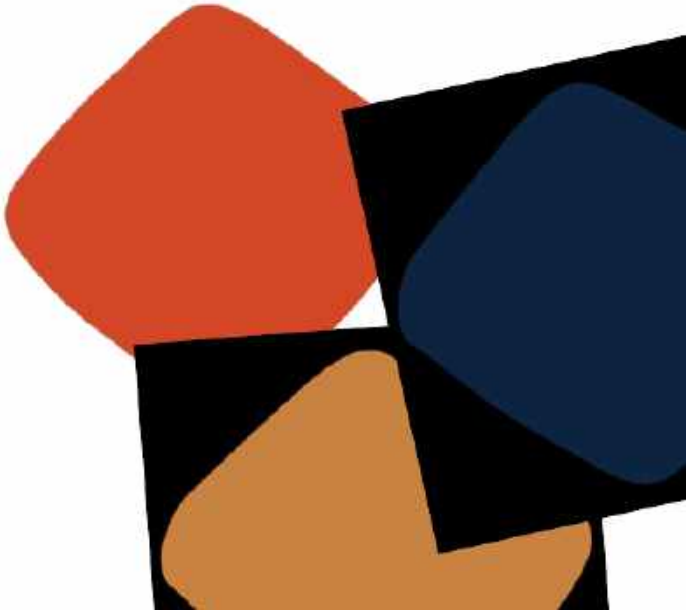
Attachment 8:
Licence Application Supporting Information

McPhee Creek Project

08/01/2026

124-EN-REP-0011



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[redacted]

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[redacted]

Abbreviations

ABN	Australian Business Number
ACN	Australian Company Number
AHD	Australian Height Datum
ALARP	As low as reasonably practicable
AN	Ammonium Nitrate
ANSF	Ammonium Nitrate Storage Facility
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
AS	Australian Standards
BC Act	Biodiversity Conservation Act 2016
BIF	Banded Ironstone Formation
BOD	Biochemical Oxygen Demand
CFU	Colony-forming Unit
CO	Carbon Monoxide
CSF	Chemical Storage Facility
DAWE	Department of Agriculture, Water and Environment
DOH	Department of Health
DOW	Department of Water
DPLH	Department of Planning, Land and Heritage
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity
ECP	Environmental Commissioning Plan
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act 1986
GL	Gigalitre
IBSA	Index of Biodiversity Surveys for Assessment
MPN	Most Probable Number
MSA	Mine Service Area
Mtpa	Million tonnes per annum
NEPC	National Environmental Protection Council
NO	Nitrogen Oxide

NZS	New Zealand Standards
PEC	Priority Ecological Communities
$PM_{2.5}$	Particle Matter <2.5um
PM_{10}	Particle Matter <10um
ROM PAD	Run of Mine
SO_2	Sulphur Dioxide
STP	Standard temperature and pressure
TEC	Threatened Ecological Communities
TLO	Time Limited Operations
TSS	Total Suspended Solids
TPH	Total Petroleum Hydrocarbons
UTSF	Used Tyre Storage Facility
WA	Western Australia
WAA	Works Approval Application
WWRD	Western Waste Rock Dump
WWTP	Wastewater Treatment Plant

1 Introduction

1.1 Project Description

Atlas Iron Pty Ltd (the Applicant) is proposing to develop a greenfield iron ore mine at McPhee Creek (the Project), located approximately 30 km to the north of Nullagine townsite occurs on Mining Lease 45/1243, Exploration Lease E46/1129-1 and Miscellaneous Licenses L46/158 and L45/598 in the Pilbara region of Western Australia (Figure 1-1).

The Project comprises both above and below water table mining of iron ore from five open cut pits, with the production rate of up to 14 million tonnes per annum (Mtpa) of ore on a 24-hour, seven day a week basis, over an expected mine life of 15 years. Once mined the ore will be transported via the haul road network to the Run of Mine (ROM) pad, where it will be processed within a dry processing facility. Due to the dry nature of the processing no tailings or wet waste products will be produced. The ore will then be stockpiled for transport along the haul road for further processing off-site. Due to portions of the ore bodies being located below the water table some of the pits will have to be dewatered. It is anticipated that a maximum of 7.5 gigalitres (GL) will be dewatered and up to 6.0 GL of water will be discharged as per the water management plan.

1.2 Purpose of This Document

The Applicant is seeking an operating licence to operate the following Prescribed Premises as defined under Schedule 1of the *Environmental Protection Regulations 1987*.

- Crushing and screening plant (Category 12 – screening of material);
- Wastewater treatment plants (WWTP) (Category 54 – sewage facility);
- Fuel Farm (Category 73 – Bulk storage of chemicals); and
- Landfill (Category 89 – putrescible landfill site).

This report (Attachment 8) provides information to support the Applicants' submission of the 'Application Form: Works Approval / Licence' as required by the Department of Water and Environmental Regulation (DWER) to assess the project.

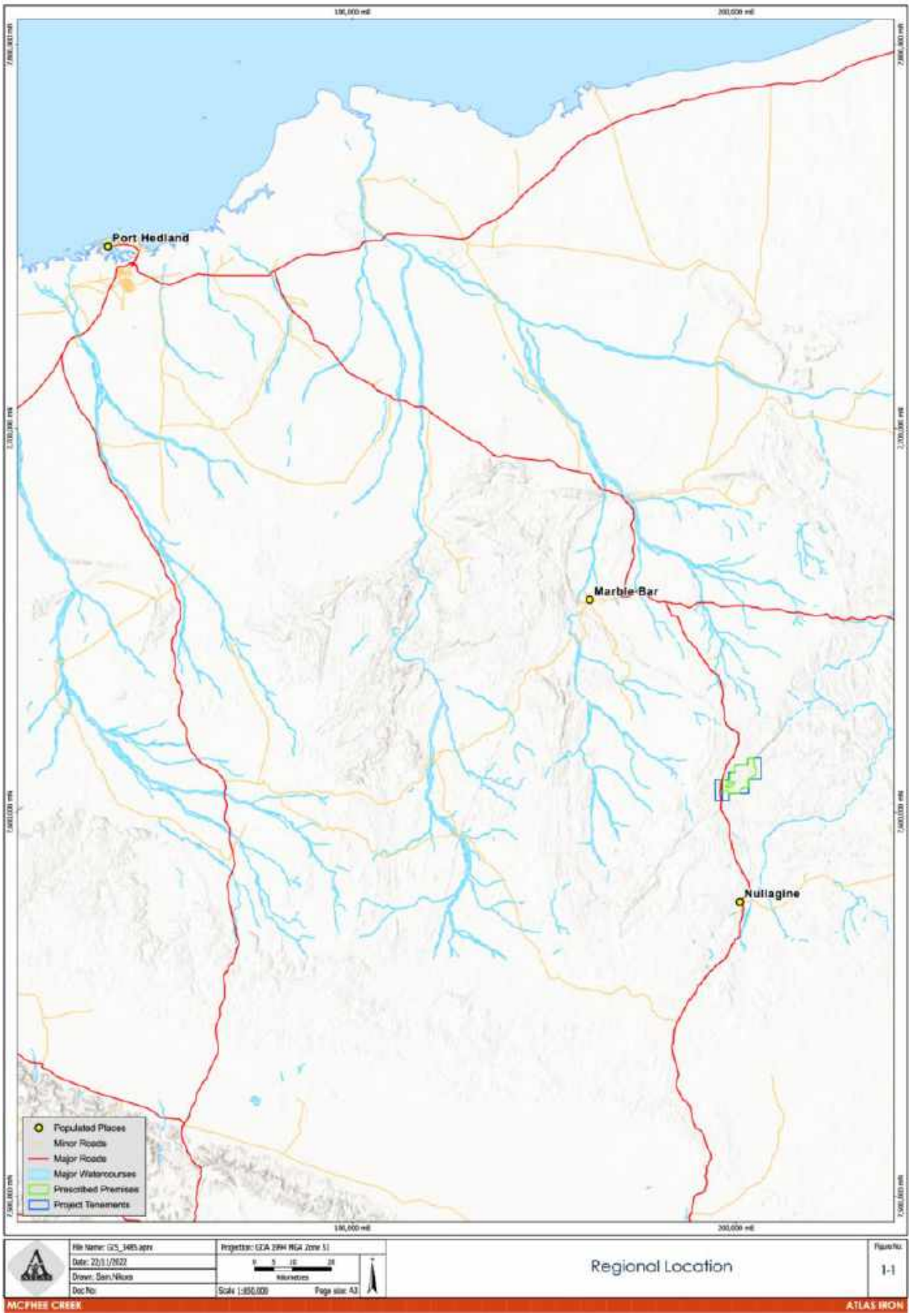

Figure 1-1: Regional Location

2 Applicant Details

The Applicant (Atlas Iron Pty Ltd (ACN 110 396 168)) was acquired by Hancock Prospecting Pty Ltd in 2018, at which time it was de-listed from the Australian Securities Exchange (ASX). The Applicant is an Australian and Securities and Investment Commission (ASIC) listed company, as demonstrated in Attachment 1B.

3 Premises Details

The Prescribed Premises boundary aligns with the Development Envelope approval Ministerial Statement (MS) 1224 under Part IV of the *Environmental Protection Act* 1986; note this excludes the Significant Fauna Exclusion Zone (SFEZ). It is located within the boundaries of Mining Lease M45/1243-I, Exploration licence E46/1129-I and Miscellaneous licences L46/158 and L45/598 as shown in Table 3-1 and the Prescribed Premises Map (Attachment 2). Evidence to support the Applicant's occupier status has been compiled and is presented in Attachment 1A.

Table 3-1: Premises Legal Description

Prescribed Premises Category	Category Threshold	Design Capacity	Premises Legal Description
Category 5 – Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	14,000,000 tonnes per annum (tpa)	M 45/1243-I, E46/1129-I, L46/158 and L45/598 (Attachment 1B).
Category 6 – Mine dewatering	50,000 tonnes or more per year	Maximum dewatering volume of 7.5 GL per annum (GL/a); Maximum discharge volume of 6.0 GL/a.	
Category 12 – Screening of material	More than 50,000 tpa	1,000,000 tpa	
Category 54 – Sewage facility	100m^3 or more per day	A maximum throughput of 140m^3 per day	
Category 57 – Used tyre storage (general)	100 tyre or more	~1000 tyres at a given time	
Category 73 – Bulk storage of chemicals	More than 1,000 m^3 in aggregate	2,820m^3	
Category 89 – Putrescible landfill site	More than 20 but less than 5, 000 tpa	~ 2,030tpa	

The indicative location of where the prescribed activities will occur within the Prescribed Premises is presented in the Prescribed Premises Map (Attachment 2).

4 Proposed Activities

This chapter provides a description of the Project's prescribed activities. Clearing of native vegetation is not included within this application as it has been addressed through the Part IV under the *Environmental Protection Act* 1986 (MS 1224).

The indicative location of prescribed activities is shown on Figure 4-1.

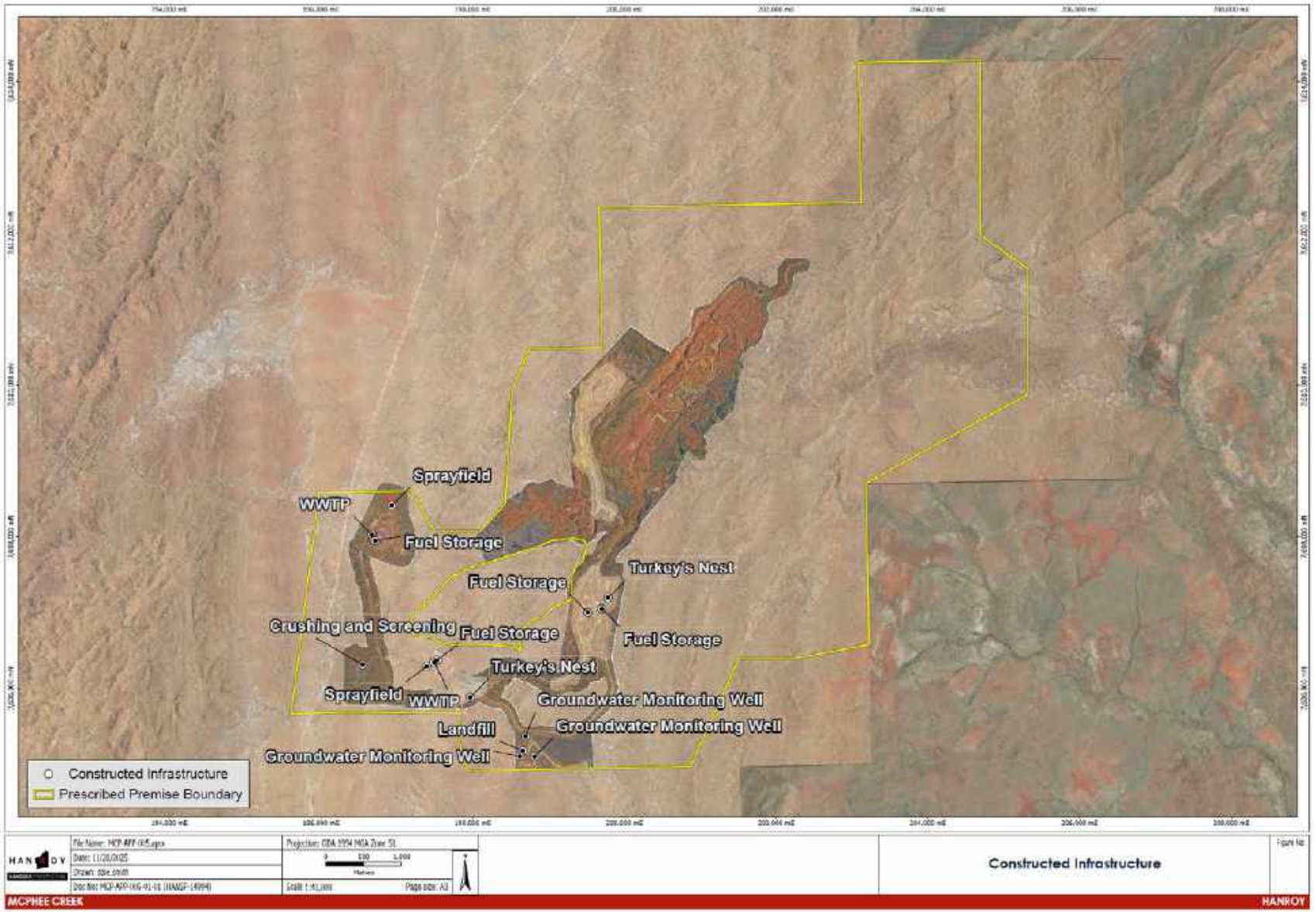

Figure 4-1: Location of Prescribed Activities

4.1 Category 12 – Screening etc. of Material

4.1.1 General Information

A mobile crushing and screening plant was mobilised under WA6780/2023/1 within the Prescribed Premises to crush and screen rock material for the construction of road base infrastructure. The mobile plant is a diesel powered self-contained modular style unit, capable of various configurations. The indicative design of the plant is presented in Figure 4-2 and the main components are presented in Table 4-1, subject to variation due to changes in availability of this particular model.

The single mobile plant is currently located at Borrow Pit 8 but will operate at up to five locations across the Prescribed Premises where the raw material for the road bases will be extracted (Figure 4-3). The mobile plant will have the capacity to process up to 1,000,000 tpa.

Table 4-1: Key infrastructure and Equipment for the Mobile Crushing and Screening Plant

Key Infrastructure and Equipment
Loading Ramp
Jaw Crusher (Primary Crusher)
Cone Crusher (Secondary Crusher)
Horizontal Screen
Mobile Conveyors
Diesel Generators
Dust Suppressing Sprayers

4.1.2 Construction

The mobile crushing and screening plant was delivered to site in prefabricated parts and assembled in accordance with the manufacture's specifications.

