Project Description

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2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This section describes the Southern Lease Exploration Program (2023-2025) (the exploration program). The setting is described along with the planning of exploration and previous exploration activities. The proposed exploration activities are then discussed, including vegetation clearing requirements, rehabilitation activities and measures to avoid and mitigate environmental impacts. The key alternatives to the proposed activities are also discussed, along with the stakeholder engagement consultation process that has been conducted, and the significance of the exploration program in the context of the proponent's long-term operations on Groote Eylandt.

2.2 SETTING

2.2.1 Location

The exploration program is proposed to be undertaken within Exploration Licence (EL) 2455 (known as the Southern Lease), on Groote Eylandt. Groote Eylandt is located in the Gulf of Carpentaria, approximately 650 km south-east of Darwin and 50 km off the coast of Arnhem Land (Figure 2-1). The Southern Lease is located in the south-western part of Groote Eylandt. It is adjacent and to the south of the existing Groote Eylandt Mining Company Pty Ltd (GEMCO) mine (Western Leases) and is also located immediately adjacent to the southern boundary of the Eastern Leases tenements (Mineral Lease (ML) 31219 and ML31220), an area approved for future mining (Figure 2-1). The Southern Lease is remote and is accessed via the Yenbakwa Road, an unsealed public road.

The area in which the exploration program will be undertaken ("the exploration program area") is in the north-western part of the Southern Lease (Figure 2-2). Angurugu is the nearest township and is located approximately 10 km by direct line from the northern boundary of the exploration program area. The nearest outstations are Yedikba Outstation, which is located approximately 400 m from the exploration program area (and 650 m from the nearest proposed disturbance) and Wurrumenbumanja Outstation, which is located approximately 80 m from the exploration program area (and 1 km from the nearest proposed disturbance).

2.2.2 Regional Setting

Groote Eylandt is Australia's third largest island, with a land area of approximately 2,285 km^2. Groote Eylandt is part of an archipelago of islands, which also includes Bickerton Island and several small, neighbouring islands. The Traditional Owners of the Groote Eylandt Archipelago are an amalgamation of two cultures, the Warnindilyakwa, and the Nunggubuyu (Anindilyakwa Land Council (ALC), 2021). The Traditional Owners are made up of 14 clan groups, divided into two moieties, united by a common culture of kinship, ceremony and language. Both cultures speak Anindilyakwa as their first language, and the land, people and culture are also referred to by this term. The remote location of the Groote Eylandt Archipelago has fostered a strong attachment to traditional culture among the Anindilyakwa People. Ceremony and spirituality play a central role in Anindilyakwa life and traditional practices, and cultural norms are still prominent on the Archipelago. Anindilyakwa People are proud and protective of their culture.

Groote Eylandt is largely undeveloped, and much of the island is still used for traditional practices. The existing GEMCO mine is the main development on the island and has been operating for nearly 60 years. There are three townships on Groote Eylandt, namely Alyangula, Angurugu and Umbakumba (Figure 2-1). They have a combined population of approximately 2,050 people (Australian Bureau of Statistics, 2021a). There are also several small, rural

Aboriginal settlements (termed "outstations") on Groote Eylandt. Outstations typically have varying levels of use, from occasional visitation to sporadic residency.

Groote Eylandt, and the surrounding marine area, has significant ecological value. Groote Eylandt and various smaller surrounding islands have been identified by the Northern Territory Government as one of 67 sites that are of "Conservation Importance in the Northern Territory" (Department of Natural Resources, Environment, the Arts and Sport (DNREAS), 2009). The area has been designated a significance ranking of "International Significance". One of the reasons for this significance ranking is that the threatened terrestrial fauna species present on the island are relatively protected from key threatening processes that exist on the mainland (e.g. Cane Toads (*Rhinella marina*)) (DNREAS, 2009). Section 4 – Terrestrial Ecosystems provides further detail on the ecological value of Groote Eylandt.

The Groote Eylandt Archipelago has been declared an Indigenous Protected Area (IPA). An IPA is an area of Indigenous-owned land or sea where Traditional Owners have entered into an agreement with the Federal Government to promote biodiversity and cultural resource conservation (Department of Climate Change, Energy, the Environment and Water, 2022.). IPAs form part of the National Reserve System, established by the Federal Government to conserve unique landscapes, plants and animals. The Groote Eylandt Archipelago was declared the Anindilyakwa IPA in 2006 and is administered by the ALC. The ALC Land and Sea Rangers are funded by the Federal Government through the IPA. A key focus of the ALC Land and Sea Rangers is to ensure that the unique culture and environment of the Groote Eylandt Archipelago is conserved for future generations.

There are no declared National Parks on Groote Eylandt.

2.2.3 Natural Features

Elevations within the exploration program area range from approximately 1 m to 103 m Australian Height Datum (AHD). Outcrops of the geological basement form rocky outcrops and are referred to as "white rock". Some white rock areas have cultural significance to the Anindilyakwa People.

The exploration program area is traversed by the Arnduwamurrumanja Creek, Salt Creek and Second Creek (Figure 2-3). These creeks are intermittent, flowing for several months during and after rainfall events, although waterholes may persist into the dry season or all year round in some locations. Flows from Salt Creek and Second Creek converge into a coastal plain, downstream of the exploration program area. The exploration program area is also traversed by the Yenbakwa River which flows to the south (Figure 2-3). The Amagula River flows to the east of the exploration program area and is a significant watercourse, maintaining flows year-round (Figure 2-3).

The land within and surrounding the exploration program area comprises natural bushland that is mainly eucalypt dominated open forest and woodland. The most common eucalypts are Darwin Stringybarks (*Eucalyptus tetrodonta*) and Darwin Woollybutt (*Eucalyptus miniata*), but a wide variety of other native plants and vegetation communities occur. *Melaleuca*-dominated vegetation also occurs within riparian zones and wetlands.

The land within the exploration program area is subject to periodic burning. Based on the Northern Australian Fire Information (NAFI, 2022) database, which contains data on fires from 2000 to 2021, the exploration program area has been consistently burnt. Between 2000 and 2021, over half the area has been burnt in 8 or more years. The exploration program area is subject to "late fire frequency (after July 31)" (NAFI, 2022), particularly in the southern section which has experienced late burns for 9 years or more from 2000-2021.

2.2.4 Land Ownership

The whole of Groote Eylandt, including the exploration program area, is Aboriginal land under the *Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) (ALRA). The ALC is responsible for managing this Aboriginal land. The proponent signed an Exploration Agreement for the Southern Lease with the ALC, under ALRA, on 17 May 2016.

This agreement provides the proponent with the legal right to access the Southern Lease for exploration purposes, subject to the terms of the agreement.

2.2.5 Administrative Boundaries and Land Zoning

Groote Eylandt, including the exploration program area, is located within the East Arnhem Local Government Area, administered by the East Arnhem Regional Council (EARC).

The exploration program area is located on Aboriginal freehold land, and the area is not zoned under *the Northern Territory Planning Scheme 2020* (NT). The closest zoned land to the exploration program area is in Angurugu, approximately 10 km north.

2.2.6 Land Use

Southern Lease

The Southern Lease is remote, containing only a few 4WD access tracks and one outstation (Wurrumenbumanja, also known as Leske Pools outstation) (Figure 2-2). There are several borrow pits in the Southern Lease, associated with the EARC's recent maintenance work on Yenbakwa Road.

Accessible portions of the Southern Lease are periodically used by the Traditional Owners for fishing, hunting, camping, swimming and collecting resources including bush tucker, such as sugarbag (honey from native bees). There are also sacred sites within the exploration program area, which are important for ceremonial purposes. The location of sacred sites is confidential, and therefore cannot be disclosed within this *Environment Protection Act 2019* (NT) (EP Act) Referral.

Being Aboriginal land under ALRA, the majority of the Southern Lease is not open to the general public. However, the ALC has nominated a number of recreation areas that can be accessed by the general public, subject to a permitting system. Figure 2-2 shows the location of the recreation areas within or in proximity to the Southern Lease.

Wurrumenbumanja Outstation is the only permanent structure within the Southern Lease (Figure 2-2). There are two additional outstations located beyond, but in close proximity to, the Southern Lease, namely the Yedikba Outstation and Yenbakwa Outstation (Figure 2-2). Yedikba Outstation, which consists of two houses, water tanks and a small solar farm is permanently occupied. Although Yenbakwa and Wurrumenbumanja outstations are occasionally used by the Traditional Owners, they have not been permanently occupied for more than ten years.

The proponent has undertaken exploration in the Southern Lease since 2016, as discussed in Section 2.4.

No grazing, cropping, forestry, or industrial activities are undertaken in the Southern Lease.

Exploration Program Area

The land uses within the exploration program area are similar to those within the broader Southern Lease, with land uses as follows:

- There is no built infrastructure in the exploration program area, other than 4WD access tracks.
- The exploration program area is used periodically by the Traditional Owners for traditional purposes.
- There are no recreation areas in the exploration program area. The nearest recreational area to the exploration program area is South Point Area located approximately 80 m to the west of the exploration program area. The Amagula Pools (Leske Pools) recreation area is located approximately 2.2 km to the east of the exploration program area.

- There are no outstations in the exploration program area and the nearest outstation is Wurrumenbumanja Outstation, located approximately 80 m from the exploration program area. Yedikba Outstation is located approximately 400 m from the exploration program area and Yenbakwa Outstation is located approximately 5.4 km from the exploration program area.
- Exploration activities have been undertaken in the exploration program area since 2016 (Section 2.4).

2.2.7 Tenements

The proponent holds an Exploration Licence (EL2455) over the Southern Lease (Figure 2-4). The Exploration Licence was granted on 12 October 2016 and was renewed for a further two years on 16 December 2022. Figure 2-4 also shows the mineral tenements in the vicinity of the Southern Lease. These include the mineral leases for the existing mine, as well as the mineral leases which comprise the Eastern Leases, an area in which mining is approved but has not yet commenced.

The Southern Lease is traversed in the north-west by an Access Authority (AA32517), granted on 12 October 2020 to connect mineral leases within the existing mine (Figure 2-4). The Access Authority includes a haul road currently being constructed, termed the "J Quarry Haul Road". The J Quarry Construction Access Track (Figure 2-2) provides access to the J Quarry Haul Road from the southern side of the river for construction purposes.

2.2.8 Geology

Groote Eylandt was formed on a stable basement of Proterozoic quartzite that outcrops in the centre of the island (Figure 2-5). The elevated basement outcrops form hills and escarpments in the east of the Southern Lease (white rock).

In lower lying coastal plains and valleys, the basement quartzite is overlain by a sequence of sedimentary rocks. The sedimentary rocks typically comprise claystone and sandstone, with zones of manganese mineralisation.

The uppermost sedimentary rocks have been modified by a long period of tropical weathering. The weathering process has resulted in the development of a thick laterite profile (Figure 2-6). Laterite is extensive and covers the majority of the lower lying areas within the exploration program area and its surrounds (Figure 2-5).

2.3 PLANNING OF EXPLORATION

2.3.1 Introduction

Groote Eylandt, including the Southern Lease, has significant environmental and cultural values. The proponent has therefore undertaken a comprehensive planning process to locate its exploration activities to avoid environmental impacts where possible. This has involved:

- Gathering baseline data on environmental and cultural values to ensure that the most sensitive features in the Southern Lease are identified.
- Undertaking an iterative project planning process to identify an area for future exploration that avoids the most sensitive environmental and cultural features in the Southern Lease.

Further detail on these elements is provided in Section 2.3.2 and Section 2.3.3.

2.3.2 Baseline Data

The proponent signed an Exploration Agreement for the Southern Lease with the ALC, under ALRA, on 17 May 2016. This agreement provides the proponent with the legal right to access the Southern Lease for exploration purposes, subject to the terms of the agreement. An Exploration Licence (EL2455) was granted on 12 October 2016.

