Act 1992*.
- the potential for water extraction to result in groundwater drawdown and impacts to GDEs
- the requirement to understand the magnitude and extent of cumulative impacts of water take from the proposal and the GLP
- the need for detailed management and monitoring plans related to groundwater, surface water and GDEs to assess impacts during the life of the proposal
- the need for an adaptive management approach to account for changing conditions and/or changes in the actual significance of impacts compared to those predicted.

6.4.4. Potentially significant impacts

Hydrological processes and associated values have the potential to be impacted through:

- changes to surface flows from water take and release
- flooding
- groundwater drawdown from mine dewatering.

Changes in surface water flows and groundwater levels may have significant impacts on groundwater dependent vegetation communities.

Potential impacts on water quality are discussed in section 6.5.

6.4.5. Avoidance and mitigation of impacts

The proponent has proposed the following measures to minimise impacts on hydrological processes:

- Mine water management system design to contain excess water and permit controlled release to receiving waters during the wet season only
- Diversion of upslope stormwater runoff to minimise the need for mine dewatering and discharge
- Reuse of dewatered mine inflows to reduce water extraction from OHD
- Stormwater treatment in sediment basins to allow release as overland flow
- Progressive backfill of underground mine stopes to minimise groundwater drawdown impacts
- Monitoring water use, water extraction, discharge, surface flows and groundwater levels to verify predicted impacts and identify any significantly different impacts to those originally predicted.

6.4.6. Assessments of impacts to environmental values

Changes to surface flows from water take and release

The proposal has an estimated operational water demand of 2.62 ML/day, 76% of which would be used for dust suppression on the mine site and haul road. Water would be sourced from underground mine dewatering, stormwater collected during rain events, and OHD. The proponent's modelling indicates that most of the operational demand (88%) would be met through reuse of dewatered underground mine inflows.

During the wet season, surplus water would need to be released, either through controlled discharge to the receiving environment, irrigation to land, or transfer to the GLP pit void (if available) for reuse and/or disposal. Advice from the DEPWS Water Resources Division in its submission indicates that the proposed water reuse and disposal options appear to be viable, and would require further investigation by the proponent to identify the preferred methods.

Controlled water discharge to a waterway would require regulation through a Waste Discharge Licence (WDL) granted under the *Water Act 1992*. Being an ephemeral system, the proponent would only be able to discharge when flow rates at the release point are sufficient to meet site-specific guideline values (SSGVs) for water quality and limit contaminant concentrations in the receiving environment.

The SER states that a 20 ha land irrigation area may be required to dispose of excess water (estimated 120 – 210 ML) during construction of the proposal when the GLP pit void would not be available for storage. The NT EPA notes that this is an initial assessment, and the actual requirement, size and location of the land irrigation area would be determined through detailed design. Any surplus water transferred to the GLP pit void from the proposal would be regulated through the existing GLP mining authorisation granted under the MM Act.

The proponent assessed the potential changes in stream flow and flood inundation associated with development of the proposal. Hydrologic modelling and flood inundation modelling showed a slight decrease (<2 %) in surface discharges from the proposal footprint during mining compared to pre-mining conditions. However, this is based on an assumption that all rainfall is captured onsite which is not practicable during the wet season and is not consistent with the proposed stormwater management approach. Therefore, the reduction in surface flow from the proposal is likely to be less than predicted and would not result in any significant impacts to the natural flow regime.

The proponent modelled the reduction in surface water flows that would result from the use of OHD as a water source as part of the GLP environmental impact assessment, and stated that the predicted impacts would not increase for the proposal, given the timing of proposal commencement after GLP mining is completed.

The modelled reduction in wet season flows in the Charlotte River due to the proposal is <3% which is consistent with the requirement of the NT Water Allocation Planning Framework⁹ that consumptive uses do not exceed 5% of flow at any time in any part of a river. In the ephemeral watercourse upstream of the confluence with the Charlotte River, the reduction in flow is predicted to be 20-30%. There are no other known consumptive uses within the Charlotte River catchment. The NT EPA considers that the predicted reduction in flows from the proposal would not result in any significant impacts on surface hydrology.

The NT EPA notes that the proponent committed to conduct further baseline and operational monitoring of surface flows during the wet season to validate modelled predictions and inform development of its strategy for the controlled release of mine affected water to the receiving environment.

The proponent submitted a draft Water Management Plan (WMP), a site groundwater model and a site water balance model with the SER to provide a risk-based framework for avoiding and minimising impacts to surface water flow regimes. The WMP documents the proponent's knowledge of surface and groundwater hydrology, potential impacts and mitigation measures, and provides a strategy to address knowledge gaps prior to the commencement of mining.

The NT EPA considers that any changes to surface water flows as a result of the proposal can be adequately managed through implementation of the proponent's commitments, regulation under the MM Act and regulation under the *Water Act 1992* to meet the NT EPA's objective for hydrological processes.

Flooding impacts

The referral found that generally, flood characteristics would remain unchanged under the final landform compared to existing conditions. Flood modelling for the operation of the proposal for the 50%, 2%, 1%, 0.1% annual exceedance probability flood events indicates that peak flows in the Charlotte River are likely to be unchanged by the proposal.

The proponent's hydrology assessment identified that mining areas and infrastructure occur outside of flood impact areas and would be unaffected by flooding and unlikely to impact flood regimes.

The risk of OHD failure would be mitigated through implementation of the NT EPA's recommendations for the GLP, including a requirement for water dams to be designed, constructed and operated in accordance with the Australian National Committee on Large Dams (ANCOLD) guidelines. Compliance with the guidelines would be monitored and reported by an independent engineer with appropriate qualifications and experience, and reports would be made publicly available.

The NT EPA considers that any potential flooding impacts would not be significant, and that the NT EPA's objective for hydrological processes could be achieved through implementation of the proponent's commitments and regulation under the MM Act.

⁹ DENR 2020. [NT Water Allocation Planning Framework](#).

Groundwater drawdown from mine dewatering

Groundwater drawdown has the potential to impact on groundwater dependent vegetation, depending on the reliance of that vegetation on groundwater. Impacts to potential GDEs are assessed in section 6.3 of this report.

The proposal would directly intercept groundwater from the alluvial and Burrell Creek Formation aquifers and require dewatering of up to 7 ML per day during mining operations. Based on the proponent's modelled predictions there is expected to be a groundwater drawdown of 25-35 m extending beyond the southern and eastern boundaries of the mining lease after five years of mining. The drawdown cone would extend in a radius of approximately 2 km from the underground mine. Groundwater levels are predicted to recover to pre-mining levels within 3 years of mine closure and no long-term changes to the water table surface are predicted post-closure.

The proponent has committed to monitor groundwater drawdown to detect changes in groundwater levels within the 2 km radius predicted zone of influence; and to identify, monitor and mitigate potential groundwater drawdown impacts from the proposal in accordance with its Water Management Plan. The NT EPA notes that potential groundwater drawdown impacts would be regulated under the MM Act.

No impacts are predicted to existing active groundwater users, the nearest of which is 4.6 km from the proposal. The NT EPA considers that its objective for hydrological processes would be met through the proponent's implementation of its commitments and regulation under the MM Act.

6.4.7. Summary of factor assessment

The NT EPA has considered the potential significant impacts of the proposal on hydrological processes. In doing so, the NT EPA has considered whether reasonable conditions could be imposed, or whether other statutory decision-making processes could ensure the NT EPA's factor objective is likely to be met. The NT EPA assessment findings are presented in Table 5.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

Table 5 Summary of assessment for hydrological processes

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Changes to surface flows from water take and release	The predicted reduction in surface water flows meet the requirements of the Water Allocation Planning Framework. Implementation of the proponent's Water Management Plan, and regulation under the MM Act would mean that impacts are not considered significant and are likely to meet the NT EPA's objective for hydrological processes.	Regulated by other statutory decision-making processes under the MM Act (Mining authorisation, MMP and MCP); and the <i>Water Act 1992</i> (Waste Discharge Licence and Surface Water Extraction Licence (for OHD)).
Flooding impacts	The proponent has proposed mitigation measures in the Referral and SER to manage potential flood impacts.	Regulated by other statutory decision-making processes under the MM Act:

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
	Environmental outcome likely to meet the NT EPA's objectives for this factor, subject to regulation under the MM Act.	Mining authorisation, MMP and MCP.
Groundwater drawdown from mine dewatering	The Water Management Plan contains measures to avoid, minimise and mitigate the impact of proposal activities on groundwater and other users of groundwater. The environmental outcome is likely to meet the NT EPA's objective for hydrological processes, subject to regulation under the MM Act.	Regulated by other statutory decision making processes under the MM Act: Mining authorisation, MMP and MCP.

6.4.8. Conclusion against the NT EPA objective

With implementation of the proponent's commitments, the recommended conditions in Appendix 1 and regulation under the MM Act, the NT EPA considers that the proposal could be conducted in such a manner that its objective for hydrological processes is likely to be met.

