Groundwater Assessment for Round Hill Iron Ore Mine

24 November 2025

DOCUMENT CONTROL

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REVISION HISTORY

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C Gilligan	K Johnston	DB	A	IFR	03/11/2025
C Gilligan	B Willis-Jones	DB	0	IFU	24/11/2025

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Appendix B: Round Hill Project Hydrogeology Conceptual Study (Rockwater, 2025)

1. Executive Summary

Darkwater Consulting have completed a Hydrogeological Impact Assessment to support the referral of the Round Hill Project (the Project). As part of this assessment, outcomes of hydrogeological investigations completed during the project study were summarised and used to develop an updated conceptual model of the Project area.

Investigative drilling completed during this study resulted in the establishment of three (3) production bores across various hydrostratigraphic units within Round Hill tenure, which are assessed as being able to sustainably meet the Project water demands for the proposed duration (up to 10 years) inclusive of a construction phase.

Water demand estimates were updated based upon information provided by relevant stakeholders. Water demands are estimated to be in the order of 2,000 kL/day (0.73 GL/a, or 23 L/sec). A nominal 30% buffer was applied for a total water demand of 2,600 kL/day (0.95 GL/a, or 30 L/sec).

Implementation of the Project water supply will lower groundwater levels locally (i.e., within the development envelope) and to a lesser degree outside of the project footprint. However, based upon analytical assessments completed using AnAqSim, there is a low likelihood of the changes to groundwater levels having a significant impact on regional subterranean fauna habitat and third-party groundwater users.

Predictions show that drawdown will propagate both along strike within the Brockman Iron Formation and within the Wittenoom Formation. Low permeability units which bound the abstraction areas will constrain impacts to the project area, preventing propagation of drawdown beyond the regional anticline structure.

Assessments to date indicate there is no interconnection between the groundwater system and surface water features or groundwater dependent vegetation.

Residual risks to the Project water supply security, and the associated scale of impacts, relate to the lateral extent of higher permeability conditions as measured in the hydraulic testing of the proposed water supply bores.

These risks are to be addressed in the Groundwater Operating Strategy framework, through continued monitoring of drawdown and continued interpretation of the aquifer response for the duration of operation. The distribution of abstraction between sites, and the incorporation of contingency water supply sites, will also be regularly assessed to manage groundwater impacts.

2. Introduction

2.1 Scope Overview

HanRoy Iron Ore Projects Pty Ltd (HanRoy) is conducting development studies for the proposed Round Hill Project; an iron ore deposit located approximately 30 km north-west of Newman in the Pilbara region of Western Australia (Figure 2-1).

The Project refers to the Round Hill Main deposit, located wholly within tenure held by Hancock Prospecting Pty Ltd (E47/1313-I).

Darkwater Consulting has been engaged to provide hydrogeological support for the duration of the development studies, inclusive of production of a groundwater impact assessment, to support environmental assessment of the Project. Darkwater Consulting were previously engaged by HanRoy during the Round Hill Conceptual Study completed in 2023.

2.2 Study Objectives

The primary purpose of this document is to support the environmental impact assessment associated with the Project. As part of this, this document will:

- Describe the regional baseline understanding of the broader project area;
- Summarise works completed during this study phase;
- Develop an updated conceptual hydrogeological model for the study area;
- Quantify the Project water demand and associated abstraction requirements;
- Identify other groundwater users and environmental features which may be impacted by changes to the groundwater regime relating to the Project;
- Identify potential impacts to other users and environmental features;
- Develop a conceptual water management strategy to measure and mitigate impacts; and
- Assess residual risks to environmental features associated with implementation of the proposed water management strategy.

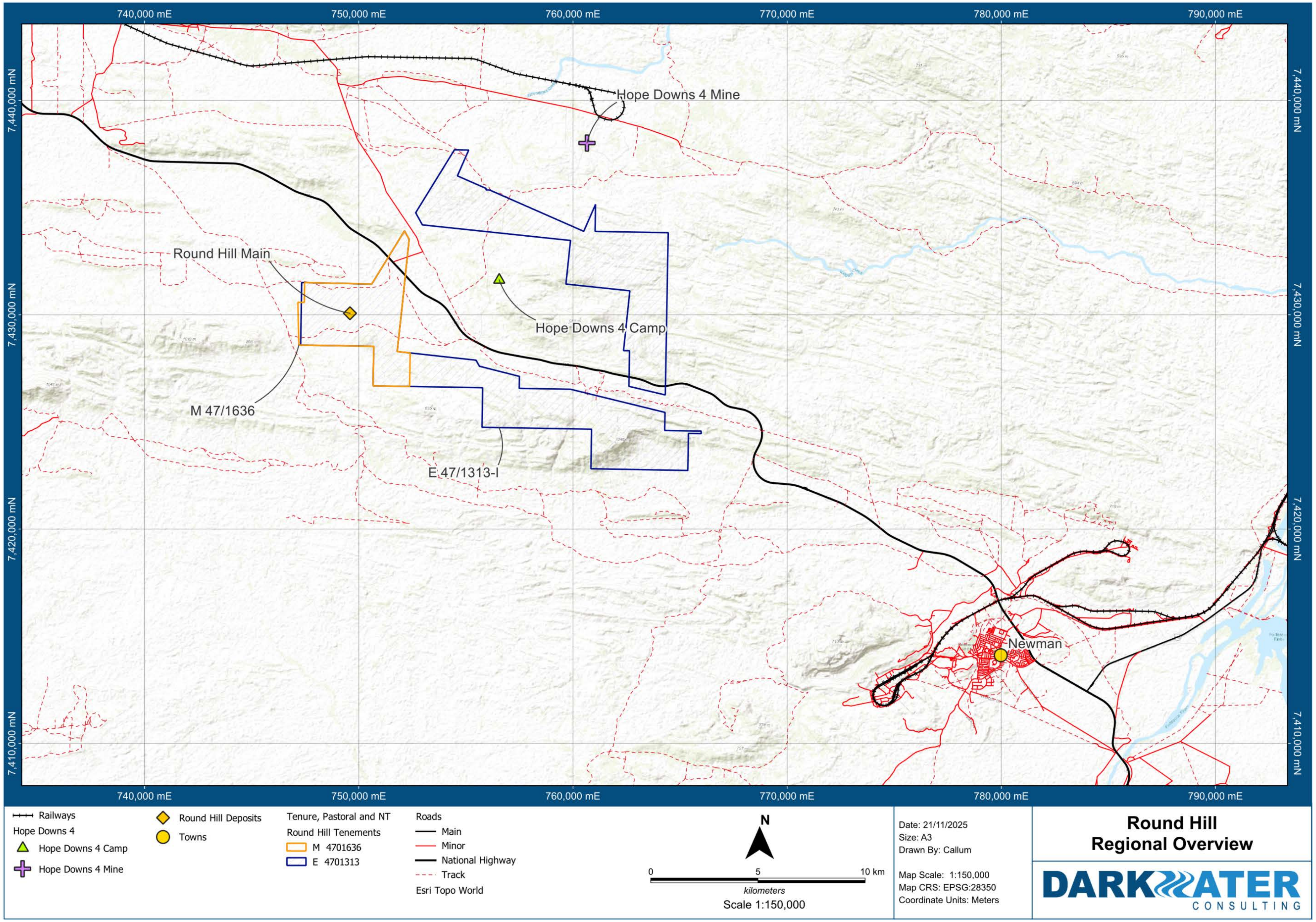


Figure 2-1: Round Hill Regional Overview

3. Regional Setting

3.1 Climate

The Round Hill Project is located in a semi-arid to arid environment, with hot summers and warm winters. The climate of the area is influenced by the Australian monsoon to the northeast and the warm northern seas that generate tropical cyclones and tropical depressions (Charles S., 2015). There is a marked seasonality and large year-to-year variability in these processes that result in highly seasonal (wet and dry) and variable rainfall, ranging from local-scale, intermittent, intense rainfall to large-scale, persistent rainfall events (Charles S., 2015).

