Crusader Templar Gold Project

Works Approval Supporting Document

Prepared for Nexus Minerals Ltd

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Prepared by

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Contents

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Executive Summary

Nexus Minerals Limited (Nexus) submits the following information in support of a Works Approval application. Prescribed activities applicable to this works approval include:

- Category 6 – Mine dewatering where water is extracted and discharged into the environment to allow mining of ore,
- Category 70 Screening etc. of material: premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated; and
- Category 89 Putrescible landfill site: premises (other than clean fill premises) on which waste of a type permitted for disposal for this category of prescribed premises, in accordance with the Landfill Waste Classification and Waste Definitions 1996, is accepted for burial.

as described in Schedule 1 of the *Environmental Protection Regulations 1987* and summarised in the table below.

Category	Activity	Production or Design Capacity	Nominated Production of Design Capacity
Category 6 Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore	Mine dewater discharged into Crusader and Templar mining voids.	50 000 tonnes or more per year	763 000 kL per year
Category 70 Screening etc. of material: premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated	Mobile crushing facilities brought onto site for road base, stemming and other ancillary products.	More than 5 000 but less than 50 000 tonnes per year	45 000
Category 89 Putrescible landfill site: premises (other than clean fill premises) on which waste of a type permitted for disposal for this category of prescribed premises, in accordance with the *Landfill Waste Classification and Waste Definitions 1996*, is accepted for burial	Burial of Class II wastes in an area proposed for future waste landform.	More than 20 but less than 5 000 tonnes per year	<5 000 tonnes per year.

The premises includes parts of tenements M31/251 and M31/231, both wholly owned by Nexus Minerals Limited.

This Works Approval Supporting Application follows the structure of DWER Application for Works Approval / Licence/ Renewal / Amendment / Registration (form IR-F09 – v16.0). Completion of the DWER Application Form is a statutory requirement under section 54(1)(a) of the EP Act for Works Approval Applications.

All sections of this form relevant to the project have been included in this supporting application for ease of assessment by DWER.

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1 Applicant Details

The Crusader-Templar Gold Project (the Project) is operated by Nexus Wallbrook Pty Ltd, a 100% subsidiary of Nexus Minerals Limited. Tenements listed in this works approval application are held by Nexus Wallbrook Pty Ltd. Company ASIC extract for Nexus Wallbrook is attached as **Attachment 1B** submitted in accordance with Section 2.9 of the DWER Application Form (Attachment 1A: ASIC company extract)**.** Contact details are provided in **Table 1.**

***Table 1**: Works Approval applicant details*

[redacted]

2 Occupier Status

The Crusader-Templar Gold Project is located on parts of mining tenements M31/251 and M31/231, in accordance with the *Mining Act 1978, division 4* (**Table 2**). Both tenements are held by Nexus Wallbrook Pty Ltd, a 100% subsidiary of Nexus Minerals Limited.

Mining Tenement Summary Reports are provided in **Attachment 1A** and submitted in accordance with Section 2.8 of the DWER Application Form (Attachment 1A: Proof of Occupier Status).

***Table 2**: Occupier tenement details*

Tenement Details		
Tenement	**Holder**	**Area**
M31/251	Nexus Wallbrook Pty Ltd	115.15 ha
M31/231	Nexus Wallbrook Pty Ltd	870.9 ha

3 Premises Details

The proposed Project is a greenfields site, owned and operated by Nexus Minerals Limited. The Project is located approximately 130km northeast of the City of Kalgoorlie-Boulder, approximately 600km east of Perth, as shown in (**Figure 1**).

Prescribed Premises maps for the Crusader Templar Gold Project show the prescribed premises boundary layout of key infrastructure and emission and discharge locations (**Figure 2**). Please note that exact location of pipelines and abstraction points shown on the map is indicative, and may be placed at a more suitable location during operations.

Maps are submitted in accordance with Section 3.4 of the DWER Application Form (Attachment 2: Premises Maps).

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Prescribed premises boundary coordinates are provided below in **Table 3** below and provided in GDA2020/MGA zone 51.

Table 3: Premises boundary proposed coordinates

Point	Tenement	Easting	Northing
1	M31/251	432,799	6,697,755
2	M31/251	433,858	6,697,752
3	M31/231	433,876	6,696,268
4	M31/231	433,249	6,696,264
5	M31/231	433,249	6,696,215
6	M31/231	432,806	6,696,524

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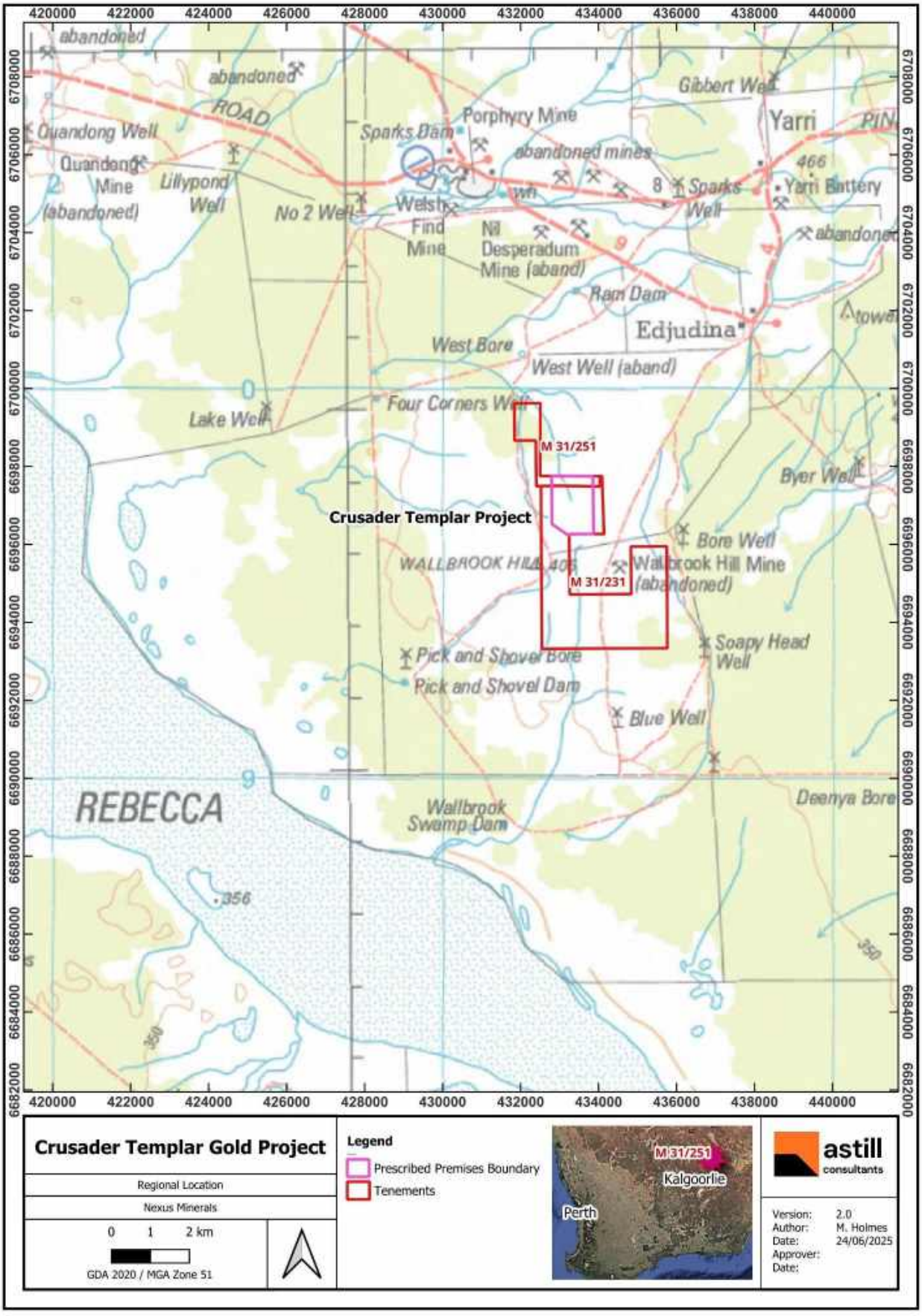

***Figure 1**: Site location relative to Kalgoorlie-Boulder and including prescribed premise boundary*

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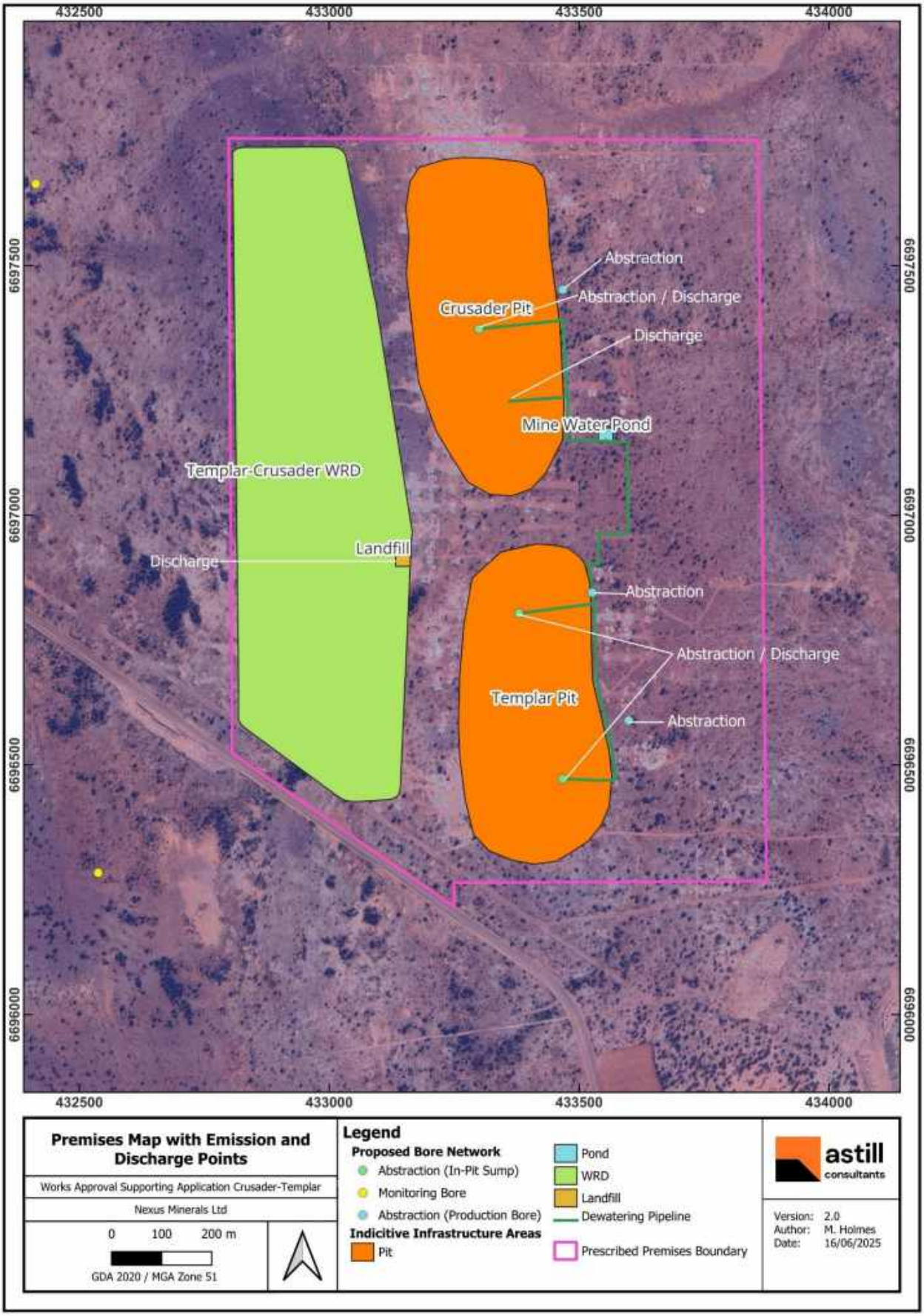

Figure 2: Layout and key infrastructure – emission and discharge locations

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Figure 3: *Location of Crusher and Screening within Prescribed Premises*

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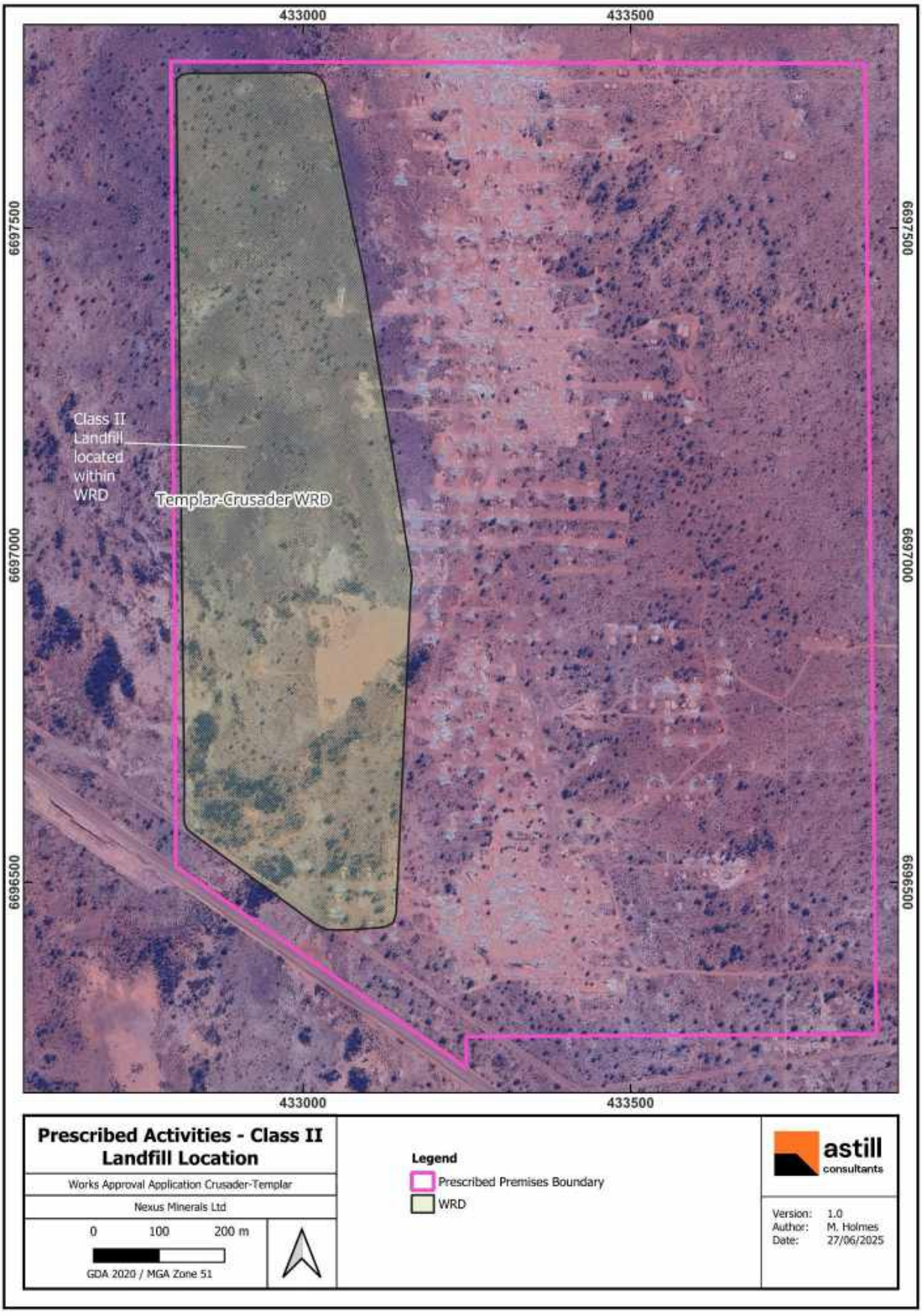

***Figure 4**: Location of Class II Landfill within Prescribed Premises*

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4 Proposed Activities

The following sections provide detailed descriptions of proposed activities for each prescribed premises category in accordance with Section 4.12 of the DWER Application Form (Attachment 3B: Proposed Activities).

4.1 Category 6 - Mine Dewatering

Nexus plan to develop the Crusader-Templar Project, which will ultimately consist of two open cut pit voids (Crusader Pit and Templar Pit) over a total period of 10 years. Stage 1 of the project will involve mining the Crusader-Templar gold deposits across multiple starter pits over approximately 28 months. Three of these starter pits (Crusader South, Templar South and Templar North) are planned to be mined below the water table and will require dewatering to provide dry mining conditions.

Water movement within the project area will be largely cyclical in nature, with dewatering activities rotating between adjacent pits. This approach is designed to maintain dry mining conditions across the site by sequentially managing groundwater inflows, rather than continuous dewatering of a single location. The system will be adaptive, responding to changing pit priorities and water levels, ensuring efficient control of water ingress throughout operations.

Note: both Crusader and Templar will have a north and south pit, connected by a saddle below ground level which may eventually merge.

Groundwater extraction is proposed via a combination of production bores, located directly east (upstream) of the pits and via in -pit sumps. Above ground dewatering pipeline will be constructed using HDPE pipe and will transfer water to a turkey's nest/saline water dam for temporary storage. Extracted water will then be taken from this dam and used onsite for dust suppression activities on the Projects tracks and haul roads, and excess water will be discharged into starter pits Crusader South, Templar South or Templar North, depending on the mining sequence.

Dewatering volumes were estimated by Rockwater using a simple numerical groundwater model together with pit inflow estimates using analytical calculations. Peak monthly dewatering requirements for the first two years of mining are projected to be 27.5L/s after 16 months (approximately 73,656kL/month), before decreasing to approximately 20L/s (53,568kl/month) as mining advances below the weathered zone. The annual dewatering rate applied under this works approval includes a 10% contingency on the peak annualised dewatering rate of 22L/s, which totals 763,000 kL/annum as described below in **Table 4**.

Table 4: *Modelled dewatering requirements*

Project year	Peak monthly dewatering volume		Annualised dewatering volume		Annualised dewatering volume + 10% contingency	
	L/s	kL/ month	L/s	kL/annum	L/s	kL/annum
1	27.5	73,656	9.8	309,052	10.8	339,957
2	20	53,568	22	694,000	24.2	**763,000**

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The estimated dewatering discharge volume has been conservatively overestimated, based on data collected when the adjacent Wallbrook mine (not owned by Nexus) void was at full capacity and contributing to regional groundwater pressures. While actual discharge rates are expected to be significantly lower under typical conditions, the adjacent operation's future water levels and dewatering activity are outside of Nexus' control. As such, a precautionary approach has been adopted to ensure the application accounts for worst-case groundwater inflow scenarios.

For further information on the dewatering rate predictions Rockwater's H2 Hydrogeological Assessment for Dewatering of Crusader-Templar Deposit is included as **Attachment 2.**

4.1.1 Groundwater Monitoring

Groundwater modelling results indicate at the end of Stage 1 mining that a one metre drawdown extent could extend 1,500 m radially from the pit. Due to the relatively high permeability of the weathered bedrock, the cone of depression extends radially instead of being confined to the discrete mineralised and fractured zones. The drawdown is predicted to affect aquifer areas associated with groundwater licenses GWL 157428 and GWL 169295, likely used by the neighbouring Wallbrook project, for mining operations including dewatering.

To monitor impacts of drawdown, two monitoring bores are proposed to be drilled at the Nexus tenement boundaries, approximately 800m west of the Crusader and Templar Pits and within the 1.5km predicted drawdown affected area.

Nexus is committed to undertaking groundwater monitoring before, during and after dewatering operations at Crusader-Templar to monitor the resulting water level drawdown against modelled impacts. A proposed monitoring program for monitoring bores is outlined in **Table 5** and the location of proposed monitoring bores shown in **Figure 2**.

All monitoring will be conducted in accordance with requirements of this Works Approval, future EP Licence and pending 5C Groundwater Abstraction Licence under the 1914 *RIWI Act*.

Table 5: *Groundwater Monitoring Program*

Parameters	Production Bores / In pit Sumps	Monitoring Bores
Groundwater extraction	Monthly	N/A
Water level	Monthly (when mining active)	Monthly
pH, EC and temperature	Quarterly	Quarterly
Comprehensive groundwater analysis	Annually	Annually

4.1.2 Dewatering Discharge infrastructure

A dewatering discharge pipeline will be constructed prior to dewatering activities being required. The discharge pipeline will link with a turkey's nest to provide an initial sediment settling point and water truck filling station.

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Abstracted water will be used for dust suppression in the first instance on the Project's tracks and haul roads, and soil conditioning of areas planned for construction such as the workshop and ROM pad. Any excess water will be discharged into starter pits Crusader South, Templar South or Templar North, depending on the mining sequence.

Pipelines will be made of high-density polyethylene (HDPE). They will be constructed using poly welding to join individual sections, with flanged control valves to direct flow between discharge points. Key controls for the management of the discharge pipeline include:

- Constructed using HDPE material that meets the following standards:
  - Australian/New Zealand Standard (AS/NZS) 2033:2008: Installation of polyethylene pipe systems;
  - AS/NZS 4129:2008 Fittings for polyethylene pipes for pressure applications;
  - AS/NZS 4130:20069 Polyethylene pipes for pressure applications; and
  - AS/NZS 4131:2010 Polyethylene compounds for pressure pipes and fittings.
- To be located within earthen bunded v-drains with scour pits and constructed along the pipeline route at strategic locations and low points to ensure any leaks or spills are contained within bunded areas. Secondary containment will be sufficient to contain any spill for a period equal to the time between inspections;
- Flow metres fitted to measure discharge volumes;
- Isolation valves installed at appropriate intervals;
- Daily inspections of the dewatering pipeline when in use to confirm visual integrity of the pipeline, bunding and scour pits during operation; and
- Shut down the required section of the dewatering network if any spills or leaks from the pumps or pipeline are detected, until the leak has been verified and/or repaired.

