



Environmental Referral Report

→ GEMCO Excess Water Disposal Project



06 March 2025

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Executive Summary

Groote Eylandt Mining Company Proprietary Limited (GEMCO) ('the Proponent') proposes the development of the Excess Water Disposal project (the Proposal). Proposals that have the potential to have a significant impact on the environment require referral to the Northern Territory Environment Protection Authority (NT EPA) in accordance with the *Environment Protection Act 2019* (NT) (EP Act) and the Environment Protection Regulations 2020 (NT) (EP Regulations). GEMCO is seeking approval for the Proposal under the EP Act.

The Proposal is being referred to the NT EPA to determine whether formal assessment is required pursuant to the EP Act.

A self-assessment conducted under the '*Significant impact guidelines 1.1 – Matters of national environmental significance*' determined that no triggers for referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) exist. The self-assessment was validated by a third-party consultant during a peer review which supported this decision. As such, GEMCO is not referring the Proposal under the EPBC Act.

Proposal location

GEMCO's mining operation is located on Groote Eylandt in the Gulf of Carpentaria, approximately 650 km south-east of Darwin and 50 km off the coast of Arnhem Land.

Groote Eylandt is part of an archipelago of islands known as the Groote Eylandt Archipelago, which is Aboriginal land under the federal *Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) (ALRA). The township of Angurugu is directly adjacent to the mine. The township of Alyangula and the Port are located approximately 14 km to the north of the mine's processing facilities and main infrastructure. The Malkala community is located along the Rowell Highway approximately halfway between the mine and Alyangula.

The Proposal area is on the western side of Groote Eylandt at/adjacent to the Milner Bay Port Facility (the Port), the Rowell Highway and GEMCO's Western Leases. The scope of the project includes onshore works (pipeline, pumps and break tank) and tidal/marine works (pipeline and sump) to redirect and release excess water from the existing GEMCO mine operations

The Proposal area is situated in largely disturbed habitats adjacent to the Rowell Highway and the Port, where historical activities have resulted in ground disturbance. The Proposal area extends into the marine environment approximately 320 m south of the Port's ship loader jetty.

The Rowell Highway (Portion 1305) between the northern boundary of the GEMCO Western Lease area and the Port is Crown land owned by the NT Government and is mineral lease MLN 956. Land outside the Rowell Highway boundary (off lease) is Aboriginal freehold land.

The Port (Portions 1306 and 1031) is land provided to GEMCO under Special Purpose Lease 383 (SPL 383) for a specific purpose including stockpiling of ore. The proposed ocean outfall for the Proposal will be located within the tidal waters of Groote Eylandt.

Environmental factors

The self-assessment using the NT EPA screening tool determined that the Proposal has potential to significantly impact three (3) of the 14 environmental factors. These are listed in the Table 1 below.

Table 1 Environmental factors included in the assessment

Theme	Environmental factor	Environmental values
Land	Terrestrial ecosystems	Listed fauna species
Sea	Marine environmental quality	Quality of water
	Marine ecosystems	Listed marine reptiles Listed sharks and rays Migratory marine mammals

Environmental protection and management

Table 2 provides a summary of how the Proposal aligns with the purpose of the NT environmental impact assessment process and meets the general duty of proponents as per EP Act section 42 and 43.

Table 2 Principles of ecological sustainable development as applied to the Proposal

Section 42 EIA Purpose & Section 43 General Duty	Comment
Section 42 – How does the Proposal align with the purpose of the NT environmental impact assessment process?	
Principles of ecologically sustainable development	The Proposal has considered both short- and long-term impacts and benefits – including impacts during construction and operation of the Proposal. The Proposal lifecycle includes both managing construction and operation of the excess water pipeline with sustainability principles in mind.
Environmental decision-making hierarchy	In assessing each impact, the environmental decision-making hierarchy has been applied including siting and design of infrastructure to avoid potential impacts, as well as mitigating potential impacts through the construction and operational phases through risk-based decision making and safe-guards.
Waste management hierarchy	The Proposal will manage waste management in accordance with GEMCO's MMP and the waste management hierarchy. Waste management is considered within the Greenhouse Gas Assessment Report for contributions to emissions throughout the Proposal's life cycle.
Impacts of a changing climate	The Proposal has considered a changing climate within the Hydrology and Hydraulic Modelling Report (Red Earth Engineering, 2024) as well as assessing the Proposal's impact on global warming potential as a result of greenhouse gas emissions.
Less environmentally damaging alternative approaches, methodologies or technologies for actions	The Proposal was developed as a more environmentally sustainable alternative to the currently approved practice of bush discharge for excess water disposal allowing higher volumes of water and more saline water to be discharged to sea.
Community opportunity to participate and have views considered	The community is provided opportunities to provide feedback on the Proposal and other activities associated with the GEMCO operations in an ongoing nature. Dedicated engagement throughout the development of the Proposal has occurred.
Actions to enhance or restore environmental quality	The construction footprint is expected to be rehabilitated with the aim to restore the area as close to pre-disturbance conditions as practicable. Similarly, the pipeline footprint is expected to be rehabilitated during GEMCO mine closure.
Section 43 – Have the following principles of ecologically sustainable development been taken into consideration in the design of the proposed action?	
Decision making principle	Yes – the Proposal has considered both short- and long-term impacts and benefits – including impacts during construction and operation of the Proposal. Significant planning was undertaken as part of the Pre-feasibility Study (PFS) to identify potential options for excess water discharge (refer Section 2.3). A multi-criteria analysis was undertaken to identify an option that has: – Avoidance of potential environmental impacts (Figure 4). – Avoidance of known heritage features (Figure 4) and acceptance by the Traditional Owners. – Approval pathways based on inferred significance of impact. – Operational effectiveness to achieve dewatering outcome. The option selected (this Proposal) offers the best environmental and heritage outcomes compared to alternatives (as described in Section 2.3). Further to this, the Proposal allows for flexibility and continuous improvement through the ability to modify discharge flow rate, operating times and mine-side source locations as the mining operation continues through the Proposal's operational phase.

Section 42 EIA Purpose & Section 43 General Duty	Comment
Precautionary principle	Yes – the Proposal has considered the potential for threats of serious or irreversible environmental damage from the excess water discharge pipeline development by undertaking comprehensive technical studies and field surveys completed by suitability qualified professionals within the Proposal study area. Modelling of the discharge plume within the marine environment through varying scenarios has also been completed to reduce the uncertainty of the potential environmental impacts of the Proposal as much as possible.
Principle of evidence-based decision making	Yes - this is based on the best scientific knowledge available, including targeted field studies undertaken for the Proposal.
Principle of intergenerational and intergenerational equity	Yes – planning and predictions of the possible intergenerational equity impacts have been undertaken through stakeholder engagement, the pipeline will be operational throughout the operation and closure of the mine with pumping to cease following mine closure and site relinquishment. Ongoing monitoring will be conducted during the Proposal's operational period to ensure ecological health, diversity and sustainability is maintained.
Principle of sustainable use	Yes – the Proposal lifecycle includes managing construction and operation of the excess water pipeline with sustainability principles in mind.
Principle of conservation of biological diversity and ecological integrity	Yes – the majority of the construction footprint is located within previously disturbed areas which minimises further loss of native vegetation. The Proposal and supporting technical reports document how it will avoid and mitigate potential impacts on biodiversity and ecological integrity to reduce the risk of significant impacts.
Principle of improved valuation, pricing and incentive mechanisms	Yes – the Proposal would be incorporated in the reporting, valuation and pricing mechanisms implemented by GEMCO for the mine site. Greenhouse gas generation during construction and operations has been calculated for the Proposal to inform contributions.
Additional section 43 considerations	
Have communities that may be affected by the proposed action been provided with information and opportunities for consultation?	Yes – GEMCO collaborated with the ALC to identify affected stakeholders and deliver engagement activities that provided information about the Proposal and captured stakeholder feedback.
Has consultation with affected communities, including Aboriginal communities' been undertaken in a culturally appropriate manner?	Yes – Informed by on-site experience and guided by the ALC, GEMCO employs an engagement approach tailored to the needs of the local community. This includes utilising team members with cultural awareness for engagement activities, developing accessible information tools, and adhering to ALC guidance on the appropriate format and timing for events.
Has community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action been sought and documented?	Yes – The engagement activities captured knowledge from Senior Clan members about the values and uses of the areas affected by the Proposal. These were documented and are summarised in section 4.
Have Aboriginal values and the rights and interests of Aboriginal communities' been addressed in relation to areas that may be impacted by the proposed action?	Yes – GEMCO developed an understanding of the values, rights and interests of Aboriginal people connected to the proposed sites. GEMCO will commence an engagement process that includes negotiations of access agreements with the Traditional Owners for off-lease portions of the Proposal, clearing permits, and other permits. based on the principles of Free, Prior and Informed Consent (FPIC) that recognises the critical decision-making role of Traditional Owners.

The Proposal was developed as a mechanism to minimise potential impacts to terrestrial environments through the current approved practice of excess water disposal in the bush environment (disposal to land). The Proposal has accounted for environmental protection principles through avoidance and proposed mitigation measures. The placement of the Proposal has sought to avoid or minimise the potential for impact as far as reasonably practical. Table 3 details impact avoidance and mitigation measures committed to by GEMCO, with a focus on the marine and terrestrial ecosystem.

Table 3 *Impact avoidance and mitigation measures*

Environmental factor	Impact avoidance	Impact mitigation
Terrestrial ecosystems	– Avoidance of direct habitat removal through reduction in construction footprint throughout design. – Avoidance of clearing potentially sensitive or significant vegetation. – Avoidance of prolonged impacts from lighting. – Conformance with the GEMCO procedures regarding quarantine (biosecurity)	– Appropriate management of invasive flora (weeds), waste, dust and emissions, erosion and sedimentation, and hazardous materials. – Vegetation clearing will be no wider/extensive than is necessary. – Pre-clearance surveys will be conducted over the extent of clearing disturbance. – Any material(s) or machinery brought to the island to support the construction or maintenance of the proposed pipeline must be clean and free of biological material, and carefully inspected as part of a biosecurity assessment. All machinery will be inspected as part of Groote Eylandt biosecurity procedures prior to transport and upon arrival. – Construction works within 300 m of the marine environment would involve a pre-clearing inspection. – The contractor will clearly demarcate all watercourses and the extent of riparian vegetation. – Construction of 53 crossings along the pipeline alignment; including 17 specifically design for fauna passage.
Marine environmental quality	– Avoidance of environmental values and sensitive or culturally valued areas by utilising lower value environmental habitat that is widely represented in the region. – Utilising an area that is already disturbed/modified and impacted by historical and existing Port operations.	– Mandatory requirements for handling hazardous and/or polluting materials, including storage and transfers in accordance with industry standards, appropriate code of practice and manufacturing directions. – Development and implementation of environmental management plans for the construction and operational phase of the Proposal. – Development and implementation of a Construction Environmental Management Plan (CEMP) to support management of excavation activities, including development of a monitoring program and Erosion and Sediment Control Plan (ESCP) as part of the CEMP. – Controls will be adopted during construction to mitigate the potential for impact on water and sediment quality via seabed disturbance. – Controls will be adopted to mitigate the potential for altered water quality via spill of hazardous chemicals. – Controls will be adopted to mitigate the potential for altered water quality via spill of hydrocarbon from refuelling of vessels or machinery onboard. – Confirmation of the validity of the mixing zones predicted from the <i>Marine Discharge Modelling Report</i> (Appendix A). – Controls will be implemented to prevent routine discharge from altering the receiving environment water quality beyond the identified mixing zone.
Marine ecosystems	– Avoidance of environmental values and sensitive or culturally valued areas by utilising lower value environmental habitat that is widely represented in the region. – Further utilising an area that is already disturbed/modified and impacted by historical and existing Port operations.	– Controls will be adopted for the purposes of decreasing or mitigating the impact of underwater noise. – Controls will be implemented where possible in order to mitigate or eliminate the risk of introducing pests. – Controls will be adopted and executed for all construction methods to mitigate or eliminate the risk of collision between vessels and marine fauna. – To manage impacts to created habitat, the outfall structure will be inspected during scheduled maintenance activities and validation monitoring will be undertaken to validate the outcomes of the Marine Discharge Modelling.

Residual impacts

The residual impacts on the environmental values and sensitivities relevant to all environmental factors were assessed by considering both the direct and indirect effects of the Proposal, as well as the effectiveness of the proposed mitigation measures. The assessment took into account the severity (including scale, duration, and magnitude) of the predicted impacts, alongside the importance and sensitivity of the environmental value components. Based on this assessment, with the implementation of the identified avoidance and mitigation measures, it was determined that there will be no significant residual impacts on all factors assessed.

Further, the project allows the reduction in the current approved practice of discharging stored site water to land; this is considered to be a net environmental benefit and is particularly important as future groundwater ingress to the quarries is predicted to increase.

Key conclusions

The detailed impact assessment presented in this referral has determined that through the implementation of the proposed avoidance and mitigation measures the Proposal is unlikely to have a significant impact on the environment.

The assessment further determined that the NT EPA's environmental objectives for the identified environmental factors can be met.

This report is subject to, and must be read in conjunction with, the assumptions and qualifications contained throughout this Report and its appendices.

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Appendix C	GEMCO Excess Water Disposal Project – Terrestrial Ecology Assessment Report
Appendix D	GEMCO Excess Water Disposal Project – Marine Ecology Assessment Report
Appendix E	GEMCO Excess Water Disposal Project - Air Quality Assessment Report
Appendix F	GEMCO Excess Water Disposal Project - Greenhouse Gas Assessment Report
Appendix G	GEMCO Excess Water Disposal Project - Cultural Heritage Assessment Report
Appendix H	GEMCO Excess Water Disposal Project - Noise and Vibration Impact Assessment Report
Appendix I	PMST search data

Acronyms and abbreviations

Table 4 Acronyms and abbreviations

Term	Meaning
AAPA	Aboriginal Areas Protection Authority
ACNL	Assigned Construction Noise Levels
AEP	Annual Exceedance Probability
AG	Attorney-General's Department
AHD	Australian height datum
AIMS	Australian Institute of Marine Science
AIPA	Australian Industry Participation Authority
ALC	Anindilyakwa Land Council
ALRA	<i>Aboriginal Land Rights (Northern Territory) Act 1976</i> (Cth)
AMSA	Australian Maritime Safety Authority
ANC	Acid Neutralising Capacity
AQIS	Australian Quarantine and Inspection Service
ARI	Average Recurrence Interval
ASS	Acid Sulfate Soils
CBR	California Bearing Ratio
CEMP	Construction Environmental Management Plan
DAFF	Department of Agriculture, Fisheries and Forestry
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEPWS	Department of Environment, Parks, Water and Security
DGV	Default Guideline Value
DIPL	Department of Infrastructure, Planning and Logistics
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DITT	Department of Industry, Tourism and Trade
DML	Deemed Mining Licence
DN	Nominal diameter (internal pipe diameter in mm)
DTFHC	Department of Territory Families, Housing and Communities
EIA	Environmental Impact Assessment
EP Act	<i>Environment Protection Act 2019</i> (NT)
EP Regulations	Environment Protection Regulations 2020
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
ESCP	Erosion and Sediment Control Plan
Fisheries Act	<i>Fisheries Act 1988</i> (NT)
FPIC	Free, Prior and Informed Consent
FS	Feasibility Study Phase
GEESC	Groote Eylandt Executive Steering Committee
GEMCO	Groote Eylandt Mining Company Pty Ltd

Term	Meaning
GL	Gigalitres
ha	hectare
HAT	Highest astronomical tide
HDPE	High-density polyethylene
Heritage Act	<i>Heritage Act 2011</i> (NT)
hr	hour
IAQM	Institute of Air Quality Management
ILUA	Indigenous Land Use Agreement
IPA	Indigenous Protected Area
km/hr	kilometre per hour
km ²	square kilometre
km	kilometre
LAT	Lowest Astronomical Tide
LOR	Limit of reporting
m	metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Multicriteria analysis
ML	Mineral lease
MLC	Mining Liaison Committee
mm	millimetre
MMA Act	<i>Mining Management Act 2001</i> (NT)
MMP	Mining Management Plan
MNES	Matters of National Environmental Significance
Mtpa	Million tonnes per annum
NEPC	National Environment Protection Council
NLC	Northern Land Council
NMFG	Northern Territory Noise Management Framework Guideline
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Agency
NTU	Nephelometric Turbidity Unit
NVIS	National Vegetation Information System
OEMP	Operational Environmental Management Plan
pa	Per annum
PASS	Potential Acid Sulfate Soils
PFS	Pre-Feasibility Study
Planning Act NT	<i>Planning Act 1999</i> (NT)
PMS	Pump Management System
PMST	Protected Matters Search Tool
PTC	Permit to Clear
RAMSAR	Wetlands of International Importance
SER	Supplementary Environment Report

Term	Meaning
SEP	Stakeholder Engagement Plan
SIA	Significant Impact Assessment
SMPEP	Shipboard Marine Pollution Emergency Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
South32	South32 Group Operations Pty Ltd
SPL	Special Purpose Lease
the Port	Milner Bay Port Facility
the Proposal	Excess Water Pipeline
TPWS Act	<i>Territory Parks and Wildlife Conservation Act 1976</i> (NT)
VPO	Vice President Operations
Water Act	<i>Water Act 1992</i> (NT)
WDL	Waste Discharge Licence

1. Introduction

Groote Eylandt Mining Company Proprietary Limited (GEMCO) ('the Proponent') proposes the development of the Excess Water Disposal project (the Proposal). Proposals that have the potential to have a significant impact on the environment require referral to the Northern Territory Environment Protection Authority (NT EPA) in accordance with the *Environment Protection Act 2019* (NT) (EP Act) and the Environment Protection Regulations 2020 (NT) (EP Regulations). GEMCO is seeking approval for the Proposal under the EP Act.

The Proposal is being referred to the NT EPA to determine whether formal assessment is required pursuant to the EP Act. This referral also considers whether the Proposal should be referred for assessment under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This assessment is subject to, and must be read in conjunction with, the assumptions and qualifications contained throughout this report and its appendices.

1.1 Proposal overview

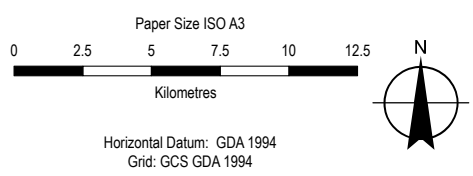
GEMCO operates an open cut, strip-mining operation on Groote Eylandt in the Gulf of Carpentaria, approximately 650 kilometres (km) south-east of Darwin and 50 km off the coast of Arnhem Land in the Northern Territory (NT) (Figure 1). GEMCO's Western Leases are the main development on the island and extend over an area covering approximately 90 km² on the western side of the island. The existing operation mines manganese ore by open-cut methods before processing the ore at an on-site facility. Manganese is then transported by road train to GEMCO's Milner Bay Port Facility (the Port) (Figure 2). The mine has been in operation for over 60 years and operates under a Mining Management Plan, GEMCO – Western Leases (MMP), also referred to as the Deemed Mining Licence (DML) after 1 July 2024.

To access the manganese ore, existing vegetation is cleared, and topsoil and overburden is removed to form mine pits (quarries). As mining intersects aquifers and due to rainfall and runoff in some areas, water naturally collects within the quarries. The water is extracted, and a portion is typically used during operations with surplus water transferred between quarries and released to bushland in accordance with the MMP.

Deeper mining has resulted in greater groundwater intrusion within the quarries while progression of mining towards the coast has resulted in an increase in salinity within water contained in quarries in some areas. The MMP currently permits discharge surplus water into bushland (discharge to land). To address this increase in quantity and salinity a marine outfall project (the Proposal) is proposed to allow an additional discharge volume of up to 80 GL pa of water from the quarries.

GEMCO is currently completing the Feasibility Study (FS) of the Proposal, which includes the design of the pipeline and pumping infrastructure from an existing northern quarry to a marine discharge point near the Port. The pipeline is planned to follow the alignment of the Rowell Highway (Figure 2) and utilise areas of existing or historical disturbance as far as practical. GEMCO has prepared a referral report (this report) under the NT EP Act and EP Regulations.

The Proposal area is detailed in Figure 2.



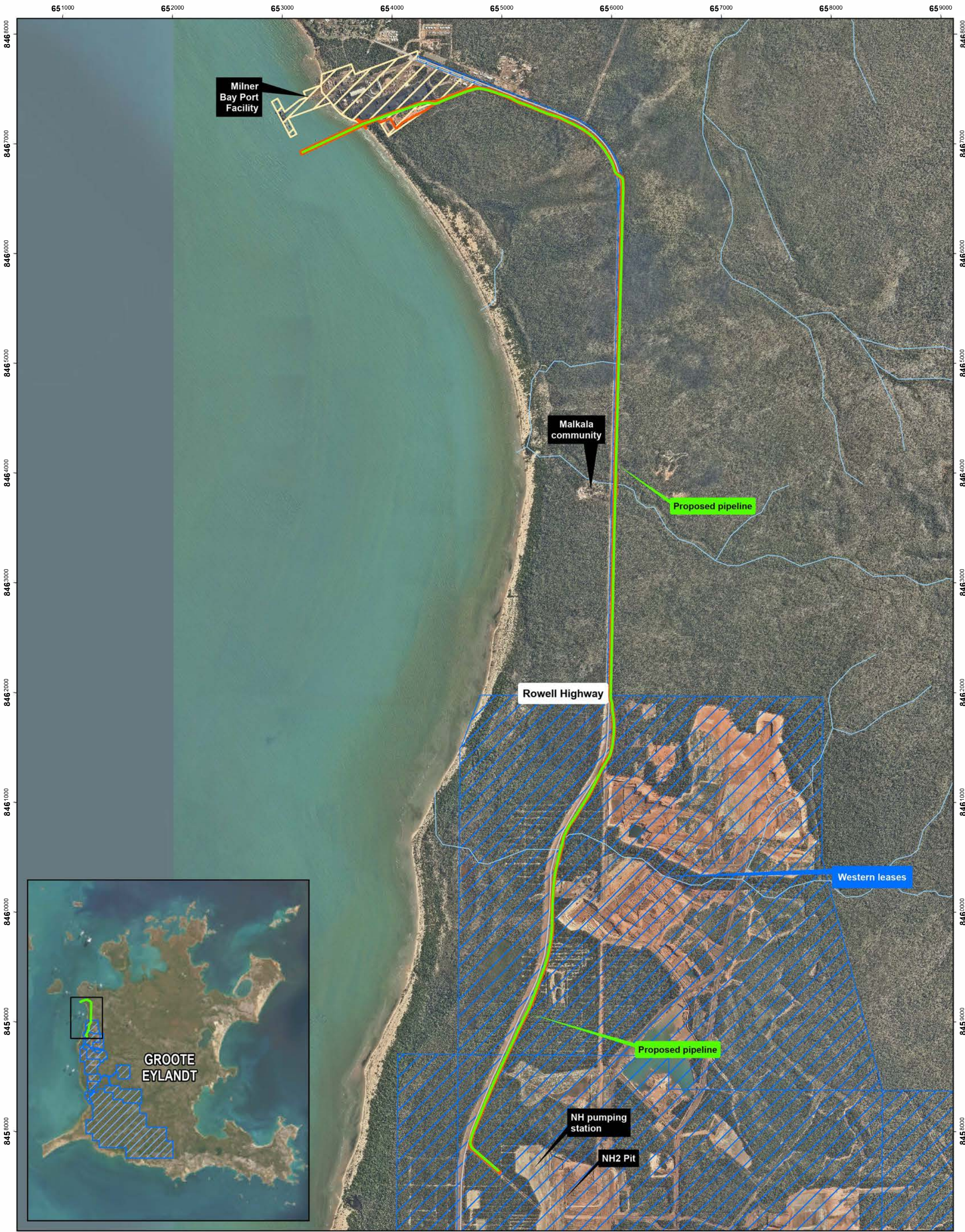
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GEMCO Excess Water Disposal Project
Environmental Referral Report

Project No. 12624084
Revision No. A
Date 24/01/2025

Locality plan

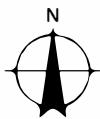
FIGURE 1

Data source: GA: site locations (2024); South32: GEMCO lease boundaries(2024); Imagery_Offline: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.
Created by: mvandermerwe



- Legend**
- Road
 - Stream
 - Proposed pipeline
 - Disturbance area
 - Special purpose lease
 - Lease boundaries

Paper Size ISO A3
0 250 500 750 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Environmental Referral Report

Project No. 12624084
Revision No. A
Date 4/02/2025

Proposal overview

FIGURE 2

Data source: South32. Aerial photos (2023); Pipeline route (2024); GEMCO lease (2024); Pipeline disturbance footprint (2024); South32/GHD. Special purpose lease (2024); GA. road (2024); NT gov. Stream (2024); World Imagery. Earthstar Geographics World Imagery. Maxar. Created by: mvandermerwe

1.2 Proponent details

GEMCO, the Proponent for the Proposal, has been operating on Groote Eylandt since 1964. General details for the Proponent and consultant are provided in Table 5. Further details are provided in the *Referral Form* which is also submitted for the referral.

Table 5 Proponent and consultant details

Proponent details	
Name	Groote Eylandt Mining Company Proprietary Limited
ACN	004 618 491
ABN	26 004 618 491
Registered office	Level 35, 108 St Georges Terrace, Perth WA 6000 Australia
Site address	Rowell Highway, Alyangula NT 0885
Primary contact	Steven Hedges, VPO
Telephone	08 8987 4264
Email	steve.hedges@south32.net
Consultant details	
Name	GHD Pty Ltd
Address	Level 7/24 Mitchell Street, Darwin NT 0800
Primary contact	Brioni Armstrong

1.3 Scope of referral

This referral is for the pipeline and associated infrastructure and the offshore release of excess quarry water into the marine environment. It does not include the activities currently approved to occur on the GEMCO Western Leases and covered by the current MMP.

The activities included in this referral are:

- Construction works and installation of infrastructure within the terrestrial and marine environment.
- Discharge of quarry water into the marine environment.
- Vegetation clearing for the purpose of constructing the Proposal. Based on the current design, an area of approximately 10.44 ha of vegetation clearing is proposed, with the potential for this area to change depending final design and on future mine clearing prior to construction commencing.

The following activities have been excluded from this referral as they have existing approval under the MMP:

- On-site water management upstream of the Proposal's pump and pipeline infrastructure.
- Placement and utilisation of pipelines to move water between quarry pits.
- Operation of pumps to move water between quarry pits.
- Extraction of groundwater in dewatering of quarry pits.
- Discharge of excess water to bushland.
- Approved extent of mine disturbance.

The operation of pumps associated directly with marine discharge has been included for completeness of the assessment, however use of pumps (and associated fuel storage) for the movement of water is an existing approved activity under the MMP.

1.4 Publication statement

This referral was produced by suitably qualified and experienced impact assessment professionals within the GHD Environment Team based in Northern Australia (NT and QLD), in collaboration with a range of technical specialists within GHD's national and global business on behalf of GEMCO (the Proponent). A listing of the key technical consultants, their qualifications and experience in the environmental field are provided in Table 6.

Table 6 GHD key technical consultants

Key technical specialist	Specialist area	Qualifications	Experience
Terrestrial and Marine Ecosystems			
Anna Boden	Marine Ecology & Environmental Impact Assessment	Bachelor of Science (Marine Science and Biology) Master of Applied Science (Environmental Science)	20+ years
Nicholas Priest	Terrestrial Ecology	Bachelor of Arts (Political Science) Bachelor of Science (Environmental Management and Ecology)	10+ years
Environmental Impact Assessment			
Brioni Armstrong	Environmental Impact Assessment	Bachelor of Science (Environmental Science) Postgraduate Diploma (Environment and Sustainability) Postgraduate Diploma (Environmental Health)	12+ years
Natalie Fries	Environmental Impact Assessment	Bachelor of Environmental Science (Land and Water Management) Diploma of Environmental Technology Certified Practicing Project Manager, Australian Institute of Project Management	20+ years
Consultation			
Maddison Clonan	Stakeholder Engagement	Bachelor of Science (Environmental Science) Master of Sustainable Agriculture IAP2 Certificate of Engagement	8+ years

Technical inputs and quality assurance and quality control reviews from relevant technical specialists have been provided throughout the development of this referral. This referral has been developed based on an established and robust technical and quality review process. The process started with technical specialists undertaking research (desktop/field), investigations and engagement specific to relevant Environmental Factors; this information was then collated into corresponding chapters and/or supporting technical appendices. Documentation was then reviewed internally by the relevant Technical Lead or Technical Director, who has sufficient project knowledge, technical experience and authority.

Following this process the information was submitted to South32 and GEMCO project team members for their review and comment. Following this, a third-party peer review of this referral report and key technical appendices was undertaken by Aurecon Australasia Pty Ltd. A list of the key peer reviewers, their qualifications and experience in the environmental field are provided in Table 7.

Review comments received have been addressed to the satisfaction of all stakeholders (GHD Technical Specialists, South32 and GEMCO project team members, and Aurecon peer reviewers) prior to submission of this referral to the NT EPA for assessment.