In 2016 the proponent commenced exploration drilling (comprising approximately 300 drill holes) to gain a better understanding of the manganese resource. Figure 2-7 shows the potential mineralised area in the Southern Lease (i.e. the area in which manganese may potentially occur). This is the area in which exploration would be undertaken if there were no environmental or cultural considerations. It comprises approximately 16,830 ha.

The proponent also commenced baseline environmental studies in 2016. Baseline environmental work was undertaken with the permission of the ALC. The Traditional Owners were provided with an opportunity to participate in fieldwork and most field surveys included Traditional Owner participation. Baseline environmental work has included:

- Terrestrial ecology work, described further in Section 4 – Terrestrial Ecosystems, and including:
  - A baseline terrestrial ecology assessment of the western part of the Southern Lease in 2016. This assessment included vegetation mapping, threatened flora searches, fauna trapping (including motion-sensor camera trapping), active searches, bird census, spotlighting, and habitat assessments.
  - A large-scale research project (termed the "Southern Lease Small Mammal Research Project") undertaken between 2017-2019 in consultation with the Northern Territory Government. The research project comprised detailed camera surveys at 152 locations within and adjacent to the Southern Lease.
  - Reviewing Northern Territory government vegetation mapping and refining this mapping through undertaking fieldwork in areas of sensitive or significant vegetation types (e.g. riparian and wetland areas) as defined in the *Land Clearing Guidelines – Northern Territory Planning Scheme* (DEPWS, 2021a) (Land Clearing Guidelines).
- Undertaking an aquatic ecology field survey in 2019 to determine the baseline condition of aquatic ecosystems associated with each of the watercourses in the Southern Lease. Surveys included assessment of macroinvertebrate, fish and flora communities, and water and sediment quality.
- Mapping the alignment of waterways, including watercourses (i.e. the more significant waterways, generally with riparian vegetation and aquatic ecology values) and drainage features. This was done by:
  - Reviewing government data and any other available waterway mapping;
  - Using LiDAR, aerial imagery, and drone imagery to correct the mapped alignment of waterways and identify additional potential waterways; and
  - Undertaking field inspections of the potential waterways to confirm the geomorphology, geology and presence or absence of riparian vegetation.
- Mapping of catchment areas.
- Engaging the ALC to undertake a study to define the location of sacred sites and delineate the required buffer zones around these sites (termed restricted work areas).

2.3.3 Project Planning Process

In 2019 the proponent undertook an internal planning process, guided by the baseline environmental work described in Section 2.3.2, to delineate the most environmentally sensitive areas of the Southern Lease. The kinds of features that were identified and considered were large, perennial rivers and their floodplains, estuarine areas, significant wetlands, and monsoonal vine thicket (this vegetation type is generally considered to be culturally and environmentally sensitive). The proponent then delineated an area for future exploration that avoids the identified sensitive areas. This area was referred to as the "potential exploration area" and it is shown in Figure 2-7[1]. It comprises 9,521 ha. Excluding the most sensitive areas from the potential exploration area resulted in approximately 7,300 ha of potential mineralised area being excised from future drilling programs.

In 2019, the proponent consulted with the ALC, the Northern Territory Environment Protection Authority (NT EPA), the Department of Environment, Parks and Water Security (DEPWS) and the Department of Industry, Tourism and Trade (DITT) about the process that was adopted to plan exploration and develop the potential exploration area. All stakeholders were supportive of the process.

All of the proponent's recent exploration (i.e. since 2019) in the Southern Lease has been limited to the potential exploration area, which has minimised the impacts of exploration. Refer to Section 2.4 for an overview of this exploration. The exploration program that is the subject of this EP Act Referral has also been limited to the potential exploration area.

Limiting the exploration program to the potential exploration area has ensured that the activities are located in a broad area that avoids the most sensitive environmental and cultural features in the Southern Lease. At a finer scale, and to further reduce impacts, the disturbance footprint for the exploration program has been designed to ensure that all activities are located beyond watercourses, wetlands and riparian vegetation.

2.4 PREVIOUS EXPLORATION PROGRAMS

Since the planning process described in Section 2.3.3 was undertaken, there have been two subsequent exploration programs in the Southern Lease (termed Stage 1 and Stage 2). These were designed to:

- Obtain further information regarding the extent of mineralisation in areas that have already been confirmed as containing manganese;
- Determine whether manganese is present in areas where very little geological information was available;
- Provide further information on the manganese mineralisation (depth, thickness, quality/grade of ore, stripping ratio and continuity) and;
- Provide core samples which were subject to laboratory testing for geometallurgical properties including grade and density.

The Stage 1 Exploration Program was undertaken from 2019 to 2020 and included drilling of approximately 500 drill holes, including infill drill holes using Reverse Circulation (RC) methods, regional exploration holes using aircore drilling, and diamond drill holes using diamond drilling methods (Figure 2-8). The Stage 1 Exploration Program also included the associated development of access tracks (Figure 2-8). The Stage 2 Exploration Program commenced in 2020 and was completed in 2022. It included further infill drilling (i.e. RC drilling), diamond drilling and the associated development of access tracks. This involved approximately 830 infill drill holes and 75 diamond drill holes (Figure 2-8). Areas disturbed by exploration were also progressively rehabilitated. The full extent of the

[1] Since the potential exploration area was developed in 2019, there have been additional vegetation surveys, which have refined the boundaries of vegetation communities. The potential exploration area shown in Figure 2-7 reflects the outcomes of the most recent vegetation mapping.

Stage 1 Exploration Program has been rehabilitated, as has the majority of the Stage 2 Exploration Program undertaken prior to 2022.

Both exploration programs were referred to the NT EPA under the now superseded *Environmental Assessment Act 1982* (NT) (EA Act) and *Environmental Assessment Administrative Procedures 1984* (NT) (EAA Procedures). A Notice of Intent (NOI), which is an equivalent document to this EP Act Referral, was prepared for each program. The NOI for the Stage 1 Exploration Program was submitted to the NT EPA in 2019 and the NOI for the Stage 2 Exploration Program was submitted to the NT EPA in 2020. In both cases, the NT EPA concluded that potential environmental impacts and risks arising from the planned activities could be adequately managed and were not significant. The NT EPA determined that neither exploration program required further assessment. The exploration programs were undertaken in accordance with Mining Management Plans (MMPs) prepared under the *Mining Management Act 2001* (NT) and approved by DITT.

For the Stage 1 and Stage 2 exploration programs, the proponent undertook a self-assessment of potential impacts on Matters of National Environmental Significance (MNES), protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). The assessments were informed by ecological assessments prepared by qualified and experienced ecological consultants. These assessments concluded that the exploration programs were unlikely to have a significant impact on MNES and hence approval under the EPBC Act was not required.

2.5 PROPOSED EXPLORATION PROGRAM

2.5.1 Summary of Program

The exploration program includes:

- Exploration drilling, including infill drilling (using RC drilling) and geometallurgical investigations (using diamond drilling);
- Geotechnical investigations, including developing geotechnical boreholes (using diamond drilling) and geotechnical test pits; and
- The development of new tracks to access drill pads and test pits, as well as the use of tracks from previous exploration programs.

These activities are described in detail in Section 2.5.3.

Areas that have been disturbed by exploration are progressively rehabilitated (refer Section 2.4), with monitoring of previous exploration programs showing that the vegetation rapidly regenerates. An indicative layout for the exploration program is shown in Figure 2-9 and Figure 2-10 shows the layout on an aerial imagery base. Section 2.5.4 provides a summary of proposed disturbance associated with the exploration program.

The exploration program is scheduled to commence in calendar year 2023 and will be undertaken over approximately 3 years. Work will be restricted to the dry season (generally May to December).

The exploration program has been designed to avoid impacts on sensitive features wherever possible, with the following measures adopted to avoid impacts:

- The exploration program will be located entirely within the potential exploration area described in Section 2.3.3. Restricting exploration to this area ensures that exploration activities are not undertaken in the most sensitive parts of the Southern Lease.
- The exploration program has been sited and designed to ensure that there will be no disturbance of riparian or wetland vegetation, as defined under the Land Clearing Guidelines.

- At a finer scale, on ground pre-clearance surveys will be undertaken prior to disturbance to ensure that sensitive local environmental features are identified and avoided (Section 2.5.2).
- A sacred sites assessment has been recently undertaken and has identified the location of sacred sites and protective buffers. All exploration activities will be sited beyond the sacred sites and buffers (Section 5 – Culture and Heritage).

2.5.2 Permit to Clear Process

Prior to any ground disturbance, the proponent's Permit to Clear process will be followed. This process is described in detail in Section 6 – Avoidance and Mitigation. It includes a pre-clearance survey, which will address the following:

- The limits of clearing will be clearly delineated (via flagging) and will be restricted to the minimum areas required to safely complete the exploration program.
- Searches of each proposed clearing area will be undertaken by an experienced ecologist to identify and flag key habitat features of threatened fauna species. Further details of the measures to be implemented to protect any identified threatened species habitat are provided in Section 6 – Avoidance and Mitigation.
- The area to be cleared will be inspected for weeds. In the event weeds are present, the location of these weeds will be GPS recorded, with the information provided to the proponent's Exploration and Environment Department as well as the Rehabilitation Mine Services Team. Any weeds that are identified will be sprayed or removed prior to any clearing being undertaken.

Consultation will be undertaken with the ALC as part of the Permit to Clear process. As part of this process, a cultural monitor (i.e. a Traditional Owner who speaks for the country) will be invited to visit the area in which exploration is proposed to be undertaken and confirm that it is suitable from a cultural perspective. As detailed in Section 5 – Culture and Heritage, an assessment of sacred sites has been completed and the Traditional Owners have nominated buffers around sacred sites. All exploration activities will be sited beyond the sacred sites and buffers.

2.5.3 Drilling and Geotechnical Investigations

Exploration Drilling

Infill Drilling (RC Drilling)

Infill drilling will be undertaken in locations where previous drilling has already confirmed that manganese is present. Infill drilling is undertaken for the purpose of providing further information on the manganese mineralisation (depth, thickness, quality, and continuity).

Approximately 1,424 infill drill holes are proposed within an exploration program area of 4,534 ha. The holes will be distributed in a grid pattern and will be predominantly spaced approximately 60 m apart.

Infill drilling is proposed to be undertaken using an RC drill rig. RC drilling uses a pneumatically operated hammer at the face of the drill bit which pulverises the rock. The drill rods have an inner and outer tube. Air is forced down the hole in the outer tube which forces the pulverised rock up the inner tube and into a cyclone which allows the sample to be collected at the base of the cyclone. The rock sample is then collected in a bucket for logging and further analysis. A photograph of a typical RC drill rig is shown in Photo 2-1. RC drilling is a form of dry hole drilling and no water is required to be added, apart from small volumes to control dust at the collar when dusty conditions are present. The water is generally absorbed into the sample, which comes out damp. Drilling will target the mineralised horizon but can extend up to 10 m below the mineralised horizon to ensure that all potential

mineralisation is sampled. Some holes may be drilled to intercept basement quartzites to test for multiple mineralised horizons and ensure the full stratigraphic column is recorded for geological modelling.

For safety reasons, it will be necessary to clear a pad for each drill hole. Depending on the location of the drill pad, the clearing area will be approximately 9 m x 18 m or 20 m x 15 m exclusive of access track width. The slightly larger drill pads are required at the end of a drill traverse to allow sufficient turn around space for both the RC drill rig and support equipment.