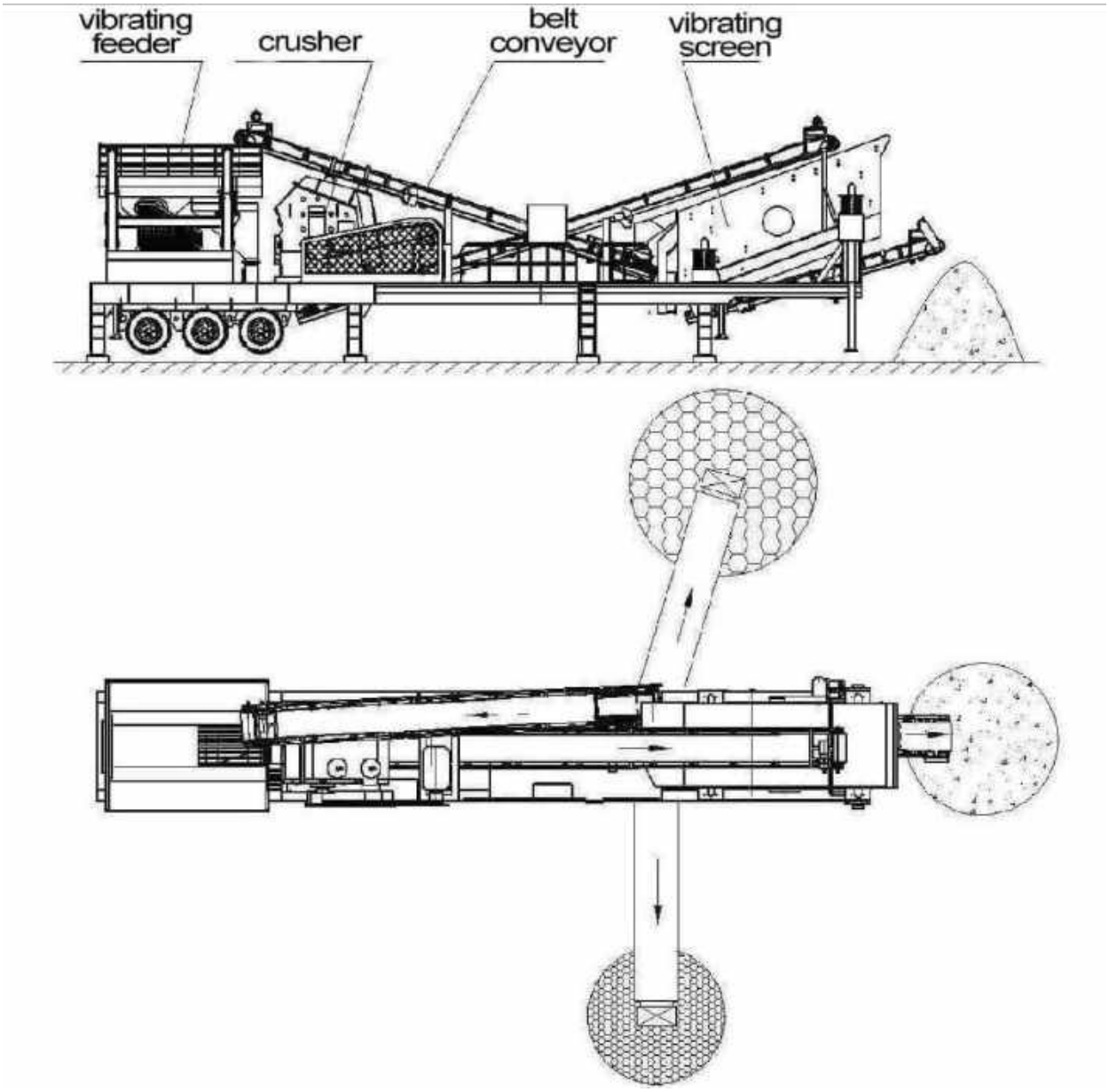

Figure 4-2: Indicative Design of the Crushing and Screening Plant

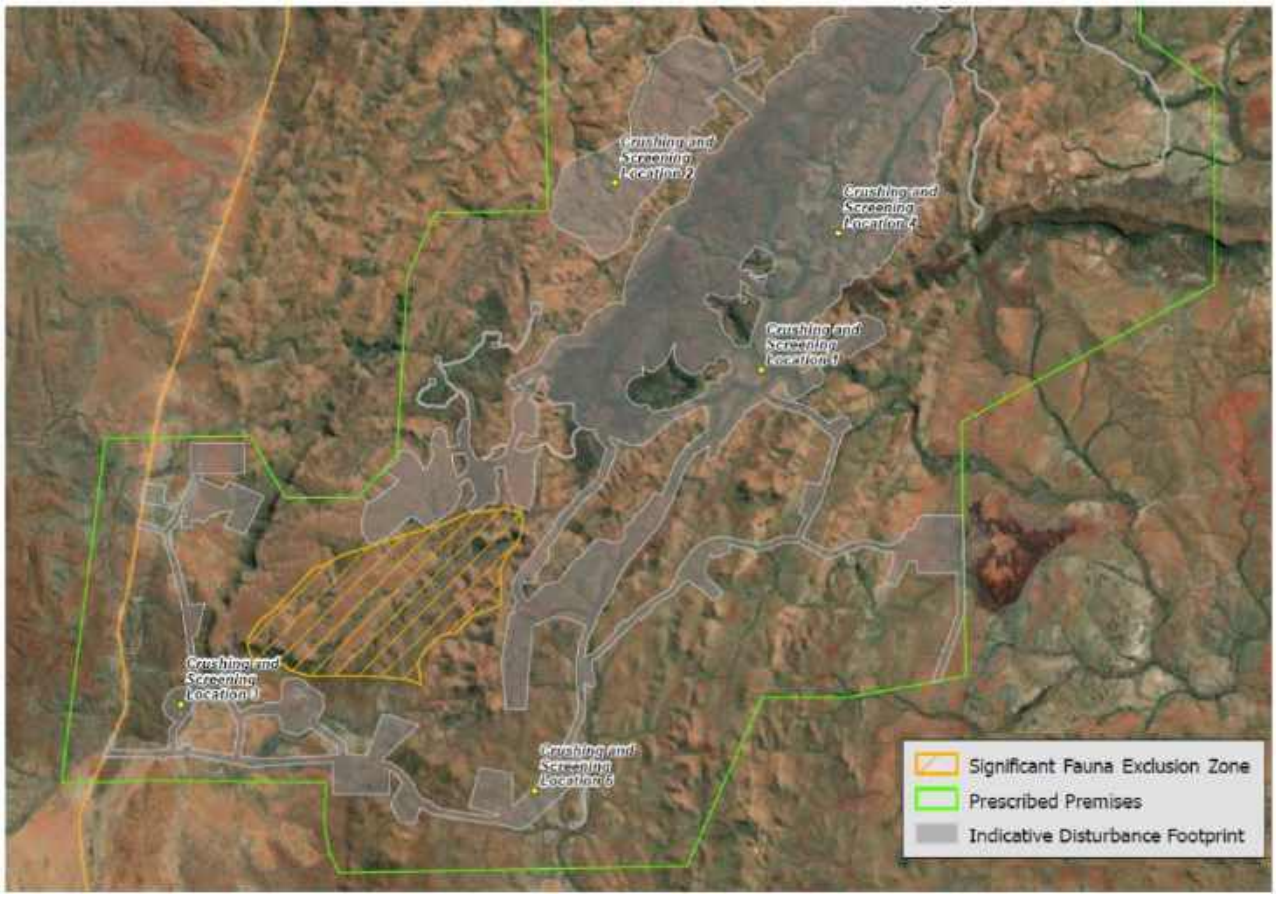

Figure 4-3: Indicative Locations of Mobile Crushing and Screening Plant Operation (Figure 6 of WA6780/2023/1)

4.1.3 Operations

4.1.3.1 Inputs

The mobile crushing and screening plant will have the following key inputs:

- Power (diesel generators),
- Water for dust suppression and conditioning of the crushed material, and
- Raw geological material.

4.1.3.2 Process

Material is extracted from borrow pits and either placed directly into the hopper of the mobile plant, or stockpile near the plant until it is required. Once the material has been fed into the mobile plant it will pass through the primary crusher, where the material will be crushed to the required size before being conveyed to a secondary crusher where material still oversized will be further crushed. The crushed material then passes through a screen, where the material will be sorted into separate sizes. Once screened the material is then conveyed to separate stockpiles from where it will be transported to where it is needed on the site.

A noise assessment (Appendix 1) has been completed that assesses the noise from mobile crushing and screening activities.

Temporary stormwater diversion structures were constructed at Borrow Pit 8 to divert uncontaminated stormwater around the operation area.

4.1.3.3 Output

The Mobile Crushing and Screening Plant is anticipated to process approximately 360,000 tpa of crushed rock. This is based on the plant operating during daylight hours only. In addition to the sorted material, the plant is likely to produce the emissions and wastes listed below. These are discussed further in Section 9.

Emissions:

- Dust – mobile plant hopper, conveyor transfer points, stackers and product stockpiles,
- Noise – mobile plant and associated vehicle movements and machinery operations, and

Waste:

- Hydrocarbons, including lubricants and oil – diesel generators and plant maintenance, and
- Contaminated soils (if any) – potential for accidental spills during maintenance.

4.1.4 Compliance Reporting

Mobilisation and assembly of the unit was completed on 30 April 2025.

The Environmental Compliance Report required by Condition 6 of W6780/2023/1 was submitted via email 30 May 2025.

This mobile crushing Screening unit was demobilised and swapped out with a replacement unit in October 2025. Mobilisation and assembly of the replacement unit was completed 30 Oct 2025 and a revision to the Environmental Compliance Report submitted via email 3 Nov 2025.

There were no commissioning requirements, and the plant is currently operating under Time Limited Operations.

4.2 Category 54– Sewage Facility

4.2.1 General Information

Three wastewater treatment plants (WWTP) will be located within the Prescribed Premises. One will be located with the main accommodation camp, one at the exploration camp and the other at the mine administration buildings on the MSA. (Figure 4-4). Across all three wastewater treatment facilities, approximately 140 m3 of effluent will be treated per day.

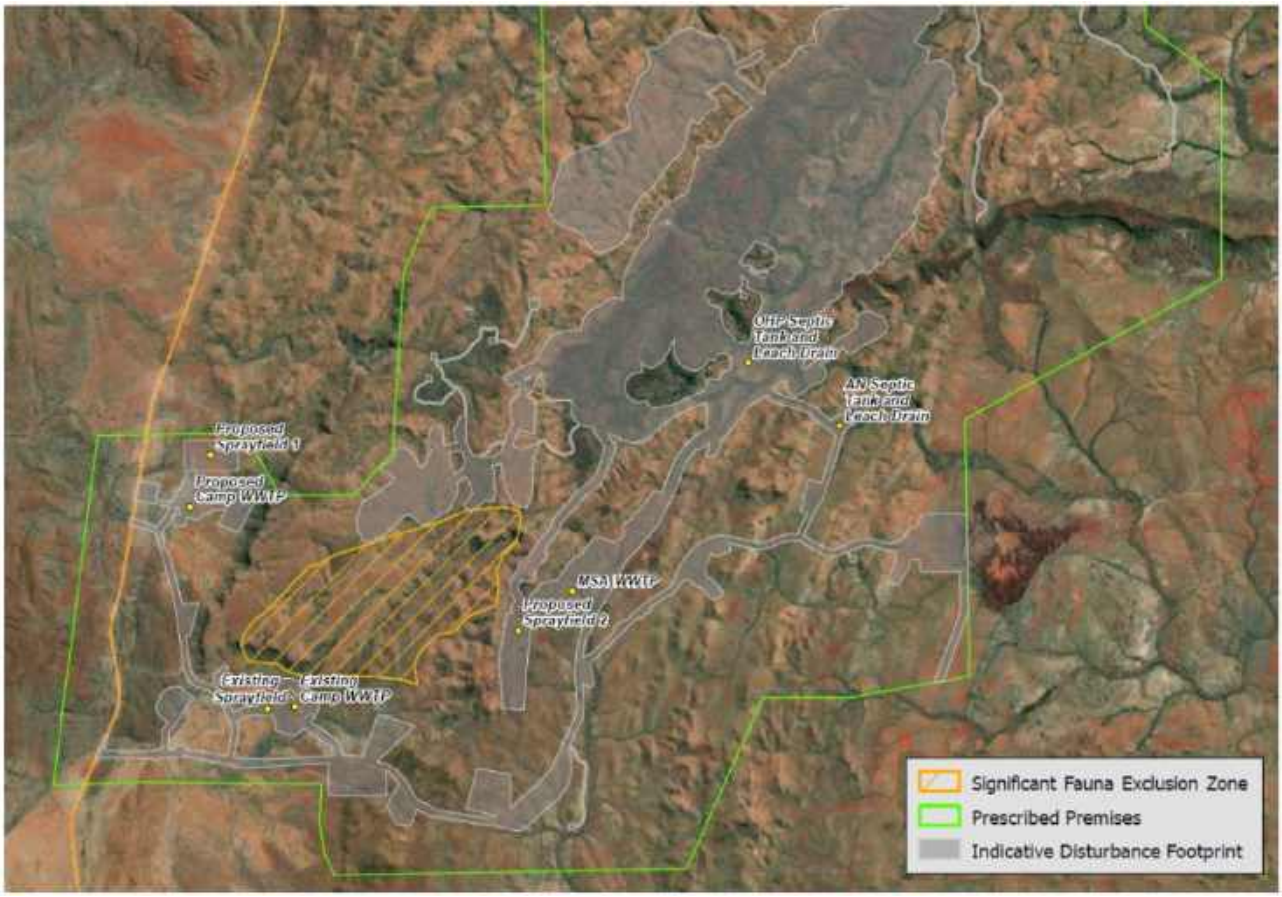

Figure 4-4: Location of the two constructed camp WWTPs and irrigation spray fields (Figure 7 of WA6780/2023/1)

4.2.1.1 Exploration Camp and Main Camp WWTPs

The WWTPs at the camps are prefabricated modular Sequence Batch Reactor (SBR) systems with associated treated effluent disposal spray fields. The system at the main camp is designed to accommodate the needs of a maximum of 250 people by processing a maximum of 60 kilolitres (kL) per day, or 240 litres (L) per person per day. While the system at the existing exploration camp will be expanded to accommodate the needs of a maximum of 275 people by processing a maximum of 70 kL per day or 250 L per person per day. Both camp WWTP systems operate on 24 hours/7 days a week basis. The design of the exploration and main camp WWTPs are presented in Figure 4-6 and Figure 4-7. The main components of each are listed in Table 4-2, all of which will be constructed to Australian standards.

Table 4-2: Key Infrastructure and Equipment for the Accommodation Camp WWTP and Sprayfield

Key Infrastructure and Equipment
Camp WWTPs
Duty 2.5mm inlet bar screen
External 32m³ Poly balance tanks
Grundfos duty balance pump
SBR Tank
Grundfos duty decant pump
Worm Drive duty sludge pump
Grundfos duty recirculation pump with online chlorine dosing.
Grundfos sodium hypochlorite dosing system
Grundfos poly aluminium chloride dosing system
32 kL Poly Irrigation tank
32 kL sludge storage tank
Irrigation pump
Discharge flow meter
Control panel with PLC and remote monitoring capabilities
Audible and visual alarm
Access ladder and high-level platform to top of container
Sprayfield
Above ground hammer type sprinkler with a 4 mm nozzle
Sewage Piping
Automated Control Panel
1,200 mm high two strand steel wire fencing with steel corner posts strainers and intermediate solid mounted posts
Vehicle Access Gate
Branch Line Flush Valves
Safety Signage and Tagging

4.2.1.2 MSA WWTP

The third system is currently being constructed at the Mine Service Area and is not included within this License application.

4.2.2 Construction

Construction of the two Camp WWTPs commenced with the installation of a compacted earth foundation for the tanks. The prefabricated modular components of the WWTPs were transported to site and constructed in accordance with manufacturing specifications.

4.2.3 Commissioning

The WWTPs required a 30-day commissioning period to optimise and stabilise the wastewater treatment processes. Commissioning of the WWTPs commenced following the submission of the Environmental Compliance Report. The Environmental Compliance Report confirmed the Facilities have been constructed in accordance with the issued Works Approval.

The commissioning process utilises groundwater to test the equipment and facility, with influent then slowly being introduced until a steady state has been reached. The treated effluent will be collected in the balance tank (WWTP) until the effluent quality is able to consistently meet the effluent quality identified in Table 4-3 (main and exploration camp WWTPs).

Table 4-3: Required Effluent Quality for the Sprayfields

Discharge Point	Parameter	Limit
Sprayfield ('low exposure risk level')	Total Nitrogen	<30 mg/L
	Total Phosphorous	<8 mg/L
	Biochemical Oxygen Demand (BOD)	<20 mg/L
	E. Coli	<1000 cfu / 100mL
	pH	6.5 - 8.5
	TSS	<30 mg/L