A mine water dam or turkey's nest (approximately 0.8 ha) will be constructed to hold discharged water. Water carts will fill from this dam via hose or pump set-up. The dam will be built with above-ground embankments with, at most, a 2:1 batter using non-acid forming waste material. Embankments will be compacted as required to form a safe and stable structure that is capable of retaining water. The dam will be lined with high-density polyethylene (HDPE), minimum 1 mm thick, and fauna egresses installed. **Figure 5** depicts a typical mine water dam design which will be

utilised.

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Figure 5: Typical mine water dam design

4.2 Category 70 - Crushing and Screening of Material

Nexus proposes to establish mobile crushing and screening campaigns, for the generation of road base and hardstand material to support development of the project and also used as stemming in drill and blast holes, if required. A crushing and screening unit will be mobilised to site and deployed for campaigns as required to process stockpiled materials. All crushed / screened materials are proposed to be used within the prescribed premises boundary. A nominal maximum throughput of 45,000 tonnes per year will be crushed and screened, however actual throughput is likely to vary due to the campaign nature of activities and hence a conservative maximum is being sought for this application.

Stockpiled inert waste rock material will be fed via front end loader into a feeding hopper which will be crushed by a jaw crusher and fed via conveyor to an adjacent screening unit. Crushed material will go through a secondary impact crusher before going through a vibrating screen, separating material into various sizes from approximately 5 mm to 300 mm.

Details of the exact mobile crushing and screening plant to be used are not available, as it will be sourced and provided by contractors on an as-needed basis. A typical crushing and screening plant anticipated to be used has an approximate capacity of 475 tonnes per hour, though actual throughput will be dependent on Nexus' requirements and available stockpiled volumes of material.

There are no consumable reagents or chemicals used in the mobile plant. No hydrocarbons will be stored within the plant, except within a service truck that feeds the diesel engine (typically up to 1,500L capacity). A watercart will be available during all crushing and screening activities with stockpiles watered down before crushing / screening on an as required basis to mitigate dust emissions.

A typical crushing and screening plant design is shown below in **Figure 6.**

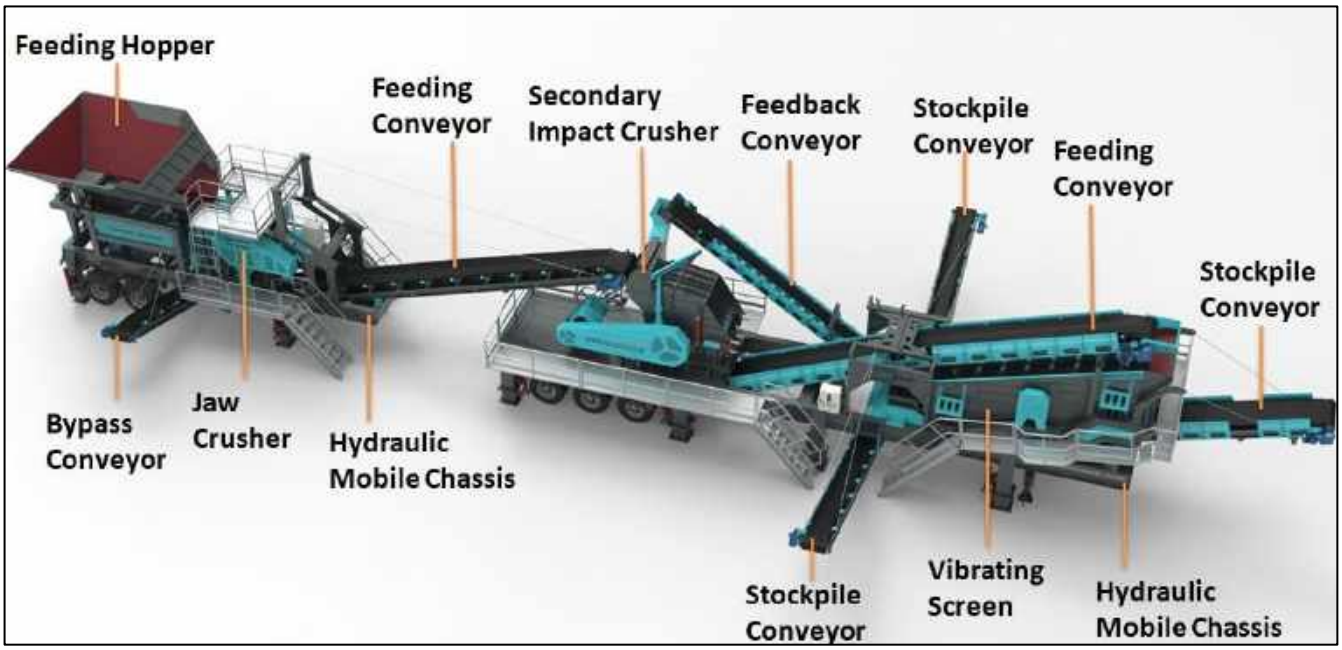

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Figure 6: Typical Mobile Crusher and Screener Plant Design

Crushing and screening activities will occur within the prescribed premises boundary, the location will change as each crushing campaign requires. Refer to **Figure 3.**

Ore will be blasted small enough to move, picked up by shovel, loaded into dump trucks and taken to the run-of-mine (ROM) pad for stockpiling, likely separated by grade. From the ROM pad, ore is to be loaded directly into road trains via a large front-end loader or excavator for transportation offsite for processing. Note: Category 5 prescribed activity Processing or beneficiation of metallic or non-metallic ore is not applicable to the Project as no screening or processing of ore will occur onsite.

4.3 Category 89 – Class II or III Putrescible Landfill

An unlined Class II Landfill site is proposed to be constructed in the Crusader-Templar Waste Rock Dump for the disposal of site generated waste. The landfill cell will be constructed in tandem with active mining operations to allow regular covering of the landfill with waste material and eventual encapsulation as rehabilitation progresses. Refer to **Figure 4** for location of the landfill facility.

Waste materials generated at the Crusader-Templar project will be collected, transported, stored, and disposed of by burial in the site landfill. Nexus will work with employees, suppliers and contractors to:

- Minimise the volume of waste generated;
- Maximise the volume of material sent for reuse, recycling, or reprocessing; and
- Minimise the volume of waste sent to the site landfill.

In accordance with the DWER *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)* the following waste types are planned to be disposed in the Crusader-Templar Class II Landfill:

- Clean and Uncontaminated Fill;
- Inert Waste Type 1 and Type 2;
- Putrescible wastes; and
- Contaminated solid waste meeting waste acceptance criteria specified for Class II landfills.

Volumes of waste will be recorded in m^3. Other wastes, i.e., recyclable, controlled wastes such as hazardous or hydrocarbons etc. will be transported to an off-site and appropriately licensed waste disposal facility in accordance with the applicable transport and disposal requirements.

4.3.1 Landfill Design

Landfill design will include the sequenced construction of a series of trenches up to approximately 5 metres (m) depth by 5 m width and 50 m in length within the prescribed landfill area.

Excavated inert materials will be used to construct windrows with excess material stockpiled for temporary cover placement and final capping of the trenches.

Following excavation, the trench will be filled with waste and periodically covered before the next trench is excavated. The active tipping area will be maintained to less than 30 m in length and

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covered at a frequency and method consistent with Section 6 of the *Environmental Protection (Rural Landfill) Regulations 2002* to prevent windblown waste, odour, and fire.

Surface water run-off will be managed with windrows to divert water away from trenches.

A visual inspection of the landfill will be conducted weekly, and any windblown waste removed and disposed of. Nexus is in the process of developing a Waste Management Procedure as part of the Nexus Environmental Management System (EMS) which will include details for the disposal of all waste streams on-site and will be used to educate employees and contractors on waste disposal requirements.

4.4 Construction Activities

The project is expected to commence in 2025 and operate until approximately 2035. Additional expansion approvals are anticipated in the future which may extend operations until approximately 2045.

Preliminaries & Site Preparation
Activities will commence with site clearing including grubbing and stockpiling of vegetation from the access road (2km x 10 m approx. for corridor), ROM pad, workshop, pits, Waste Rock Dump (WRD) (including landfill), pipeline corridor, turkey's nest, laydown and magazine.

4.4.1 Earthworks

Construction earthworks will include the following:

- Strip topsoil (approximately 200mm depth) from approved disturbance areas progressively as per schedule and stockpile separately from vegetation;
- Borrow, transport and compact an earthen bund to both sides of dewatering pipeline corridor;
- Grade access tracks for dewatering pipeline corridors;
- Sheet access roads with aggregate sheeting material;
- Excavate ground for turkey's nest construction and use borrow material for compacted soil or rock layer using heavy machinery;
- Excavate/level ground and compact for ROM pad construction;
- Drainage diversion infrastructure installed where necessary; and
- Construct sediment traps as appropriate to reduce downstream impacts on water quality.

4.4.2 Dewatering Pipework

Pipework installation will include the following:

- Supply and install requisite dewatering pipework;
- Dewatering pipeline contained within a lined trench (exception of inside pits); and
- Supply and install in-pit sumps to enable water recovery.

Excavation and HDPE lining of turkey's nest for water storage of dewatered groundwater.

4.4.3 Landfill

Excavation of landfill within the WRD footprint consisting of 30m long and 5m wide trenches with earthen windrows.

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4.4.4 Groundwater Bores

4.4.4.1 Monitoring Bores

Drill and construct two new monitoring bores at indicative locations and within 1.5 km of predicted water drawdown of Crusader and Templar pits as per **Figure 2**.

4.4.4.2 Production Bores

Drill and construct three new production bores at indicative locations upstream (east) of Crusader and Templar Pits as per **Figure 2**. Equip with pumps, power supply and flow meters.

4.4.4.3 In-Pit Sumps

Once a starter pit breaches the water table, a sump will be excavated (typically 2-4m deep) and positioned in the lowest point of the pit (natural gravity flow) with the base graded toward pump inlet to prevent stagnant water.

See indicative locations as per **Figure 2**.

4.5 Clearing Activities

A maximum 120 ha of native vegetation will be cleared within a 176 ha clearing envelope in preparation for construction and operation of the Project.

An application for a clearing permit has been submitted to DEMIRS in accordance with the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Proposed clearing will be demarcated by a surveyor using high visibility tape / survey pegs to ensure clear visual boundaries for operators prior to clearing commencement, or alternatively, a spotter with handheld GPS will guide clearing. A toolbox meeting will be held between the supervisor and clearing operator to ensure awareness of clearing areas and any areas to be avoided.

Topsoil will be stripped to 200 mm depth and stockpiled for use in rehabilitation, along with removed vegetation. Once clearing has been completed, surveyors will record cleared areas and provide the data for records and external reporting obligations.

Vegetation will be cleared by mechanical means. Where practicable, raised blade clearing will be used where topsoil is not being harvested. Clearing areas will be kept to the minimum required for mine activities and undertaken progressively as required. Existing disturbances will be utilised where possible. Nexus maintain an internal clearing procedure which will be adhered to for all clearing activities conducted.

4.6 Environmental Commissioning

As outlined in the Department of Water and Environmental Regulation's (DWER) Guideline: Industry Regulation Guide to Licensing (June 2019), environmental commissioning is testing undertaken to validate actual environmental performance relative to predicted performance, as assessed by the Department under the works approval. This is a separate activity to environmental commissioning that may occur for production or to check that contractors have completed construction works as agreed.

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Environmental commissioning may include testing the integrity of containment such as pipelines, liners or barrier systems, testing the performance of emission controls such as baghouses or filters, or testing waste digestion or treatment processes.

During environmental commissioning, emissions or discharges of waste may be permitted, subject to the works approval conditions. It is recognised that in optimising operations, emissions higher than normal operation may occur in the short term until the plant is stabilised. It is understood that DWER's assessment will consider these emissions and discharges and ensure that during the proposed environmental commissioning phase they do not present an unacceptable risk to the environment, public health, or public amenity. Nexus is seeking to undertake environmental commission under this works approval and as such must provide sufficient information in the works approval application so that the environmental commissioning activities can be assessed under the works approval.

4.6.1 Environmental Commissioning Plan (Attachment 3A)

This environmental commission plan supports the Works Approval application and outlines how Nexus will undertake commissioning of infrastructure associated with this Works Approval, as well as how Nexus will operate infrastructure during Time Limited Operations (TLO) prior to licensing. The proposed works involve construction of a dewatering pipeline connecting two starter pits in Templar Pit, running north to the Turkeys Nest. Dewatering pipelines will also be constructed connecting two starter pits in the Crusader Pit, running south to the same Turkeys Nest. Maintaining numerous discharge and abstraction points will allow Nexus to have a flexible approach to the mining sequence without disrupting operations.

Pending regulatory approval, establishment of the dewatering infrastructure is tentatively proposed for Quarter 1 of the 2026 calendar year (January to April).

Tentative construction and commissioning stages are indicated in **Table 6** below. It is important to note that this schedule is indicative, as timing will be adjusted to suit the mining schedule, however, the broad sequence will remain. All prescribed activities are expected to complete construction within one year of commencement of the Project.

4.6.2 Project Construction and Commissioning

The proposed approximate schedule for construction, commissioning and operation of facilities relevant to this works approval at the Crusader-Templar Gold Project are detailed in **Table 6**

Table 6: *Indicative project schedule for Crusader-Templar Gold Project*

Construction Activities	Indicative Scheduled
Installation of groundwater monitoring/production bores	January to March 2026
Installation of in-pit sumps	July to September 2026
Surface water management construction	January to March 2026
Installation of dewatering pipelines/infrastructure (breather valves, sour pits and pump installation)	January to March 2026
Turkeys nest construction	January to March 2026
Power supply installation	January to March 2026
Water supply installation	April to June 2026

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4.6.3 Emissions and Discharges

The anticipated emissions and / or discharges expected to occur during commissioning with inputs and outputs during this commissioning process is summarised in **Table 7** below.

Table 7: *Inputs and outputs summary*

Activity	Inputs	Potential outputs (discharges / emissions)
Mine dewatering	• Hydrocarbon fuels and oils (for operation of diesel generators) • Brackish to saline water	• Hydrocarbon emissions (spills) • Noise • Brackish to saline water

4.6.4 Environmental Performance Monitoring

Table 8 below details environmental performance monitoring which will be undertaken during commissioning to verify performance against environmental performance criteria.

Table 8: *Environmental performance monitoring*

Sampling Location	Frequency	Monitoring Parameters	Environmental Performance Criteria
Groundwater Management			
Groundwater Monitoring Bores	Monthly	Groundwater levels (standing water level)	No significant changes to groundwater levels
	Quarterly	Field analysis of pH, EC and temperature	Monitoring data is consistent with baseline groundwater monitoring data
	Annually	Comprehensive groundwater quality (laboratory analysis)	No significant changes to groundwater quality
Production Bores and In-Pit Sumps	Monthly	Groundwater extraction (cumulative volumes of groundwater pumped from each bore)	Within licenced allocation
	Annually	Comprehensive groundwater quality (laboratory analysis)	No significant changes to groundwater quality
Pipeline Integrity			
Dewatering pipelines	Once per shift (every 12 hours)	Visual inspection to confirm integrity	No leaks or spills identified

4.7 Time Limited Operations

To streamline the approvals process and enable proposed activities to commence following construction. It is noted the planned TLO activities will not be different from future licensed operations. Nexus understand conditions will be included in the Works Approval to regulate emissions and discharges that arise during the TLO phase. These conditions will be based on an assessment of the Prescribed Premises design performance provided in this Works Approval Application.

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4.8 Licence Application

Nexus will submit an Operating Licence application following the completion of works in accordance with the conditions of the Works Approval.

5 Emissions, Discharges and Waste

Prescribed Premises activities with potential for emissions or discharges are provided in **Table 9**Error! Reference source not found. with further information and details of proposed controls. Submitted in accordance with Section 9 of the DWER Application Form.

Table 9: Emissions and Discharges

Emission or discharge type	Source	Volume and Frequency (where applicable)	Proposed controls
Saline water	Discharged to mining void	763,000 k per annum, During Operations	• Minimum freeboard of 6 m in pit void. • Visual inspection of freeboard capacity carried out daily when operational. • Pit lake standing water level (mbgl) recorded quarterly. • Spot sampling to monitor pit water field parameters carried out quarterly.
	Discharged to dam	N/A, During Operations	• Minimum dam freeboard of 300 mm when operational. • Visual inspection of freeboard capacity carried out daily when operational. • Emergency spillway on saline water dams to protect from wall failure. • Dam lined with HDPE to prevent seepage.
	Pipeline failure	N/A, During Operations	• All HDPE pipelines built to pertinent Australian Standards of manufacture, design and construction. • All pipelines containing saline water are situated within bunded corridor. • Visual inspection of pipelines containing saline water carried out daily when operational.
Waste	Disposal to landfill	>5,000 tonnes/year, During Operations	• Landfill trenches approximately 5 m depth, 5 m width and up to 30 m length. • Waste is levelled and compacted regularly and cover applied monthly. • Visual inspection of landfill carried out weekly.
Potentially contaminated stormwater	Rainfall runoff from landfill	N/A, During Operations and storm events	• Windrows constructed to divert water away from landfill trenches.
Dust	Mobile crushing and screening plant, machinery and vehicle movement	NA, During Construction, Operations	• Vehicle movement restricted to constructed and formed roads. • Blasting activity occurs within pit surrounds minimising escape into environment. • Water cart used for dust suppression.
Noise	Noise generated from mobile crushing and	N/A, During Construction and Operations.	• N/A as no nearby sensitive receptors.

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	screening, generators, machinery and vehicles.		
Odour	Landfill	N/A, During Operations	• N/A as no nearby sensitive receptors.

6 Approvals and Consultation

Details are provided in this section, in accordance with Section 7.9 of the DWER Application Form (Attachment 5: Other approvals and consultation documentation).

6.1 Environmental Protection (Clearing of Native Vegetation) Regulations 1994

Clearing for the project will be undertaken in accordance with the *Environmental Protection Regulations (Clearing of Native Vegetation) 1994,* via a Purpose Permit application, submitted to DEMIRS with the Mining Proposal and Mine Closure Plan. Vegetation clearing of up to 120 ha within a disturbance envelope of 176 ha has been sought for the purpose of mineral production and associated activities.

6.2 Mining Act 1978

A Mining Proposal and Mine Closure Plan will be submitted to Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) for the Crusader-Templar project.

6.3 Rights in Water and Irrigation Act 1914

Nexus is in the process of obtaining a 26D construct and alter well licence from Department of Water and Regulation (DWER) to construct a combination of in-pit sumps and production bores in and around the Crusader and Templar Pits in accordance with the *Rights In Water and Irrigation Act 1914*.

A 5C Licence application has also been submitted for a groundwater entitlement of 763,000 kL/annum for dewatering and to enable safe mining of Crusader and Templar Pits.

7 Siting and Location

7.1 Climate

Crusader-Templar is situated in the south of the Murchison bioregion, within the Goldfields region of Western Australia. Climate in this region is arid to semi-arid with hot, dry summers and cool, wet winters (Cowan, 2001). The nearest Bureau of Meteorology (BOM) weather station is located approximately 125 km south-west at Kalgoorlie-Boulder Airport (Station ID 12038) (BOM, 2024).

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Mean maximum temperatures in Kalgoorlie-Boulder range from 33.7°C in January, to 16.9°C in July; mean minimum temperatures range from 18.4°C in January, to 5.1 °C in July (BoM, 2024). Rainfall is irregular but with a relatively even distribution over the year, with mean annual rainfall approximately 265 mm with an average of 39.1 days of rain per year (≥1 mm) (BoM, 2024). Cyclonic activities in the north of Western Australia can occasionally cause heavy rainfall events and flooding in this area during summer months. Climate data from the Kalgoorlie-Boulder Airport weather station (12038) between 1939 and 2024 (BoM, 2024) is presented in **Figure 7** below.

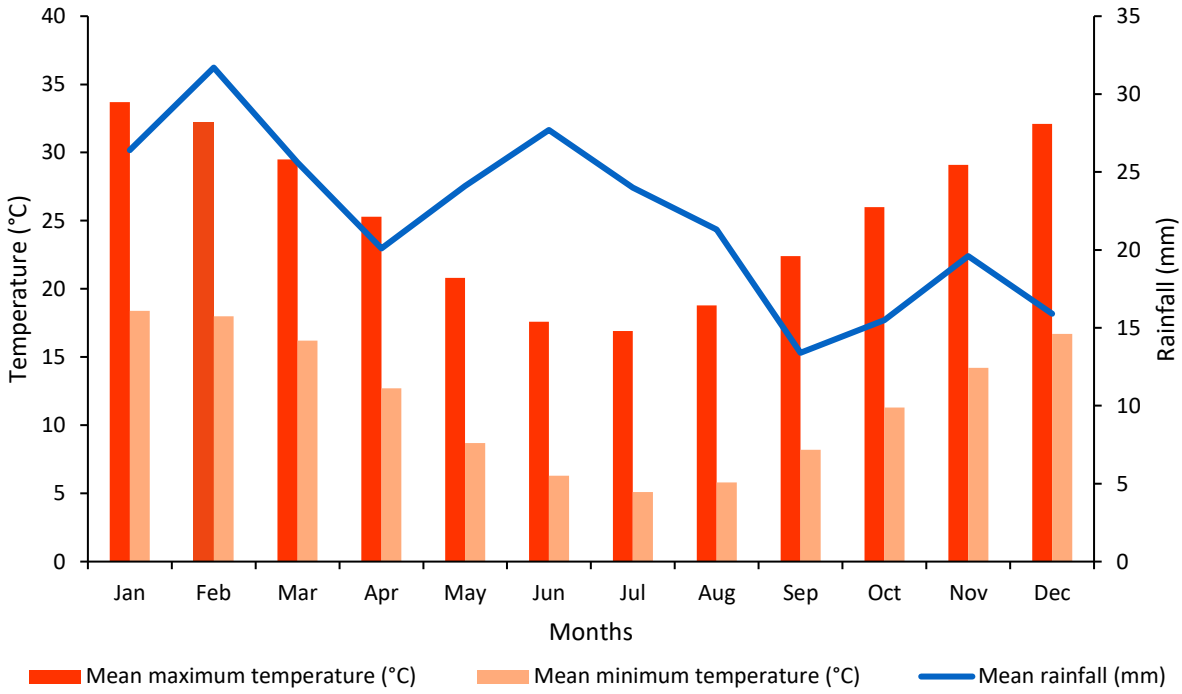

Figure 7: Mean rainfall and climatic data for Kalgoorlie-Boulder 1939-2024

Annual Exceedance Probability (AEP) is defined as the chance that an extreme rainfall event will occur in any given year. Based on AEP calculations by BOM, there is a 1 in 100 (1%) chance that the Kalgoorlie area will receive 52 mm of rain for a 1-hour period, 159 mm for a 24-hour period and 206 mm for a 72-hour period based on AEP calculations (BOM, 2024).