Average climatic conditions, as measured at the Bureau of Meteorology (BoM) Newman Aero site (007176), located approximately 45 km to the southeast, are shown in Figure 3-1.

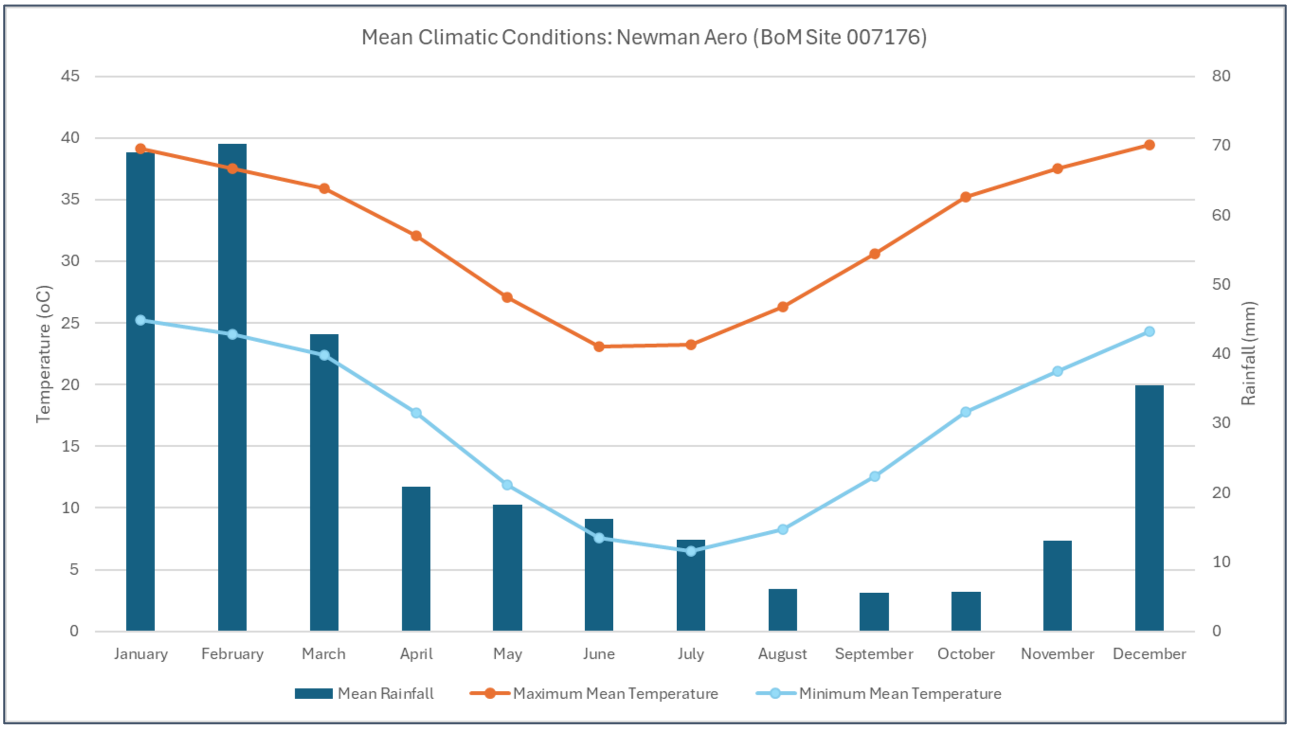


Figure 3-1: Newman Aero – Monthly Temperature and Rainfall (BoM site 007176)

3.1.0 Temperature

The study area experiences an extreme range in temperature, rising to over 45°C in summer, and falling to near 0°C in winter. Average monthly maximum-temperature ranges from 23°C in June to 39°C in January and December, with the hottest day recorded being 47°C on 15 January 1998. The average monthly minimum-temperature ranges from 7°C in July to 25°C in January, with the coldest minimum recorded being -2°C on 23 August 2000. Average monthly temperatures, recorded at Newman Aero (BoM site 007176), are provided in Table 3-1.

Table 3-1: Average Temperature – Newman Aero (1996 to 2025)

Average Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum (^{o}C)	39.1	37.5	35.9	32.1	27.1	23.1	23.2	26.3	30.6	35.2	37.5	39.4
Minimum (^{o}C)	25.2	24.1	22.4	17.7	11.9	7.6	6.5	8.3	12.6	17.8	21.1	24.3

3.1.1 Rainfall and Evaporation

Rainfall is highly variable and is primarily associated with thunderstorms and cyclonic events during the wet season, between December and March. Average annual rainfall from 1971 to 2025 is approximately 320 mm; 68% of rainfall occurs during the wet season, with January and February being the wettest months (Table 3-2). The highest recorded annual rainfall at Newman Aero is 619 mm in 1999, and the lowest is 37 mm in 1996. The highest monthly rainfall recorded is 305 mm in February 2001, and the highest daily rainfall recorded is 214 mm on 16 December 1999 (BoM climate statistics). Average annual rainfall in the region has increased by more than 30% over the last 30 years (Figure 3-2) attributable to increased summer rainfall (Charles S., 2015), although the cause is unclear and it is not known whether this represents a long-term trend.

Estimated pan evaporation (as determined from BoM contour map) indicates that evaporation exceeds rainfall every month of the year, with annual evaporation levels an order of magnitude higher than annual rainfall (Table 3-3).

Table 3-2: Average Monthly Rainfall - Newman Aero (1971 to 2025) and Estimated Pan Evaporation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Mean Rainfall (mm)	69	70.2	42.8	20.8	18.2	16.2	13.2	6.1	5.5	5.7	13	35.4	**319.9**
Mean Evaporation (mm)	400	300	300	250	175	125	150	200	250	350	450	400	**3350**