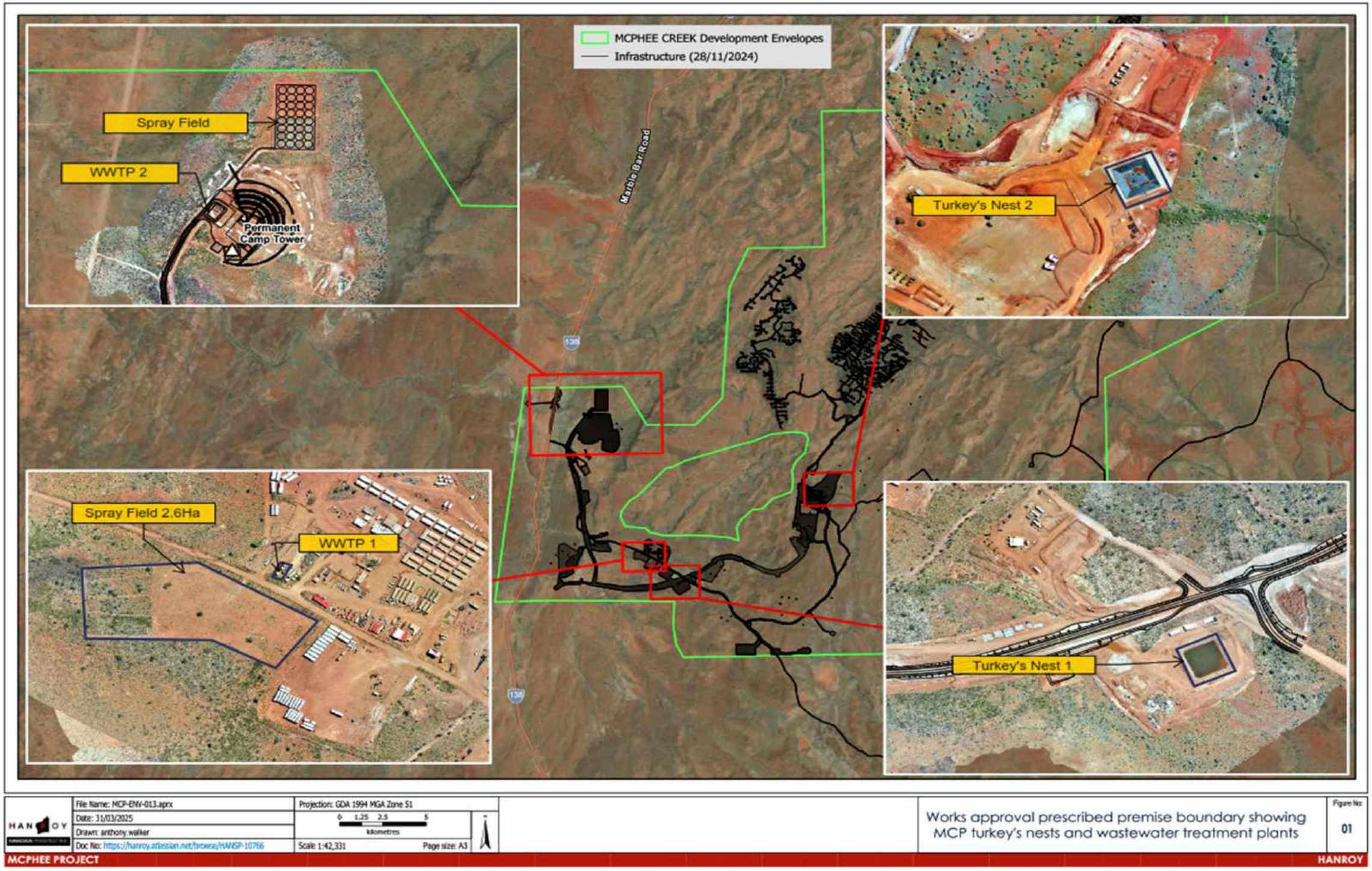

Figure 4-5: Location of the Site WWTPs

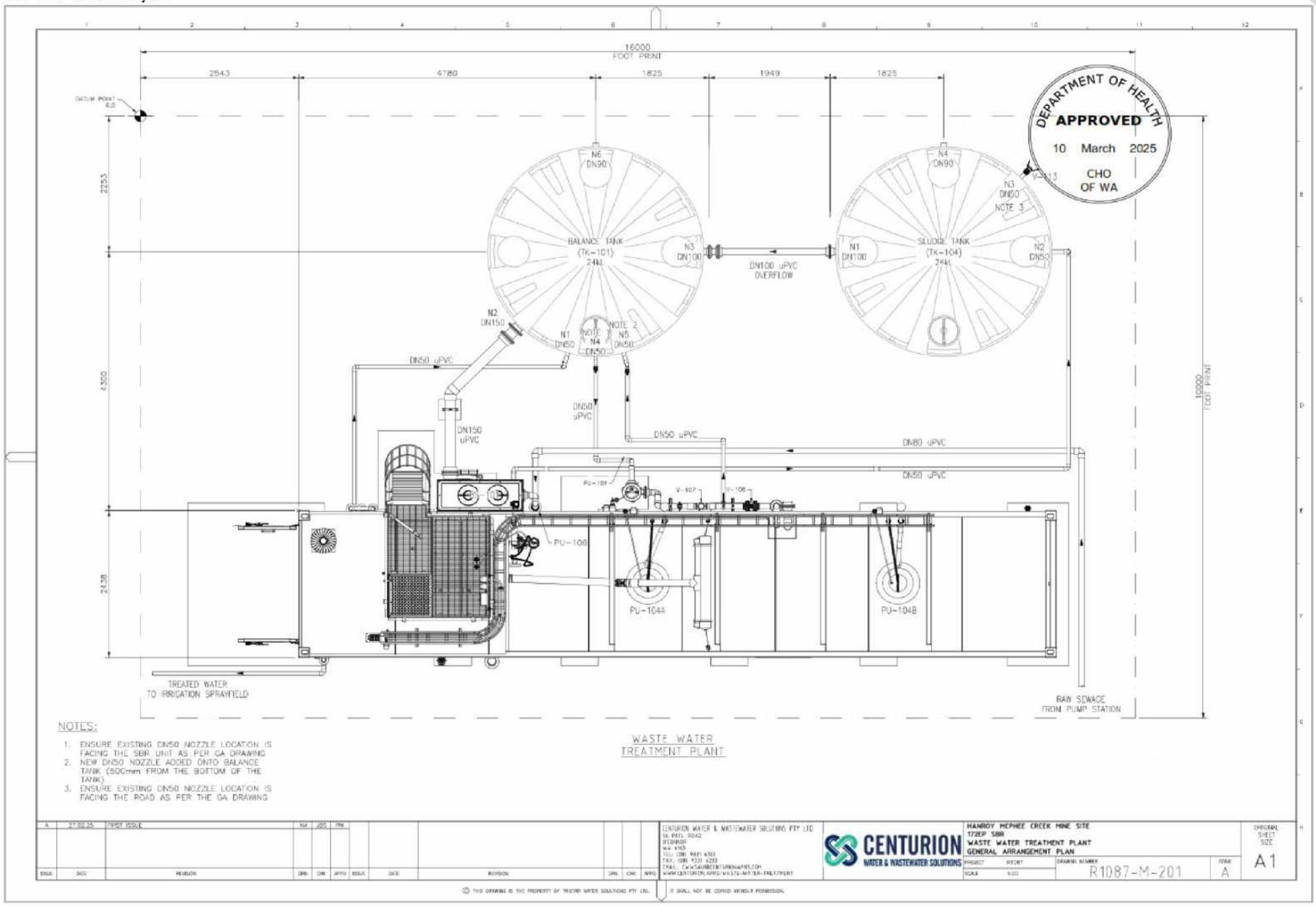

Figure 4-6: Design of the exploration camp WWTP

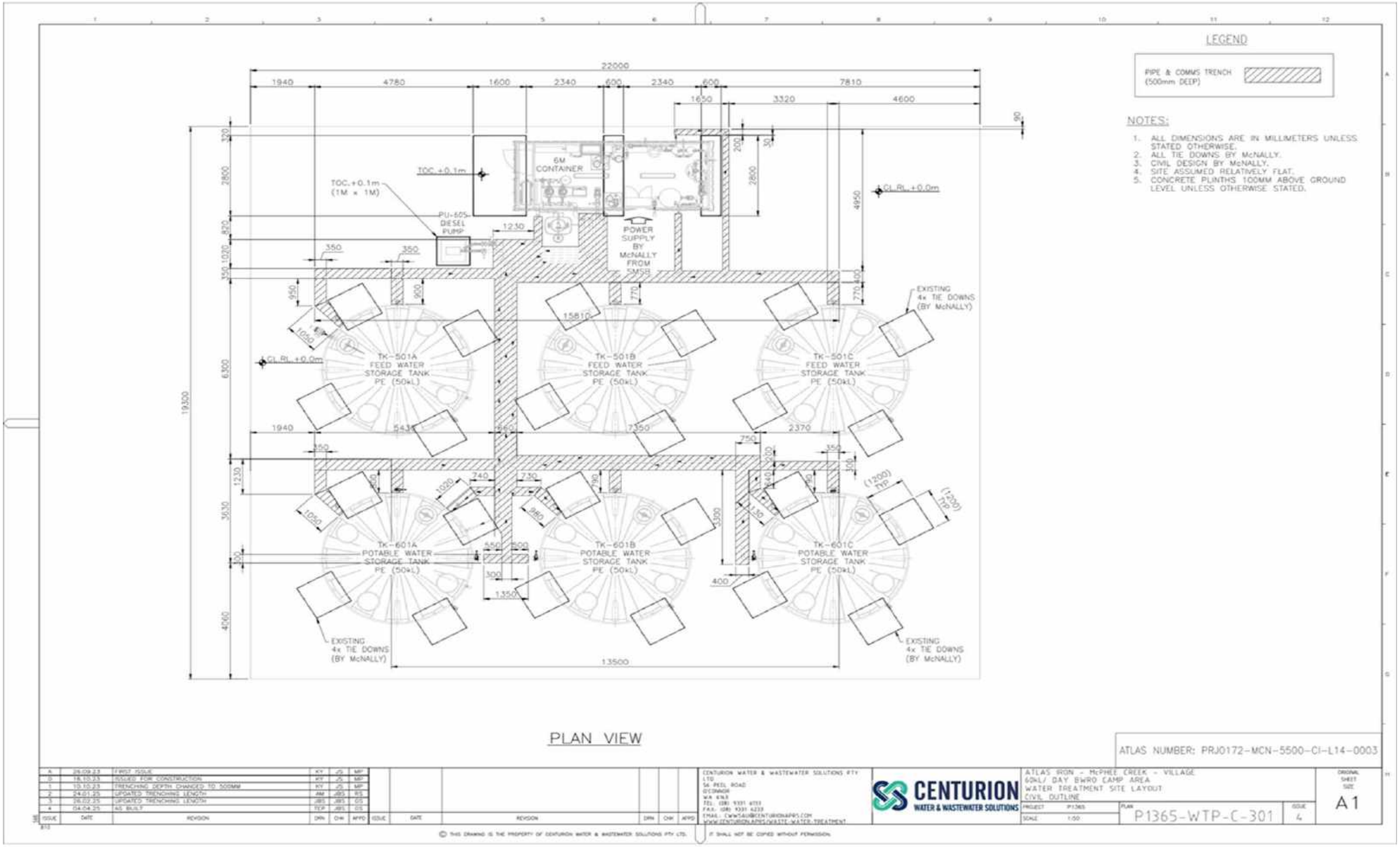

Figure 4-7: Design of the main camp WWTP

4.2.4 Operations

4.2.4.1 Inputs

During operations the WWTPs have the following inputs:

- Treatment chemicals
- Untreated wastewater – influent.

4.2.4.2 Camp WWTPs Process

The influent is delivered from the source (i.e., toilets, showers, kitchens etc.) to the WWTP via underground pipes. The influent is then be pumped through a rotary screen to remove and store unsuitable waste material for disposal to the main landfill site. The screened influent is then held in a balance tank in preparation for the next treatment batch. The wastewater in the balance tank will be dosed with an 'activating sludge' (nitrified liquor) from the aeration/decant tank to facilitate the treatment process.

Once the activating sludge has been added, the wastewater is moved into the anoxic treatment tank to allow the denitrifying bacteria present to break down the wastewater under anaerobic conditions and in doing so, remove nitrogen as nitrate as well. The wastewater is continuously mixed within the tank and held for a sufficient length of time to effectively remove all the nitrate.

The partially treated (denitrified) wastewater from the anoxic treatment tank is then transferred to the aeration tank and air is pumped through the wastewater at very high rates to enable the bacteria to aerobically metabolise the sewage and reduce the BOD and ammonia levels. At the end of the aeration phase, a precipitant (aluminium sulphate) is added to the tank to encourage the suspended solids (including biological flocs) to settle and for a sludge to form at the base of the tank. Once sufficiently settled the treated clarified liquor from the top of the tank is decanted and dosed with sodium hypochlorite.

The decanted and dosed wastewater (now referred to as effluent) is held for a minimum of 30 minutes to ensure the chlorination achieves the necessary levels of disinfection. By this time, the treated effluent will achieve a level of treatment equivalent to a 'low exposure risk level' (Table 4-3 and Table 4-4) based on the 'Guidelines for Non-potable uses of recycled Water in Western Australia (DoH, 2011).The treated effluent will be stored in the final effluent tank until such time is it is discharged at the respective spray fields.

The thick sludge from the bottom of the aeration/decant tanks is retained to allow it to further consolidate. Decanted effluent from the sludge tanks is then returned to the aeration tanks, while the dewatered sludge is held pending periodic removal by a vacuum truck for disposal at the onsite main Class II landfill site.

4.2.4.3 Sprayfields

The treated effluent from the two WWTPs will be of sufficient quality to be discharged to their respective spray fields. To ensure that the recycled water (and the nutrients it contains) does not pose a risk to the receiving environment, the Applicant will adhere to the irrigation regimes outlined in Table 4-4. These have been developed to be in accordance with the *Water Quality Protection Note 22: Irrigation with nutrient -rich wastewater* (DOW 2008). Access to areas under reticulation will be restricted through the installation of fences. However, the water used will be treated so that it has a 'low exposure risk level' for human health and environmental values (Table 4-4) (DOH, 2011).

Table 4-4: Sprayfield Sizes

Parameters	Main Camp		Exploration Camp	
Number of People	250		270	
Hydraulic Load (kL/Day/Person)	0.24		0.25	
Total Daily Flow (m^3/day)	60		70	
Nitrogen/Phosphorus	**Nitrogen**	**Phosphorus**	**Nitrogen**	**Phosphorus**
Total N/P in Effluent (mg/L)	30	8	30	8
Total N/P per Year (kg/L)	657	175.2	739.1	197.1
Total N/P allowed per ha (kg/ha/year)	480	120	480	120
Area Required (ha)	1.37	1.46	1.54	1.64
Area Required (m^2)	13,700	14,600	15,400	16,400
Required Size of Spryfield (m^2)	14,600		16,400	

4.2.4.4 Outputs

The WWTPs are anticipated to process a maximum combined total 130 kL of untreated wastewater per day. In addition to the treated effluent being discharged to land via the spray fields, the WWTPs have the potential to produce the emissions and wastes listed below. These are discussed further in Section 9.

Emissions:

- Odour – WWTP tanks, septic tanks and spray fields; and
- Noise – WWTP pumps and machinery operations.

Waste:

- Excess sludge and screening material – from WWTP storage tanks.

4.2.5 Compliance Reporting

4.2.5.1 Environmental Compliance Reporting

Wastewater Treatment Plant 1 (Exploration Camp) reached practical completion on 29 March 2025.

The Environmental Compliance Report required by Condition 6 of W6780/2023/1 was submitted via email 3 April 2025.

Wastewater Treatment Plant 2 (Main Camp) reached practical completion on 8 April 2025.

The Environmental Compliance Report required by Condition 6 of W6780/2023/1 was submitted via email 16 April 2025.

4.2.5.2 Environmental Commissioning Reporting

The Environmental Commissioning Report for the Exploration Camp required by Condition 11 of W6780/2023/1 was submitted via email 12 May 2025.

The Environmental Commissioning Report for the Main Camp required by Condition 11 of W6780/2023/1 was submitted via email 24 June 2025.

4.2.6 Compliance Monitoring

Commissioning phase effluent monitoring results shown below.

Table 4-5: WWTP effluent monitoring during commissioning

Parameters	Specified Limit	Exploration Camp	Main Camp
Total Suspended Solids (TSS)	<30 mg/L	41	10
Total Dissolved Solids (TDS)	1500 mg/L	644	974
Biological Oxygen Demand (BOD)	<20 mg/L	12	22
E. coli	<1000 cfu/100ml	46	62
Residual free chlorine	<2 mg/L	-	0.01
Total Nitrogen (TN)	<30 mg/L	8.7	21.2
Total Phosphorous (TP)	<8 mg/L	4.87	3.11
pH	6.8 to 8.5	7.99	8.23

Time Limited Operation phase effluent monitoring results shown below

Table 4-6: WWTP effluent monitoring during time limited operations

Parameters	Specified Limit	Exploration Camp	Main Camp
Total Suspended Solids (TSS)	<30 mg/L	<5	<5
Total Dissolved Solids (TDS)	1500 mg/L	1280	954
Biological Oxygen Demand (BOD)	<20 mg/L	3	4
E. coli	<1000 cfu/100ml	<1	<1
Residual free chlorine	<2 mg/L	0.04	0.23

Parameters	Specified Limit	Exploration Camp	Main Camp
Total Nitrogen (TN)	<30 mg/L	2.2	14.9
Total Phosphorous (TP)	<8 mg/L	0.12	0.21
pH	6.8 to 8.5	7.96	7.99

4.3 Category 73 – Bulk Storage of Chemicals

4.3.1 General Information

A total of 2,820 m^3 of chemical aggregate will be stored within the Prescribed Premises. The aggregate will consist of hydrocarbons in the form of liquid petroleum, explosives and other chemicals, such as ammonium nitrate (AN), AdBlue and chlorine.

The hydrocarbons will be stored in fuel farms located at the exploration camp, accommodation camp, MSA, OHP, ANSF and power station. The explosives will be stored within a magazine, the AN in the ANSF, and all other chemicals will be stored in suitable storage facilities within the site's workshops (Figure 4-8). These buildings will be collectively referred to as Chemical Storage Facilities (CSF), throughout the rest of the document.

4.3.2 Construction

4.3.2.1 Fuel Farms

The construction of the various fuel farms within the Prescribed Premises will consist of a number of safety fill self-bunded fuel tanks, transfer pipes and hand pump units. The construction will commence with the installation of a compacted earth foundation and the installation of stormwater diversion structures.

Currently the number of tanks planned at each location is as follows:

- Seven tanks (260 kL) at the MSA, which will increase to eight as the mine expands (total combined holding capacity of 1,110 kL;
- One tank (60 kL) at the exploration camp, this is already operational (total holding capacity of 60 kL);
- Two tanks (60 kL) at the main accommodation camp;
- One tank (50kL) at the ANSF;
- One tank (110 kL) at the OHP; and
- 740kL of Liquefied Natural Gas storage at the power station.

The primary fuel farm will consist of seven fuel tanks in line and an associated pipeline network and will be fitted with appropriate emergency devices, including an emergency shut off valves. The indicative design of the fuel farms is presented in Figure 4-8.

4.3.3 Commissioning

Once the CSFs have been constructed, they will undergo a commissioning period with an indicative length of approximately one week. The commissioning will be undertaken by qualified individuals and will consist of a design characteristics inspection, pressure testing, leakproof testing and inspections of tank markings, in accordance with the requirements outlined in Section 6.7.3 of the *Australian Code for the Transport of dangerous Goods by Road and Rail 2020*.

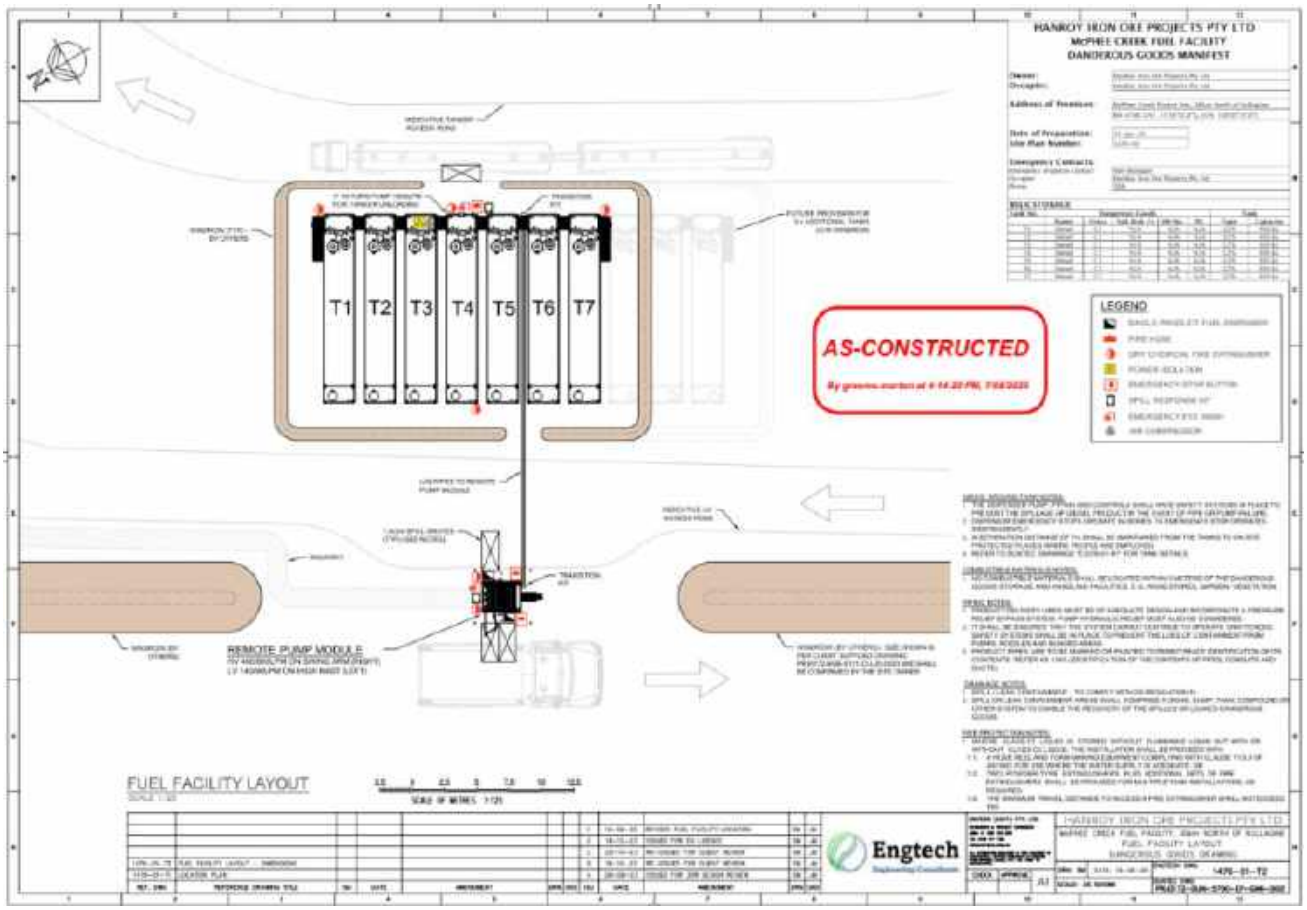

Figure 4-8: Layout of the Fuel Farm Facility

4.3.4 Operations

4.3.4.1 Inputs

Once operational, the fuel farm units will store 700,000L of Diesel.

4.3.4.2 Fuel Farm Process

Liquid fuel will be transported to site in a road train by an appropriately qualified subcontractor licenced to transport explosive dangerous goods. The fuel will be pumped from the road train into the tanks present at each fuel farm. Emergency equipment including spill kits and fire extinguishers will be made available at all fuel farms.