6.5. Inland water environmental quality

6.5.1. Environmental values

Surface water

The proposal is in the Charlotte River catchment of Bynoe Harbour, where the declared beneficial uses for the Fog Bay Area and Darwin Rural Water Control District provide for protection of environmental and cultural aspects of the water resource. Bynoe Harbour is considered to be in 'near pristine' condition with relatively little human impact, and is important to the community in terms of its biophysical and recreational values. An appropriate level of protection for Bynoe Harbour has not yet been formally defined in terms of the Australian and New Zealand Guidelines for fresh and marine water quality¹⁰ (referred to hereafter as ANZG), and management objectives for the water resource have not been designated.

The Charlotte River and Bynoe Harbour support freshwater and marine aquatic ecosystems that rely on good water quality. The proponent has undertaken baseline surface water monitoring at four freshwater sites in the Charlotte River catchment since 2017, including OHD, the historic BP33 pit lake, and at one upstream and one downstream site in the ephemeral drainage line to the east of the proposal.

Monitoring results show that water quality in the proposal area is generally good with some detectable concentrations of metals/metalloids including aluminium, arsenic, barium, iron, lithium and strontium. Electrical conductivity (EC) is generally <35 µS/cm, pH ranges between 5 and 9.3, median dissolved oxygen is 80% saturation and total alkalinity is <8 mg/L indicating a limited buffering capacity to neutralise acids and stabilise pH. Turbidity levels are low (<9NTU), even during high rainfall events. Oxides of Nitrogen (NOx) were often detected up to 0.04 mg/L. Total

¹⁰ ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

nitrogen (TN), total phosphorous (TP) and reactive phosphorus were below ANZG water quality guidelines with the exception of some isolated TN, TP and reactive phosphorus spikes. Total and recoverable petroleum hydrocarbons (TPH/TRH) and BTEXN concentrations were below detection limits.

Groundwater

The environmental values supported by groundwater quality at and surrounding the proposal are riparian vegetation (which are also potential GDEs) (see section 6.3). Other groundwater users are distant (>4.6 km) from the proposal as discussed in section 6.4.

The proponent sampled groundwater in 13 bores at seven locations (depths ranging from 8 m to 109 m BGL) in the Burrell Creek Formation aquifer at the proposal site since September 2020. The shallow (up to 36 m deep) and deep (36-109 m deep) aquifers showed distinct water quality characteristics. The shallow aquifer had slightly acidic pH, low EC, positive oxidation reduction potential (ORP), low alkalinity, low arsenic, high zinc, low iron and low phosphorus, with *Escherichia coli* (E. coli) and enterococci mostly below the limit of reporting. The deep aquifer was naturally high in arsenic and phosphorous, with close to neutral pH, higher EC, negative ORP, higher alkalinity, low zinc and high iron.

6.5.2. Investigations and surveys

The proponent undertook a number of investigations and surveys relevant to inland water environmental quality:

- Finniss Lithium Project - Core Lithium BP33 - Geochemical characterisation of waste rock and ore (Appendix A to the referral) (Environmental Geochemistry International 2020).
- Finniss Lithium Project – BP33 Underground Water Balance Modelling Report (Appendix A to the SER) (WRM Water & Environment 2021).
- Finniss Lithium Project – BP33 Underground Groundwater Modelling Report (Appendix B to the SER) (WRM Water & Environment 2021).
- Finniss Lithium Project BP33 Underground Mine, Static Geochemical Testing of Mine Wastes & Ore (Appendix H to the SER) (Environmental Geochemistry International 2021).
- Finniss Lithium Project BP33 Groundwater Investigation Report, Groundwater Enterprises, 2020 (Appendix L to the SER).

6.5.3. Consultation

Matters raised during consultation relating to potentially significant impacts on inland water environmental quality include:

- concern about the potential for waste to contaminate waterways through controlled and uncontrolled discharge and seepage
- the need for SSGVs to be developed for all key contaminants of water
- the need to consider the assimilative capacity of the receiving environment in relation to water discharge
- the potential for AMD to affect the water quality of surface water and groundwater resources
- the need for a comprehensive water quality monitoring program to assess whether the management measures being implemented are sufficient to prevent environmental harm.

6.5.4. Potentially significant impacts

Inland water environmental quality has the potential to be impacted through:

- discharge of stormwater and/or mine affected water
- seepage or runoff from potential AMD sources.

6.5.5. Avoidance and mitigation of impacts

The proponent has proposed the following measures to avoid and mitigate impacts on inland water environmental quality:

- mine design includes drainage and water storages to capture mine affected water to avoid uncontrolled release and use of low permeability material in WRD and ROM pad.
- soil erosion, sediment and drainage control to be implemented in accordance with the Best Practice Erosion and Sediment Control Guidelines¹¹
- maximise mine affected water reuse for dust suppression, transfer to GLP pit void for storage or disposal through irrigation to land
- any discharge of mine affected water to receiving waters would be conducted in accordance with a waste discharge licence under the *Water Act 1992*.
- removal and backfilling of mine waste from surface to underground on completion of mining
- a risk-based approach to AMD management consistent with the International Network for Acid Prevention (INAP) 2018 Global Acid Rock Drainage Guide.

6.5.6. Assessment of impacts to environmental values

Discharge of stormwater and/or mine affected water

The proposal would potentially result in increased soil erosion that could lead to surface water quality impacts, including increased turbidity and sediment transport downstream of the proposal. However, the NT EPA considers that the implementation of the proposed erosion and sediment control planning, management and monitoring measures would ensure that sediment is captured and retained on site and there would be no material impact on surface water quality and therefore no adverse impacts to downstream habitats.

The NT EPA notes that the proponent's implementation of best practice erosion and sediment control techniques for the duration of land disturbance associated with the proposal could be adequately regulated under the MM Act. The NT EPA notes that the proponent's commitment to rehabilitate disturbed land on completion of mining, and has recommended conditions requiring that the proponent meet closure objectives, and implement erosion and sediment control measures, which would prevent any long-term sedimentation impacts post-mining.

Mine affected water would be managed in accordance with the proponent's WMP which is designed to align with the ANZG and Darwin Harbour Region¹² water quality objectives. The NT EPA notes that the proponent's adoption of the Darwin Harbour Region water quality objectives may be acceptable for use as interim trigger values for the Bynoe Harbour region; however, to account for differences in catchment inputs, SSGVs would be refined with further data collection

¹¹ International Erosion Control Association (IECA) 2008, Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia), Picton NSW.

¹² Department of Natural Resources, Environment, the Arts and Sport, 2010. [Water Quality Objectives for the Darwin Harbour Region - Background Document](#)

prior to commencement of the proposal in line with the proponent's baseline water quality monitoring commitments.

The proponent's management strategy for mine affected water relies on three key options; discharge to receiving waters and dilution to meet the water quality objectives; storage in the GLP pit void; and disposal by irrigation to land. The SER discussed water treatment in sediment basins and the mine site dam to remove sediment and hydrocarbons, and identified that treatment would potentially be required to lower phosphorous and arsenic levels, but did not provide detail about how that treatment would be undertaken. Based on water quality monitoring results, the proponent predicted that water with elevated metal concentrations could be managed via irrigation or transfer to GLP, and noted that potential treatment options to lower metal concentrations would be investigated if required.

The proponent committed to obtain a waste discharge licence under the *Water Act 1992* for controlled release of mine affected water. This licence would regulate impacts associated with active (i.e. release via pumping or other controlled means) controlled discharge to receiving waters, but would not regulate water quality impacts resulting from overflow from the spillway of any water storages from the proposal, reuse for dust suppression or disposal by irrigation to land. The NT EPA considers that regulation of impacts from water storage overflows, dust suppression and disposal via irrigation to land could be managed under the MM Act.

The NT EPA notes water quality concerns raised by the DEPWS in its submission made in relation to the SER, including the potential for evapo-concentration to occur in site water storages, or for concentrations of contaminants to increase seasonally or over time, to levels such that water quality objectives would be unachievable. The NT EPA also notes the DEPWS concern about a lack of proposed contingencies to enable mine affected water discharge to meet the required water quality criteria in the event that sufficient dilution is not available and/or the rate of groundwater inflow is greater than expected. The NT EPA notes that there are potentially significant downstream surface water quality impacts associated with the discharge of mine affected water during the mine life, and that further consideration should be given to water treatment options prior to discharge in the case that storage and/or disposal options are not viable.

The proponent indicated in the SER that its proposed controlled release strategy would achieve the water quality objectives for the receiving drainage line and the Charlotte River. Preliminary SSGVs were developed by the proponent from its baseline water quality data to use as thresholds for early detection of impacts to surface water from mining activities, and to determine the need for implementation of adaptive management measures to respond to changes to expected water quality conditions.