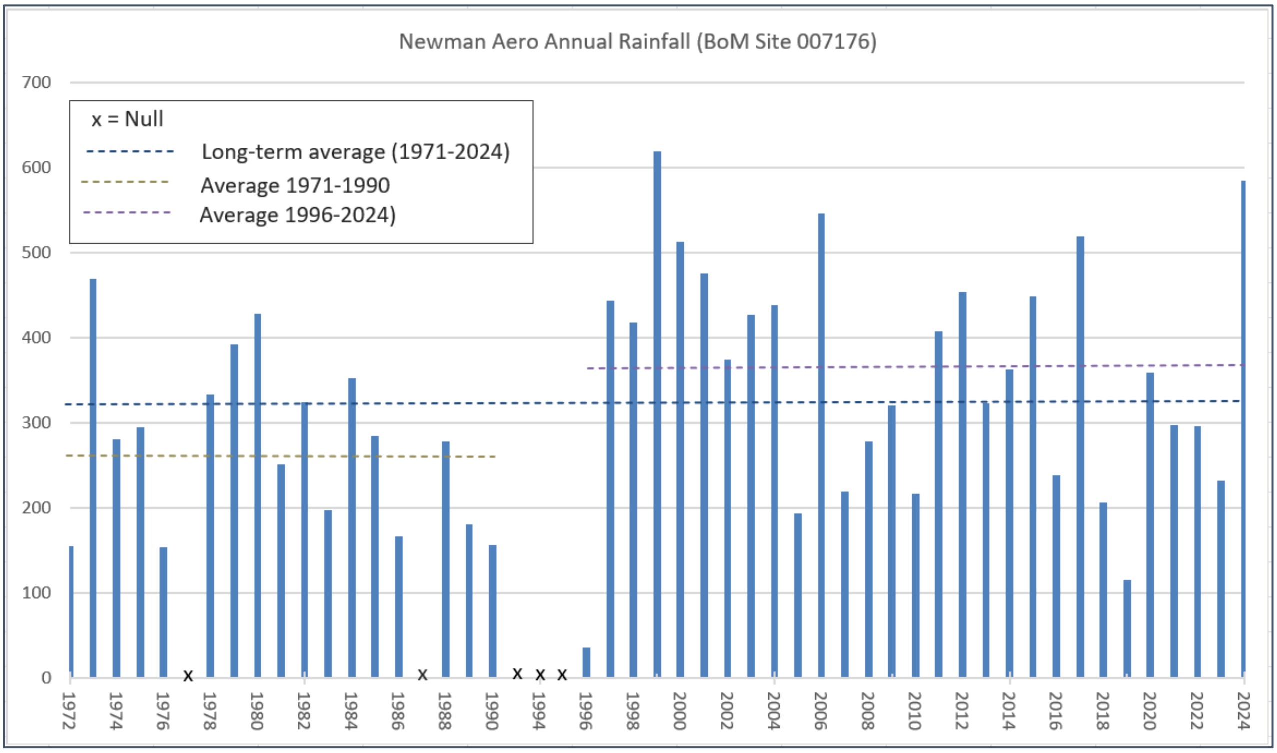


Figure 3-2: Annual Rainfall Newman Aero (BoM Site 007176)

3.1.2 Climate Change

Climate projections for the region suggest temperature, summer rainfall, and inter-annual rainfall variability will continue to increase, with less frequent but more intense rainfall predicted to occur in association with tropical cyclones and monsoonal influences. However, there is a relatively high degree of uncertainty in these projections and the median result for climate models under the RCP4.5 emission scenario have rainfall remaining within 5% of current levels (BoM, 2022).

3.2 Physiography

The project area is located within the Fortescue River Catchment, in the Hamersley sub-region of the Pilbara Region (Environment Australia, 2000). The Hamersley sub-region covers 5,634,727 ha and represents a mountainous area of Proterozoic meta-sedimentary ranges and plateau, with Mulga low woodland over bunch grasses on fine textured soils and Snappy Gum over spinifex on the skeletal sandy soils of the ranges (Environment Australia, 2000).

The Round Hill deposit area is predominantly low relief, with extensive colluvial and alluvial cover present in the area, characterised as hardpan plains supporting Mulga shrublands and spinifex (Tille, 2006). Rolling hills associated with the east-west striking Brockman Iron Formation are present in the immediate Round Hill Main deposit, and along strike (HPPL, 2023).

3.2.0 Topography

Topography of the Project surrounds is shown in Figure 3-3. Elevation in the Round Hill Main area ranges from 795 mAHD, at the peak of Round Hill, to 690 mAHD on the hardpan plains north of the deposit. In the Round Hill North area, elevation ranges from approximately 700 mAHD in the outcropping Brockman Iron Formation hills to the west, to 650 mAHD in the Coondiner Creek channel to the north-east.

3.2.1 Drainage

The Round Hill deposit is located in the upper margins of the Coondiner Creek catchment, and immediately north of the Western Creek and Homestead Creek catchments. Coondiner Creek flows to the north, through the Hope Downs 4 mine site, and reports to the southern boundary of the Fortescue Marsh. The Western Creek and Homestead Creek catchments flow to the south-east and east, before flowing north through the Newman area and reporting to the Fortescue River.

A 500-km2 internally draining catchment is present immediately west of the Round Hill Main area. While surface water contributions from this catchment may only occur during sufficiently large rainfall events, this area represents a likely groundwater recharge area which contributes to groundwater throughflow.

Watercourses in the project area are ephemeral, with surface water flows only occurring during sufficiently large rainfall events. Drainage is poorly defined in the Round Hill Main deposit area, while the Coondiner Creek becomes more defined north of the Great Northern Highway. North of the project area, the Coondiner Creek watercourse has been partially diverted by mining infrastructure relating to the Hope Downs 4 mine site (Strategen, 2010).

Eagle Rock Pool and Eagle Rocks Falls are identified as permanent water holes occurring along Coondiner Creek, downstream of the Hope Downs 4 mine site (Strategen, 2010). These sites are conditioned within the Ministerial Statement attached to the approval of Hope Downs 4 (Ministerial Statement 854 and 932). Named watercourses and rock pools within catchments associated with the Project area are shown in Figure 3-4.