4.3.4.3 Output

The fuel farm units have the potential to produce the following emissions and wastes which are also discussed further in Section 9.

Emissions:

- Hydrocarbon and chemical spills.

Waste:

- Hydrocarbons, including lubricants and oils – from plant maintenance,
- Contaminated soil – from hydrocarbon or chemical spills.

4.3.5 Compliance Reporting

Construction of the fuel farm was completed 30 July 2025.

The Environmental Compliance Report required by Condition 6 of W6780/2023/1 was submitted via email 8 Aug 2025.

The Environmental Compliance Report confirmed the Facilities have been constructed in accordance with the issued Works Approval.

4.3.6 Commissioning

Commissioning of the WWTPs commenced following the submission of the Environmental Compliance Report.

The Environmental Commissioning Report required by Condition 11 of W6780/2023/1 was submitted via email 12 Nov 2025.

4.4 Category 89 – Putrescible Landfill Site

4.4.1 General Information

The two landfills which will be constructed within the Prescribed Premises are as follows:

- One main Class II (putrescible) landfill will be constructed for all domestic waste and some industrial waste from the mine; and
- One Class II landfill will be constructed for the disposal of used tyres.

The main landfill will be located to the east of the MSA and will progressively be expanded over the life of the mine, with the total landfill area being approximately 5.1 ha.

The used tyre landfill will be located within the Western WRD landfill site (Figure 4-9) and consist of a number of cells to contain batches of up to 1000 used tyres at a time. The combined total waste to be buried per annum across the two landfill sites within the Prescribed Premises is approximately 2,030 tonnes.

4.4.2 Construction

The main landfill will be constructed within an area totally enclosed by fencing. The fencing will be designed to limit the discharge of any airborne litter into the surrounding environment and prevent feral animals and livestock from accessing the site. The fencing surrounding the main landfill will have a number of gates to allow personal and vehicles to access the facility.

No fencing is proposed around the WWRD landfill site as it will be contained within the western waste rock dump. Both landfills will be constructed in stages, with each cell being constructed whilst the previous cell is still being filled.

The cells walls will be at least 100 mm thick and the floor will be constructed out of compacted soil, to reduce the likelihood of hazardous substances leaching into the surrounding soil. The material which is excavated from each cell will be stockpiled within the fenced area. All aspects of the two landfill sites will be constructed in accordance with the requirements under the *Environmental Protection (Rural Landfill) Regulations 2002*.

The indicative location of the landfill sites is presented in Figure 4-9.

4.4.3 Testing/Commissioning

Due to the nature of this activity no environmental commissioning is required and operations will commence once the Works Approval Application has been approved under the monitoring requirements for the Time Limited Operations.

4.4.4 Monitoring wells

Installation of one monitoring bore was required by condition 4 of WA6780/2023/1.

The well was installed 6 June 2025.

The Bore Construction Report was submitted to DWER via email 25 July 2025. Locations of the monitoring wells at the Landfill are shown in Figure 4.10.

Figure 4-9: Layout of the Landfill

Figure 4-10: Well Network Landfill

4.4.5 Operations

4.4.5.1 Inputs

Once operational, the landfills will have the following combined total inputs:

- 1,030 tonnes per year of putrescible waste
- 1,000 tonnes per year of industrial inert waste.

4.4.5.2 Process

The landfill will be managed in accordance with the Atlas Landfill Management Procedure and generally includes:

- Covering of waste with an inert and incombustible material sufficient to ensure waste is completely covered as soon as practicable after discharge,
- Levelling and compacting of waste as soon as practicable after discharge,
- Tyres shall be disposed in batches no greater than 40 m^3. Each batch for disposal will either be:
    - Reduced to pieces; or
    - Comprise not more than 1,000 whole tyres.
- Placement and compaction of waste to ensure all faces are stable and capable of retaining rehabilitation material,
- Rehabilitation of the landfill cell within 6 months after disposal to that cell has been completed.

At the end of an operational week (as required under the *Environmental Protection (Rural Landfill) Regulations 2002*), the waste within the landfill sites will be covered with a layer of cover material, approximately 0.30 m thick for the landfill site and 0.5 m thick for the WWRD landfill site. Within Western Australia there are no legislation or guidelines which stipulates the thickness or characteristics of the covering material. However, the Applicant will apply the best industry standards for landfill covering material.

4.4.5.3 Outputs

The landfills have the potential to produce the following emissions and wastes, also discussed further in Section 9.

Emissions:

- Odour – landfill material
- Leachate – landfill material

Waste:

- Litter

4.4.6 Compliance Reporting

Construction of the Landfill was completed 30 July 2025.

The Environmental Compliance Report required by Condition 6 of W6780/2023/1 was submitted via email 4 Aug 2025.

The Environmental Compliance Report confirmed the Facilities have been constructed in accordance with the issued Works Approval.

5 Index of Biodiversity Surveys for Assessment

The Applicant understands that DWER requires the submission of all relevant biological data prior to the issuing of approvals under the EP Act. The IBSA data has been submitted to DWER EPA Services as part of the *Environmental Protection Act 1986* Part IV Environmental Review Document and Response to Submissions Report.

6 Other DWER Approvals

The other environmental approvals required for the Project which are regulated by DWER are presented in Table 6-1and extracts are provided in Attachment 5.

Table 6-1: Other DWER Approvals

Legislation	Status	Summary
Environmental Protection Act 1986		
Part IV, Section 38 MS1224	Approved	The Proposal was referred to the Environmental Protection Authority (EPA) for assessment on 18 February 2021 (Assessment Number 2285). The Proposal was approved on the 14 June 2024 via Ministerial Statement 1224.
s.41A(3) of EP Act 1986	Approved	Minor or preliminary works were approved under s41A (3) of the EP Act on 12 July 2022. These works specifically related to the construction and maintenance of four communication towers, connecting fibre-optic wire cables, a small Class II landfill (below the Prescribed Activity threshold) and water bores with their associated pipelines. These preliminary works were completed and required the clearing of approximately 9 ha of native vegetation.
Part V of EP Act Works approval or Licence	Approved	On the 7 January 2020 the Applicant was granted a licence R2500/2019 to operate a sewage facility (Category 85) under Part V of the EP Act, with a maximum through put of 32 m^3 of effluent per day for the operation of the exploration camp.
Rights in Water and Irrigation Act 1914		
Section 5C	Approved	The Applicant holds ground water abstraction license number 175352

7 Other Approvals and Stakeholder Consultation

7.1 Other Approvals

Due to the nature this Project, it has the potential to impact environmental values of national significance. The Applicant submitted an application for approval under the *Environment Protection and Biodiversity Conservation Act 1999* and other applications under several other pieces of legislation. These are summarised in Table 7-1 and extracts are provided in Attachment 5.

Table 7-1:Other Approvals for the McPhee Creek Project

Legislation	Status	Summary
Environmental Protection and Biodiversity Conservation Act 1999		
Section 68	Approved	Due to the presence of federally listed species and communities (Section 18 and 18a) the Applicant has referred the Project pursuant to the EPBC Act (EPBC 2021/8897). On 15 September 2024 the Proposal was approved.
Mining Act 1978		
Section 74	Approved	The Applicant has an approved Mining Proposal REG ID 500644
Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulation 2007		
Part V Section 29	pending	The Applicant will apply for the relevant licence when required.
Dangerous Goods Safety (Explosives) Regulation 2007		
Part IX, Section 76	pending	The Applicant will apply for the relevant licence when required.
Dangerous Goods Safety (Security Sensitive Ammonium Nitrate) Regulation 2007		
Part X, Section 30	pending	The Applicant will apply for the relevant licence when required.

7.2 Stakeholder Consultation

As the Project has developed, the Applicant has undertaken on-going consultation with all relevant stakeholders, a list of which is provided in Table 7-2, and a detailed stakeholder register is provided in Attachment 5. The principal objectives of the stakeholder consultation program have been to:

- Identify interested and potentially affected individuals and groups, to understand the nature of the stakeholders' interest in the project.
- Ensure that stakeholders are properly informed about the project and that there are adequate and timely opportunities for stakeholders to provide input and raise issues.
- Ensure that any stakeholder issues or concerns are managed with respect, are given due consideration and are responded to in a timely manner.
- Meet the relevant regulatory requirements with regard to appropriate stakeholder input to the impact assessment and approval process.

The Applicant is committed to continuing consultation with stakeholders through the approval, construction and operational phases of the Project to ensure stakeholders are regularly informed or Project developments and address concerns raised efficiently.

Table 7-2: Project Stakeholders

Stakeholders	
Government Agencies and Departments	Department of Water and Environmental Regulation (DWER)
	Department of Mines, Petroleum and Exploration (DMPE)
	Department of Planning, Lands and Heritage (DPLH)
Traditional Owners	Nyamal and Palyku Aboriginal Corporation
Landowners	Bonney Downs Pastoral lessees

8 Applicant History

The Applicant holds or has held several instruments under Part V (Division 2) of the EP Act for other projects, as summarised in Table 8-1.

Table 8-1:The Applicant's Prescribed Premises Instruments

Project	Instrument	Status
Abydos DSO Project	L8733/2013/1	Active
	W5253/2012/1	Inactive
	W5743/2014/1	Inactive
Sanjiv Ridge (previously Corunna Downs) DSO Project	W6043/2017/1	Active
Mt Dove DSO Project	L8678/2012/1	Active
	W5181/2012/1	Inactive
Mt Webber DSO Project	L8788/2013/1	Active
	W5312/2012/1	Inactive
	W5373/2013/1	Inactive
	W5667/2014/1	Inactive
Pardoo DSO Project	L8276/2008/2	Inactive
	W4434/2008/1	Inactive
	W5191/2012/1	Inactive

9 Emissions, Discharges and Waste

This section describes the potential emissions, discharges and waste products which may be generated as a result of the operation of the activities outlined in Section 4.1 to 4.4. The mitigation and management actions that will be implemented to reduce any potential environmental impacts associated with these emissions, discharges and wastes are also outlined in this section and a detailed risk assessment to key sensitive receptors is provided in Section 11.

9.1 Emissions and Discharges

A summary of the potential emissions and discharges to be produced within the Prescribed Premises, as well as the Applicant's proposed controls are presented in Table 9-1.

Table 9-1: Emissions and Discharges within the Prescribe Premises and Proposed Controls

Type	Emission	Source	Predicted Amount Reaching Closest Sensitive Receptor	Controls
Construction Phase				
Discharges to land	Sediment laden water	Construction of mine facilities	Various	• Temporary drains, bunds and sediment traps will be used during construction to capture sediment laden runoff when required. • Potentially contaminated stormwater will not be discharged into the environment. • Sediment laden water storage infrastructure will be regularly cleaned when the basin capacity ha inadequate capacity. • The sediment control infrastructure will be inspected after storm events, and any built up material will be removed as required.
Discharges to air	Dust	Construction of mine facilities	1.06 (g/m²/month)	• Suitable separation distances will be maintained between high dust generating activities (i.e., crushing and screening) and sensitive receptors, in accordance with *Guidance for the Assessment of environmental factors: Separation Distances between Industrial and Sensitive Land Uses* (EPA, 2005). • Equipment and infrastructure will undergo regular maintenance and housekeeping practices to prevent excessive dust build up. • Water carts will be used for the suppression of dust along roads and cleared areas as required. • Unused exposed areas will be stabilised and/or rehabilitated to minimise dust generation where necessary. • Covered transfer points will be installed for the OHP and mobile crushing and screening plants where necessary.
	Noise	Mobile crushing	• 40 dB L_{A10} at accommodation camp • 52dB L_{A10} at exploration camp	• The mobile crushing and screening will operate for a period of between one and six weeks in various locations during the construction phase of the project to make road-base material. The crushing will occur within five locations as detailed in the Noise Assessment in Appendix 1. The internal noise criterion for accommodation units is L_{Aeq} 40 dB. However, given the temporary nature of the mobile crushing and that it will be undertaken during daylight hours, the noise emissions are considered to comply with *Environmental Protection (Noise) Regulations 1997*. • Equipment and machinery will be regularly maintained in accordance with manufactures specifications to ensure optimum efficiency and minimisation of noise emissions. • Noise generating infrastructure, such as exhausts and fans will be preferentially directed away from noise sensitive receptors as much as reasonably practicable.

Type	Emission	Source	Predicted Amount Reaching Closest Sensitive Receptor	Controls
Commissioning and Operation Phase				
Discharges to land	Sediment laden Water	• Crushing and screening plant • Workshops • Vehicle washdown points	Various	• Compacted earth bunds will be constructed around infrastructure to direct sediment laden storm water to the nearest sedimentation trap depending on risk of water containing contaminants as required. • Suitable amount of freeboard will be maintained at all sedimentation basins and turkey nests. • Sedimentation basins will undergo periodic excavations to remove excess material and will be deposited at the main Class II landfill site. • Flocculation material will be added if necessary to help the sediment to come out of suspension. • The TSS will be measured prior to the water in the sedimentation basins being discharged into the surrounding environment.
	Hydrocarbons and chemical spills	• Crushing and screening plant • Power plant • Fuel farm • Workshops • Vehicle washdown points	Various	• The applicant will implement the '*Atlas Hydrocarbon Management Procedure and Hydrocarbon (And Chemical) Spill Management Procedures*' at all times. • Transport of Dangerous Goods will be undertaken in accordance with the *Dangerous Goods Safety (Road and Rail Transport of Non-Explosive) Regulation 2007* and the *Australian Dangerous Goods Code*. • Where contaminated water associated with the fuel farm, power station, workshops and vehicle washdown points is retrieved, it will be treated by oily water separators as required.
	Treated effluent	WWTP	Approximately 140 KL/Day	• Components of the WWTPs will be fitted with alarms or other suitable alert device to warn of high-water levels in tanks or if a component has failed. • Spill kits will be made available, and staff trained in their use. • WWTPs will be constructed on top of a compacted earth base and surrounded by compacted earth diversion bunds, which will feed into sedimentation traps. • The sewage facilities will be regularly inspected, and equipment maintained to ensure that the effluent is treated to meet the values to be of a low exposure risk ('*Guidelines for Non-potable uses of recycled Water in Western Australia* (DoH, 2011). • Suitable separation distances will be maintained between the sewage facilities and sensitive receptors. • The treated effluent will be applied over sufficiently sized sprayfields to reduce the likelihood of runoff and nutrient contamination.
	Litter	Landfill	Various	• All waste material will be covered during transportation. • The unloading of waste will be confined to designated drop-off areas. • A perimeter fence will be installed around the main landfill to minimise any litter escaping. The fence will be regularly inspected for holes. • Should any litter escape the perimeter, it will be collected and disposed of accordingly.

Type	Emission	Source	Predicted Amount Reaching Closest Sensitive Receptor	Controls
	Brine discharge	Desalination plant	Approximately 30 KL/day	• Brine will be pumped to the WWTPs and will be diluted with treated effluent in the final chamber of the WWTPs. The mixture will then be pumped to the WWTP's associated discharge. The brine from the OHP and ANSF RO plants will be piped to the holding tank for septic treated wastewater where it will be combined to minimise salinity of the discharge to the leach drains. • The EC of the water will be regularly monitored and if necessary, will be stored in the WWTPs mixing tank until sufficiently diluted. • Suitable separation distances will be maintained between the sprayfields and sensitive receptors.
Discharges to air	Dust	Crushing and screening plant	1.06 (g/m²/month)	• Suitable separation distances will be maintained between high dust generating activities (i.e., crushing and screening) and sensitive receptors, in accordance with *Guidance for the Assessment of environmental factors: Separation Distances between Industrial and Sensitive Land Uses* (EPA, 2005). • Equipment and infrastructure will undergo regular maintenance and housekeeping practices to prevent excessive dust build up. • Water carts will be used for the suppression of dust along roads and cleared areas as necessary. • Unused exposed areas will be stabilised and/or rehabilitated to minimise dust generation. • Covered transfer points will be installed for the OHP and mobile crushing and screening plants.
	Noise	Power Plant Crushing and screening plant Fuel farm WWTP Desalination plant	• 23 dB L_{A10} at accommodation camp • 25 dB L_{A10} at exploration camp	• Equipment and machinery will be regularly maintained in accordance with manufactures specifications to ensure optimum efficiency and minimisation of noise emissions. • Noise generating infrastructure, such as exhausts and fans will be preferentially directed away from noise sensitive receptors. • A Noise Assessment (Appendix 1) indicates noise emissions will comply with the *Environmental Protection (Noise) Regulations 1997*.
	Gaseous emissions	Power plant	Various	• The gaseous emissions will be monitored and reported in accordance with National Pollutant Inventory and National Greenhouse and Energy Reporting Scheme.
	Odour	WWTP and sprayfields Fuel farm Landfill site	Various	• All odour producing facilities will be located at appropriate distances from sensitive receptors (i.e., accommodation camps) in accordance with DWER's *Guidelines: Odour Emissions* (DWER 2019). • The WWTPs and fuel farms will be regularly inspected and maintained to ensure negative pressure is maintained.

9.2 Waste Products

The potential waste products produced within the Prescribed Premises as well as the Applicant's proposed controls are presented in Table 9-2.

Table 9-2:Waste Products Generated within the Prescribe Premises and Proposed Control

Type	Source	Storage Location	Quantity	Controls/Storage	Monitoring
Construction					
Solid and liquid construction waste	Construction of all mine facilities	• Workshops	Various	All waste generated during construction will be stored in appropriate storage facilities for the specific waste. It will be removed to either the main Class II landfill site within the Prescribed Premises or to an appropriate offsite location by a qualified contractor.	NA
Commissioning and Operations					
Waste oils and lubricants	• OHP • Dewatering pump • Power plant • Crushing and screening plant • Fuel farm • Desalination plants • Dewatering Infrastructure • WWTP • Workshops • Vehicle washdown points	• Workshops • Bioremediation site	Various	• Any waste oil and lubricants generated during the maintenance of the onsite facilities will be collected and stored in an appropriate storage facility within the nearest workshop. It will then either be taken to the onsite bioremediation farm or to a suitable offsite location for recycling or disposal. • Installed oily water separators will be regularly inspected and, in the event of a build-up of captured oily material, it will be removed, stored and disposed of as above. • The collection, transportation and disposal will be undertaken in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*.	• Incident reporting, • Regular visual inspections, and • Reporting on collection and disposal of waste oil and lubricants.
Contaminated soil	• OHP • Dewatering pump • Power plant • Crushing and screening plant • Fuel farm • Desalination plant • Dewatering Infrastructure • WWTP • Workshops • Vehicle washdown points	Workshops	Various	• Any soils which become contaminated in the event of an unplanned hydrocarbon or chemical release will be immediately removed and stored in an appropriate storage unit within the nearest CSF. It will then either be taken to the onsite bioremediation farm or to a suitable offsite location for disposal. • If the spill is substantial, an investigation will be conducted to determine if soil sampling is required to confirm that all contaminated material has been removed. • The collection, transportation and disposal will be undertaken in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*.	• Incident Reporting, and • Reporting on collection and disposal of contaminated soil material.
Excess Sewerage Sludge and Screening Material	WWTP	WWTP	Various	Sludge produced by the WWTPs, and leach drains will be collected within their corresponding sludge storage tanks. This will be periodically removed by suitably qualified individuals to the main Class II landfill site. The collection, transport and disposal of the sludge will be undertaken in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*.	• Regular visual inspection of the sludge storage tanks and leach drain, and • Reporting on collection and disposal.
Waste Chemicals	Bulk Chemical Storage Facilities	• Workshops • ANSF • Magazine	Various	Any hazardous chemicals generated during the operation of the onsite facilities will be immediately collected and stored in an appropriate storage facility within the nearest workshops, ANSF or magazine. The material will then be transported offsite and to an appropriate facility for disposal.	• Incident reporting, and • Reporting on collection and disposal of waste chemicals.
Haul Truck and Road Train Tires	• Workshops • UTSF	• Workshops • UTSF	1000 Tyres/month	Used tyres will be transported from the onsite storage location (Workshop or UTSF) to the WWRD landfill site for appropriate disposal.	NA

10 Siting and Location

10.1.1 Topography

The Prescribed Premises is in the northeast Pilbara region of Western Australia. It comprises an elevated ridge that strikes northeast to southwest, largely defined by exposed local syncline and banded iron lithologies. To the east and south-east of the ridge structure, the topography is less elevated and undulating and drains predominately to the south-east.