While the NT EPA supports the proponent's commitment to continue to develop and refine SSGVs based on available local water quality reference data, it also notes that there is currently insufficient representative data to develop SSGVs for a number of parameters and further data collection will be required. The NT EPA considers that water quality sampling at the sites identified in the Water Management Plan for the purpose of deriving SSGVs should capture at least two consecutive full annual cycles of monthly monitoring data (during periods of flow). Further, the NT EPA has recommended a condition requiring that the discharge of mine affected water does not cause exceedances of the water quality guideline values¹³ at the downstream compliance point. The NT EPA considers that the waste discharge licensing process under the *Water Act 1992* would ensure that the suite of physical and chemical stressors (including toxicants) included in the proponent's surface water quality monitoring program are appropriate

¹³ The guideline values are the ANZG default guideline values for slightly to moderately disturbed systems (95% species protection level); where natural background levels exceed ANZG default guideline values, or default guideline values have not been set by ANZG, SSGVs must be derived in accordance with ANZG.

for the site and take into account the elements found to be elevated in geochemical waste characterisation results (SER Appendix H) and baseline water quality monitoring results.

The NT EPA has recommended a condition requiring that the draft Water Management Plan be updated prior to commencement of the proposal and that the proponent implements the proposal in a manner that demonstrates no measurable adverse change in water quality compared to the pre-mining baseline condition of the downstream receiving aquatic ecosystem at the end of the mine life. The NT EPA considers that potential water quality impacts downstream of the proposal and upstream of the confluence with the Charlotte River could be adequately managed and regulated through the mining authorisation and the MMP under the MM Act; and the waste discharge licensing process under the *Water Act 1992*.

Contamination of surface water and/or groundwater from AMD

The proponent addressed the potential for AMD to impact surface water and groundwater quality by undertaking geochemical characterisation of mine waste, committing to ongoing characterisation during mining and selective placement or encapsulation of problematic material to minimise the generation of AMD or contaminated leachate.

The total volume of material mined over the four-year life of mine would be 2,095 kt (comprising 99 kt ore and 1,996 kt of waste rock). The proponent analysed 9 ore and 89 waste rock samples which were broadly considered to be representative of the lithology and oxidation profile of the deposit overall. The oxidised and transitional waste rock samples were generally considered to be non-acid forming (NAF); however, fresh waste rock which comprises <10 % of the total volume of mine waste contains some areas with a high sulfur content associated with fresh phyllite, and water leachable arsenic and zinc. The proponent's geochemical characterisation estimated that 15,000 t of a total 229,000 t (of 6.6%) of mine waste would be potentially acid forming.

A hydrogeochemical study was undertaken to predict the movement of potential solutes originating from the WRD and their concentrations over time (Appendix B of the SER). The random walk particle tracking model developed for the groundwater assessment predicted that the majority of solutes would migrate along the hydraulic gradient from the box cut WRD and terminate at the underground decline, with a small proportion terminating about 1 km to the west of the proposal footprint.

The proponent acknowledged that further testing is required to quantify the volume of potential acid forming (PAF) material in fresh waste rock and address uncertainty about the acid generating properties of the material and characterise the risks of metals being mobilised from mine wastes and leached into receiving waters in the surrounding area. The SER included commitments to undertake a program of ongoing kinetic testing of mine waste to determine the risk that mining and mineral processing in the area could increase the concentrations of chemical constituents in receiving surface waters and groundwater. A groundwater monitoring program and AMD management plan would also be implemented by the proponent to detect changes early and prevent significant AMD related water quality impacts.

The NT EPA notes the proponent's commitments to undertake ongoing kinetic tests and sequential-extraction leaching tests, the results of which would be used to conduct an AMD risk assessment to inform the development of the AMD management plan. These test results would determine what the long-term leachate potential from these sources is, and elements that leachate is likely to contain, and would be useful for management and modelling post-closure scenarios.

The NT EPA considers that potential impacts related to AMD, and the proponent's ongoing waste characterisation studies of ore and mine waste material prior to the commencement of mining activities and during operations, could be managed through the proponent's commitment

to implement an AMD Management Plan, and that this would be regulated under the recommended conditions in Appendix 1 and the MM Act.

6.5.7. Summary of factor assessment

The NT EPA has considered the potential significant impacts of the proposal on inland water environmental quality values. In doing so, the NT EPA has considered whether reasonable conditions could be imposed, or whether other statutory decision-making processes could ensure the NT EPA's factor objective is likely to be met. The NT EPA assessment findings are presented in Table 6.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

Table 6 Summary of assessment for inland water environmental quality

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Discharge of stormwater and/or mine affected water	<p>Proponent's draft Water Management Plan (Appendix C to the SER) contains monitoring and management approach for water quality.</p> <p>A waste discharge licence under the <i>Water Act 1992</i> would regulate water quality impacts and condition controlled discharges.</p> <p>MM Act requirements (mining authorisation and MMP) would regulate uncontrolled discharges that are not regulated under a WDL.</p> <p>Residual impacts can be regulated through conditions and can be subject to decisions by other statutory decision-makers, so the environmental outcome meets the NT EPA's objective for inland water environmental quality.</p>	<p>Outcome regulated through: Recommended condition 4: Inland waters. Recommended condition 5: Soil erosion and sediment control.</p> <p>Other statutory decision-making processes: MM Act – Mining Authorisation, MMP and MCP.</p> <p>Waste Discharge licence under the <i>Water Act 1992</i>.</p>
Seepage or runoff from AMD.	<p>The proponent would prepare and implement an AMD Management Plan.</p> <p>MM Act will require the review and assessment of impacts related to mine waste and AMD, and regulate the design, construction, and operation of the temporary WRDs.</p> <p>Residual impacts can be regulated by other statutory decision-making processes, so the environmental outcome meets the</p>	<p>Regulated through other statutory decision-making processes:</p> <p>Section 74 of <i>Water Act 1992</i> – grant of WDL (only relevant for the controlled discharge of water affected by AMD to a waterway under a WDL).</p> <p>MM Act – Mining Authorisation, MMP and MCP.</p>

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
	NT EPA's objective for inland water environmental quality.	

6.5.8. Conclusion against the NT EPA objective

With the implementation of the proponents commitments in the referral and SER, the recommended conditions identified in Appendix 1, and regulation under the MM Act and *Water Act 1992*, the NT EPA considers that the proposal could be conducted in such a manner that its objective for inland water environmental quality is likely to be met.

6.6. Community and economy

6.6.1. Environmental values

The nearest community to the proposal is Belyuen Aboriginal community located approximately 20 km to the north-east. The township of Berry Springs is located 33 km to the east. Other key communities include Tumbling Waters, Wagait Beach and Dundee Beach which are accessed via Cox Peninsula Road; and Darwin rural communities including Noonamah, Bees Creek and Coolalinga. Darwin and Palmerston are likely to be a key source of potential employees and services for the proposal.

The local community, tourists and recreational fishers place strong value on the natural environment. Through public participation processes including community consultation, interviews conducted by the proponent, briefings and public submissions on the referral the community identified the environment, recreational assets, community cohesion, lifestyle, amenity, health and safety as the social values that should be protected from negative environmental impacts. Economic values raised during the consultation were focussed on livelihood and economic wellbeing.

6.6.2. Investigations and surveys

The proponent undertook a number of investigations and surveys relevant to community and economy:

- Finniss Lithium Project - BP33 Stakeholder Engagement Report (Appendix D to the SER) (True North Strategic Communication 2020).
- Finniss Lithium Project - BP33 Underground Mine Traffic Impact Statement (Appendix G to the SER) (GHD 2021).
- Finniss Lithium Project - BP33 Social impact assessment (Appendix J to the SER) (True North Strategic Communication 2021).
- Finniss Lithium Project - BP33 Greenhouse Gas Assessment (Appendix K to the SER) (ERM Consulting 2021).

6.6.3. Consultation

Matters raised during consultation relating to potentially significant impacts on community and economy include:

- the potential for the proposal to result in pressures on the social and economic environment

- the need for information about the economic impacts of the proposal, how the proponent would engage with local businesses and job seekers, potential employment levels from within the local community
- the need for adequate stakeholder engagement to understand potential social impacts
- potential impacts related to increased industrial vehicle road traffic
- the need for consultation with potentially affected Aboriginal people and communities to understand impacts on traditional activities
- the need for information about the economic viability of lithium mining over the next decade.

6.6.4. Potentially significant impacts

The following opportunities and impacts on community and economy may occur as a result of implementation of the proposal:

- opportunities for employment, increased economic activity, and local community benefit from sponsorship and local support
- impacts to stakeholders and/or community members during mine construction, operation, rehabilitation and closure due to:
 - increased mining traffic on roads leading to a reduced sense of road safety and wellbeing
 - amenity impacts due to an increased duration of road train movements associated with the proposal
 - concern about water use, legacy mines, and environmental impacts
 - cumulative impacts of the proposal and other developments in the region.

6.6.5. Avoidance and mitigation of impacts

The proponent has proposed the following measures to avoid and mitigate impacts to the community and economy:

- the proposal would not result in any increase of haulage traffic compared to GLP operations
- restriction of haulage to outside of Berry Springs Primary School drop off and pick up times (7:45-8:45am and 2:30-3:30pm)
- processes would be implemented to manage traffic movements, road safety, complaints, noise and dust associated with haulage
- ongoing stakeholder engagement and consultation
- public reporting of environmental monitoring reports and data.