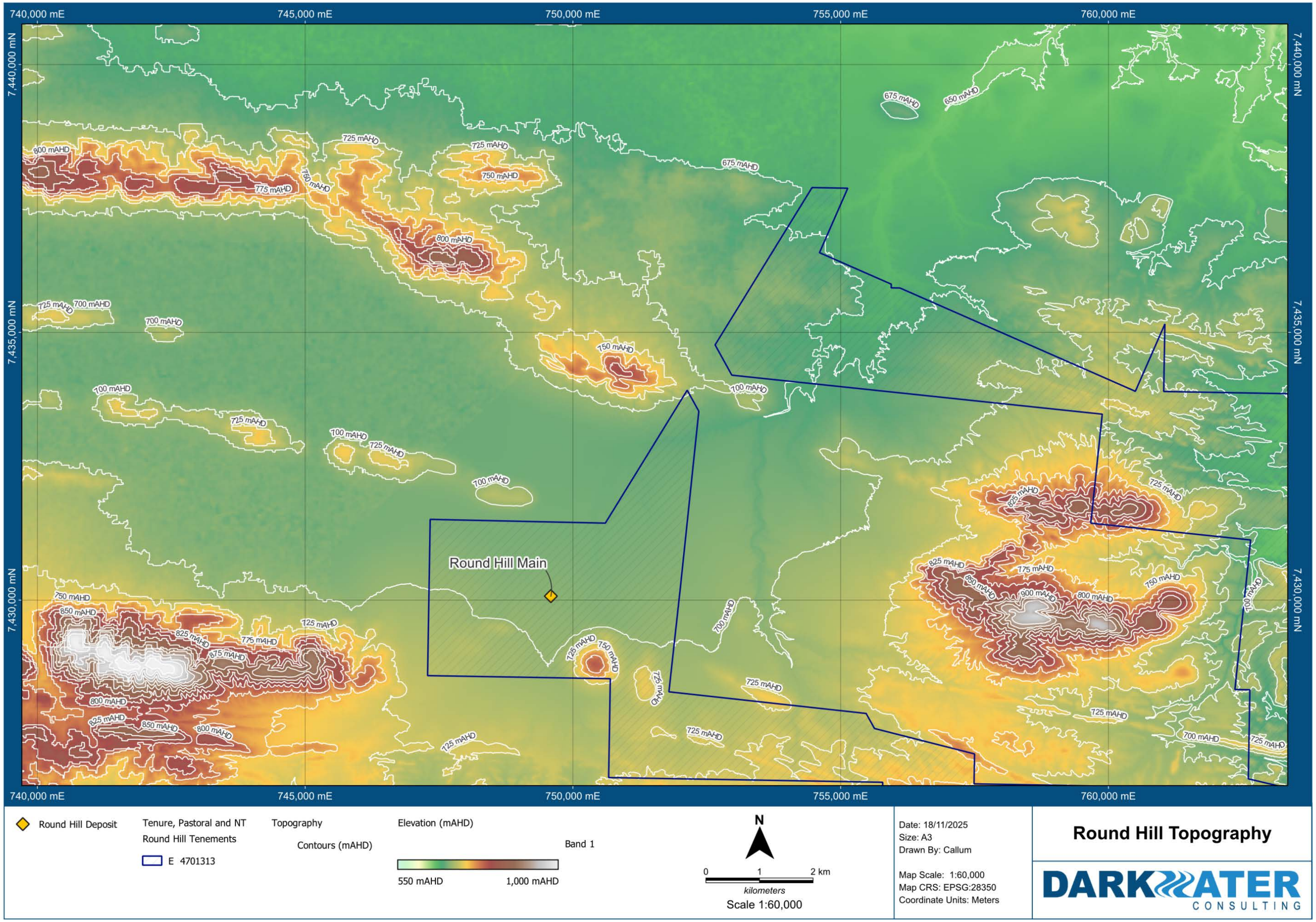


Figure 3-3: Round Hill Area Topography

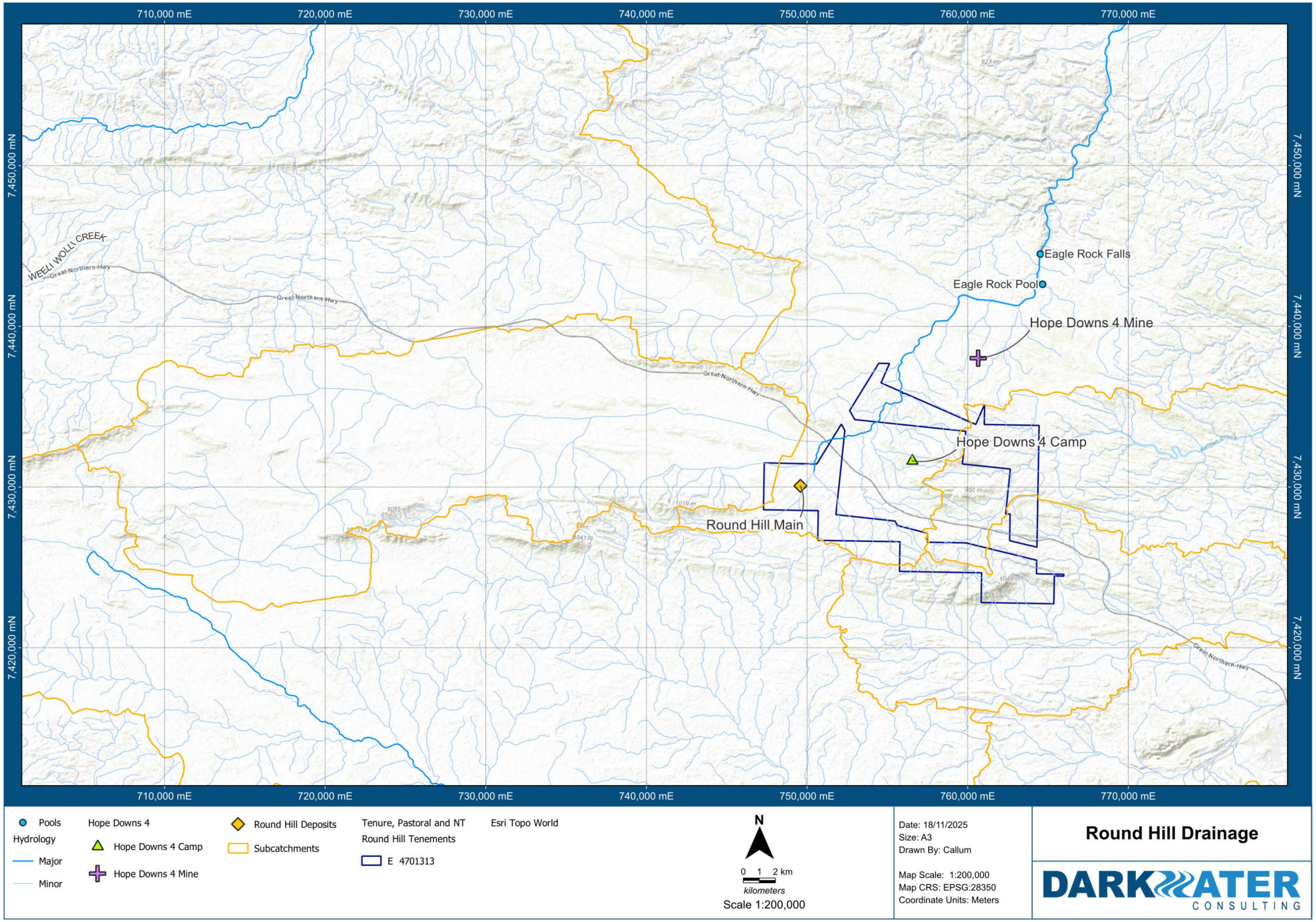


Figure 3-4: Round Hill Area Drainage and Rock Pools

3.3 Regional Geology

This section describes the broad regional geological setting. Features described may not be present within the Project area. The geological setting specific to the Project area, inclusive of field investigative findings, is addressed in Section 4.2.

3.3.0 Tectonic and Structural

The project area is located within the eastern portion of the Hamersley Basin, which covers an area of approximately 40,000 km^2 over the southern part of the Archean-Proterozoic Pilbara Craton (Rojas, 2018). The Hamersley Basin comprises the Mount Bruce Supergroup (2770 to near 2350 Ma), which consists of the volcanic sedimentary Fortescue, Hamersley, and Turee Creek Groups unconformably overlying granite-greenstone terrane. The Hamersley Range, running along the southern margin of the basin, is formed by a syncline in the Hamersley Group.

Strata throughout the Round Hill Main area generally dips at 40°- 50° to the south, with parasitic folding evident in both mapped outcrop and drill hole data. The broader area is dominated by east-west trending folds, forming ridges associated with outcrops of strata more resistant to weathering.

Regional thrust faults trending parallel to fold structures are identified north and south of the Project area. Major strike slip faults, which cross-cut the area perpendicular to folding, are present outside of the immediate Project area.

3.3.1 Geology

The surface geology is best represented by the 1:250,000 Geological series map – Newman (SF50-16), which covers the area under investigation. Mapping is compiled in State-scale 1:100,000 bedrock and regolith geology spatial datasets produced by GSWA. Regolith and bedrock geology for the project area are shown in Figure 3-5 and Figure 3-6, respectively. The stratigraphy for the resource areas is provided in Table 3-3. Stratigraphic cross-sections are provided in Figure 3-7 and Figure 3-8.

The broader region is characterised by extensive areas of exposed bedrock overlain in places by a cover of Cenozoic-age clastic sediments in valleys and on outwash plains (Figure 3-5). Locally, extensive colluvium is present overlying sub-cropping Wittenoom Formation immediately north of the Round Hill Main deposit.

The bedrock predominantly comprises tightly folded Proterozoic-age rocks of the Hamersley Group, with older Archean-age rocks of the Fortescue Group exposed to the south of the Project area, separated by the Ophthalmia Thrust Fault.