The ground elevation varies between a maximum of 560 m Australian Height Datum (AHD) along the ridges within the Prescribed Premises and is approximately 60 m higher than the surrounding areas. The ground elevation is approximately 240 m AHD along the Nullagine River to the south-east of the Prescribed Premises. The topographic gradient over the plains to the south-east averages approximately 0.5 to 0.75%.

10.1.2 Climate

The Pilbara is characterised by very hot summers and warm winters, rainfall generally being low and variable, with inland areas classified as hot desert (Sudmeyer, 2016). At Marble Bar weather station (Bureau of Meteorology Station 004106), located 60 km north-west of the Prescribed Premises, the average monthly mean maximum temperatures ranges from 27.1°C in June to 42°C in December, with an annual average of 35.6°C. The monthly average minimum temperature ranges from 12.2°C in July to 26.5°C in January (Bureau of Meteorology, 2020). Mean annual rainfall for Marble Bar station is 392 mm. The highest rainfall occurs during the summer months between December and March (AECOM, 2013a and GHD, 2020). Rainfall data for Marble Bar Station shows the largest rainfall is typically recorded in January, with the average monthly total of 118 mm, while the lowest average monthly rainfall total is recorded in August (0.7 mm). The annual rainfall is highly variable ranging between 195 mm to 705 mm over 20-year period of record, with an average annual rainfall of 393 mm (Bureau of Meteorology, 2020).

Annual pan evaporation at Marble Bar averaged 3,312 m from 1968 to 1988, with typical daily rates of 11 to 13 mm (AECOM, 2013a) or an order of magnitude greater than the mean annual rainfall).

10.1.3 Geology

The Prescribed Premises is situated within Archean rocks of the Kelly Greenstone belt in the East Pilbara (Bagas, 2005). This terrain consists of the volcanic and sedimentary sequences of the Warrawoona, Gorge Creek (McPhee Creek – Main Range Deposit host) and De Grey Groups. Unassigned ultramafic rocks intrude the southern area of the Kelly Greenbelt. West of the Kelly Greenbelt is the Corunna Downs Granitoid Complex. The domal Project Greenstone belt is abutting to the east, which is intruded by gabbro and dolerite dykes. To the south of the Project Dome lie sediments of the Mosquito Creek Basin. A series of northeast faults occur between Gorge Creek Group and Warrawoona Groups in the Kelly Greenstone Belt and form terrace boundaries between Gorge Creek Group and Project Greenstone Belt on the western margin of the Project Dome (Bagas, 2005).

The Main Ridge and Main Ridge West pit areas are hosted by greenschist facies quartz-magnetite BIF of the Cleaverville Formation in the Kelly Greenstone Belt along the eastern margin of the Corunna Downs Granitic Complex. Bedding contacts within the belt tend mainly north-east-south-west and dip moderately to steeply to the north-west or south-east presenting in an isoclinal syncline.

The core of this syncline coincides with fold-thickened BIF that is underlain to the west and east by Farrel Quartzite, Charteris Basalt, felsic volcanic and volcaniclastic rocks of the Wyman Formation and the Euro Basalt.

10.1.4 Soil Type

The surface soils of all landform associations within the Prescribed Premises are predominately single grained with some week aggregation and were classified as sandy loams to medium clays. The soils located on the ridges, hills and slopes are generally shallow over competent rock. The majority of the soils are partially dispersive, which has the potential to become problematic as they can be hard setting and have low rates of infiltration following severe disturbance such as earthworks or heavy rainfall. The hydraulic conductivity of the soils higher in the landscape have a relatively lower susceptibility to surface runoff and erosion, while the hydraulic conductivity of the soils lower in the landscape are more likely to experience waterlogging, and increased surface runoff and erosion.

The pH of the surface soils ranges from 4.9 (very strongly acidic) to 8.8 (moderately alkaline), which is within the typical range for soils in the Pilbara. The soils higher in the landscape are typically more acidic that those lower in the landscape, which generally contain calcareous soils. The majority of the soils within the Prescribe Premises are classified as non-saline and non-sodic. The plant available nutrient concentrations for nitrate, phosphorous and potassium are low to moderate, which are typical of the soils within the region. The total concentrations of most heavy metals in the soils are generally low with some areas possessing high concentrations of nickel, however, not outside the range of natural occurrence.

10.1.5 Surface Hydrology

The hydrology of the Pilbara is one of extremes, ranging from severe droughts to major floods. As stream flow in the Pilbara region predominately occurs in direct response to rainfall only (from cyclones and thunderstorms), there is a similar seasonality and variability in runoff in the ephemeral creek lines (DoW 2010).

The proposed Prescribed Premises and the main McPhee Creek ridge is on the catchment divide between the Coongan River and Nullagine River catchments. The Coongan River catchment drains north to northeast and the Nullagine River to the southeast. Watercourses that intersect the Prescribed Premises are ephemeral and tend to flow sporadically during and immediately after summer storm events (SKM 2013). Three tributaries of the Nullagine River flow south east from the Prescribed Premises, referred to as McPhee Creek, Branch of McPhee Creek and Lionel Creek.

A number of rock pools with standing water have been recorded along the tributaries within the Prescribed Premises. Like any pools within the Pilbara region, they are considered to be seasonally fed by rainfall and surface runoff. Fifteen surface water pools have been recorded within the Prescribed Premises including five permanent, two semi-permanent and eight temporary/seasonal pools. An additional 28 surface water pools outside the Prescribe Premises have been identified including six permanent, five semi-permanent and seventeen temporary/seasonal. The potential impact the Project will have on these surface water pools is being assessed under Part IV of the EP Act.

10.1.6 Hydrogeology

The Prescribed Premises is located within the Pilbara Fractured Rock Aquifer (DoW, 2009) and is within the Proclaimed Pilbara Groundwater Area under the *Rights in Water and Irrigation Act 1914* (RiWi Act). It comprises multiple disconnected fractured rock aquifers with some areas of high permeability in unconsolidated sedimentary or chemically deposited aquifers. Fractured rock aquifers exist in many

different rock formations in the higher fractured or weathered zones, or zones of intensive bedding plane parting (Johnson and Wright, 2001). The most significant fractured rock aquifer tends to be the more brittle and more intensively fractured, units such as quartz veins, cherts, BIFS, dolomite and quartzite sandstones (Commander et al, 2015).

The aquifers within the Prescribed Premises comprise secondary porosity dominated by fractured units within the Paddy Market Formation. They are contained within the elongated Sandy Creek Syncline within BIFs, chert and quartzite. The basal Footwall Shale of the Paddy Market Formation and quartzites of the underlying Corboy Formation are generally less fractured and have lower permeabilities than the BIF and chert aquifers. The shale and quartzite bound the aquifer system and reduce the exchange or outflow from the structure to the surrounding fresh bedrock or country rock.

The Paddy Market formation in the Prescribed Premises act as an isolated, unconfined elongated basin aquifer approximately 7,500 m long by 700 m wide and up to 250 m deep (AECOM, 2013a). In the southwest area of the Prescribed Premises the aquifer forms separate and discrete sub-basins as a result of faulting and secondary folding.

The depth of the groundwater across the Prescribed Premises ranges between 5 m to 100 m bgl. The extent of the depth is due to the topography of the main ridge which extends up to 60 m above the surrounding plains. The depth of the watertable in the areas greater along the ridgelines (generally >50m) and shallower in the creeklines and plains. The groundwater is considered to be fresh and having a near neutral to slightly alkaline pH (AECOM 2013b).

10.1.7 Biodiversity

10.1.7.1 Flora and Vegetation

Sixteen vegetation types have been mapped within the Prescribed Premises (Ecoscape 2020a and Ecoscape 2020b). Approximately, 91.4% of the vegetation mapped within the Prescribed Premises was considered to be in Excellent condition. None of the vegetation types mapped were considered to represent any Western Australian or Federally listed Threatened Ecological Communities or Priority Ecological Communities. One vegetation type represents potentially groundwater dependent vegetation.

No Western Australian or Federally listed Threatened Flora species were recorded within the Prescribed Premises area, however, four Priority flora species were recorded within the Prescribed Premises:

- *Acacia aphanoclada* (Priority 1),
- *Rostellularia adscendens* var. *latifolia* (Priority 3),
- *Ptilotus mollis* (Priority 4), and
- *Eragrostis crateriformis* (Priority 3).

10.1.7.2 Terrestrial Fauna

Eight conservation significant fauna species have been recorded as occurring within the proposed Prescribed Premises boundary, with an additional two species being likely to occur due to the presence of suitable habitat and nearby historical records (Table 10-1).

Table 10-1: Conservation significant species within the Prescribed Premises.

Species	Conservation Status	Presence in Prescribed Premises
Northern Quoll (*Dasyurus hallucatus*)	Endangered – EPBC Act and BC Act	Recorded
Ghost Bat (*Macroderma gigas*)	Vulnerable – EPBC Act and BC Act	Recorded
Grey Falcon (*Falco hypoleucos*)	Vulnerable – EPBC Act and BC Act	Likely to Occur (Recorded in Local Area)
Greater Bilby (*Macrotis lagotis*)	Vulnerable – EPBC Act and BC Act	Previously recorded
Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*)	Vulnerable – EPBC Act and BC Act	Recorded
Pilbara Olive Python (*Liasis olivaceus barroni*)	Vulnerable – EPBC Act and BC Act	Recorded
Fork Tailed Swift (*Apus pacificus*)	Migratory – EPBC Act	Previously recorded
Gane's Blind Snake (*Anilios ganei*)	Priority 1	Likely to Occur (Highly Suitable Habitat)
Long-tailed Dunnart (*Sminthopsis longicaudata*)	Priority 4	Previously recorded
Western Pebble-mound Mouse (*Pseudomys chapmani*)	Priority 4	Previously recorded

A total of eight terrestrial fauna habitat types has been mapped within the Prescribed Premises during a fauna survey conducted by Biologic (2021a). The following five of the habitat types were considered to be of high value; Gorge/Gully, Breakaway/Cliff, Drainage Line, Hillcrest/Hillslope and Spinifex Sandplains. These habitat types are considered to be of high value as they support the denning/burrowing, roosting and or foraging of at least one of the conservation significant fauna species present in Table 10-1. A total of 20 caves are located within the Prescribed Premises.

10.2 Key Receptors

A list of the nearest sensitive land uses and receptors are presented in Table 10-2 and Figure 10-1 to Figure 10-4.

Table 10-2: Closest Sensitive Receptors and Land Uses to Prescribed Premises.

Type/Classification	Description	Distance & Direction to Premises Boundary	Reference Figures
Sensitive Land Uses			
Pastural leases and stations	The Bonney Downs Station is a cattle station located between Marble Bar and Newman.	Intersects with the southern portion of the Prescribed Premises.	Figure 10-1
Residential developments	No rural and residential developments occur within the Prescribed Premises. The closest rural/residential development is the township of Nullagine.	The township occurs approximately 30 km south of the Prescribed Premises.	Figure 10-1
Sensitive Receptors			
Environmentally Sensitive Areas (ESAs)	No ESAs occur within the Prescribe Premises. The two closest are: • De Grey River; and • Fortescue Marsh.	De Grey River is located approximately 90 km from the northern boundary of the Prescribed Premises, while Fortescue Marsh is approximately 115 km from the southwest boundary of the Prescribe Premises.	Figure 10-2
Threatened Ecological Communities (TEC)	No TECs occur within the Prescribed Premises. The closest TEC is Ethel Gorge *aquifer stygobiont community*. This TEC occurs on the Fortescue River in the vicinity of the township of Newman. This TEC comprises a diverse assemblage of stygofaunal species	The Ethel Gorge TEC is located approximately 205 km south of the Prescribed Premises boundary.	NA
Priority Ecological Communities	No PEC occurs within the Prescribed Premises	NA	NA
Public Drinking Water Source Areas (PDWSAs)	No PDWSAs occur within the Prescribe Premises. The closest are: • Marble Bar Water Reserve; and • Nullagine Water Reserve.	The former is located approximately 55 km from the north-western boundary of the Prescribed Premises and the latter is approximately 35 km from the southern boundary of the Prescribed Premises.	Figure 10-2
Threatened and/or Priority Fauna	• Northern Quoll (Endangered); • Ghost Bat (Vulnerable); • Grey Falcon (Vulnerable); • Greater Bilby (Vulnerable); • Pilbara Leaf-nosed Bat (Vulnerable); • Pilbara Olive Python (Vulnerable); • Fork Tailed Swift (Migratory); • Gane's Blind Snake (P1); • Long-tailed Dunnart (P4); and • Western Pebble-mound Mouse (P4).	All species have either been recorded within the Prescribed Premises or are likely to occur within the Prescribed Premises due to the presence of suitable habitat and/or proximal recordings (recent or historical).	Figure 10-3
Threatened and/or Priority Flora	• *Acacia aphanoclada* (Priority 1); • *Rostellularia adscendens var. latifolia* (Priority 3); • *Ptilotus mollis* (Priority 4); and • *Eragrostis crateriformis* (Priority 3).	All species have been recorded within the Prescribed Premises boundary.	Figure 10-4
Aboriginal and Other Heritage Sites	• Six 'Other Heritage Sites' which have been lodged with the DPLH occur within the Prescribed Premises. • A number of other areas are considered to be 'Potential Sites'. These include natural features, artefacts, engravings, quarrying and ceremonial sites.	All 'Other Heritage Sites' and 'Potential Sites' occur within the Prescribed Premises.	NA

Type/Classification	Description	Distance & Direction to Premises Boundary	Reference Figures

Rivers, lakes, oceans, and other bodies of surface water	• Five ephemeral creeks:
	  ○ McPhee Creek;
	  ○ Branch of McPhee Creek;
	  ○ Lionel Creek;
	  ○ Spinaway Creek; and
	  ○ Sandy Creek.
	• Fifteen surface water pools:
	  ○ Five permanent;
	  ○ Two semi-permanent; and
	• Eight temporary/seasonal.
		All these water bodies occur within the Prescribed Premises	NA

Acid Sulphate Soils (ASS)	No areas within the Prescribed Premises are likely to contain ASS. The closest at risk area is: • Midgengadge Creek; • Camel Creek; • Ernst River; and • Percival Lakes.	The closest of which is located 61 km from the western boundary of the Prescribed Premises.	NA