Drill pads will be cleared of vegetation using a D6 scrub dozer. A spotter will work with the dozer operator during the clearing of any vegetation. The spotter is required to ensure compliance with the various restrictions identified during pre-clearance surveys (Section 2.5.2), as well as to ensure the dozer operator maintains the correct alignment and stays within the approved clearing area. The dozer operator and spotter utilise a GPS to assist with ensuring that all requirements from the Permit to Clear are met (e.g. ensuring that any flagged habitat features are avoided). Clearing will be conducted using the "blade up" method, whereby the blade of the dozer is lifted to reduce soil disturbance and to avoid disturbing the topsoil horizon. Grasses and cleared vegetation will be pushed into small windrows at the side of the drill pad (with the cleared vegetation respread across the drill pad when it is rehabilitated). The extent of clearing for the drilling program will be limited by minimising the width of access tracks and the area of drill pads. Soil disturbance will also be minimised.

The cleared areas will be rehabilitated and naturally regenerate following drilling. Further detail on the rehabilitation process is provided in Section 2.5.5. Photos 2-2 to 2-5 show examples of rehabilitated drill pads from Groote Eylandt, disturbed in the 1970s, 2006, 2014 and 2017 and their analogue sites (i.e. nearby undisturbed vegetation).

Multiple RC drill rigs will operate during the exploration program, as well as support vehicles. Rigs will be left in situ and workers transported daily, via 4WD light vehicles, to and from the drill rigs.

Geometallurgical Investigations (Diamond Drilling)

Diamond drilling is utilised to obtain core samples for detailed geological and geometallurgical analysis.

Diamond drilling is proposed to be undertaken at approximately 14 locations. This includes a number of individual diamond drill holes, as well as locations where material for bulk sampling will be gathered. Diamond drill holes used for bulk sampling will be drilled as a group of holes (approximately five holes) on one drill pad.

A photograph of a typical diamond drill rig is shown in Photo 2-6. A diamond impregnated hollow core bit is used which cuts until the core barrel is full. This produces an intact, continuous sample representing the in situ rock. LIQUI POL, a non-toxic, biodegradable organic polymer, will be mixed with water and injected down the drill hole to assist with lifting the drill cuttings. The majority of the LIQUI POL is retrieved with the drill cuttings from the drill hole, but any LIQUI POL that remains in the drill hole will biodegrade over time. Water used during drilling will be supplied by a support truck. Wastewater will be recaptured in tanks on the support vehicle and reused for each hole. No sumps are required.

The drill pads required for diamond drill holes will be approximately 20 m by 12 m. The method of clearing and rehabilitating the drill pads is the same as the method of infill drilling, described in the preceding section.

A single diamond drill rig will be used for the program. Similar to infill drilling, the rig will be left in situ and workers will be transported to and from the drill rig daily by a light vehicle.

Geotechnical Investigations

Geotechnical Boreholes (Diamond Drilling)

Approximately 14 geotechnical boreholes will be drilled, using diamond drilling methods, to provide information about the physical, mechanical and chemical properties of sub-surface materials in the Southern Lease. This information is required to enable the design of water storages, haul roads and mining quarries for a potential, future mining project in the Southern Lease (Section 2.5.11).

The geotechnical boreholes will be drilled with a diamond drill rig, with the methods for clearing the drill pads, drilling the boreholes and rehabilitating the drill pads being as per the description of diamond drilling in the preceding section. The pad sizes will be 20 m by 12 m.

Geotechnical Test Pits

Test pits will be developed to obtain bulk samples of material for geotechnical testing. Approximately 63 geotechnical test pits will be developed.

The majority of test pits will be located in the centre of access tracks. To avoid additional clearing, the test pits will be approximately 1.2 m wide and will fit within the 3 m width of the access tracks, meaning that it will not be necessary to clear pads for the test pits located in access tracks. A small number of test pits will be located on the drill pads developed for the geotechnical boreholes. These test pits will fit within the footprint of the drill pads, with no further clearing required.

Test pits will be excavated with a backhoe to a depth of approximately 3 m. The side walls of the test pits will be visually inspected and photographed, and a tactile assessment of the disturbed material from the test pit will be conducted at each location. Bulk samples of material will be obtained from the test pits and will be sent for laboratory analysis, including strength testing, dispersion, and material quality/characterisation.

Each test pit will be backfilled immediately following the collection of samples. Backfilling will be undertaken with material removed from the pit. This material will be placed in approximately 500 mm thick layers and tamped down with the back of the backhoe bucket. Topsoil that was previously removed from the test pit will be reinstated over the disturbed area after the backfilling is completed.

Access Tracks

The sites for drill holes and test pits will be accessed via a combination of the following:

- New tracks established as part of the proposed exploration program;
- Tracks from previous exploration. These include tracks that will still be "open" at the time that the proposed exploration program is undertaken (e.g. tracks from any recent exploration), as well as "closed" tracks. Closed tracks are tracks from previous exploration programs that have already been rehabilitated, ranging from tracks rehabilitated in 2016 to tracks rehabilitated in 2022.

Where possible, drill holes and test pits have been sited to avoid the need for new tracks, with existing tracks used in preference to the development of new tracks. Section 2.5.4 contains a summary of the length of track required for the exploration program.

Vegetation clearing procedures for access tracks will follow a similar process as outlined above for the drill pads. The access tracks will be approximately 3 m in width to allow for safe movement of vehicles and equipment. Tracks will be cleared using a D6 scrub dozer or equivalent. As per the drill pads, the blade up method is used, whereby the blade of the dozer is lifted to reduce soil disturbance and to avoid disturbing the topsoil horizon. Access tracks will be rehabilitated as per the methods described in Section 2.5.5. This includes measures to prevent the ongoing use of the tracks to avoid them becoming permanent access tracks.

2.5.4 Disturbance

Figure 2-9 shows the location of drill pads, test pits and tracks, and Figure 2-11 shows the total disturbance footprint associated with the exploration program over a period of three years. Table 2-1 contains a summary of the total disturbance associated with the exploration program. The area disturbed at any one time will be less than the total area, given that the disturbance occurs over a three year period and disturbed areas are progressively rehabilitated.

Table 2-1 Summary of Total Exploration Program Disturbance

ELEMENT	NUMBER	NATURE OF DISTURBANCE	AREA
Exploration Drilling			
Drill pads (i.e. RC drill pads and diamond drill pads)	1,438 drill pads, comprising 1,424 RC drill pads and 14 diamond drill pads	Clearing native vegetation.	25.76 ha[1]
New tracks to access exploration drill pads	67.7 km	Clearing native vegetation.	20.31 ha
Tracks from previous exploration	51.0 km of track	This includes tracks that will still be open (i.e. not rehabilitated) at the time that the proposed exploration program is undertaken, as well as tracks that are closed (i.e. rehabilitated). In the case of tracks that are already open, use of these tracks will not give rise to any disturbance. In the case of recently closed exploration tracks, the vegetation to be cleared will be regrowth vegetation that is approximately 1-2 years old. In the case of older exploration tracks, the regrowth will be approximately 7-10 years old, depending on when the track is reopened for the proposed exploration program.	15.29 ha This is the full area of tracks to be used. Some of these tracks will already be open and will not require clearing.
Geotechnical Investigations			
Drill pads (i.e. diamond drill pads)[2]	14 drill pads	Clearing native vegetation.	0.35 ha
Geotechnical test pits	63 test pits	No disturbance as the test pits are small enough to be located on the tracks or on drill pads developed for the geotechnical boreholes.	No clearing
New tracks to access geotechnical drill pads and test pits[2]	3.3 km of track	Clearing native vegetation.	0.99 ha
Total Area			**62.70 ha**

[1] This is a maximum disturbance area given that it does not account for the fact that it may be possible to locate some diamond drill holes on the same site as RC drill pads.
[2] The geotechnical program will also use tracks listed as part of the drilling program, but these tracks are accounted for in the areas quoted for the exploration drilling.

Figure 2-9 and Figure 2-11 is indicative and subject to change given that the pre-clearance surveys and advice from the ALC and/or cultural monitors may necessitate the relocation of drill pads, test pits and tracks. However, any drill pads, test pits or tracks that are required to be relocated will:

- Be situated within the exploration program area shown in Figure 2-2;
- Not exceed a total disturbance area of 63 ha;
- Comply with the pre-clearance requirements specified in Section 2.5.2 (and described further in Section 6 – Avoidance and Mitigation); and
- Not be located within watercourses, wetlands or riparian vegetation (as shown in Figure 2-11) or sacred sites and their restricted work areas (the location of sacred sites and restricted work areas is confidential and cannot be provided in a public document).

2.5.5 Rehabilitation

Rehabilitation methods are discussed in the following sections.

Capping of Holes

Two main aquifers occur in places in the Southern Lease, namely a shallow, unconfined laterite aquifer and a deeper, confined aquifer associated with the Cretaceous sandstone. Bentonite, an inert low permeability clay, will be used to create a seal in any holes where the confined aquifer is intersected. This will prevent any possible connection between the aquifers.

The top of the holes will then be plugged using a hole plug and backfilled with drill cuttings to produce a mound on top of the hole to allow for consolidation.

Rehabilitation of Drill Pads and Access Tracks

Rehabilitation of drill pads and tracks is planned to occur progressively during the three year exploration program and is designed to occur before the onset of the next wet season. Drill pads and access tracks will be rehabilitated using the same methods adopted for previous exploration in the Southern Lease. The tasks involved in rehabilitation of drill pads and access tracks are as follows:

- Removing and disposing of any rubbish.
- Respreading any remaining drill cuttings on drill pads.
- Respreading the windrows of cleared vegetation (e.g. logs, vegetation cover and leaf litter) on the disturbed area. Note that topsoil is not stripped as part of developing the drill pads or access tracks and so it is not necessary to respread topsoil.

The area will then be allowed to naturally revegetate from endemic seeds in the soil seed bank and from adjacent vegetation.

Upon completion of rehabilitation, and prior to the commencement of the wet season, felled timber and logs will be placed across the entrance to access tracks and along a sufficient distance of track to prevent ongoing access. This measure is designed to prevent the access tracks becoming permanent tracks. This will assist with reducing the potential for threatening processes to be introduced (e.g. changes to the fire regime or introduction of weeds due to increased access, and/or facilitation of Feral Cat (*Felis catus*) movement). There may be some instances where tracks may be required to remain open longer than a single dry season. For example, if the exploration drilling program is unable to be fully completed in an area before the onset of the wet season, some cleared tracks may need to remain open to enable access to drill holes in the following dry season. These instances would be

considered an exception to the rehabilitation process and would be subject to an internal review and approval process.

Monitoring

Rehabilitation Checklist

As each drill pad and track is rehabilitated, an Exploration Field Technician will complete a checklist and take a photograph of the pad or track. The checklist will confirm that the following actions have been undertaken for each pad/track:

- All drill holes have been capped and backfilled;
- Rubbish has been removed;
- Drill cuttings, as well as surface materials such as logs and woody debris, have been spread back over the pad; and
- Logs have been placed where the associated access track intersects a public access track.

This information, including photographic reference, will be recorded in the proponent's geographic information system (GIS) database for the Southern Lease.

Monitoring

As noted above, rehabilitation of drill pads and tracks is planned to occur progressively during the three year exploration program and is designed to occur before the onset of the next wet season. Monitoring of rehabilitated areas will be undertaken one to two wet seasons after rehabilitation has been completed. Monitoring will be undertaken in the dry season by a qualified ecologist and will comprise:

- Inspecting access tracks to confirm they are not being used and that the log barriers are effective in preventing access;
- Inspecting drill pads for erosion or for evidence of subsidence in drill holes that have been backfilled;
- Assessing the area to confirm that revegetation is occurring;
- Undertaking a survey to identify the presence of weeds; and
- Taking a photograph of each drill pad.

The ALC will also be provided an opportunity to inspect rehabilitated exploration areas to confirm the rehabilitation has been undertaken to the satisfaction of the Traditional Owners.