Average long-term annual rainfall is exceeded by average annual evaporation rate (approximately 2,600 mm) by a factor of almost 10 to 1. Evaporation exceeds rainfall in all months of the year, with June having the lowest daily evaporation and January having the highest daily evaporation.

Wind conditions from Kalgoorlie-Boulder airport weather station (#12038) show that morning wind conditions are predominantly easterlies, north-easterlies, and south-easterlies averaging between 12 and 17 km/hr. Afternoon wind direction is variable, and predominantly westerlies, easterlies and south-easterlies averaging between 13 and 18 km/hr.

7.2 Landscape

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (IBRA 2010).

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Crusader-Templar is located within the Austin Botanical District and is part of the Eremaean Botanical Province (Beard, 1976). The Project occurs within the Murchison bioregion and Eastern Murchison subregion (MUR01). The Eastern Murchison subregion lies on northern parts of the Yilgarn Craton, within the Kalgoorlie Province soil-landscape (Tille, 2007). Red/brown calcareous loamy earths are the dominant surface soil group. Located on greenstone and granitic rocks, the relief of this province is subdued and comprises of flat to undulating plains with small valleys. Hills, ranges, salt lakes and stony plains occasionally feature in the landscape. Underlying basement geology is of granite, gneiss and greenstone. Geology of the Eastern Murchison bioregion characteristically features internal drainage, extensive areas of elevated red desert sandplains, broad plains of red-brown soils with breakaways, and paleo-drainage salt lakes. Crusader-Templar is situated at a local topographical high point from where surface drainage flows towards Lake Rebecca, located to the south-west. Ephemeral watercourses are present in the landscape but no permanent rivers, creeks or lakes within the region.

Vegetation of the Eastern Murchison subregion is characterised by low woodlands of eucalyptus and mulga. Eucalypts dominate towards the south and mulga dominates increasingly towards the north. The study area features mulga woodlands, eucalypts, eremophilas, hummock grasslands, saltbush shrublands and *Halosarcia* shrublands (Cowan, 2001). Diverse eucalyptus woodlands are present in valleys, on ranges and around salt lakes.

The region supports numerous mining projects and has been grazed for over 100 years.

7.3 Sensitive Land Uses

A sensitive land use is a residence or other land use which may be affected by an emission or discharge associated with the proposed activities.

Crusader-Templar is located within Edjudina pastoral lease (N049971) which is primarily used for sheep grazing.

The Project is not located within proximity to any legislated lands or waters. The nearest reserve is Goongarrie National Park (R35637) located approximately 55 km south-west. Bullock Holes Timber Reserve (R19825) is located 80 km south-west and Queen Victoria Spring Nature Reserve (R19825) is located 90 km south-east.

A map showing sensitive land uses is provided in **Figure 8**.

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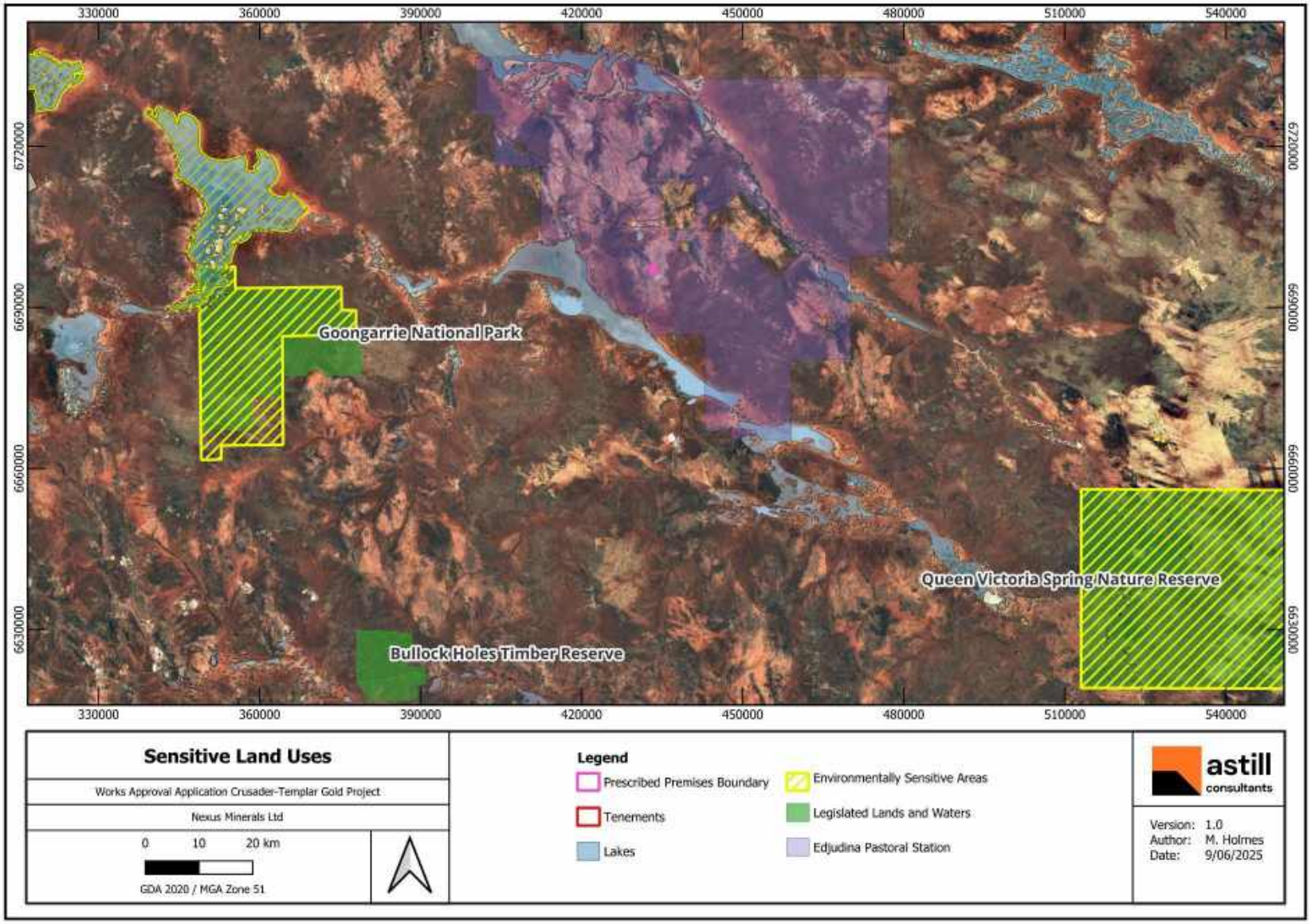

***Figure 8**: Sensitive Land Uses*

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7.4 Biodiversity

Flora, vegetation and fauna studies have been carried out over the Crusader-Templar Project area as summarised in **Table 10**. The following section details the findings of these studies and discusses the management strategies implemented.

Table 10: Summary of Biodiversity Surveys

Survey Type	Author	Year
Detailed Flora & Vegetation	Native Vegetation Solutions	2022
Vertebrate Fauna Reconnaissance and Risk Assessment	Terrestrial Ecosystems	2022
Environmental Assessment	Alexander Holm & Associates	2009

7.4.1 Vegetation & Flora

Pre-European vegetation association dataset (DPIRD, 2019) indicates the Project area is located within one vegetation association. Areas retaining less than 30% of their pre-European vegetation extent generally experience exponentially accelerated species loss, while areas with less than 10% are considered "endangered" (EPA, 2000). As shown in **Table 11** the vegetation association within the surveyed area is Barlee 400 and it retains > 99% of the pre-European extent (Beard et al, 2013). Therefore, development within the prescribed premises boundary will not significantly reduce the extent of pre-European vegetation associations or increase risk of loss. As concluded from previous flora and vegetation surveys, majority of vegetation represents broader vegetation associations and are not considered regionally significant.

Table 11: Pre-European Vegetation Associations

Vegetation Association	Extent Remaining (%)	Structural Description	Floristic Description
Barlee 400	99.45	Succulent steppe with open low woodland. Saltbush and/or bluebush with scattered low trees	Mulga, other wattle, Casuarina, *Atriplex* spp. *Maireana* spp. with *Acacia aneura, A. papyrocarpa, Allocasuarina cristata.*

Native Vegetation Solutions carried out a Detailed Flora and Vegetation survey of the project area in 2022 which defined a total of four vegetation types at Crusader-Templar as described in **Table 12**. Additionally, a bare clay pan comprising 0.93% of the survey area was identified where no vegetation was recorded.

Vegetation in the survey area has been subjected to historical exploration activities and grazing. Vegetation condition was predominantly assessed as "Good" to "Very Good", with some areas of disturbance which were assessed as "Degraded" (Native Vegetation Solutions, 2022). Observed vegetation disturbance was attributed mainly to access tracks and exploration activities. No flora and vegetation types within the survey area were assessed to be pristine (Native Vegetation Solutions, 2022).

Table 12: Vegetation Types

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Vegetation Group Description	Percentage of Survey Area (%)
Mulga over *Maireana sedifolia* shrubland	51.26
Mulga over sclerophyll shrubland	8.28
Open chenopod shrubland with occasional *Mulga*	28.36
Casuarina pauper over *Maireana sedifolia* and *Eremophila pantonii* shrubland on ironstone rocky rises	11.16

7.4.1.1 Conservation Significant Vegetation

No significant vegetation including representatives of Threatened or Priority Ecological Communities (T/PECs) were identified within the prescribed premises boundary (Alexander Holm & Associates, 2009; Native Vegetation Solutions, 2022).

7.4.1.2 Conservation Significant Flora

Based on database searches and verified by survey outcomes, no Threatened or Priority flora species have been recorded in the Project area (Alexander Holm & Associates, 2009; Native Vegetation Solutions, 2022).

Two Priority flora species have been recorded within a 20 km radius of the project area, including:

- *Acacia eremophila* var. Numerous-nerved variant (A.S. George 11924); and
- *Thryptomene eremaea*.

Both Priority flora species were assessed to be unlikely to occur in the Project area due to lack of suitable habitat (Native Vegetation Solutions, 2022).

Development of the Crusader-Templar Gold Project is unlikely to impact any Threatened or Priority flora.

7.4.1.3 Weeds & Introduced Flora

No introduced weed species were detected within the project area (Native Vegetation Solutions, 2022).

7.4.2 Fauna

A vertebrate fauna reconnaissance survey and risk assessment was carried out by Terrestrial Ecosystems in 2022.

Three broad fauna habitats were mapped within the prescribed premises boundary: clay pan, scattered Mulga and Casuarina over mixed shrubs and chenopods over a rocky substrate, and scattered Mulga over mixed shrubs and chenopods over sand and clay (Terrestrial Ecosystems, 2022). Some disturbed area was observed, linked to recent exploration activity and historical disturbance associated with exploration and pastoralism.

Fauna habitats observed in the Project area are considered well represented more broadly in the region. Therefore, fauna assemblage identified in the Project area is likely to be present abundantly

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in the broader region. As such, proposed activities within the prescribed premises boundary are unlikely to impact regional fauna biodiversity value.

Primary impacts to fauna in the area are predicted to be direct loss of habitat from clearing of native vegetation and habitat fragmentation. Other impacts to operations include displacement due to noise, dust, light and introduced fauna and weeds, and mortality due to vehicle/fauna interactions.

No evidence of conservation significant fauna species was observed in the Terrestrial Ecosystems (2022) survey.

Based on desktop and field results, 11 fauna species of conservation significance were identified as potentially occurring in the general area during favourable conditions, or as part of a wider foraging range. An assessment was carried out to determine likelihood of significant fauna species occurring in the Project area (**Table 13**). Eight species of conservation significance were deemed highly unlikely to occur in the Project area and three species were regarded as may infrequently/very infrequently be seen in the region. Assessment concluded a low potential to impact on any of these species in the Project area.

Table 13: *Fauna Likelihood of Occurrence*

Species	Conservation Status		Assessment	Likelihood
	DBCA Schedule / Priority	EPBC Act		
Night Parrot *Pezoporus occidentalis*	Critically Endangered	Endangered	Highly unlikely to be in the project area, due to a lack of suitable habitat. The potential for impacting on this species is therefore very low.	Would not occur
Sandhill Dunnart *Sminthopsis psammophila*	Endangered	Endangered	Highly unlikely to be in the project area, due to a lack of suitable habitat. The potential for impacting on this species is therefore very low.	Would not occur
Malleefowl *Leipoa ocellata*	Vulnerable	Vulnerable	Highly unlikely to be in the project area due to a lack of suitable habitat and prevalence of feral and pest fauna. No evidence of malleefowl activity (inactive or active mounds, tracks, feathers or bird observations etc.) were observed within the survey area. The potential for impacting on this species is therefore very low.	Would not occur
Grey Falcon *Falco hypoleucos*	Vulnerable	Vulnerable	Highly unlikely to be in the project area due to a lack of suitable habitat. The potential for impacting on this species is therefore very low.	Would not occur
Great Desert Skink *Liopholis kintorei*	Vulnerable	Vulnerable	Highly unlikely to be in the project area due to a lack of suitable habitat. The potential for impacting on this species is therefore very low.	Would not occur

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Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Highly unlikely to occur in the project area. The potential for impacting on this species is therefore very low.	Low
Princess Parrot *Polytelis alexandrae*	Priority 4	Vulnerable	May infrequently be seen in the region, however, clearing vegetation is unlikely to impact on this species.	Medium
Mulgara *Dasycercus blythi*	Priority 4		Highly unlikely to be in the project area due to a lack of suitable habitat. The potential for impacting on this species is therefore very low.	Would not occur
Fork-tailed Swift *Apus pacificus*	Migratory	Migratory	May very infrequently be seen in the region, however, clearing vegetation is unlikely to impact on this aerial species.	Low
Grey Wagtail *Motacilla cinereal*	Migratory	Migratory	Highly unlikely to be present in the project area. The potential for impacting on this species is therefore low.	Low
Peregrine falcon *Falco peregrinus*	OS		May very infrequently be seen in the region, however, clearing vegetation is unlikely to impact on this aerial species.	Low

7.4.2.1 Subterranean Fauna

There have been limited subterranean fauna studies conducted in the vicinity of Crusader-Templar. Typically, stygofauna are found in karstic or fractured formations such as calcretes, limestones and alluvial systems (Humphreys, 2000). Within the arid portion of the Yilgarn Craton where Crusader-Templar is located, significant stygal communities have been associated with major calcrete systems in palaeodrainages (Humphreys, 2000). Stygofauna are dependent on less saline groundwater, typically associated with freshwater and precluded where salinity is greater than >60,000 mg/L (EPA, 2016; Humphreys, 2008).

Crusader-Templar and surrounding areas characteristically lack calcrete (Saracen Gold Mines Pty Ltd, 2010), indicating it is unlikely stygofauna are present at Crusader-Templar.

7.5 Surface Water

Crusader-Templar is located within the interior of Western Australia where the climate is arid, resulting in surface water being insignificant and only present ephemerally. The Project is not located near defined rivers, with several local-scale, ephemeral drainage lines traversing the Project tenements. Drainage lines are typically areas of natural depression and remain dry for a greater part of the year.

Crusader-Templar is positioned at a local topographical high point within moderately hilly terrain, with surface drainage flowing from the Project area towards the main local receptor, Lake Rebecca. Lake Rebecca is located approximately 10 km south-west and spans approximately 115 km in length in a north-west to south-east orientation.

The Project is within the Raeside-Ponton catchment, which is part of the Salt Lake Basin of the Western Plateau division. Within this catchment, water is lost to evaporation and seepage enroute to, and in terminal salt lakes. Salt lakes retain most runoff from surrounding catchments, and only overspill after a particularly high rainfall event.

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Proposed operations within watercourses are generally likely to have minor impacts due to the nature of ephemeral drainage lines. Drainage diversion infrastructure will be installed where necessary to ensure that flood risks to the Project at a local scale are mitigated whilst preserving natural flow paths.

The proposed premises boundary of the Project is located approximately 6.7 km from Lake Rebecca at the nearest point. This salt lake is part of a system of connected lakes that drain towards the southeast, A map of regional surface water drainage is provided in **Figure 9.**

There are limited beneficial users of surface water within vicinity of the Project area. Cattle on underlying pastoral leases obtain water from surface water dams located throughout the region.

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Figure 9: *Regional Surface Water*

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7.6 Soils

The Project is located within the Salinaland Plains Zone of the Kalgoorlie Province soil-landscape according to Tille (2007). Soils characteristic of the Salinaland Plains are red sandy earths, red deep sands, red loamy earths and red shallow loams which sometimes feature hardpans. These soils are in association with sandplains including hardpan wash plains, mesas, stony plains and salt lakes on granitic rocks of the Yilgarn Craton.

A search of NRInfo (natural resource information) database (DPIRD, 2018) provided general soils data for Crusader-Templar. The Project area is within the Gundockerta and Nubev land systems, encompassed by the greater North-Eastern Goldfields soil-landscapes as classified by the soil landscapes and land mapping system. The Gundockerta system is associated with extensive, gently undulating calcareous stony plains supporting bluebush shrublands, while the Nubev system is characterised by gently undulating stony plains, minor limonitic low rises and drainage floors supporting mulga and halophytic shrublands. These plains may be susceptible to soil erosion if protective shrub, soil surface or mantle cover is impacted (DPIRD, 2018).

Soil types at Crusader-Templar vary, with calcareous loamy earth and red shallow loam dominant (DPIRD, 2018). Soils across Crusader-Templar are indicated to be neutral to slightly alkaline pH, with low surface salinity between 50-300 mS/m. Organic carbon content is expected to be low with susceptibility to soil structure degradation being variable. Indicative soil characterisation of Crusader-Templar is shown in **Table 14.**

Table 14: *Land Systems and Associated Indicative Soil Qualities at Crusader-Templar According to DPIRD (2018)*

Soil Groups	% of Land System	pH at 20 cm Depth	Surface Salinity (mS/m)	Organic Carbon Content	Structure Degradation Susceptibility
Gundockerta Land System					
Calcareous loamy earth	55	8.5	250	Low	Moderate
Red shallow sandy duplex	25	7	300	Low	Low
Stony soil	10	7	50	Low	Low
Friable non-cracking clay	5	7.5	150	Low	High
Red-brown hardpan shallow loam	5	7	250	Low	High
Nubev Land System					
Red shallow loam	50	7	100	Low	High
Red shallow sandy duplex	30	7	300	Low	Low
Red shallow sand	20	7	75	Low	Moderate

Previous studies of the neighbouring Wallbrook Mine assessed soil properties of the area that can be broadly attributed to Crusader-Templar. Topsoil was described to be relatively coarse textured,

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ranging from clayey sand to gravelly silty clay loam while subsoil was described as clayey fine sand to sandy loam. Soil analysis indicated neutral to slightly alkaline pH and generally low salinity with concentrations of 20-85 mS/m. Total sulphur content was identified to be low and potential for acid generation and associated heavy metal leaching was considered low. Concentrations of plant nutrients were considered typical of the region and adequate for establishment of native vegetation. Concentrations of heavy metals were at concentrations considered unlikely to impact the environment (MBS Environmental, 2009).

During construction of proposed activities, topsoil will be stripped to a minimum depth of approximately 150 mm and stockpiled for rehabilitation purposes. Native plants in the region are well adapted to soil properties detailed above therefore they should not impede vegetation growth.

7.7 Geology

Crusader-Templar is located on the Archean Yilgarn Craton, within the eastern portion of the Norseman-Wiluna Belt of greenstone rocks. The Belt is approximately 600 km in length and characterised by thick, possibly rift-controlled accumulations of ultramafic, mafic, felsic volcanic, intrusives and sedimentary rocks (MBS Environmental, 2024). The Project is associated with the Kurnalpi Terrane, within the Edjudina Region in the Laverton Tectonic Zone. The Keith-Kilkenny Tectonic Zone lies to the west of the Project, with gold mineralisation along the regional north-west striking Kilkenny Fault located six kilometres west of the deposit. Local geology of the Project area features a series of north-east trending faults (Rockwater, 2024a).

Lithologies at Crusader-Templar include intermediate (andesitic) volcanics, intrusive felsic porphyries and granite, with the dominant lithology in the Project area being Wallbrook Monzonite (an intermediate rock) (Rockwater, 2024a). North of the monzonite are relatively smaller granitic intrusions and related narrow felsic porphyry dykes/sills which run predominantly parallel to the regional trend.

A waste rock characterisation study has been carried out for Crusader-Templar by MBS Environmental in 2024 (MBS Environmental, 2024). Main lithologies described at Crusader-Templar included: volcaniclastic, volcanic undifferentiated, porphyry and schist, with volcaniclastic lithologies being the predominant waste rock.