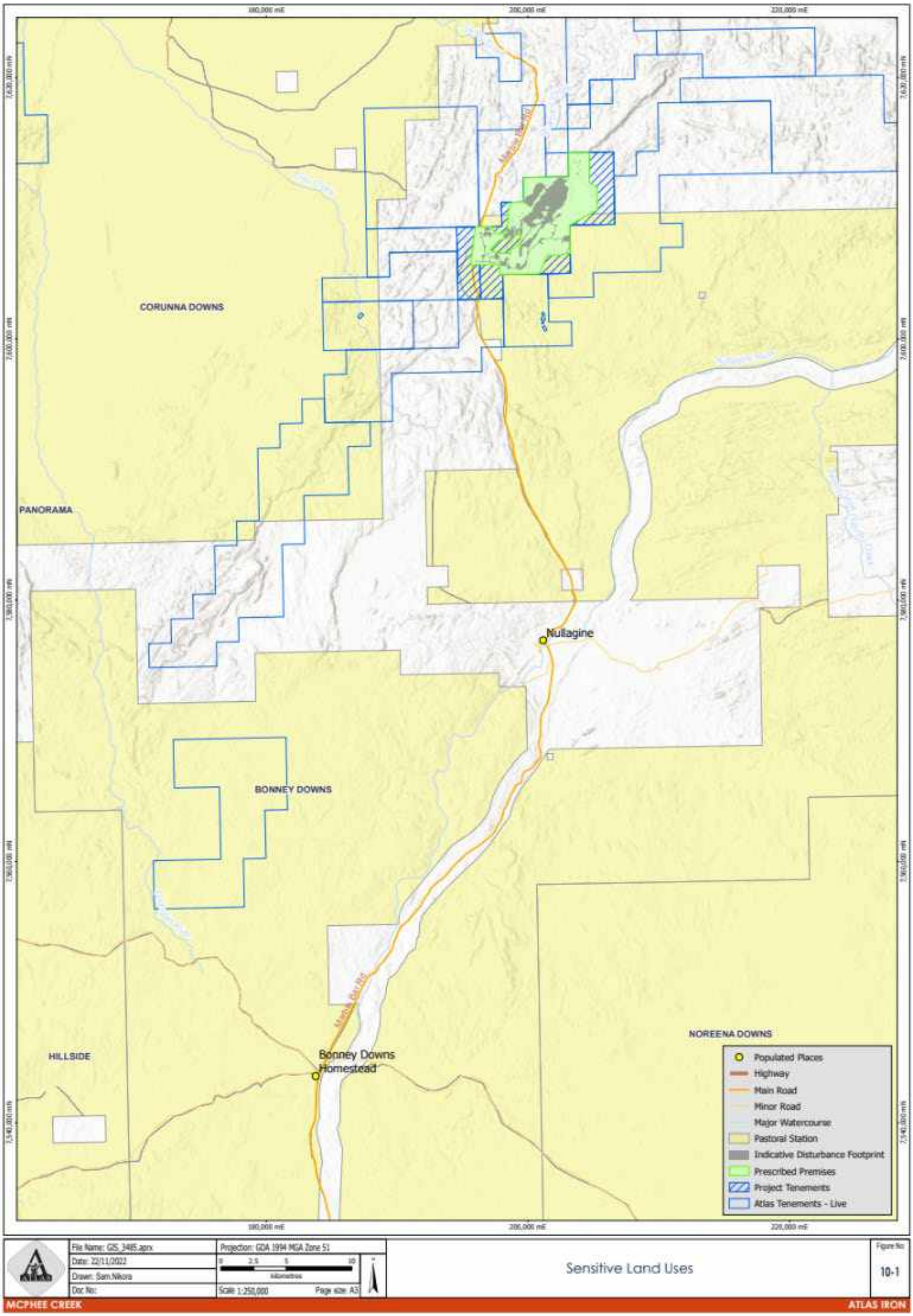

Figure 10-1: Sensitive Land Uses

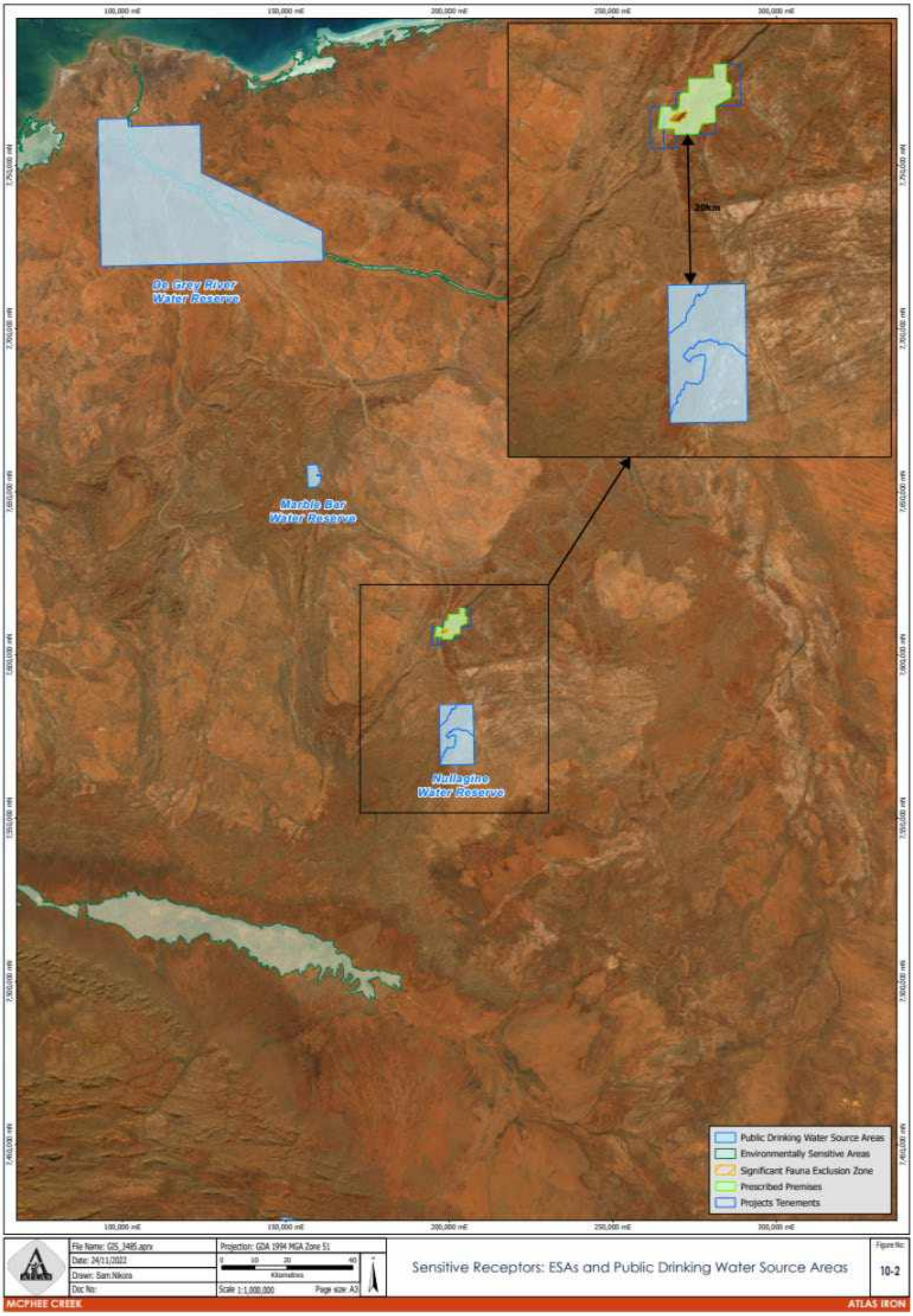

Figure 10-2: Sensitive Receptors – ESAs, TECs and Public Drinking Water Source Areas

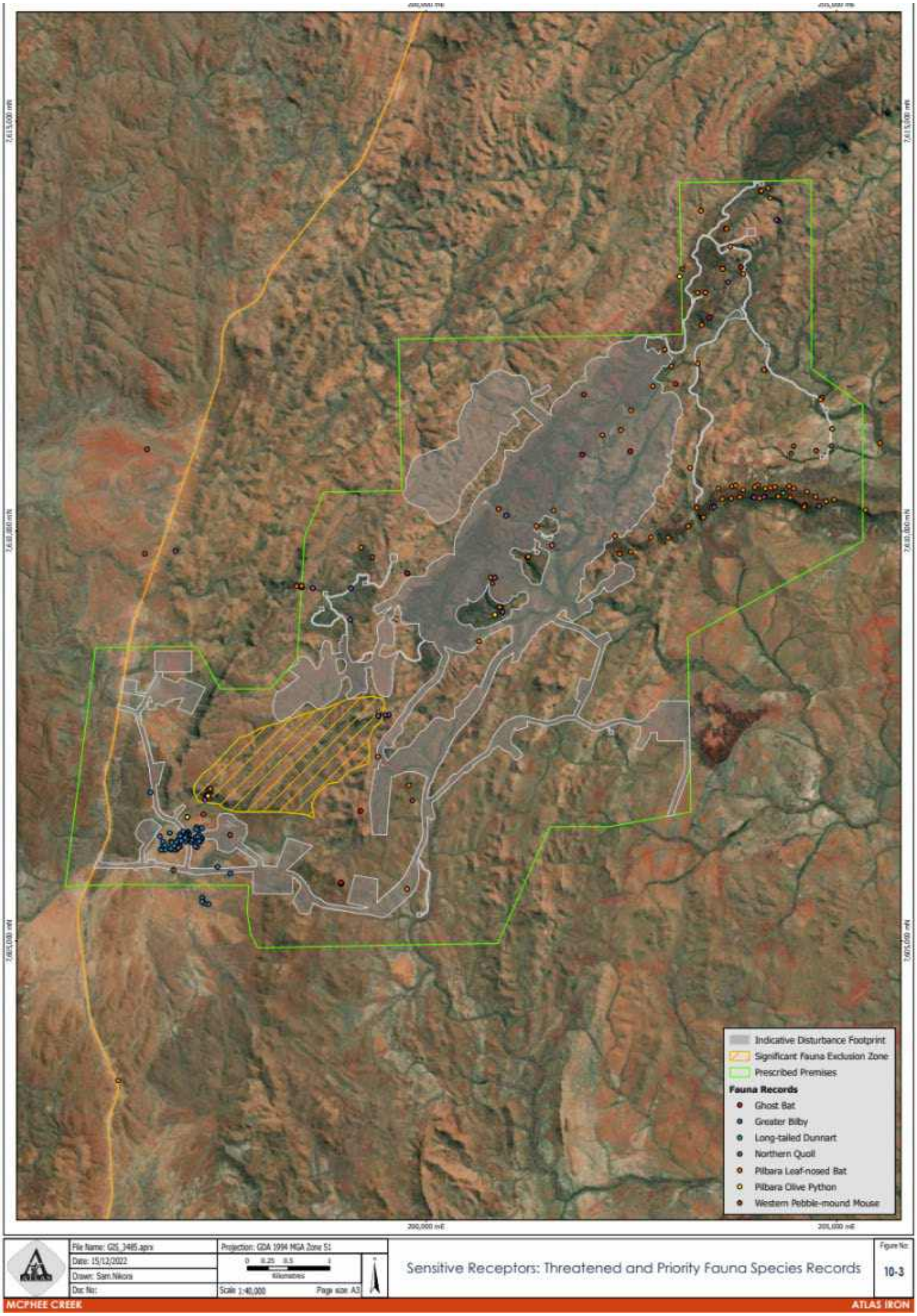

Figure 10-3: Sensitive Receptors: Threatened and Priority Fauna Species Records

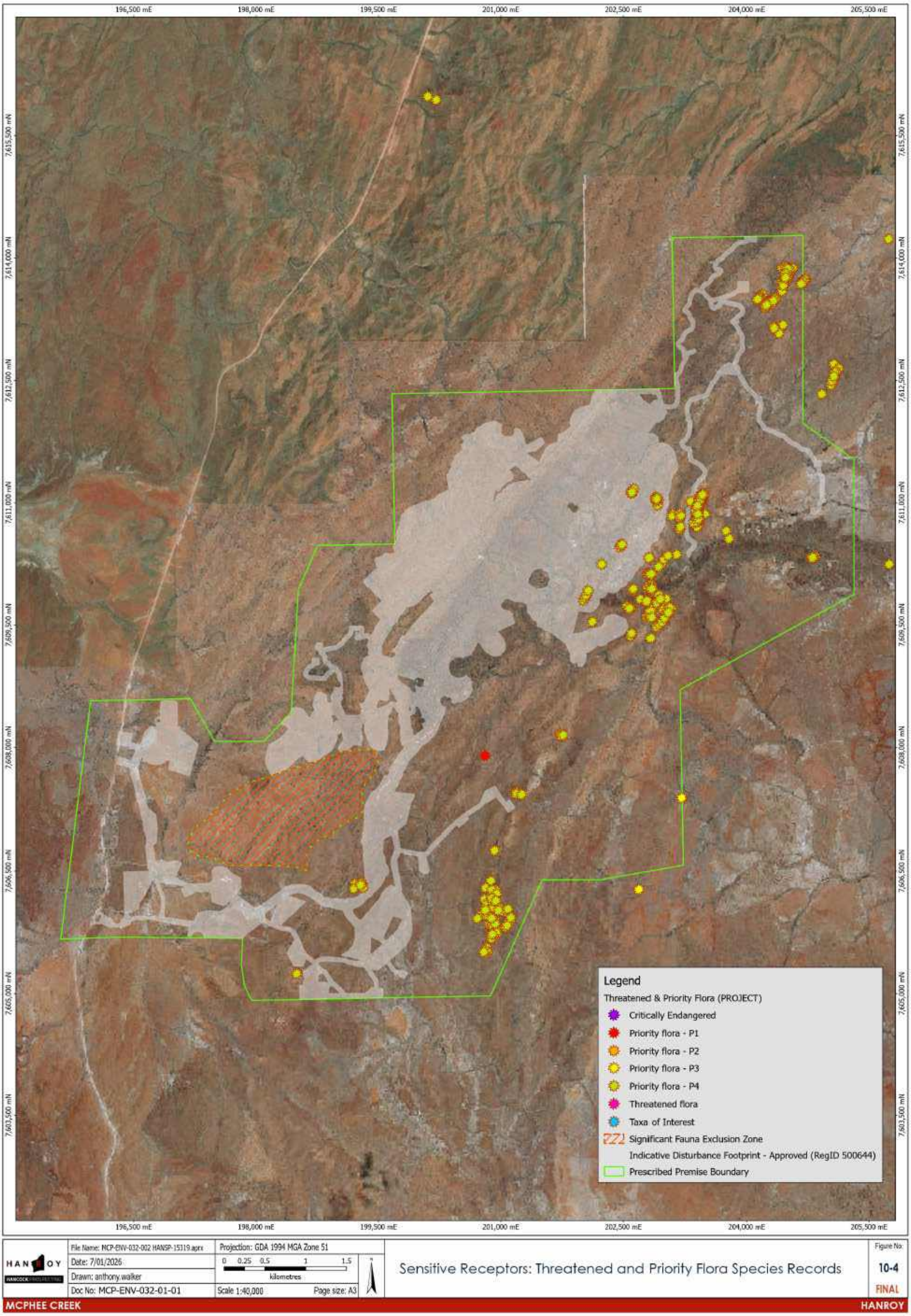

Figure 10-4: Sensitive Receptors: Threatened and Priority Flora Species Records

11 Risk Assessment

The Applicant has undertaken a risk assessment to determine the overall environmental risks of the Project as well as the risks it poses to the closest sensitive land uses and receptors to the Prescribed Premises (Table 11-2).

The residual risk assessment ratings are consistent with the risk assessment matrix in the 'Guideline for Risk Assessments under Part V, Division 3 of the EP Act' (DWER 2017) and are presented in Table 11-1. The risk assessment has been based on an accepted risk level being the "As Low as Reasonably Practicable" (ALARP) principles.

A summary of the environmental risk assessment, including the proposed environmental management measures to minimise the risks to an acceptable level, is presented in Table 11-1.

Table 11-1: Risk Matrix and Criteria

	Consequences				
Likelihood	**Slight**	**Minor**	**Moderate**	**Major**	**Severe**
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High
Likelihood					
The following criteria has been used to determine the likelihood of a risk/opportunity occurring					
Almost Certain	The risk event is expected to occur in most circumstances				
Likely	The risk event will probably occur in most circumstances				
Possible	The risk event could occur at some time				
Unlikely	The risk event will probably not occur in most circumstances				
Rare	The risk event may only occur in exceptional circumstances				
Consequences					
The following criteria has been used to determine the consequences of a risk occurring					
	Environment			**Public Health and Amenity**	
Severe	• On-site impacts: catastrophic • Off-site impacts local scale: high level or above • Off-site impacts wider scale: mid-level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded			• Loss of life • Adverse health effects: high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • Local scale impacts: permanent loss of amenity	
Major	• On-site impacts: high level • Off-site impacts local scale: mid-level • Off-site impacts wider scale: low level • Short term impact to an area of high conservation value or special significance^ • Specific consequence criteria (for environment) are exceeded			• Adverse health effects: mid-level or frequent medical treatment • Specific consequence criteria (for public health) are exceeded • Local scale impacts: high level impact to amenity	
Moderate	• On-site impacts: mid-level • Off-site impacts local scale: low level • Off-site impacts wider scale: minimal • Specific consequence criteria (for environment) are at risk of not being met			• Adverse health effects: low level or occasional medical treatment • Specific consequence criteria (for public health) are at risk of not being met • Local scale impacts: mid-level impact to amenity	
Minor	• On-site impacts: low level • Off-site impacts local scale: minimal • Off-site impacts wider scale: not detectable • Specific consequence criteria (for environment) likely to be met			• Specific consequence criteria (for public health) are likely to be met • Local scale impacts: low level impact to amenity	
Slight	• On-site impact: minimal • Specific consequence criteria (for environment) met			• Local scale: minimal to amenity • Specific consequence criteria (for public health) met	

Table 11-2: Risk Assessment

Emission Type	Source	Potential Receptors	Potential Pathway	Potential Adverse Impact	Initial Risk			Proposed Controls & Monitoring	Residual Risk		
					Likelihood	Consequence	Ranking		Likelihood	Consequence	Ranking
Construction											
Construction	Accidental discharge of sediment laden water	• Ephemeral creeks • Pools	Waterborne	Adverse impacts to aquatic ecology from sedimentation of local waterways	Possible	Moderate	Medium	• Temporary drains, bunds and sediment traps will be used during construction to capture sediment laden runoff as required. • Potentially contaminated stormwater will not be discharged into the environment. • Sediment laden water storage infrastructure will be regularly cleaned when the basin has inadequate storage. • The sediment control infrastructure will be inspected after storm events, and any built up material will be removed as necessary.	Unlikely	Slight	Low
Construction	Dust	• Aboriginal heritage sites • Terrestrial environment • Native vegetation • Accommodation and exploration camps	Airborne	• Impacts on human health and environmental amenity • Reduced viability	Unlikely	Minor	Medium	• Equipment and infrastructure will undergo regular maintenance and housekeeping practices to prevent excessive dust build up. • Water carts will be used for the suppression of dust along roads and cleared areas. • Unused exposed areas will be stabilised to minimise dust generation. • Covered transfer points will be installed for the OHP and mobile crushing and screening plants where suitable.	Rare	Slight	Low
Construction	Noise	• Aboriginal heritage sites • Accommodation and exploration camps	Airborne	Impacts on human health and environmental amenity	Unlikely	Moderate	Medium	• Equipment and machinery will be regularly maintained in accordance with manufactures specifications to ensure optimum efficiency and minimisation of noise emissions. • Separation distances will be maintained between construction areas and the nearest sensitive receptors. • Noise generating infrastructure, such as exhausts and fans will be preferentially directed away from noise sensitive receptors as much as reasonably practicable. • Noise emissions will comply with the *Environmental Protection (Noise) Regulations 1997*.	Rare	Slight	Low

Emission Type	Source	Potential Receptors	Potential Pathway	Potential Adverse Impact	Initial Risk			Proposed Controls & Monitoring	Residual Risk		
					Likelihood	Consequence	Ranking		Likelihood	Consequence	Ranking
Commissioning and Operations											
Fuel farm	Hydrocarbons and chemical spills	• Ephemeral creeks • Pools • Groundwater • Native vegetation	Soilborne	• Contamination of local surface water and ground water • Individual animal deaths	Possible	Major	High	• The applicant will implement the '*Atlas Hydrocarbon Management Procedure and Hydrocarbon (And Chemical) Spill Management Procedures*' at all times. • Transport of Dangerous Goods will be undertaken in accordance with the *Dangerous Goods Safety (Road and Rail Transport of Non-Explosive) Regulation 2007* and the *Australian Dangerous Goods Code*. • Where contaminated water associated with the fuel farm, power station, workshops and vehicle washdown points is retrieved, it will be treated by oily water separators as required.	Rare	Moderate	Medium
WWTPs	Treated effluent	• Ephemeral creeks • Pools • Groundwater • Native vegetation	Soilborne	• Contamination of surface water bodies. • Contamination of terrestrial environment • Eutrophication • Reduction in visual amenity • Anoxic water conditions	Almost Certain	Moderate	High	• Components of the WWTPs will be fitted with alarms or other alert devices to warn of high-water levels in tanks or if a component has failed. • Spill kits will be made available, and staff trained in their use. • WWTPs will be constructed on top of a compacted earth base and surrounded by compacted earth diversion bunds, which will feed into sedimentation traps. • The sewage facilities will be regularly inspected, and equipment maintained to ensure that the effluent is treated to meet the values to be of a low exposure risk ('*Guidelines for Non-potable uses of recycled Water in Western Australia* (DoH, 2011). • Suitable separation distances will be maintained between the sewage facilities and sensitive receptors. • The treated effluent will be applied over sufficiently sized sprayfields to reduce the likelihood of runoff and nutrient contamination.	Rare	Moderate	Medium
Landfill site	Leachate	• Groundwater • Native vegetation	Soilborne	• Contamination of local surface water and ground water • Individual animal deaths	Likely	Moderate	High	• Landfill sites will be located in areas with low soil permeability and away from sensitive receptors including groundwater and surface water systems. • The landfill site will be constructed with the sides of graded to facilitate the preferential flow of water way from the landfill cells. • As soon as practicable, once a cell has been filled with waste, it will be covered with suitable covering material. This will minimise the amount of rainwater which will enter into the cell.	Unlikely	Moderate	Medium