Corrective action will be taken in response to issues identified during monitoring. If further remediation is required due to significant subsidence of drill holes, a stable landform will be achieved through sourcing and placing suitable local backfill materials. If monitoring reveals the presence of weeds, the weeds will be recorded and treated/removed, and further monitoring will be undertaken to confirm the success of weed control/removal work.

The proponent has achieved considerable success with rehabilitation of exploration drill pads and access tracks. A recent survey of rehabilitated drill pads and tracks was conducted of exploration sites from 2017 to as far back as the 1960s (Cumberland Ecology, 2019). Analysis was made of vegetation in areas cleared or disturbed by exploration activities compared to adjacent, uncleared areas. The survey included assessment of 72 sample sites, with each site including a disturbed site (i.e. previous drill pads or tracks) and an analogue (undisturbed) site. Monitoring was undertaken across the Eastern Leases, the existing mine and the Southern Lease. Sites were monitored for vegetation structure, woody species regeneration, ground cover, time since fire, fire impact and weed species cover. Photographs of both disturbed and analogue sites were taken. Photos 2-2 to 2-5 show examples of regeneration recorded during the survey, including photographs of drill pads disturbed in the 1970s, 2006, 2014 and 2017 and their analogue sites.

Survey results showed that woody species composition appears to rapidly regenerate (within 1 to 2 years) following cessation of disturbance. This was in part attributed to the "blade up" method of clearing, which ensures that topsoil is undisturbed and contains vegetative material as well as the soil seed bank. This mimics natural regeneration following fire, where suckering occurs from in situ roots and lignotubers and germination occurs from soil stored seed.

Vegetation structure (assessed as basal area, mean tree height and canopy cover) was found to return more slowly to pre-disturbance levels, with comparable levels being achieved around 30 years after disturbance. Regeneration of vegetation structure was influenced by recurrent fires, with frequent fire regimes considered likely to extend the timeframe for the establishment of large stems. A Threatened Species Management Plan (TSMP) for Groote Eylandt was developed by the Department of Environment and Natural Resources (DENR) (now DEPWS), in collaboration with the ALC, Federal government and the proponent (DENR et al., 2019). One of the objectives of the TSMP is to develop and implement a fire management regime that optimises outcomes for threatened species. The proponent is working with key stakeholders, including the ALC and Northern Territory Government, to implement the TSMP, including this objective. The proponent will review and implement any specific actions related to fire management in its tenements and develop site specific measures to achieve them.

With the exception of one plot (of 72), no weeds were identified within any sites, indicating that measures to prevent the spread of weeds are effective. Overall, monitoring indicates that the rehabilitation techniques used by the proponent allow exploration areas to successfully regenerate over time.

Regeneration monitoring was also undertaken in the Southern Lease in 2021 to assess exploration areas that were cleared between 2016 and 2019. Regeneration was assessed based on the presence/absence of species in different stratum. The assessment involved collecting data on the key canopy species, mid-layer (small trees and shrubs) species, and the presence of regeneration (grasses, sedges, rushes, herbs, vines and small shrubs) and leaf litter within the ground layer. Monitoring showed that canopy species were regenerating at 98% of sites, while mid-layer and ground layer regeneration was present at all sites.

2.5.6 Utilities

Diesel

Light vehicles will be refuelled at the existing mine, prior to the commencement of daily exploration activities. As drill rigs will be left in situ, refuelling will be required to be undertaken at the drill pads. Drill rigs are expected to be refuelled approximately every 2 days. Diesel will be transported and stored in 5,000 L tanks on support trucks which are internally bunded to catch any spills. The support trucks will also contain hydrocarbon spill kits. Any spillage during refuelling will be removed and disposed in accordance with the existing mine site procedures.

Any spill reporting will be done in accordance with the *Waste Management and Pollution Control Act 1998* (NT). Hazardous materials management is described further in Section 6 – Avoidance and Mitigation.

Water

Apart from the diamond drill rig, the water demands for the exploration program are minimal. The rigs used for infill drilling and geotechnical drilling only use water for dust suppression (via water sprayers and down hole injection) when dusty conditions are present. The water is generally absorbed into the sample, which comes out damp. Water is stored in a 500 L tank on the drill rig and the support truck supplies additional water if required in a 5,000 L tank.

The diamond drill rig requires water during drilling to cool and lubricate the drill bit. The water is supplied via a 5,000 L tank on the support truck. The water used in drilling is captured, stored in a tank and reused for each hole. All water is sourced from the existing mine water fill point areas. No water will be sourced from any surface water feature or groundwater aquifer located in the exploration program area.

2.5.7 Waste Management

All rubbish and consumables used as part of the drilling activities will be collected and returned to the existing mine where it will be appropriately disposed. Any spillage of hydraulic oils, diesel or other hydrocarbons and spent hydraulic fluids will be removed and disposed in accordance with the existing mine procedures. Waste management is described further in Section 6 – Avoidance and Mitigation.

2.5.8 Timing

Exploration activities will commence once all environmental approvals are obtained. The exploration program is intended to be undertaken over three drilling campaigns, in successive dry seasons (generally May to December). Undertaking exploration in the dry season will assist in ensuring that the program is not impacted by extreme weather events (e.g. due to a changing climate where such events may become more frequent). The exploration program is scheduled to commence in calendar year 2023 and be completed by 2025. Drilling may extend beyond this if there are delays in the program (e.g. due to weather). The schedule for the commencement of the exploration program is dependent on the timing of regulatory approvals.

2.5.9 Workforce and Accommodation

Only a small workforce will be required for the exploration program, with the drilling workforce being mostly contractors. The scheduling arrangements will determine the number of people on site at any one time. Workforce requirements are as follows:

- There will be approximately three people per drill rig, with up to two RC drill rigs and one diamond drill rig operating at one time.
- Two people will be involved in the development of geotechnical test pits (i.e. a supervisor and a backhoe operator).
- Up to 14 additional support staff may be required (e.g. spotter, dozer operator, geologist).

Contractors undertaking exploration activities may be existing residents of Groote Eylandt, or non-residents, employed on a fly-in and fly-out basis either from Darwin or Cairns. The roles include geologists, drilling supervisors, drillers, offsiders, and maintenance staff.

Accommodation will be provided in the proponent's accommodation village, located in Alyangula. Contractors will be sourced from the existing contractor workforce as well as available contractors from the Northern Territory, Queensland and Western Australia. There will be an opportunity for employment of Traditional Owners for the exploration work, particularly as cultural monitors during the Permit to Clear process (Section 2.5.2).

2.5.10 Alternatives

There are areas beyond the potential exploration area that are prospective for manganese exploration. However, a detailed risk-based approach, informed by fieldwork and consultation, has been undertaken to define the potential exploration area (Section 2.3.3). This has resulted in an area of approximately 7,300 ha being excised from the potential mineralised area due to cultural and environmental considerations. Since the potential exploration area was delineated in 2019, additional cultural heritage considerations have been identified which have further limited the spatial extent of the exploration program. Given that the location and design of the exploration program has been strongly influenced by environmental and cultural considerations, there are numerous alternatives to the exploration program that would involve undertaking exploration in a much larger area. These alternatives would give rise to greater impacts on sensitive environmental and cultural features and these alternatives are not being pursued in order to avoid impacts on these values.

The proposed drilling methods are proven methods used previously on Groote Eylandt that provide the necessary geological information and result in minor environmental impacts that are predictable and manageable. As such, no alternative drilling methods are proposed.

The analysis of alternatives has accounted for the principles of environment protection and management as specified in Part 2 of the EP Act.

2.5.11 Related Projects

Exploration

Exploration is undertaken in a structured, progressive manner designed to gain increasing levels of understanding of the geology and mineralisation of the exploration area. The results from initial exploration programs therefore influence the design of subsequent programs. As described in Section 2.4, the proponent has undertaken previous exploration programs in the Southern Lease, with these previous programs having been referred to the NT EPA under the EA Act. The NT EPA determined that potential environmental impacts and risks arising from the exploration programs could be adequately managed and were not significant. The exploration programs were undertaken in accordance with MMPs prepared under the *Mining Management Act 2001* (NT) and approved by DITT. These previous exploration programs have provided information that has enabled the proponent to design the proposed exploration program.

Depending on the results of the proposed exploration program, further exploration (i.e. beyond that described in this EP Act Referral) may be required in the future. The details of any potential future exploration work cannot be determined at this point in time because the scope and location of future exploration will be dependent on the results of the exploration drilling that is the subject of this EP Act Referral. Separate approvals will therefore be sought for any future exploration that may be required.

Mining

The proponent is currently undertaking a pre-feasibility study (PFS) for a potential future mining project in the Southern Lease. A mining project in the Southern Lease would require approval under the EP Act and the EPBC Act and the proponent is intending to lodge referrals under those Acts in 2023. A mining project, unlike the proposed exploration program, would have the potential to give rise to significant impacts on environmental values. Consequently, it is anticipated that a detailed environmental impact assessment process will be required for a mining project, with a multi-year impact assessment and approval process. Current scheduling indicates that a mining project in the Southern Lease, if developed, would not commence prior to 2026. The exploration program described in this EP Act Referral is scheduled to have been completed by this time.

The results from the exploration program are necessary to inform the design of any future mining project in the Southern Lease and will also determine whether a mining project is economically feasible. Data from exploration drilling will determine the design and economic feasibility of mining areas in the Southern Lease and the proponent will be unable to make an investment decision on whether to progress a mining project in the Southern Lease until these results are available. The geotechnical investigations are necessary to inform the detailed design of any infrastructure required for a future mining project (e.g. dams, haul roads) as well as the safety in design criteria of mining excavation slopes.

The exploration program and a potential future mining project are therefore related. However, a mining project cannot progress without the results from the exploration program and consequently it is necessary to undertake the activities in sequence, with the exploration program being undertaken first. It is not practical for a single approval process to be adopted for exploration and mining, given that the timeframes for the approvals are likely to be very different. Exploration can be undertaken in a manner that avoids significant impacts on environmental values, meaning that only limited environmental assessment is necessary. In contrast, a detailed environmental

impact assessment process will be required for a future mining project, given the potential for significant impacts from mining.

2.6 STAKEHOLDER ENGAGEMENT AND CONSULTATION

The proponent has undertaken extensive stakeholder engagement in relation to the exploration program. This has included engagement with the ALC, as well as direct engagement with the clan groups that speak for the country within the local area. This consultation is discussed below.

The proponent and the ALC signed an Exploration Agreement under ALRA for the Southern Lease in 2016. The Exploration Agreement is designed to ensure that exploration is undertaken in a manner that is respectful of the Traditional Owners' preferences and that areas considered by the Traditional Owners to be environmentally or culturally significant are protected. The signing of an Exploration Agreement was preceded by several years of discussions and culturally appropriate consultation between the proponent, the ALC and Traditional Owners. These discussions ensured the timely provision of relevant and easily understood information to the ALC and Traditional Owners, allowed key preliminary concerns to be addressed, key decisions to be influenced, and positive relationships to be developed.

Since the signing of the Exploration Agreement, the proponent and the ALC have had regular discussions about proposed exploration activities in the Southern Lease. As discussed in Section 2.3.3, the proponent consulted extensively with the ALC between 2017-2019 during the planning of exploration and development of the potential exploration area. The ALC was very supportive of this planning process, particularly as the work was undertaken very early in the exploration planning process, and allowed for the identification and avoidance of the most environmentally sensitive areas of the Southern Lease.

There have also been formal, quarterly meetings between the proponent and the ALC (termed Mining Liaison Committee Meetings). In addition to the attendees from the ALC and the proponent, Traditional Owner representatives from each clan are invited to be part of this committee. In these meetings, the proponent provides an update on activities undertaken in the Southern Lease and activities proposed to be undertaken. In addition to discussing the proponent's proposed activities, opportunities are identified for Traditional Owners to undertake site visits and assist with fieldwork. The ecological fieldwork discussed in Section 4 – Terrestrial Ecosystems provided a number of opportunities for Traditional Owners to assist with fieldwork. The proponent presented the details of the exploration program at a recent MLC meeting and the ALC did not raise any issues in response to it.