Table 7 *Aurecon peer reviewers*

Key peer reviewer	Specialist area	Qualifications	Experience
Tania Golingi	Marine and coastal environmental quality impact assessment, Environmental Impact Assessment	Bachelor of Science (Environmental Science) with Hons in Botany	25+ years
Leesa Bignill	Ecology	Bachelor of Environmental Science (Honours) (Environmental Science), Master of Science (Ecology),	18+ years
Jane Mulvena	Ecology	Bachelor of Science (Environmental Science), Bachelor of Science (Marine Science)	14+ years
Gabi Wilhelm	Environmental Impact Assessment	Bachelor of Science (Environmental Science), Bachelor of Law, Graduate Diploma of Legal Practice, Admission to Legal Practice, EMS Auditing Certificate	20+ years
Jack Leverett	Terrestrial environmental quality, cultural heritage	Bachelor of Wildlife Science	10+ years

2. Proposal description

2.1 Regional and local context

GEMCO's mining operation is located on Groote Eylandt in the Gulf of Carpentaria, approximately 650 km south-east of Darwin and 50 km off the coast of Arnhem Land.

Groote Eylandt is part of an archipelago of islands known as the Groote Archipelago Region, which is Aboriginal land under the *Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) (ALRA). The Anindilyakwa Land Council (ALC) is the statutory body responsible for activities within the Groote Archipelago Region on behalf of the Traditional Owners. The Traditional Owners are an amalgamation of two cultures: the Warnindilyakwa and the Nunggubuyu (ALC, 2019). Both cultures speak Anindilyakwa as their first language, and the land, people and culture are also referred to by this term.

The township of Angurugu is directly adjacent to the mine. The township of Alyangula and the Port are located approximately 14 km to the north of the mine's processing facilities and main infrastructure. The Malkala community is located along the Rowell Highway approximately halfway between the mine and Alyangula.

GEMCO's Western Leases is the main development on Groote Eylandt and extends over an area covering approximately 90 km² on the western side of the island. The Proposal area is on the western side of Groote Eylandt at/adjacent to the Port, the Rowell Highway and GEMCO's Western Leases (Figure 2).

The Proposal area and surrounds is characterised by low-lying plains with elevations ranging from sea level to approximately 50 metres (m) Australian height datum (AHD). It comprises natural bushland that is mainly eucalypt dominated open forest, woodland and shrubland. The most common eucalyptus species are Darwin woollybutt and Darwin stringybark, however a wide variety of other plants occur. The Proposal area is situated in largely disturbed habitats adjacent to the Rowell Highway and the Port, where historical works (roadside verge, channel and port works) have resulted in ground disturbance, some with relatively recent regrowth.

Surface water drainage features are present along the Rowell highway and within the Proposal area. The Proposal area also extends into the marine environment approximately 320 m south of the Port's ship loader jetty.

2.2 Land ownership, land tenure and land use

Groote Eylandt is Aboriginal land as granted under ALRA.

The GEMCO Western Leases is Crown land owned by the NT Government. Mining within the Western Leases occurs under mineral leases granted under the *Mineral Titles Act 2010* (NT).

The Rowell Highway (Portion 1305) between the northern boundary of the GEMCO Western Lease area and the Port is Crown land owned by the NT Government and is mineral lease MLN 956. Land outside the Rowell Highway boundary (off lease) is Aboriginal freehold land. Use of this freehold land as per the Proposal would require GEMCO to negotiate with the ALC and enter into access arrangements on behalf of the Traditional Owners.

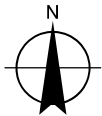
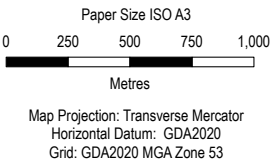
The Port (Portions 1306 and 1031) is land provided to GEMCO under Special Purpose Lease 383 (SPL 383) for a specific purpose including stockpiling of ore. The use of this land by GEMCO is provided for under SPL 383.

Parts of the pipeline will need to extend outside of the current lease areas. Off-lease areas would include areas close to the Port not covered by the existing MLs, existing cleared off-lease areas, and the offshore components. GEMCO will obtain land access and tenure for the Proposal as required for any of the off-lease areas prior to construction commencing.

A summary of the Proposal area location, land tenure and land ownership is provided in Table 8. The Proposal location in the context of the regional setting is illustrated in Figure 3.

Table 8 *Proposal location and land parcels*

Details	Mine	Mine	Mine / Rowell Highway	Easement	Rowell Highway – off lease	The Port	The Port	The Port	Milner Bay-off-lease
Parcel number	MLN951 (NT Portion 1669)	MLN956 (NT Portion 1671)	MLN956 (NT Portion 1305)	MLN2 (over portion of NT Portion 1632)	Off-lease within NT Portion 1632	SPL383 (NT Portion 1306)	SPL383 (NT Portion 1031)	SPL383 (over portion of NT Portion 1632)	N/A
Zone	No zone								N/A
Land tenure	Crown – Registered Mineral Lease	Crown – Registered Mineral Lease	Crown – Registered Mineral Lease	Crown – Registered Mineral Lease	Aboriginal Freehold Land	Special purpose lease	Special purpose lease	Special purpose lease	Crown Land and Aboriginal Freehold Land
Owner category	NT Government	NT Government	NT Government	NT Government	Aboriginal Land (Scheduled under ALRA)	Private	Private	Private	NT Government and Aboriginal Land (Scheduled under ALRA)
Comment	Mineral lease 951	Mineral lease 956	Mineral lease 956	Infrastructure Lease - Power Line.	No existing lease	Industrial area including stockpiling of ore	Industrial area including stockpiling of ore	Industrial area including stockpiling of ore	No existing lease
Land Council	Anindilyakwa Land Council								



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Regional setting

FIGURE 3

Data source: GHD: project area (2024); GEMCO: mining lease, special purpose lease (2024); South32: imagery (2023); NT gov: cadastre (2007); World Imagery: Earthstar Geographics
World Imagery: Maxar. Created by: mvandermerwe

2.3 Alternatives to the Proposal

The Proposal objective is to support dewatering management practices to enable effective mining activities. During 2023, the Proposal progressed through a prefeasibility stage which considered nine alternatives to discharge excess quarry water in the ocean. This was conducted through a multicriteria assessment (MCA) of alternatives, which considered the criteria listed below and is summarised in Table 9. In application of the hierarchy of controls, consideration was first given to avoidance of impact.

- Avoidance of potential environmental impacts (Figure 4).
- Avoidance of heritage features (Figure 4) and rejection by the Traditional Owners.
- Approval pathways based on inferred significance of impact.
- Operational effectiveness to achieve dewatering outcome.

The results of the MCA were then used to guide the selection of the preferred option (Table 9).

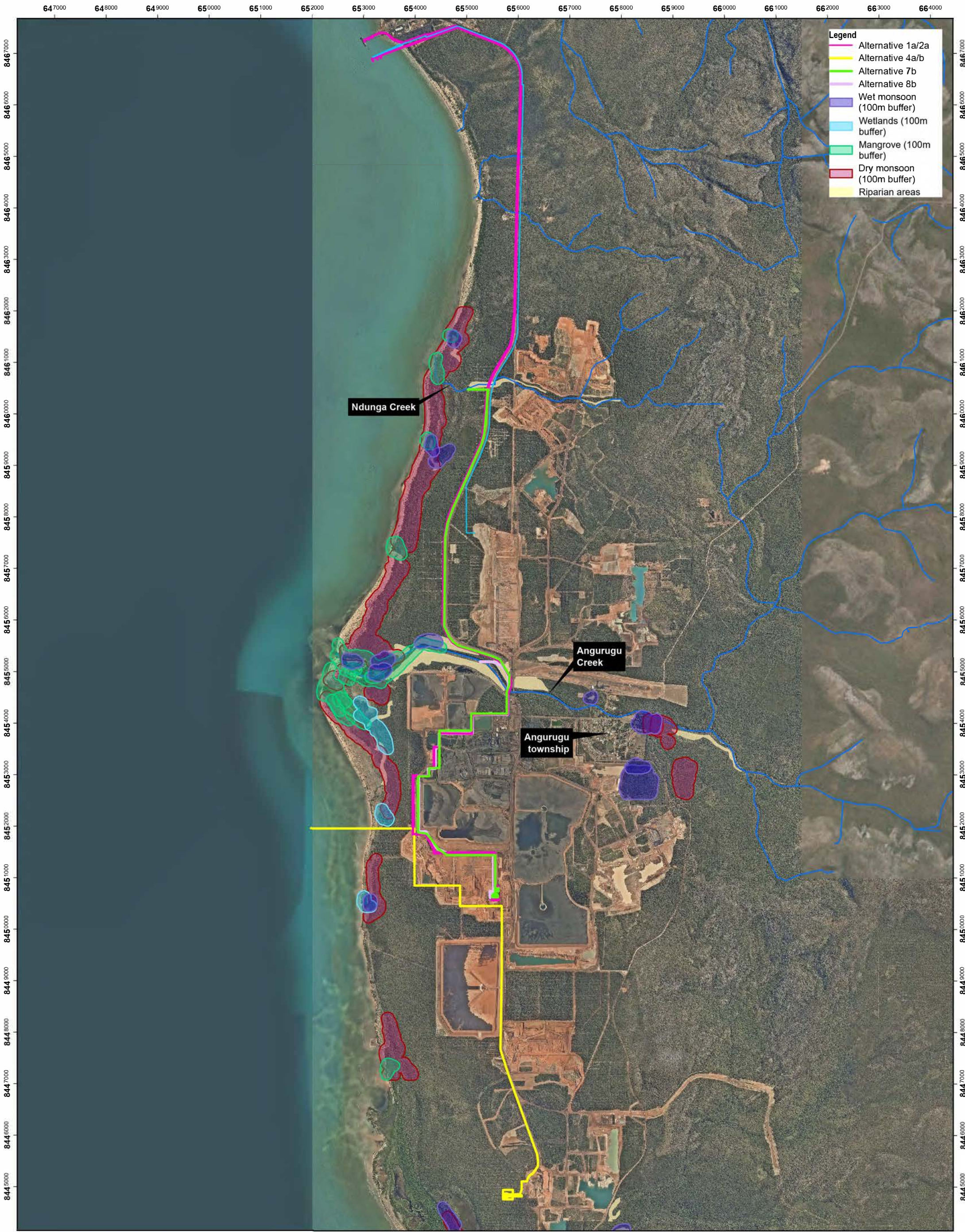
During this process, consultation with the ALC was conducted to inform the potential heritage impacts (Section 4) and environmental impacts were evaluated through a review of available desktop information.

The preferred pipeline alignment was selected to progress into further design phases and is being further refined to minimise associated impacts with consideration of environmental, heritage and safety values in the subsequent design phases. The Proposal presented herein has taken into account these minimisations of impact, providing for appropriate avoidance and mitigation of potential impacts. Field surveys were conducted for this preferred option with the aim of understanding environmental context and informing suitable controls. Ecological (terrestrial and marine) assessments of the preferred option and surrounding areas were carried out to identify environmental values and minimise potential impacts, including the incorporation of mitigation measures into the Proposal design, including:

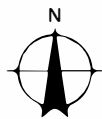
- Realignment of the pipelines to reduce clearing extents – i.e. pipeline length extended to follow existing road disturbances.
- Review of construction methodologies to reduce clearing extent (width) requirements – i.e. reduction from 20 m clear width along the alignment to a variable width dependent on the types of works required in a section of pipeline. Design at the time of referral indicated a reduced clearing width to approximately 11 m. This may vary throughout finalisation of the design.
- Refinement of particular infrastructure elements through design discussed in Section 2.6 to reduce the impact extent (i.e. alternative pump types, refinement of design for pre-break tank and sump and consideration of powerline alignment and road safety barriers). Where potential further design refinements have been identified but cannot yet be confirmed, the proposed option considered worst case (e.g. diesel generated or largest disturbance footprint) in this referral assessment.
- Increase in the number of crossing points to maintain hydrological flow through the landscape, with a mix of crossing types (i.e. pipeline raisers, pipeline cradles and buried pipeline sections). These crossing points also serve as pathways enabling fauna movement either under the elevated pipeline or over the buried pipeline and earthen mound crossings.

Additionally, dispersion modelling (Appendix C) was conducted to refine the discharge parameters to be designed into the Proposal to minimise impact to the receiving environment.

Following operations, the footprint will be rehabilitated during site closure works.



Paper Size ISO A3
0 0.5 1 1.5 2
Kilometres
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



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Summary of alternatives

FIGURE 4

Data source: GHD project area (2024); South32 PFS alternatives; #image and watercourse layers, riparian areas, mangroves 100m buffer, #dry monsoon 100m buffer, wet monsoon 100m buffer, wetlands 100m buffer, imagery (2023); World Imagery Earthstar Geographics. Created by: m.vandermerwe

Table 9 Summary of alternatives assessed

Alternative	Description	Discharge location	MCA Outcome
1a Port outfall (E South quarry intake – 60 GL pa)	Pipe alignment extending from a water storage area south of the Angurugu River to the Port facility for discharge of 60 GL pa to the ocean.	Ocean	Rejected. This option was deemed economically not feasible given the required distance from the Port compared to 1b and 2b.
1b Port outfall (F3 quarry intake - 60 GL pa)*	Pipe alignment extending from a water storage area north of the Angurugu River to the Milner Bay Port facility for discharge of 60 GL pa to the ocean. During the start of the Feasibility study, the water intake point, also referred to as the "water extraction point", was moved to NH2 quarry due to mine schedule constraints.	Ocean	Preferred. Balance of economics and capacity. The majority of the Proposal is in disturbed areas limiting environmental impacts. Located outside identified Cultural Heritage (Restricted Works) Zones.
2a Port outfall (E South quarry intake – 90 GL pa)	Pipe alignment extending from a water storage area south of the Angurugu River to the Port facility for discharge of 90 GL pa to the ocean.	Ocean	Rejected. This option was deemed economically not feasible given the required capacity and distance from the Port compared to 1b and 2b .
2b Port outfall (F3 quarry intake – 90 GL pa)	Pipe alignment extending from a water storage area north of the Angurugu River to the Milner Bay Port facility for discharge of 90 GL pa to the ocean.	Ocean	Rejected. This option was deemed economically not feasible given the required capacity compared to 1a and 1b .
4a Ocean Outfall south of Angurugu Creek (O quarry intake – 30 GL pa)	Pipe alignment from water storage area at O quarry to the ocean directly west.	Ocean	Rejected. The alignment traverses a Cultural Heritage (Restricted Works) Zone. Given the sensitivities of the Cultural Heritage (Restricted Works) Zone, this option is not favourable. In addition, this option has a large marine disturbance footprint due to the additional pipeline distance required to extend the pipe out into the target water depth. Finally, it requires extensive baseline data gathering in the marine environment which would extend the approvals timeline beyond mine life .
4b Outfall south of Angurugu Creek (E South quarry intake – 90 GL pa)	Pipe alignment from water storage area at E South quarry to the ocean directly west.	Ocean	Rejected. The alignment traverses the Cultural Heritage (Restricted Works) Zone. Given the sensitivities of the Cultural Heritage Zones this option is not favourable. In addition, this option has a large marine disturbance footprint due to the need to extend the pipe out into deeper water. It also has a large capital cost due to the high capacity. This option would also require extensive baseline data gathering in the marine environment which would extend the approvals timeline beyond mine life .

Alternative	Description	Discharge location	MCA Outcome
7b Ndunga Creek discharge for 60 GL pa	Includes a pipeline alignment from F3 quarry to an area along Ndunga Creek, with 60 GL pa discharge occurring directly into Ndunga Creek.	Creek	Rejected. The Ndunga Creek is a small waterway that holds environmental and significant cultural heritage values with Indigenous peoples. This option has a high inherent risk with the inability to handle an increase in water salinity. It also requires a large amount of baseline information to be gathered which would extend the approvals process.
8b Angurugu Creek discharge for 60 GL pa	Includes a pipeline alignment from E South quarry to an area along Angurugu River, with discharge occurring directly into Angurugu River.	Creek	Rejected. This option was rejected due to the requirement to dispose of large volumes of water over an extended period of time (up to 60 GL pa). The uncertainty over the amount of time to undertake impact assessment work to address the large volume was also a consideration.
12 Water treatment plant for 5 GL pa	Treatment plant to consider the treatment of higher salinity water	Bush / creek	Rejected. Not viable for large volumes of water and creates a high salinity waste stream for disposal. Economics for this option are challenging due to required energy and capital cost .
‘No-Action’	The alternative to not proceeding with the Proposal is the ‘No-Action’ option. The ‘No-Action’ option is to maintain the current water discharge arrangement to surrounding bushland at an increased volume. A continuation of discharging to bush cannot continue as the main form of excess water disposal due to: – the anticipated increase in volume of excess water to be discharged as a result deepening of quarries and corresponding groundwater intrusion rates. – a potential increase in the salinity of the discharge water and a resulting potential impact to the environment. – potential impact to the ecosystems in the receiving environment as a result of the increased volume of discharged water to the bush (discharge to land). Under the ‘No-Action’ option, GEMCO would increase discharge water to the bushland using its approved mechanism in accordance with current release requirements (timing and quality). This is not deemed viable to be able to support the volume of water requiring discharge under the future scenarios and based on engagement with Traditional Owners.		
*Preferred proposal option			

2.4 Rationale for the Proposal

Through the MCA process it was identified that the preferred placement of the discharge outfall pipeline is at the Port due to its existing disturbance (i.e. dredge spoil stockpile areas and Port operations water management infrastructure) and the ability for the pipelines to travel from the mine to the Port adjacent to the existing road without intersecting areas identified as sensitive ecological zones (riparian habitat, wet monsoon vegetation and buffer, wetlands and buffer, mangroves and buffer and dry monsoon and buffer) or Cultural Heritage restricted works zones (Figure 4). The pipeline at the Port is also only required to extend around 600 m into the ocean compared to the approximately 3 km pipeline length required to meet deep water for Alternative 4b (Figure 4). Additionally, as outlined in the MMP, an effluent discharge pipeline is already present at the Port to support the township of Alyangula with effluent discharge occurring into Milner Bay and shipping operations occurring resulting in existing disturbances compared to the Alternative 4b.

Ndungu Creek (Alternative 7b) and Angurugu River (Alternative 8b) were considered as discharge locations during the PFS stage; however, these options were not progressed for the reasons described in Table 9.

Four of the alternatives considered discharge at the Port (preferred discharge location) (Alternative 1a/b and Alternative 2a/b). These options were differentiated by volume and water extraction point. Alternatives 1a and 2a sourced water from quarries south of the Angurugu River and Alternatives 1b and 2b sourced water north of the Angurugu River. Options 1a, 2a and 2b were deemed economically not feasible compared to the preferred option 1b.

Water extraction from a quarry south of the Angurugu River would result in a larger disturbance footprint, impacting the Angurugu River. Due to the discharge volumes proposed, this was not selected as the preferred option.

For the preferred northern quarry option, the NH2 quarry has been proposed for the purpose of this referral as the water extraction point as it is the most southern point from which water would be extracted based on the MCA. The NH2 quarry provides a conservative design assumption with close access to the road corridor. This option presents the greatest extent of Construction footprint and therefore is representative of the worst-case impact scenario. It should be noted that the water extraction point may change to better align with operational requirements, prior to construction commencing, however, though the conservative approach of selection NH2 as the extraction point, changes to this are expected to result in a reduced disturbance; this will be optimised as the design is progressed.

Due to the existing operations at the Port (bulk transport, dredging, historical contamination, and discharge of effluent) monitoring programs are in place and baseline data is available and has been included within this referral application to support the assessment of the Proposal.

2.5 Proposal boundary area definitions

The Proposal boundary area definitions are described in Table 10 and illustrated in Figure 5. The full glossary of key terms is provided in the acronym and abbreviation table (Table 4).

Table 10 *Proposal boundary area definitions*

Term	Definition
The Proposal	All aspects of the GEMCO Excess Water Disposal Proposal not currently approved within the GEMCO MMP, including construction and operation as outlined in Section 2.6. The internal movement of water, including water extraction from mine pits are existing approved activities and not included within the Proposal.
Construction footprint	Area directly impacted by the construction of the Proposal including both onshore and offshore areas and totalling 25.17 hectares (ha) (including 1.84 ha in the marine environment).
Marine environment	The marine environment is defined as all marine and coastal habitats up to the Highest Astronomical Tide (HAT) boundary.
Study area	Construction footprint plus 10 km buffer (marine survey) and 5 km buffer (terrestrial survey), used during desktop investigations to assess the likelihood of occurrence of conservation listed species.



Paper Size ISO A3

0 0.5 1 1.5 2 2.5

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Environmental Referral Report

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Revision No. A
Date 4/02/2025

Proposal study area

FIGURE 5

Data source: GHD: project area, study area (2024); South32: Aerial photos (2023), construction footprint (2024); G4: road (2024); NT gov: Stream (2024); World Imagery: Earthstar Geographics. Created by: mmandermerwe

2.6 Principles of environment protection and management (Part 2 of the EP Act) and General duty of proponents (s43 of the EP Act)

The NT EPA guidance document (*'Referring a proposal to the NT EPA - Environmental impact assessment - Guidance for proponents'*) requires that the proponent discusses how the *principles of environment protection and management* (Part 2 of the EP Act) and the *general duty of proponents* provided for under Section 43 of the EP Act have been applied to the design and subsequent phases of the Proposal.

Part 2 of the EP Act provides Principles of Environmental Protection and Management that decision-makers (i.e. NT EPA) and proponents must take into account when making decisions about actions that could affect the environment. Section 42 and 43 of the EP Act describe the purpose of the NT environmental impact assessment process and General duty of proponents.

Table 11 summarises how each of the sections of the EP Act have been applied.

Table 11 Checklist of the EP Act Section 42 and 43 requirements

Section 42 EIA Purpose & Section 43 General Duty	Comment
Section 42 – How does the Proposal align with the purpose of the NT environmental impact assessment process?	
Principles of ecologically sustainable development	The Proposal has considered both short- and long-term impacts and benefits – including impacts during construction and operation of the Proposal. The Proposal lifecycle includes both managing construction and operation of the excess water pipeline with sustainability principles in mind.
Environmental decision-making hierarchy	In assessing each impact, the environmental decision-making hierarchy has been applied including siting and design of infrastructure to avoid potential impacts, as well as mitigating potential impacts through the construction and operational phases through risk-based decision making and safe-guards.
Waste management hierarchy	The Proposal will manage waste management in accordance with GEMCO's MMP and the waste management hierarchy. Waste management is considered within the Greenhouse Gas Assessment Report for contributions to emissions throughout the Proposal's life cycle.
Impacts of a changing climate	The Proposal has considered a changing climate within the Hydrology and Hydraulic Modelling Report (Red Earth Engineering, 2024) as well as assessing the Proposal's impact on global warming potential as a result of greenhouse gas emissions.
Less environmentally damaging alternative	The Proposal was developed as a more environmentally sustainable alternative to the currently approved practice of bush discharge for excess water disposal allowing higher volumes of water and more saline water to be discharged to sea.
Community opportunity to participate and have views considered	The community is provided opportunities to provide feedback on the Proposal and other activities associated with the GEMCO operations in an ongoing nature. Dedicated engagement throughout the development of the Proposal has occurred.
Actions to enhance or restore environmental quality	The construction footprint is expected to be rehabilitated post-closure with the aim to restore the area as close to pre-disturbance conditions as practicable. Similarly, the pipeline footprint is expected to be rehabilitated during GEMCO mine closure.

Section 42 EIA Purpose & Section 43 General Duty	Comment
Section 43 – Have the following principles of ecologically sustainable development been taken into consideration in the design of the proposed action?	
Decision making principle	Yes – the Proposal has considered both short- and long-term impacts and benefits – including impacts during construction and operation of the Proposal. Significant planning was undertaken as part of the PFS to identify and assess potential options for excess water discharge (refer Section 2.3). An MCA was undertaken to identify an option that has: – Avoidance of potential environmental impacts (Figure 4). – Avoidance of known heritage features (Figure 4) and acceptance by the Traditional Owners. – Approval pathways based on inferred significance of impact. – Operational effectiveness to achieve dewatering outcome. The option selected (this Proposal) offers the best environmental and heritage outcomes compared to alternatives (as described in Section 2.3). Further to this, the Proposal allows for flexibility and continuous improvement through the ability to modify discharge flow rate, operating times and mine-side source locations as the mining operation continues through the Proposal's operational phase.
Precautionary principle	Yes – the Proposal has considered the potential for threats of serious or irreversible environmental damage from the excess water discharge pipeline development by undertaking comprehensive technical studies and field surveys completed by suitability qualified professionals within the Proposal study area. Modelling of the discharge plume within the marine environment through varying scenarios has also been completed to reduce the uncertainty of the potential environmental impacts of the Proposal as much as is possible.
Principle of evidence-based decision making	Yes - this is based on the best scientific knowledge available, including targeted field studies undertaken for the Proposal.
Principle of intergenerational and intergenerational equity	Yes – planning and predictions of the possible intergenerational equity impacts have been undertaken through stakeholder engagement, the pipeline will be operational throughout the operation and closure of the mine with pumping to cease following mine closure and site relinquishment. Ongoing monitoring will be conducted during the Proposal's operational period to ensure ecological health, diversity and sustainability is maintained.
Principle of sustainable use	Yes – the Proposal lifecycle includes managing construction and operation of the excess water pipeline with sustainability principles in mind.
Principle of conservation of biological diversity and ecological integrity	Yes – the majority of the construction footprint is located within previously disturbed areas which minimises further loss of native vegetation. The Proposal and supporting technical reports document how it will avoid and mitigate potential impacts on biodiversity and ecological integrity to reduce the risk of significant impacts.
Principle of improved valuation, pricing and incentive mechanisms	Yes – the Proposal would be incorporated in the reporting, valuation and pricing mechanisms implemented by GEMCO for the mine site. Greenhouse gas generation during construction and operations have been calculated for the Proposal to inform contributions.

Section 42 EIA Purpose & Section 43 General Duty	Comment
Additional section 43 considerations	
Have communities that may be affected by the proposed action been provided with information and opportunities for consultation?	Yes – GEMCO collaborated with the ALC to identify affected stakeholders and deliver engagement activities that provided information about the Proposal and captured stakeholder feedback.
Has consultation with affected communities, including Aboriginal communities' been undertaken in a culturally appropriate manner?	Yes – Informed by on-site experience and guided by the ALC, GEMCO employs an engagement approach tailored to the needs of the local community. This includes utilising team members with cultural awareness for engagement activities, developing accessible information tools, and adhering to ALC guidance on the appropriate format and timing for events.
Has community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action been sought and documented?	Yes – The engagement activities captured knowledge from Senior Clan members about the values and uses of the areas affected by the Proposal. These were documented and are summarised in section 4.
Have Aboriginal values and the rights and interests of Aboriginal communities' been addressed in relation to areas that may be impacted by the proposed action?	Yes – GEMCO developed an understanding of the values, rights and interests of Aboriginal people connected to the proposed sites. GEMCO will commence an engagement process that includes negotiations of access agreements with the Traditional Owners for off-lease portions of the Proposal, clearing permits, and other permits. based on the principles of Free, Prior and Informed Consent (FPIC) that recognises the critical decision-making role of Traditional Owners.

3. Proposal overview

This chapter provides a description of the Proposal through its lifecycle (construction, operation and decommissioning) and includes a description of the Proposal components, construction methodologies and infrastructure descriptions.

3.1 Overview

GEMCO is proposing to construct and operate the Proposal to redirect and release excess quarry water from the existing GEMCO mine operations. The Proposal aims to support the water management strategy of the mine during mine operations and closure. Water volumes associated with mining operations at GEMCO are forecast to increase in the coming years as quarries become deeper and intersect higher flow aquifers. GEMCO is seeking a sustainable solution to the management of excess water of the mine. The Proposal was selected through a comprehensive decision-making process with the goal of minimising environmental and cultural impacts.

Quarry water comprises groundwater from aquifers intercepted by the quarry, rainfall and runoff. The quarry water is mostly stored in non-active quarry voids for use as process water and for dust suppression. Water in excess of the void storage capacity is currently being released to surrounding bushland.

The release of excess water from mining operations to surrounding bushland was authorised by the DITT in 2020, as part of GEMCO's MMP. GEMCO has released water to bushland under this approval since this authorisation was granted, however, this option on its own is not considered a sustainable method of water management for the future of the mine. As mining moves towards the coast and an increase in water volumes is forecasted, salinity in some quarries also has the potential to increase.

GEMCO proposes to install and operate a marine outfall pipeline. Two pipelines are proposed to run from one of the group of quarries referred to as the northern quarries (herein NH2 quarry) on the existing GEMCO mineral leases (MLs), along the Rowell Highway. The two pipelines will combine to become a single pipeline near the ocean outfall location adjacent to the Port (Figure 2). The NH2 quarry is viewed as the worst-case scenario for the Proposal due to being situated further south compared to other potential northern pit options that GEMCO are considering. These northern options would lead to shorter pipelines and less vegetation clearing than the NH2 quarry, owing to their closer proximity to the Port.

The marine outfall pipeline is anticipated to operate at 60 GL pa with a design capacity of up to 80 GL pa with the balance being managed under existing mine site excess water management practices. The pipeline will be operational throughout the operation and closure of the mine and extend into mine decommissioning and closure. The marine outfall will be designed to accommodate a 100-year wave event.