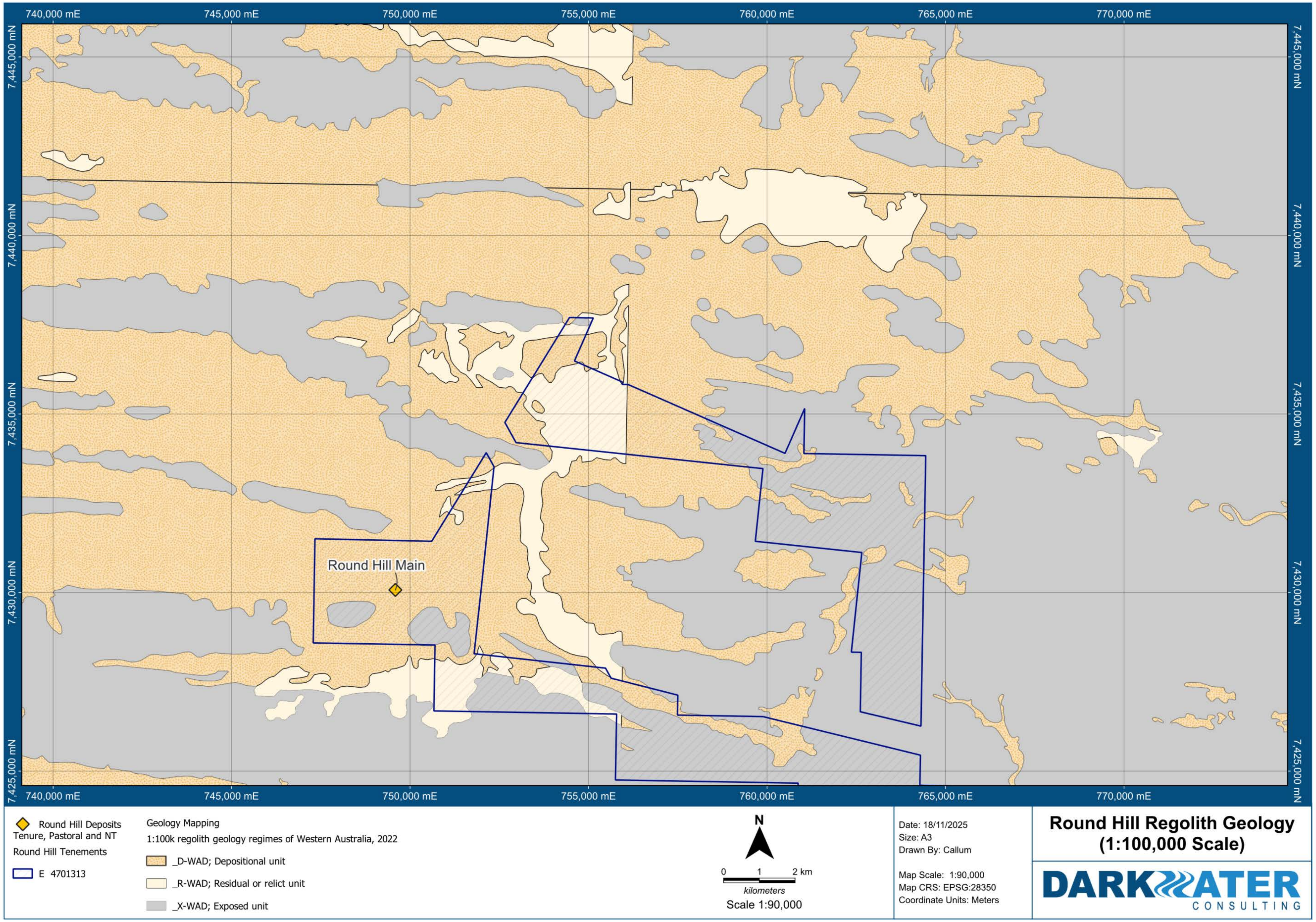


Figure 3-5: Round Hill Regional Regolith Geology

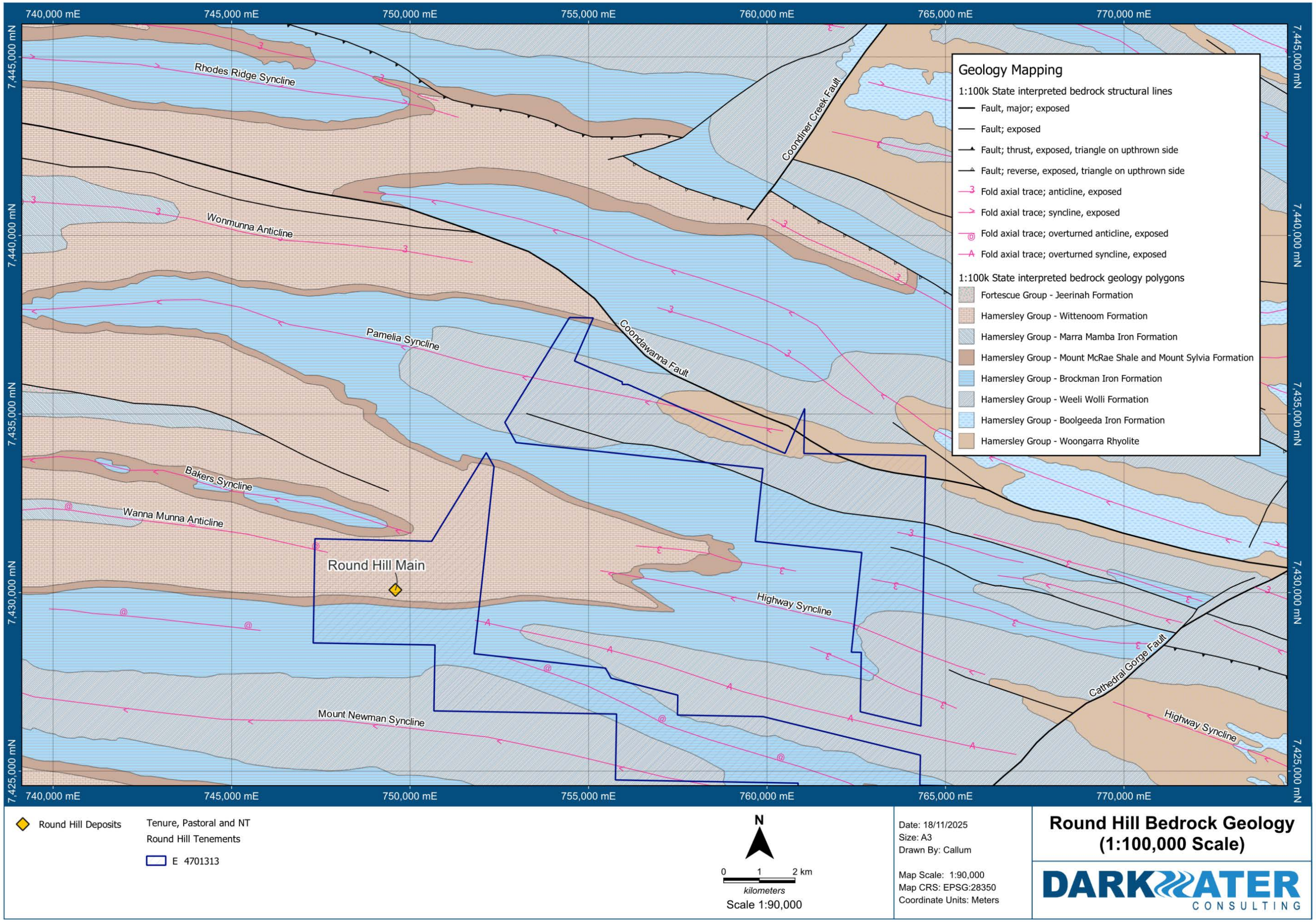


Figure 3-6: Round Hill Regional Bedrock Geology

Cenozoic

The Cenozoic geology is represented by Quaternary-age alluvium and colluvium deposits derived from the proximal Paleo-Proterozoic outcrop, overlying bedrock or older Cenozoic sediments commonly referred to as the “Tertiary Detritals”. The alluvial sediments include unconsolidated, poorly-sorted silt, sand, and gravel, deposited within the modern-day ephemeral creek and riverbed systems. A gently-sloping, colluvial sheet-wash unit lies adjacent to the outcrop areas and main drainages.