Prior to the commencement of exploration, and as part of its standard operating procedure, the proponent will consult with the ALC on the annual work program (including timing, location of drilling activities etc.) and the results of pre-clearance surveys. During this consultation, the risks, potential impacts, and mitigation and management measures of the exploration program will be communicated. Exploration cannot commence until the ALC's endorsement of the activities has been obtained. As part of this process, the ALC may arrange for a cultural monitor to visit the proposed clearing area and provide advice on areas that should be avoided for cultural reasons.

The location of sacred sites was a key consideration in the design of the exploration program. As described in Section 5 – Culture and Heritage, the proponent engaged the ALC in 2019 to undertake a sacred sites assessment to delineate sacred sites in the Southern Lease. The consultation program undertaken as part of the sacred sites assessment was extensive, involving more than 100 Warnindilyakwa Traditional Owners. Culturally appropriate methods were used, including:

- Large general meetings/focus groups;
- On-site meetings;
- Small group meetings;

- Vehicular (including helicopter) and pedestrian surveys;
- Participatory digital mapping meetings; and
- Ad hoc meetings.

2.7 SIGNIFICANCE OF THE EXPLORATION PROGRAM

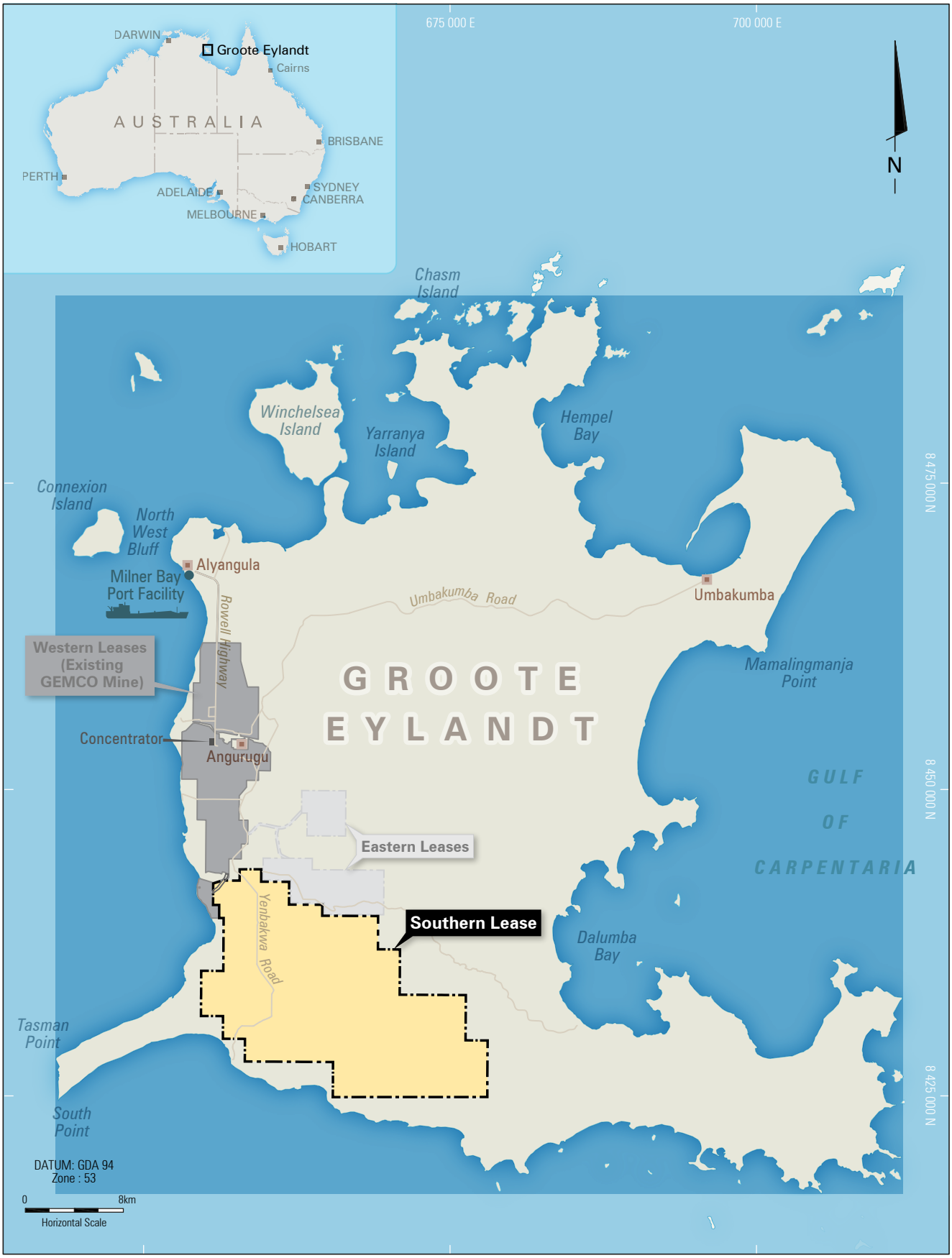
As noted in Section 2.5.9, there is direct employment associated with the exploration program. This includes employment of Traditional Owners, particularly as cultural monitors during the Permit to Clear process. However, the key significance of the exploration program relates to its role in securing the long-term future of the proponent's operations on Groote Eylandt.

The existing GEMCO mine has been operating for nearly 60 years and is an integral part of the economy of Groote Eylandt. The existing GEMCO mine provides significant socio-economic benefits to the Traditional Owners, as well as the regional economy of the Northern Territory. These benefits include:

- Provision of approximately 1,100 direct jobs at the existing mine, comprising approximately 900 employees and 200 agency contractors. This includes approximately 60 jobs for Aboriginal and Torres Strait Islanders;
- Provision of employment opportunities for service contractors, with a proportion of these service contractors working for the proponent on a full time basis;
- Royalties for distribution to the ALC and Traditional Owner groups. The ALC has an infrastructure development plan, which is reliant on royalties from GEMCO, including royalties from a future mining project in the Southern Lease;
- Royalties, government taxes and business opportunities which significantly contribute to both the local economy and the regional economy of the Northern Territory;
- Education, training and apprenticeship opportunities for local residents, including Traditional Owners;
- Provision of social infrastructure and services, specifically health services, to the communities on Groote Eylandt;
- Procurement opportunities for businesses on Groote Eylandt and, in particular, Indigenous enterprises; and
- Coordination of community events by the proponent.

The continuation of these benefits in the medium to long term is dependent on the identification and development of additional manganese resources by the proponent, with the Southern Lease being the proponent's only exploration tenement on Groote Eylandt. The Southern Lease is considered to be critical to the long term future of the proponent's mining operations on Groote Eylandt.