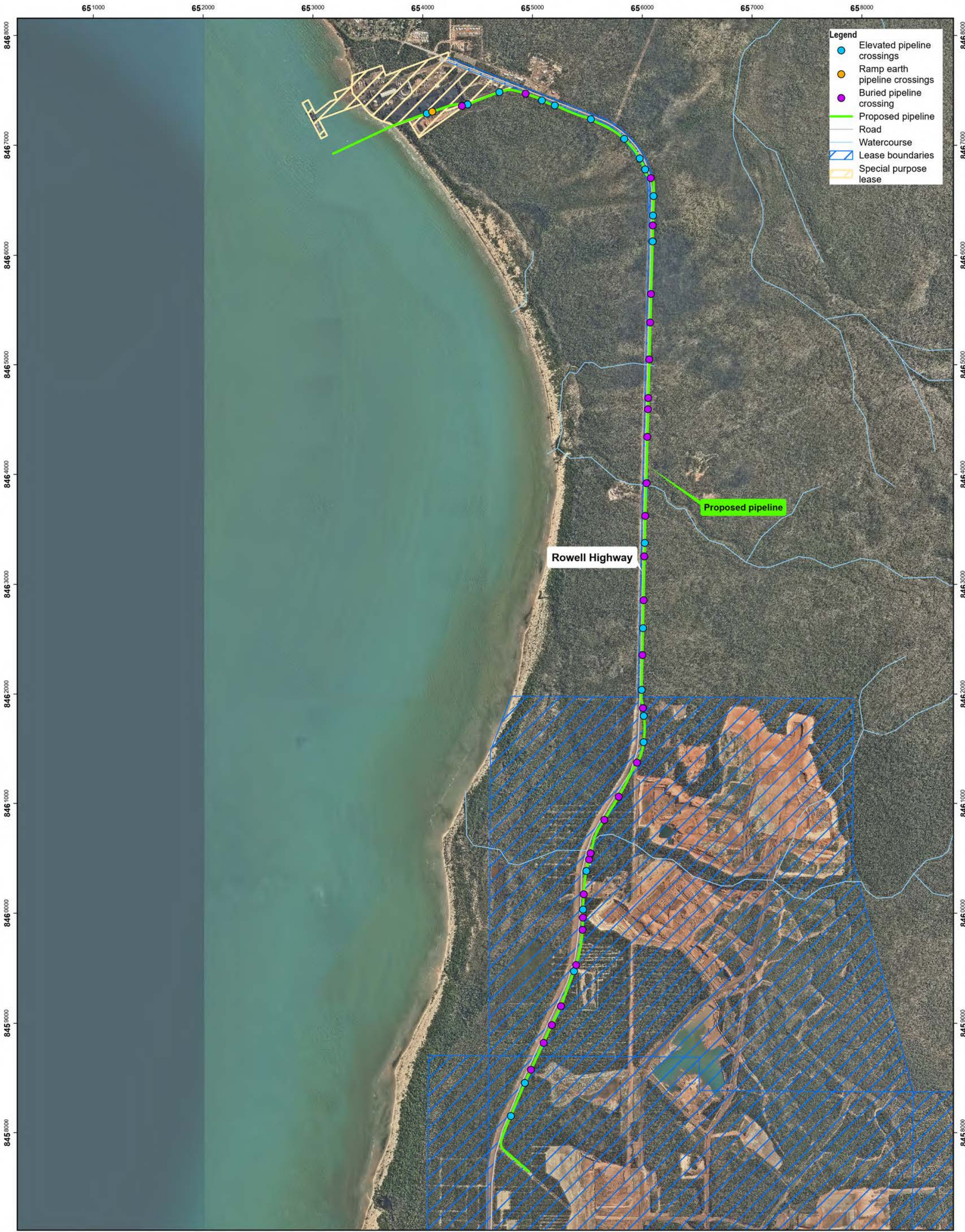
Approval is being sought for the installation and operation of the pipeline and associated infrastructure. Most of the Proposal will be located within the existing ML, however some of the Proposal extends beyond the existing lease boundaries as outlined in Section 2.1.

All water extraction or transfers resulting from dewatering, on-site management and handling of quarry water between pits is part of the currently approved operations and therefore does not form part of the Proposal scope (as described in Section 1.3).

The pipeline will be laid predominantly on the ground with a mix of buried and raised sections (approximately 53 crossings) to facilitate hydraulic flows, fauna passage and human egress (Figure 6). The key components of the Proposal are specified in Table 12.

Table 12 Key components of the Proposal

Component	Size / capacity
Two DN1000 high-density polyethylene (HDPE) pipelines: – Total on ground pipeline: – Total elevated crossings: – Total trenched and buried crossings*: – Ramped earth crossing <i>*Types, lengths and positions of crossings are to be confirmed throughout design finalisation.</i>	Approximately 12,100 m comprising: – 10,354 m – 639 m – 1,082 m – 25 m Shown in Figure 6.
One DN1400 HDPE pipeline: – Buried pipeline: – On seabed pipeline: – Diffuser:	Approximately 600 m comprising: – Approximately 200-300 m through the surf zone – Approximately 150-250 m – Approximately 145 m
Pipeline corridor width	11 m construction width, 5 m width installed corridor.
Pressure break tank	Two DN1000 pipelines will enter the pressure break tank before it is carried through a single DN1400 pipeline to the outfall sump structure (Figure 7). Pressure break tank will be located at a height >15 m AHD to provide sufficient hydraulic pressure for water discharge into the marine environment.
Outfall sump	The outfall sump will be approximately 5 m AHD behind the beach front and will extend below ground level to approximately -4.63 m AHD with a wall height of 6.74 m AHD. The overall specification of the sump is determined by the hydraulic requirements of the outfall pipeline; however, a schematic cross section of an outfall expected to be installed is provided in Figure 8.
Marine excavations placement area	Existing GEMCO dredge / excavations stockpile area.
Construction footprint (incl. laydown areas and pipeline)	23.33 ha
Total area of vegetation clearing	10.44 ha
Rehabilitation	Rehabilitation to occur as part of mine closure and decommissioning activities.
Timing – construction	Construction is anticipated to occur between March 2026 and December 2026.
Timing – operations	The Proposal is anticipated to become operational at the start of 2027. The pipeline will be operational throughout the operation and closure of the mine before reaching its decommissioning phase during mine closure (Section 3.5).
Timing – decommissioning	Decommissioning and closure to occur in alignment with the mine site decommissioning and closure.
Construction workforce (full time equivalents)	Approximately 93
Operations workforce (full time equivalent)	No planned change to existing workforce.
Annual operational discharge volume	Up to 80 GL pa



Paper Size ISO A3
0 250 500 750 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



South32 Group Operations Pty Ltd
GEMCO Excess Water Disposal Project
Environmental Referral Report

Project No. 12624084
Revision No. A
Date 24/01/2025

Pipeline crossings

FIGURE 6

Data source: GEMCO: mining lease, special purpose lease (2024); South32: pipe burying (2024); imagery (2023); NT gov. roads, watercourse (2023); cadastre (2007); World Imagery, Earthstar Geographics
World Imagery, Maxar - Created by: mmandemerne

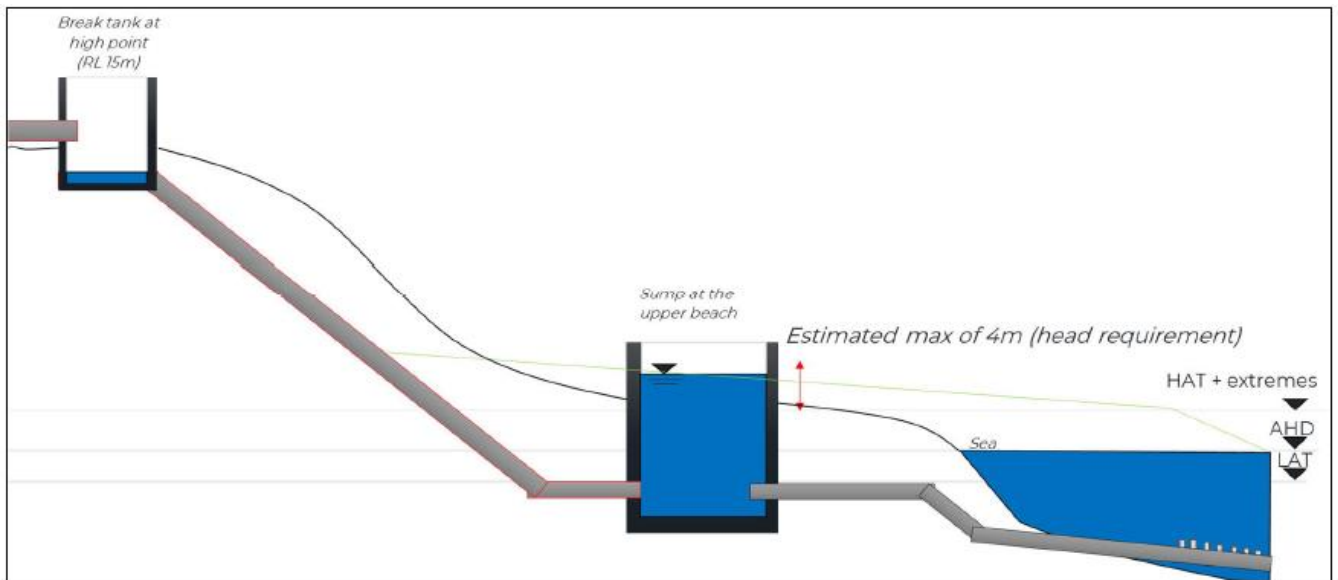


Figure 7 Schematic hydraulic system expected to be developed, including pre break tank, pipeline and outfall sump

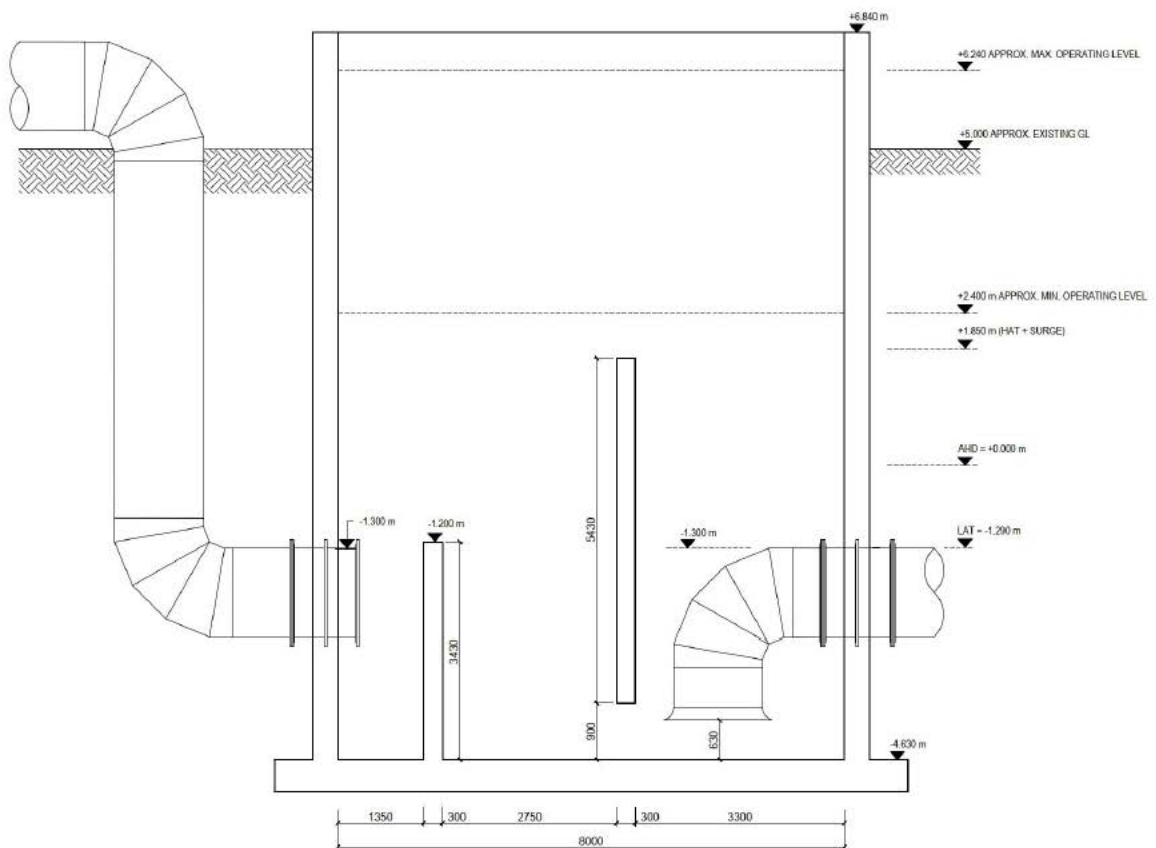


Figure 8 Sectional view of outfall sump (conceptual design stage)

3.2 Construction specifications / methods

This section summarises the activities that will be undertaken during the Proposal construction.

The construction phase will comprise several key activities, with some activities occurring concurrently. Construction works anticipated based on the current Proposal design include:

- Material transport
- Earthworks
- Hardstand construction
- Sheet piling and pile driving
- Pipeline assembly
- Marine dredging/excavations.

The pipeline construction will be undertaken in accordance with the specifications detailed in Table 13.

Table 13 Civil infrastructure design criteria

Element	Design criteria
Bulk earthworks and hardstand	
Vehicle paths	Hardstand areas and pump access roads to accommodate the turning circle (centreline) of the largest design vehicle.
Hardstand surfaces	All hardstand surfaces shall be free draining. Finished grades shall be 2% preferred. Where design circumstances permit, 1% absolute minimum and 3% absolute maximum may be used unless noted otherwise.
Cut and fill batters	3H:1V minimum. Where a safety berm is provided at the top of the batter and geotechnical conditions are suitable, fill batters may be steepened to 2H:1V.
Safety berms	Safety berms for vehicle separation and facility protection as required. Berms shall have 1H:1V side slopes and be at least half the wheel height of the largest nominated design heavy vehicle operating in the area, and as per GEMCO requirements.
Flood immunity	1% Annual Exceedance Probability (AEP) (1 in 100-year Average Recurrence Interval (ARI)).
Stormwater management	
Clean water runoff	Runoff from existing creeks and gullies within the pipeline corridor is to remain free draining and undisturbed. Erosion and sediment controls are to be installed.
Dirty water runoff	Runoff from hardstand areas and other unsealed areas of the mine infrastructure area shall report to a pit. The pipeline is to be bunded on the downstream side to capture runoff in the event of a pipeline burst or leak. Erosion and sediment controls are to be installed.
On site roads	
Extent of light vehicle roads	Access to the pipeline alignment will be from existing local roads and tracks.
Pipelines	
Corridor	Above ground pipelines within a cleared corridor.
Road crossings (Mine haul road, mine access track, community access track)*	Trenched and buried with minimum of 0.9 m cover.

Element	Design criteria
Creek crossings*	Trenched and buried with rock erosion protection, OR Elevated on pipeline cradles/supports. <i>To be confirmed throughout design completion. Impact assessment has assumed trenched and direct buried methodologies as a conservative assumption (i.e. trenching being the higher impact methodology).</i>
Drainage lines*	Trenched and buried with minimum cover of 1 m with a rock and/or geofabric erosion protection covering. OR Elevated over gully in pipeline cradles/supports. <i>To be confirmed throughout design completion. Impact assessment has assumed trenched and direct buried methodologies as a conservative assumption (i.e. trenching being the higher impact methodology).</i>
Major road crossings*	Trenched and buried with a minimum cover of 0.9 m. Pipelines will be enclosed within an appropriately sized and reinforced envelope pipe or stabilised backfill.
Existing pipeline crossings*	Crossing above ground on loose placed earthen mound over the existing pipeline.
Access for foot traffic and fauna*	Provision has been made for fauna and pedestrian crossing points (trenched and buried pipeline or elevated on pipeline cradles/supports).
Additional crossings for hydraulic connectivity*	Provision has been made for additional hydraulic connectivity points consisting of a mix of buried and elevated pipeline sections to meet the flood immunity design criteria.
*All pipeline crossings identified as per the design at time of referral submission are shown in Figure 6.	

3.2.1 Materials transport

Groote Eylandt has two primary public roads: the Rowell Highway and the Angurugu-Umbakumba Road. Both roads are well-maintained, two-lane thoroughfares, facilitating travel between Alyangula, the airport and the GEMCO MLs, as well as between Angurugu and Umbakumba. For air travel, Groote Eylandt is served by an airport near Angurugu, offering regular flights to and from Darwin and Cairns. Moreover, there are frequent barge services connecting Darwin to the Port at Alyangula.

Material required for the Proposal construction will be transported to Groote Eylandt via barge. Transport of materials to the island will be concentrated during the early stages of the Proposal's construction but will occur throughout the Proposal's construction schedule until it becomes operational. Furthermore, specialised construction equipment not currently used and present on the island will be transported to the island and will include heavy machinery and equipment. The construction contractor will be required to provide more detailed information on the material and machinery specifications at a later stage of development.

Equipment and materials will be moved from the Milner Bay Port to the construction area via the Rowell Highway and mining haul roads, using a variety of road transport vehicles.

3.2.2 Onshore earthworks

Construction activities include:

- Minor earthworks
- Vegetation clearing
- Installation of pumping and ancillary infrastructure
- Installation of pressure break tank / outfall sump structure
- Installation of pipeline crossings (buried and raised)
- Reshaping and rehabilitation of final landform

- Sediment and erosion controls
- Laydown areas.

Clearing will only occur when existing clearing extents (and approved clearing under the mine management plan) cannot presently accommodate the placement and installation of the pipeline infrastructure. A breakdown of vegetation clearing requirements is outlined in Table 14.

Due to the predominantly east to west drainage topography and the north to south perpendicular alignment of the pipeline, the pipeline will have to cross two creeks - Malkala Creek and Ndunga Creek. Rowell Highway drainage culverts will also require crossings that will either be trenched or supported by pipeline cradles/supports to allow existing drains to continue to operate (Figure 9). Several additional crossing points have also been identified during the hydraulic modelling to maintain surface water connectivity in flood events - these consist of a mixture of buried and raised crossing sections. It is also envisaged that several small recreational road access crossings will also be required to facilitate community access.

The pumping outfall structures including the pre break tank and outfall tank will require structural pads to be constructed and/or localised excavations to support proposed structures. It is envisaged that the construction stage and the closure stage will require the greatest impact areas due to access laydowns and/or temporary construction pads for crane lifts. Other pumping and pumping ancillary equipment laydowns and lifting hardstands are required for pumps, diesel generators and fuel storage including operational access requirements within the mining operational area at the NH2 quarry. These are existing approved activities and do not form part of the referred action.

Table 14 Summary of clearing requirements as per design current at time of referral submission

Clearing Description	Area (ha)
Disturbance off lease with no vegetation clearing required	1.57
Disturbance on lease with no vegetation clearing required	11.32
Vegetation clearing on lease	9.9
Vegetation clearing off lease	0.54

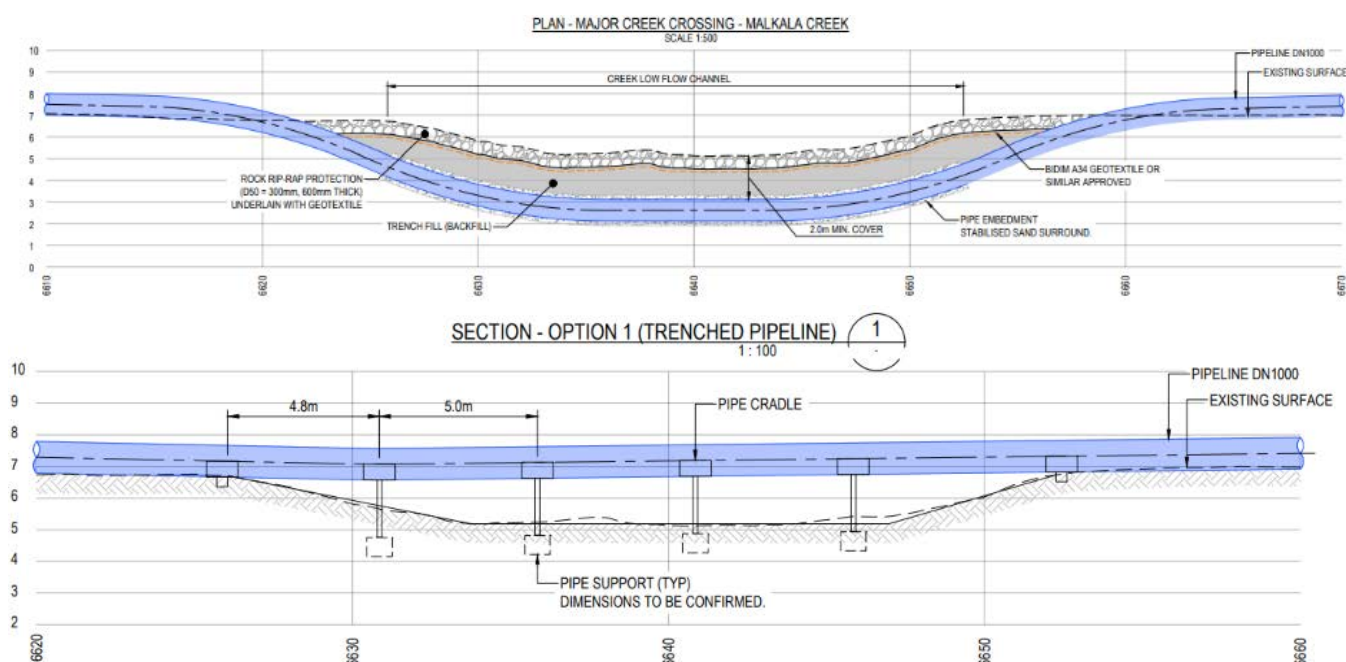


Figure 9 Typical Pipeline Crossings

3.2.3 Excavations in tidal and marine zones

The pipeline and sump installation will require excavation in the tidal and marine zones. While the Proposal design aims to minimise disturbance in both tidal and marine zone as much as reasonable possible, the wave impact zone will necessitate excavation to facilitate burial of the pipeline in these areas (Figure 10, Figure 11). Intertidal works are anticipated to run for approximately 8 months.

Trenching can occur either from land or sea and is generally dependent on prevailing wind and wave conditions during construction. Trenching is expected to be undertaken using conventional excavation from a jack up barge or dredge, with sheet piling proposed in marine sediments to provide trench support through the surf zone (approximately 200-300 m), followed by the removal of sediment from between the piled sheets. Where land excavation is completed, this will be undertaken using a grab-crane or similar from onshore. Both methods will be utilised to aid construction and minimise disturbance in the environment. If stockpiling of excavated material is required during or following construction, the existing Port dredge spoil stockpile area has been nominated to receive and store spoil materials.

Tubular piles are expected to be installed via vibratory piling outside the sheet piling to provide stability to the sheet pile walls during trenching. Both sheet piles and stabilising piles are planned to be removed after the burial of the pipeline.

Two additional piles are proposed to be installed at the end of the pipeline to hold the pipeline and diffuser in place. At the current stage, it is estimated that vibratory piling is sufficient to install the required piles for the Proposal and impact piling has not been considered in the construction methodology. If information becomes available which suggests that impact piling may be necessary, additional measures to manage the potential noise impacts to marine fauna will be implemented.

Following the pipeline placement within the trench, the trench will be backfilled using the excavated material. The seabed and shoreline will be returned to previous conditions as far as is reasonably practicable, so as to not interfere with coastal processes (Figure 11). Where reinstatement is not possible, excavated/dredged materials will be handled and stored appropriately within the existing Port dredge spoil stockpile area.

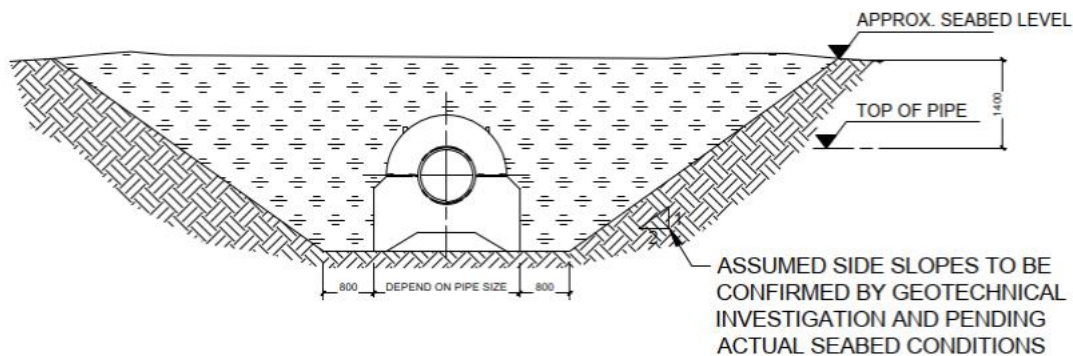


Figure 10 Typical Pipeline Burial Detail

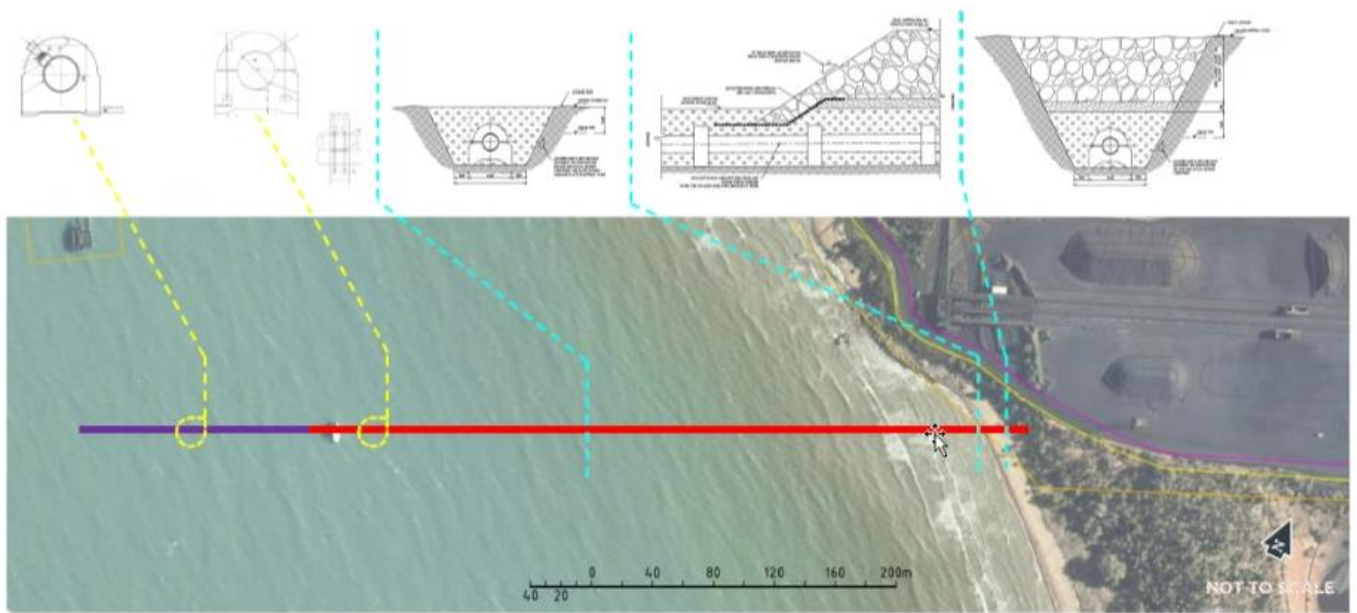


Figure 11 Ocean underwater pipeline construction (indicative to show potential burial method)

3.2.4 Hardstand construction

The majority of the construction areas will be contained within the existing lease boundaries with the exception of the ocean outfall construction works and portions of works along the Rowell Highway described in Section 3.1. The sump tank will be located on the beach area (i.e. in sandy soils) and dewatering is expected to occur. As a result of this and the pipeline to be constructed in the marine environment, an area will be required on the foreshore for plant and materials. It is anticipated that some of the excavated material would be returned as backfill over the offshore pipeline (Figure 12). All surplus spoil will be stored within the existing GEMCO Port dredge spoil stockpile area.