These lithologies are described slightly differently in the field where differentiation of the porphyry dykes is the focus, with a block model that has a coarser description. **Table 15** is a translation of terms used by the geologist and MBS (2024).

Table 15: *Lithology translation*

Lithology (MBS 2024)	Lithology (block model & waste rock volumes)	Comments
Porphyry, Intrusive undifferentiated	Felsic intrusive, Granite intrusive	Series of elongate feldspar-quartz porphyry dykes.

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Volcaniclastic, Volcanic undifferentiated, Schist	Intermediate volcanic, Sediments, Mafic (historic terminology and comprises most of the Mafic classification)	These terms are used collectively for the same package. Represent a thick sequence of intermediate volcanic and associated volcaniclastic host rocks. Texturally variable and strongly to intensely foliated. Differentiation in the field often challenging.
Basalt	Mafic (very low portion of the Mafic classification)	Proterozoic dyke (low volume)

Minerology determined silicates as the dominant mineral group, comprising 60-70% by mass. No sulfide containing minerals such as pyrite were detected. Carbonates accounted for 2–7% by mass across lithologies, and predominantly present as calcite. Todorokite was indicated in volcanics and schist. Clays comprised 6-20%, predominantly as mica with some kaolin present, while amorphous minerals accounted for 11–17% across lithologies (MBS Environmental, 2024).

7.8 Groundwater

7.8.1 Hydrogeology

Crusader-Templar is located within the Eastern Murchison subregion, which is associated with fractured bedrock aquifers. In this area, groundwater predominantly resides in weathered rock zones near fresh rock interfaces, and within ancient alluvial paleochannel aquifer complexes as part of salt lake systems. Groundwater is primarily replenished by infrequent, high intensity rainfall events, with water entering aquifers directly via salt lake basins and gravitationally via basement rock fractures (Kern, 1995).

A preliminary mine dewatering assessment and a H2 hydrogeological assessment for dewatering of Crusader-Templar deposit was carried out for the Project by Rockwater Pty Ltd in 2024, attached as **Attachment 2**. Groundwater chemistry was analysed via water samples collected from a bore in the Project area expected to be representative of groundwater from the fractured rock aquifer. Falling-head tests were conducted as a method of permeability testing. Nine RC boreholes and two diamond cored boreholes were selected to target representative rock units surrounding the proposed site.

7.8.2 Water Quality

Groundwater in the area was identified to be brackish, with Total Dissolved Solids (TDS) of 3,920 mg/L and EC at 25°C of 7050 µS/cm (Rockwater, 2024b). The salinity of local groundwater indicates limited groundwater use outside of mining. pH was indicated to be slightly alkaline with a value of 7.98. Mineral content was predominantly sodium, chloride and bicarbonate.

7.8.3 Water Level

Standing water levels at Crusader-Templar indicated to range from 349 m Australian Height Datum (AHD) in the north-east of the Project to 346 m AHD in the south-west. Water levels exhibited a regional groundwater system flowing from the north-east and west, across the proposed mining

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voids, towards Lake Rebecca in the west. This finding was consistent with local topography (Rockwater, 2024b).

Depth to water was indicated to range from 26 m bgl at the northern Templar deposit to 32 m bgl in the southern Crusader deposit (Rockwater, 2024b). Proposed open pit mining voids at Crusader-Templar will be below groundwater level. Dewatering by sump pumping is required to remove groundwater inflows and rainfall from the voids.

7.8.4 Scheme Description

Hydraulic conductivity values broadly indicated one order of magnitude difference between fresh rock (10^{-3} m/d), weathered rock (10^{-2} m/d) and fractured rocks (10^{-1} m/d) while mineralised rock produced variable values (Rockwater, 2024b).

Groundwater chloride concentration was used to estimate a groundwater recharge rate of 0.6 mm/a, or 0.2% of annual rainfall at Crusader-Templar. In the general area, the groundwater table has been indicated to be deeper than 20 m bgl, thus groundwater loss through evapotranspiration was deemed to be minimal (Rockwater, 2024b).

Rockwater (2024b) developed and ran a numerical groundwater model and estimated conservative likely dewatering flows required to provide dry mining conditions at Crusader-Templar. Mine dewatering requirements were predicted to peak at 27.5 L/s after 16 months before decreasing to approximately 20 L/s as mining advances below the weathered zone. Pit inflow estimates using analytical calculations suggested similar peak dewatering inflows of 30.3 L/s. Annualised dewatering requirements for the first and second years of mining were projected to be 9.8 L/s and 22 L/s, respectively. Additionally, modelling results indicate that at the end of mining, a one metre drawdown extent could extend 1500 m radially from the pit. However, groundwater inflows are expected to be lower than predicted due to groundwater abstraction from the Northern Star operated Wallbrook Pit (located approximately 600 m south) occurring since the Rockwater (2024b) survey.

7.9 Heritage

7.9.1 Aboriginal Heritage

There is currently one determined Native Title group over the Project area, Nyalpa Pirniku (WC2019/002) determination. Nexus has consulted with the Nyalpa Pirniku group in relation to the Project and maintains appropriate engagement with relevant knowledge holders and the Native Title group.

A search of DPLH Aboriginal Heritage Inquiry System (ACHIS) indicated no places of Aboriginal Heritage significance in the area, as shown in **Figure 10**. Nearest Aboriginal heritage site (DPLH Place ID 2327) is located approximately 7.4km north of the prescribed premises boundary.

An Aboriginal heritage survey was carried out for the Project in 2024 by Daniel de Gand and Associates Pty Ltd with Aboriginal Heritage Consultants of the Nyalpa Pirniku Native Title Group (WC2019/002). Due to confidentiality, the heritage survey report has not been attached to this

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Works Approval application. The nearest site is located 4.5km to the south west of prescribed premises boundary. Aboriginal Heritage Consultants confirmed no Aboriginal heritage sites, Lodged Places nor Historical places occur on proposed Crusader-Templar Project tenure and consent was given to proceed with proposed works (Daniel de Gand and Associates, 2024).

7.9.2 European Heritage

All European heritage places listed in the WA State Register are protected under the *Heritage Act 2018*. A search of DPLH's inHerit database shows there are no heritage places located in vicinity of the Project. The closest heritage place (included in the State Heritage Register) is Niagara Dam (Place no. 1557) located approximately 98 km north-west of the Project.

No European heritage places will be impacted due to mining operations.

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***Figure 10**: Aboriginal Heritage Sites*

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Attachment 2 – Hydrogeological Assessment Report

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WALLBROOK GOLD PROJECT

H2 HYDROGEOLOGICAL ASSESSMENT FOR DEWATERING OF CRUSADER-TEMPLAR DEPOSIT

REPORT FOR
NEXUS MINERALS LIMITED

JULY 2024

Report No. 527.1/24/02

Rockwater
HYDROGEOLOGICAL AND ENVIRONMENTAL CONSULTANTS

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TABLE OF CONTENTS

Tables

Chart

TABLE OF CONTENTS

(Continued)

Figures

Appendices

[redacted]

1 INTRODUCTION

Nexus Minerals Limited (Nexus) is planning to develop the Wallbrook Gold Project (the Project), located approximately 150 km northeast of Kalgoorlie in the Eastern Goldfields (Figure 1). Stage 1 development of the Project involves mining of the Crusader-Templar gold deposits across multiple pits over approximately 28 months. It is proposed to develop up to six open pit mines and three of these (Crusader South, Templar South, and Templar North) are planned to be mined below the water table (~ 25 m bgl) and will require dewatering (Section 3.2).

This report is intended to facilitate the Department of Water and Environmental Regulation's (DWER's) assessment of Nexus Minerals Limited's application for a 5C licence to take 763,000 kL/annum from the Goldfields Groundwater Area (Rebecca Subarea) Combined - Fractured Rock West - Fractured Rock aquifer, on tenements M31/231, M31/251 and M31/502. This assessment report follows the guidance outlined in the DWER Operational Policy no.5.12 – Hydrogeological reporting associated with a groundwater well licence (Department of Water, 2009) for an H2 level hydrogeological assessment.

2 PROJECT SETTING

2.1 LOCATION AND LANDUSE

The Wallbrook Project is located within the Edjudina pastoral lease, which is primarily used for sheep grazing. The Project's Templar-Crusader gold deposit lie within Nexus' mining leases M 31/502, M 31/251, and M 31/231 within the pastoral lease. The planned southernmost pit will mine into the Crusader deposit, and is expected to be about 640 m long, 270 m wide and 123 m deep. The northernmost pit will mine into the Templar deposit and is expected to be 330 m long, 250 m wide and 124 m deep. Templar South pit will also mine into the Crusader deposit, but only to a depth of 60 m bgl.

Nexus is currently undertaking mineral exploration drilling within the mining leases. Northern Star Resources (Carosue Dam), or NSR, has operated the Porphyry underground mine located 6 km north of the Project since October 2022. A waste rock dump and a disused open pit from historical NSR operations are also located 500 m south of the Project.

2.2 CLIMATE

The climate at Wallbrook is characterised by hot, dry summers and cold winters. The region is classified as arid, with a mean annual rainfall of 263 mm with most rainfall occurring between December and March. The mean annual evaporation is 3,645 mm and exceeds rainfall in every month of the year and exceeds the mean annual rainfall by more than an order of magnitude. The average rainfall and evaporation data for Wallbrook (-21.85, 122.31), derived from the SILO database is shown in Chart 1.

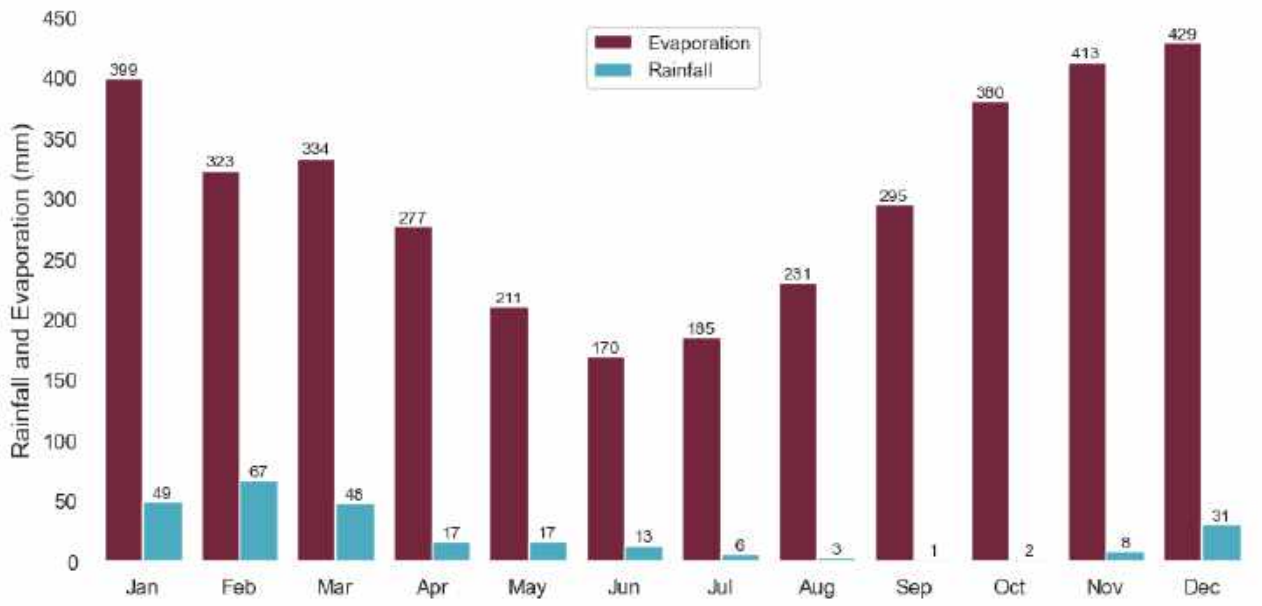

Chart 1: Average climate statistics

2.3 TOPOGRAPHY AND DRAINAGE

The topography of the Wallbrook area is moderately hilly, rising to 454 m above height datum (m AHD) in the north-east and falling to about 334 m AHD at Lake Rebecca to the south-west (Figure 2). The tenement area is a local high point from where surface drainage eventually flow towards Lake Rebecca to the south-west. The Project area has no known perennial surface water drainage lines, with flows likely being ephemeral and occurring only briefly after a significant rainfall event.

3 HYDROGEOLOGICAL SETTING

The Wallbrook Project occurs within the Norseman – Wiluna Archaean Greenstone belt in the Eastern Goldfields province of the Yilgarn Craton. The Project is located within the Edjudina Region in the Laverton Tectonic Zone, centrally between Kalgoorlie and Laverton. The granite-greenstone belt is characterised by thick, possibly rift-controlled accumulations of ultramafic, mafic, felsic volcanic, intrusive, and sedimentary rocks. Greenstone successions of the southern Eastern Goldfields have been segregated into elongate structural terranes bounded by regional NNW-trending faults (Swager, 1995). The Wallbrook Project is associated with the Kurnalpi Terrane, with gold mineralisation along the regional northwest striking Kilkenny Fault (Figure 3). The mafic-felsic rocks hosting the Crusader-Templar deposit at Wallbrook are bounded by regional Kilkenny Fault six kilometres to the west and large granitoid intrusions to the east.

The local geology of the project area is shown in Figure 4. The lithologies at Wallbrook are comprised of intermediate (andesitic) volcanics, intrusive felsic porphyries and granite, with Wallbrook Monzonite (an intermediate rock) being the dominant lithology in the project area (Nexus, 2024a). The local geology of the Project area is crosscut by a series of northeast trending faults, and higher groundwater yields have been noted from boreholes intersecting some of these faults (further groundwater discussion in Section 3.1).

Within the felsic lithologies there is a correlation between the hematite/silica alteration and gold mineralisation. Gold mineralisation is related to hematite bearing oxidized alteration assemblages, with deposition occurring where gold bearing fluids have come into contact with earlier magnetite-hematite assemblages (Nexus, 2024a). The Wallbrook Project will mine into the NNW trending zone of mineralisation to about 120 m below ground level as part of the Stage 1 mining development (Chart 2).

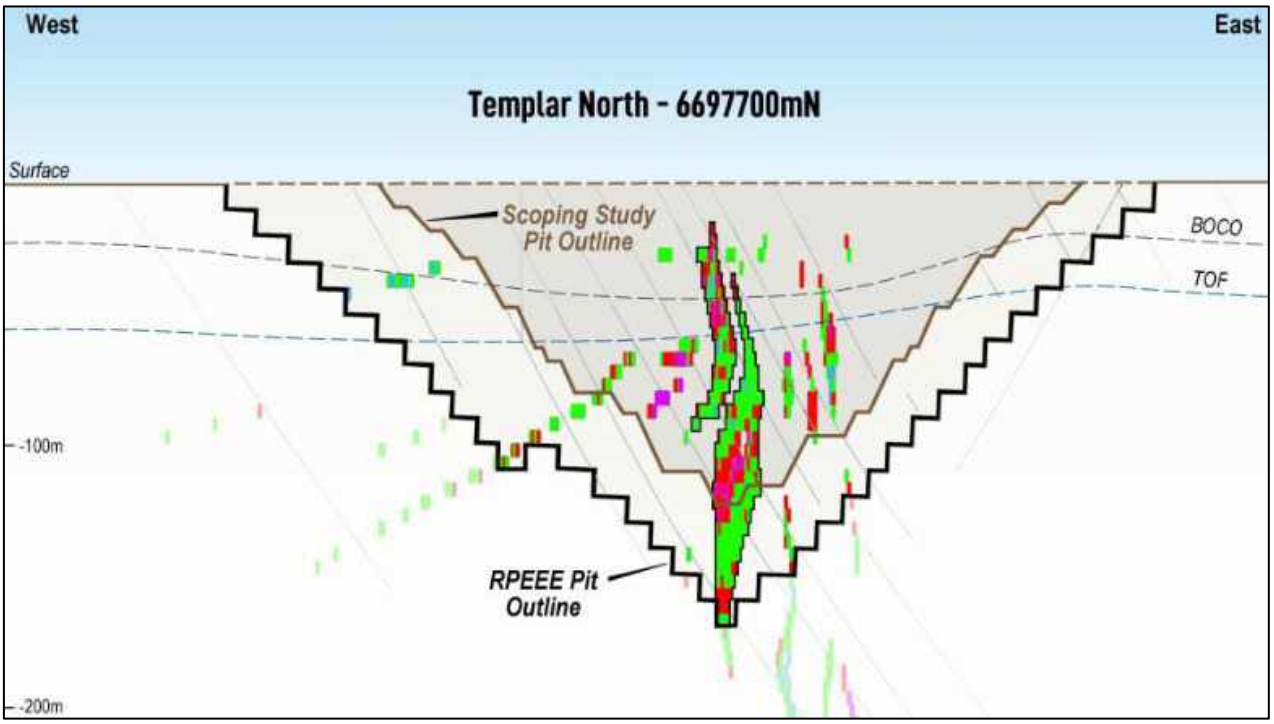

Chart 2: Cross section showing mineralisation in the Northern Templar Deposit (from Nexus, 2024b)

3.1 Groundwater occurrence

Groundwater at Wallbrook primarily occurs at the contact between the weathered rock and the underlying fresh rock. The rate of groundwater inflow, or bore yields, is determined by the presence and interconnectivity of water-bearing, permeable fractures, which enhance the natural rock's permeability through fracturing, dissolution, and chemical weathering processes. However, these fractured rock aquifers may have limited sustainable yields due to the limited storage of the interconnected water-bearing fractures.

The occurrence of fractures and depth of weathering can therefore be used to infer where higher groundwater yields could occur. A review of Nexus' exploration drilling database suggests that the depth to base of weathering is 64 m bgl. As groundwater levels at Wallbrook occur around 30 m bgl much of the weathered profile is saturated (Section 3.2). The weathered profile is therefore a potential source of groundwater inflow to the proposed pit.

The depth and degree of fracturing recorded by the available drill core RQD measurements at Wallbrook are shown in Chart 3. The frequency of fracturing decreases with depth and is a function of the lower rock strength due to weathering. The likelihood of fracturing decreases beyond 80 m, likely due to the pressure of the overlying rock mass impeding the formation of fractures. Deeper fractured intervals are representative of regional faulting or zone of mineralisation; however, these have not been observed in from the RQD data from Wallbrook.

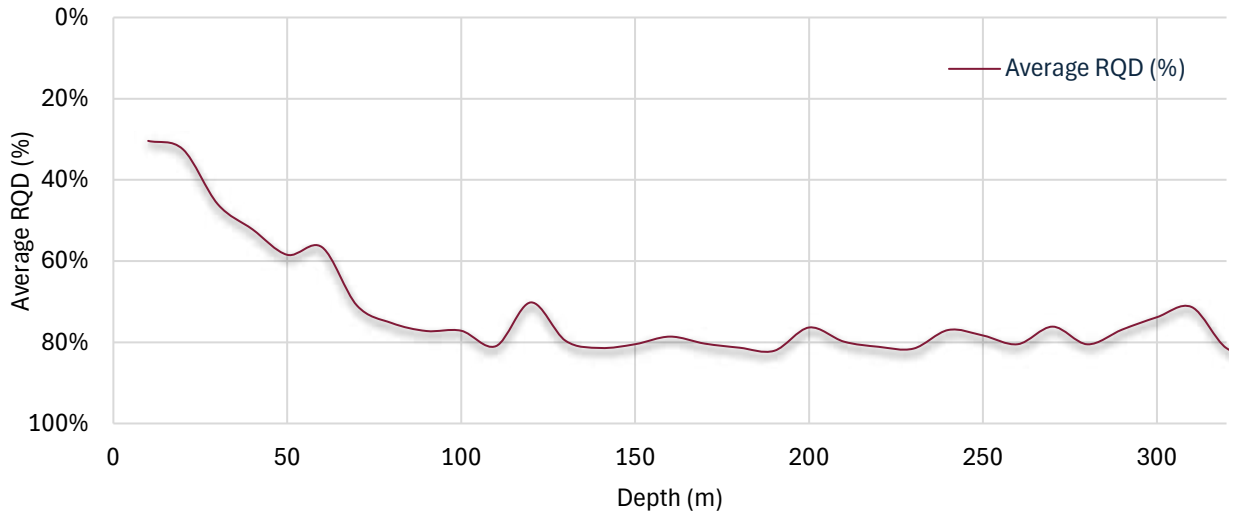

Chart 3: RQD vs depth

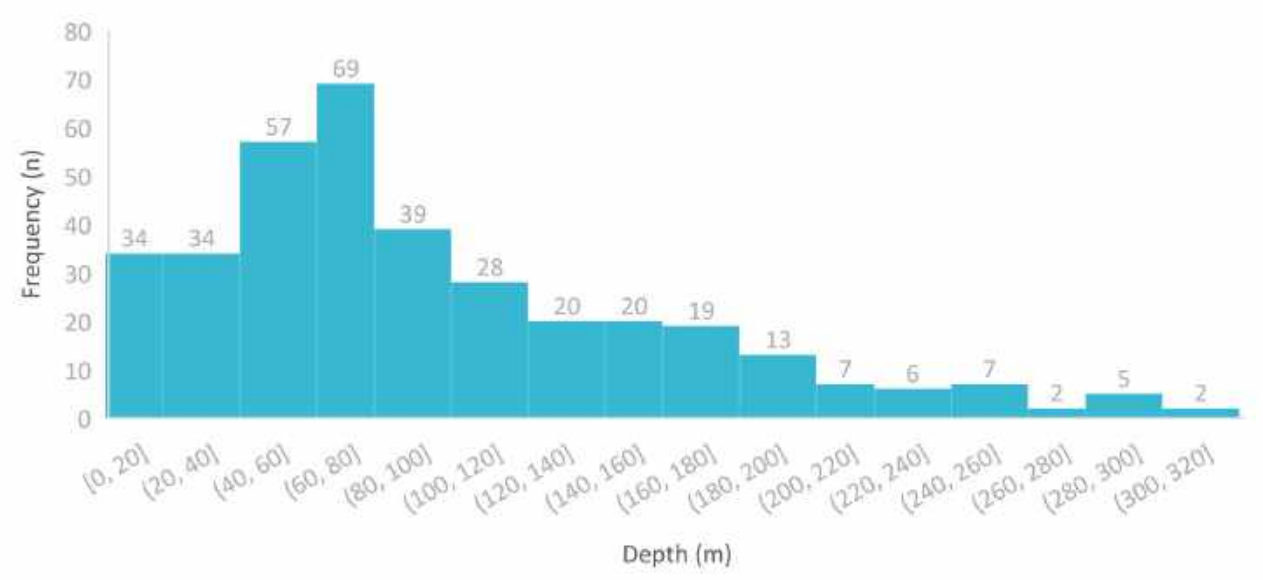

Chart 4: Waterstrike occurrence

The base of weathering (64 m) and occurrence of fractured intervals (< 80 m) broadly coincide with the depth of waterstrike occurrence peaking between 60 to 80 m (Chart 4). Whilst no airlift yield flow rates have been measured, higher groundwater yields have been noted in drillholes that intersect mapped structures such as fractures, lithological contacts, and mineralised zones. The locations of drillholes with higher than usual groundwater intercepts are shown in Figure 4.