The proponent has proposed the following measures to maximise opportunities for the community and economy:

- maximise the recruitment and retention of local workers, both directly and with contractors through recruitment and procurement processes that prioritise the local market
- maximise local Aboriginal employment on the project, directly and with contractors, by working with Aboriginal organisations and employment providers and implementing an Aboriginal Participation Plan

- benefiting the regional economy through implementation of a local procurement plan
- implementation of a sponsorship plan and prioritising sponsorship opportunities that benefit community groups in the local area.

6.6.6. Assessment of impacts to environmental values

Opportunities for employment, increased economic activity, and local community benefit from sponsorship and local support

The NT EPA acknowledges that the proposal could provide significant benefit to the community through employment opportunities, increased economic activity (capital expenditure estimated at \$45 million), sponsorship and local support, should it be approved.

The proponent developed and implemented a stakeholder engagement strategy which outlined the proposal's key stakeholders and the recommended approach for engagement. An engagement report was prepared to detail the methodology, the stakeholders that were contacted and briefed, the information provided to stakeholders about the proposal, the key themes and to summarise discussions.

A Social Impact Assessment was also undertaken by the proponent to provide an assessment of the expected social impacts and opportunities of the proposal on potentially affected communities, including Aboriginal communities, using an evidence-based approach. A Social Impact Management Plan, which outlines management measures to guide the proponent's long-term social performance, was also prepared by the proponent and submitted with the SER.

The proponent's commitment to prioritise the local market in recruitment and procurement processes would generate short-term opportunities in the Litchfield Local Government Area and the Greater Darwin region. The proponent expects the proposal to generate up to 60 direct jobs during construction and 120-150 jobs during operation.

The proponent anticipates most of the workers would be local residents of Darwin, Palmerston and surrounding areas and will travel to and from site for each shift. The proponent has committed to working with Aboriginal employment and training providers to identify opportunities for employment and participation for local Aboriginal people. The proposal has the potential to improve socio-economic conditions of local residents for the five-year duration of the proposal, although there is potential for the duration of opportunity to be increased when considered cumulatively with the GLP.

Impacts to stakeholders and/or community members during mine construction, operation, rehabilitation and closure

The proposal would result in impacts to road traffic through increased mine vehicle road use. Potential traffic impacts were identified as a key concern for local residents during the proponent's community consultation, due to direct impacts to road users as well as indirect impacts such as a reduced sense of road safety and wellbeing.

The transport of processed lithium concentrate to Darwin in quad road trains, combined with staff and general operational traffic, is expected to result in a 3% increase in traffic volume. The proposal would not result in an increased number of daily road train vehicle movements as mining at the proposal would only commence after mining at the GLP has ceased. The NT EPA assessed potential impacts associated with the increased duration (from 2-3 yrs to 7 yrs) of road train haulage of product as part of its assessment of the altered GLP proposal in June 2020, and considered that those impacts could be managed in accordance with the recommendations made in Assessment Report 89. Therefore, the NT EPA has not given further consideration to these matters during its assessment of the proposal.

The NT EPA acknowledges that there is valid community concern about environmental impacts, water usage and the potential for unplanned mine closure to result in a legacy mine site which could pose a risk to the environment and/or public safety. All reports submitted to DEPWS under an environmental approval for the proposal would be made available on the public register in line with EP Regulation 282 and therefore the community would be able to access information related to the proponent's environmental compliance and performance. The NT EPA considers that potential impacts on the environment, due to water use and unplanned mine closure, would be manageable through implementation of the proponent's commitments, the recommended conditions in Appendix 1 and regulation under the MM Act.

The potential cumulative impacts of the proposal with other current approved or planned proposals in the area, including the GLP, Project Sea Dragon and Department of Defence training area upgrades, were considered by the NT EPA. These impacts were not considered to be significant, given the relatively short timeframe for increased traffic, the extent of the impact and the proponent's proposed mitigation measures, including ongoing community engagement, regular review of traffic management plans, and road condition survey prior to commencement.

The NT EPA notes that the proponent committed to develop and implement a Community and Stakeholder Engagement Plan, regularly update the Social Impact Management Plan (SIMP), and address all issues raised in the SIMP to manage the social impacts of the proposal.

The NT EPA considers that potential impacts to community and the economy could be managed through implementation of the proponent's commitments and the MMP process under the MM Act.

6.6.7. Summary of factor assessment

The NT EPA has considered the potential significant impacts of the proposal on the community and economy. In doing so, the NT EPA has considered whether reasonable conditions could be imposed, or whether other statutory decision-making processes could ensure the NT EPA's factor objective is likely to be met. The NT EPA assessment findings are presented in Table 7.

The NT EPA has also taken into account the objects and principles of the EP Act (Appendix 2) in assessing whether the residual impacts will meet its environmental factor objective and whether reasonable conditions can be imposed.

Table 7 Summary of assessment for community and economy

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
Opportunities for employment, increased economic activity, and local community benefit from sponsorship and local support	Proponent committed to implement a community and stakeholder engagement plan and a local procurement plan. Opportunities could be regulated through the MM Act, so the environmental outcome is likely to meet the NT EPA's objective for community and economy.	Regulated through other statutory decision-making processes under the MM Act.
Impacts to stakeholders and/or community members during	Implementation of the proponent plans for management of traffic, road journeys, the environment, community and stakeholder	Regulated through recommended condition 2: Action implementation and closure.

Residual impact to environmental value	Assessment finding	Recommended conditions and regulation by other statutory decision-makers
mine construction, operation, rehabilitation and closure	<p>engagement, sponsorship, emergency management and response, mine closure, human resources, site safety and local procurement are likely to be sufficient to ensure the outcome for community and economy meets the NT EPA's objective.</p> <p>Impacts to the community and economy could be managed and regulated under the MM Act.</p>	Regulated through other statutory decision-making processes under the MM Act.

6.6.8. Conclusion against the NT EPA objective

With the implementation of the proponent's commitments, the NT EPA's recommended conditions identified in Appendix 1, and regulation under the MM Act, the NT EPA considers that the proposal could be conducted in such a manner that its objective for community and economy is likely to be met.

7. Whole of environment considerations

The NT EPA has considered connections and interactions between the key environmental factors (terrestrial environmental quality, terrestrial ecosystems, hydrological processes, inland water environmental quality and community and economy) together with other environmental factors (including air quality, atmospheric processes, culture and heritage, and human health) in its consideration of impacts to the whole of environment.

Inland water environmental quality has a key reliance on terrestrial environmental quality to sustain vegetation, and hydrological processes to maintain the levels and quantity of water required for ecosystem health.

Groundwater aquifers support groundwater-dependent ecosystems such as riparian vegetation, which are an important environmental asset. The NT EPA recognises that there are intrinsic links between the factor inland water environmental quality and other environmental factors. For example, changes to the quality or quantity of inland waters can affect flora and vegetation and social surroundings.

Similarly, terrestrial ecosystems have explicit links to terrestrial environmental quality, inland water environmental quality and hydrological processes to sustain and maintain growth and healthy flora and fauna populations.

Community and economy values are intrinsically linked to environmental values associated with inland water environmental quality, terrestrial ecosystem health and terrestrial environmental quality. The impact assessment has considered the strong connection of the community to land and water, and the potential impact that land and water disruptions may have on this connection.

When the separate environmental factors of the proposal were considered together in a whole of environment assessment, the NT EPA formed the view that the impacts from the proposal would not alter its views about whether the proposal could meet its factor objectives.

The NT EPA considers that an environmental performance report is required from the proponent at the mine closure phase, given the interconnected environmental values in the area likely to be affected by the proposal, the potential for cumulative environmental impacts due to the vicinity to GLP and other prospective lithium resources, and to validate the proponent's modelled predictions. The NT EPA has recommended a condition to this effect. The purpose of the environmental performance reporting is to provide the proponent and the Minister with a current evaluation of the performance of the proposal with respect to actual impacts on environmental values over the life of the project compared to those predicted during the environmental impact assessment process.

The NT EPA is of the view that the potential impacts of the proposal on the 'whole of environment', with consideration of the intrinsic interactions between environmental factors, would not lead to any substantial detrimental effect on achievement of the NT EPA's environmental objectives.

8. Conclusion and recommendation

The NT EPA has considered the proposal by Core Lithium Ltd to develop the Finnis Lithium Project BP33 Underground Mine. The NT EPA's assessment of the proposal identified potentially significant environmental impacts associated with the environmental factors of terrestrial environmental quality, terrestrial ecosystems, hydrological processes, inland water environmental quality and community and economy.

The NT EPA considers that the proposal can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted subject to implementation of the proponent's commitments and the conditions recommended in Appendix 1.