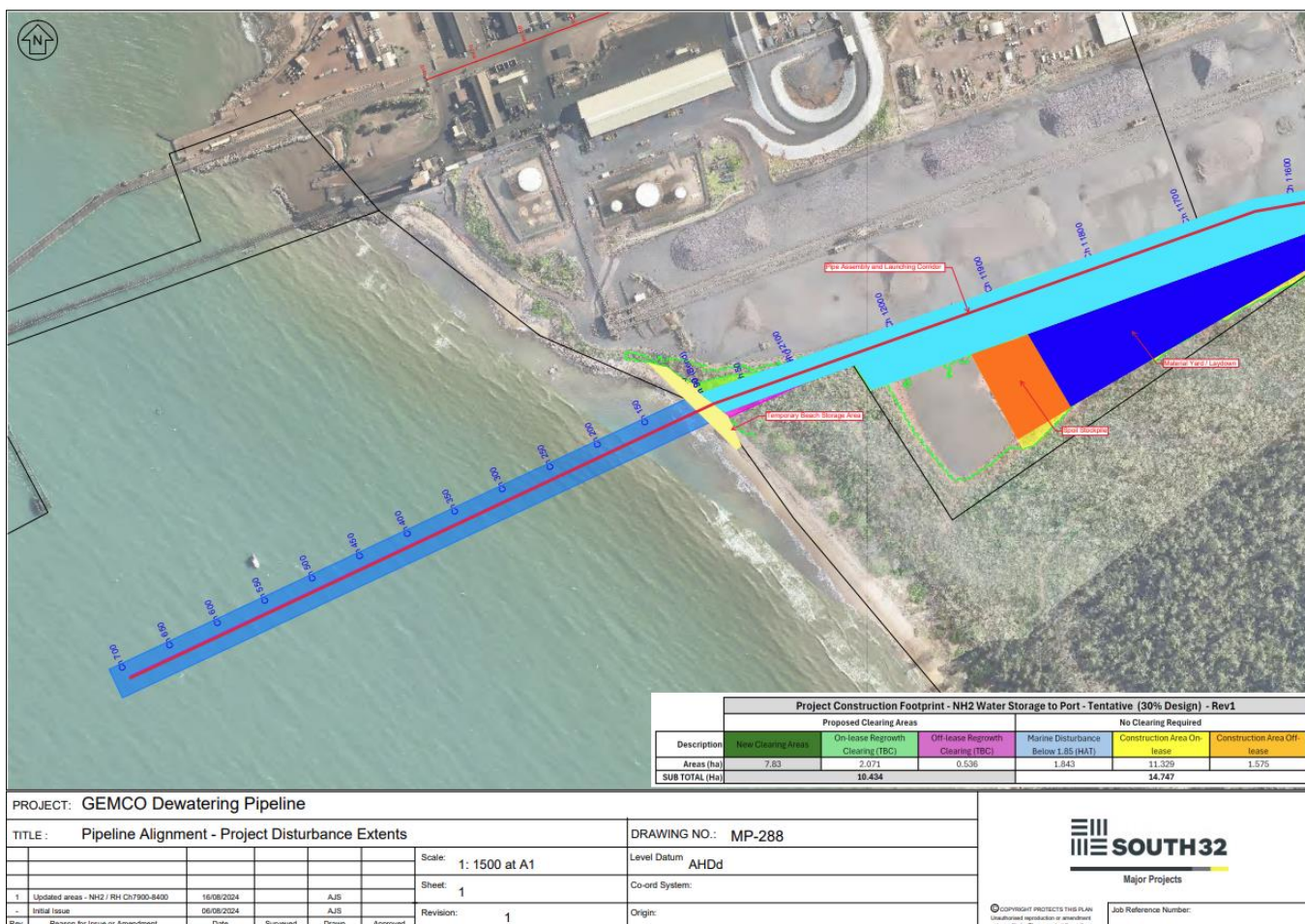


Figure 12 Proposed laydown/hardstand area

3.2.5 Pipeline assembly

HDPE pipes will be welded together in approximately 12 m sections along the length of the pipeline route. Construction will occur within the pipeline corridor within the lease boundaries as much as reasonably practicable. Laydown areas for pipe will be on the mineral lease and the Port.

In the marine environment, HDPE pipe strings (approximately 12 – 18 m long) will be welded together prior to being launched into the ocean. To install the pipeline in the marine environment, the pipeline will be pulled offshore by a suitable marine vessel and then sunk in place. Given the pipeline will be composed of HDPE pipes with concrete collars, the S-bend installation method will be utilised (Figure 13). The pipeline will be secured to the piles installed at the seaward end of the pipeline for stability.

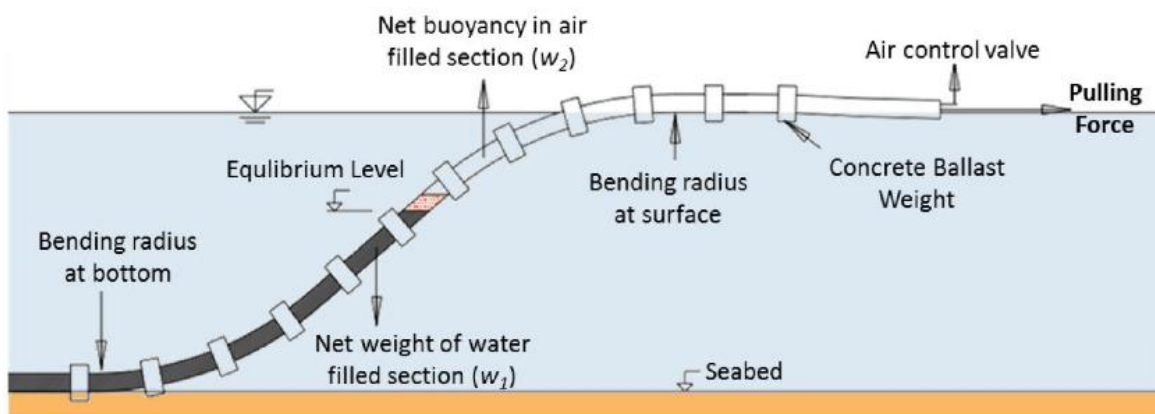


Figure 13 S-bend pipe installation method

3.3 Operations

The pipeline will be operational throughout the operation and closure of the mine following construction. In addition, the pipeline will be utilised for water management during decommissioning and closure of the mine. The marine outfall has been designed to release up to 80 GL pa. The outfall system will be pumping continuously under worst case conditions or as required to adequately discharge excess water from the water storage facility (quarry) in accordance with GEMCO's water management strategy.

The pipeline will require regular maintenance and monitoring. The system infrastructure will be maintained through a combination of preventative and on-condition maintenance strategies. The preventative maintenance plans for mechanical and electrical components will be managed through the GEMCO asset management system, while the on-condition assessment of piping will be conducted periodically to assess wear rates and system compliance.

Monitoring and maintenance activities would include:

- Pipeline infrastructure monitoring and repair
- Drainage infrastructure and temporary (project construction duration) and permanent erosion sediment and control monitoring
- Access crossings (fauna, pedestrian and vehicle) monitoring and repair
- Weed management of project disturbance areas monitoring and treatment

3.4 Decommissioning / Closure

Decommissioning and closure of the pipeline and associated infrastructure will occur as part of the mine site decommissioning and closure process in accordance with the GEMCO Closure Plan, once finalised.

3.5 Proposal timeline

3.5.1 Construction

Figure 14 provides an overview of the Proposal timeline. The approvals are prepared in parallel during the Proposal phases. The Proposal will progress from the Feasibility phase to the construction phase (construction) once all regulatory approvals have been obtained. It is currently anticipated that regulatory approvals would be received by early 2026 allowing commencement of the construction phase (estimated between March 2026 and December 2026).

3.5.2 Operation

The Proposal is anticipated to become operational at the start of 2027. The pipeline will be operational throughout the operation and closure of the mine before reaching its decommissioning phase during mine closure (Section 3.4).

3.5.3 Decommissioning and closure

Timelines regarding decommissioning and closure will be informed by the GEMCO Closure Plan, which is yet to be finalised.

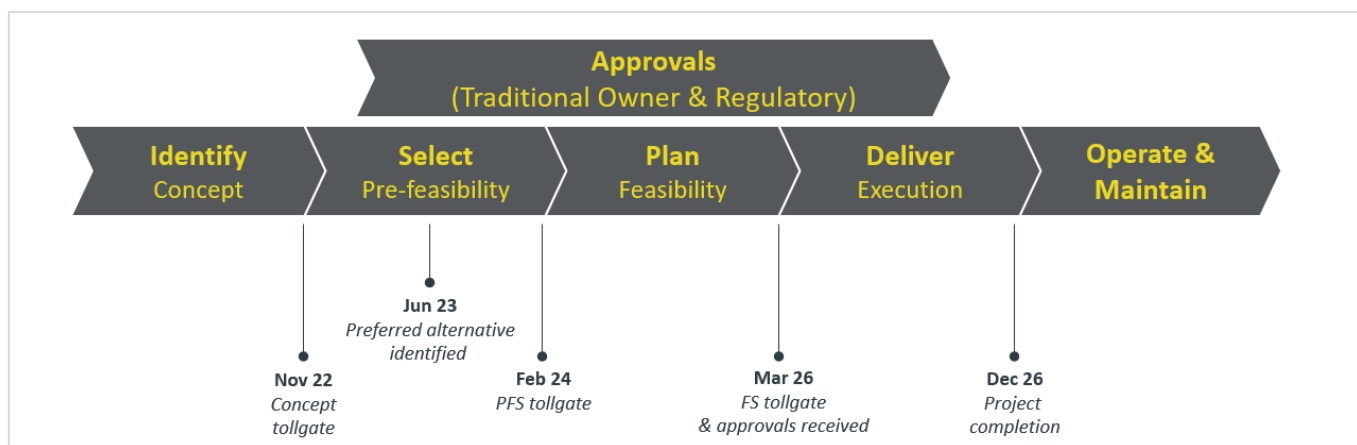


Figure 14 **Proposed Project Timeline – Studies and Execution**

4. Consultation

4.1 Stakeholder identification

The Proposal site is located on Groote Eylandt in the Gulf of Carpentaria, approximately 650 km south-east of Darwin and 50 km off the coast of Arnhem Land. Groote Eylandt is Aboriginal land under the Aboriginal Land Rights Authority (ALRA). The Anindilyakwa Land Council (ALC) represent the 14 clan groups of the Groote Archipelago, and is the statutory body responsible for negotiations and engagement regarding activities on Aboriginal land. The Traditional Owners are an amalgamation of two cultures: the Warnindilyakwa and the Nunggubuyu (ALC, 2019). Both cultures speak Anindilyakwa as their first language, and the land, people and culture are also referred to by this term.

The ALC, under section 23(1) of the ALRA undertakes consultation regarding proposals relating to lands and seas in the Groote Archipelago. The ALC identified the Bara and Jaragba clan groups as the appropriate stakeholders to engage for this Proposal.

Parts of the Proposal site extends outside of the Proponents current lease area. As such, the Proponent requires an access arrangement with the ALC. This gives the Traditional Owners, represented by the ALC, a decision-making role in the Proposal.

4.2 Approach and objectives

Consultation with impacted stakeholders plays an important role in Proposal development. The aim of consultation is to raise awareness, understand community and stakeholder issues, and obtain feedback from community and other key stakeholders to inform the Proposal design, development, and future consultation requirements.

For the Proposal, the Proponent considers effective communication and stakeholder engagement to be fundamental to reducing risk, minimising social, cultural and environmental impacts, considering the needs of the community and stakeholders, and understanding their concerns about the Proposal and opportunities.

The Proposal was originally developed to address feedback from ongoing engagement with the community and therefore is a direct reflection of the Proponent's commitment to meaningful engagement.

The approach to consultation for the Proposal aims to:

- Maintain relationships with key stakeholders and the community including Traditional Owner groups and Custodians.
- Provide information about the Proposal to stakeholders.
- Establish channels for feedback.
- Understand community and stakeholder issues and concerns.
- Inform Proposal development including design and construction planning, environmental assessment, and future consultation requirements.

The stakeholder engagement and consultation approach for the Proposal is underpinned by the *IAP2 Public Participation Spectrum* (IAP2, 2014) (see Table 15). The Spectrum has been used to assist in identifying the level of participation to be pursued for the Proposal. Adoption of the Spectrum also aligns with the requirements set out in the *NT EPA's Guidance for Stakeholder Engagement and Consultation*¹ document.

As Traditional Owners have a decision-making role in the proposal, consultation and engagement is conducted at all levels of the IAP2 Spectrum. Based on advice from the ALC, senior clan members and Traditional Owners should receive regular updates in the form of face-to-face meetings. Broader clan groups should be kept informed through existing regular engagement mechanisms and also Proposal specific face-to-face presentations.

Table 15 outlines the high-level strategies for delivering engagement across all levels of the IAP2 Spectrum.

¹ NT EPA 2021. Stakeholder Engagement and Consultation. https://ntepa.nt.gov.au/data/assets/pdf_file/0005/884696/guidance-proponents-stakeholder-engagement-and-consultation.pdf

Table 15 *Proposal strategies aligned with IAP2 Spectrum*

IAP2 Public Spectrum	Participation goal	Proposal strategy
Inform	Provide information that stakeholders should know and be able to act on.	Develop collateral and present to stakeholders providing regular Proposal updates.
Consult	Obtain feedback and consider the issues, concerns and suggestions.	Regularly seek feedback through Proposal updates.
Involve	Work with stakeholders to understand issues and identify options.	Meet with stakeholders to determine preferred Proposal concept options.
Collaborate	Create working partnerships and support involvement with decisions.	Maintain existing relationships by involving stakeholders in key Proposal stages and working with stakeholders to deliver.
Empower	Stakeholders are part of the final decisions and outcomes.	Ultimately the stakeholders have a decision-making role.

The approach to community and stakeholder engagement and consultation continues to adapt to the advice and needs of the community and stakeholders throughout the engagement process.

4.3 Guiding documents

Consultation and engagement are guided and informed by various statutory, legislative and guideline requirements of the NT planning approval. Those relevant to this Proposal are listed below.

- Anindilyakwa Indigenous Protected Area Plan of Management 2016.
- NT EPA Environmental Impact Assessment – Guidance for Proponents.
- NT EPA Stakeholder Engagement and Communication Strategy Guidelines.
- NT *Environment Protection Act 2019*.
- NT *Environment Protection Regulations 2020*.
- Remote Engagement and Coordination Strategy (NT Government).
- ISO 26000 Standards for Social Responsibility.
- Core Values and Code of Ethics of IAP2.
- FAO Free, Prior and Informed Consent – Manual for Project Practitioners.

4.4 Regular engagement

The Proponent has a long history of engagement with the ALC and the communities of Groote Eylandt. As per the GEMCO Stakeholder Engagement Plan, engagement activities occur for operational, regulatory and Indigenous participation activities. The Proponent prioritises face to face engagement and has established the following avenues for regular engagement:

- Mining Liaison Committee (MLC) meeting for the Western, Eastern and Southern Lease Areas with the Anindilyakwa Land Council (quarterly).
- Groote Eylandt Executive Steering Committee (GEESC) of which GEMCO participates with NT Government, NIAA and Anindilyakwa Land Council (quarterly).
- Government briefings with ministerial departments regarding GEMCO's future requirements – as required.
- Community Safety Meetings in Angurugu and Umbakumba (coordinated by NT Police).
- Topical meetings with priority stakeholders.
- Vice President Operations (VPO) Town Halls/Internal workforce updates with leadership team members.
- Presentation opportunities at key stakeholder meetings (for example - ALC Board Meetings).
- Targeted Traditional Owner site visits and tours with specific family groups, organisations or groups.

The Proponent also has the following established engagement mechanisms for communication activities:

- Community Investment execution through grants and signature partnerships.

- Complaints and Grievance Management which may be captured via any of the methods of engagement.
- Email, telephone and face to face surveys with communities and internal workforce targeted to projects to receive specific information on key topics.
- Telephone and email communication – either direct or via GEMCO community email and phone line.
- Facebook page GEMCO Community.
- Information stands at key community events.
- Local radio in Angurugu and Umbakumba which is primarily in Anindilyakwa language.
- Standardised communication via flyers, South32 website and social media channels.
- Bulk text message capability exists for emergency notifications to GEMCO workforce members, Alyangula residents and can be accessed for broader Groote Eylandt.

4.5 Proposal specific engagement

Targeted engagement to inform the Proposal was undertaken between March 2023 and February 2025. Activities during this period aimed to:

- Provide information about the environmental approval process in a suitable format.
- Seek and capture early feedback, concerns, issues and opportunities from stakeholders.
- Seek and capture early feedback from the ALC and Traditional Owners on cultural protocols around engagement and understanding of sensitivities.
- Provide information about how stakeholders can engage throughout the approval process.
- Seek and capture information about how stakeholders would like to be engaged through the approval process.
- Provide information about the environmental studies to be undertaken and findings.
- Present information on the proposed design and the other alternatives considered.

Specifically, engagement and consultation with Traditional Owners during the referral was designed to meet the requirements of Section 43 of the EP Act. The legislative requirements are as follows:

- 43(a) to provide communities that may be affected by a proposed action with information and opportunities for consultation to assist each community's understanding of the proposed action and its potential impacts and benefits.
- 43(b) to consult with affected communities, including Aboriginal communities, in a culturally appropriate manner.
- 43(c) to seek and document community knowledge and understanding (including scientific and traditional knowledge and understanding) of the natural and cultural values of areas that may be impacted by the proposed action.
- 43(d) to address Aboriginal values and the rights and interests of Aboriginal communities in relation to areas that may be impacted by the proposed action.

4.5.1 Messaging and information

The following is a summary of the key messages and information presented throughout the engagement:

- Rationale for the Proposal.
- Overview of the Pre-feasibility Study.
- Overview of the environmental impact studies and approvals pathway.
- Proposal alternatives.
- Forecast water volumes.
- Preferred proposal concept.
- Findings of the environmental impact studies.

4.5.2 Engagement activities

A summary of the activities, tools, uptake and stakeholders targeted during consultation to inform the referral is provided in Table 16.

Table 16 *Engagement activities – consultation to inform the referral (2023 – 2025)*

Activity	Purpose	Target stakeholder group	Date
Face to face meeting	Introduce the Proposed Excess Water Disposal Proposal.	Anindilyakwa Land Council (ALC)	13 Mar 2023
Face to face meeting	Engagement with ALC to share Proposal information.	ALC	19 July 2023
Face to face meeting	Consultation with Traditional Owners to present technical aspects of the Proposal concept.	Senior members of Bara & Jaragba clan groups	30 Aug 2023
Face to face meeting	Consultation with Traditional Owners to present technical aspects of the Proposal concept.	Members of Bara clan group	7 Sept 2023
Letter	Received by proponent from the ALC confirming Traditional Owners understood and agreed to GEMCO undertaking further investigation into the proposed concept and outlining further steps for engagement.	ALC	11 Sept 2023
Face to face meeting	On Country engagement with Traditional Owners to identify values.	Senior men from Bara & Jaragba clan groups	24 Oct 2023
Face to face meeting	Engagement with ALC to present updates on the referral, status of the Proposal and outcomes of environmental impact assessments.	ALC	16 Oct 2024
Email	Sent draft environmental assessment reports to the ALC.	ALC	23 Jan 2025
Face to face meeting	Engagement with ALC to discuss the Proposal and further engagement with Traditional Owners.	ALC	5 Feb 2025

4.5.3 Summary of feedback received

Feedback received from the above engagement activities has been addressed in the table below or where relevant to the referral, in other sections of this report. Feedback has been grouped into key themes outlined below in Table 17.

Table 17 *Summary of feedback received during consultation to inform the referral*

Theme	Feedback	Response
Water quality	– How will testing results be reported?	GEMCO advised the ALC that they will work with the ALC to develop a reporting protocol, which could be similar to the current reporting arrangements to the ALC on water monitoring.

Theme	Feedback	Response
Engagement	The ALC advised on 11 September 2023 that: – Negotiations are still necessary for use of the intertidal zone at Milner Bay port which is currently outside of the GEMCO lease. – GEMCO needs to provide updates to the ALC and relevant traditional owners if there are advancements or changes to this Proposal. – Future consultation is required for GEMCO to attain traditional owner consent for the finalised plan.	GEMCO will negotiate access agreements for the Proposal's areas of land which are off lease of the GEMCO mine. GEMCO has provided regular Proposal updates to the ALC since September 2023 and is committed to continue to do so. GEMCO is committed to continue to engage with the ALC and the Traditional Owners to gain their consent for the Proposal.
	– Need to develop a mechanism for communicating volumes of water to Traditional Owners. – ALC would like to see the environmental reports.	With regards to communicating volumes of water, the proponent has established processes to continually engage with the ALC, which represent the Traditional Owners. The proponent identified familiar bodies of water (local swimming pool) to communicate the volume of water relevant to the proposal. In response to the request for environmental reports, GEMCO provided the draft environmental referral report and the draft technical reports proposed for submission for referral in January 2025.
Community use of proposed site and surrounds	– Some people from Bickerton use the port area, particularly the ramp near the fishing jetty. – Community use the beach north of the Port at an area called Flat Rock to fish and collect milky oysters. – Community use the area south of the Port to fish for trevally, queenfish, parrotfish and coral trout. – Community fish, hunt, collect mud crabs and oysters, along the west coast of the island. – Boating is common for local community with small boats being launched from Malkala community off the beach.	GEMCO acknowledges the existing community uses of the proposed site and surrounds. To manage any disturbance to marine activities by the local community, GEMCO will regularly communicate any Proposal activities within the Port area to the ALC to inform Traditional Owners of access restrictions during time of construction. The operation of the pipeline is not expected to impact on fishing activities adjacent to the Port.
Culturally important sites	– Senior men advised on 24 October 2023 that all known cultural sites are included on GEMCO's cultural heritage constraint mapping. – Bara Totem is the parrotfish and the song-line for the parrotfish is along the west coast through the Port area around to Winchelsea Island. – ALC advised GEMCO on 30 October 2024 that there are no cultural significant areas within the proposed offshore geotechnical drilling areas. The footprint of the geotechnical drilling area is identical to that of the marine section of the Proposal.	A Cultural Heritage Assessment report was prepared by the Proponent. A Construction Environmental Management Plan (CEMP) will be developed and implemented, which will make provisions to stop work during an unexpected find and reporting to the ALC.
Tourism	– Traditional Owners said there are no tourist activities in the area and members of the public cannot access the area without written permission from Traditional Owners and the ALC.	N/A

Theme	Feedback	Response
Marine ecology	– Flatback and green turtles sometimes nest along the beaches but not often. They are more often seen around Winchelsea Island. – Community do not see dugong in the area. – Sometimes community see prawns in nets. – There is a reef that runs from Ndunga to Alyangula. – Community said there is heaps of seagrass. – A 6 m long white crocodile lives in a creek south of the Port area. – Community sometimes see dolphins. – What are the impacts to sea life? – Consider showing Traditional Owners images of marine animals of conservation significance.	– The location of the ocean outfall has been selected to avoid areas of high environmental value. – The area of Milner Bay presents a lower value marine habitat than the surrounding Groote Eylandt marine habitat. The wharf area is a heavily modified habitat. – Traditional Owner consultation identified that the Proposal area does not provide high value fishing habitat. Some key points on the proposed location were provided to the ALC and Traditional Owners: – Marine discharge area is adjacent to operating port – Benthic habitat primarily comprised of open, soft substrate – Patchy seasonal presence of seagrasses to north and south of Proposal area – No commercial fishing activities undertaken in the Proposal area – Traditional Owner consultation identified that the Proposal area does not provide high value fishing habitat – No records of turtle nesting in the Proposal area – Conservation species may transit the footprint – available habitat is not as high value as on eastern side of the Eylandt In response to the query regarding impacts to sea life, the ALC was provided with the following information which is also included in the referral submission: – The marine ecology assessment determined that the Proposal is not likely to significantly impact on marine ecosystems if proposed measures to avoid and mitigate the effects of the Proposal are implemented. – The results also found that no significant residual impacts to MNES and/or TPWC Act listed threatened species are anticipated. GEMCO will be monitoring the effectiveness of the mitigation measures during construction and operation. – No other Proposals have been identified by GEMCO that would occur in the same footprint at the same time. Therefore, there is no potential for cumulative impacts from other activities. The discharged water plume is predicted to be buoyant and will be flushed rapidly. This limits the potential for impacts to marine life, especially benthic ecosystems.
Discharge to ocean	– How is the discharge plume researched? – How does water move at the discharge location?	In response to the request by the ALC to provide further information on the discharge plume and the hydrodynamic model, GEMCO provided a detailed response to the ALC on the dispersion model, explaining how the marine model was developed and its results. A copy of the Marine Discharge Modelling Report prepared by GHD was also provided.

Theme	Feedback	Response
Cumulative impacts	What cumulative impacts could there be over the life of the Proposal?	GEMCO advised the ALC that no other Proposals have been identified that would occur in the same footprint at the same time. Therefore, there is no potential for cumulative impacts from other activities.
Communication of referral studies	The ALC suggested that during subsequent engagement with the Traditional Owners, they are shown: - Images of what is on the sea floor. - A map showing marine habitats that were identified.	In response to this feedback, GEMCO provided maps and photos from the benthic habitat survey and marine fauna confirmed to occur to the ALC. In addition, the following key observations from the marine ecology study were provided: - Open soft substrate in deeper waters beyond 15 m depth - Open sandy substrate in shallower areas from 15 m to intertidal zone - Hard substrate and reefs adjacent to the jetty (north and south) in the nearshore zone - Seasonal presence of seagrass and macroalgae Scattered coral gardens and individual coral colonies in pockets south of the marine footprint.
Construction	How long will construction take?	GEMCO advised the ALC that construction is predicted to take approximately 9 months.
Noise and vibration	Will nearby communities of Malkala, Alyangula and Pole 13 be able to hear or feel vibration from the pipeline?	A copy of the noise and vibration assessment report was provided to the ALC. In addition, GEMCO advised the ALC: - During construction, communities near by active construction works may hear construction noises for periods of up to 12 days at a time. - Vibrations from sheet piling at the ocean outfall are far enough away from residences so are unlikely to cause any disturbance to communities. - During operation, the only source of noise are pumps and generators at the NH2 quarry. This is approximately 4 kilometres from the nearest community (Angurugu). - No vibration sources have been identified for the operation of the pipeline. Therefore, no noise or vibration impacts are anticipated. - No noise emissions or vibrations are anticipated from the movement of water through the pipelines, as water is being pumped at low velocity. - In addition, the draft noise and vibration impact assessment was provided to the ALC in January 2025.
ALC 'in principle' support	- The ALC has made a commitment to providing a letter stating 'in principle' support for the referral. - Engagement with Traditional Owners is to continue to gain further endorsement	GEMCO will continue to engage with ALC and Traditional Owners on the Proposal throughout the Proposal lifetime (refer to section 4.6).

4.5.4 Response to feedback

GEMCO responded to feedback and questions received throughout the engagement process either directly during engagement or by providing further information at the subsequent event or via meetings or electronic communication afterwards.

The feedback from the ALC and Traditional Owners confirmed that the Proposal's aim of avoidance of impacts on culturally significant sites and environmentally sensitive areas and the development of detailed technical studies

are able to provide assurance that impacts to community and stakeholders have been considered and are managed appropriately. This is further supported by the ALC making a commitment to providing 'in principle' support for the referral of the Proposal.

4.6 Summary of engagement to date

GEMCO collaborated with the ALC to identify affected stakeholders and deliver engagement activities that provided information about the Proposal and captured stakeholder feedback. GEMCO has attended or held seven face-to-face meetings, three of which were with relevant Traditional Owners and Senior Clan members. Additionally, GEMCO's External Affairs team resides on Groote Eylandt and regularly engages with the ALC on routine business.

Informed by on-site experience and guided by the ALC, GEMCO employs an engagement approach tailored to the needs of the local community. This includes utilising team members with cultural awareness for engagement activities, developing accessible information tools, and adhering to ALC guidance on the appropriate format and timing for events. For example, meetings have been held face-to-face on the beach, near the Proposal site.

As documented in Table 17, the engagement activities captured knowledge from Senior Clan members about the values and uses of the areas affected by the Proposal. In conjunction with this engagement, GEMCO developed an understanding of the rights and interests of Aboriginal people connected to the proposed sites and has commenced an engagement process that includes negotiations of access agreements with the Traditional Owners for off-lease portions of the Proposal, clearing permits, and other permits. No engagement to date has identified 'red flags' or suggested opposition to the Proposal. Most recently, the ALC indicated they would be able to supply an 'in principle' letter of support for the Proposal.

GEMCO is committed to continually engaging with the ALC and Traditional Owners on the Proposal and will maintain a relationship with the relevant community throughout the Proposal's life.

4.7 Ongoing Proposal engagement

GEMCO's engagement on the Proposal will continue throughout the Proposal's life. The engagement with the Aboriginal community is based on the principles of Free, Prior and Informed Consent (FPIC) that recognises the critical decision-making role of Traditional Owners.

In the context of the Proposal, an element of FPIC is the requirement for continuous and ongoing engagement to ensure that Traditional Owners are informed and are given the opportunity to be involved in the Proposal. GEMCO has an External Affairs team with dedicated resources that provides ongoing facilitation of this process.

This involvement will include negotiations of access agreements with the Traditional Owners for off-lease portions of the Proposal, engagement regarding cultural heritage on clearing permits and other matters, as appropriate.

In addition to Proposal, specific engagements, updates on the Proposal will also be provided to the ALC during the monthly MLC meetings.

5. Legislative and regulatory framework

The Project is subject to both Commonwealth and NT legislation and regulatory requirements. A summary of legal, policy and guideline frameworks relevant to the Proposal and their context to the Project is provided in Table 18 and Table 19.

Table 18 Commonwealth legislation and Proposal relevance

Legislation / Administering authority	Purpose	Proposal relevance
<i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i> Department of Climate Change, Energy, the Environment and Water (DCCEEW)	Provides for the preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition.	At the time of preparation of this report, no active applications were found within the Construction footprint arising from this Act. An unexpected finds procedure will be adopted and included in the Construction Environmental Management Plan (CEMP) for the Proposal.