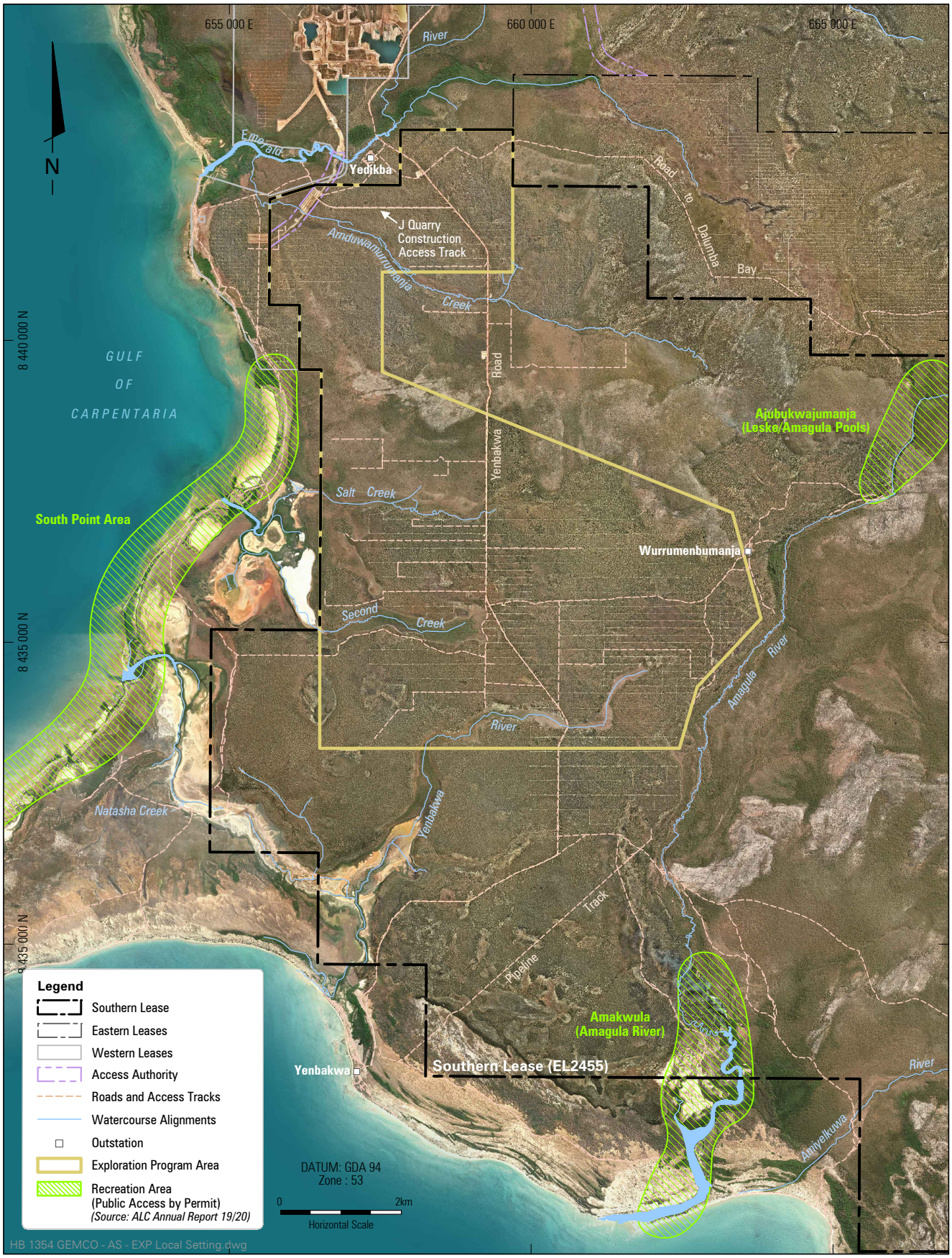
FIGURES



SOUTHERN LEASE EXPLORATION PROGRAM

Location Plan

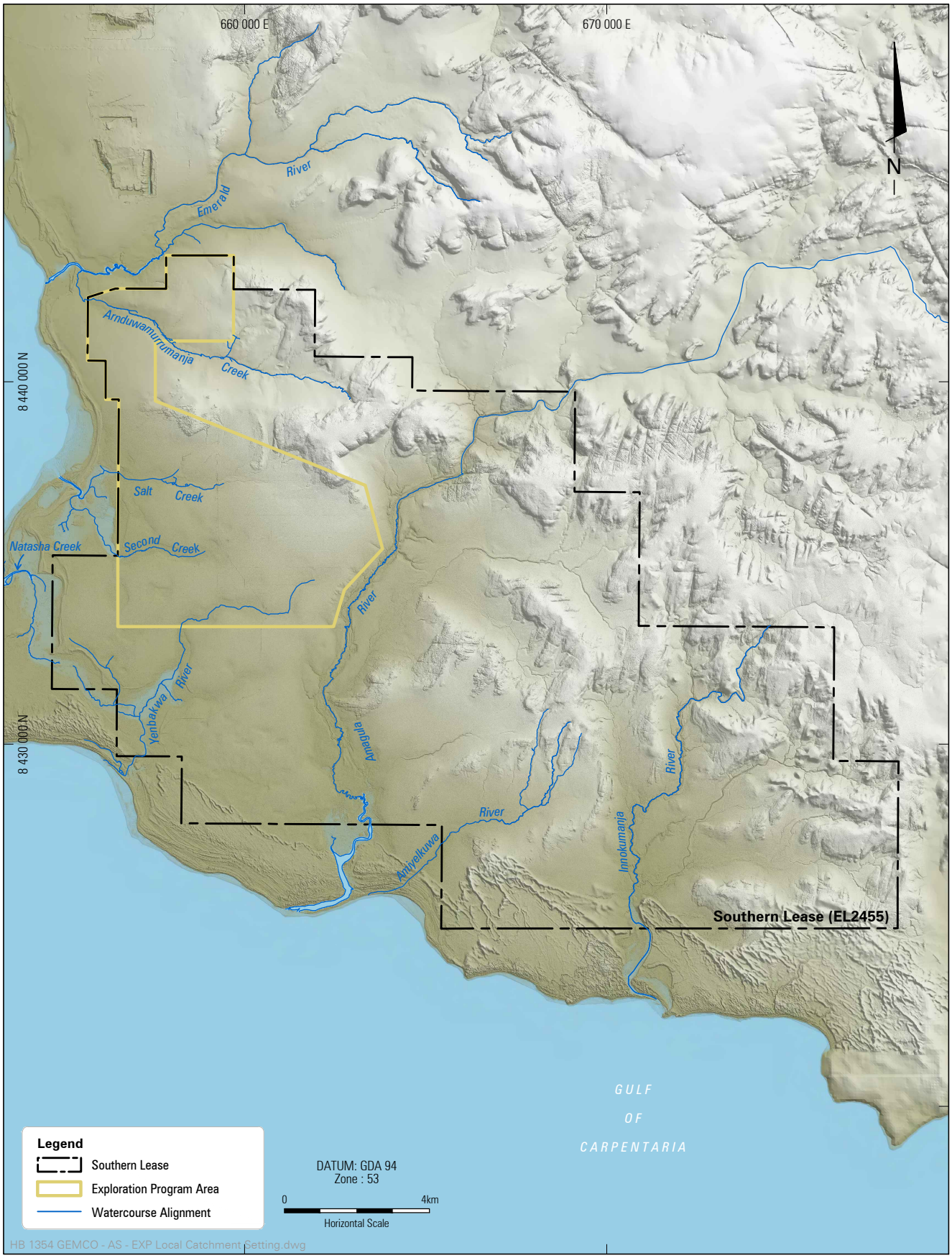
FIGURE 2-1



SOUTHERN LEASE EXPLORATION PROGRAM

Local Setting

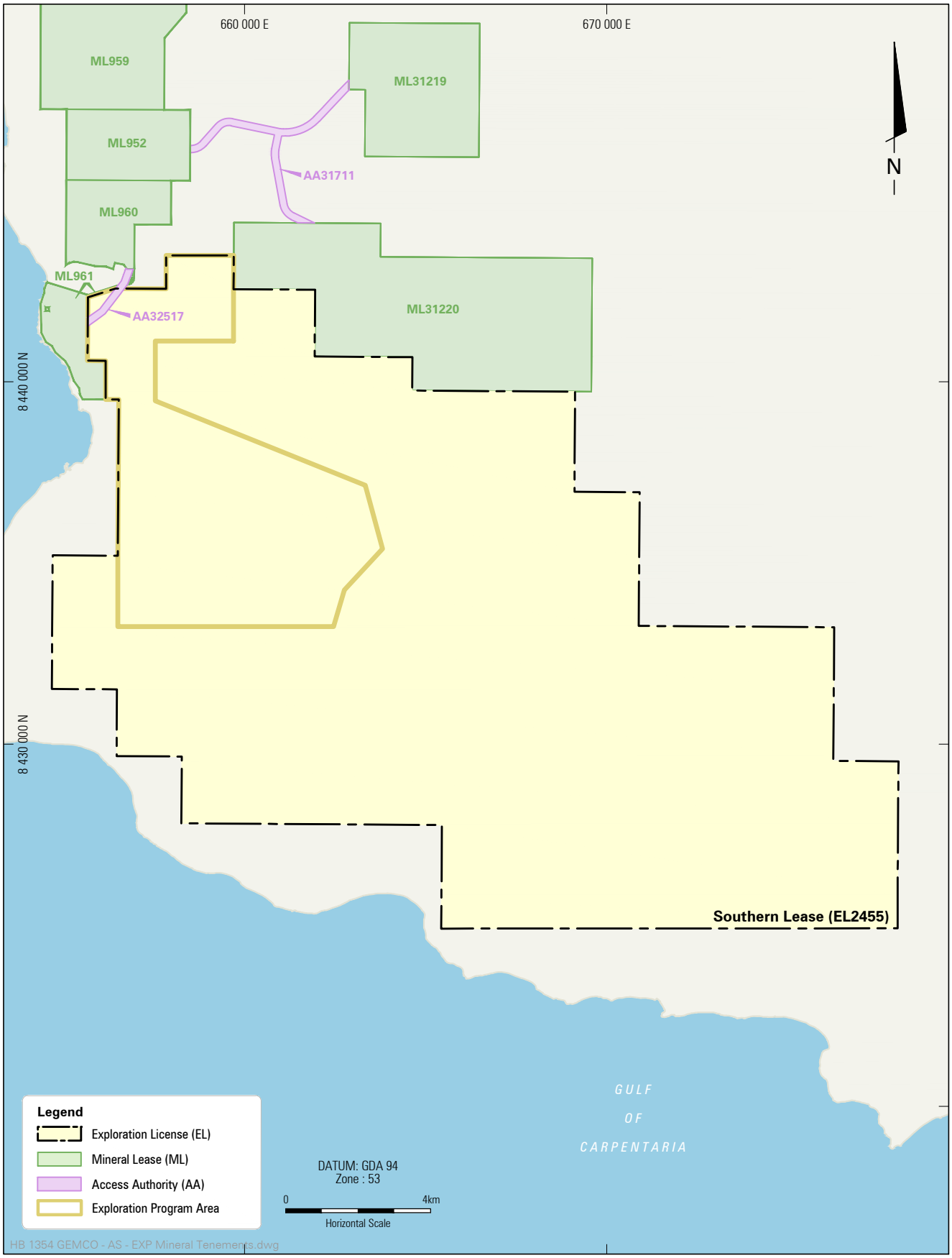
FIGURE 2-2



SOUTHERN LEASE EXPLORATION PROGRAM

Local Catchment Setting

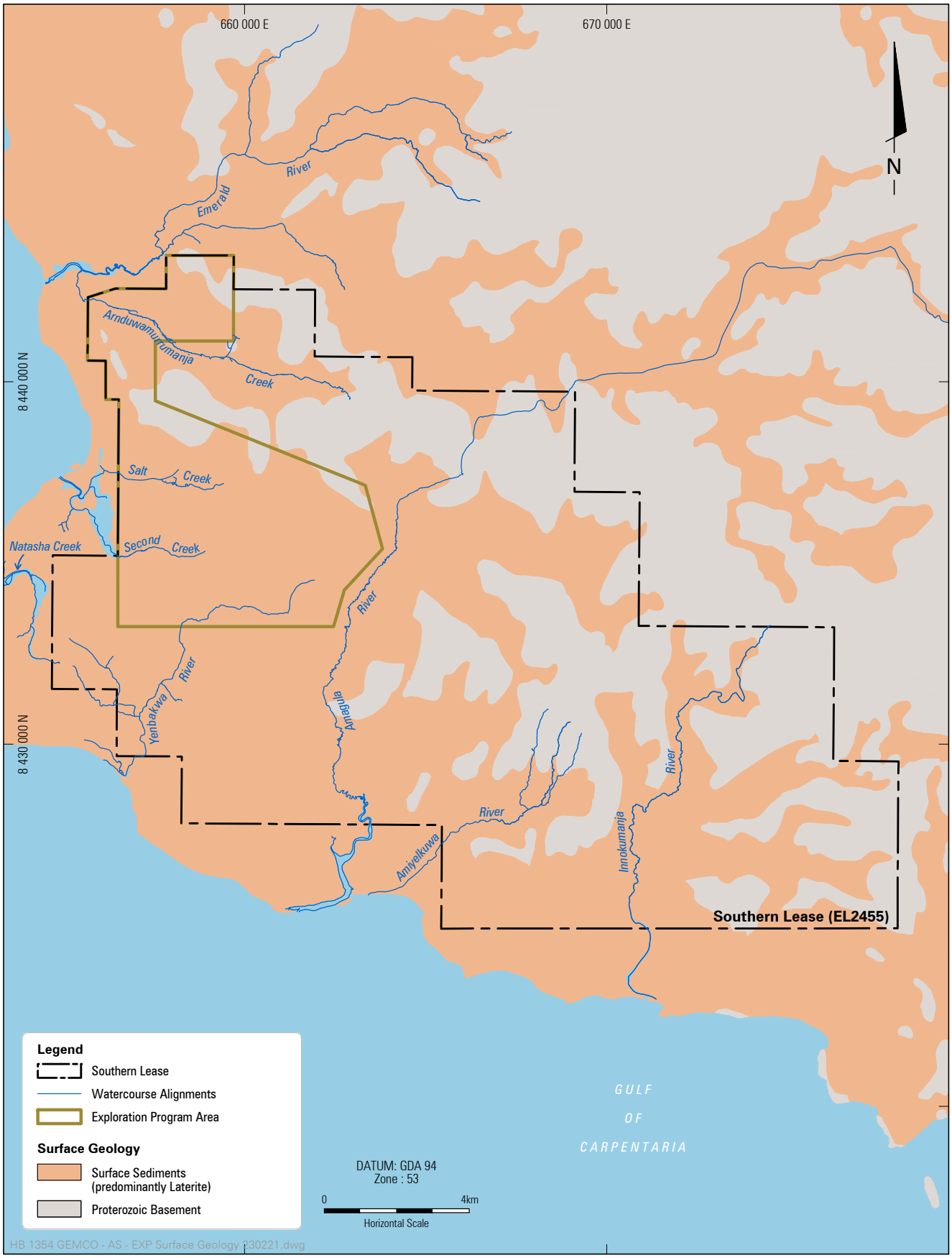
FIGURE 2-3



SOUTHERN LEASE EXPLORATION PROGRAM

Mineral Tenements

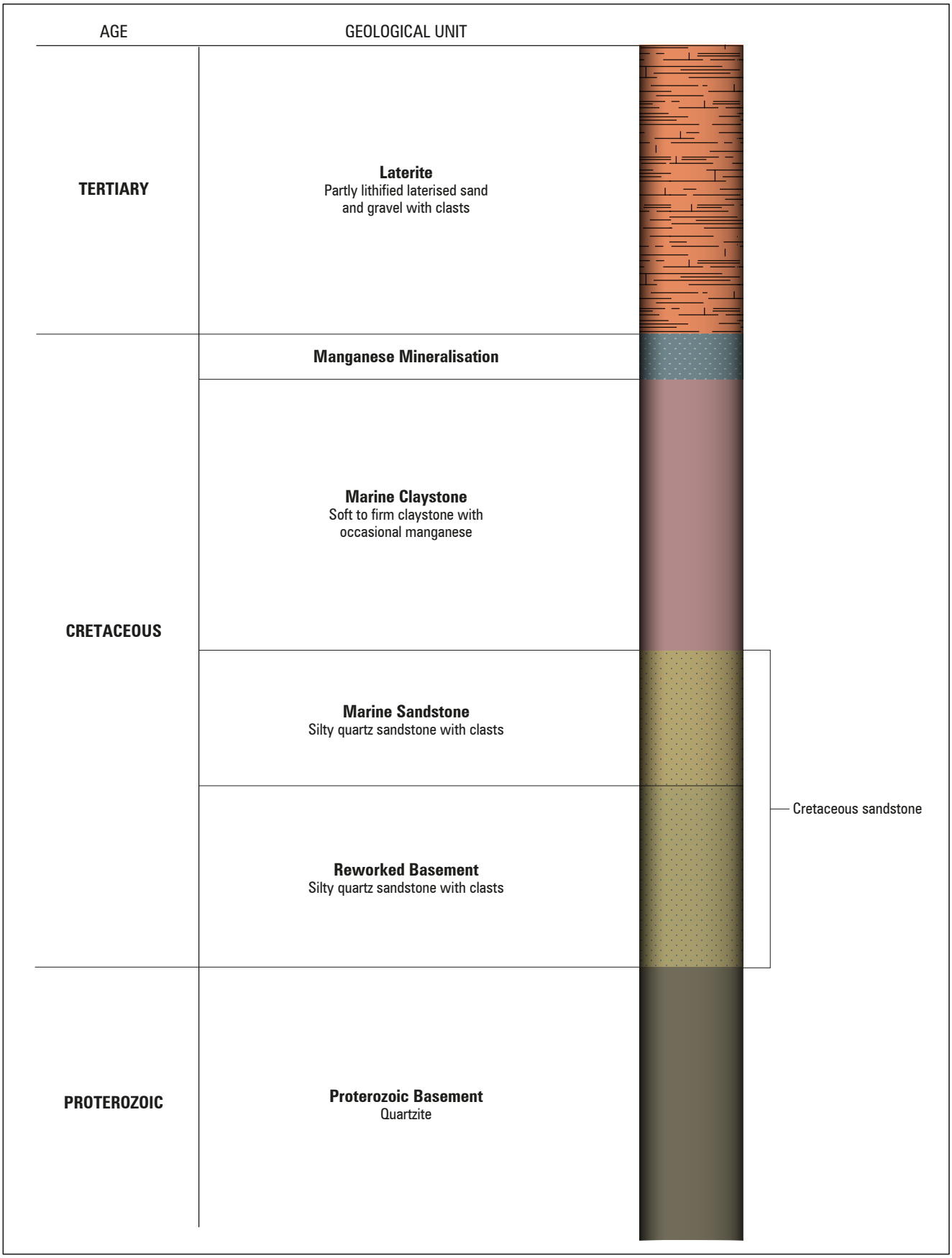
FIGURE 2-4



SOUTHERN LEASE EXPLORATION PROGRAM

Surface Geology

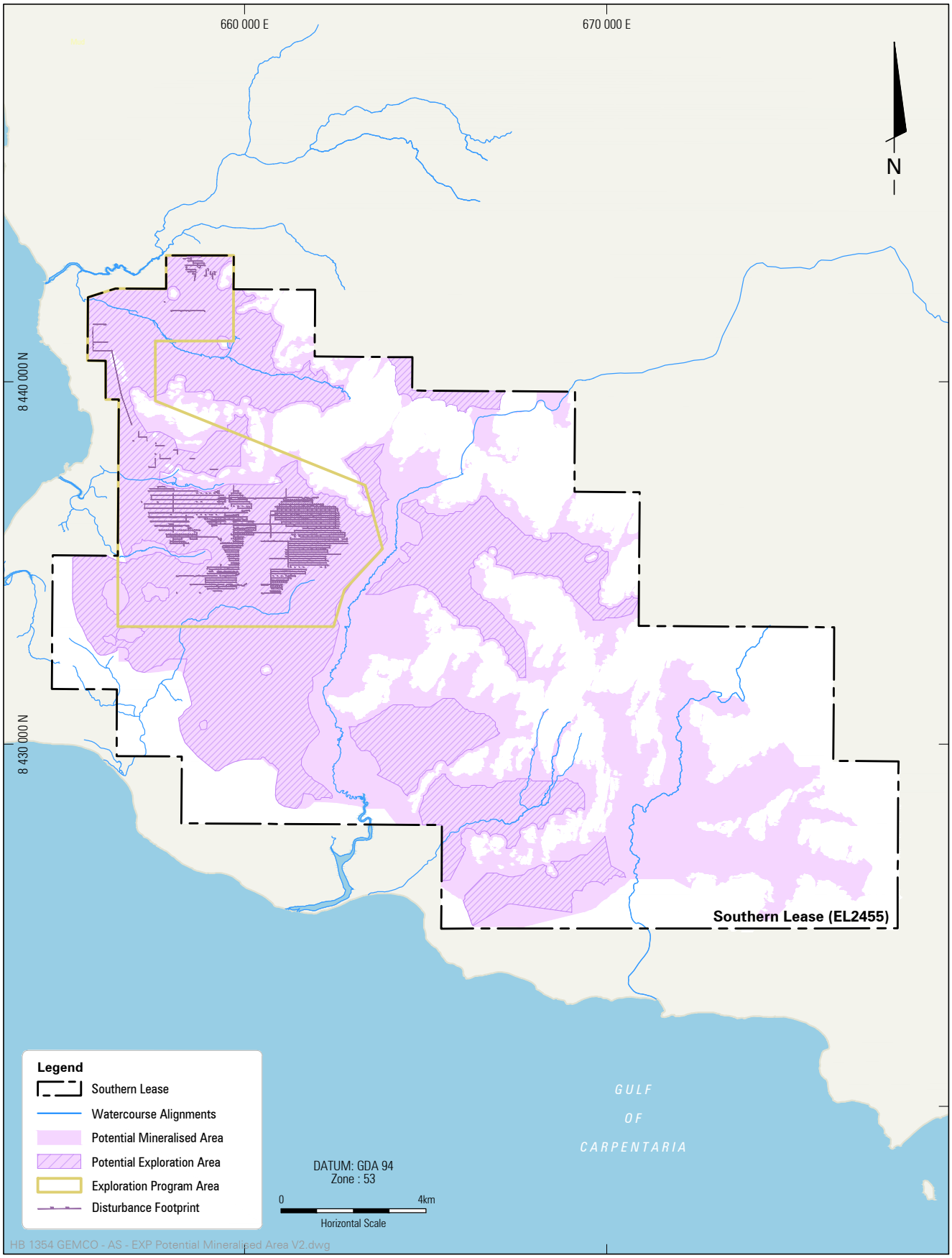
FIGURE 2-5



SOUTHERN LEASE EXPLORATION PROGRAM

Indicative Stratigraphy of the Southern Lease

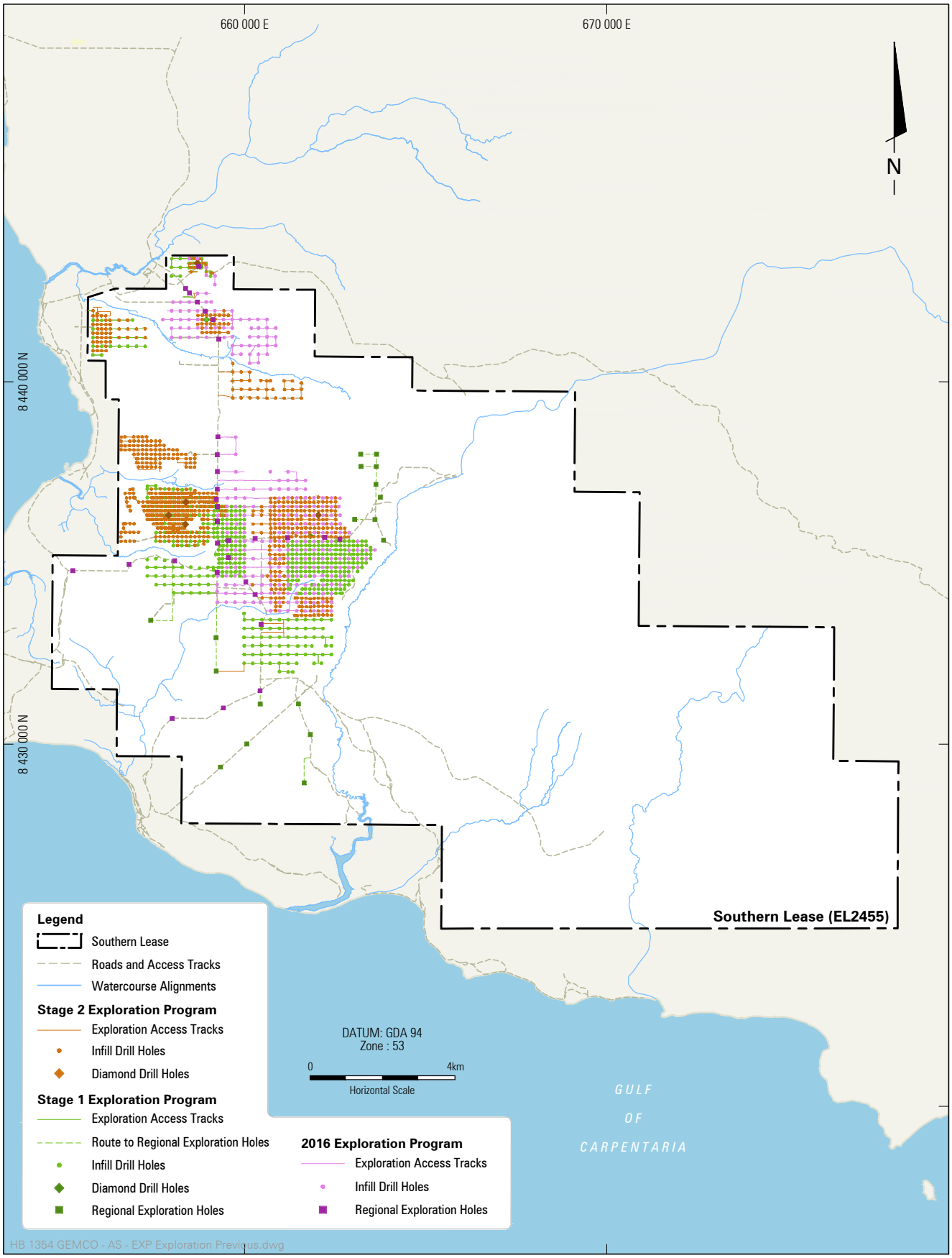
FIGURE 2-6



SOUTHERN LEASE EXPLORATION PROGRAM