9. Definitions

The terms used in this report have the same meaning as the terms defined in the *Environment Protection Act 2019* and *Environment Protection Regulations 2020*.

adaptive management	A systematic approach to improving environmental results and management practices during action implementation through the application of learning from monitoring of outcomes and management actions. Refer to NT EPA Guidance on Adaptive Management:
AMD	Acid and metalliferous drainage, meaning any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. 2018. Available at www.waterquality.gov.au/anz-guidelines
CEO	The Chief Executive Officer of the Department of Environment, Parks and Water Security [or another name for that department, which may vary from time to time], or their delegate.
Certified professional	In the context of this Assessment Report, a Certified Practitioner in Erosion and Sediment Control.
Closure certificate	Closure certificate under section 212 of the EP Act
default guideline value	A guideline value recommended for generic application in the absence of a more specific guideline value (e.g. a site-specific guideline value) in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Formerly known as 'trigger values'.
ecologically sustainable	Meeting the principles of ecologically sustainable development as defined in Part 2 Division 1 of the EP Act, to ensure that development improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.
emergency	An event not authorised by the environmental approval for the action or other relevant statutory authorisation, with the potential to cause significant environmental harm if urgent action is not taken.
environmental harm	Direct or indirect alteration of the environment to its detriment or degradation, of any degree or duration, whether temporary or permanent.
EP Act	<i>Environment Protection Act 2019</i>
ESC	Erosion and sediment control
GDE	Groundwater Dependent Ecosystem
GLP	Grants Lithium Project
life of the action	The period of time from substantial disturbance until the issue of a closure certificate under section 213 of the EP Act .
mine affected water	Includes the following types of water: <ul style="list-style-type: none"> • pit water, dam water, processing water; • water contaminated by a mining activity

	<ul style="list-style-type: none"> • rainfall runoff which has been in contact with any areas disturbed by the action which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water; • groundwater which has been in contact with any areas disturbed by the action which have not yet been rehabilitated; • groundwater from the mine dewatering activities; • a mix of mine affected water and other water. <p>Does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by the action that have not yet been completely rehabilitated, has only been in contact with:</p> <ul style="list-style-type: none"> • land that has been rehabilitated to a stable landform and either revegetated in accordance with the approved MCP • land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater.
MM Act	<i>Mining Management Act 2001</i>
PAF	Potentially acid forming mine waste. Waste is classified as PAF where the net acid producing potential (NAPP) is positive (excess acidity) and the net acid generation pH (NAGpH) is below 4.5
spillway	A weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the water storage structure (i.e. dam, sediment basin, tank etc.), normally under flood conditions or in anticipation of flood conditions.
SSGV	A site-specific guideline value that is relevant to the specific location or conditions that are the focus of a given assessment or issue.
stormwater	Water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
waste	A solid, a liquid or a gas; or a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
water	Surface water, groundwater and tidal waters; and coastal waters of the Territory, within the meaning of the <i>Coastal Waters (Northern Territory Powers) Act 1980</i> (Cth); and water containing an impurity.

Appendix 1 – Draft Environmental Approval

Draft Environmental Approval

PURSUANT TO SECTION 65 OF THE ENVIRONMENT PROTECTION ACT 2019

Approval number	EP2020/001 - 001
Approval holder	Core Lithium Ltd
Australian Company Number (ACN)	146 287 809
Registered business address	Level 1, 366 King William Street Adelaide, South Australia 5000
Approval holder reference number	CORE-0001

Action

Development of an underground lithium mine at the BP33 resource on Mineral Leases 32346, 32074 and Mineral Lease Northern 16, on the Cox Peninsula approximately 33 km west of Berry Springs including:

- Clearing of 88 ha of native vegetation for the mine site
- Clearing of 0.4 ha of native vegetation for the **water** pipeline
- Clearing for 12.5 ha of native vegetation for the haul route
- Total resource recovery of 2.1 million tonnes
- Total **mine life** duration of 55 months.

Under section 65 of the EP Act approval is granted for the action to be undertaken in the manner described, including with implementation of the environmental management measures, commitments and safeguards documented, in the **Referral** and **SER**. If there is an inconsistency between the **Referral** or the **SER**, and this environmental approval, the requirements of this environmental approval prevail.

This approval does not authorise the approval holder to undertake an activity that would otherwise be an offence under section 16 of the *Water Act 1992*.

Address of action	2873 Cox Peninsula Road, Cox Peninsula Section 1 Hundred of Parsons & Section 2746 Hundred of Hughes
NT EPA Assessment Report number	94

Decision maker

NOT FOR SIGNING

Hon Eva Dina Lawler MLA,
Minister for Environment

Date of approval

Environmental approval conditions

1 Limitations and extent of action

- 1-1 When implementing the action, the approval holder must ensure the action does not exceed the following extent:

Action element	Location	Limitation or maximum extent
Clearing for mine site	Figure 1	No more than 88 ha of the approved extent
Clearing for water pipeline	Figure 2	No more than 0.4 ha of the approved extent
Clearing for haul route	Figure 2	No more than 12.5 ha of the approved extent

2 Action implementation and closure

- 2-1 The approval holder must implement the action to meet the following environmental outcomes:

- (1) The action must be rehabilitated and closed in such a manner that the approval holder can demonstrate that it:
 - (a) is physically safe to humans and animals; and
 - (b) is geo-technically stable; and
 - (c) is non-polluting, non-contaminating; and
 - (d) does not cause material environmental harm or significant environmental harm; and
 - (e) is able to sustain the post-mining land use in the approved Mine Closure Plan required by condition 3.

3 Mine Closure Plan

- 3-1 To demonstrate that the outcomes required by condition 2-1 are achieved, the approval holder must prepare a Mine Closure Plan, before **substantial disturbance**, that is consistent with contemporary best practice guidance on mine closure.

4 Inland waters

- 4-1 The approval holder must implement the action to meet the following environmental objective and outcome:

- (1) Protect the quality and hydrological regimes of groundwater and surface **water** so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
- (2) Discharge of any mine-affected water from the action must not cause water quality at the **downstream compliance point(s)** to exceed the guideline values.

4-2 For the purpose of condition 4-1(2) the guideline values are the **ANZG** default guideline values for slightly to moderately disturbed systems (95% species protection level). Where natural background levels exceed **ANZG** default guideline values, or default guideline values have not been set by **ANZG**, site-specific guideline values must be derived in accordance with **ANZG**.

4-3 The site-specific guideline values required by condition 4-2 must be:

- (1) derived from **baseline data** prior to **substantial disturbance**; and
- (2) re-derived at the end of the wet season in any year that discharge of **mine affected water** to waterways occurs, from the collected baseline and operational water quality dataset.

Site-specific guideline values must be derived for the physical and chemical indicators appropriate to the mineralogical properties of mined material and the range of declared beneficial uses, in accordance with **ANZG**.

4-4 The draft Water Management Plan (Appendix C to the **SER**) must:

- (1) be revised by a qualified person and submitted to the **CEO** for review and approval at least three months before **substantial disturbance**, and within every 12 months thereafter for the **life of the action** unless otherwise directed by the **CEO** in writing, to ensure it is consistent with achievement of the environmental outcomes in conditions 4-3(1) and 4-1(2).

4-5 The revised Water Management Plan required by condition 4-4(1) must:

- (1) provide for the management of potential impacts of the action on waterways, waterbodies and aquifers; and
- (2) include detailed **baseline data**, collected from a baseline study conducted in accordance with **ANZG** on:
 - (a) surface **water** flows and quality in waterways and/or waterbodies that could be affected by the action; and
 - (b) groundwater levels, yield and quality in aquifers that could be affected by the action.
- (3) define the aspects to be monitored and measured including;
 - (a) determine the locations and methods for monitoring, measurement, analysis and evaluation to ensure valid results, including the **downstream compliance point(s)**; and
 - (b) define when monitoring must be performed, when the results from monitoring must be analysed and evaluated, how monitoring results will be communicated and reported and to whom; and
- (4) include quantitative triggers and limits which would be used to initiate investigative and/or **adaptive management** actions when surface water and/or groundwater monitoring results exceed guideline values or deviate from the predictions outlined in the **Referral** and the **SER** and appended documents; and
- (5) detail how monitoring exceedances and the outcomes of investigative and/or adaptive management actions would be notified to the **CEO**.
- (6) be implemented for the **life of the action**.

- 4-6 The approval holder must continue to implement the last approved version of the Water Management Plan required by condition 4-4 until the **CEO** provides written confirmation that a revised version is approved.
- 4-7 At the end of the **mine life**, the approval holder must demonstrate that there has been no measurable adverse change in **water** quality compared to the pre-mining baseline condition at the **downstream compliance point(s)** established under condition 4-1(2).