Legislation / Administering authority	Purpose	Proposal relevance
<i>Aboriginal Land Rights (Northern Territory) Act 1976</i> ALC	Relates to providing for the granting of Traditional Aboriginal land in the NT for the benefit of Aboriginal people and other purposes. This Act also facilitates access to Aboriginal land via certain roads bordered by Aboriginal land. This Act also facilitates the establishment of Land Councils, being the statutory bodies who represent the interests of Aboriginal peoples in relation to land. The ALC represents the Groote Eylandt Archipelago.	The Anindilyakwa were granted an inalienable freehold title to the islands of the Groote Eylandt Archipelago to the “high water mark”. As a result of the “Blue Mud Bay” decision in 2008, this freehold title now extends to the “low water mark”. This means permission is required from the landowner to access to the water and/or land between the high and low tide watermarks. The off-lease area for the Proposal is located within the Groote Eylandt tidal waters and is included as part of the Anindilyakwa Land Trust. Approval for use of and formal tenure arrangements (Access Agreement) will be required from the ALC to access and use the off-lease area. The use of the off-lease area will need to have regard to the Anindilyakwa Indigenous Protected Area Plan of Management 2016. Any works on land located outside existing lease areas (e.g. for the pipeline) will also require an Access Agreement with the ALC. There are currently no pending native title claims or registered native title claims within the Construction footprint. There are currently no Future Act applications or notices within the Construction footprint. There are currently no registered Indigenous Land Use Agreements (ILUAs) for the Construction footprint.
<i>Australian Heritage Council Act 2003</i>	This Act establishes the Australian Heritage Council, the principal advisor to the Australian Government on issues regarding the listing of heritage areas. A Heritage List contains places and areas of national heritage value.	At the time of preparation of this report, no active applications were found within the Construction footprint arising from this Act.
<i>Australian Jobs Act 2013</i> Australian Industry Participation Authority (AIPA)	This Act requires proponents with a project value equal to or greater than \$500 million (M) to provide an opportunity for Australian industry to supply goods and services associated with the Proposal.	Australian industry will be given the opportunity to supply goods and services for the Proposal.

Legislation / Administering authority	Purpose	Proposal relevance
<i>Australian Maritime Safety Authority Act 1990</i> Australian Maritime Safety Authority (AMSA) / Department of Transport	The Act established the Australian Maritime Safety Authority and aims to promote maritime safety and protection of the marine environment, preventing and combating ship-sourced pollution in the marine environment while providing infrastructure to support safety of navigation in Australian waters and providing a national search and rescue service to the maritime and aviation sectors.	The ocean outfall offshore component of the Proposal will be constructed within the marine environment and must provide for the protection of the marine environment. The construction of the ocean outfall offshore component will require the use of vessels and must provide for the maritime safety and minimise ship-sourced pollution.
<i>Biosecurity Act 2015</i> Department of Agriculture, Fisheries and Forestry (DAFF)	This Act is about managing diseases and pests that may cause harm to human, animal or plant health or the environment. It covers both agricultural and human medical biosecurity risks, including epidemics, pandemics, diseases, and pests.	The Proposal will be required to meet the obligations of the <i>Biosecurity Act 2015</i> (Cth) through the implementation and incorporation of the existing GEMCO biosecurity inspections procedures to prevent invasive species arriving and establishing on Groote Eylandt.
EPBC Act DCCEEW	The EPBC Act is Australia's principal piece of environmental legislation and provides a legal framework to protect and manage Matters of National Environmental Significance (MNES), which includes World heritage properties, National heritage properties, Wetlands of international importance, Threatened species and ecological communities, Migratory species, Commonwealth marine areas, Great Barrier Reef Marine Park, Nuclear actions (including uranium mines) and Water resources, in relation to coal seam gas and coal mining development. A person who proposes to take an action that will have or is likely to have a significant impact on one or more MNES must refer that action to the Minister administering the EPBC Act for a decision on whether assessment and approval is required under the EPBC Act. Under the EPBC Act, a project requiring assessment (and approval) from both the Territory and Commonwealth, may be assessed under the Bilateral Agreement.	The Proposal was self-assessed against the Commonwealth '<i>Significant impact guidelines 1.1 – Matters of national environmental significance</i>' (Commonwealth of Australia, 2013). The Proposal is considered unlikely to result in a significant residual impact as described in Section 6.5.

Legislation / Administering authority	Purpose	Proposal relevance
<i>National Environment Protection Council Act 1994</i> National Environment Protection Council (NEPC)	This Act implements an agreement between the states and territories and the Commonwealth by establishing a National Environment Protection Council "NEPC", and defines the purpose, powers, functioning and financing of NEPC, as well as providing for related matters. NEPC has two primary functions: to make National Environment Protection Measures (NEPMs) and to assess and report on the implementation and effectiveness of NEPMs in participating jurisdictions.	If the Proposal is expected to impact the ambient environmental quality, either air, noise, marine, estuarine, freshwater or land, the Proposal's construction and operation must comply with any national environment protection measures as described by the NEPC.
<i>Native Title Act 1993</i> Attorney-General's Department (AG)	Provides for the recognition and protection of native title and to establish ways in which future dealings affecting native title may proceed.	The Anindilyakwa people became one of the first Australian Aboriginal traditional owner groups recognised by Australian law, as having inalienable freehold title over the islands within the Groote Archipelago. As a result of the ALRA, the Northern Land Council (NLC) became the statutory body responsible for activities on the Groote Archipelago. In 1991, the Anindilyakwa Land Council (ALC) was established, taking over most of the role previously held by the NLC, although the NLC remains responsible for Native Title representations (ALC, 2019). A search of the National Native title Tribunal on 06/02/25 identified no currently registered Native Title Applications or Native Title Determinations within the Construction footprint.
<i>Navigation Act 2012</i> Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA)	This Act covers international ship and seafarer safety, protects the marine environment where it relates to shipping and the actions of seafarers in Australian waters.	Commercial vessels operating with the Milner Bay Construction footprint may be required to have: – Safety certificate relating to: • Survey • Construction • Machinery and equipment • Other matters relating to vessel safety. – Specified pollution certificates, including certificates relating to: • Carriage of noxious liquids or oils • Carriage of packaged harmful substances • Energy efficiency • Tonnage regulations and/or certificates.

Legislation / Administering authority	Purpose	Proposal relevance
<i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> Australian Maritime Safety Authority (ASMA)	Provides for Australia's domestic obligations under the MARPOL Convention, relating to the prevention of accidental and operational maritime environmental pollution from shipping. This Act applies to both within and outside Australia and extends to every external Territory and to the exclusive economic zone.	The Proposal will require the operation of vessels which are not naval, or government ships exempt under this Act. Therefore, the prevention, avoidance and reporting measures specified in the Act apply to all vessels within the ocean outfall offshore component of the Proposal.

Table 19 NT legislation and Proposal relevance

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>Northern Territory Aboriginal Sacred Sites Act 1989</i> Aboriginal Areas Protection Authority (AAPA)	Facilitates the protection and registration of sacred sites, by providing entry onto sacred sites subject to conditions and supplying procedures for avoidance of sacred sites when developing and using land. An Authority Certificate is required where sacred sites have been identified in specific areas of land or sea in the NT. An Authority Certificate is a legal document that protects sacred sites from damage by setting out the conditions for carrying out specific works on an area of land or sea.	Works will be conducted in accordance with existing site Authority Certificate, management plans and procedures. No further approval under this Act is required.
<i>Bushfire Management Act 2016</i> Bushfire NT / Northern Territory Fire and Emergency Service	The BM Act provides the framework for managing bushfire in areas outside the Emergency Response Areas of cities and towns in the NT.	Bushfire management during construction and operations will be in accordance with existing site management plans and procedures. No further approval under this Act is required.

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>Environment Protection Legislation Amendment Act 2023</i> (Amendment Act) DEPWS	New system for licensing of mining operations introduced in the NT in 2023. The new licensing arrangements introduces a new three tier, licensing system, being: – Standard conditions – Modified conditions – Tailored licences. – The Amendment Act introduced a new environmental licensing framework for mining and took effect on 1 July 2024. The <i>Mining Management Act 2001</i> (NT) (MMA Act) was repealed at that time.	Mining operators (like GEMCO) with an existing authorisation are considered to have a 'deemed licence' 1. All existing operators that held a mining authorisation and approved Mining Management Plan (MMP) on 1 July 2024 were automatically deemed to hold an environmental (mining) licence under the EP Act. This is referred to as a 'deemed licence'. 2. The 'deemed licence' is made up of the Authorisation and approved MMP and will effectively operate as an 'environmental (mining) licence' under the EP Act (i.e. compliance and enforcement instruments under the EP Act apply). 3. Existing operators were not required to take any steps to obtain the deemed licence as this is an automatic process that occurred upon commencement of the Amendment Act (section 304). 4. An actual 'licence' will not be issued for deemed mining licences. The actual MMA's mining Authorisation and approved MMP make up the deemed licence and the terms and conditions of the mining Authorisation and approved MMP will continue to apply. 5. The deemed licence will remain valid for a period of 4 years (i.e. until 30 June 2028), unless it is first cancelled, revoked or replaced.
<i>Environment Protection Act 2019</i> Department of Lands, Planning and Environment (DLPE)	The key environmental legislative framework designed to address and manage environmental concerns within the Northern Territory. The primary purpose of the EP Act is to promote the sustainable management of natural resources and the protection of environmental values. Furthermore, the EP Act identifies obligations and duties to prevent environmental harm, environmental nuisance and contamination. The EP Act was amended and came into force on 1 July 2024. The amended Act introduced a new environmental licensing framework for managing environmental impacts of mining activities in the NT. The MMA Act was repealed at that time.	The Proposal has the potential to impact on the environmental factors under the themes of Land, Water and Sea including the impacts of excavations and freshwater discharge into tidal waters. A NT EPA Referral is required for the Proposal. The NT EPA determines the assessment process based on the information provided in the Referral documentation.
<i>Fisheries Act 1988</i> Fisheries Branch Department of Agriculture and Fisheries	Manages aquatic resources within the principles of ecologically sustainable development and objectives include to maintain stewardship of aquatic resources that promotes fairness, equity and access to aquatic resources by all stakeholders.	Construction activities associated with ocean outfall pipeline and creek crossings that cause shock, sound or vibration under water or introduce dangerous substances in NT waters will require a permit under this Act.

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>Heritage Act 2011</i> DLPE	The objective of this Act is to provide for the conservation of the Territory's cultural and natural heritage. Achieved by declaring places and objects of heritage significance, establishing the Heritage Council and providing for heritage agreements to encourage conservation, use and management of heritage places and objects. The <i>Heritage Regulations 2012</i> supports this Act.	There are no heritage places listed on the NT Heritage Register within the Construction footprint. The NT Heritage Register identified the following heritage items on Groote Eylandt in proximity to GEMCO operations: – Angurugu Heritage Project – Emerald River Mission – Emerald River Cemetery. All activities during construction will be in accordance with existing site management plans and procedures for managing unknown heritage finds. No further approval under this Act is required.
<i>Marine Pollution Act 1999</i> DLPE	The overall purpose of this Act is to protect the Territory's marine and coastal environment by minimising intentional and negligent discharges of ship-sourced pollutants into coastal waters.	The ocean outfall offshore component of the Proposal will require the operation of vehicles and equipment in the Milner Bay marine environment. Accordingly, the prevention, avoidance and reporting measures specified in this Act will apply within this Construction footprint. Vessel and equipment operation during construction and operations will be in accordance with existing site management plans and procedures. No further approval under this Act is required.
<i>Mineral Titles Act 2010</i> Department of Mining and Energy	The Mineral Titles Act is an act that establishes a framework for granting and regulating mineral titles that authorise exploration for, and extraction and processing of minerals and extractive minerals.	The mineral leases at GEMCO, known as the Western Leases, are subject to licence conditions under the Mineral Titles Act , relevant environmental licence and approvals and a Mining Agreement with the ALC.

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>National Environment Protection Council (Northern Territory) Act 1994</i> National Environment Protection Council (NEPC)	The object of this Act is to ensure that, by means of the establishment and operation of the National Environment Protection Council, people enjoy the benefit of equivalent protection from air, water, noise or soil pollution and decisions of the business community are not distorted and not fragmented between participating jurisdictions. NEPC may make national environment protection measures relating to any of the following: – ambient air quality – ambient marine, estuarine and/or freshwater quality – the protection of amenity in relation to noise – general guidelines for the assessment of site contamination – environmental impacts associated with hazardous wastes, – re-using and recycling used materials – motor vehicle noise and emissions. These measures will then be implemented by the Territory and GEMCO will have to comply.	If the Proposal is expected to impact the ambient environmental quality, either air, noise, marine, estuarine, freshwater or land, the Proposal construction and operation must comply with any national environment protection measures as described by the NEPC. Activities during construction will be in accordance with existing site management plans and procedures for managing noise, vibration, air, soil and water quality. No further approval under this Act is required.
<i>Planning Act 1999</i> (Planning Act) DLPE	The purpose of this Act is to establish a system to facilitate planning for the orderly use and development of land, including a strategic plan applied to planning schemes and implemented in individual planning decisions, while ensuring that strategic planning reflects the wishes and needs of the community.	The Proposal is not subject to a use approval under the Planning Act, however, secondary approvals may apply for elements of the Proposal. A Development Permit may be required for activities such as excavation, filling, clearing native vegetation or upgrading roads and drains.
<i>Ports Management Act 2015</i> Department of Logistics and Infrastructure	This Act provides for the control, management, and operation of ports, and for related purposes. The <i>Ports Management Regulations 2015</i> supports this Act.	Groote Eylandt is a declared pilotage area. All vessels greater than 35 m in length within a declared pilotage area must either carry a licensed pilot or be under the lawful command of a master who holds a pilotage exemption certificate. Vessel use during construction will be in accordance with existing site management plans and procedures. No further approval under this Act is required.

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>Soil Conservation and Land Utilisation Act 1969</i> DLPE	The primary purpose of this Act is to make provision for the prevention of soil erosion and for the conservation and reclamation of soil.	Soils within the Construction footprint include hydrosols, tenosols and kandosols. There are four types of ESCP required by DEPWS, being: – Type 1 ESCP – suitably qualified professional (ESCP is recommended, but non-statutory) – Type 2 ESCP – certified professional in erosion & sediment control (statutory) – Type 3 ESCP – certified professional in erosion & sediment control plus auditor (statutory) – Type 1A, 2A, 3A – assessment required by DEPWS. An ESCP will be required for the Proposal prior to construction commencing.
<i>Territory Parks and Wildlife Conservation Act 1976</i> Department of Tourism and Hospitality / Department of Lands, Planning and Environment	The Act aims to establish Territory parks and reserves and protect and conserve NT wildlife that is listed as threatened including essential habitat. The Territory Parks and Wildlife Regulations 2000 supports this Act.	A permit is required under this Act if the Proposal construction or operation necessitates the taking or interfering with wildlife. Mitigation measures including fauna spotters are proposed in Section 6.2.
<i>Water Act 1992</i> DLPE	Provides for the investigation, allocation, use, control, protection, management and administration of water resources, including extraction of groundwater, wastewater management and water pollution. The Act also provides for water allocation plans, drilling licences, bore construction permits, water extraction licences, waste discharge licences, fees and charges, and penalties for offences against the Act. The Water Regulation 1992 supports this Act.	Water extraction does not form part of this Proposal. Dewatering of the GEMCO quarry pits is an existing approved action under the MMP. Water use during construction will be in accordance with existing site management plans and procedures. A Waste Discharge Licence (WDL) is required when discharged waste comes into contact with water. A WDL is required for the discharge of water into the marine environment for operation of the pipeline.
<i>Waste Management and Pollution Control Act 1998</i> DLPE	The purpose of this Act is to protect, and where practicable to restore and enhance the quality of the NT environment by preventing and reducing the likelihood of pollution while effectively responding to pollution. The Act also aims to reduce waste generation and increase re-use and recycle of waste while effectively managing waste disposal. The Waste Management and Pollution Control (Administration) Regulation supports the <i>Waste Management and Pollution Control Act 1998</i> (NT).	All waste generating activity works carried out in association with the Proposal will need to meet the objectives of the Act. Compliance will be required in accordance with the provisions of this Act.

Legislation / Administering authority	Purpose	Relevance to the Proposal
<i>Weeds Management Act 2001</i> DLPE	The purpose of this Act is to address invasive weeds and associated issues within the NT. The WM Act seeks to establish a legal and administrative framework for the proactive management of invasive plant species to protect native flora and ecosystems while also minimising potential damages to agriculture production. Furthermore, the act aims to provide a structured and scientific framework for managing and controlling the spread of noxious and invasive plant species among relevant authorities and stakeholders. Weeds Management Regulations 2006 supports this Act.	Weeds were identified during site surveys. Weed management during construction and operations will be in accordance with existing site management plans and procedures.
<i>Work Health and Safety (National Uniform Legislation) Act 2011</i> Attorney-General's Department	This Act provides a balance and nationally consistent framework to provide for safety and security to works and workplaces.	The management of the workplace and workforce associated with the Proposal will need to comply with the requirements of this Act to ensure that workers are protected and workplaces are safe for them, this will be in accordance with existing site management plans and procedures.

6. Environmental factors and objectives

6.1 Overview

6.1.1 Self-assessment screening

A self-assessment of the Proposal has been undertaken using the pre-referral screening tool (Appendix A) provided in the NT EPA guideline '*Referring a proposed action to the NT EPA*' V2.0, August 2022.

The Proposal is the construction of pipeline and outlet, and movement and discharge outfall of dewatered water to the marine environment at a discharge rate determined through hydrodynamic modelling (Appendix B). Before self-assessment against environmental factors was undertaken, the Proposal (as described in Section 2.6) was considered against Question 1 in the NT EPA self-assessment screening questions. Based on the limited Proposal activities in a largely brownfield area and the action being construction of the pipeline and outlet, movement of water and the key water quality parameters of the water to be discharged to the marine environment, the Proposal was considered to not be of an inherently hazardous nature.

The following approach has been taken for the self-assessment to identify potential environmental impacts from the Proposal on the NT EPA's environmental factors and objectives:

- **Identification and characterisation of environmental values:** A combination of desktop assessments, literature reviews, and field surveys were undertaken to identify and characterise the existing environment that occurs within the Construction footprint and surrounding areas. Environmental values were then selected for further assessment on the basis that they are ecologically, socially, culturally and/or economically important, and are either likely to be impacted by the Proposal, or people are highly concerned that they could be impacted.
- **Identification of potential impacts:** Consideration was given to the potential impact of activities associated with the construction and operation of the Proposal (described in Section 2.6). Potential direct and indirect impacts were considered.
- **Avoidance and mitigation:** For each impact, measures that will be implemented to avoid and mitigate those impacts were identified.
- **Residual impacts:** The residual impact to each valued component was then assessed considering the context and intensity of the impact, and the scale, duration and magnitude (degree of change) of the impact.
- **Cumulative impacts:** Cumulative impacts to each valued component were assessed considering the context and intensity of impacts from other developments occurring concurrently or proposed to occur in the Construction footprint.

A self-assessment of the Proposal has been undertaken in accordance with the EPBC Act self-assessment guidelines, '*Significant impact guidelines 1.1 – Matters of national environmental significance*' (Commonwealth of Australia, 2013) and the Proposal did not trigger the requirement for a referral based on the type, scale and nature of the activity (Section 6.5).

6.1.2 Factors and objectives included in the assessment

The NT self-assessment determined that the Proposal has potential to significantly impact three of the 14 environmental factors. These are listed below.

- **LAND**
 - Terrestrial ecosystems
- **SEA**
 - Marine environmental quality
 - Marine ecosystems

These environmental factors are discussed in Section 6.2 to Section 6.4.

6.1.3 Factors and objectives excluded in the assessment

The self-assessment determined that the Proposal is not expected to significantly impact 11 of the 14 environmental factors. These are listed below:

- **LAND**
 - Landforms
 - Terrestrial environmental quality
- **WATER**
 - Hydrological processes
 - Inland water environmental quality
 - Aquatic ecosystems
- **SEA**
 - Coastal processes
- **AIR**
 - Air quality
 - Atmospheric processes
- **PEOPLE**
 - Community and economy
 - Cultural and heritage
 - Human health

The findings of the screening assessment and why these objectives are not considered further for this Proposal are discussed in Sections 6.1.3.1 to Section 6.1.3.10.

6.1.3.1 LAND – Landforms

The NT EPA's objective for the landforms factor is to '*conserve the variety and integrity of distinctive physical landforms*'.

No distinctive physical landforms, either geologically or anthropogenically are present within the Construction footprint. The terrain is relatively flat within the Construction footprint with topography ranging from approximately 0-20 m AHD in areas of publicly available data (NR Maps, 2024).

Furthermore, the Construction footprint was selected during the pre-feasibility study as it is primarily located in areas of existing disturbance within and immediately adjacent the existing mineral leases, special purpose leases at the Port and power easements. The approximately 600 m segment of pipeline (and diffuser) located at the beach and within the marine environment is off lease however has been positioned adjacent to existing disturbed areas associated with the Port facility.

The Proposal will be primarily constructed above ground with the pipeline buried in 29 targeted locations along the alignment to facilitate egress and water movement resulting in limited changes only to the landform profile for:

- Grading prior to pipeline installation to form an appropriately level landform for the pipeline placement.
- Construction of one overpass on the pipeline alignment to provide vehicle, pedestrian and fauna connectivity.
- Where the pipeline is proposed to be buried for vehicle, pedestrian and fauna connectivity, the landform profile would be returned to ground surface level following installation.

No distinctive landforms were identified within the Construction footprint, therefore the Proposal is not likely to significantly affect landforms. It is concluded that the NT EPA's objective for the Landforms factor of '*conserve the variety and integrity of distinctive physical landforms*' will be met.

6.1.3.2 LAND – Terrestrial environmental quality

The NT EPA's objective for the terrestrial environmental quality factor is to '*protect the quality and integrity of land and soils so that environmental values are supported and maintained*'.

Topsoil and subsoils would be disturbed during the Proposal for pipeline construction.

Given the topographic level of the Construction footprint (<20 m) the potential for Acid Sulfate Soil (ASS) to be encountered exists where excavations are occurring, particularly around watercourses where ground level is lower.

Impacts are expected to be minimal during the construction phase of the Proposal. The pipeline is predominantly positioned above ground and cradled in approximately 22 locations to elevate as required. Once vegetation has been removed for these activities, topsoil would be stripped and stockpiled in accordance with a CEMP and GEMCO standard operating procedures. The works would be staged over an approximate one-year period with reinstatement of topsoil and subsoils to occur progressively.

Where impacts are proposed in watercourses, ground disturbing works will be scheduled under no or low flow conditions preventing impact occurring outside the Construction footprint where possible. Earthworks including trenches will be returned to pre-construction surface level following pipeline installation. No trenches will remain open for extended periods.

Where borrow materials are required for construction of the earthen ramp crossing, materials would be taken from the remaining subsoil following burial of the pipeline and additional material sourced from the GEMCO Western Leases. Material sourced from the GEMCO Western Leases would be of known origin, geochemical and geotechnical properties so as not to introduce a source of contamination to the Construction footprint.

During the commissioning and operation phases, where terrestrial environment disturbance is limited to maintenance along the pipeline, impacts are expected to be negligible and restricted to limited erosion from routine vehicle use along existing roads.

With effective implementation of mitigation measures, including the CEMP, GEMCO standard operating procedures and ASS management plan (if required), the Proposal is not likely to significantly affect terrestrial environmental quality. Therefore, it is concluded that the NT EPA's objective for the terrestrial environmental quality factor of *'protect the quality and integrity of land and soils so that environmental values are supported and maintained'* will be met.

6.1.3.3 WATER – Hydrological processes and inland water environmental quality

The NT EPA's objective for the hydrological processes and inland water environmental quality factors are to *'protect the hydrological regimes and quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained'*.

Extraction of water through dewatering of quarry pits is an existing approved activity at the GEMCO mine site in accordance with the current MMP, therefore water quantity, supply and quality are not considered relevant to the Proposal.

Surface water features (e.g., watercourses and drainage lines) would be temporarily disturbed during the Proposal for pipeline construction where pipeline cradles, culverts or pipeline burial are required. A total of 29 culverts were identified during the August terrestrial ecology field investigations along the Proposal alignment. Surface water features within the Construction footprint are ephemeral and generally flow east to west through the Construction footprint.

Given the ephemeral nature of the surface water features, construction works are proposed to preferentially occur when the features are dry and / or not flowing and erosion and sediment controls can be implemented to reduce risk to hydrological process and inland water environmental quality. If flow is present, additional controls are required to be implemented including review if temporary embankment / bunding of the surface water feature is required to reduce risk to an acceptable level. During construction, works would be conducted progressively with any trenching through surface water features backfilled progressively as works progress to mitigate erosion and sedimentation risks to water quality. Surface water features would be returned to existing ground level following pipeline installation.

An erosion and sediment control plan (ESCP) will be developed for the construction works and implemented to manage unplanned flow events throughout the construction footprint. Soil management (including stockpiles) would be implemented as per the ESCP, CEMP and GEMCO standard operating procedures.

Pre-screening for ASS or potential ASS (PASS) will be conducted prior to construction commencing. An ASS management plan will be developed and implemented, if ASS/PASS are identified.

The construction phase of the Proposal is not expected to have impacts on the hydrological processes as works are to be staged and reinstated such that works within watercourses / drainage lines are to occur outside times of flow. In addition, no water extraction from the ephemeral surface water bodies within the Construction footprint are proposed to occur during construction. These measures will be documented within the CEMP, and GEMCO standard operating procedures are to be implemented.

Pipeline placement could result in changes to surface water flows to ephemeral watercourses / drainage lines within the Construction footprint. Hydrological modelling of the pipeline's barrier effect was conducted for the Proposal to evaluate design considerations for waterway crossings and drainage features, as well as, to assess the flood impacts (changes in water levels) resulting from the installation of the pipeline.

Modelling demonstrated that implementation of the proposed mitigation measures (e.g. increased instances of water crossing points (i.e. culvert, raised pipeline or buried pipeline) resulted in a reduction in afflux to a level which met the Proposal design criteria. The design criteria included an adopted design flood event that was 1:10 AEP return period.

A total of 53 water crossing points of lengths ranging from 15 m to >50 m are proposed to be constructed the preferred method of mitigation being pipeline burial as it provides the greatest reduction in potential flood impact loading and minimises risk of blockages in larger flood events.

With effective implementation of mitigation measures modelled (Red Earth Engineering, 2024) and implementation of an ESCP, CEMP and ASS management plan (if required), the Proposal is not likely to significantly affect hydrological processes and inland water environmental quality values. Therefore, it is concluded that the NT EPA's objective to *'protect the hydrological regimes and quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained'* will be met.

Extraction of water that includes groundwater from dewatering of quarry pits is an existing approved activity at the GEMCO mine site in accordance with the current MMP and therefore, a groundwater impact assessment is not part of this Referral.

6.1.3.4 WATER – Aquatic ecosystems

The NT EPA's objective for the aquatic ecosystems factor is to *'protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning'*.

The Proposal is located across two hydraulic catchments (Catchment 01 and Catchment 02) (Red Earth Engineering, 2024). Catchment 01 includes Ndunga Creek and Catchment 02 includes Malkala Creek. The aquatic habitat types present within the Proposal area are ephemeral and generally flow east to west towards the coast (Red Earth Engineering, 2024).

Review of publicly available desktop information (Appendix C) indicates that there are no NT or Commonwealth conservation significant aquatic species likely to occur within the Proposal area. The riparian habitat in proximity to the Proposal is likely to support conservation significant species such as the Mertens' water monitor and migratory wetland birds. These are addressed further in Section 6.2 and the accompanying *Terrestrial Ecology Assessment Report* (Appendix C).

Potential impacts to aquatic ecosystems would be from direct habitat disturbance during construction. As noted above, construction works are to be staged and reinstated such that works within watercourses / drainage lines preferentially occur outside times of flow; impacts to hydrology are not expected. If water is present additional controls are required to be implemented including minimisation of dimensions of temporary barriers to minimum practicable for the site and purpose; method of water draining must not cause fish to become entrapped or stranded and if fish salvage is required, consultation with an aquatic ecologist is required. In addition to these, any management requirements stipulated in secondary approvals for works in watercourses are to be included within the CEMP and adopted. With these mitigation measures the potential risk is reduced to an acceptable low level. Potential impacts to terrestrial fauna that utilise riparian or aquatic habitat include disruption of behaviour and/or injury or mortality. These impacts are addressed further in Section 6.2 and the accompanying *Terrestrial Ecology Assessment Report* (Appendix C). Surface water features will be restored to surface levels progressively as construction progresses; no trenches will remain open for extended periods of time.

With effective implementation of mitigation measures, including the CEMP and GEMCO standard operating procedures, the Proposal is not likely to significantly affect aquatic ecosystems. Therefore, it is concluded that the NT EPA's objective for the aquatic ecosystems factor of '*protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning*' will be met.

6.1.3.5 SEA – Coastal processes

The NT EPA's objective for the coastal processes factor is to '*protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained*'.

The west coast of Groote Eylandt is generally characterised by broad sandy beaches, rocky outcrops with reef forming epifauna, sparse seagrass and patches of other aquatic flora (Appendix D). The marine environment surrounding the Groote Eylandt region is described in the *Marine Ecology Assessment Report* (Appendix D). Survey of the construction footprint and surrounds (Appendix D) demonstrated that water depths >10 m were generally dominated by soft substrates consisting of mud and silt, while water depths <10 m were generally characterised by coarse sand with some gravels and pockets of rubble present. The Construction footprint is located in shallower water depths ranging up to ~10 m depth. In the shallow nearshore environment, the effects of wave action on the seabed were visible in the form of sand ripples (Appendix D).

Boulders and small patch reef structures were observed within the shallow subtidal zone immediately north and south of the Port facilities (ship loader and wharf structure). Review of nautical charts, surface sediment data and tow-and-drop camera footage did not identify rock bars, sandbars, boulders or reef structure present within the Construction footprint. Benthic surveys (surface sediments) indicate the Construction footprint is located on a sandy surface substrate. This positioning of the Construction footprint avoids environmental values associated with areas of higher environmental and cultural sensitivity.

The Construction footprint traverses the beach. Once construction completes, the pipeline will be buried and positioned under the existing beach surface through the tidal zone.