The Tertiary Detritals commonly overly the Wittenoom Formation as valley infill sediments derived from weathering of the less resistant surrounding outcrop. The Wittenoom Formation rarely occurs in outcrop as it is usually covered by alluvial and colluvial material from surrounding rock formations (RPS, 2015). On the margins of hills there are colluvial deposits that fine into alluvial deposits (sand and silt) further into the valley. In places, secondary cementation and chemical alteration of these deposits has formed calcrete, silcrete and goethite-rich pisolite (RPS, 2015).

Table 3-3: Round Hill Stratigraphy in Resource Areas

Era	Period	Group	Formation	Member	Stratigraphy
Cenozoic	Quaternary		Alluvium (Qa) Alluvium and Colluvium (Qw) Eollian Sand (Qs) Colluvium (Qc)		Unconsolidated silt, sand and gravel. Red-brown sandy and clayey soil. Sheets and dunes. Unconsolidated quartz and rock fragments in soil.
Cenozoic	Tertiary		Colluvium (Czc) Laterite (Czr) Calcrete (Czk)		Partly consolidated valley-fill deposits (Tertiary Detritals) Surficial hematite-goethite deposits over banded iron formation (Hamersly Surface) Sheet carbonate, usually formed in major drainage channels.
Proterozoic		Hamersley Group	Boolgeeda Ironstone Formation (P_Hao-ci)		Fine-grained, finely laminated, dark grey-brown to black, fissile to flaggy iron formation with minor chert, jaspilite and shale.
Proterozoic		Hamersley Group	Woongarra Rhyolite (Volcanics)		Quartz- or feldspar-phyric rhyolite and rhyodacite as sills or flows, tuff and minor jaspilite banded iron formation.
Proterozoic		Hamersley Group	Weeli Wolli Formation		Interlayered banded iron formation and meta-dolerite sills, minor shale.
Proterozoic		Hamersley Group	Brockman Iron Formation	Yandicoogina Shale Member	Alternating thin shale and chert beds. Member up to 60 m thick
Proterozoic		Hamersley Group	Brockman Iron Formation	Joffre Member	Thin bedded banded iron formation, interbedded with varying proportions of minor shale.
Proterozoic		Hamersley Group	Brockman Iron Formation	Whaleback Shale Member	Shale and chert with minor banded iron formation. Minor mineralisation.
Proterozoic		Hamersley Group	Brockman Iron Formation	Dales Gorge Member	Interbedded banded iron formation and thin shale bands. Primary mineralisation host.
Proterozoic		Hamersley Group	Mt McRae Shale and Mt Sylvia Formation		Massive shales with interbedded cherts and thin banded iron formation.
Proterozoic		Hamersley Group	Wittenoom Formation		Dolomite, interbedded with thin chert and shale. Commonly heavily weathered at the contact.

Proterozoic

The Proterozoic-age basement regionally comprises mainly Hamersley Group deposits, with older Fortescue Group deposits exposed to the south and west of the Project area.

The Hamersley Group is one of the most economically important stratigraphic units in Australia, containing vast iron-ore resources. The group is 2.5 to 3 km thick and contains some of the thickest and most extensive banded iron formations (BIF) in the world. It conformably overlies the Archean-age Fortescue Group and is paraconformably overlain by the Turee Creek Group (Martin, GSWA

Explanatory Notes; Hamersley Group (AP_-HA-xci-sl), 2025). The depositional environment is mainly deep marine. The Hamersley Group comprises predominantly chemical sedimentary rocks interbedded with fine-grained siliciclastic and volcaniclastic sedimentary rocks, as well as lesser felsic and mafic extrusive and intrusive rocks (Martin, GSWA Explanatory Notes; Hamersley Group (AP_-HA-xci-sl), 2025). The chemical sedimentary rocks include BIF, chert, and fine- to coarse-grained carbonates. The group is formally subdivided into eight formations, which from top to bottom are the Boolgeeda Ironstone Formation, Woongarra Rhyolite, Weeli Wolli Formation, Brockman Iron Formation, Mt McRae Shale, Mt Sylvia Formation, Wittenoom Dolomite, and the Marra Mamba Formation.

Boolgeeda Ironstone

The uppermost formation of the Hamersly Group is the Boolgeeda Ironstone Formation. It is up to 450 m thick and generally consists of two or three flaggy to fissile iron formation units separated by shaly intervals (Martin, GSWA Explanatory Notes. Boolgeeda Iron Formation (P_-HAo-ci), 2020). The unit is distinctly different from other BIF units in the Hamersley Group, comprising dark greyish-brown to black, highly magnetic, finely laminated iron formation, which is lacking in the chert-BIF meso-banding that is typical of other BIF units in this group. It paraconformably underlies the Turee Creek Group and paraconformably overlies the Woongarra Rhyolite. Exposed Boolgeeda Ironstone Formation is limited to syncline structures east of the Project area.

Woongarra Rhyolite

The Woongarra Rhyolite consists predominantly of massive, medium-grained rhyolite and felsic tuff, with thin local-beds of jaspillitic iron formation. It conformably overlies the Weeli Wolli Formation and is disconformably overlain by the Boolgeeda Iron Formation. It has an average thickness of about 400 m but thins markedly towards the east. Woongarra Rhyolite is observed north of the Project area, where the east-plunging Parmelia Syncline separates the area from the Hope Downs 4 operation.

Weeli Wolli

The Weeli Wolli Formation comprises distinctive jaspillitic BIF with shale, intruded by thick, medium- to coarse-grained dolerite sills that make up the bulk of the volume of the formation in most areas. The thickness of the formation is highly variable depending on the proportion of dolerite sills (Martin, GSWA Explanatory Notes. Weeli Wolli Formation (P_-HA-xci-od), 2021). The dolerite sills are locally vesicular and most abundant in the southeastern Hamersley Basin, particularly in the Ophthalmia Range where individual sills may be up to 150 m thick. The banded iron formations of the Weeli Wolli Formation are distinctively red in colour and conspicuously laminated. The dolerite sills show visible thermal metamorphic effects at both upper and lower contacts. The contact relationship with overlying and underlying units are difficult to place precisely due to the intrusion of the dolerite sills, particularly at the basal contact. The Weeli Wolli Formation overlies the Brockman Iron Formation.

The Weeli Wolli formation, and associated dolerite sills, are observed in exploration drilling within HPPL tenure, immediately north of the Project area.

Brockman Iron Formation

The Brockman Iron Formation is further subdivided into four members, from top to bottom, the Yandicoogina Shale Member, the Joffre Member, the Whaleback Shale Member and Dale Gorge Member. The iron ore is hosted predominantly within the Dales Gorge and Joffre Members. The BIF's are typically hard, fine-grained and have well developed vertical joint systems. Their resistance to weathering results in them forming cliff-faced gorges and elevated ridgelines where superimposed drainage patterns impact the topography (Golder Associates, 2018).

The Yandicoogina Shale Member comprises up to 60 m of alternating chert and shale. It is commonly grouped with the Joffre Member due to poor exposure and difficulty in defining the upper and lower contacts. It conformably overlies the Joffre Member and is conformably overlain by the Weeli Wolli Formation; the upper contact is commonly intruded by dolerite sills (Martin, GSWA Explanatory Notes, Yandicoogina Shale Member (P_-HAby-sh), 2021).

The Joffre Member is up to 360 m thick, and is present throughout the central and southern Pilbara region. It is characterised by its homogeneity with alternating BIF and shale beds. The banded iron comprises interbedded chert and iron rich material (Golder Associates, 2018). It has a gradational contact with the underlying Whaleback Shale Member and is conformably overlain by the Yandicoogina Shale.