5 **Soil erosion and sediment control**

- 5-1 An Erosion and Sediment Control Plan must be developed by a Certified Professional in Erosion and Sediment Control, in accordance with International Erosion Control Association Australasia (IECA) 2008, *Best Practice Erosion and Sediment Control*, revised within every 12 months thereafter (or at more frequent intervals if site conditions significantly change), and implemented for the **life of the action** to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

6 **Groundwater dependent ecosystems**

- 6-1 The approval holder must implement the action to meet the following environmental outcomes:
- (1) identify the presence and extent of, and monitor the impacts of the action on, GDE vegetation within the predicted cone of groundwater drawdown; and
 - (2) avoid the loss of no more than 3.6 ha of identified GDE vegetation in 6-1(1).
- 6-2 A **GDE** Management Plan must:
- (1) be developed by a qualified person and submitted to the **CEO** for review and approval at least three months before **substantial disturbance**, and within every 12 months thereafter for the **life of the action** unless otherwise directed by the **CEO** in writing, to ensure it is consistent with achievement of the environmental outcomes in conditions 6-1(1) and 6-1(2); and
 - (2) provide for the collection of **baseline data** to assess the baseline condition of **GDEs** that could be affected by the action; and
 - (3) provide for monitoring and management of the impacts of the action on water availability for **GDE** vegetation within the area of drawdown; and
 - (4) define how the presence and extent of **GDEs**, and impacts of the action on **GDEs**, would be identified, monitored and measured including:
 - (a) determine the locations and methods for monitoring, measurement, analysis and evaluation to ensure valid results; and
 - (b) define when monitoring must be performed, when the results from monitoring must be analysed and evaluated, how monitoring results will be communicated and reported and to whom; and
 - (5) include quantitative triggers and limits which would be used to initiate investigative and/or adaptive management actions when:
 - (a) groundwater levels deviate significantly from the predictions outlined in the Finnis Lithium Project BP33 Groundwater Modelling Report,

Final Version 3.0, October 2021, prepared by CloudGMS (Appendix B to the **SER**); and/or

- (b) **GDE** vegetation monitoring identifies that the extent of impacts to **GDE** health exceeds 3.6 ha, which is the extent of potential **GDE** that occurs within the modelled extent of the groundwater drawdown cone as a result of the action;
 - (6) detail how monitoring exceedances and the outcomes of investigative and/or adaptive management actions would be notified to the **CEO**.
 - (7) be implemented for the **life of the action**.
- 6-3 The approval holder must continue to implement the last approved version of the **GDE** Management Plan required by condition 6-2 until the **CEO** provides written confirmation that a revised version is approved.
- 6-4 The approval holder must provide notice in writing to the **CEO** if **GDE** monitoring identifies that the total area of **GDE** loss attributable to the action exceeds 3.6 ha, within seven days of the identification of the exceedance.
- 7 Commencement of action**
- 7-1 This approval expires five years after the date on which it is granted, unless **substantial disturbance** has occurred on or before that date.
- 7-2 Within 10 business days of the commencement of the **substantial disturbance** the approval holder must provide notification in writing to the **CEO**.
- 8 Change of contact details**
- 8-1 The approval holder must provide notification in writing to the **CEO** of any change of its name, physical address or postal address for the serving of notices or other correspondence within 10 business days of such change.
- 9 Submission of documents**
- 9-1 All notices, reports, documents or other correspondence required to be provided to the **CEO** as a condition of this approval, unless otherwise specified as a condition of this approval, must be provided in electronic form by emailing environmentalregulation@nt.gov.au.
- 10 Compliance reporting**
- 10-1 The approval holder must:
- (1) within six months of **substantial disturbance**, obtain from an **independent qualified person**, a report on compliance with the conditions of this environmental approval; and
 - (2) obtain further such reports at regular intervals not exceeding 12 months from the report referred to in condition 10-1(1); and
 - (3) submit each report to the **CEO** within 90 days of its completion.
- 10-2 The reports required by conditions 10-1(1) and 10-1(2) must:
- (1) be endorsed by the approval holder's Chief Executive Officer or a person delegated to sign on the approval holder's Chief Executive Officer's behalf;

- (2) include a statement as to whether the approval holder has complied with the conditions of this approval; and
- (3) identify all non-compliances and describe corrective and preventative actions taken.

11 Environmental Performance Report

- 11-1 The approval holder must submit an Environmental Performance Report to the **CEO** on completion of the **mine life**.
- 11-2 The report required by condition 11-1 must be prepared by an **independent qualified person**.
- 11-3 The Environmental Performance Report must report on impacts of the action on the state of the following environmental values:
 - (1) terrestrial environmental quality; and
 - (2) terrestrial ecosystems; and
 - (3) inland waters including surface water and groundwater hydrological processes and quality; and
 - (4) community and economy including social impacts, and community and stakeholder engagement; and
 - (5) the whole of environment within the area of influence of the action.
- 11-4 The Environmental Performance Report must include:
 - (1) a comparison of the environmental values identified in condition 11-3 at the end of the **mine life** against the state of each environmental value prior to **substantial disturbance**; and
 - (2) a comparison of the predicted impacts of the action as identified in the **Referral** and **SER**, and the actual impacts of the action as verified by environmental monitoring data; and
 - (3) an assessment of the cumulative impacts of the action and other actions for which the approval holder is responsible.

12 Provision of environmental data

- 12-1 All environmental monitoring data required to be collected or obtained under this environmental approval must be retained by the approval holder for a period of not less than 10 years commencing from the date that the data is collected or obtained.
- 12-2 The approval holder must, as and when directed by the **CEO**, provide any validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (such as maps)) relevant to the assessment of the action and implementation of this environmental approval, to the **CEO** in the form and manner, and at the intervals specified, in the direction.

Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and *Environment Protection Regulations 2020*.

approved extent	The extent identified in Figures 1 and 2 of this approval which includes equipment, plant and structures, whether stationary or portable, and the land on which the action is situated.
adaptive management	A systematic approach to improving environmental results and management practices during action implementation through the application of learning from monitoring of outcomes and management actions.
ANZG	ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines .
baseline data	Environmental monitoring data collected (from studies undertaken) prior to substantial disturbance , that is used to characterise baseline conditions.
CEO	The Chief Executive Officer of the Department of Environment, Parks and Water Security [or another name for that department, which may vary from time to time], or their delegate.
closure certificate	Certificate of closure under section 213 of the EP Act .
downstream compliance point(s)	The downstream compliance point(s) for water quality monitoring associated with mine-affected water discharge approved by the CEO or their delegate (post-approval and prior to substantial disturbance). Identification of the downstream compliance point(s) must include the monitoring point name, location description, latitude and longitude (GDA94, decimal degree)).
ecologically sustainable	Meeting the principles of ecologically sustainable development as defined in Part 2 Division 1 of the EP Act , to ensure that development improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.
EP Act	<i>Environment Protection Act 2019</i> .
GDE	Groundwater Dependent Ecosystem.
life of the action	The period of time from substantial disturbance until the issue of a closure certificate under section 213 of the EP Act , or revocation of the environmental approval by the Minister at the request of the approval holder under section 114 of the EP Act .
mine life	The period of time nominated by the approval holder in the SER to carry out construction, operation and rehabilitation of the action, including 6 months construction, 44 months operation and 5 months rehabilitation (55 months total).
mine affected water	Includes the following types of water: <ul style="list-style-type: none"> • pit water, dam water, processing water; • water contaminated by a mining activity • rainfall runoff which has been in contact with any areas disturbed by the action which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and

	<p>requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;</p> <ul style="list-style-type: none"> • groundwater which has been in contact with any areas disturbed by the action which have not yet been rehabilitated; • groundwater from the mine dewatering activities; • a mix of mine affected water and other water. <p>Does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by the action that have not yet been completely rehabilitated, has only been in contact with:</p> <ul style="list-style-type: none"> • land that has been rehabilitated to a stable landform and either revegetated in accordance with the approved Mine Closure Plan <p>land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater.</p>
NT EPA	Northern Territory Environment Protection Authority.
independent qualified person	<p>A qualified person as defined under section 4 of the EP Act; and who also meets the following requirements:</p> <ol style="list-style-type: none"> a) was not involved in the preparation of the approval holder's Referral or SER; b) is independent of the personnel involved in the design, construction and operation of the action c) has obtained written approval from the CEO to be the qualified person to satisfy the independent qualified person reporting requirements under this approval.
Referral	<p>The approval holder's Referral to the NT EPA under section 48 of the EP Act:</p> <p>Finniss Lithium Project BP33 Underground Mine Environment Protection Act (EP Act) Referral Supporting Information Document, Revision 2, dated 1 July 2020 (including appendices A to E).</p>
substantial disturbance	Means substantial disturbance of a mining site as defined under section 35(3) of the <i>Mining Management Act 2001</i> .
SER	<p>The approval holder's Supplementary Environmental Report prepared under regulation 119 of the Environment Protection Regulations 2020:</p> <p>Finniss Lithium Project BP33 Underground Mine Supplementary Environmental Report, Revision 2, dated 15 November 2021 (including appendices A to L)</p>
water	Surface water, groundwater and tidal waters; and coastal waters of the Territory, within the meaning of the <i>Coastal Waters (Northern Territory Powers) Act 1980 (Cth)</i> ; and water containing an impurity.
wet season	For the purpose of this environmental approval, the wet season is defined as the period from 1 October to 30 April for any calendar year.