3.2 WATER LEVELS AND FLOW DIRECTION

To provide pre-mining water levels for the groundwater model, groundwater contours were developed from water level measurements recorded at Wallbrook during the site visit, these are presented in Table 1, and shown in Figure 5. The measurements indicate that the standing water level (SWL) ranges from 349 m AHD in the northeast of the project to 346 m AHD at the southwest. The regional groundwater system flows from the northeast and west across the open pits towards Lake Rebecca in the west, consistent with the local topography. The depth to water ranges from 26 m bgl at the northern Templar deposit to 32 m bgl in the southern Crusader deposit.

Table 1: Water level measurements

Bore	Easting[1]	Northing[1]	Elevation (m AHD)	Deposit Area	Measured Date	SWL (m bgl)	SWL (m AHD)
NMWBDD22-019	433,487	6,697,747	372.52	Templar	28/05/2024	23.31	349.21
NMWBRC21-197	433,242	6,697,698	371.26	Templar	28/05/2024	26.14	345.12
NMWBRC22-330	433,204	6,697,464	371.61	Templar	28/05/2024	25.33	346.28
CRUC005	433,341	6,697,391	372.90	Templar	28/05/2024	25.28	347.62
NMWBRC22-289	433,325	6,696,540	376.68	Crusader	28/05/2024	30.34	346.34
NMWBRC22-618	433,614	6,696,523	378.05	Crusader	28/05/2024	30.66	347.39
NMWBRC22-569	433,463	6,696,480	378.04	Crusader	28/05/2024	31.63	346.41
NMWBRC22-569	433,463	6,696,480	378.04	Crusader	28/05/2024	31.38	346.66
NMWBDD24-27	433,447	6,696,432	378.30	Crusader	29/05/2024	32.37	345.93
WBRC176	433,531	6,696,427	378.59	Crusader	27/05/2024	32.79	345.80
NMWBRC22-558	433,485	6,696,339	378.74	Crusader	28/05/2024	33.47	345.27
NMWBRC22-558	433,485	6,696,339	378.74	Crusader	28/05/2024	33.49	345.25
NMWBRC19-026	433,470	6,696,298	378.50	Crusader	28/05/2024	25.56	352.93*

*likely to be stagnant water in collapsed hole

Planned mining depths for the Templar North (124 m bgl), Templar South (60 m bgl) and Crusader South (123 m bgl) extend below the standing water level and will require dewatering to provide dry mining conditions.

3.3 Recharge and discharge

The estimated groundwater recharge rate at Wallbrook is 0.6 mm/a, or 0.2% of annual rainfall. This recharge rate is preliminary estimate based on groundwater chloride concentration from NMWBRC22-296 and chloride deposition rates from Wilkins et. al. (2022). The weathered rock aquifer is recharged by direct infiltration of rainfall or by infiltration of surface water during periodic stream-flows. The fractured rock aquifer is predominantly recharged by leakage from overlying weathered profile.

Locally, the groundwater table is deeper than 20 m bgl so groundwater loss through evapotranspiration is expected to be minimal. Groundwater flows towards Lake Rebecca (a salt lake) following local topography, where is eventually discharges.

4 EXISTING GROUNDWATER USE

4.1 OTHER GROUNDWATER USERS

NSR is the closest licensed groundwater user to the Wallbrook Project. NSR holds two groundwater licences; GWL 169295 and GWL 157428 which have a combined groundwater allocation 6 GL/a from the Combined - Fractured Rock West - Fractured Rock aquifer. The next closest licenced groundwater user is Rock Mining Australia Pty Ltd, located 7 km northeast of the project area, with an allocated volume of 1,500 kL from the same aquifer.

Details of the licenced groundwater users are summarized in Table 2 and their locations are shown in Figure 6. Also shown are the locations of registered bores in proximity to the project. Water level and water quality records from bores within 3 km of the project is summarized in Table 3.

Table 2: Groundwater licence holders near the Project

Licence number	Distance from Wallbrook (km)	Owner	Allocation (kL/annum)	Expiry date	Aquifer
157428	0	Northern Star (Carosue Dam) Pty Ltd	4,000,000	30/06/2024	Combined - Fractured Rock West - Fractured Rock
169295	3	Northern Star (Carosue Dam) Pty Ltd	2,000,000	30/06/2024	Combined - Fractured Rock West - Fractured Rock
203473	7	Rock Mining Australia Pty Ltd	1,500	15/10/2029	Combined - Fractured Rock West - Fractured Rock

Table 3: Summary of registered bores around 3 km of the Project

Site Ref	Name	Easting	Northing	Depth	Water level	TDS
		GDA2020 Zone 51		m	m bgl	mg/L
120415917	Porphyry Pw 55	435,816	6,698,991	48	-	-
120415916	Well	435,816	6,698,991	24	-	-
120415907	West Extension	436,359	6,695,878	37	-	6,350
120415905	Porphyry Pw 25	432,287	6,700,829	-	-	2,620
120413281	Porphyry Pw 65	436,784	6,694,467	64	21.25	1,220
120413274	Porphyry Pw 64 Prod	432,521	6,700,143	57	20.85	2,190
120413273	Porphyry Pw 23A Prod	432,521	6,700,143	48	17.05	8,400
120413267	Porphyry Pw 23	436,315	6,695,865	48	21.25	4,470
120413266	Porphyry Pw 55	436,315	6,695,865	49	21.22	3,100

4.2 GROUNDWATER DEPENDENT ECOSYSTEMS

Potential groundwater-dependent ecosystems (GDEs) are delineated in the Bureau of Meteorology's online GDE database (http://www.bom.gov.au/water/groundwater/gde/map.shtml). The GDE data for the Project area are presented in Figure 7.

The closest potential GDE communities occurs approximately 4 km west of the Project site. This area is classified as a high-potential terrestrial GDE, featuring "Calcareous plains supporting acacia, black oak, and mallee shrublands/woodlands adjacent to salt lake systems." A low-potential GDE community with similar vegetation also occur about 7 km southeast of the Project site.

4.3 CULTURALLY SIGNIFICANT GROUNDWATER

Locations of the nearest Aboriginal heritage areas are presented in Figure 8. The nearest registered Aboriginal heritage site is Lake Rebecca, located 9 km southwest of the Project. The lake is considered to have mythological heritage values. Artefacts have been recorded at sites 8 km to the north of the Project area. Cultural heritage surveys should be undertaken ahead of any clearing at the Project.

5 GROUNDWATER INVESTIGATIONS

5.1 AQUIFER TEST

To provide an initial estimate of hydraulic conductivities for use in groundwater modelling, Rockwater conducted falling-head tests in nine RC boreholes and two diamond cored boreholes during May 2024. Test locations were selected to target representative rock units surrounding the proposed pit area, at the locations shown in Figure 4. The representative rock units in each borehole were determined by data provided by Nexus, including lithology, depth of weathering, mapped fractures and mineralisation zones.

Falling head tests comprised injecting at least 20 L slug of water into each bore to create a near-instantaneous rise in water level, and then measuring the fall in water level until it reached its original position. Also known as a “slug test”, this method of permeability testing provides a simple and cost-effective alternative to a pumping test, which requires a production bore to be installed and pumped for one day or more. However, unlike pumping tests, slug tests only sample a narrow zone of aquifer around the bore and may not be representative of the bulk of the aquifer. Furthermore, slug tests tend to give lower values of permeability than those obtained from pumping tests.

Water level displacement (recovery) data from the slug tests were analysed for hydraulic conductivity using the Bouwer & Rice (1976) method for an unconfined aquifer. The results of the analyses of the falling head test are presented as Appendix I and summarised in Table 1.

The results from the slug tests indicate that:

- Fresh rock has a low hydraulic conductivity of 0.006 to 0.008 m/d;
- Weathered rock has a moderate hydraulic conductivity between 0.06 to 0.09 m/d;
- Fractured rock has a high hydraulic conductivity of 0.1 m/d; and
- Mineralised rock has variable hydraulic conductivities of 0.003 to 1 m/d.

The derived hydraulic conductivity values broadly indicate one order of magnitude difference between fresh rock (10^{-3} m/d), weathered rock (10^{-2} m/d) and fractured rocks (10^{-1} m/d). Although only two slug tests were conducted in the mineralised zone, the results indicate hydraulic conductivity values can potentially vary by several orders of magnitude, up to 1.1 m/d.

Table 4: Summary of slug test data

Bore	Easting[1]	Northing[1]	Geology	Hole depth (m bgl)	SWL (m bgl)	B (m)	H_0 (m)	Hydraulic conductivity (m/d)
NMWBRC19-026	433,470	6,696,298	Weathered rock	53	25.56	24	0.31	0.080
NMWBRC22-330	433,204	6,697,464	Weathered rock	84	25.33	59	2.40	0.090
NMWBRC22-289	433,325	6,696,540	Weathered rock	78	30.34	48	1.21	0.055
NMWBRC21-197	433,242	6,697,698	Fractured rock	60	26.14	34	0.71	0.107#
WBRC176	433,531	6,696,427	Fresh rock	104	32.79	66	1.93	0.008
NMWBDD22-019	433,487	6,697,747	Fresh rock	259	23.31	232	1.19	0.006
NMWBRC22-558	433,485	6,696,339	Mineralised	126	33.47	drill hole likely collapsed		
NMWBRC22-558	433,485	6,696,339	Mineralised	126	33.49	drillhole collapsed		
NMWBRC22-569	433,463	6,696,480	Mineralised	102	31.63	70	*	-
NMWBRC22-569	433,463	6,696,480	Mineralised	102	31.38	71	0.16	1.089
NMWBDD24-27	433,447	6,696,432	Mineralised	86	32.37	49	3.38	0.005

[1] Datum MGA2020 Zone 51
Recovery data transformed using the Agarwal (1980) method; Cooper-Jacob analysis
* No hydraulic response was observed
m bgl = metres below ground level; SWL = vertical standing water level; b = saturated thickness; H_0 = initial displacement; K = hydraulic conductivity

5.2 WATER QUALITY

Water samples were collected from bore NMWBRC22-296 during the field visit on 28 May 2024. More than three times the bore's water volume was purged before sampling. The samples were then submitted to NATA-accredited laboratory (ALS) for comprehensive water analyses. No other boreholes were sampled due to the absence of properly cased bores, which prevented adequate purging.

The sample from NMWBRC22-296 is expected to be representative of groundwater from the fractured rock aquifer at Wallbrook. The water quality at Wallbrook is slightly alkaline and is brackish with Total Dissolved Solids (TDS) of 3,920 mg/L. The sampled water quality meets the Australian Drinking Water Guidelines (ADWG) health standards, but exceeds its aesthetic thresholds for salinity, hardness, total alkalinity, sodium, chloride, and sulphate (NHMRC, NRMMC, 2011). The field measurements and laboratory results are presented together with the ADWG guidelines in Table 5.

Table 5: Results of laboratory water quality analyses

Analytes	Units	LOR	NMWBRC22-296	ADWG value^
Field pH	pH Unit	0.01	6.66	(6.5 - 8.5)
Field Electrical Conductivity @ 25°C	µS/cm	1	5860	-
pH	pH Unit	0.01	7.98	(6.5 - 8.5)
Electrical Conductivity @ 25°C	µS/cm	1	7050	-
Total Dissolved Solids @180°C	mg/L	10	3920	(600)
Total Hardness as CaCO3	mg/L	5	706	(200)
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	-
Carbonate Alkalinity as CaCO3	mg/L	1	<1	-
Bicarbonate Alk.[2]	mg/L	1	678	-
Total Alk.[1]	mg/L	1	678	(200)
Sulphate as SO4[1]	mg/L	1	315	500 (250)
Chloride	mg/L	1	1570	(250)
Calcium	mg/L	1	75	-
Magnesium	mg/L	1	126	-
Sodium	mg/L	1	1300	(180)
Potassium	mg/L	1	16	-
Aluminium	mg/L	0.01	0.02	(0.2)
Arsenic	mg/L	0.001	<0.001	0.01
Cadmium	mg/L	1.00E-04	<0.0001	0.002
Chromium	mg/L	0.001	<0.001	0.05
Lead	mg/L	0.001	<0.001	0.01
Manganese	mg/L	0.001	0.002	0.5 (0.1)
Selenium	mg/L	0.01	<0.01	0.01
Zinc	mg/L	0.005	<0.005	(3)
Iron Dissolved	mg/L	0.05	<0.05	(0.3)
Mercury	mg/L	1	<0.0001	0.001
Reactive Silica	mg/L	0.05	16.1	(80)
Ammonia as N	mg/L	0.01	0.01	-
Nitrite as N	mg/L	0.01	<0.01	3
Nitrate as N	mg/L	0.01	16.2	50
Nitrite + Nitrate as N	mg/L	0.01	16.2	-
TKN as N	mg/L	0.1	1.4	-
Tot. Nitrogen as N	mg/L	0.1	17.6	-
Tot. Phos. as P	mg/L	0.01	0.05	-
Reactive P as P	mg/L	0.01	<0.01	-
Total Anions	meq/L	0.01	64.4	-
Total Cations	meq/L	0.01	71.1	-
Ionic Balance	%	0.01	4.93	-

1. NHMRC, NRMMC (2011) ADWG values. Aesthetic guideline values in brackets
2. Guideline values are provided as NO_x. A nitrate guideline value of 50 mg/L NO_3 is equivalent to 11 mg/L NO_3 as N.
3. ADWG2011: Guideline value will protect bottle-fed infants under 3 months from methemoglobinemia. Adults and children over 3 months can safely drink water with up to 100 mg/L nitrate.

6 ASSESSMENT OF POTENTIAL IMPACTS

6.1 METHOD

A simple numerical groundwater model was constructed to estimate dewatering the required dewatering rated to provide dry mining conditions. The groundwater model utilises Processing Modflow Pro-Version 8, which incorporates MODFLOW, the industry-standard finite-difference groundwater modelling software designed by the U.S. Geological Survey (McDonald and Harbaugh 1988). The model domain comprised a 6 x 6 km area, subdivided into 120 rows and 120 columns, resulting in model cell sizes of 50 x 50 m.

6.1.1 HYDRAULIC PARAMETERS

Two horizontal model layers were used, as shown in Chart 5. The upper layer represents a weathered rock interval; and the lower layer representing fresh rock.

Hydraulic conductivities of the geological zones were assigned based on the field-derived slug test values discussed in Section 5.1. Specific storage values in the fresh bedrock were not measured from the slug tests and have been assumed to be low, to take into account increasing compaction and lower storativity with increasing depth. The parameters assigned to each layer and geological zones are provided in Chart 5.

In addition to the model layers, two additional geological zones representing discrete fractured rock and mineralised zone were defined in the model. The fault zone was assigned a value of 0.1 m/d, based on the slug test results from NWNMWBRC21-197 which intersects the fractured rock (Section 5.1). The upper range of hydraulic conductivity measured from slug tests in the mineralised zone were adopted to model a conservative (higher) dewatering requirement.

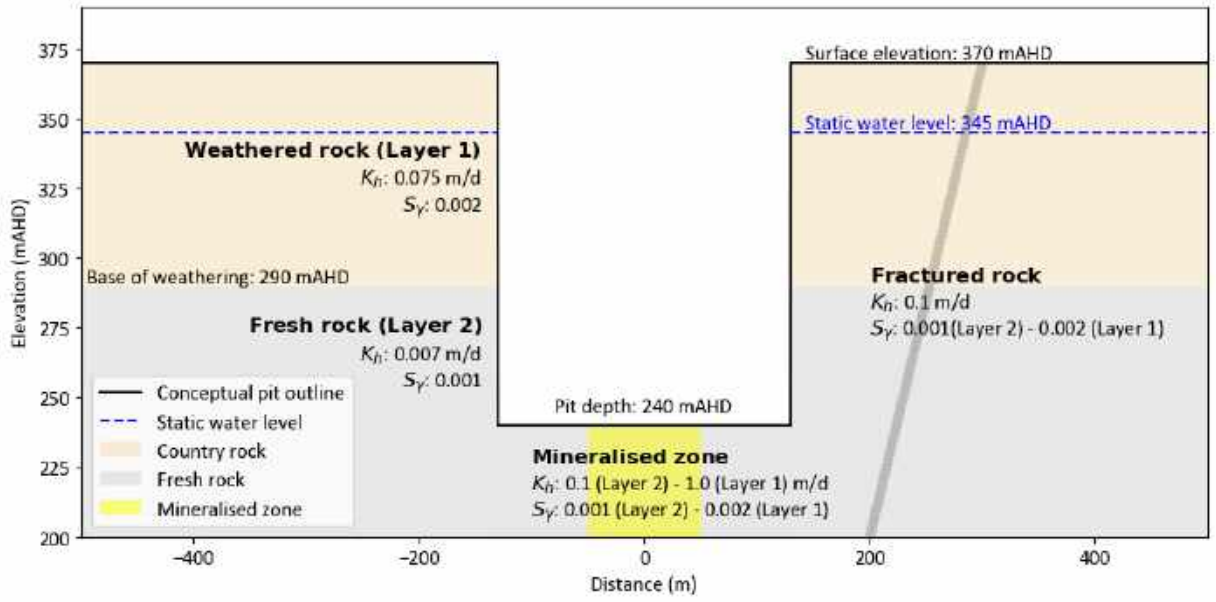

Chart 5: Model conceptualisation and parameters

6.1.2 FLOW BOUNDARIES AND STARTING HEADS

The north and east model boundaries were assigned as constant head boundaries to simulate higher water levels due to topography and groundwater flow from the north and east of the model domain. Initial heads adopted for the model are conservatively based on some of the shallower depth to water (345 m AHD) measured from Wallbrook (Section 3.2), which will result in slightly higher dewatering volumes. A model scenario was also run with no constant head boundaries applied; the difference in peak dewatering results were minor (< 4%).

6.1.3 DRAIN CELLS

Mine dewatering was simulated by placing 'drain' cells in areas of the pit floor. A drain cell can be manipulated to remove as much water as necessary from that cell to lower the water table to the elevation specified and is therefore equivalent to pumping from a sump at that position.

Drain cells are located within Templar North, Templar South, and Crusader South pits (Figure 4), with dewatering expected to be required from the first year until the pits are mined to depth over a 28-month life of mine. Mining depth is assumed to progress from 370 m AHD (surface level) to 240 m AHD (Templar North and Crusader South pit) and 305 m AHD (Templar South pit) over its life of mine as depicted in Chart 6.

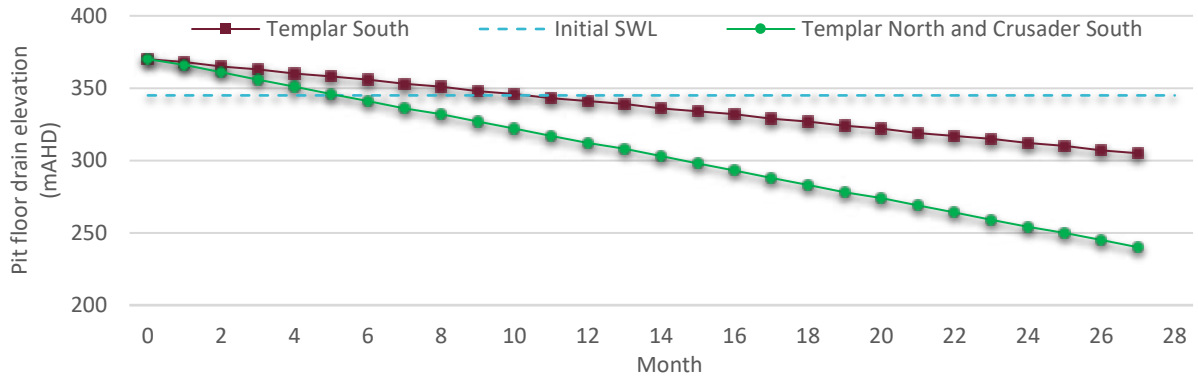

Chart 6: Modelled mining progression

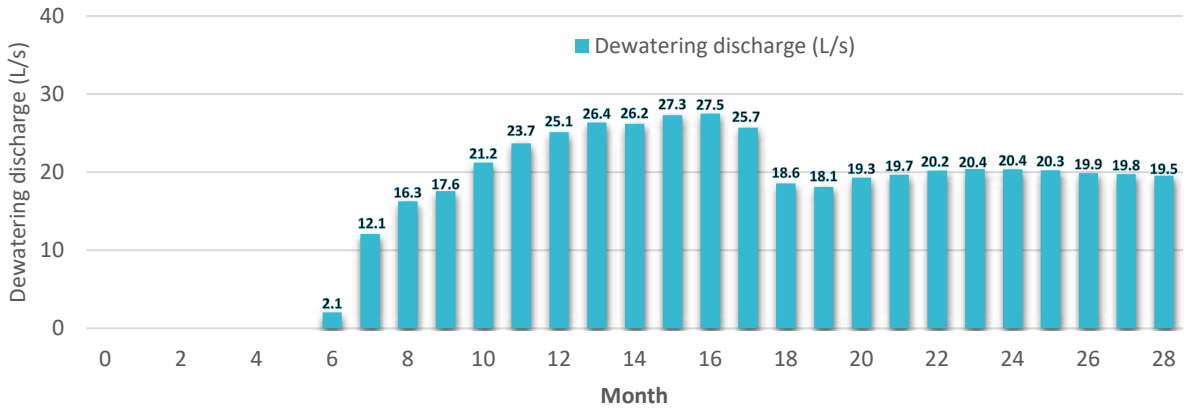

Chart 7: Model predicted dewatering requirement

6.2 GROUNDWATER DRAWDOWN AND IMPACTS

The modelling results indicate that at the end of mining, a one metre drawdown extent could extend 1,500 m radially from the pit (Figures 6, 7 and 8). Due to the relatively high permeability of the weathered bedrock, the cone of depression extends radially instead of being confined the discrete mineralised and fractured zones. The drawdown affects aquifer areas associated with groundwater licenses GWL 157428 and GWL 169295, used by NSR for mining operations including dewatering. A review of aerial imagery of the project area indicates that the drawpoints associated with GWL 157428 are used by NSR for mine dewatering from a historical open pit. Therefore, any groundwater impacts on these drawpoints' operations are likely negligible.