Emission Type	Source	Potential Receptors	Potential Pathway	Potential Adverse Impact	Initial Risk			Proposed Controls & Monitoring	Residual Risk		
					Likelihood	Consequence	Ranking		Likelihood	Consequence	Ranking
Landfill site	Litter	• Ephemeral creeks • Pools • Terrestrial environment • Accommodation camp	Airborne	• Contamination of local surface water • Individual animal deaths • Reduced environmental amenity	Likely	Slight	Medium	• All waste material will be covered during transportation. • The unloading of waste will be confined to designated drop-off areas. • A perimeter fence will be installed around the main landfill to minimise any litter escaping. The fence will be regularly inspected for holes. • Should any litter escape the perimeter, it will be collected and disposed of accordingly.	Rare	Slight	Low
Desalination plant	Brine discharge	• Ephemeral creeks • Pools • Groundwater • Native vegetation	Soilborne	• Contamination of local surface water and groundwater • Reduced environmental amenity	Likely	Major	High	• Brine will be pumped to the WWTPs and will be diluted with treated effluent in the final chamber of the WWTPs and then the mixture will be pumped to the WWTP's associated discharge. The brine from the OHP and ANSF RO plants will be piped to the holding tank for septic treated wastewater where it will be combined to minimise salinity of the discharge to the leach drains. • The EC of the water will be regularly monitored and if necessary, will be stored in the WWTPs mixing tank until sufficiently diluted. • Suitable separation distances will be maintained between the sprayfields and sensitive receptors.	Rare	Major	Medium
Crushing and screening plant	Dust	• Aboriginal heritage sites • Terrestrial environment • Native vegetation • Accommodation camp	Airborne	• Impacts on human health and environmental amenity. • Reduced viability	Unlikely	Minor	Medium	• Equipment and infrastructure will undergo regular maintenance and housekeeping practices to prevent dust build up. • Water carts will be used for the suppression of dust along roads and cleared areas as necessary. • Unused exposed areas will be stabilised to minimise dust generation as required. • Covered transfer points will be installed for the OHP and mobile crushing and screening plants where suitable.	Rare	Slight	Low

Emission Type	Source	Potential Receptors	Potential Pathway	Potential Adverse Impact	Initial Risk			Proposed Controls & Monitoring	Residual Risk		
					Likelihood	Consequence	Ranking		Likelihood	Consequence	Ranking
Crushing and screening plant, fuel farm, WWTPs, desalination plants	Noise	• Accommodation camp • Aboriginal heritage sites	Airborne	Impacts on human health and environmental amenity	Unlikely	Moderate	Medium	• Equipment and machinery will be regularly maintained in accordance with manufactures specifications to ensure optimum efficiency and minimisation of noise emissions. • Separation distances will be maintained between construction areas and the nearest sensitive receptors. • Noise generating infrastructure, such as exhausts and fans will be preferentially directed away from noise sensitive receptors. • Noise emissions will comply with the *Environmental Protection (Noise) Regulations 1997*.	Rare	Slight	Low
WWTP, sprayfields, fuel farm and landfill site	Odour	• Accommodation camps • Aboriginal heritage sites	Airborne	• Reduced environmental amenity • Impact human health	Likely	Slight	Medium	• All odour producing facilities will be located at appropriate distances from sensitive receptors (i.e., accommodation camps) in accordance with DWER's *Guidelines: Odour Emissions* (DWER 2019). • The WWTPs and fuel farms will be regularly inspected and maintained.	Unlikely	Slight	Low

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13 Submission of Other Relevant Information – Appendices to Support Information

Appendix 1: McPhee Creek Noise Assessment

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Environmental Noise Assessment

McPhee Creek Project

Reference: 21076503-01A

Prepared for:
Atlas

This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

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Appendices

1 INTRODUCTION

The McPhee Creek Project (the Project) is located approximately 30 kilometres (km) north of Nullagine townsite, 220 km south-east of Port Hedland, in the Pilbara region of Western Australia - refer *Figure 1-1*.

Figure 1-1 Project Locality

The Project involves developing a greenfield mine and processing operation. The deposit contains approximately 260 million tonnes (Mt) of banded iron formation (BIF) haematite/goethite which is expected to be mined in five pits.

The mine has been referred under the WA Environmental Protection Act 1986 (EP Act) and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), with Atlas as the Proponent.

The Proposal includes a proposed Development Envelope of approximately 4,465 ha, of which up to 1,913 ha is proposed to be cleared (*Figure 1-2*).

Mining will use conventional drill and blast, load, and haul methods, with a production rate of up to 14 Mtpa of ore.

Mining will be undertaken on a 24-hour basis, seven days a week. The expected footprint of the Proposal is referred to as the Conceptual Footprint, however the exact location of the footprint may change as mine planning progresses.

Once blasted, broken ore and waste rock will be loaded separately into haul trucks. Ore will be transported via the haul road network to the Run of Mine (ROM) pad. Crushing may be undertaken using a dry crushing and screening facility. Stockpiling of marginal ore material will also be undertaken to ensure maximum resource recovery. No tailings or wet waste product will be produced. Following

mining, the McPhee Creek iron ore will be stockpiled for transport via trucks off the McPhee Creek site.

Ore will be transported by truck to third parties for processing or may be on sold as direct shipping ore. Any processing at third party locations is outside of the scope of this Project.

Although only indicative, Murray and Avon pits will be mined concurrently, followed by Ord Pit and finally Nicholson Pit over the life of mine. This is what has been assumed in the assessment.

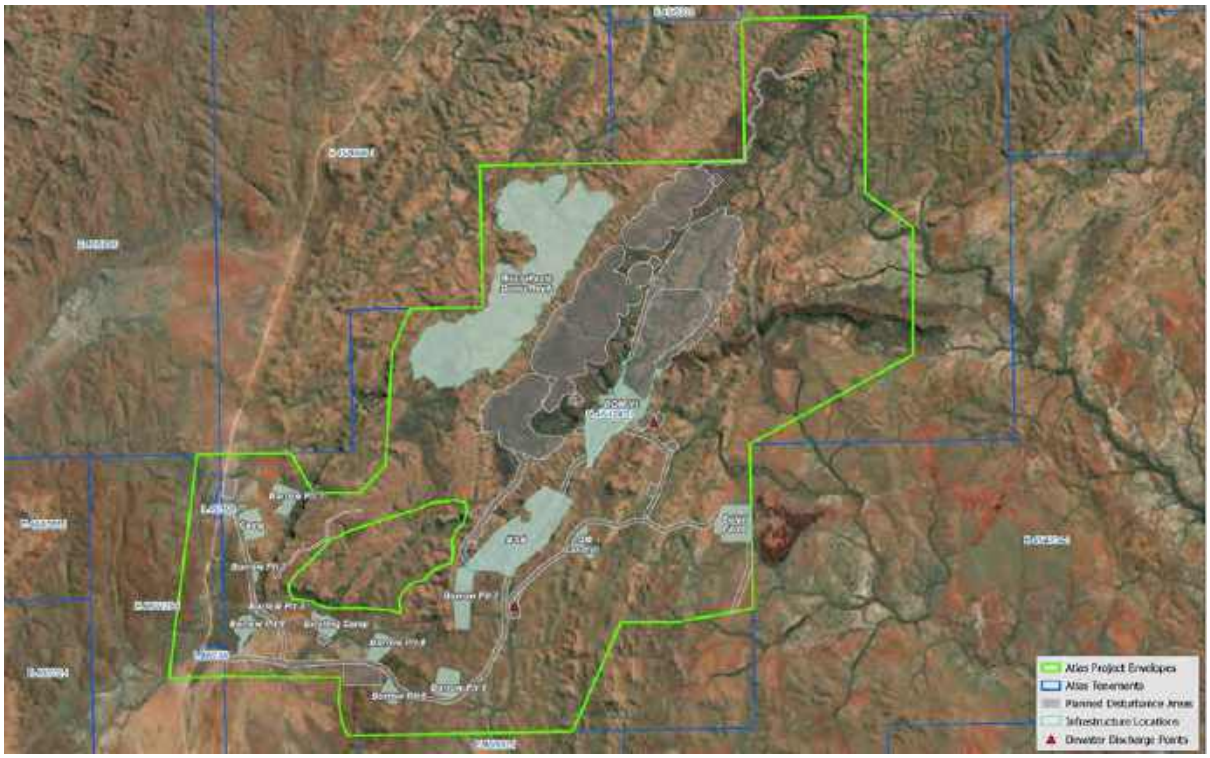


Figure 1-2 Proposed Mine Layout

As part of the environmental studies undertaken for the Project, Lloyd George Acoustics has been commissioned to undertake noise prediction modelling, including airblast, and to compare the results against relevant criteria. This report presents the methodology, results and assessment of the noise modelling study.

Appendix A contains a description of some of the terminology used throughout this report.

2 CRITERIA

2.1 Operational Noise

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (1) Noise emitted from any premises or public place when received at other premises –

(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) Must be free of –

i. tonality;

ii. impulsiveness; and

iii. modulation,

when assessed under regulation 9"

A "…noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level…"

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

(a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) The noise emission complies with the standard prescribed under regulation 7 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Industrial	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

The project is located in a remote area with the closest residential area, being Nullagine, located approximately 30 kilometres away to the south. As there are no industrial or commercial land uses in the area, the influencing factor is considered to be zero. Therefore the baseline assigned levels in *Table 2-2* would apply.

As the accommodation camp is located on the same premises as the prescribed activity, the prescribed standard does not apply as the noise emissions must be received on a premises other than the premises or public place where the noise was generated. In these cases, the *Assessment of Environmental Noise Emissions Guideline*, produced by DWER, states that at a minimum, accommodation will be designed to achieve a level of L_{Aeq} 40 dB, based on indoor levels inside the accommodation sleeping areas.

2.2 Airblast

With regard to airblast levels due to blasting, regulation 11 prescribes that:

(4) Subject to subregulation (5), no airblast level resulting from blasting on any premises or public place, when received at any other premises between 0700 hours and 1800 hours on any day, may exceed —

(a) for an airblast level received at noise sensitive premises —

(i) when received at a sensitive site — 120 dB $L_{Z\,peak}$; or

(ii) when received at a location other than a sensitive site — 125 dB $L_{Z\,peak}$;

or

(b) for an airblast level received at any other premises — 125 dB $L_{Z\,peak}$.

(5) The levels specified in subregulation (4) do not apply in respect of an airblast level when received at premises, or a part of premises, on which the blaster believes on reasonable grounds no person is present at the time of the blast.

(6) Despite subregulation (4), airblast levels for 9 in any 10 consecutive blasts (regardless of the interval between each blast), when received at any other single premises between 0700 hours and 1800 hours on any day, must not exceed —

(a) for airblast levels received at noise sensitive premises —

(i) when received at a sensitive site — 115 dB $L_{Z\,peak}$; or

(ii) when received at a location other than a sensitive site — 120 dB $L_{Z\,peak}$;

or

(b) for airblast levels received at any other premises — 120 dB $L_{Z\,peak}$.

(8) Subject to subregulation (9), no airblast level resulting from blasting on any premises or public place, when received at other premises outside the periods between 0700 hours and 1800 hours on any day, may exceed 90 dB LZ peak except where that blasting is carried out in accordance with the Mines Safety and Inspection Regulations 1995 *regulation 8.28(4).*

2.3 Noise to Fauna Exclusion Zone

The mine is located close to areas where colonies of Pilbara Leaf-nose Bats and Ghost Bats are located. While there are no legislated noise criteria, the noise levels will be assessed based on relevant studies on the impact of noise on these animals. While the response to noise and vibration vary among vertebrate fauna species and individuals according to a number of factors (Busnel and Fletcher[1]), a study undertaken by Bullen and Creese [2] suggested that sound levels up to 70 dB are unlikely to result in ghost bats leaving their roost. Therefore this criterion will be applied to the Fauna Exclusion Zone located to the south of the mining activities.

[1] Busnel, R.G. and Fletcher, J.L. (Eds.) (1978). *Effects of Noise on Wildlife*. Academic Press, New York.

[2] Bullen, R. and Creese, S. (2014). A note on the impact on Pilbara leaf-nosed and Ghost Bat activity from cave sound and vibration levels during drilling operations. *The Western Australian Naturalist* 29: 145-154.

3 METHODOLOGY

3.1 Noise Predictions

Computer modelling has been used to predict noise levels at the various receivers during normal operations. The software used was *SoundPLAN 8.2* with the CONCAWE (ISO 171534-3 improved method) algorithms selected. These algorithms have been selected as they include the influence of wind and atmospheric stability. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1.1 Meteorological Information

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation.

At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1 Modelling Meteorological Conditions

Parameter	Night (1900-0700)
Temperature (°C)	15
Humidity (%)	50
Wind Speed (m/s)	3
Wind Direction*	All
Pasquil Stability Factor	F

* Note that the modelling package used allows for all wind directions to be modelled simultaneously.

It is generally considered that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time between April and October, and therefore must be satisfied.

3.1.2 Topographical Data

Topographical data was based on that provided by the project in the form of LiDAR data. The topography to outlying areas, such s Nullagine, was obtained from *Google*.

3.1.3 Ground Absorption

Ground absorption varies from a value of 0.0 to 1.0, with 0.0 being for an acoustically reflective ground (e.g. water or bitumen) and 1.0 for acoustically absorbent ground (e.g. grass). An average value of 0.4 has been used for the assessment, e.g. compacted earth with loose rocks and shrubs.

3.1.4 Source Sound Levels

The sound power levels used in the modelling are provided in *Table 3-2*.

Table 3-2 Source Sound Power Levels, dB(A)

Description	Source Height	Octave Band Centre Frequency (Hz)								Overall dB(A)
		63	125	250	500	1k	2k	4k	8k	
Cat 16G Grader	3m	89	94	98	106	108	107	102	94	**113**
CAT 785 Water Cart	3m	90	109	114	116	113	111	106	103	**121**
CAT 789 Dump Truck	3m	86	104	108	115	116	115	109	101	**121**
CAT 844 Wheeled Dozer	3m	83	98	103	109	110	110	102	91	**115**
CAT 992 Loader	3m	85	101	101	108	107	106	99	88	**113**
CAT D10 Dozer	3m	80	95	100	106	107	107	99	88	**112**
Tamrock CHA110 Drill	2m	88	87	95	103	110	114	112	109	**118**
Road Haul Truck Iron Ore	1.5m	95	101	108	110	108	102	94	88	**114**
Fixed - Primary Crusher	4m	100	107	115	117	115	112	109	98	**122**
Fixed - Secondary Crusher	4m	89	102	108	117	120	117	109	97	**123**
Fixed - Tertiary Crusher 3	4m	88	99	105	112	114	114	110	101	**119**
Mobile Crusher and screen	3m	91	97	103	112	116	116	112	101	**121**

With regards to the above, please note the following:

- It is assumed that all noise sources will be operating simultaneously. This will be considered as a conservative approach and plant noise levels may be lower under normal operations.
- While it is not confirmed that crushing and screening will occur on-site, these noise sources have been included in this assessment.
- The mobile crushing and screening unit will be used for a short periods of time (2-3 weeks) at a number of locations throughout the mine site to make road-base material during the mine construction. It will then be used every few years for short periods to crush stemming on the waste dump or low grade dump area.
- Sources heights are relative to natural ground, such that conservatively, no account has been taken for pit activity below natural ground.

3.2 Blasting

3.2.1 Airblast Levels

Airblast is calculated using equations provided in Australian Standard A*S 2187.2-2006 Explosives - Storage and use*.

The accurate estimation of airblast levels is a complex task. The blasting process is highly non-linear and the variability of most rock types also contributes to the difficulty in accurate predictions of the environmental outcomes. In the absence of either field data or the opportunity to conduct blasting trials in the region of interest, it is possible to estimate likely airblast levels using simple charge weight scaling laws. Such laws incorporate the charge weight per delay and the distance from the blast to the monitoring location. The prediction formula is detailed below:

$$P = K_a \left(\frac{R}{Q^{1/3}} \right)^a$$

where

P = pressure, in kilopascals

Q = explosives charge mass, in kilograms

R = distance from charge, in metres

K_a = site constant

a = site exponent

It is noted that Q is also referred to as the Maximum Instantaneous Charge (MIC), which is the mass of explosives detonating within a defined time period, usually approximately 8 milliseconds. Therefore, when delay blasting occurs, the MIC (or Q) may be relatively small compared to the overall amount of explosive used for each blast.

For confined blast hole charges, a site exponent a of −1.45 is used, and the site constant K_a is commonly in the range 10 to 100.

4 RESULTS

4.1 Operational Noise Modelling

The noise levels under 'worst-case' meteorological conditions were predicted assuming the Murray and Avon pits are being mined concurrently. This scenario was chosen as the plant would be closest to both the mining camp and the 'Fauna Exclusion Zone', which are the areas requiring assessment. The predictions, shown in *Table 4-1*, also assumes the plant and equipment will be on the natural surface, representing the early stages of the mine.

Table 4-1 'Worst-case' Predicted Operational Noise Levels

Receiver	Predicted Noise Level, dB L_{A10}
Future Accommodation Camp	23
Existing (Exploration) Accommodation Camp	25
Sprayfield Camp	24
Fauna Exclusion Zone	39
Nullagine	0

Figure 4-1 also shows the predicted noise levels as a contour map at 1.5 metres above ground level.