Tides and currents as presented in the *GEMCO Excess Water Disposal Project Marine discharge modelling report* (Appendix B). The report identifies the Construction footprint as being in a tidally influenced area with currents alternating in a south-easterly and north-westerly direction. Current peaks were recorded to range from 0.5-0.6 m/s during spring tides and 0.3-0.4 m/s during neap tides (Appendix B).

Tidal creeks, Malkala Creek (3.7 km south of the Port) and Ndunga Creek (6.5 km south of the Port), are located near the Proposal but approximately 3.5 km and 6 km outside of the modelled mixing zone (Appendix D). No deltas or river mouths are found in vicinity of the Proposal.

No storm surge protection structures are present within the Construction footprint and surrounding area. Burial of the pipeline may provide mitigation against storm surge events, including storm bite. The pipeline will exit from the sump underground as per the conceptual drawing in Figure 8 at a height below the lowest astronomical tide (LAT). As shown on Figure 8, the sump tank breaks the beach surface at a height of approximately 5 m AHD (existing ground level), while the HAT plus surge is at a height of approximately 1.85 m AHD. Further, the pipeline will emerge from the surf zone on the seabed in approximately 5 m water depth. Positioning of the beach side breaching point (sump tank) beyond the extent of the HAT plus storm surge minimises ongoing impacts resulting from storm surge events.

No unique coastal landforms are identified in the Construction footprint and surrounds (Appendix D).

Construction in the marine, tidal and upper beach environment is proposed to occur over eight months. Excavation works within the storm surge area would be conducted outside of storm season as far as possible. Site preparation and completion works are planned to occur predominantly during dry season (April to November). If a storm occurs during construction, the site will be managed in accordance with project specific emergency plans and GEMCO standard operating procedures.

Potential impacts to coastal processes are expected to be temporary in nature and localised to the construction footprint. Potential impacts during construction include accretion as a result of temporary sheet piling. Intertidal/surf zone works are anticipated to run for approximately 8 months through which time sheet piling will be used to reduce impacts to the seabed and limit excavation footprint from trenching through the surf zone (i.e. sheet piling to limit the excavation footprint, as opposed to open excavation which requires a stable batter slope that increases footprint). Sheet piling will be installed and removed within this 8-month window.

Removal will occur once trenching has been backfilled following pipeline installation. The sheet piling is expected to be 200-300 m in length along the alignment from the sump to the end of the surf zone (~5 m water depth); and stand above the water surface. The sheet piles will create a cofferdam, to allow extraction of water within the structure and limit plume dispersion footprint during excavations. As the result of the cofferdam intercepting the longshore current, it is expected that some sediment accretion will take place on the up current sides of the structure. This accumulation on the up current sides is anticipated to be resolved with the removal of the cofferdam. No areas of coral or bouldering were identified immediately adjacent the construction footprint that would be impacted by this accretion.

The pipeline will be buried under the beach and through the surf zone, resurfacing at approximately 5 m of water depth, following the completion of construction it is anticipated that the natural sediment transport processes through this surf zone will resume and continue. The pipeline, resurfacing from 5 m of water depth onwards, is likely to be exposed to ongoing underwater sediment accretion mechanics throughout its life with sediment accretion on the up currents side of the pipeline. With water exchange occurring over the pipeline and water depths of approximately 5 - 10 m, a lower accretion impact is expected to occur compared to the shallower surf zone construction works.

With effective design measures for storm surge (including consideration of pipeline burial depths) and implementation of mitigation measures, including the CEMP, GEMCO standard operating procedures and emergency response plans, the Proposal is not likely to significantly affect coastal processes. Therefore, it is concluded that the NT EPA's objective for the coastal processes factor of *'protect the geophysical and hydrological processes that shape coastal morphology so that the environmental values of the coast are maintained'* will be met.

6.1.3.6 AIR – Air quality

The NT EPA's objective for air quality is to *'protect air quality and minimise emissions and their impact so that environmental values will be maintained'*.

A qualitative air quality impact assessment (Appendix E) was undertaken for the Proposal, indicating that it is unlikely to result in a significant residual impact to air quality. The main pollutants of concern were identified to be fine particulate matter during the construction phase.

A qualitative assessment was undertaken to estimate the impacts of dust emissions for the construction stage in accordance with the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from construction. Risk of dust impacts to sensitive receptors is low across all construction stages.

It was determined that a detailed risk assessment was not required for the operation of the pipeline, as the nearest sensitive receptor is over 4 km from the proposed generator and pump station. As such, the risk of air quality impacts is negligible.

With effective implementation of management and mitigation measures through GEMCO standard operating procedures and management plans and implementation of a CEMP capturing management and mitigation measures (where reasonable and practicable) identified in the *Air quality impact assessment report* (Appendix E) the Proposal is not likely to significantly affect air quality values. Therefore, it is concluded that the NT EPA's objective for air quality of *'protect air quality and minimise emissions and their impact so that environmental values will be maintained'* will be met.

6.1.3.7 AIR – Atmospheric processes

The NT EPA's objective for the atmospheric processes factor is to *'minimise greenhouse gas emissions so as to contribute to the Government's goal of achieving net zero greenhouse gases by 2050'*.

A greenhouse gas assessment report was prepared to inform the Proposal, *GEMCO Excess Water Disposal Project – Greenhouse gas assessment report* (Appendix F). Total emissions for the Proposal's construction phase (inclusive of vegetation clearing) were calculated to be 62,346 tCO_{2e}, operations (approximately 12,296 tCO_{2e}/yr) and decommissioning phase (12,187 tCO_{2e}/yr) contributions in subsequent years.

Annual emissions for the Project are negligible compared to annual emissions in Northern Territory and Australia, at 16.7 Mt CO_{2e} and 432.6 Mt CO_{2e} in 2022, respectively.

Based on this assessment, the Proposal is not likely to significantly affect atmospheric process values. Therefore, it is concluded that the NT EPA's objective to '*minimise greenhouse gas emissions so as to contribute to the Government's goal of achieving net zero greenhouse gases by 2050*' will be met.

6.1.3.8 PEOPLE – Community and economy

The NT EPA's objective for the community and economy factor is to '*enhance communities and the economy for the welfare, amenity and benefit of current and future generation of Territorians*'.

Pedestrian and vehicle transport impacts have been considered along the pipeline. Nineteen of the proposed 53 crossing points are nominated for provision of pedestrian or vehicle egress. The crossings range from 24 m to >50 m in length including buried and elevated pipeline sections. No roads are proposed to be permanently cut as a result of the pipeline; allowance for burying the pipeline or construction of vehicle overpasses have been made. Community access will be maintained to potential areas of importance and to community through these passages. Additionally, crossing placement has also considered requirements for safety and fire crews to have timely access.

No changes to participation in jobs, business, education are proposed as part of the Proposal. The development of the pipeline will facilitate the continued operations of the GEMCO mine site through facilitating discharge or water.

Therefore, it is concluded that the NT EPA's objective to '*enhance communities and the economy for the welfare, amenity and benefit of current and future generation of Territorians*' will be met through the continued operation of the GEMCO mine on Groote Eylandt.

6.1.3.9 PEOPLE – Culture and heritage

The NT EPA's objective for the culture and heritage factor is to '*protect culture and heritage*'.

A desktop cultural heritage assessment has been conducted for the Proposal, *Desktop Cultural Heritage Assessment* (Appendix G). The assessment identifies that there is a low risk of Aboriginal cultural heritage values, European heritage values, Macassan archaeological values, or natural heritage values within the Construction footprint assuming the adoption of the impact avoidance and mitigation measures.

The construction phase of the Proposal is expected to have the greatest potential for impact on unknown culture and heritage values, as a result of ground disturbing activities. No known sensitive or sacred sites have been identified. Works are to be conducted in accordance with the guiding principles of the Anindilyakwa IPA Plan of Management (ALC, 2016); including inductions that include heritage and cultural awareness, and implementation of an unexpected finds protocol.

With effective implementation of avoidance measures documented in this referral through selection of the Proposal option (Section 2.3 and Section 2.4) and implementation of a CEMP requiring inductions and including unexpected finds protocols, the Proposal is not likely to significantly affect cultural and heritage values. Therefore, it is concluded that the NT EPA's objective to '*protect culture and heritage*' will be met.

6.1.3.10 PEOPLE – Human health

The NT EPA's objective for the human health factor is to '*protect the health of the NT population*'.

The Angurugu River system provides potable water for the mine site and Alyangula township, this was considered in the selection of this Proposal to avoid potential impacts given the discharge volumes proposed. The Angurugu River system is located to the south of the Construction footprint, surface water flows through the Proposal alignment are east to west; therefore, no impact on the Angurugu River system are likely to occur as a result of the Proposal.

Extraction of water including groundwater in dewatering of quarry pits is an existing approved activity at the GEMCO mine site in accordance with the current MMP, therefore no additional impacts to groundwater quality that may impact on human health are considered to result from the Proposal.

No activities in the Proposal will impact on radiological limits.

The construction phase of the Proposal is expected to have the greatest potential to impact on human health values via impacts to air quality.

As presented in Section 6.1.3.4, a qualitative air quality impact assessment was conducted for the Proposal (Appendix E), which identified that, with effective implementation of mitigation measures, the Proposal is not likely to significantly affect air quality values in the community.

Existing site facilities such as toilets, rubbish management and drinking water are proposed to be used for the duration of the works removing the associated human health risks. The CEMP will include mitigation measures for the management of waste and pooling water which may increase biting insect presence.

Vegetation clearing is limited to pre-disturbed areas adjacent to existing infrastructure and will not significantly impact bush tucker within the region. No concerns with the terrestrial Construction footprint have been identified in consultation with Traditional Owners.

A quantitative noise and vibration impact assessment was conducted for the terrestrial construction noise impacts at sensitive receptors for the Proposal in accordance with *Northern Territory Noise Management Framework Guideline* (NMFG) (NT EPA, 2018). The construction noise levels are predicted to be above the recommended Assigned Construction Noise Levels (ACNL) at the receptors situated at Malkala community, and at receptors close to the construction footprint in Alyangula. As such, feasible and reasonable mitigation measures have been recommended in the *Noise and Vibration Assessment Report* (Appendix H) to reduce the noise impacts at receptors. It should be noted that receptors impacted by the linear construction works are only expected to experience noise levels above the ACNL for 12 days per construction scenario. The assessment identified no adverse human comfort or structural damage impacts are predicted from the construction of the Proposal. Operational noise impacts from the proposed generators and pump stations are not anticipated due to the distance between the noise sources and the nearest residential receptors. With effective implementation of mitigation measures, the proposal is unlikely to result in significant impact from noise and vibration on community values.

With effective implementation of avoidance measures documented in this referral through selection of the Proposal option (Section 2.3 and Section 2.4) and implementation of a CEMP, the Proposal is not likely to significantly affect human health including drinking water, air quality, bush tucker, radiological limits or biting insects. Therefore, it is concluded that the NT EPA's objective to '*protect the health of the NT population*' will be met.

6.1.4 Risk assessment framework

An environmental risk assessment was undertaken to identify the potential environmental impacts and mitigation measures from activities associated with the Proposal. The assessment process undertaken is consistent with AS/NZS ISO 31000:2018 Risk management – Principles and guidelines (ISO, 2018)

6.1.4.1 Methodology

Likelihood and consequence definitions applied in this assessment of residual impact are outlined in Table 20 and Table 21. The overall residual risk category was determined through application of the risk matrix provided in Table 22, which considers both likelihood and consequence. It is noted that residual risk considers the successful application of all identified mitigation measures included in this referral and accompanying technical reports.

Table 20 Likelihood of occurrence criteria

Likelihood	Definition
Almost certain	Could be expected to occur more than once in a year
Likely	Could be incurred over a 1 - 2 year timeframe
Possible	Could be incurred over a 5 year timeframe
Unlikely	Could be incurred over a 5 - 20 year timeframe
Rare	Less than once in 20 years

Table 21 Consequence category definition

Consequence level	Environment	Community
1	Low level impact/s to land, biodiversity, ecosystem services, water resources or air.	Low-level social impacts. Low-level infringement of cultural heritage or minimal disturbance to heritage structures. Minimal impact on human rights
2	Minor impact/s to land, biodiversity, ecosystem services, water resources or air.	Minor medium-term social impacts on a small number of people. Repairable damage or disturbance to property, structures or items. Minor infringement of cultural heritage. Minor, temporary human rights impacts.
3	Moderate impact/s to land, biodiversity, ecosystem services, water resources or air.	Moderate medium-term social impacts or frequent social issues. Moderate damage to structures/items of local cultural heritage significance/sacred locations.
4	Significant impact/s (>20 years) to land, biodiversity, ecosystem services, water resources or air.	A breakdown of social order. Widespread damage to items of global cultural significance. Highly offensive infringements of cultural heritage. Company directly responsible or complicit in severe, long-term impacts on human rights.
5	Permanent, severe impact/s to land, biodiversity, ecosystem services, water resources or air.	Complete breakdown of social order. Widespread desecration of items of global cultural significance. Company directly responsible or complicit in severe and widespread long-term impacts on human rights.

Table 22 Risk assessment matrix

Likelihood	Consequence				
	Level 1 Low level impact	Level 2 Minor impact	Level 3 Moderate impact	Level 4 Significant impact	Level 5 Permanent impact
6. Almost certain	High	High	Extreme	Extreme	Extreme
7. Likely	Moderate	High	High	Extreme	Extreme
8. Possible	Low	Moderate	High	Extreme	Extreme
9. Unlikely	Low	Low	Moderate	High	Extreme
10. Rare	Low	Low	Moderate	High	High

6.1.4.2 Results of environmental risk analysis

Table 23 presents the environmental risk analysis that was undertaken for the Proposal. It includes a description of the potential impacts associated with the proposed activities. The consequence and likelihood of each risk is provided in accordance with the rating system provided in Table 21 and Table 22. The overall residual risk (i.e. the risk remaining following the successful implementation of identified avoidance and mitigation measures) has been assessed in accordance with the matrix provided in Table 22.

Table 23 Environmental risk analysis

Factor	Environmental Values	Potential impact	Unmitigated			Avoidance and mitigation	Residual		
			L ¹	C ²	R ³		L ¹	C ²	R ³
Land – Landforms Section 6.1.3.1	– No distinctive landforms present within Proposal area	– Construction activities including clearing and grading	E	1	L	– Siting of the footprint along Rowell Highway to reduce impact potential – Limited changes to landform profile as a result of the Proposal	E	1	L
Land – Terrestrial environmental quality Section 6.1.3.2	– Topsoil and subsoil quality	– Disturbance of topsoil and subsoil	B	1	M	– Siting of the footprint along Rowell Highway to reduce impact potential – Stockpile and progressive reinstatement of topsoil and subsoil – Restriction of works in watercourses during flow periods	E	1	L
Land – Terrestrial ecosystems Section 6.2	– Vegetation and habitat – Threatened species – Migratory species	– Fauna injury and mortality – Habitat removal/reduction – Disruption of fauna behaviour – Restriction of movement – Introduction of pests/weeds	A	3	E	– Impact footprint reduction/ positioning via design – CEMP implemented – ESCP implemented – Weed, dust and biosecurity management implemented – Pre-clearance surveys implemented – Pipeline crossings installed	D	2	L
Water – Hydrological processes Section 6.1.3.3	– Ephemeral watercourses and drainage lines	– Ground disturbance works – Creation of barrier effect from pipeline placement	B	1	M	– CEMP implemented – ESCP implemented – Restriction of works in watercourses during flow periods – Water crossing points including in design	E	1	L
Water – Inland water environmental quality Section 6.1.3.3	– Water quality within ephemeral watercourses and drainage lines	– Ground disturbance works	B	1	M	– CEMP implemented – ESCP implemented – Restriction of works in watercourses during flow periods	E	1	L
Water - Aquatic ecosystems Section 6.1.3.4	– Riparian habitat values	– Ground disturbance works	B	1	M	– CEMP implemented – ESCP implemented – Restriction of works in watercourses during flow periods	E	1	L
Sea - Coastal processes	– Beach, intertidal and subtidal zone	– Seabed disturbance	C	1	L	– Siting of Proposal to avoid sensitive marine habitat	D	1	L

Factor	Environmental Values	Potential impact	Unmitigated			Avoidance and mitigation	Residual		
			L ¹	C ²	R ³		L ¹	C ²	R ³
Section 6.1.3.5	Sand and soft sediment substrate	- Accretion / erosion from temporary sheet piling - Accretion from placement of the pipeline on the seabed				- Burial of pipeline in surf zone - Detailed design to consider storm surge protection requirements - Construction works to be conducted outside of storm season as far as possible, with site preparation works to occur predominantly during the dry season (April to October).			
Sea - Marine environmental quality Section 6.3	- Water and sediment quality - Macroinvertebrates - Values supporting fishing, recreation and aesthetics - Cultural and spiritual values	- Seabed disturbance - Water quality impacts	A	3	E	- Siting of Proposal to avoid sensitive marine habitat - Development and implementation of CEMP and Operational Environmental Management Plan (OEMP), including monitoring plans. - Model validation monitoring implemented - Spill avoidance/management measures implemented	D	1	L
Sea - Marine ecosystems Section 6.4	- Conservation significant species - Soft substrate benthic ecology	- Seabed disturbance - Water quality impacts - Underwater noise - Marine fauna strike / disturbance - Introduction of marine pests / diseases	A	3	E	- Siting of Proposal to avoid sensitive marine habitat - CEMP and OEMP implementation, including monitoring plans - Underwater noise management measures implemented - Model validation monitoring implemented - Spill avoidance/management measures implemented - Biosecurity management implemented - Vessel operation restrictions implemented	C	1	L
Air - Air quality Section 6.1.3.6	Ambient air quality in the local airshed	Dust emissions during construction	B	1	M	CEMP including dust management implemented	D	1	L
Air - Atmospheric processes Section 6.1.3.6	Greenhouse gas emissions	Greenhouse gas emissions	-	1	L	Greenhouse gas assessment undertaken to understand emissions generated by the Proposal	-	1	L
People - Community and economy Section 6.1.3.8	Alyangula and Malkala communities	- Construction noise - Restriction of movement from pipeline placement	A	3	E	- CEMP implemented, including measures associated with construction noise - Community access maintained via pipeline crossings	C	1	L

Factor	Environmental Values	Potential impact	Unmitigated			Avoidance and mitigation	Residual		
			L ¹	C ²	R ³		L ¹	C ²	R ³
People – Culture and heritage Section 6.1.3.9	– No known sensitive or sacred sites identified within Construction footprint	– Ground disturbance works impacting on unknown culture and heritage values	A	3	E	– Siting of Proposal to avoid sensitive or sacred sites – Inductions including heritage and cultural awareness to be undertaken – Unexpected finds protocol to be implemented	C	1	L
People – Human health Section 6.1.3.10	– Angurugu River potable water source	– Impacts to potable water source – Construction noise and dust impacts	B	3	H	– Siting of the Proposal to avoid impacts to potable water – CEMP implemented including dust and noise management measures	C	1	L

¹ L: Likelihood, ²C: Consequence, ³R: Risk

6.2 LAND – Terrestrial ecosystems

The NT EPA's objective for Terrestrial ecosystems is to “*Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning*”.

This section outlines the current understanding of the terrestrial ecosystems within and around the Proposal. It explores how the environmental values could be directly or indirectly affected by changes to terrestrial ecosystems during the Proposal's construction and operation.

6.2.1 Environmental values

This section provides a summary of the environmental values for the Proposal. These values are further described in the *Terrestrial Ecology Assessment Report* (Appendix C).

6.2.1.1 Threatened ecological communities

A search with the EPBC Act Protected Matters Search Tool (PMST) (DCCEEW, 2024) conducted on 6 February 2025 identified no listed threatened ecological communities within the Construction footprint and 5 km buffer.

No threatened ecological communities were identified during field investigations undertaken within the Construction footprint in April and August 2024.

6.2.1.2 Sensitive / significant vegetation

A search of the NR Maps flora atlas database did not identify any vegetation communities that correspond to sensitive / significant vegetation.

With the exception of riparian vegetation, which is considered significant under the NT Planning Scheme, no significant or sensitive flora were identified during field investigations undertaken within the Construction footprint in April and August 2024.

6.2.1.3 Threatened flora species

A search of the relevant Commonwealth and NT threatened species databases (EPBC Act PMST, NR Maps, and NT Government Threatened Flora and Fauna database) did not identify any conservation significant flora species with the potential to occur within 5 km of the Construction footprint. Furthermore, no threatened flora species were identified in the Construction footprint from a review of GEMCO's existing site data.

Two threatened flora species *Eleocharis retroflexa* (vulnerable EPBC Act), and *Utricularia singeriana* (vulnerable NT Act) were assessed as 'may occur' within the likelihood of occurrence assessment in *Appendix B of the Terrestrial Ecology Assessment Report* (Appendix C).

No significant or sensitive/threatened flora were identified during field investigations undertaken within the Construction footprint in April and August 2024.

6.2.1.4 Vegetation communities

A total of 12 National Vegetation Information System (NVIS) vegetation communities were identified across the Construction footprint from a combination of desktop review of existing GEMCO field verified data layers and survey conducted for the Proposal by 4Elements Consulting and documented in the *Terrestrial Ecology Assessment Report* (Appendix C).

6.2.1.5 Threatened fauna species

The PMST report and NR Maps search identified a total of 44 conservation significant fauna species that have the potential to occur within the Construction footprint and a 5 km buffer, inclusive of marine species. During the August fauna-focussed field surveys, a total of 74 fauna species were recorded, including one listed threatened species, the northern quoll (*Dasyurus hallucatus*). The Northern Quoll is listed as critically endangered under the *Territory Parks and Wildlife Conservation Act 1976* (NT) (TPWC Act) and endangered under the EPBC Act.

In addition, based on the findings from the field surveys, despite the overall altered state of fauna habitats within the Construction footprint, and considering the availability and condition of habitats observed during the surveys; various threatened fauna species were evaluated as 'likely to occur' or 'may occur' in some form (e.g., foraging, dispersal, nesting, roosting, etc.) within the likelihood of occurrence assessment in *Appendix B of the Terrestrial Ecology Assessment Report* (Appendix C). These species include:

Birds

- *Tyto novaehollandiae kimberli* - northern masked owl – likely to occur – Vulnerable EPBC Act & TPWC Act
- *Tringa nebularia* – common greenshank – may occur – Endangered & Migratory EPBC Act
- *Calidris acuminata* – sharp-tailed sandpiper – may occur – Vulnerable & Migratory EPBC Act
- *Limosa lapponica baueri* – Alaskan bar-tailed godwit – may occur – Vulnerable EPBC Act and TPWC Act

Mammals

- *Trichosurus vulpecula arnhemensis* – northern brushtail possum – may occur – Vulnerable EPBC Act
- *Macroderma gigas* – ghost bat – may occur – Vulnerable EPBC Act

Reptiles

- *Varanus mertensi* - Mertens' water monitor – likely to occur – Endangered EPBC Act & Vulnerable TPWC Act
- *Tiliqua scincoides intermedia* – northern blue-tongue skink – may occur – Critically endangered EPBC Act

Searches for the northern hopping-mouse habitat and their spoil heaps were conducted during the August 2024 survey however no potential habitat or evidence of burrows was found (Appendix C). Recent surveys by GEMCO have verified the inland occurring northern hopping-mouse's preference for sandy areas around weathered sandstone, with 95 % of recorded burrows within 500 m of sandstone or quartzite edges and a median distance of 136 m (unpublished data). Within the Construction footprint, potential habitat for the species was observed to be heavily modified (i.e. fire) and generally unsuitable for this species based on known habitat requirements. Notably, the geology which is associated with northern hopping-mouse burrows is not present in the vicinity of the Proposal.

A number of species, including the Brush-tailed rabbit-rat, were assessed as unlikely to occur; details relating to these assessments are provided in *Appendix B of the Terrestrial Ecology Assessment Report* (Appendix C)

6.2.1.6 Migratory species

The PMST report and the NR Maps database identified 71 species listed as Migratory under the EPBC Act, that have the potential to occur within the Construction footprint and a 5 km buffer, inclusive of marine species. These species include:

- Fifty birds
- Six mammals
- Seven reptiles
- Eight sharks.

In addition, based on the findings from the field surveys; despite the overall altered state of fauna habitats within the Construction footprint, and considering the availability and condition of habitats observed during the surveys; various migratory bird species were evaluated as 'confirmed present' or 'may occur' in some form (e.g., foraging, dispersal.) within the likelihood of occurrence assessment in *Appendix B of the Terrestrial Ecology Assessment Report* (Appendix C). These species include:

- Migratory marine birds:
 - *Pandion haliaetus* – eastern osprey – confirmed present
 - *Sterna hirundo* – common tern – confirmed present
 - *Sterna sumatrana* – black-naped tern – may occur
 - *Hydroprogne caspia* – caspian tern – may occur
 - *Tringa brevipes* – grey-tailed tattler – may occur
 - *Sternula albifrons* – little tern – may occur

- *Pluvialis fulva* – pacific golden plover – may occur
- *Calidris ruficollis* – red-necked stint – may occur
- *Chlidonias leucopterus* – white-winged black tern – may occur
- *Sterna dougallii* – roseate tern – may occur
- Migratory terrestrial birds:
 - *Apus pacificus* - fork-tailed swift – may occur
 - *Cuculus optatus* - oriental cuckoo – may occur
 - *Hirundo rustica* - barn swallow – may occur
 - *Cecropis daurica* - red-rumped swallow – may occur
 - *Motacilla cinerea* - grey wagtail – may occur
- Migratory wetland birds:
 - *Gallinago megala* - Swinhoe's snipe – may occur
 - *Glareola maldivarum* - oriental pratincole – may occur
 - *Acrocephalus orientalis* - oriental reed-warbler – may occur
 - *Charadrius veredus* - oriental plover– may occur

6.2.2 Potential impacts

Potential impacts to terrestrial ecosystem values including NT and Commonwealth protected matters, that occur within the Construction footprint from the Proposal as defined in Section 2.6 include a combination of direct and indirect impacts. These include:

- Fauna injury and mortality: Construction works have the potential to cause direct wildlife injury and mortality if animals are struck by machinery or injured during the clearing process.
- Habitat removal: Clearing of vegetation (including riparian vegetation) has the potential to remove habitat for fauna species resulting in displacement of individuals and potential increased pressure on adjacent habitat.
- Reduction in habitat: Vegetation clearing (including riparian vegetation) to support construction work resulting in reduction of available habitat.
- Disruption of fauna behaviour: Construction activities may result in a temporary, localised disturbance to fauna behaviour in local habitats through construction-related air, noise and vibration.
- Spread of weeds: Vegetation clearing and soil disturbance during construction has the potential to degrade local habitats through facilitating the introduction and spread of established introduced species.
- Proliferation of pest fauna: Construction activities have the potential to attract localised concentrations of exotic fauna by increasing the availability of food and water through inappropriate waste disposal and water management. Exotic fauna species can adversely impact native wildlife by increasing levels of predation and competition. In particular, proliferation of feral cats and / or an introduction of cane toads may have a significant impact on the northern quoll population.
- Restriction of movement/fauna dispersal barriers: The construction of pipeline infrastructure has the potential to restrict movement across the landscape. Linear infrastructures like roads, pipelines, and electrical networks can contribute to habitat fragmentation and reduced faunal diversity (de Jonge et al., 2022).

6.2.3 Environmental protection and management

6.2.3.1 Impact avoidance

Avoidance of impact has been undertaken for the Proposal through:

- Avoidance of direct habitat removal through reduction in construction footprint throughout design including consideration of:
 - Decision for extraction to occur from the NH2 pit rather than southern pit (as discussed in Section 2.3 and Section 2.4).

- Reduction in construction footprint clearing width requirements from 20 m width to minimum corridor width of 11 m based on current design. Clearing widths may be subject to change through finalisation of design.
- Positioning of the Proposal in areas of existing (and future planned) vegetation clearing where possible.
- Avoidance of clearing potentially sensitive or significant vegetation through placement of the marine discharge location at the existing disturbed Port area, as discussed in Section 2.3 and Section 2.4.
- Avoidance of prolonged impacts from lighting as works are proposed to be conducted between the hours of 6 am to 6 pm, 7 days a week.
- Conformance with the GEMCO biosecurity inspection procedure on freight and luggage, including barges and their cargo to prevent invasive species arriving and establishing on Groote Eylandt.
- Waste management under this Proposal will be conducted in accordance with the general environmental duty under the *Waste Management and Pollution Control Act 1998* (NT). The waste management hierarchy of “Avoid – Reuse – Recycle -Recover – Dispose” will be applied to environmental management during all phases of the Proposal.