No known groundwater dependent ecosystems, aboriginal heritage places or registered bores are located within the one metre groundwater drawdown extent due to dewatering.

6.3 DEWATERING RATE PREDICTION

The model predicted dewatering rates for the combined Templar-Crusader pits are presented in Chart 7. Mine dewatering requirements peak at 27.5 L/s after 16 months before decreasing to around 20 L/s as mining advances below the weathered zone. Pit inflow estimates using analytical calculations (Marinelli & Nicolli, 2000) suggest similar peak dewatering inflows of 30.3 L/s. The annualised dewatering requirements for the first and second years of mining are projected to be 9.8 L/s and 22 L/s, respectively.

7 RECOMMENDED GROUNDWATER MONITORING

It is recommended that groundwater monitoring be undertaken before, during and after dewatering operations at Wallbrook to monitor the resulting water level drawdown against modelled impacts. A proposed monitoring program for monitoring bores is outlined in Table 6 and the location of the monitoring bores shown in Figure 7. Nexus may dewater the mine pits using dewatering bores or from in pit sumps, or a combination of both. It is recommended that Nexus also monitor groundwater extraction rates monthly and undertake comprehensive groundwater analysis annually.

It is also recommended that monitoring data be collated, reviewed, and documented in an annual groundwater monitoring review to determine any impacts on other users and the environment.

Table 6: Recommended groundwater monitoring program

Parameters	Pumping bores/In pit sumps	Monitoring bores
Groundwater extraction	Monthly	-
Water level	Monthly	Monthly
pH, EC & temperature	Quarterly	Quarterly
Comprehensive groundwater analysis	Annually	-

8 SUMMARY AND CONCLUSIONS

Nexus is planning to mine the Crusader-Templar gold deposit, located approximately 150 km northeast of Kalgoorlie in the Eastern Goldfields. Planned mining depths for the Templar North (124 m bgl), Templar South (60 m bgl) and Crusader South (123 m bgl) pits are deeper than the groundwater levels and would require dewatering over its 28-month life of mine.

Using the results of hydraulic tests from exploration bores, water level measurements, lithological logs, geotechnical logs, cross sections, and core photos supplied by Nexus, a simple groundwater model was constructed to predict dewatering rates and resulting drawdown associated with the mining of the proposed pits. The model adopts the upper range of hydraulic conductivity measured from slug tests where applicable to provide conservative estimates of dewatering requirement.

The peak dewatering requirement for the project is predicted to be 22 L/s, or approximately 694,000 kL/a. Based on this, Nexus is applying for a groundwater entitlement of 763,000 kL/a from the Combined - Fractured Rock West - Fractured Rock aquifer, incorporating a 10% allowance for contingency.

The drawdown is anticipated to extend up to 1.5 km radially from the pit by the end of mining, affecting aquifer areas associated with groundwater licenses GWL 157428 and GWL 169295, which are likely used by NSR for mining operations, including dewatering. Any groundwater impacts on these drawpoints' operations are likely to be negligible.

No groundwater-dependent ecosystems, Aboriginal heritage sites, or registered bores are located within the predicted extent of drawdown by the end of mining.

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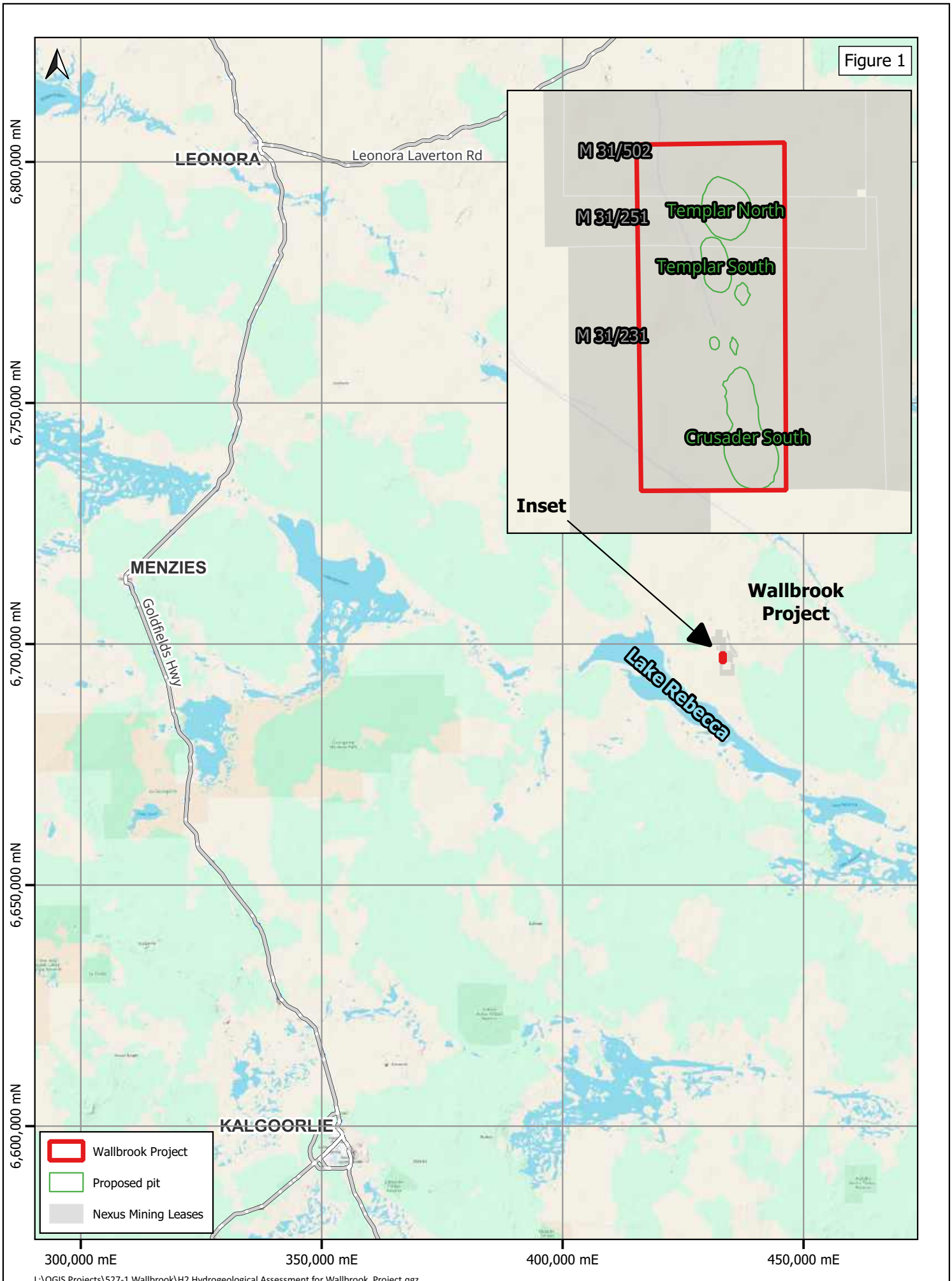
FIGURES



L:\QGIS Projects\527-1 Wallbrook\H2 Hydrogeological Assessment for Wallbrook Project.qgz

Rockwater

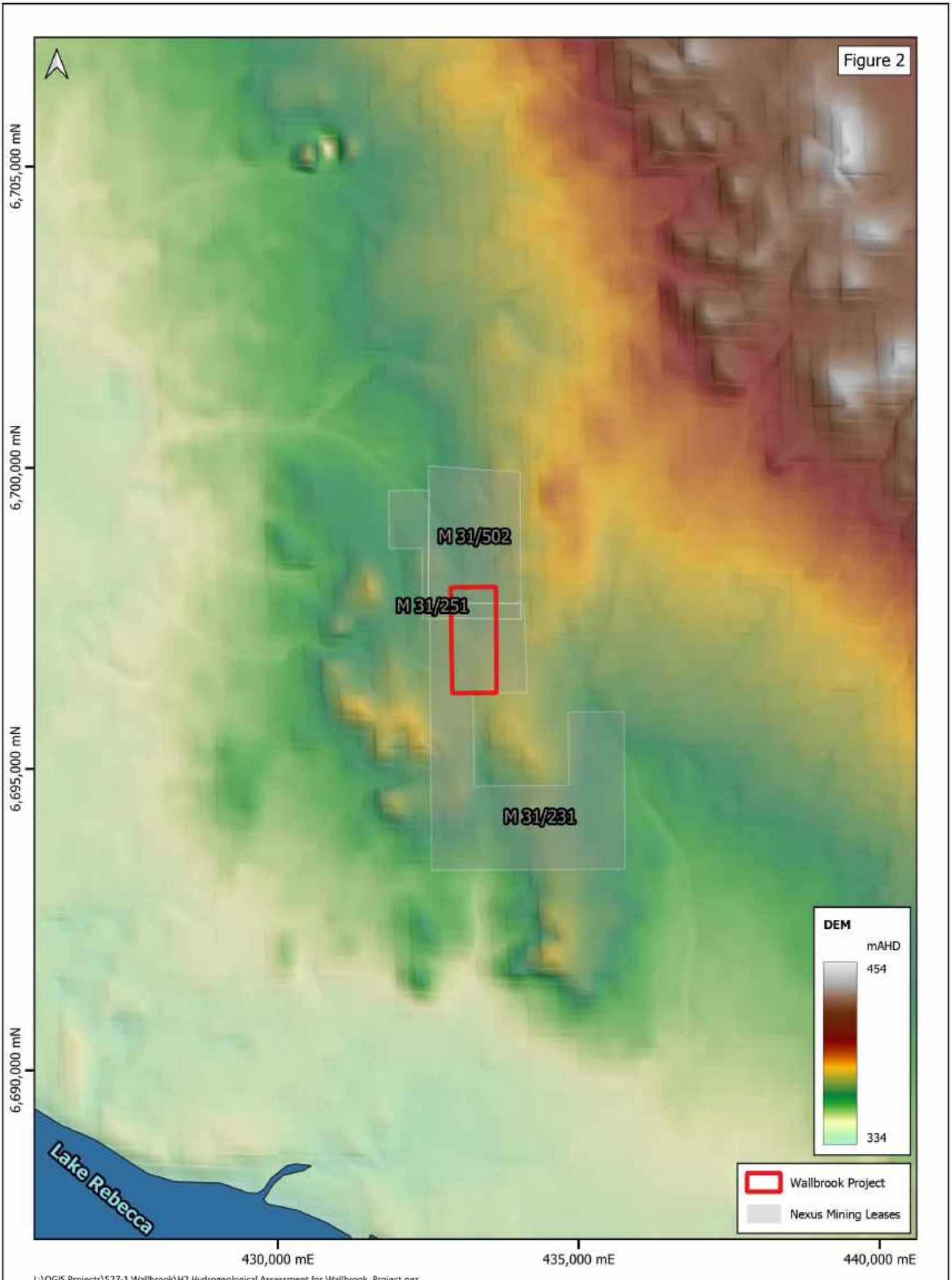
0 15 30 km

1:1,000,000

GDA2020 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-01/01

LOCALITY AND SITE MAP



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Rockwater

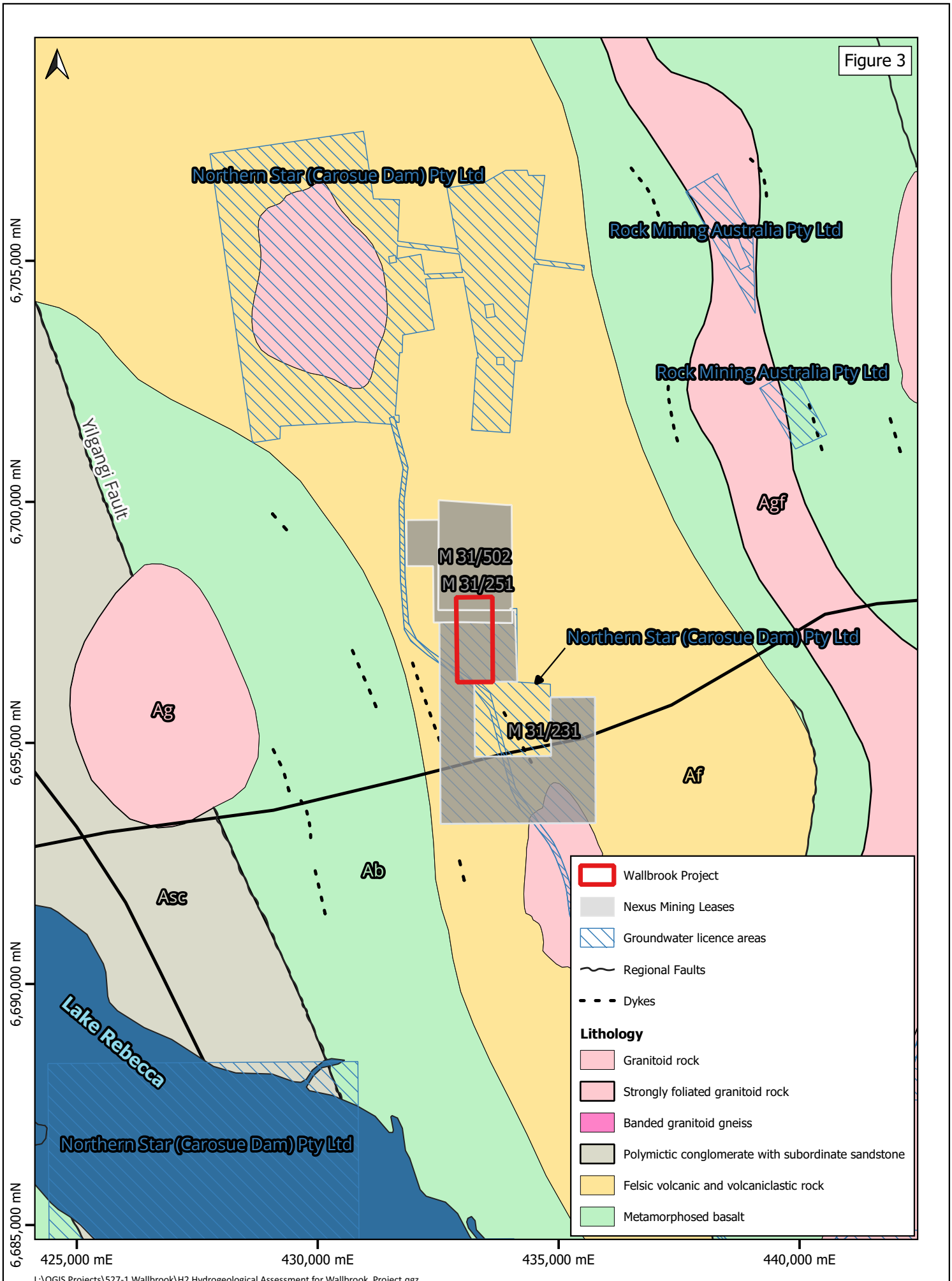
0 1 2 km

1:80,000

GDA2020 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-01/02

TOPOGRAPHY AND DRAINAGE



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Rockwater

0 1.5 3 km

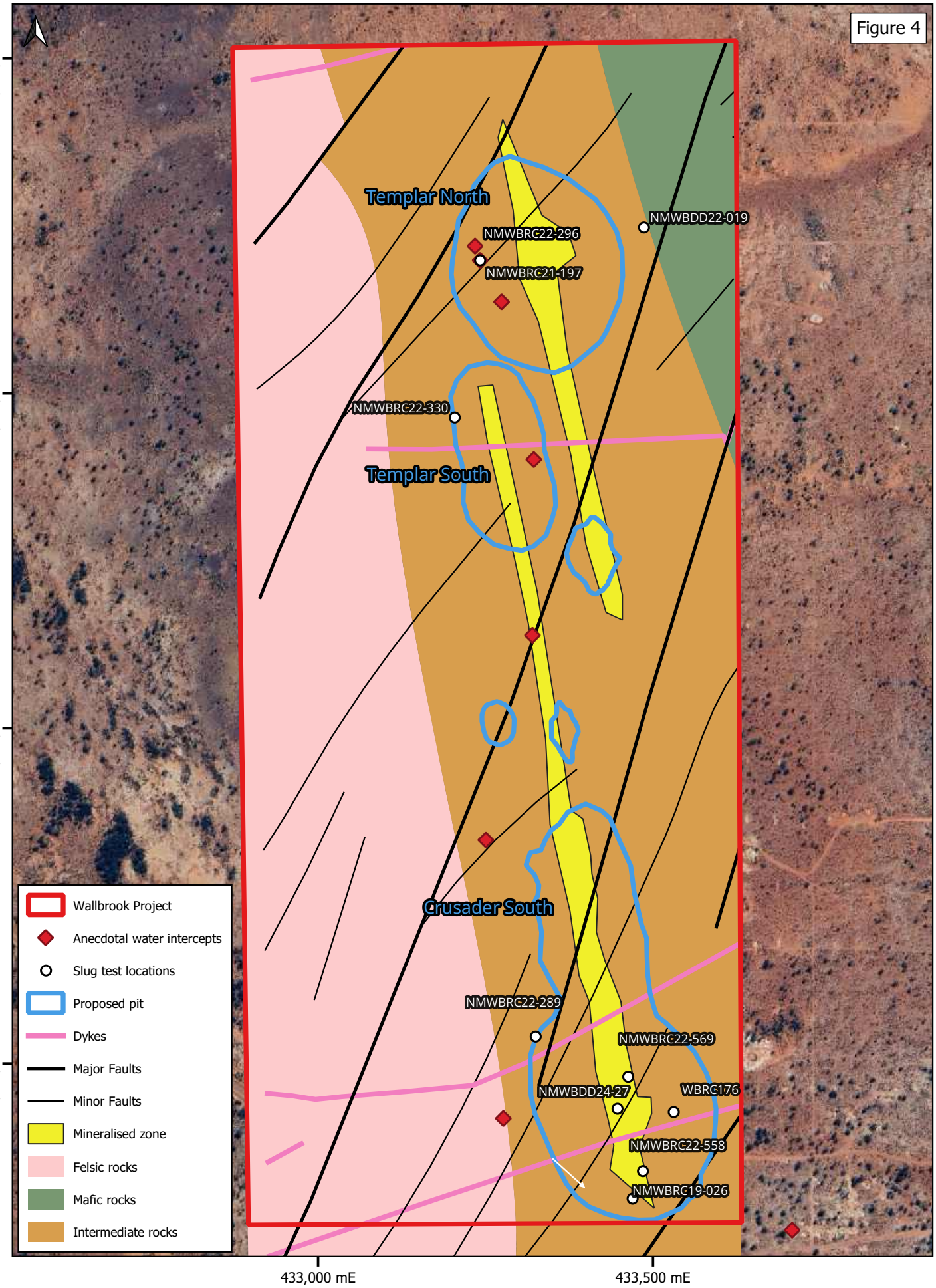
1:100,000

GDA2020 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-01/03

REGIONAL GEOLOGY

Figure 4



L:\QGIS Projects\527-1 Wallbrook\H2 Hydrogeological Assessment for Wallbrook Project.qgz