4.2 Mobile Crushing

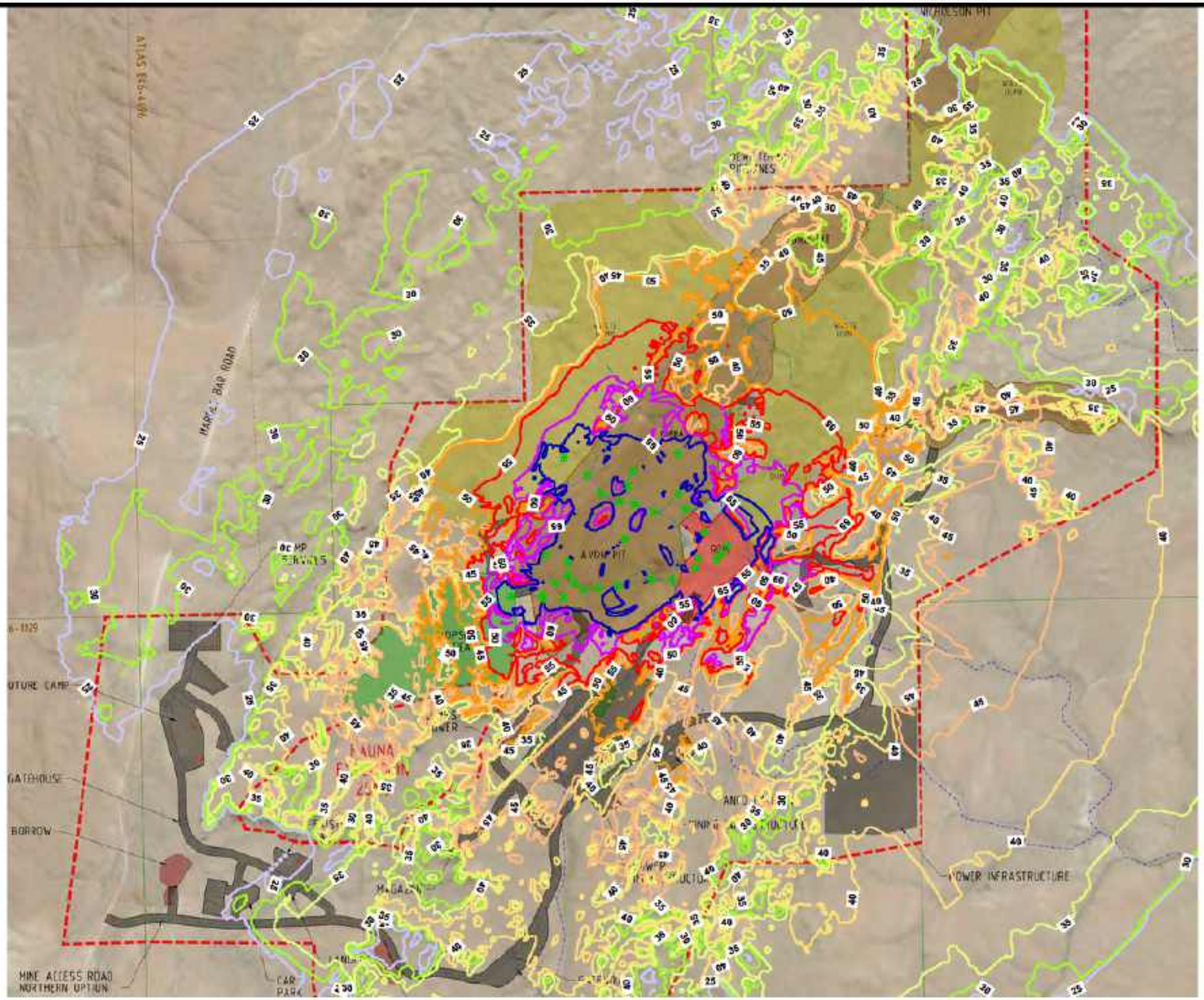
The mobile crushing and screening will operate for a period of two to three weeks at each location during the construction phase of the project to make road-base material. The crushing will occur within the five areas shown in *Figure 4-2*. In addition it will be used every few years to crush stemming on the waste dump or low grade dump area.

The predicted noise levels during these operations, which includes a loader operating near the crusher is shown in *Table 4-2*. It can be seen that the mobile crusher at Location 3 results in the highest noise levels at all receiver locations.

Table 4-2 Predicted Noise from Temporary Mobile Crushing

Receiver	Crusher Location	Predicted Noise Level, dB L_{A10}
Future Accommodation Camp	Location 3	40
Existing (Exploration) Accommodation Camp	Location 3	52
Sprayfield Camp	Location 3	40
Fauna Exclusion Zone	Location 3	35
Nullagine	N/A	0

Figure 4-1



Signs and symbols

* Mobile Plant

N

Length Scale

0 250 500 1000 1500 2000 m

McPhee Creek Project

Predicted L_{A10} Noise Levels from Mining at Murray and Avon Pits

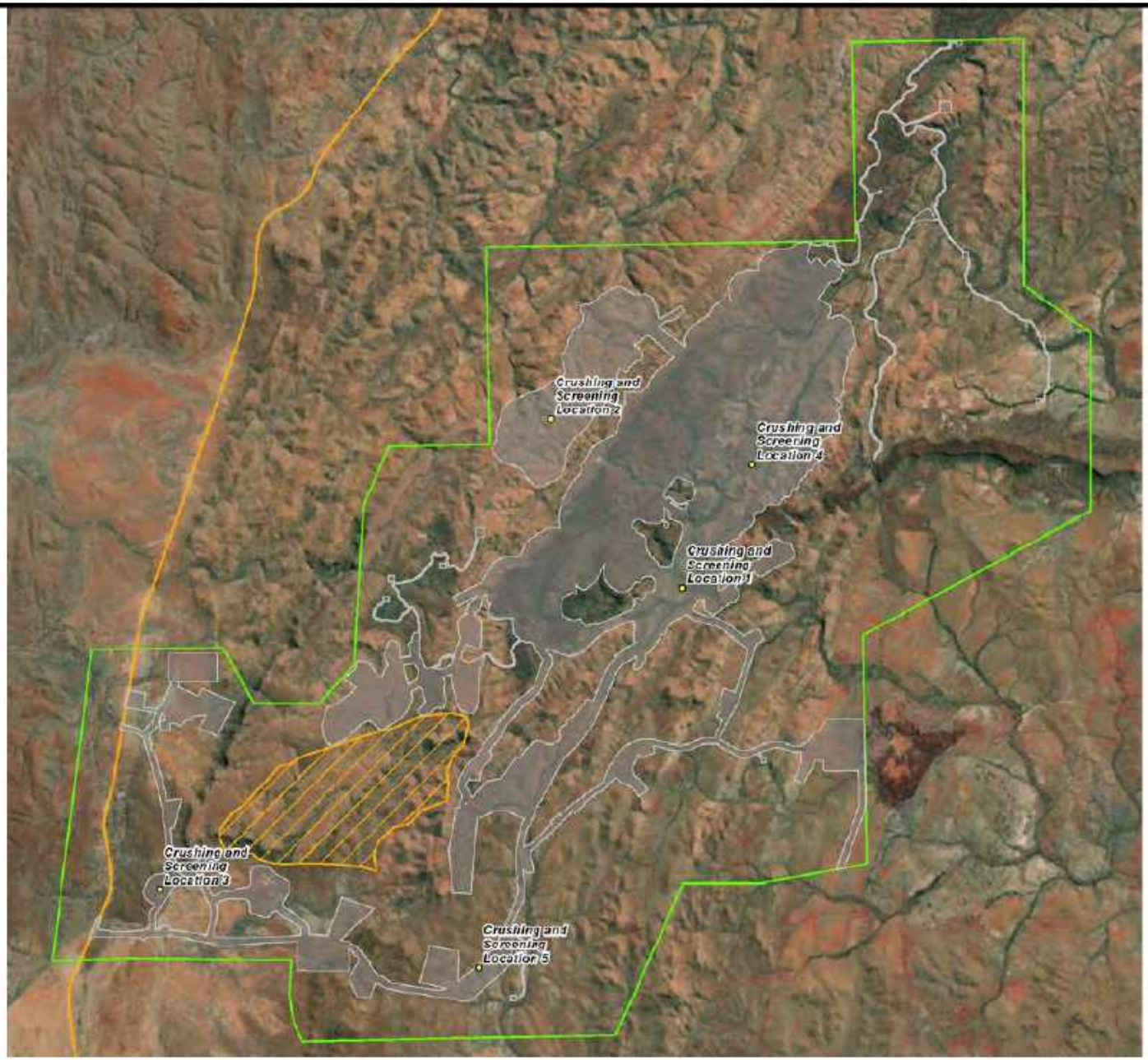
Wind from All Directions

Lloyd George Acoustics

www.lgacoustics.com.au

(08) 9401 7770

Figure 4-2



McPhee Creek Project
Mobile Crusher Locations

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(08) 9401 7770

4.3 Blasting

Airblast has been predicted to the accommodation camps, as well as the Fauna Exclusion Zone and Nullagine, being the closest community.

The variables used in the predictions are:

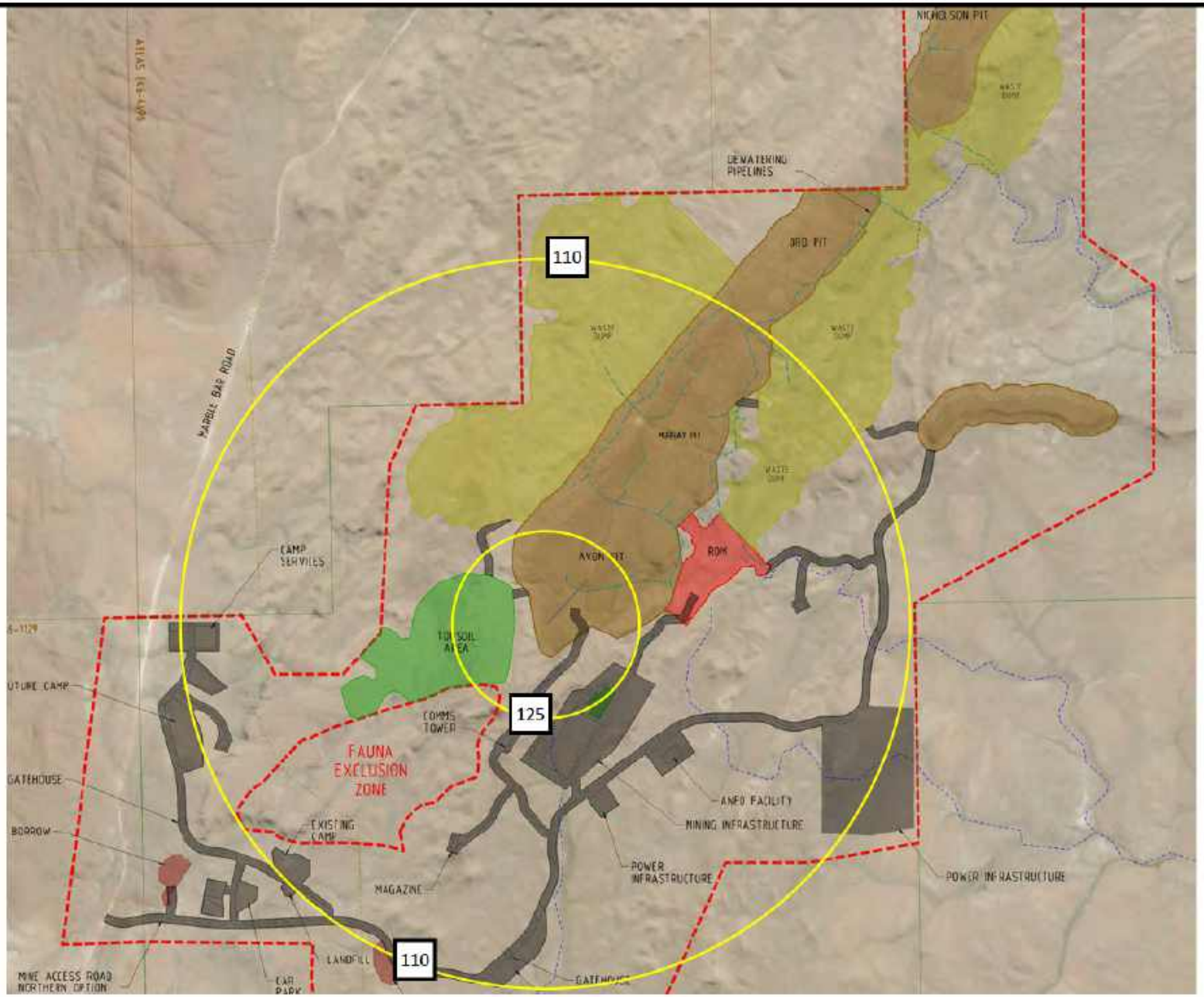
- Explosives charge mass = 27.5 kg/linear metre of hole;
- Holes drilled to 10m
- Site Exponent a = −1.45
- Site Constant K_a = 55

Table 4-3 'Worst-case' Predicted Airblast Levels

Receiver	Predicted Level, dB $L_{Z\ peak}$
Future Accommodation Camp	110
Existing (Exploration) Accommodation Camp	110
Sprayfield Camp	110
Fauna Exclusion Zone	125
Nullagine	83

Figure 4-3 shows the predicted airblast levels as a contour map in the vicinity of the mine.

Figure 4-3



McPhee Creek Project

Predicted $L_{Z\ peak}$ Airblast Levels from Blasting in Avon Pit

Wind from All Directions

Lloyd George Acoustics

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5 ASSESSMENT

5.1 Operational Noise

From *Table 4-1,* the predicted noise levels at the accommodation camps are significantly below the criterion provided in the *Assessment of Environmental Noise Emissions Guideline* produced by DWER and also significantly below the assigned level under the Regulations for a noise sensitive premises within a highly sensitive area. The noise from the mine would not be audible in Nullagine.

The operational noise to the Fauna Exclusion Zone is significantly under the criterion of 70 dB(A), at which it is considered unlikely for noise to result in Leaf-nose or ghost bats leaving their roost.

As such noise levels are considered compliant and noise mitigation does not require further consideration.

5.2 Mobile Crushing

The noise from mobile crushing is expected to comply with the assigned levels at all highly noise sensitive premises and be within the internal noise criterion of L_{Aeq} 40 dB for accommodation units as prescribed within the *Environmental Noise Emissions Guidelines*. This assumes a reduction of 15 dB between outside and inside, which would generally be easily achievable with windows closed for the average camp accommodation unit. This would therefore be considered to be acceptable, particularly as the noise would only occur for a short period of time during the construction phase.

5.3 Blasting

Although there are no criteria or guidelines for airblast to mine accommodation camps, assuming a site constant of 55, the airblast is below the criterion for 9 out of 10 blasts to a sensitive receiver during the day period, as stated in the Regulations.

It should be noted that the site constant used to calculate airblast levels is commonly in the range of 10 to 100 and therefore the airblast level to the accommodation camp could vary between 100 and 120 $dBL_{Z\ peak}$.

Airblast noise to the Fauna Exclusion Zone is predicted to be up to 125 $dBL_{Z\ peak.}$ However, we are not aware of any criteria for the impact from airblast to bats.

6 CONCLUSIONS

Operational noise from the proposed McPhee Creek Project when received at any noise sensitive premises or the mine accommodation camp, is predicted to comply with the criterion provided in the Assessment of *Environmental Noise Emissions Guideline* produced by DWER and also significantly below the assigned level under the Regulations for a noise sensitive premises within a highly sensitive area.

The operational noise to the Fauna Exclusion Zone is significantly under the criterion of 70 dB(A), at which it is considered unlikely for noise to result in Leaf-nose or ghost bats leaving their roost.

While there are no criteria for airblast to mine accommodation camps, the airblast levels is predicted to be below the criterion for 9 out of 10 blasts to a sensitive receiver during the day period, as stated in the Regulations.

Short-term mobile crushing works during the construction phase are predicted to achieve acceptable internal levels at all of the accommodation camps.

Appendix A

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S (Slow) time weighting as specified in IEC 61672-1:2002. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F (Fast) time weighting as specified in IEC 61672-1:2002. This is used when assessing the presence of modulation only.

L_{APeak}
This is the greatest absolute instantaneous sound pressure in decibels using the A frequency weighting as specified in IEC 61672-1:2002.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise
An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road
Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road
Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where :

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a100m radius of the premises receiving the noise

$\%\text{TypeA}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a100m radius of the premises receiving the noise

$\%\text{TypeB}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period
Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise
Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise
Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise
Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

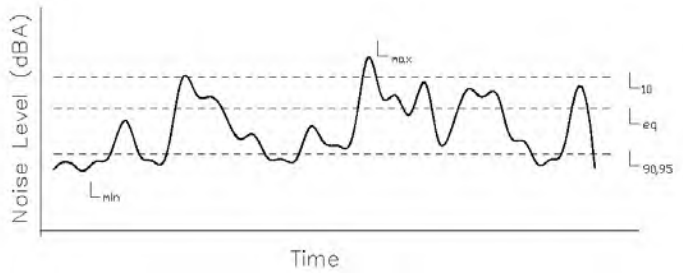
Peak Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

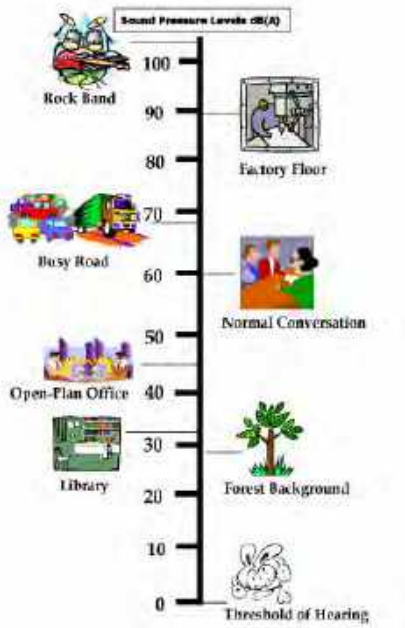
RMS Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels



Attachment 2: Premises Maps

Location	GDA2020_Lat	GDA2020_Long
1	-21.59999021	120.0637272
2	-21.59999029	120.075546
3	-21.60474674	120.0782966
4	-21.60484959	120.0841547
5	-21.60164675	120.0874134
6	-21.58817605	120.0885306
7	-21.58332362	120.0908982
8	-21.58332341	120.1000245
9	-21.56665675	120.1000245
10	-21.56665675	120.1333578
11	-21.54999008	120.1333578
12	-21.54999013	120.1488291
13	-21.57074591	120.1484354
14	-21.57485944	120.1544006
15	-21.58981412	120.1541082
16	-21.59998982	120.1333428
17	-21.619266	120.1333216
18	-21.62071786	120.1236855
19	-21.62060131	120.1167211
20	-21.63332336	120.1103634
21	-21.63333054	120.0821183
22	-21.63175812	120.0813004
23	-21.62938091	120.0809553
24	-21.62645625	120.08118
25	-21.62607031	120.0666912
26	-21.62615431	120.059644

Attachment 5: Other Approvals and Consultation Documentation

Stakeholder Consultation Register.

Stakeholder	Date	Purpose of contact	Issues raised by stakeholder	Atlas response
Agency and other consultation				
EPA Services (DWER)	January 2021 July 2021 November 2021	Pre-referral meeting Discussion of revisions to ESD prior to resubmission Meeting ahead of submission of the Environmental Review Document	NA	NA
DMIRS	2018 - on-going	Various discussions regarding Programme of Works (POW) applications in support of resource definition and water investigations	NA	NA
DPLH	26 May 2021	General Meeting to discuss DPLH s 16/s 18 information requirements and assessment timeframes	NA	NA
Consultation with Traditional Owners				
Nyamal Aboriginal Corporation (NAC)	2012 – 2014, 2019-2021 February 2021 June 2021 August 2021	Participation in archaeological and ethnographic surveys within Development Envelope. Notification of application for a miscellaneous license application (L46/158) Monitoring and Liaison Committee Meeting On Country Social Surroundings Consultation	Identification of heritage sites, cultural associations, and related values within the Development Envelope	Values have been, and will continue to be, considered during the design, construction, operation and closure of the Proposal. Engagement with the Nyamal will be ongoing through the above Proposal phases.