Potential Mineralised Area

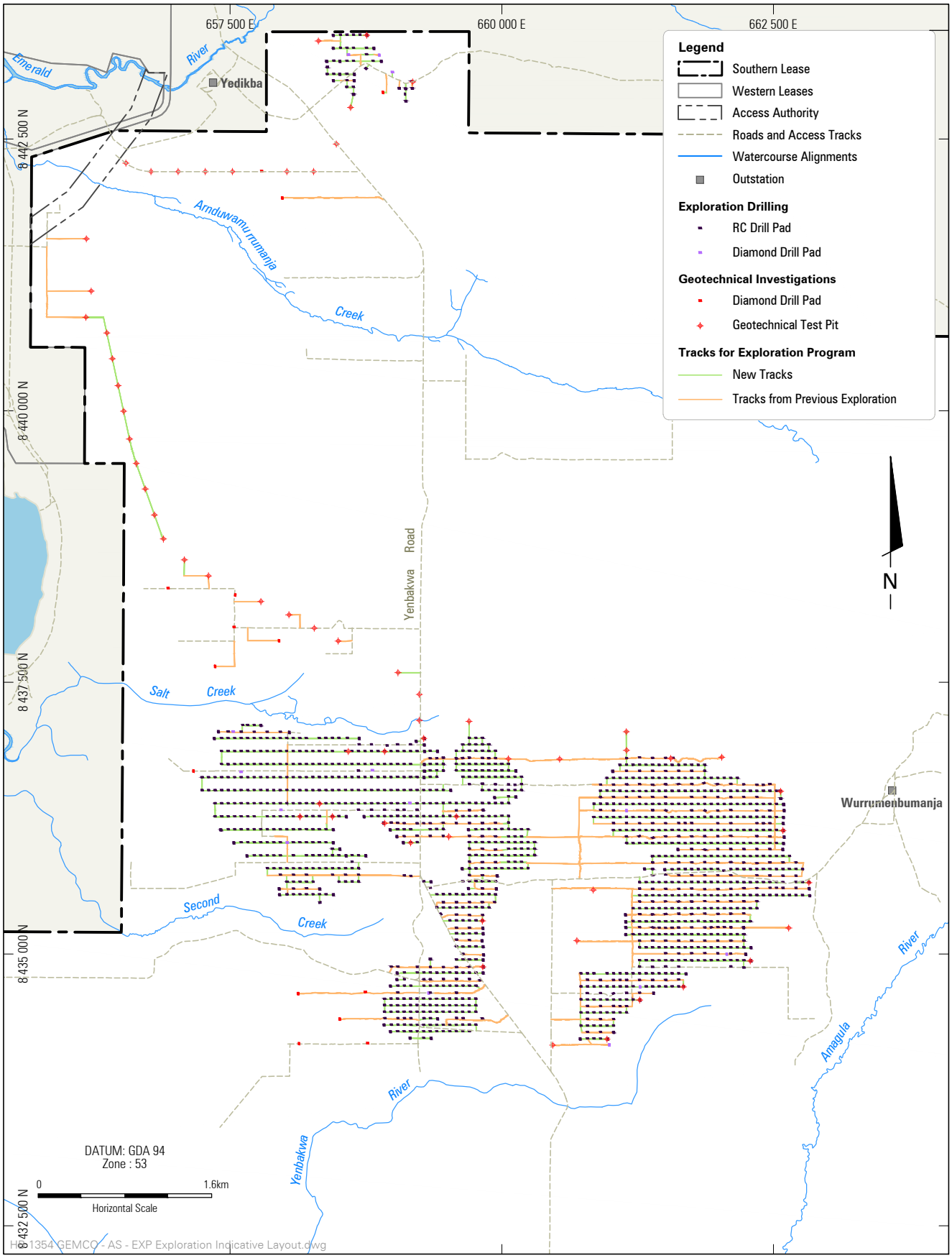
FIGURE 2-7



SOUTHERN LEASE EXPLORATION PROGRAM

Previous Exploration Programs in the Southern Lease

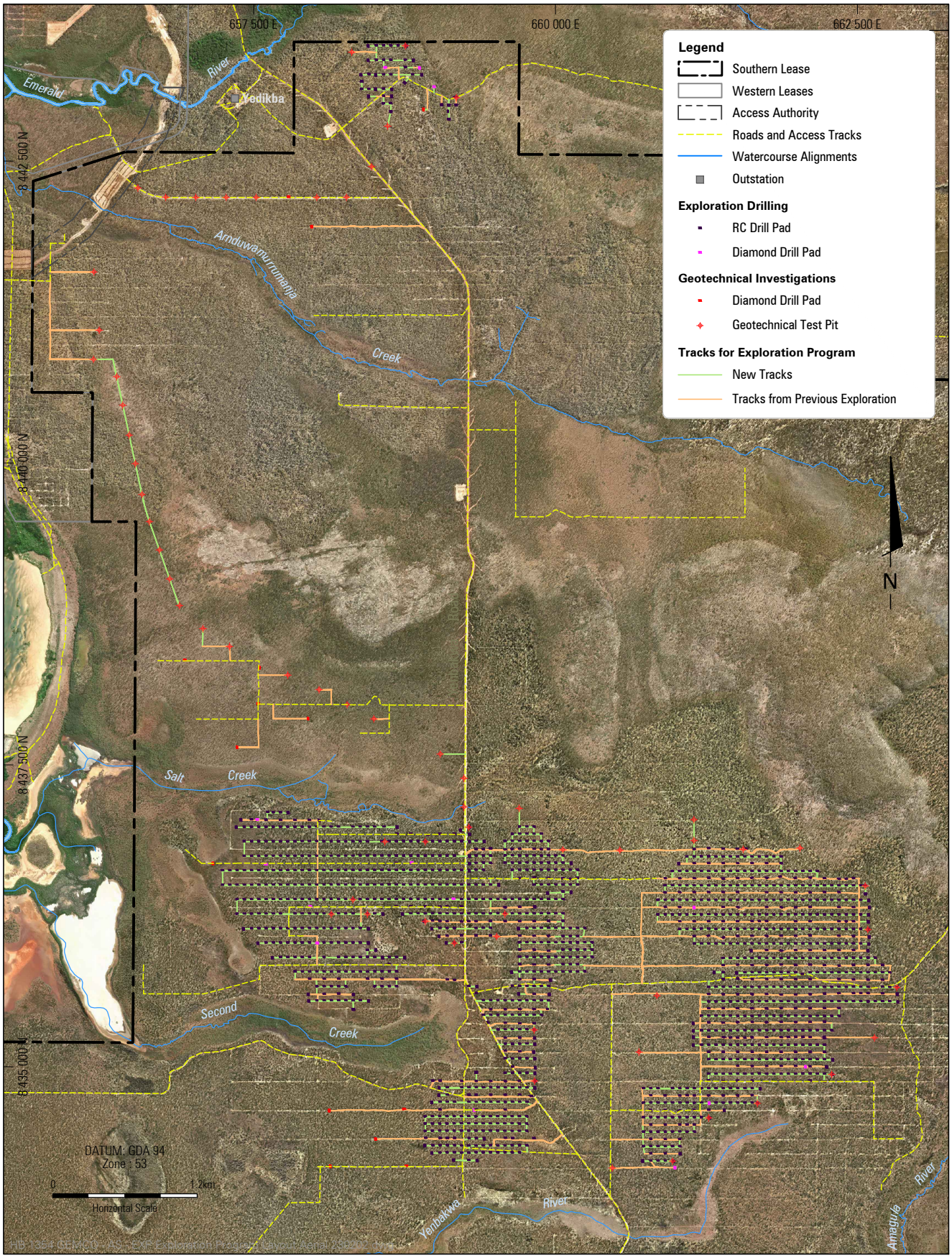
FIGURE 2-8



SOUTHERN LEASE EXPLORATION PROGRAM

Exploration Program (2023-2025)
Indicative Layout Plan

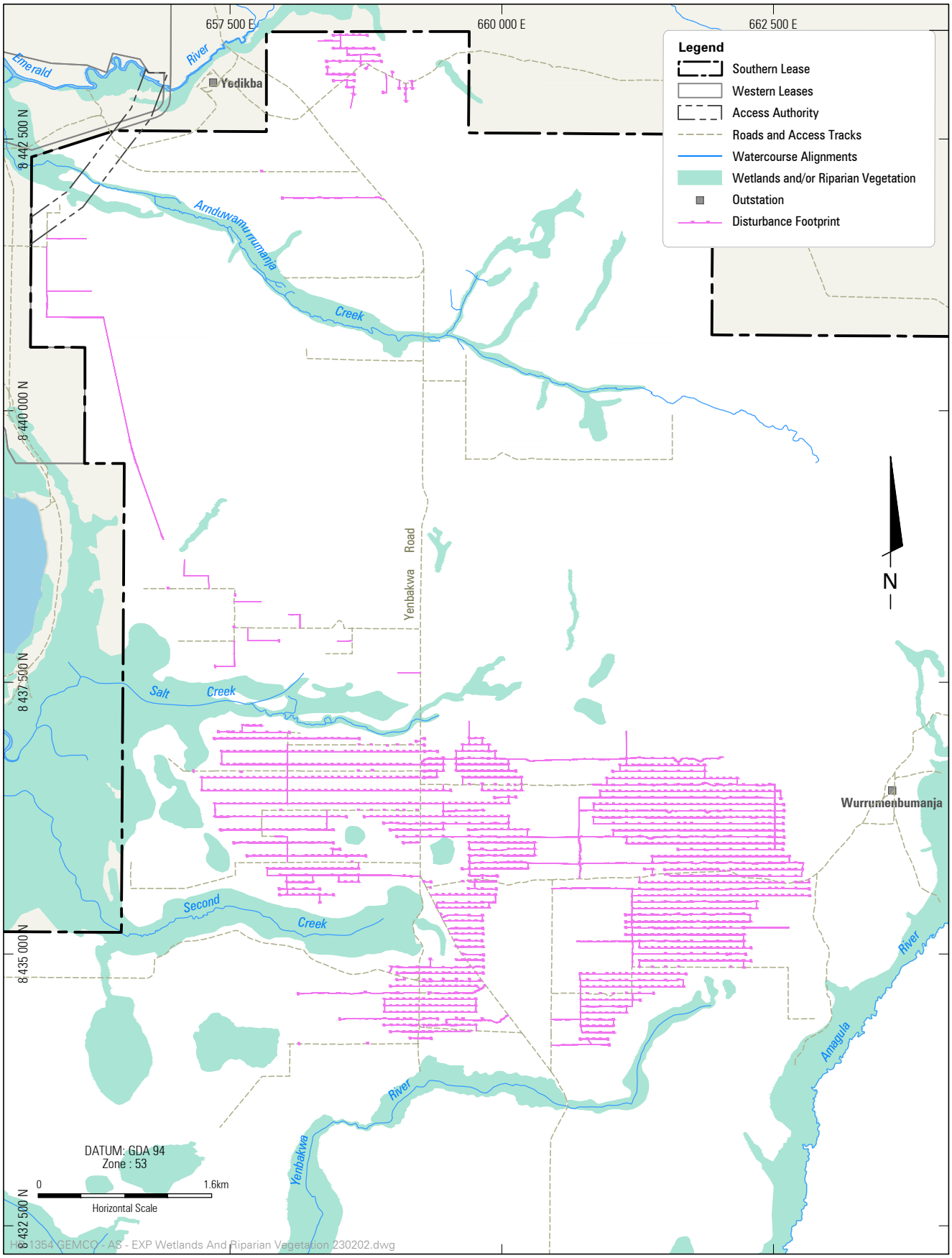
FIGURE 2-9



SOUTHERN LEASE EXPLORATION PROGRAM

Exploration Program (2023-2025)
Indicative Layout Plan Aerial Imagery

FIGURE 2-10



SOUTHERN LEASE EXPLORATION PROGRAM

Exploration Program Disturbance Footprint

FIGURE 2-11

PHOTOS

Photo 2-1 Example of a Reverse Circulation Drill Rig

Photo 2-2 Drill Pad (from the 1970s) in the Eastern Leases and Analogue Monitoring Site (Site 70-8; Cumberland Ecology 2019)

Rehabilitated Drill Pad - 1970

Analogue Site (Adjacent Undisturbed Vegetation)

Photo 2-3 Drill Pad (from 2006) in the Eastern Leases and Analogue Monitoring Site (Site 06-1; Cumberland Ecology 2019)

Rehabilitated Drill Pad - 2006

Analogue Site (Adjacent Undisturbed Vegetation)

Photo 2-4 Drill Pad (from 2014) in the Eastern Leases and Analogue Monitoring Site (Site 14-7; Cumberland Ecology 2019)

Rehabilitated Drill Pad - 2014

Analogue Site (Adjacent Undisturbed Vegetation)

Photo 2-5 Drill Pad (from 2017) in the Eastern Leases and Analogue Monitoring Site (Site 17-3; Cumberland Ecology 2019)

Rehabilitated Drill Pad - 2017

Analogue Site (Adjacent Undisturbed Vegetation)

Photo 2-6 Example of a Diamond Drill Rig