Rockwater

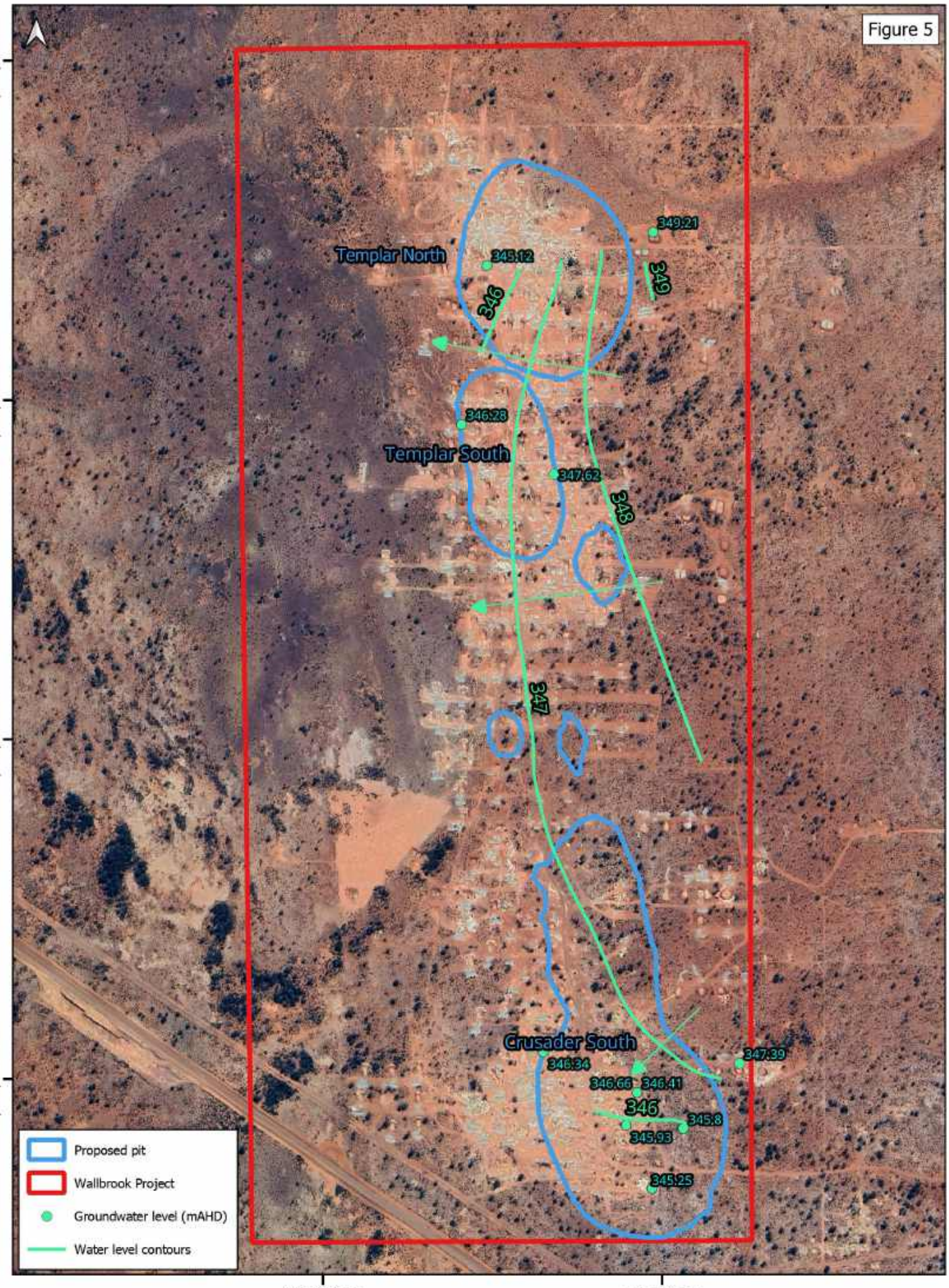
0 125 250 m

1:7,500

GDA2020 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-01/04

LOCAL GEOLOGY



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Rockwater
HYDROGEOLOGICAL + ENVIRONMENTAL

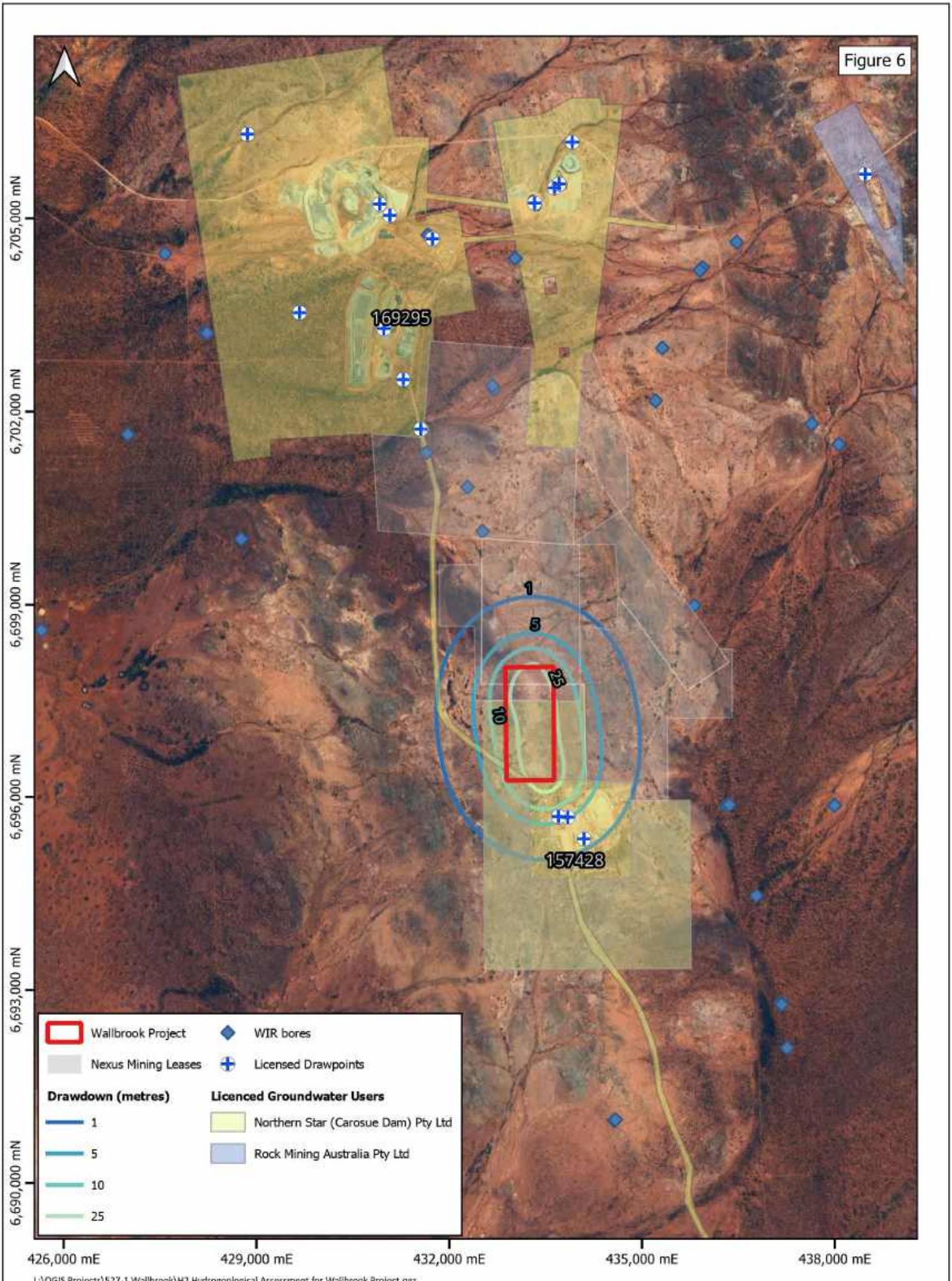
0 125 250 m

1:7,500

GDA2020 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-01/05

GROUNDWATER LEVELS



L:\QGIS Projects\527-1 Wallbrook\H2 Hydrogeological Assessment for Wallbrook Project.qgz

Rockwater

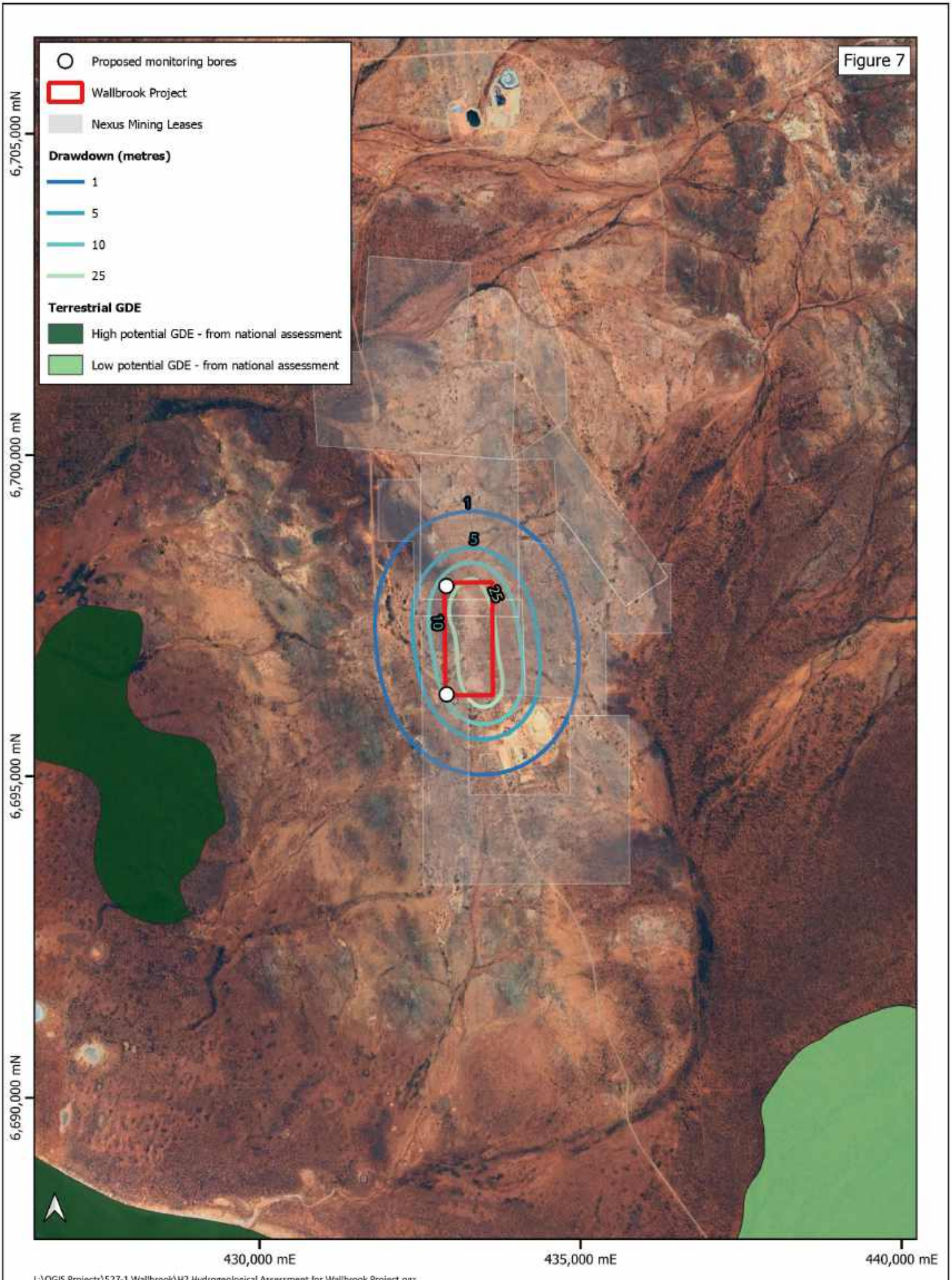
0 1 2 km

1:75,000

GDA94 / MGA zone 51

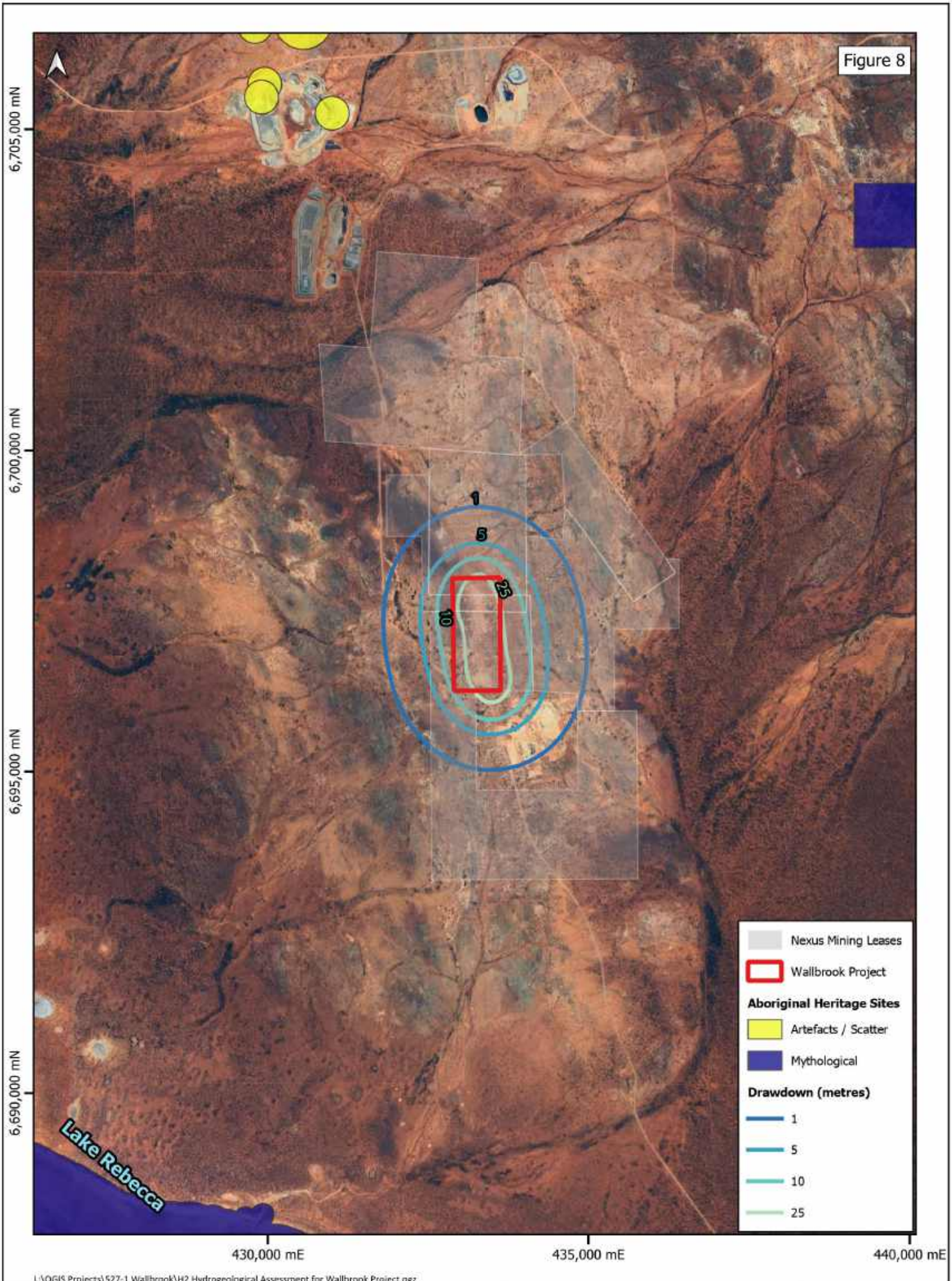
Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-02/06

OTHER GROUNDWATER USERS



Rockwater	0 1 2 km 1:75,000 GDA94 / MGA zone 51	Project	H2 Hydrogeological Assessment for Wallbrook Project
		Client	Nexus Minerals Limited
		Date	July 2024
		Figure Number	524-1/24-02/07

GROUNDWATER DEPENDENT ECOSYSTEMS



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Rockwater

0 1 2 km

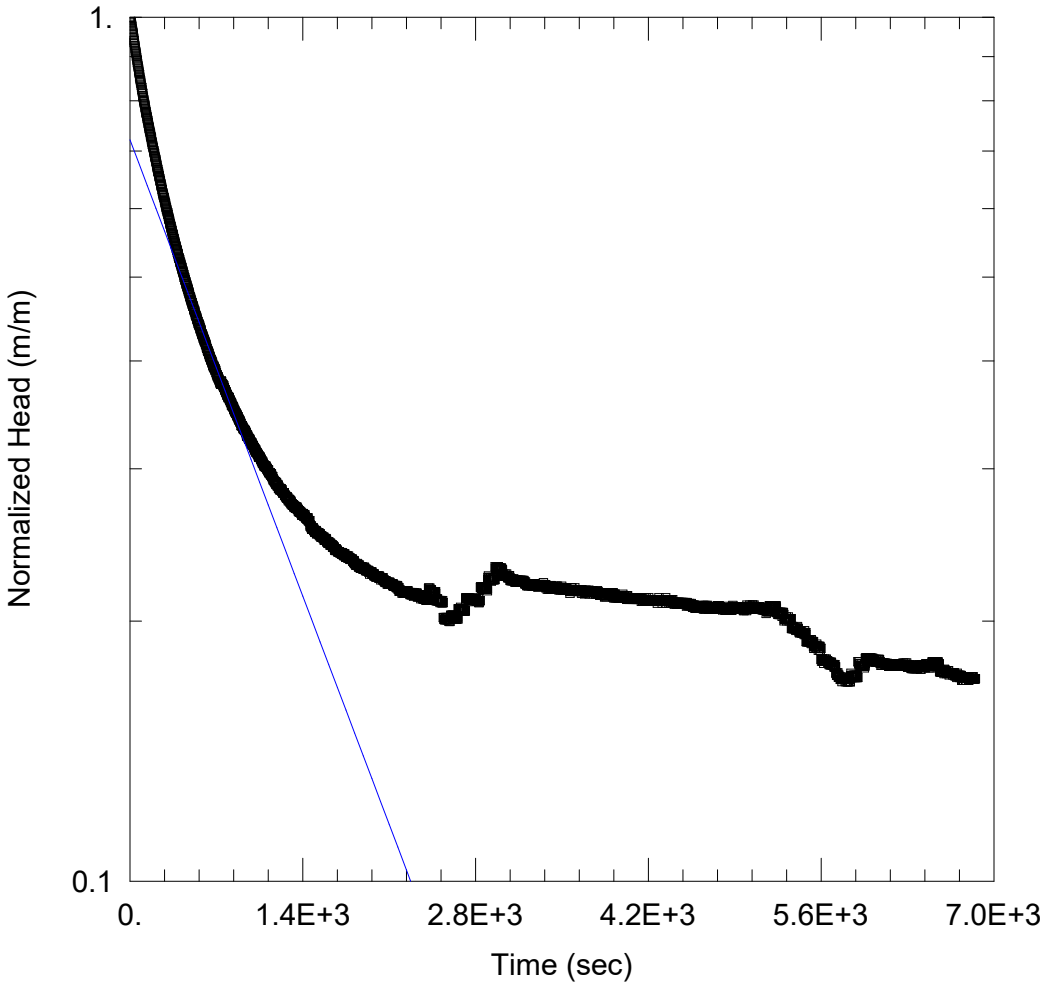
1:75,000

GDA94 / MGA zone 51

Project	H2 Hydrogeological Assessment for Wallbrook Project
Client	Nexus Minerals Limited
Date	July 2024
Figure Number	527-1/24-02/08

ABORIGINAL HERITAGE SITES

APPENDIX I
SLUG TEST ANALYSES



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBDD22-019
Test Date: 28/05/2024

AQUIFER DATA

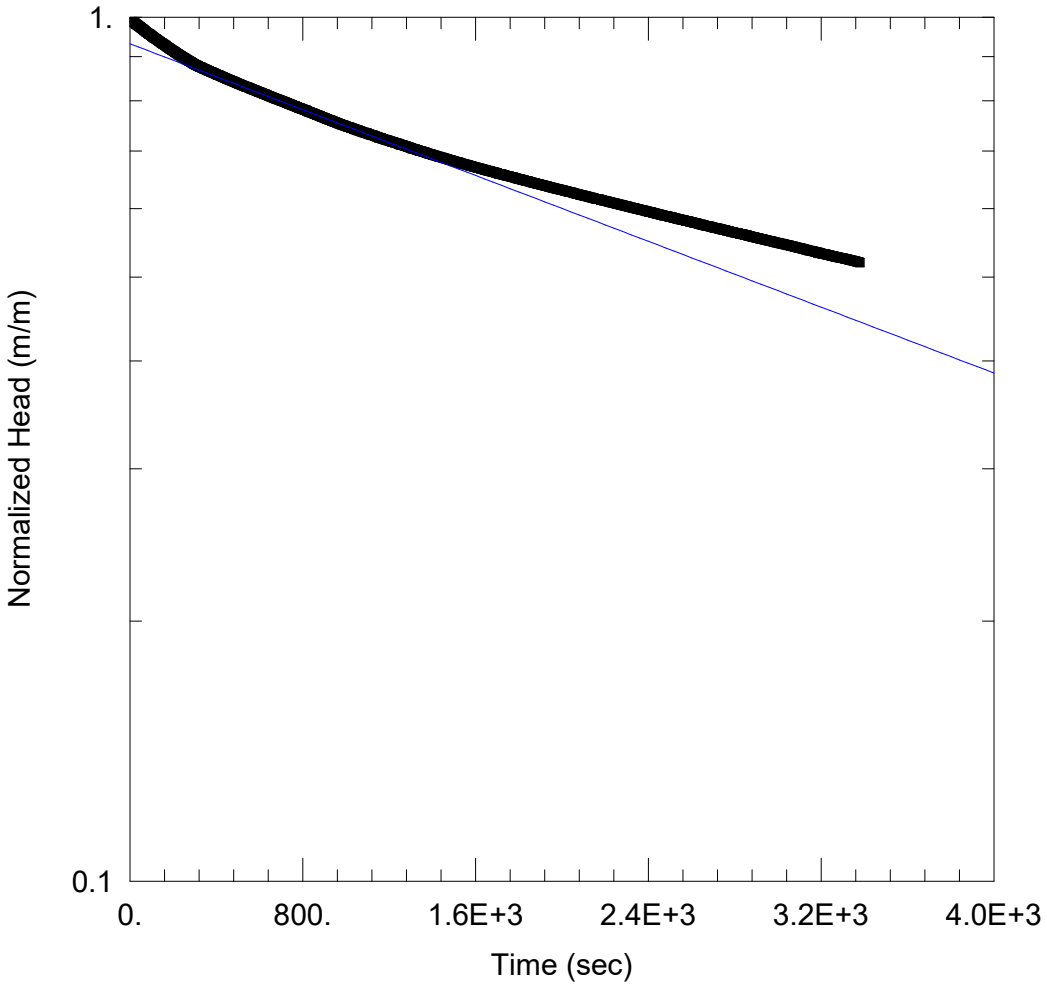
Saturated Thickness: 231.8 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBDD22-019)