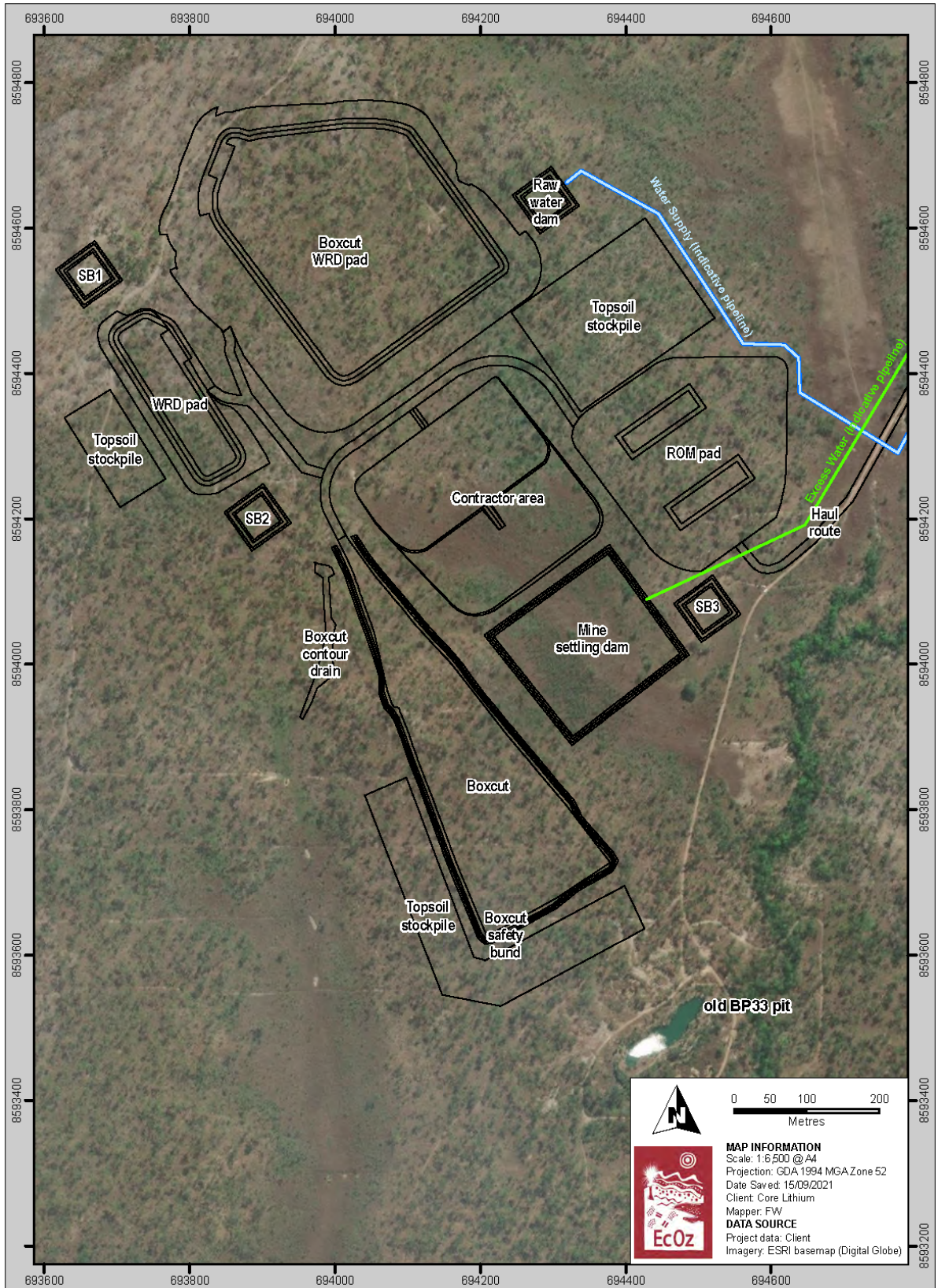
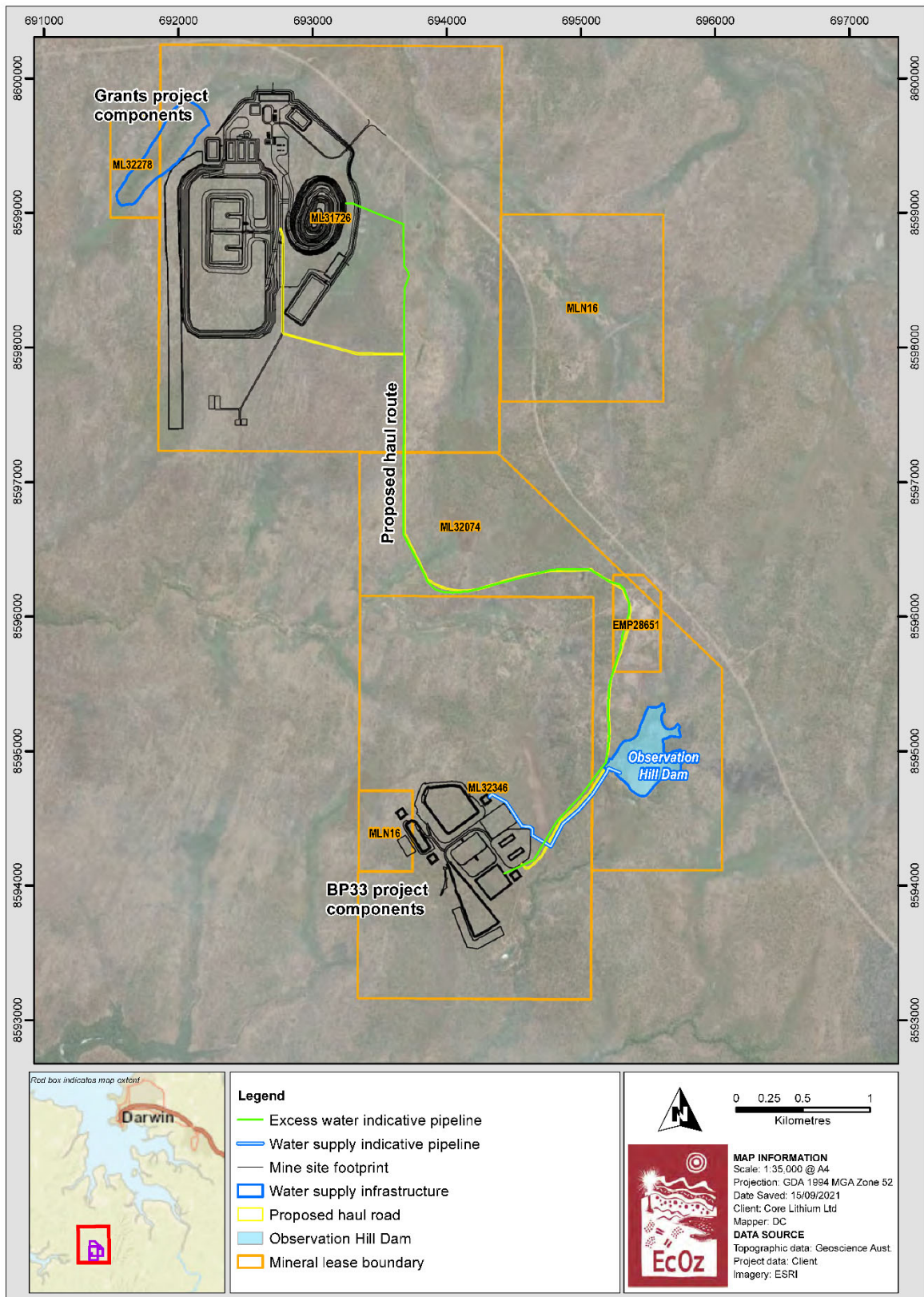


Figure 1 Location and extent of mine site



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ0208 - BP33 Supplementary Environmental Report\01 Project Files\Report map\Figure 1-1. Map of Finniss Lithium Project location and components.mxd

Figure 2 Location and extent of haul road and water pipeline

(Haul route is shown in green and water pipeline is shown in blue).

All co-ordinates are in metres, listed in Map Grid of Australia Zone 52 (MGA Zone 52), datum of Geocentric Datum of Australia 1994 (GDA94).

Spatial data depicting Figures 1 and 2 (Location and extent of action) are held by the Department of Environment and Water Security as follows:

NTEPA2020/0048-021~0017 BP33 Spatial Data.