The Whaleback Shale Member conformably underlies the Joffre Member and is approximately 50 m thick. It comprises bedded shale, chert and BIF. The Whaleback Shale is often weathered, exhibiting sepergene enrichment of the BIF bands both above and below it (Golder Associates, 2018).

The Dale Gorge Member is the most economically important unit within the Brockman Iron Formation as it hosts large, high-grade ore deposits. It conformably underlies the Whaleback Shale Member and comprises a well-bedded, alternating sequence of BIF and shale macro-bands. The weathered shales consist mainly of kaolinitic clays with varying amounts of iron staining. The Dale Gorge member conformably overlies the Mount McRae Shale.

Mt McRae Shale / Mt Sylvia Formation

The Mount McRae Shale and underlying Mount Sylvia Formations are commonly grouped together. The Mt McRae Shale is around 50 m thick with a conformable contact with the Mount Sylvia Formation, which has a thickness of around 30 m. The units consist predominantly of shale and dolomitic shale with minor chert, dolomite, and BIF. The Mount Sylvia Formation conformably overlies the Bee Gorge Member of the underlying Wittenoom Formation.

Wittenoom Formation

The Wittenoom Formation represents the front of an extensive carbonate platform, reaching a maximum thickness of around 1400 m along the Fortescue Valley and thinning to the south and southwest. It is subdivided into three conformable members, from top down, the Bee Gorge Member dominated by argillite with lesser carbonate, chert and BIF, the Paraburdoo Member consisting of dolomite with minor shale, BIF and chert, and the shale-dominated West Angela Member.