Initial Displacement: 1.19 m
Total Well Penetration Depth: 231.8 m
Casing Radius: 0.07 m
Static Water Column Height: 231.8 m
Screen Length: 231.8 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 0.005675 m/day
Solution Method: Bouwer-Rice
y0 = 0.858 m



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBDD24-27
Test Date: 29/05/2024

AQUIFER DATA

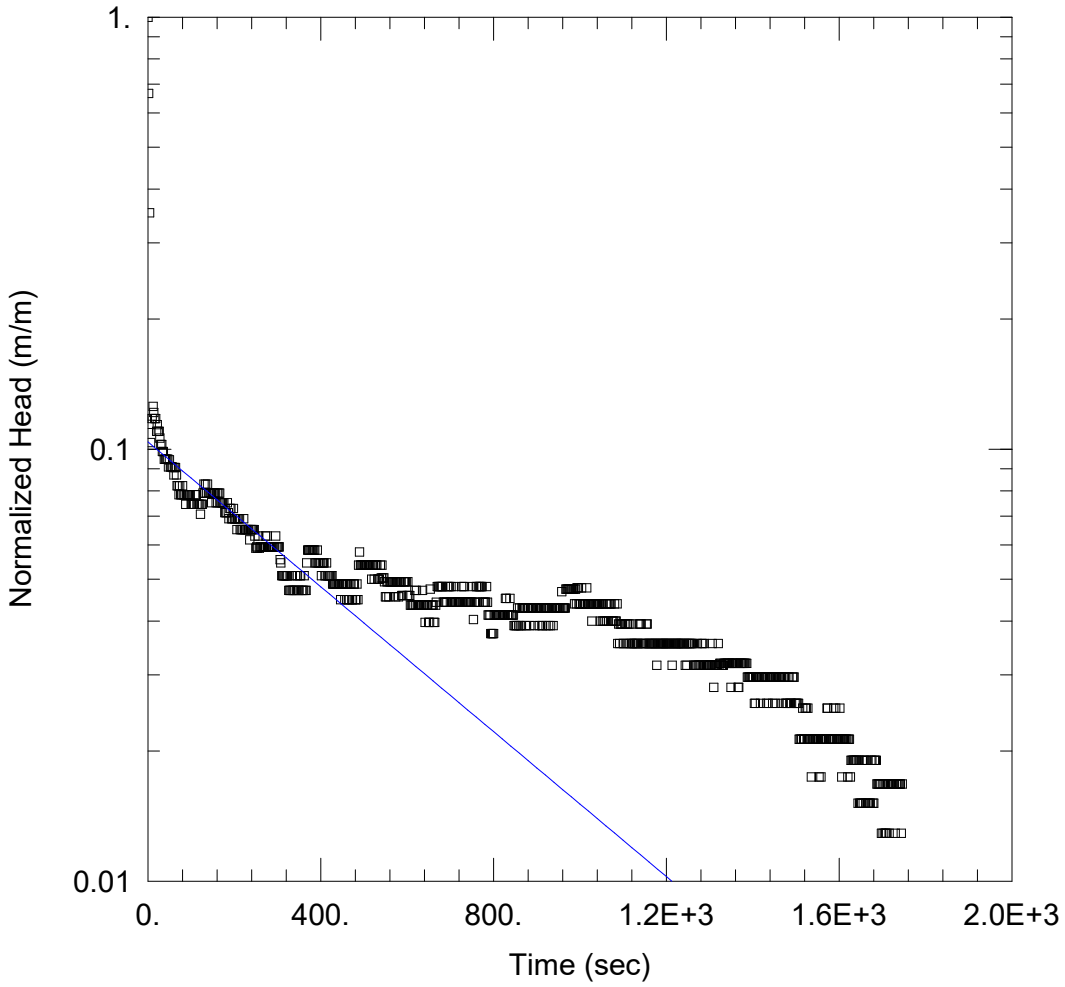
Saturated Thickness: 48.62 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBDD24-27)

Initial Displacement: 3.38 m
Total Well Penetration Depth: 52. m
Casing Radius: 0.07 m
Static Water Column Height: 48.62 m
Screen Length: 48.62 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 0.005215 m/day
Solution Method: Bouwer-Rice
y0 = 3.148 m



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBRC19-026
Test Date: 28/05/2024

AQUIFER DATA

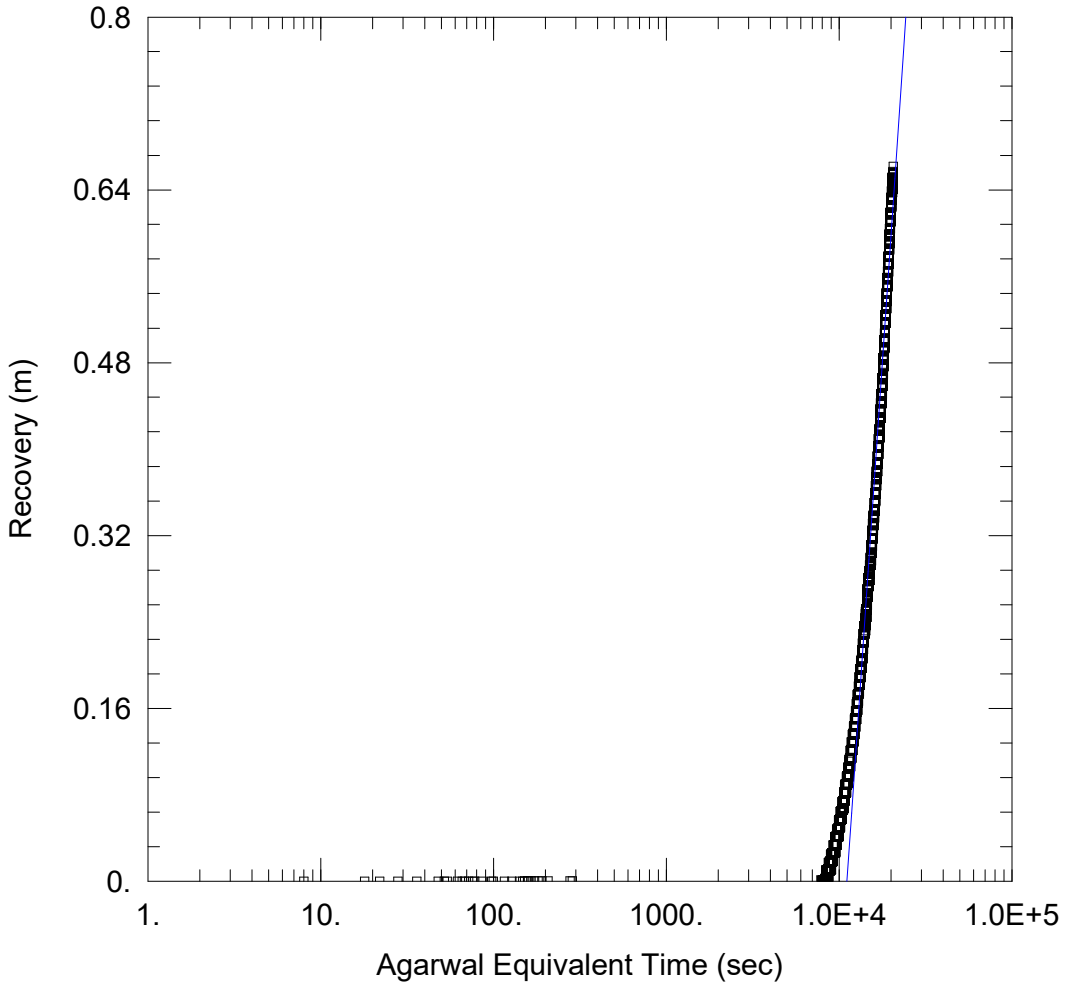
Saturated Thickness: 23.78 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBRC19-026)

Initial Displacement: 0.31 m
Total Well Penetration Depth: 23.78 m
Casing Radius: 0.07 m
Static Water Column Height: 23.78 m
Screen Length: 23.78 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 0.07971 m/day
Solution Method: Bouwer-Rice
y0 = 0.03221 m



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBRC21-197
Test Date: 28/05/2024

AQUIFER DATA

Saturated Thickness: 33.86 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
Water Bore	0	0

Observation Wells

Well Name	X (m)	Y (m)
NMWBRC21-197	0	23

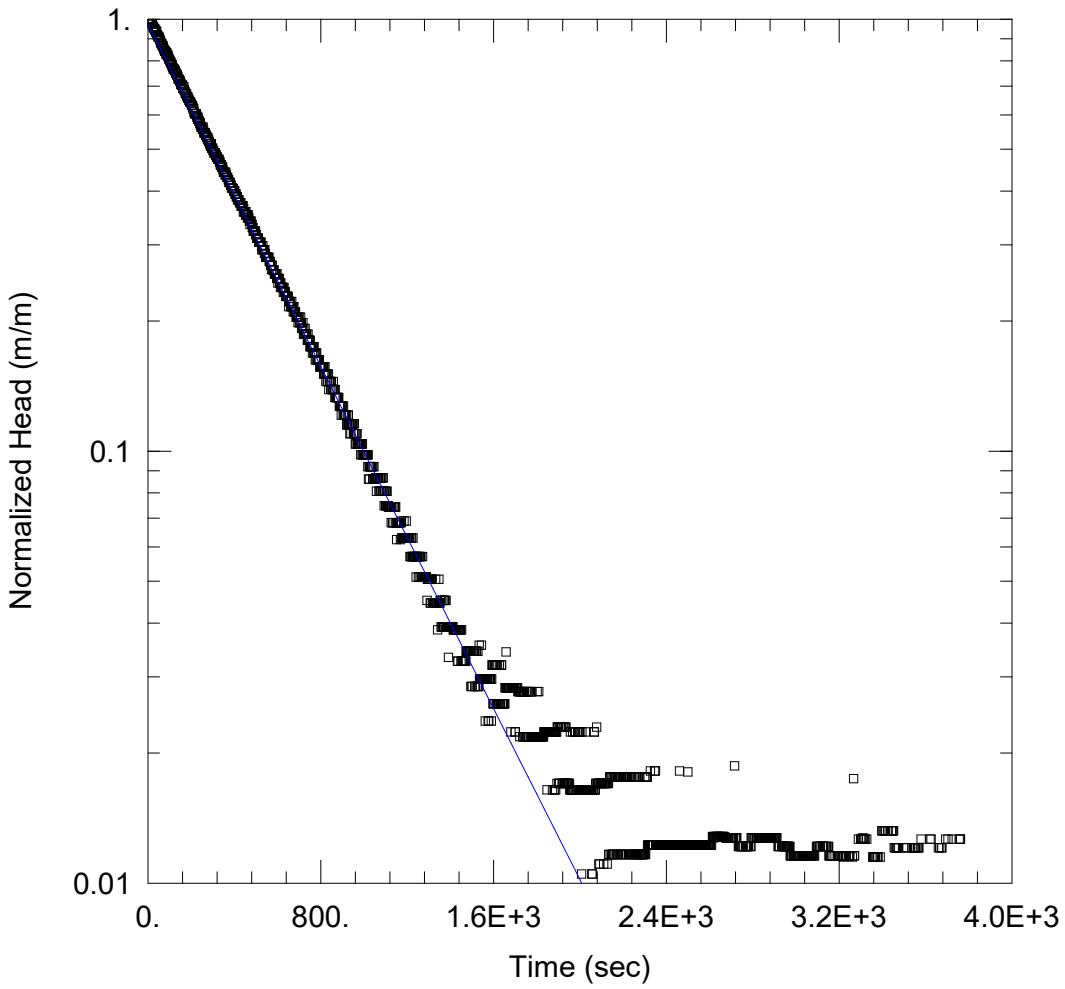
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 3.638 m^2/day

S = 0.001986



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBRC22-289
Test Date: 28/05/2024

AQUIFER DATA

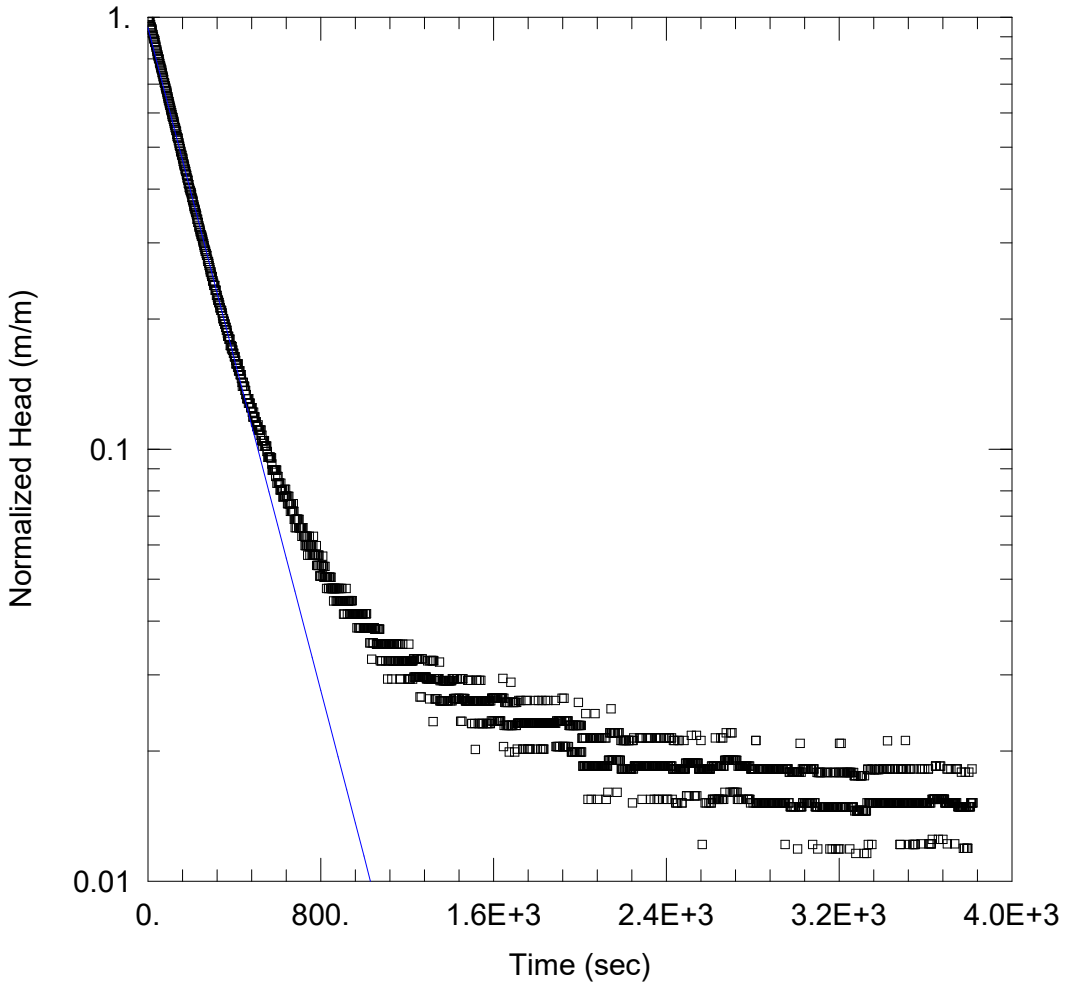
Saturated Thickness: 47.66 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBRC22-289)

Initial Displacement: 1.21 m
Total Well Penetration Depth: 47.66 m
Casing Radius: 0.07 m
Static Water Column Height: 47.66 m
Screen Length: 47.66 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 0.05456 m/day
Solution Method: Bouwer-Rice
y0 = 1.178 m



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBRC22-330
Test Date: 28/05/2024

AQUIFER DATA

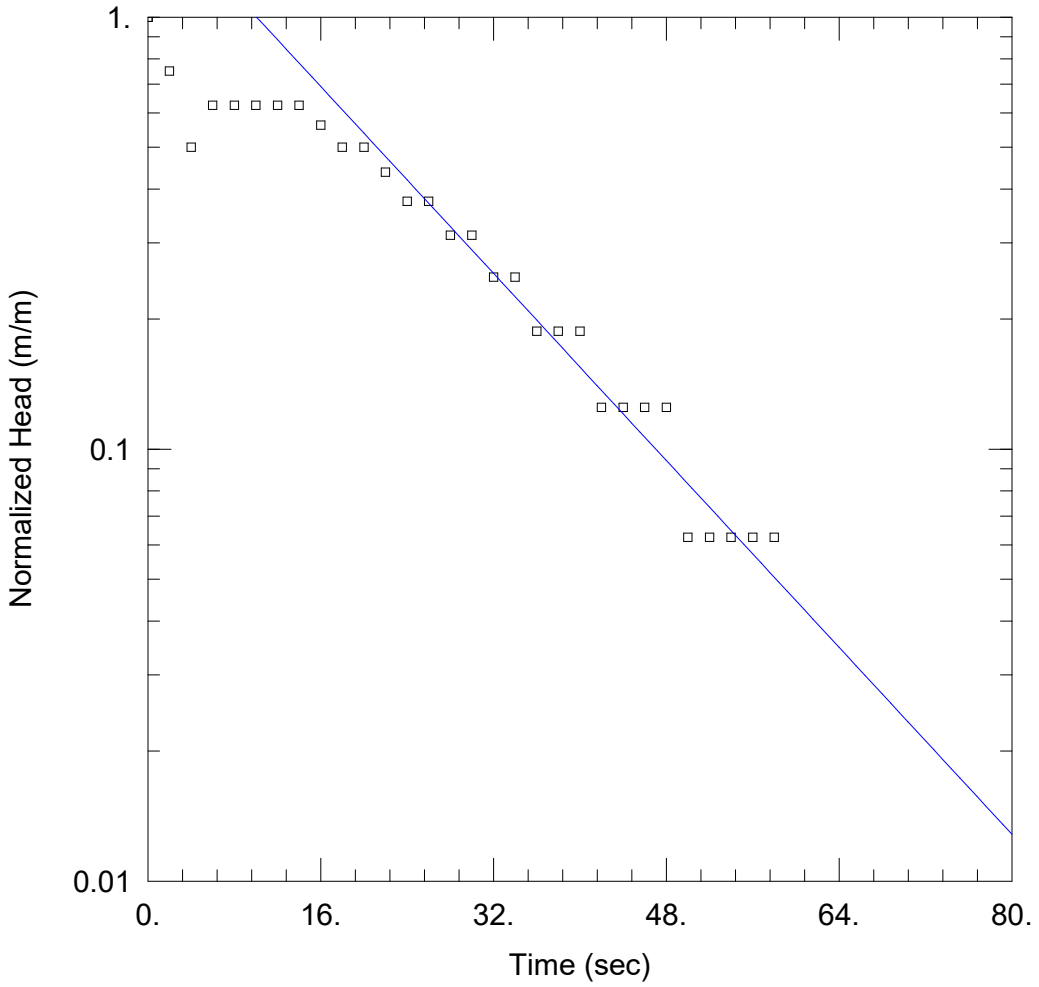
Saturated Thickness: 58.67 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBRC22-330)

Initial Displacement: 2.4 m
Total Well Penetration Depth: 58.67 m
Casing Radius: 0.07 m
Static Water Column Height: 58.67 m
Screen Length: 58.67 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 0.08957 m/day
Solution Method: Bouwer-Rice
y0 = 2.265 m



PROJECT INFORMATION

Company: Rockwater
Client: Nexus Minerals Ltd
Project: 527-1
Location: Wallbrook
Test Well: NMWBRC22-569
Test Date: 28/05/2024

AQUIFER DATA

Saturated Thickness: 70.62 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (NMWBRC22-569)

Initial Displacement: 0.16 m
Total Well Penetration Depth: 70.78 m
Casing Radius: 0.07 m
Static Water Column Height: 70.62 m
Screen Length: 70.62 m
Well Radius: 0.07 m

SOLUTION

Aquifer Model: Unconfined
K = 1.089 m/day
Solution Method: Bouwer-Rice
y0 = 0.2992 m

APPENDIX II

LABORATORY WATER SAMPLE ANALYSIS

CERTIFICATE OF ANALYSIS

Work Order	: **EP2407566**	Page	: 1 of 5
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact			
Address	[redacted]	[redacted]	
Telephone			
Project	: Wallbrook Dewatering Study	Date Samples Received	: 31-May-2024 13:00
Order number	: ----	Date Analysis Commenced	: 31-May-2024
C-O-C number	: ----	Issue Date	: 07-Jun-2024 16:15
Sampler	[redacted]		
Site			
Quote number	: EP23ROCWAT0002_V2		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

[redacted]

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NMWBRC22-296	----	----	----	----
				Sampling date / time	28-May-2024 10:55	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2407566-001	--------	--------	--------	--------
					Result	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.98**	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**7050**	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**3920**	----	----	----	----
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**706**	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**678**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**678**	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**315**	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**1570**	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**75**	----	----	----	----
Magnesium	7439-95-4	1	mg/L		**126**	----	----	----	----
Sodium	7440-23-5	1	mg/L		**1300**	----	----	----	----
Potassium	7440-09-7	1	mg/L		**16**	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.02**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	NMWBRC22-296	----	----	----	----
				Sampling date / time	28-May-2024 10:55	----	----	----	----
Compound	CAS Number	LOR	Unit		EP2407566-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Manganese	7439-96-5	0.001	mg/L		**0.002**	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L		**16.1**	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.01**	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**16.2**	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**16.2**	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**1.4**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**17.6**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.05**	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	----	----	----	----
EN055: Ionic Balance									
ø **Total Anions**	----	0.01	meq/L		**64.4**	----	----	----	----
ø **Total Cations**	----	0.01	meq/L		**71.1**	----	----	----	----
ø **Ionic Balance**	----	0.01	%		**4.93**	----	----	----	----