6.2.3.2 Impact mitigation

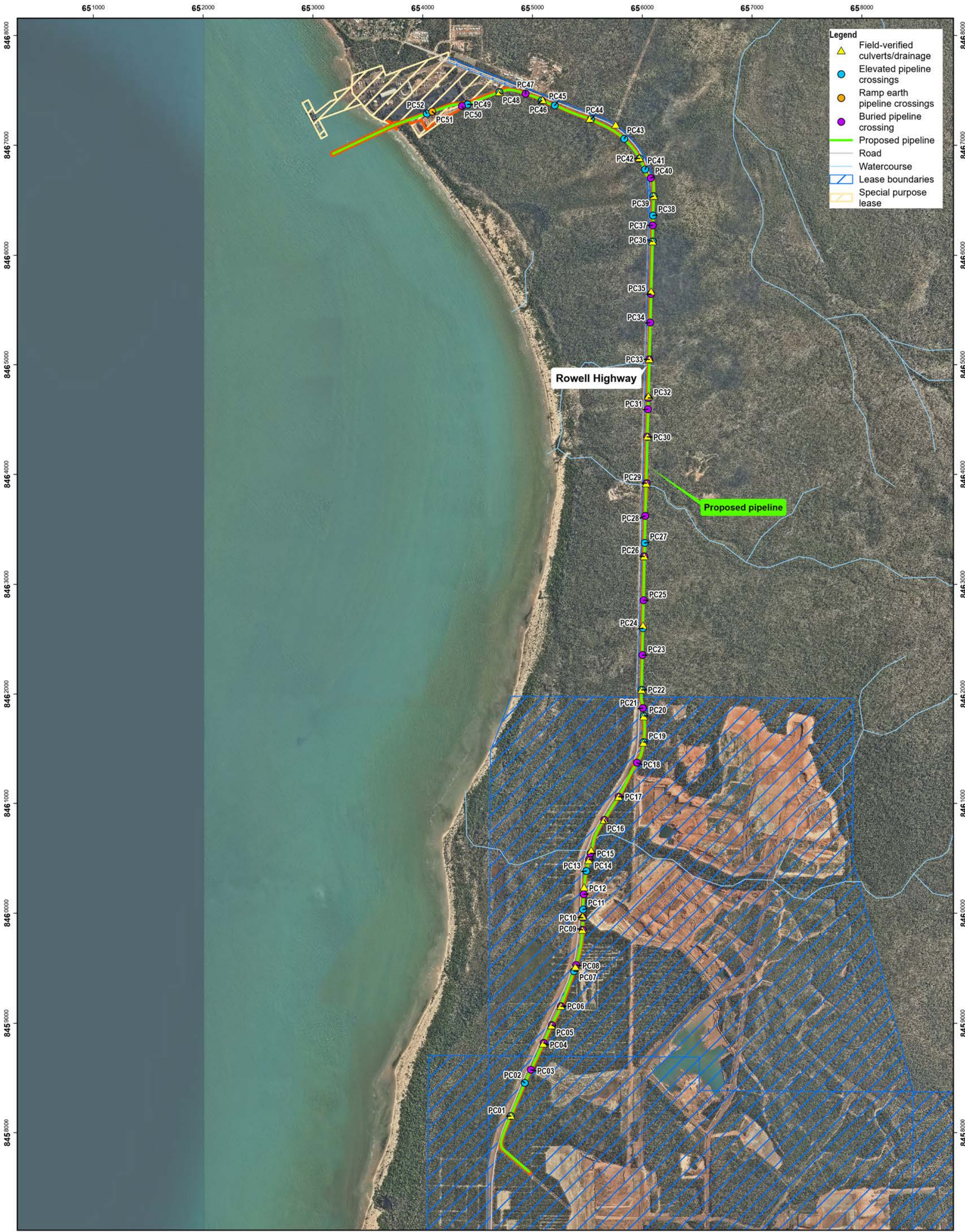
It is recommended that measures to avoid or mitigate potential flora and fauna impacts are incorporated into a site-specific Construction Environmental Management Plan (CEMP). In particular, the following mitigation measures are recommended:

- GEMCO and any associated contractors are required to ensure the appropriate management of invasive flora (weeds), waste, dust and emissions, erosion and sedimentation, and hazardous materials throughout the Construction footprint and to minimise impacts to adjacent areas.
 - This will be managed through the development and implementation of a CEMP and the implementation of applicable GEMCO standard operating procedures and management plans.
- Prior to the commencement of any activities proposed in relation to the construction of the Project, GEMCO will finalise the Project area including the layout of infrastructure, areas to be cleared, areas to be retained, temporary clearing (i.e. lay down areas, construction pads, site offices, etc), access tracks and any necessary borrow and/or overburden areas. Given that the design phase has largely been completed, the majority of these activities have already been completed.
 - When finalising the Project area (through the detailed design and placement of infrastructure), consideration has been given by GEMCO to minimising the disturbance to native flora and fauna species, as far as practicable by utilising already disturbed areas beside access tracks and the Rowell Highway roadside verge.
- All land disturbance will be managed through GEMCO’s existing Permit to Clear (PTC) process.
- Vegetation clearing will be no wider than is necessary to facilitate the construction of the pipeline and the associated infrastructure, so as to limit the impacts of local flora and fauna.
 - Clearing will be limited as much as possible on the vegetated side of the pipeline alignment, noting there may be clearing requirements for fire safety and construction effort.
 - Where possible, the on-ground layout and alignment of the corridor should be micro-sited to avoid native vegetation and suitable fauna habitat features (e.g. rock piles, termite mounds, hollow logs, etc).
- Once the final design has been determined and prior to the commencement of construction, pre-clearance surveys will be conducted by suitably qualified person over the extent of clearing disturbance to limit the potential for impacts to any fauna individual(s).
 - This survey should target threatened fauna species and habitat features including hollow-bearing trees, burrows, dens, hollow logs, caves, rocky areas i.e. crevices, riparian vegetation, embankments, and any other features which may provide suitable habitat for fauna.
 - Where pre-clearance surveys identify threatened fauna species that cannot self-disperse, works should cease immediately and specialist advice obtained regarding relocation or other controls before approval to proceed is given by GEMCO.

- To limit the potential for the introduction and establishment of invasive fauna (e.g. cane toads) on Groote Eylandt, any material(s) or machinery brought to the island to support the construction or maintenance of the proposed pipeline would be carefully inspected as part of a biosecurity assessment (this currently occurs with extensive rigor, including inspection by trained detection dogs for cane toads). Where any invasive fauna species are identified, the individuals will be disposed of and the incident documented.
- To limit the potential for disturbance to any EPBC-listed migratory shorebird species at the outfall location to the northern extent of the Project area (likely only from around November to March and predominantly during the wet season), clearing works within 300 m of the marine environment should involve an inspection by a suitably qualified person to ensure no EPBC-listed migratory shorebirds are utilising the area. If EPBC-listed migratory shorebirds are detected during site inspections, works should only proceed once birds have left the Project area.
- Clearing, earthworks, and the use of heavy machinery which may cause disturbance will be limited within 50 m of all watercourses and associated riparian vegetation.
 - The contractor will clearly demarcate all watercourses and the extent of riparian vegetation (~20 m from watercourse edge) with the intent to limit impacts to freshwater-dependent fauna species, including the Mertens' water monitor.
 - Construction works within the extent of riparian vegetation (~20 m from watercourse edge) will be planned so as to occur outside of the Mertens' water monitor's mating period (i.e. during the wet season – December to February).
 - Minimisation of incursions and access to riparian zones by construction personnel.
 - Works to preferentially occur when the watercourse is dry and / or not flowing and erosion and sediment controls implemented.
 - If a temporary waterway barrier is required:
 - The dimensions of any temporary barrier shall be limited to the minimum practicable for the site and purpose.
 - The method of draining the water must not cause fish to become trapped or stranded or have detrimental impacts on the wellbeing of fish.
 - If fish salvage is required, specialist advice will be obtained.
 - Capture within the CEMP and implement all permit requirements.
 - Minimise open excavation time in watercourses to reduce erosion risks and maintain fauna connectivity across the watercourse.

Construction phase management recommendations

- Where any trenching is required during the construction phase, any open-air trench should not be left exposed for longer than 48 hours. In instances where trenching is required, the trench is to be inspected at least once during any 24-hour period (ideally immediately post dawn), if fauna is detected in the trench advice will be sought from a suitably qualified person.



6.2.4 Residual impacts

The residual impacts on the environmental values and sensitivities relevant to the terrestrial ecosystems environmental factor were assessed by considering both the direct and indirect effects of the Proposal, as well as the effectiveness of the proposed mitigation measures outlined in Section 6.2.3. The assessment took into account the severity (including scale, duration, and magnitude) of the predicted impacts, alongside the importance and sensitivity of the environmental value components. Based on this assessment, with the implementation of the identified avoidance and mitigation measures, it was determined that there is a low likelihood of a significant residual impact on this environmental factor.

In accordance with the EPBC Act Significant Impact Guidelines 1.1 residual SIAs were conducted for:

- Listed threatened species that were assessed within the likelihood of occurrence assessments to be confirmed present, likely to occur or may occur within the Construction footprint.
- Migratory species that were assessed within the likelihood of occurrence assessments to be confirmed present, likely to occur or may occur within the Construction footprint.
- Commonwealth marine environment including Commonwealth marine area, cetaceans, listed marine species and Commonwealth heritage values.

These are discussed further in Section 6.5 and the *Terrestrial Ecology Assessment Report* (Appendix C).

6.2.5 Cumulative impacts

No other projects have been identified by GEMCO to occur concurrently with the Proposal, within the Construction footprint.

Existing operations at the GEMCO mine site will continue throughout construction of the Proposal including the haulage of ore along the Rowell Highway to the Port facility. The construction of pipeline infrastructure adjacent the existing Rowell Highway has the potential to compound movement restrictions across the landscape. Avoidance and mitigation measures as described in Section 6.5.3 including fauna passage through burial or raising of the pipeline at the 29 existing Rowell highway culverts and 53 locations in total will minimise potential impacts.

6.2.6 Conclusion

With effective implementation of designed avoidance measures, mitigation measures, including the CEMP and GEMCO standard operating procedures, the Proposal is not likely to significantly impact on terrestrial ecosystem values.

Potential impacts were identified with respect to habitat and vegetation removal, which were proposed to be mitigated through design, timing of works, pre-clearance surveys and operating in accordance with appropriate management plans and existing programs / standards.

Potential impact associated with invasive species arriving and establishing on Groote Eylandt, such as the cane toad and weeds, is mitigated through the existing GEMCO biosecurity inspection procedure.

Restriction of movement/fauna dispersal barriers is an identified impact associated with the terrestrial ecosystem. The primary mitigation measure for this is the design of pipeline crossing points along the pipeline alignment to facilitate the movement of species. A total of 53 crossing locations have been designed of which 17 were identified for the specific purpose of fauna crossings. All 53 crossings will provide passage to fauna either under the elevated pipeline or over the buried / earthen mound crossings. Additionally, 29 of the crossing points have been aligned with the existing culverts, maintaining connectivity.

Overall, the impact assessment conducted in the *Terrestrial Ecology Assessment Report* (Appendix C) for threatened species identified a low likelihood of significant impact resulting from the Proposal. It is therefore concluded that the NT EPA's objective for terrestrial ecosystems to '*protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning*' will be met.

6.3 SEA – Marine environmental quality

The NT EPA's objective for the Marine Environmental Quality factor is to "*Protect the quality and productivity of water, sediment and biota so that environmental values are maintained*".

This section outlines the current understanding of the marine environmental quality within and around the Proposal. It explores how the environmental values could be directly or indirectly affected by changes to the marine environment during the Proposal's construction and operation. Key documents that have been referenced for this section include the *Marine Ecology Assessment Report* (Appendix D), the *Marine Discharge Modelling Report* (Appendix B), and the GEMCO Marine Environment Monitoring Program (MEMP).

6.3.1 Environmental values

6.3.1.1 Quality of water, sediment and biota

6.3.1.1.1 Receiving environment

A marine environmental survey in Milner Bay was completed by Australian Marine Science Institute (AIMS) in December 2012 and included marine water sampling and analysis (Trott, 2012). Surveys were undertaken in proximity to the Port, to the north of the proposed construction footprint and far-field control sites and is used to understand historic water quality. However, this survey represents a single time point, and no temporal variability was included in the AIMS assessment. The following presents an overview of the main survey results:

- Manganese concentrations were elevated in both filtered and unfiltered marine samples close to the Port relative to control sites further afield. Although manganese concentrations were elevated, they remained below the ANZECC/ARMCANZ (2000) water quality guideline level. Furthermore, no metal/metalloid analytes in marine water samples exceeded the relevant ANZECC/ARMCANZ (2000) guidelines.
- Hydrocarbon concentrations were present in all marine water (and groundwater) samples, albeit at trace concentrations. Polycyclic aromatic hydrocarbon (PAH) concentrations were higher in marine water samples than either marine sediment or groundwater samples.
- The PAHs found to be present in the 2012 marine water samples were thought to have originated from contaminated surface water runoff, submarine groundwater discharge or the sewage outfall discharge point located mid-way along the ship-loader jetty (Trott, 2012). Additionally, a diesel spill was known to have occurred in the Port prior to the AIMS survey, although the date of occurrence of this event was not stated in the report.

Since the AIMS survey, marine water quality has been sampled annually from 2013 under GEMCO's Marine Environmental Monitoring Program (MEMP). Monitoring has been conducted at eight control sites and 12 sites in vicinity of the Port; sampling has been completed at approximately the same time every year (during neap tides of October – December). Data collected under this program is presented in Appendix D. This data has been used to establish preliminary benchmark values to inform mixing zone assessment from marine discharge modelling (Appendix B).

Additional sampling of water quality was undertaken in June 2024 to support assessment of this Proposal (refer Appendix D). This assessment found that physiochemical parameters for water temperature, dissolved oxygen, conductivity, pH and turbidity were all consistent or below their respective long term average values.

A marine sediment quality assessment was undertaken in close proximity to the Port by AIMS in 2012. This assessment found elevated concentrations of metals from beach and offshore samples at immediately surrounding the Port and up to 400 m north and south of the Port, however, these concentrations rapidly diminished with distance. GEMCO have also undertaken sediment quality assessment within the MEMP since 2013, focusing primarily on metals analysis. Data collected under this program is presented in Appendix D. For analytes with prescribed default guideline values (DGV) the median and 80th percentiles from the MEMP program are below the DGV, indicating concentrations of metals in sediments are not elevated.

The June 2024 assessment of the surface sediments within the Construction footprint similarly detected no elevated metal concentrations; other contaminants were below detection limits. PASS were identified, along with excess Acid Neutralising Capacity (ANC), indicating that the sediment is considered self-neutralising.

There is a low risk of contaminant mobilisation due to acidification, aligning with the conclusions of the GEMCO Tug Replacement Project (IPE, 2022). The sediment is predominantly comprised of sand, which is expected to settle out of suspension quickly.

6.3.1.1.2 Discharge water quality

To maintain compliance with GEMCO's MMP and to ensure existing dewatering activities do not cause significant environmental impacts, GEMCO undertakes monitoring of source water quality before discharge for comparison to a range of trigger values. A review of historical discharge water quality was completed by IndoPacific Environmental (IPE) with water quality data from 2008 – 2023 collated, reviewed, and summarised to understand parameters that may be of consequence when discharging to the marine environment (IPE, 2023). One hundred and forty-eight (148) analytes were assessed, however many of these were analysed infrequently and were discounted where available information indicated all available concentrations were below the laboratory limit of reporting (LOR).

Historical source water is consistently relatively fresh, mildly to moderately acidic (median pH 5.7) with a median (low) turbidity of 5.5 NTU (IPE, 2023). Nutrient concentrations in the discharge water were variable; total nitrogen and nitrate have median values of 215 and 211 µg/L, respectively, while phosphorus and phosphate median concentrations are generally below the laboratory LOR.

Manganese concentrations in discharge water are commonly detected above the laboratory LOR, with median manganese concentration calculated as 51 µg/L, although significantly higher concentrations were recorded in the dataset (maximum value 8,020 µg/L). Additionally, strontium, barium, aluminium, rubidium, lithium, zinc, and nickel, were all detected in discharging water quality, although at decreasing frequencies respectively. Other metals and metalloids were infrequently above the analysing laboratory's LOR, although elevated concentrations were present.

Rare-earth elements were not often detected in quarry water, with most concentrations for rare-earth elements below the LOR. Lanthanide series (15 consecutive chemical elements in the periodic table from lanthanum to lutetium) and yttrium were identified infrequently at concentrations above the analysing laboratories LOR.

Total petroleum hydrocarbons (>C10 – C40) were infrequently detected in quarry water and are not authorised to be discharged.

Hydrodynamic modelling of a marine discharge scenario was conducted for the Proposal (Appendix B) which predicts that water discharged will have the following qualities:

- Plume trajectories are generally predicted to be northwest and southeast, aligned with the coastline and the predominant directions of the tidal currents.
- Due to the buoyant nature of the discharge, the plume is primarily constrained to the surface waters and did not result in dilution rates below the adopted dilution targets at the seabed.
- The outer extent of the surface mixing zone for potential indirect effects (42-fold dilution target related to nitrate enrichment) is predicted to extend ~650 m north and ~550 m southeast from the diffuser.
- The outer extent of the surface mixing zone for potential direct effects (35-fold dilution target related to salinity reduction) is predicted to extend ~400 m north-northwest and ~350 m southeast from the diffuser.

6.3.1.2 Macroinvertebrates

Generally, marine invertebrates are poorly sampled and understood worldwide, this includes the Gulf of Carpentaria and Groote Eylandt. Abundant and diverse communities of polychaetes, crustaceans, molluscs, and echinoderms characterise the Gulf of Carpentaria basin (DCCEEW, 2023, Long et al. 1995; Haywood et al. 2005), with 33 species recorded.

Benthic epifauna (fauna living on the seabed) communities were more abundant and diverse in shallow subtidal areas, following a change in substrate from mud/silt in deeper waters to sand/gravel in shallow waters (WSP, 2023). Generally, sandy habitat was devoid of epifauna. Outside of the Construction footprint, hard substrate in the shallow subtidal was observed as supporting a diverse range of species, including corals, bryozoans, hydroids, ascidians and algae. Localised patches of coral gardens, consisting of rubble with individual coral colonies were also identified approximately 400-500 m south of the marine footprint. Boulders and small patch reef structures were observed within the shallow subtidal zone immediately adjacent the ship-loader jetty.

The benthic infauna (fauna living in the sediment) habitat observed within the Construction footprint, and the marine footprint, is not considered to be unique or of high ecological value and is widely represented throughout the broader Study area.

6.3.1.3 Physical parameters that support recreation and aesthetics

As part of the hydrodynamic modelling undertaken for the Proposal an assessment of flushing rates of the nearshore waters was completed (Appendix B). This assessment identified that the nearshore area is well flushed with e-folding timescales (the time to exchange ~67 % of the volume with surrounding ambient waters) averaging 16 hours, ranging from 6 hours at a minimum to 35 hours maximum.

To contextualise the results of the flushing assessment, the e-folding time estimates were compared with the PIANC (2008) guidance for marinas, which states an e-folding time of four days (96 hours / eight tidal cycles) to represent “good” flushing, with flushing between four and ten days (96 – 240 hours) classified as “fair” and “poor” for flushing times exceeding ten days (240 hours). The purpose of the evaluation for marinas is to avoid water quality issues related to stagnation (e.g. eutrophication).

These results indicate that water quality in the nearshore area provides adequate flushing to avoid stagnation, thus supporting water quality that would be considered appropriate for recreation and aesthetics. It is however noted that the Construction footprint is in close proximity to the active port area, and thus recreational activities are limited / restricted. Other areas of Groote Eylandt and the surrounding marine environment are considered to be of higher value for recreation.

6.3.1.4 Physical parameters that support fishing and aquaculture

There are no aquaculture activities or commercial fishing activities undertaken in proximity to the Proposal.

Stakeholder engagement by GEMCO representatives with Bara and Jaragba Traditional Owners on 24 October 2023 identified that the areas to the north and south of the Port are used by local communities for fishing however the Port area is not used. It is therefore apparent that the Proposal area, being within Port limits, does not represent high value fishing grounds for locals.

6.3.1.5 Industrial water supply

There is no industrial water supply relevant to the marine environment occurring in proximity to the Proposal.

6.3.1.6 Cultural and spiritual values

A collaboration between the ALC, Australian Institute of Marine Science (AIMS) and local Traditional Owners mapped the benthic marine environment under the ‘Mapping Makarda’ Project in 2016 (Davies et al., 2020). The outcomes of this are presented in the *Marine Ecology Assessment Report* (Appendix D). The Construction footprint was mapped under this project as *Yiningilya*, or coarse sand habitat.

As noted in Section 2.3, the Proposal has been designed to avoid areas of cultural and spiritual value. Consultation with Bara and Jaragba Traditional Owners has identified that the Port area, and thus the Proposal, is not located in a high value fishing area for the Traditional Owners.

6.3.2 Potential impacts

Potential impacts to marine environmental quality are detailed in the *Marine Ecology Assessment Report* (Appendix B), and the complementary *Marine Discharge Modelling Report* (Appendix B). Potential impacts include:

- Seabed disturbance during construction and operation and altered habitat via the installation of the discharge pipeline on the seabed.
- Increase of suspended solids during construction activities.
- Altered water quality via the discharge of quarry water. A mixing zone related to worst case scenario discharge has been defined and used to inform impact assessment for the marine environmental values.
- Accidental release of hazardous or polluting material may occur during construction (from construction vessels), or during operation (from maintenance vessels).

6.3.3 Environmental protection and management

6.3.3.1 Impact avoidance

The placement of the Proposal in the marine environment has sought to avoid the potential for impact as far as reasonably practical and minimise potential for impact where it could not be avoided. The benefits of the chosen Construction footprint include:

- Avoidance of environmental values and sensitive or culturally valued areas by utilising lower environmental value habitat that is widely represented in the region.
- Diffuser design incorporated avoidance including for seabed scouring.
- Further utilising an area that is already disturbed/modified and impacted by existing Port operations including:
 - Regular maintenance dredging of berth pockets and shipping channels.
 - Underwater noise generation from Port activities and vessel movements.
 - Existing effluent discharge activity associated with the local sewage treatment plant.

6.3.3.2 Impact mitigation

- The following general management measures will be adopted:
 - Development and implementation of CEMP to support management of excavation activities, including development of a monitoring program and ESCP as part of the CEMP.
 - Development and implementation of environmental management plans for the construction and operational phase of the Proposal.
 - Mandatory requirements for handling hazardous and/or polluting materials, including storage and transfers in accordance with industry standards, appropriate code of practice and manufacturing directions.
- The following controls will be adopted during construction to mitigate the potential for impact on water and sediment quality via seabed disturbance:
 - Development and implementation of a CEMP to support management of excavation activities.
 - Construction methodology will consider option with least disturbance to seabed area.
 - Excavation/trenching/piling will be optimised such that turbidity / plume generation is minimised.
 - Excavation is proposed to occur in a corridor between parallel sheet piles (to maintain trench integrity during pipeline installation); sheet piles will act as a boundary structure preventing unconfined plume expansion. Should trenching occur beyond the boundary of the coffer dam/sheet piles, silt curtains will be used to minimise plume expansion.
 - Development of a monitoring program as part of the CEMP that will include monitoring of turbidity and other relevant water quality parameters (i.e. pH and dissolved oxygen) during seabed disturbance works.
 - Trenches will be backfilled after pipeline installation. Where reinstatement is not possible, sediment will be placed within Port's existing onshore dredge spoil ponds. This will include measures to ensure no release of sediment/pollutants to surrounding sensitive receptors during transport and storage.
- The following controls will be adopted to mitigate the potential for altered water quality via spill of hazardous chemicals:
 - Emergency management plans for vessel operation will be developed and implemented, including the management of chemical and hydrocarbon spills and training.
 - Any contaminated material collected will be contained on board for appropriate onshore disposal.
 - All hoses for pumping and transfers will be maintained and checked as per the vessel's Pump Management System (PMS).
 - On-board oily water disposal will be managed in accordance with the *Marine Pollution Regulation 2003*.
- The following controls will be adopted to mitigate the potential for altered water quality via spill of hydrocarbon from refuelling of vessels or machinery onboard:

- Refuelling operations will be a manned operation. In the event the refuelling pipe is ruptured, fuel bunkering will cease.
- Spill clean-up equipment will be located where hydrocarbons are stored and frequently handled (i.e. 'high risk' areas).
- Refuelling of a vessel will only occur in port and in suitable weather conditions.
- The discharge plume is predicted to be buoyant with no influence on benthic habitats. To confirm the validity of the mixing zones predicted from the *Marine Discharge Modelling* (Appendix B), the following activities will be implemented:
 - Validation monitoring program to be undertaken to validate the outcomes of the marine discharge modelling.
 - Results of the validation monitoring program are to be used to inform the existing GEMCO MEMP and any possible amendments.
- To prevent routine discharge from altering the receiving environment water quality beyond the identified mixing zone the following management controls will be implemented:
 - A review of the GEMCO MEMP to be undertaken based on the outcomes of the validation monitoring. Additional monitoring locations to be added to the MEMP, if required.
 - Monitoring of the receiving environment to be undertaken under the revised GEMCO MEMP.
 - Monitoring of discharge water quality to be undertaken during discharge activities; data will be used to support interpretation of the receiving environment monitoring results.

6.3.4 Residual impacts

The residual impacts on the environmental values and sensitivities relevant to the marine environmental quality environmental factor were assessed by considering both the direct and indirect effects of the Proposal, as well as the effectiveness of the proposed mitigation measures outlined in Section 6.3.3.

The assessment took into account the severity (including scale, duration, and magnitude) of the predicted impacts, alongside the importance and sensitivity of the environmental value components. Based on this assessment, with the implementation of the identified avoidance and mitigation measures, it was determined that there will be no significant residual impact on this environmental factor.

6.3.5 Cumulative impacts

No other projects have been identified by GEMCO to occur concurrently with the Proposal within the alignment.

6.3.6 Conclusion

With effective implementation of avoidance and mitigation measures, including the OEMP, CEMP and GEMCO standard operating procedures, the Proposal is not likely to significantly affect the marine environmental quality.

Overall, the significant impact assessments conducted in the *Marine Ecology Assessment Report* (Appendix D) identified a low likelihood of significant impact resulting from the Proposal on marine ecosystem values and it is concluded that the NT EPA's objective for marine environmental quality to '*protect the quality and productivity of water, sediment and biota so that the environmental values are maintained*' will be met.

6.4 SEA – Marine ecosystems

The NT EPA's objective for the Marine Ecosystems factor is to "Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning".

This section outlines the current understanding of the marine ecosystems within and around the Proposal. It explores how the environmental values could be directly or indirectly affected during the Proposal's construction and operation. Key documents that have been referenced for this section include the *Marine Ecology Assessment Report* (Appendix D), the *Marine Discharge Modelling Report* (Appendix B), and the GEMCO Marine Environment Monitoring Program (MEMP).

6.4.1 Environmental values

This section provides a summary of the environmental values for the Construction footprint. These values are further described in the *Marine Ecology Assessment Report* (Appendix D).

- Conservation significant marine and coastal fauna are those listed as protected matters under the EPBC Act, or those listed as threatened under the TPWC Act. A likelihood of occurrence assessment was undertaken for the conservation significant species (including threatened species, migratory species and listed marine species) found in the region. This assessment was based on a review of species distributions and habitat requirements, historical records for the region, and the results of habitat assessments and ecological field surveys conducted within the Study area. Of the conservation significant species found in the region, the following (listed in Table 24) were confirmed, or considered likely to occur within 10 km of the Proposal (the Study Area):
- Seven marine reptile species
- Three species of sharks and rays
- Five marine mammal species
- Twelve fish species
- Three biologically important areas for marine turtles were also identified.

Migratory marine bird species have been covered in consideration of terrestrial species in Section 6.2 and further assessed in the *Terrestrial Ecology Assessment Report* (Appendix C).

Detailed information relating to distribution and habitat requirements of these species is provided in the *Marine Ecology Assessment Report* (Appendix D).

Table 24 Marine conservation species likely to occur within 10km of the Proposal

Species	Common name	Conservation status ²	
		EPBC Act	TPWC Act
Reptiles			
<i>Lepidochelys olivacea</i>	Olive ridley turtle	E, Mig (marine)	V
<i>Caretta caretta</i>	Loggerhead turtle	E, Mig (marine)	V
<i>Dermochelys coriacea</i>	Leatherback turtle	E, Mig (marine)	CE
<i>Natator depressus</i>	Flatback turtle	V, Mig (marine)	NL
<i>Chelonia mydas</i>	Green turtle	V, Mig (marine)	NL
<i>Eretmochelys imbricata</i>	Hawksbill turtle	V, Mig (marine)	V
<i>Crocodylus porosus</i>	Estuarine crocodile	Mig (marine)	NL
Sharks and rays			
<i>Pristis zijsron</i>	Green Sawfish	V, Mig (marine)	V
<i>Anoxypristis cuspidata</i>	Narrow Sawfish	Mig (marine)	NL
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CD	NL

² CE: Critically Endangered, E: Endangered, V: Vulnerable, Mig: Migratory, CD: Conservation Dependent, NL: Not listed

Species	Common name	Conservation status ²	
		EPBC Act	TPWC Act
Mammals			
<i>Dugong dugon</i>	Dugong	Mig (marine)	NL
<i>Tursiops aduncus</i>	Indian Ocean bottlenose dolphin	Cetacean	NL
<i>Orcaella heinsohni</i>	Australian snubfin dolphin	Mig (marine)	NL
<i>Sousa sahalensis</i>	Australian humpback dolphin	Mig (marine)	NL
<i>Pseudorca crassiden</i>	False killer whale	Cetacean	NL
Fish			
<i>Corythoichthys flavofasciatus</i>	Reticulate pipefish	Marine	NL
<i>Festucalex cinctus</i>	Girdled pipefish	Marine	NL
<i>Halicampus grayi</i>	Mud pipefish	Marine	NL
<i>Halicampus spinirostris</i>	Spiny-snout pipefish	Marine	NL
<i>Haliichthys taeniophorus</i>	Ribboned pipehorse	Marine	NL
<i>Hippichthys penicillus</i>	Beady pipefish	Marine	NL
<i>Hippocampus histrix</i>	Spiny seahorse	Marine	NL
<i>Hippocampus kuda</i>	Spotted seahorse	Marine	NL
<i>Hippocampus planifrons</i>	Flat-face seahorse	Marine	NL
<i>Hippocampus spinosissimus</i>	Hedgehog seahorse	Marine	NL
<i>Trachyrhamphus bicoarctatus</i>	Bentstick pipefish	Marine	NL
<i>Trachyrhamphus longirostris</i>	Straightstick pipefish	Marine	NL
Biologically Important Areas			
Green turtle (<i>Chelonia mydas</i>) (Nesting season - August to September)			
Hawksbill turtle (<i>Eretmochelys imbricata</i>) (Nesting season - December to January)			
Flatback turtle (<i>Natator depressus</i>) (Nesting season - November to May)			

Seasonal surveys of the Construction footprint and surrounding area (Survey area) have been undertaken to support this referral. Outcomes of the surveys are presented in the *Marine Ecology Assessment Report* (Appendix D). Key findings include:

- The benthic habitat in the Construction footprint is dominated by soft-substrate and is not considered to be unique within the surrounding environment (WSP, 2023a & Appendix D).
- Seagrass, macroalgae, and coral communities are present throughout the Study area, however, these are generally absent from the Construction footprint.
- Where seagrass and macroalgae were recorded in the Study area these were strongly seasonal, with extensive benthic cover during summer and almost no presence during winter.
- No mangrove or saltmarsh communities are present in the Construction footprint.