Appendix 2 – Matters taken into account during the assessment

Matters taken into account during the assessment	Consideration
<i>Objects of the EP Act</i>	
To protect the environment of the Territory	The proponent's referral, SER, and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposal.
To promote ecologically sustainable development so that the wellbeing of the people of the Territory is maintained or improved without adverse impact on the environment of the Territory	The NT EPA's consideration of the principles of ecologically sustainable development in relation to the proposal is addressed below.
To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA recognises the importance of the environmental impact assessment and approval processes in the protection and management of the environment of the Territory. The NT EPA has assessed the potential environmental impacts of the proposal to inform an environmental approval decision by the Minister that, in the NT EPA's view, promotes the protection and management of the Territory.
To provide for broad community involvement during the process of environmental impact assessment and environmental approval	<p>The NT EPA's public consultation undertaken during its assessment of the proposal provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposal have been taken into account in the preparation of the recommended conditions for an environmental approval.</p> <p>The proponent also undertook its own community and stakeholder consultation as detailed in the Engagement Report (Appendix D to the SER) and Social Impact Assessment (Appendix J to the SER).</p>
To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people	The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making. The public consultation process provided an opportunity for interested persons to make a submission in relation to the proposal.

Matters taken into account during the assessment	Consideration
and communities in environmental decision-making processes.	The proponent has consulted with and committed to work with Aboriginal organisations to maximise Aboriginal employment and training opportunities. The proponent committed to ongoing liaison with Belyuen Council and Aboriginal organisations to ensure any site access needs can be accommodated.
<i>Principles of ecologically sustainable development</i>	
<p>Decision-making principle</p> <p>(1) Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.</p> <p>(2) Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.</p>	<p>The NT EPA has considered the decision-making principle in its assessment and has had particular regard to this principle in its assessment of the community and economy factor.</p> <p>The NT EPA notes the interconnectedness between environmental factors and recognises that the mitigation measures to avoid and minimise impacts on community and economy may also reduce the significance of impacts on other environmental factors.</p> <p>The NT EPA acknowledges that design requirements are a combination of the application of the environmental decision-making hierarchy under section 26 of the EP Act, the waste management hierarchy under section 27 of the EP Act, and the principles of ESD.</p> <p>The NT EPA has recommended conditions for environment protection outcomes to be achieved through design, construction, operation, closure and rehabilitation phases of the proposal.</p> <p>The NT EPA considers that its environmental impact assessment and recommended conditions for an environmental approval have identified and mitigated both short-term and long-term environmental impacts, and that this has not resulted in any compromise between short and long-term environmental and equitable considerations.</p> <p>The community has been provided the opportunity for involvement in the environmental impact assessment process during public consultation, and the submissions received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval.</p>
<p>Precautionary principle</p> <p>(1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on the five key environmental factors.</p> <p>The proponent has identified appropriate measures to avoid or minimise impacts on the environment.</p> <p>The NT EPA has considered these measures during its assessment, and has recommended conditions for environment protection outcomes to be achieved. From its assessment of this</p>

Matters taken into account during the assessment	Consideration
<p>(2) Decision-making should be guided by:</p> <p>(a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and</p> <p>(b) an assessment of the risk-weighted consequences of various options.</p>	<p>proposal the NT EPA has concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments, are implemented.</p> <p>The proposal may result in some irreversible impacts associated with loss of vegetation from clearing and potential groundwater dependent ecosystem loss, however those impacts are not considered significant.</p>
<p>Principle of evidence-based decision-making</p> <p>Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.</p>	<p>The NT EPA has considered the available evidence during the course of its assessment of the proposal, and this scientific and other evidence provides the basis for its decision making and recommended conditions. The evidence made available to the NT EPA during the course of the assessment was adequate to inform the NT EPA's recommendation to the Minister. Where the NT EPA considered that further evidence is required to inform the management of potentially significant impacts on the environment, the NT EPA has recommended conditions requiring the proponent to demonstrate how impacts would be effectively avoided and/or mitigated.</p>
<p>Principle of intergenerational and intragenerational equity</p> <p>The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.</p>	<p>The NT EPA acknowledges that it is important to protect the sensitive environmental and water resource values of the Charlotte River and Bynoe Harbour for the benefit of future generations. It considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values and not constrain the ability of future generations to continue to access those water resources for a range of beneficial uses.</p> <p>Rehabilitation and closure of the proposal to sustain a future land use would ensure that environmental quality is maintained into the future.</p> <p>The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment. From the assessment of this proposal the NT EPA has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.</p>
<p>Principle of sustainable use</p> <p>Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.</p>	<p>The NT EPA acknowledges the importance of sustainable use of resources and has considered this principle during the environmental impact assessment process. It considers that this principle is closely linked to the principles of intergenerational and intragenerational equity, and conservation of biological diversity and ecological integrity.</p>

Matters taken into account during the assessment	Consideration
<p>Principle of conservation of biological diversity and ecological integrity</p> <p>Biological diversity and ecological integrity should be conserved and maintained.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on the environmental values of the receiving environment. In considering this principle, the NT EPA notes that inland water environmental quality could be significantly impacted by the proposal if appropriate measures were not implemented to avoid and mitigate impacts. The assessment of these impacts is provided in this report.</p> <p>Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and the conditions recommended by the NT EPA to ensure that environmental protection outcomes are achieved.</p> <p>From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.</p>
<p>Principle of improved valuation, pricing and incentive mechanisms</p> <p>(1) Environmental factors should be included in the valuation of assets and services.</p> <p>(2) Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement.</p> <p>(3) Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.</p> <p>(4) Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal. The NT EPA notes that the proponent would bear the costs relating to avoidance and abatement of pollution and prevention of environmental harm.</p>

Matters taken into account during the assessment	Consideration
<i>Environmental decision-making hierarchy</i>	
<p>(1) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> (a) ensure that actions are designed to avoid adverse impacts on the environment; (b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable; (c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated. 	<p>In its assessment of the proposal, the NT EPA considered the extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposal and the proposed measures to avoid and then mitigate significant impacts. Where the NT EPA was not satisfied that this hierarchy had been applied, it has recommended conditions requiring that the proponent take reasonable measures to avoid and/or mitigate impacts.</p> <p>With regard to waste and pollution that could be generated by the proposal, the NT EPA has focussed on strategies to avoid the generation and disposal of waste and pollution, in particular for discharges to receiving waters.</p> <p>The NT EPA did not identify any residual impacts that would require offsetting.</p>
<p>(2) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.</p>	<p>The proposal is located in an area that has previous minor disturbance from mining, extraction and exploration activities, with existing low levels of contamination. Proposed rehabilitation and closure of the site may improve the environmental quality of the site if undertaken successfully.</p> <p>The NT EPA has recommended conditions requiring rehabilitation and closure of the site to ensure that environmental quality is enhanced or restored to meet the NT EPA's objectives.</p>
<i>Waste management hierarchy</i>	

Matters taken into account during the assessment	Consideration
<p>(1) In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</p> <p>(2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> (a) avoidance of the production of waste; (b) minimisation of the production of waste; (c) re-use of waste; (d) recycling of waste; (e) recovery of energy and other resources from waste; (f) treatment of waste to reduce potentially adverse impacts; (g) disposal of waste in an environmentally sound manner. 	<p>The NT EPA has considered the waste management hierarchy in its assessment and has had particular regard to this principle in its assessment of inland water environmental quality and terrestrial environmental quality. The proponent is required to comply with the waste management hierarchy and the environmental decision-making hierarchy.</p>
<i>Ecosystem-based management</i>	
<p>Management that recognises all interactions in an ecosystem, including ecological and human interactions.</p>	<p>The NT EPA acknowledges the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. With consideration of the link between inland waters (surface water and groundwater inputs), hydrological processes, terrestrial environmental quality, terrestrial ecosystems and community and economy the NT EPA also considered the connections and interactions between parts of the environment to inform a holistic view of impacts on the whole environment.</p> <p>The NT EPA formed the view that the impacts from this proposal can be managed to meet the NT EPA's environmental factors and objectives.</p>
<i>The impacts of a changing climate</i>	

Matters taken into account during the assessment	Consideration
The effects of a changing climate on the proposal and resilience of the proposal to a changing climate	The NT EPA considered the life of the proposal in the context of resilience to climate change, and how climate change may impact the proposal. The NT EPA had regard to measures and controls relating to extreme weather events such as flooding and high intensity rain events. The NT EPA considered that specific conditions did not need to be recommended to address this requirement. The NT EPA had regard to this matter during its assessment of the proposal.

Appendix 3 – Environmental impact assessment timeline

Date	Assessment stages
2 July 2020	Referral information received.
9 July 2020	Referral information accepted.
10 July to 10 August 2020	Referral consultation submission period.
14 September 2020	NT EPA decided environmental impact assessment required - assessment by supplementary environmental report (SER).
16 October 2020	Proponent directed to provide additional information in the SER.
9 November 2021	Proponent submitted SER.
16 November to 20 December 2021	SER consultation submission period.
1 March to 21 March 2022	Consultation with proponent and statutory decision makers.
8 April 2022	Assessment report and draft environmental approval provided to the Minister.
26 May 2022	Minister's decision on environmental approval due (if Minister does not make a decision within 30 business days after receiving the assessment report the Minister is taken to have accepted the NT EPA's recommendation for approval).