The impact assessment undertaken for the Proposal comprised a number of steps:

- Potential impact pathways related to the construction, operation and decommissioning were identified and examined in detail. Reference was made to the Proposal activities, as well as the existing environmental values.
- Appropriate, achievable avoidance and mitigation measures were identified for each potential impact pathway, as relevant to each sensitive receptor.

- The potential for residual impact was assessed; residual impact is defined as the potential impact remaining following the application of identified avoidance and mitigation measures. For conservation significant species/matters protected under the EPBC or TPWC Act the potential for significant impact was assessed using the EPBC Significant Impact Guidelines 1.1 (DoE, 2013).
- A conclusion was formed based on the outcomes of the residual impact assessment.

6.4.2 Potential impacts

Potential impacts to marine environmental quality are detailed in the *Marine Ecology Assessment Report* (Appendix D), and the complementary *Marine Discharge Modelling Report* (Appendix B). Potential impacts include:

- Seabed disturbance during construction and operation and altered habitat via the installation of the discharge pipeline on the seabed.
- Increase of suspended solids during construction activities.
- Altered water quality via the discharge of quarry water. A mixing zone related to worst case scenario discharge has been defined and used to inform impact assessment for the marine environmental values.
- Accidental release of hazardous or polluting material may occur during construction (from construction vessels), or during operation (from maintenance vessels).
- Generation of underwater noise during construction activities.
- Interaction of marine fauna with vessels (vessel strike or disturbance) during construction or during operation.
- Introduction of marine pests and diseases.

6.4.3 Environmental protection and management

6.4.3.1 Impact avoidance

The placement of the Proposal in the marine environment has sought to avoid the potential for impact as far as reasonably practical and minimise potential for impact where it could not be avoided. The benefits of the chosen Proposal include:

- Avoidance of environmental values and sensitive or culturally valued areas by utilising lower environmental value habitat that is widely represented in the region.
- Diffuser design incorporates avoidance including for seabed scouring and entrainment / entrapment.
- Further utilising an area that is already disturbed/modified and impacted by existing Port operations including:
 - Regular maintenance dredging of berth pockets and shipping channels.
 - Underwater noise generation from Port activities and vessel movements.
 - Existing effluent discharge activity associated with the local Sewage Treatment Plant.

6.4.3.2 Impact mitigation

Impact mitigation measures outlined in Section 6.3.3 are applicable to the management of potential impacts to marine ecosystems. The following additional mitigation measures have been committed to by GEMCO, including:

- The following controls will be implemented for the purposes of decreasing or mitigating the impact of underwater noise on marine fauna:
 - Vessel, trenching and piling machinery will be maintained in accordance with the manufacturer specifications to reduce noise emissions.
 - Pre-start checks of the piling area (including a radius of 15 m around the machinery) for marine mammals or marine turtles.
 - Soft starts to be incorporated into all piling activities.
- The following controls and processes may be employed, when possible, in order to mitigate or eliminate the risk of introducing pests:

- Incorporate existing GEMCO procedures for marine pest management into the CEMP and implement these measures for the proposed works.
- Conformance with the GEMCO biosecurity inspection procedure on freight and luggage, including barges and their cargo, to prevent invasive species arriving and establishing on Groote Eylandt.
- Vessels should be sourced locally wherever possible.
- All vessels working on the Proposal, whether internationally or locally sourced, will adhere to Australian quarantine requirements.
- The management of ballast water prior to entry to Australian waters must follow AQIS guidelines and compliance requirements in relation to marine pest introduction risk management for any internationally sourced vessel.
- Vessels landing at the port must adhere to GEMCO's biosecurity inspection procedure including visual inspection for pest animals or plant material.
- Any additional vehicle, equipment or containers being brought to Groote Eylandt must adhere to the GEMCO biosecurity inspection procedure requiring a visual inspection.
- Conformance with GEMCO's existing marine pest management procedures.
- The following controls will be adopted and executed for all construction methods to mitigate or eliminate the risk of collision between vessels and marine fauna:
 - Operations of vessels will follow the vessel disturbance and vessel strike mitigations outlined by the Australian Guidelines for Whale and Dolphin Watching (Commonwealth of Australia, 2017) and the National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia, 2017a). This includes the implementation of the following guidelines:
 - Reducing vessel speed to as low as is reasonably practical within the Port area and adhere to standard speed limits within and around the wharf.
 - Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone.
 - Caution zone must not be entered when calf (whale or dolphin) is present.
 - No approach zone (100 m either side of whales and 50 m either side of dolphins) vessels should not enter this zone and should not wait in front of the direction of travel or an animal or pod or follow directly behind.
- To manage the impacts to created habitat, the following controls will be implemented:
 - Maintenance of the outfall structure shall seek to avoid slow-moving or cryptic protected species such as syngnathids through inspection of the structure for these species prior to work commencement.
- The discharge plume is predicted to be buoyant with no influence on benthic habitats. Validation monitoring of the plume will be undertaken to validate the outcomes of the Marine Discharge Modelling.

6.4.4 Residual impacts

In accordance with the EPBC Act Significant Impact Guidelines 1.1 residual SIAs were conducted for species confirmed or likely to occur (Appendix D). This assessment has incorporated the application of the avoidance and mitigation measures identified in Section 6.3.3 and 6.4.3.

The residual impacts on the environmental values and sensitivities relevant to the marine environmental quality environmental factor were assessed by considering both the direct and indirect effects of the Proposal, as well as the effectiveness of the proposed mitigation measures outlined in Section 6.3.3 and 6.4.3. The assessment took into account the severity (including scale, duration, and magnitude) of the predicted impacts, alongside the importance and sensitivity of the environmental value components. Based on this assessment, with the implementation of the identified avoidance and mitigation measures, it was determined that there will be no significant residual impact on this environmental factor, including on conservation significant species listed under the EPBC Act and/or the TPWC Act.

6.4.5 Cumulative impacts

No other projects have been identified by GEMCO to occur concurrently with the Proposal, within the Construction footprint.

6.4.6 Conclusion

With effective implementation of avoidance and mitigation measures, including the OEMP, CEMP and GEMCO standard operating procedures, the Proposal is not likely to significantly affect marine ecosystems.

Overall, the significant impact assessments conducted in the *Marine Ecology Assessment Report* (Appendix D) identified a low likelihood of significant impact resulting from the Proposal on marine ecosystem values and it is concluded that the NT EPA's objective for marine ecosystems to '*protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning*' will be met.

6.5 Protected Matters under the EPBC Act

6.5.1 Protected Matters values

A search of the EPBC Act Protected Matters Search Tool (PMST) (DCCEEW, 2024) was conducted on 6 February 2025 to identify protected matters under the EPBC Act, including matters of national environmental significance (MNES) and other matters. The PMST search included the Proposal plus a 10 km buffer³ and is provided in Appendix I. Protected matters identified in the PMST are described in the following sections.

6.5.1.1 Matters of national environment significance

World heritage properties

There are no world heritage properties within the Construction footprint and 10 km buffer.

National heritage properties

There are no national heritage properties within the Construction footprint and 10 km buffer.

Wetlands of international importance (Ramsar wetlands)

There are no Ramsar wetlands within the Construction footprint and 10 km buffer.

Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park is not within the Construction footprint and 10 km buffer.

Commonwealth Marine Area

There are no Commonwealth Marine Areas within the Construction footprint and 10 km buffer.

Listed threatened ecological communities

There are no listed threatened ecological communities within the Construction footprint and 10 km buffer.

Listed threatened species

The PMST search identified the potential presence of 36 threatened species within the Construction footprint and 10 km buffer, which comprised:

- Twelve birds
- Eight mammals (one marine and seven terrestrial)
- Nine reptiles (six marine and three terrestrial)

³ Note as per Section 6.2 and Appendix C a 5 km buffer was applied for the terrestrial ecology assessment.

- Seven sharks.

Environmental values associated with Threatened marine species (including cetaceans, turtles and sharks) are presented in the *Marine Ecology Assessment Report* (Appendix D).

Environmental values associated with threatened terrestrial species are presented in the *Terrestrial Ecology Assessment Report* (Appendix C).

Listed migratory species

The PMST search identified the potential presence of 48 listed migratory species within the Construction footprint and 10 km buffer, which comprised:

- Twenty-six birds
- Six mammals (marine)
- Seven reptiles (marine)
- Nine sharks.

Environmental values associated with Migratory marine species (including cetaceans, reptiles and sharks) are presented in the *Marine Ecology Assessment Report* (Appendix D).

Environmental values associated with Migratory bird species are presented in the *Terrestrial Ecology Assessment Report* (Appendix C).

6.5.1.2 Other matters protected by the EPBC Act

Commonwealth lands

The PMST search identified the potential presence of one area of commonwealth lands within the 10 km buffer, which comprised:

- Defence – NORFORCE DEPOT – Groote Eylandt

Refinement of the buffer area identified the NORFORCE DEPOT approximately between 400-500 m from the Construction footprint.

Commonwealth heritage places

There are no Commonwealth heritage places within the Construction footprint and 10 km buffer.

Listed marine species

The PMST search identified the potential presence of 78 listed marine species within the Construction footprint and 10 km buffer, which comprised:

- Thirty birds
- Twenty-two fish
- One mammal
- Twenty-five reptiles.

Environmental values associated with listed marine species (including fish, mammals and reptiles) are presented in the *Marine Ecology Assessment Report* (Appendix D).

Environmental values associated with listed migratory marine bird species are presented in the *Terrestrial Ecology Assessment Report* (Appendix C).

Whales and other cetaceans

The PMST search identified the potential presence of 10 whales and other cetaceans within the Construction footprint and 10 km buffer, which comprised whales and dolphins.

Environmental values associated with listed marine species (including whales and dolphins) are presented in the *Marine Ecology Assessment Report* (Appendix D)

Critical habitats

There are no critical habitats within the Construction footprint and 10 km buffer.

Commonwealth reserves terrestrial

There are no Commonwealth reserves terrestrial within the Construction footprint and 10 km buffer.

Australian marine parks

There are no Australian marine parks within the Construction footprint and 10 km buffer.

Habitat critical to the survival of marine turtles

The PMST search identified the potential presence of three habitats critical to the survival of marine turtles within the Construction footprint and 10 km buffer, which comprised:

- green turtle nesting
- hawksbill turtle nesting
- flatback turtle nesting.

Environmental values associated with habitats critical to the survival of marine turtles are presented in the *Marine Ecology Assessment Report* (Appendix D).

6.5.2 Potential impacts

Potential impacts and impact pathways to Protected Matters under the EPBC Act are discussed in detail in the appended reports:

- *Terrestrial Ecology Assessment Report* (Appendix C).
- *Marine Ecology Assessment Report* (Appendix D).
- *Air Quality Assessment Report* (Appendix E).
- *Noise and Vibration Impact Assessment* (Appendix H).

Potential impacts include:

- Habitat loss for listed threatened species (marine and terrestrial).
- Habitat degradation for listed threatened species (marine and terrestrial).
- Injury / mortality or disturbance for listed threatened species (marine and terrestrial); migratory species; listed marine species; and whales and other cetaceans.
- Habitat connectivity for listed threatened species (terrestrial).

Significant impact assessments (SIAs) were conducted for marine and terrestrial threatened species, migratory species and cetaceans that were assessed in the likelihood of occurrence assessments in *Marine Ecology Assessment Report* (Appendix D) and *Terrestrial Ecology Assessment Report* (Appendix C) as likely or confirmed to occur. Cross references to the locations of these SIAs within the respective reports is provided in Table 25. All SIAs determined there to be a low likelihood of residual significant impact following implementation of the mitigation measures identified in Section 6.5.3, and further described in the *Marine Ecology Assessment Report* (Appendix D) and *Terrestrial Ecology Assessment Report* (Appendix C).

The northern hopping mouse (*Notomys aquilo*) was assessed as unlikely to occur within the Construction footprint within the likelihood of assessment. As targeted survey effort was undertaken for this species (with no records), no SIA was completed. This basis of this determination is presented in Section 5.2.3 of the *Terrestrial Ecology Assessment Report* (Appendix C).

Table 25 Summary of location for residual significant impact assessments for Protected matters under the EPBC Act

Protected Matter under the EPBC Act	Scientific name	Conservation status		Document reference	Section of document residual SIA is located
		EPBC Act	NT Act		
Olive Ridley turtle	<i>Lepidochelys olivacea</i>	E, Mig (marine)	V	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 19
Loggerhead turtle	<i>Caretta caretta</i>	E, Mig (marine)	V	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 19
Leatherback turtle	<i>Dermochelys coriacea</i>	E, Mig (marine)	CE	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 19
Common greenshank	<i>Tringa nebularia</i>	E, Mig (marine)	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 20
Northern quoll	<i>Dasyurus hallucatus</i>	E	CE	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 22
Northern blue-tongue skink	<i>Tiliqua scincoides intermedia</i>	CE	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 26
Flatback turtle	<i>Natator depressus</i>	V, Mig (marine)	ML	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 20
Green turtle	<i>Chelonia mydas</i>	V, Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 20
Hawksbill turtle	<i>Eretmochelys imbricata</i>	V, Mig (marine)	V	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 20
Green sawfish	<i>Pristis zijsron</i>	V, Mig (marine)	V	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 20
Dwarf sawfish	<i>Pristis clavata</i>	V, Mig (marine)	V	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 20
Vulnerable threatened flora	<i>Eleocharis retroflexa</i>	V	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.1, Table 18
Vulnerable threatened shorebirds: Sharp-tailed sandpiper Alaskan bar-tailed godwit	<i>Calidris acuminata</i>	V, Mig	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 19
	<i>Limosa lapponica bauer</i>	V	NL		
Northern masked owl	<i>Tyto novaehollandiae kimberli</i>	V	V	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 21
Ghost bat	<i>Macroderma gigas</i>	V	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 23

Protected Matter under the EPBC Act	Scientific name	Conservation status		Document reference	Section of document residual SIA is located
		EPBC Act	NT Act		
Northern brushtail possum	<i>Trichosurus vulpecula arnhemensi</i>	V	NL	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 24
Mertens' water monitor	<i>Varanus mertensi</i>	E	V	Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.2, Table 25
Dugong	<i>Dugong dugon</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Australian snubfin dolphin	<i>Orcaella heinsohni</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Australian humpback dolphin	<i>Sousa sahalensis</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Reef manta ray	<i>Mobula alfredi</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Giant manta ray	<i>Mobula birostris</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Scalloped hammerhead	<i>Sphyrna lewini</i>	CD	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Estuarine crocodile	<i>Crocodylus porosus</i>	Mig (marine)	NL	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 21
Cetaceans	Various	-	-	Marine Ecology Assessment Report (Appendix D)	Appendix C, Table 22
Migratory marine species (birds)	Various	Mig		Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.3, Table 27
Migratory terrestrial species (birds)	Various	Mig		Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.3, Table 28
Migratory wetland species (birds)	Various	Mig		Terrestrial Ecology Assessment Report (Appendix C)	Section 6.4.3, Table 29

Based on the locality of the NORFORCE DEPOT (approximately 400-500 m from the Proposal) and consideration of potential impacts associated with air, noise and vibration, no Commonwealth lands are expected to be impacted by the Proposal.

6.5.3 Environmental protection and mitigation

Environmental protection and mitigation for the potential impacts identified in Section 6.5.2 are discussed below and in further detail in the appended reports:

- *Terrestrial Ecology Assessment Report* (Appendix C).
- *Marine Ecology Assessment Report* (Appendix D).
- *Air Quality Assessment Report* (Appendix E).

- *Noise and Vibration Impact Assessment* (Appendix H).

6.5.3.1 Impact avoidance

Avoidance of impact to terrestrial EPBC protected matters has been achieved for the Proposal through:

- Avoidance of direct habitat removal through reduction in construction footprint throughout design including consideration of:
 - Decision for water intake point to occur from the NH2 pit rather than southern pit (as discussed in Section 2.3 and Section 2.4).
 - Reduction in Construction footprint clearing width requirements from 20 m width to minimum corridor width.
 - Positioning of the Proposal in areas of existing (and future planned) vegetation clearing where possible (e.g. the Rowell Highway alignment).
- Avoidance of clearing potentially sensitive or significant vegetation through placement of the marine discharge location at the existing disturbed Port area, as discussed in Section 2.3 and Section 2.4.
- Avoidance of prolonged impacts from lighting as works are proposed to be conducted between the hours of 6 am to 6 pm, seven days a week.
- Conformance with the GEMCO biosecurity inspection procedure on freight and luggage, including barges and their cargo to prevent introduction of pests.
- Waste management under this Proposal will be conducted in accordance with the general environmental duty under the *Waste Management and Pollution Control Act 1998* (NT). The waste management hierarchy of “Avoid – Reuse – Recycle -Recover – Dispose” will be applied to environmental management during all phases of the Proposal.

Avoidance of impact to marine EPBC protected matters has been achieved for the Proposal through:

- Avoidance of environmental values and sensitive or culturally valued areas by utilising lower environmental value habitat that is widely represented in the region.
- Further utilising an area that is already disturbed/modified and impacted by existing Port operations including:
 - Regular maintenance dredging of berth pockets and shipping channels.
 - Underwater noise generation from Port activities and vessel movements.
 - Existing effluent discharge activity associated with the local sewage treatment plant.

6.5.3.2 Impact mitigation

Mitigation of impact to terrestrial EPBC protected matters has been achieved for the Proposal through:

- Mitigation of impacts from direct and indirect habitat loss and degradation, including:
 - Development and implementation of a CEMP and the implementation of applicable GEMCO standard operating procedures and management plans to ensure the appropriate management of invasive flora (weeds), waste, dust and emissions, erosion and sedimentation, and hazardous materials throughout the Construction footprint.
- All land disturbance will be managed through GEMCO’s existing Permit to Clear (PTC) process.
- Vegetation clearing should be no wider than is necessary to facilitate the construction of the pipeline and the associated infrastructure, so as to limit potential impacts to local flora and fauna.
 - Clearing will be limited as much as possible on the vegetated side of the pipeline alignment, noting there may be clearing requirements for fire safety and construction effort.
 - Where possible, the on-ground layout and alignment of the corridor should be micro-sited to avoid native vegetation and suitable fauna habitat features (e.g. rock piles, termite mounds, hollow logs, etc).
 - Excavated materials will be re-instated, where possible, and excess materials removed to a suitable location at the GEMCO mine. No stockpiles are proposed to remain in-situ within the construction footprint at the completion of works.
 - Minimise dust generation during construction through:

- Undertake dust suppression, as required, using water sprays, water extension agents, soil stabilising polymers or other media on:
 - unpaved work areas subject to traffic or wind
 - spoil and aggregate stockpiles
 - during the loading and unloading of dust generating materials
 - unpaved access tracks.
- Mitigation of impacts from mortality and injury, including:
 - Once the final design has been determined and prior to the commencement of construction, pre-clearance surveys will be conducted by suitably qualified person over the extent of clearing disturbance to limit the potential for impacts to any fauna individual(s). Salvage and relocation of any fauna encountered during construction will be conducted by a suitable qualified person.
 - This survey should be conducted by a suitably qualified person and target threatened and common fauna species and/or habitat features including hollow bearing trees, burrows, dens, hollow logs, caves, rocky areas i.e. crevices, riparian vegetation, embankments, and any other features which may provide suitable habitat for present fauna.
 - Where pre-clearance surveys identify threatened fauna species, works should cease immediately, and specialist advice obtained regarding relocation or other controls before approval to proceed is given by GEMCO.
 - To limit the potential for disturbance to any EPBC-listed migratory shorebird species at the outfall location to the northern extent of the Project area (likely only from around November to March and predominantly during the wet season), clearing works within 300 m of the marine environment should involve an inspection by a suitably qualified person to ensure no EPBC-listed migratory shorebirds are utilising the area. If EPBC-listed migratory shorebirds are detected during site inspections, works should only proceed once birds have left the Project area.
 - Clearing, earthworks, and the use of heavy machinery which may cause disturbance will be limited within 50 m of all watercourses and associated riparian vegetation.
 - The contractor will clearly demarcate all watercourses and the extent of riparian vegetation (~20 m from watercourse edge) with the intent to limit impacts to freshwater dependent fauna species, including the Mertens' water monitor.
 - Construction works within the extent of riparian vegetation (~20 m from watercourse edge) should be planned so as to occur outside of the Mertens' water monitor mating period (i.e. during the wet season – December to February).
 - Minimisation of incursions and access to riparian zones by construction personnel.
 - Works to preferentially occur when the watercourse is dry and / or not flowing and erosion and sediment controls implemented.
 - If a temporary waterway barrier is required:
 - The dimensions of any temporary barrier shall be limited to the minimum practicable for the site and purpose.
 - The method of draining the water must not cause fish to become trapped or stranded or have detrimental impacts on the wellbeing of fish.
 - If fish salvage is required, specialist advice will be obtained.
 - Capture within the CEMP and implement all permit requirements.
 - Minimise open excavation time in watercourses to reduce erosion risks and maintain fauna connectivity across the watercourse.
 - Where any trenching is required during the construction phase, any open-air trench should not be left exposed for longer than 48 hours. In instances where trenching is required, the trench is to be inspected at least once during any 24-hour period (ideally immediately post dawn), if fauna is detected in the trench advice will be sought from a suitably qualified person.
- Mitigation of impacts from lost habitat connectivity / fauna passage, including:

- No installation of fencing between the road and pipeline crossings.
- Construction of 53 crossings along the pipeline alignment; including 17 specifically designed for fauna passage; (approximately 22 elevated crossings, 29 buried crossings and 1 earthen ramp) (Figure 15).
- Crossings range from 15 m to > 50 m, totalling a length of approximately 1.7 km of the pipeline (~14 % of the total terrestrial pipeline). Additionally alignment of the crossing points with the existing culverts under the Rowell Highway will maintain the existing passage under the existing Rowell Highway.

Figure 15 shows the alignment of the existing culverts and the proposed pipeline crossings. Evidence of northern quoll footprints in the vicinity of existing culverts along the Rowell highway during the August GHD survey were observed, indicating that fauna may already use these existing crossing points. Alignment of existing crossing points and new pipeline crossings will provide connectivity between the eastern and western extents of the road / pipeline corridor.

Mitigation of impact to marine EPBC protected matters will be achieved for the Proposal through:

- Mitigation of impact of underwater noise on EPBC protected matters during construction and operation:
 - Pre-start checks of the piling area (including a radius of 15 m around the machinery) for marine mammals or marine turtles during construction.
 - Soft starts to be incorporated into all piling activities during construction.
 - Vessel, trenching and piling machinery will be maintained in accordance with the manufacturer specifications to reduce noise emissions.
- Mitigation of impacts from introduction of pests which may result in degradation of EPBC protected matters or their habitat during construction and operation:
 - Incorporate existing GEMCO procedures for marine pest management into the CEMP and implement these measures for the proposed works.
 - Conformance with the GEMCO biosecurity inspection procedure on freight and luggage, including barges and their cargo to prevent invasive species arriving and establishing on Groote Eylandt.
 - Vessels would be sourced locally wherever possible.
 - All vessels working on the Proposal, whether internationally or locally sourced, will adhere to Australian quarantine requirements.
 - The management of ballast water prior to entry to Australian waters must follow AQIS guidelines and compliance requirements in relation to marine pest introduction risk management for any internationally sourced vessel.
 - Vessels landing at the port must adhere to GEMCO's biosecurity inspection procedure including visual inspection for pest animals or plant material.
 - Any additional vehicle, equipment or containers being brought to Groote Eylandt must adhere to the GEMCO biosecurity inspection procedure requiring a visual inspection.
 - Conformance with GEMCO's existing marine pest management procedures.
- Mitigation of impacts from mortality or injury to EPBC protected matters resulting from collision with vessels during construction or operation:
 - Operations of vessels will follow the vessel disturbance and vessel strike mitigations outlined by the Australian Guidelines for Whale and Dolphin Watching (Commonwealth of Australia, 2017) and the National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (Commonwealth of Australia, 2017a). This includes the implementation of the following guidelines:
 - Reducing vessel speed to as low as is reasonably practical within the Port area and adhere to standard speed limits within and around the wharf (6 knots).
 - Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone.
 - Caution zone must not be entered when calf (whale or dolphin) is present.
 - No approach zone (100 m either side of whales and 50 m either side of dolphins) vessels must not enter this zone and would not wait in front of the direction of travel or an animal or pod or follow directly behind.

- To mitigate the impacts to EPBC protected matters resulting from created habitat, the following controls will be implemented throughout operations:
 - The outfall structure will be inspected during scheduled maintenance activities for any slow-moving or cryptic protected species such as syngnathids. Maintenance activities will seek to avoid these species.

6.5.4 Residual impacts

In accordance with the *Significant impact guidelines 1.1 – Matters of national environmental significance* (Commonwealth of Australia, 2013) residual SIAs were conducted for:

- Listed threatened species that were assessed within the likelihood of occurrence assessments to be confirmed present, likely to occur or may occur within the Construction footprint.
- Migratory species that were assessed within the likelihood of occurrence assessments to be confirmed present, likely to occur or may occur within the Construction footprint.
- Commonwealth marine environment including Commonwealth marine area, cetaceans, listed marine species and Commonwealth heritage values.

All SIAs identified a low likelihood of significant residual impacts following implementation of the avoidance and mitigation measures detailed in Section 6.5.3.1 and 6.5.3.2.

6.5.5 Cumulative impacts

No other projects are proposed to occur within the Construction footprint throughout construction of the Proposal. Therefore, no cumulative impacts have been identified.

Existing operations at the GEMCO mine site will continue throughout construction of the Proposal including the haulage of ore along the Rowell Highway to the Port facility. The construction of pipeline infrastructure adjacent the existing Rowell Highway has the potential to compound movement restrictions across the landscape. Avoidance and mitigation measures as described in Section 6.5.3 including fauna passage through burial or raising of the pipeline at the 29 existing Rowell Highway culverts and 53 locations in total are key controls for reducing the potential impacts.

6.5.6 Conclusion

The Proposal was self-assessed against the Commonwealth '*Significant impact guidelines 1.1 – Matters of national environmental significance*' (Commonwealth of Australia, 2013). This process demonstrated that, following the application of avoidance and mitigation measures, the Proposal is unlikely to result in a significant residual impact. Therefore, no referral is proposed to be made to DCCEEW.

7. Conclusion

A self-assessment of the Proposal has been undertaken using the pre-referral screening tool provided in the guideline '*Referring a proposal to the NT EPA*' and the Proposal triggered a referral based on the type, scale and nature of the action for three of the 14 environmental factors. The environmental factors considered are terrestrial ecosystems, marine environmental quality, and marine ecosystems.

Further assessment of these environmental factors was conducted in Sections 6.2, 6.3 and 6.4 reviewing the environmental factors, impacts, mitigation measures, residual impacts and cumulative impacts to determine if a significant impact was likely to occur as a result of the Proposal.

These assessments determined that with the implementation of the identified avoidance and mitigation measures, it was unlikely that a significant residual impact would result on any of the three environmental factors.

Additionally, a self-assessment of the Proposal was undertaken in accordance with the EPBC Act self-assessment guidelines, '*Significant impact guidelines 1.1 – Matters of national environmental significance*' (Commonwealth of Australia, 2013). As discussed in Section 6.5, the Proposal did not trigger the requirement for an EPBC Act referral based on residual significant impact assessments. A referral under the EPBC Act will not be made.

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Appendices

Appendix A

NT EPA pre-referral screening tool

Appendix B

**GEMCO Excess Water Disposal Project –
Marine Discharge Modelling Report**

Appendix C

**GEMCO Excess Water Disposal Project –
Terrestrial Ecology Assessment Report**

Appendix D

**GEMCO Excess Water Disposal Project –
Marine Ecology Assessment Report**

Appendix E

GEMCO Excess Water Disposal Project - Air Quality Assessment Report

Appendix F

**GEMCO Excess Water Disposal Project -
Greenhouse Gas Assessment Report**

Appendix G

**GEMCO Excess Water Disposal Project -
Cultural Heritage Assessment Report**

Appendix H

GEMCO Excess Water Disposal Project - Noise and Vibration Impact Assessment Report

Appendix I

PMST search data



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