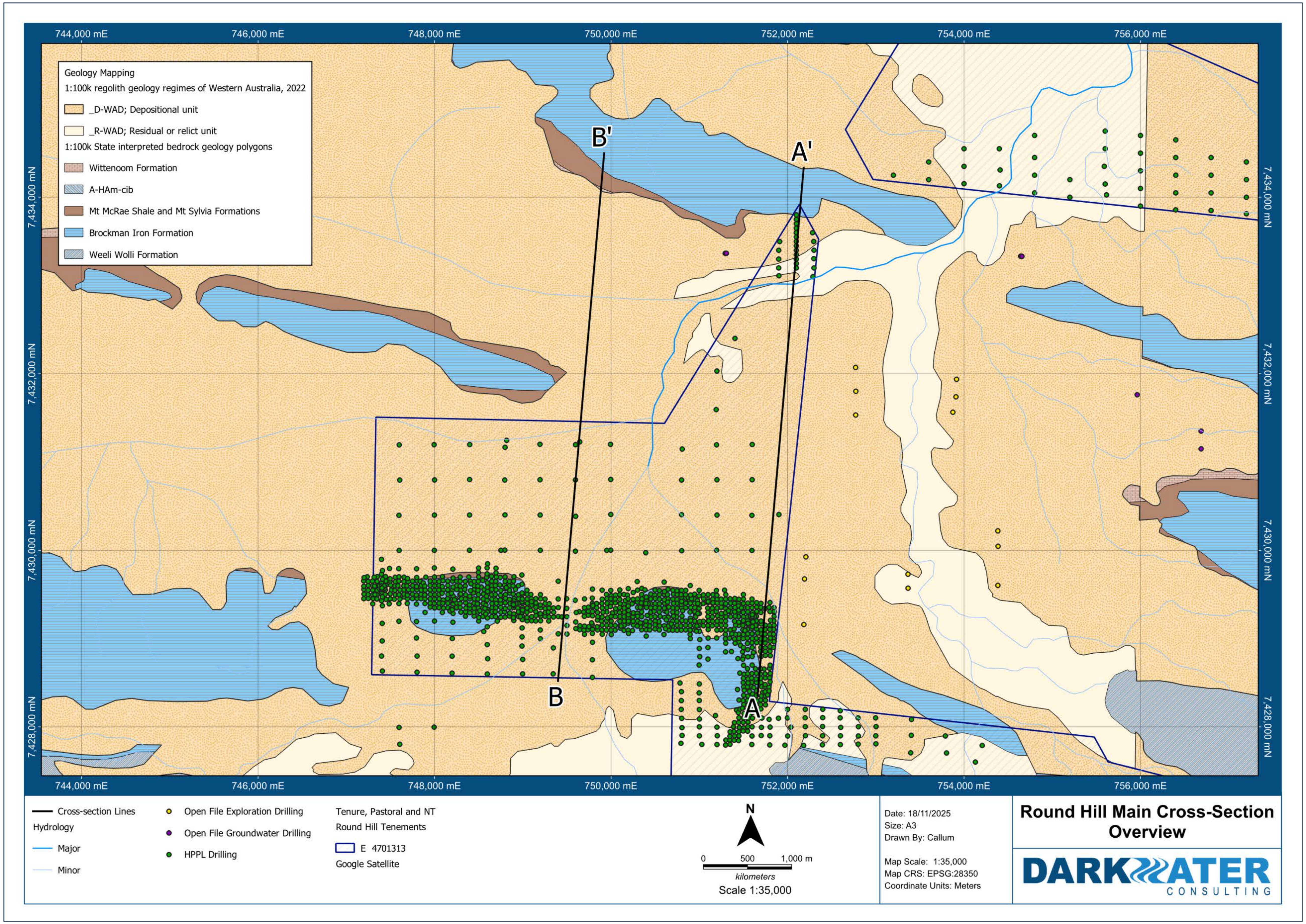


Figure 3-7: Round Hill Geological Cross-section Overview

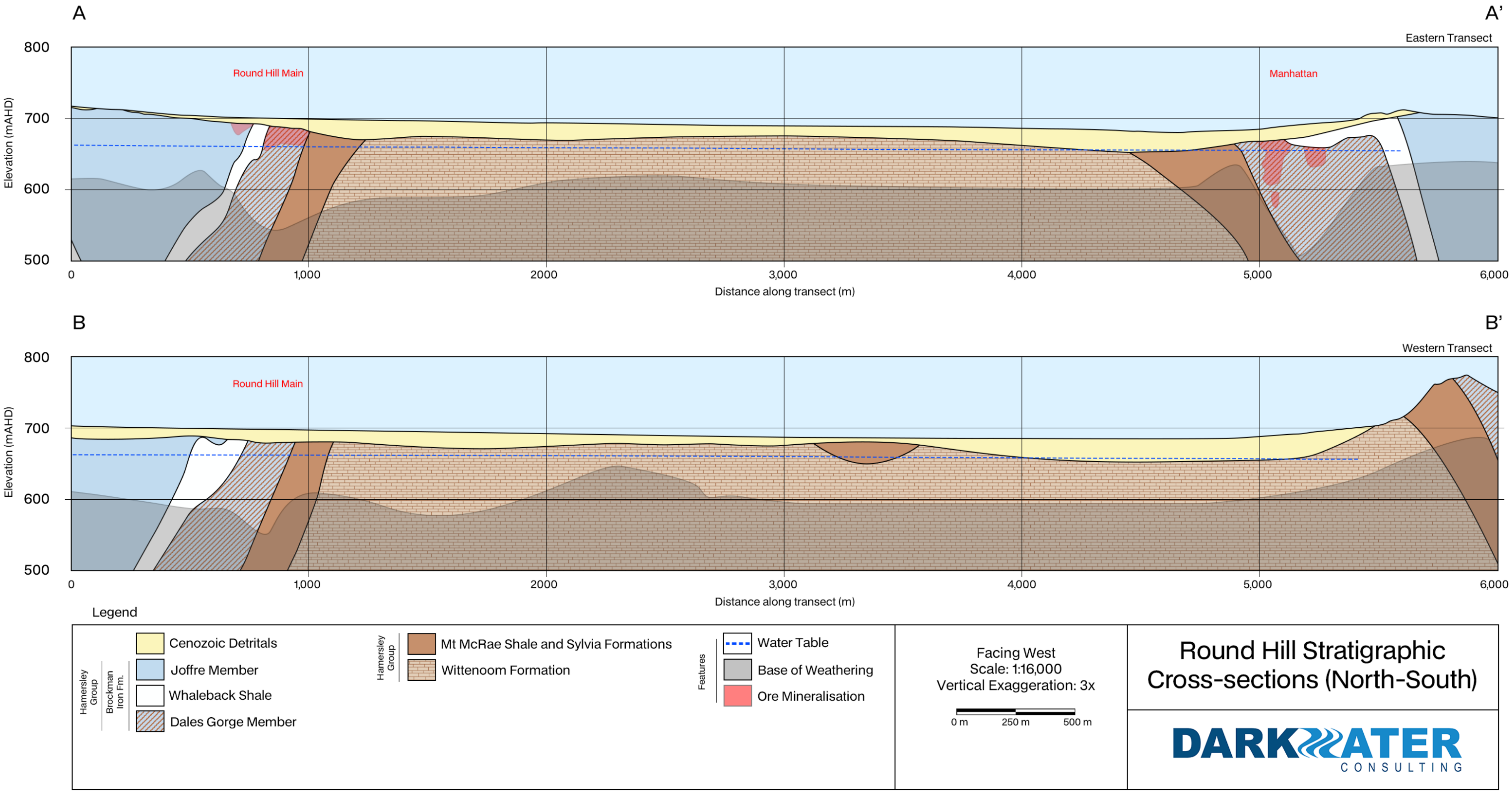


Figure 3-8: Round Hill Stratigraphic Cross-section – North-South

3.4 Regional Hydrogeology

The regional hydrogeological setting is provided herein as a basis for the hydrogeological investigations which have taken place to date. The hydrogeological conceptualisation specific to the Round Hill area, inclusive of all data collected during this study phase, is presented in Section 4.2

The characterisation of the regional hydrogeology is derived from publicly available reports, including the Ecohydrogeological Conceptualisation for the Eastern and Central Pilbara Region (RPS, 2015a & RPS, 2015b), the Central Pilbara Groundwater Study (Johnson & Wright, 2001), and hydrogeological reports from proximal and/or analogous projects (MWH, 2009 & Golder Associates, 2018).

In general, the regional groundwater system is hosted in aquifers associated with Tertiary Detritals and underlying Paraburdoo Member of the Wittenoom Formation, located within the present-day, strike-orientated valleys between ridges of Brockman and Marra Mamba Iron Formation. In addition, zones of high-permeability associated with mineralisation, or with more generalised weathering, form localised aquifers. The extent to which these aquifer-systems are in hydraulic connection varies with the site-specific geology and is largely dependent on structural features.

The generalised hydrostratigraphy of the region is provided in Table 3-4, and conceptual hydrogeological cross sections for the Round Hill Main and Manhattan resource areas are provided in Figure 3-9 .Location of cross-sections are shown above in Figure 3-7.

3.4.0 Aquifers

The primary aquifer unit within the resource area is anticipated to be mineralised Brockman Iron Formation. Aquifers may also occur within the Cenozoic sediments that overly the basement formations where saturated, and within the Wittenoom Formation where weathering is present.

Brockman Iron Formation

The Brockman Iron Formation is composed of low-permeability BIF, chert and shale. Mineralisation of the Brockman introduces secondary permeability and porosity through chemical weathering, forming localised aquifers where mineralisation occurs beneath the water table. Locally, increased hydraulic conductivity is observed in unmineralised Brockman Iron Formation where weathered.

Mineralisation at Round Hill Main is primarily hosted within the Dales Gorge Member, with minor mineralisation noted in the Joffre and Whaleback Shale Members.

In the absence of mineralisation, the Brockman Iron Formation is usually considered to have limited aquifer potential and a "bucket" type aquifer is assumed. However, drawdown propagation observed 5 km along strike at HD4 and statistical analysis conducted on hydraulic conductivity data for the Pilbara region (Kalaka, 2021) indicate low to moderate permeability may persist outside of the mineralised zone. Similarly, while the Yandicoogina and Whaleback Shale Members are regionally characterised as aquitards they can potentially form localised aquifers where mineralisation is hosted, or where extensive structural deformation has occurred.

Table 3-4: Regional Hydrostratigraphy (after RPS, 2015a)

<table>
<tr><th>Group</th><th>Formation</th><th>Member</th><th>Thickness (m)</th><th>Lithological Description</th><th>Hydrogeological Description</th></tr>
<tr><td>Quaternary</td><td colspan="2">Alluvium and Colluvium</td><td>Less than 20</td><td>Unconsolidated silt, sand and gravel associated with ephemeral creeks and riverbeds. Sheet wash colluvial units adjacent to main drainages.</td><td>Generally unsaturated but can be aquifer where occurs below water table</td></tr>
<tr><td rowspan="2">Tertiary Detritals</td><td colspan="2">Duricrust</td><td rowspan="2">Less than 180</td><td>Calcretes, silcretes in sediment profiles.</td><td>Aquifer where saturated, laterally extensive, and secondary porosity exists</td></tr>
<tr><td colspan="2">Detritals</td><td>Valley fill sediments, silt and clay, scree on valley sides, mottled clay with channel iron deposits (CID), calcrete and silcrete, piezolitic at base.</td><td>Generally unsaturated but can be aquifer where occurs below water table dependent on clast size</td></tr>
<tr><td rowspan="10">Hamersley Group</td><td colspan="2">Boolgeeda Ironstone Formation</td><td>to 450</td><td>Fine-grained, finely laminated, flaggy iron-formation.</td><td>Low permeability</td></tr>
<tr><td colspan="2">Woongarra Rhyolite (Volcanics)</td><td>To 800</td><td>Acid lavas and tuffs with interbedded iron formation</td><td>Low permeability</td></tr>
<tr><td colspan="2">Weeli Wolli Formation</td><td>Less than 450</td><td>BIF, shale, jaspilite, dolerite sills</td><td>Low permeability</td></tr>
<tr><td rowspan="4">Brockman Iron Formation</td><td>Yandicoogina Shale Member</td><td>60 to 70</td><td>Interbedded chert and shale locally intruded by dolerite sills</td><td>Low permeability.</td></tr>
<tr><td>Joffre Member</td><td>70 to 100</td><td>BIF minor shale bands. Major ore host</td><td>Aquifer potential limited to mineralised and/or weathered zones</td></tr>
<tr><td>Whaleback Shale Member</td><td>40 to 60</td><td>Interbedded shale, chert and BIF</td><td>Low permeability</td></tr>
<tr><td>Dales Gorge Member</td><td>90 to 190</td><td>Interbedded BIF and shale. Major ore host</td><td>Aquifer potential limited to mineralised and/or weathered zones</td></tr>
<tr><td colspan="2">Mount McRae Shale Formation</td><td>45 to 50</td><td>Massive shales and interbedded cherts.</td><td>Low permeability with localised aquifers associated with chert</td></tr>
<tr><td colspan="2">Mount Sylvia Formation</td><td>15 to 20</td><td>Shale, dolomite with several BIF macro-bands.</td><td>Low permeability with localised aquifers associated with chert</td></tr>
<tr><td>Wittenoom Formation</td><td>Undifferentiated</td><td>Up to 600</td><td>Calcareous shale and dolomite. Dolomite of Paraburdoo Member may be karstic where weathered.</td><td>Low permeability where unweathered. Potential regional aquifer in karstic zones</td></tr>
</table>

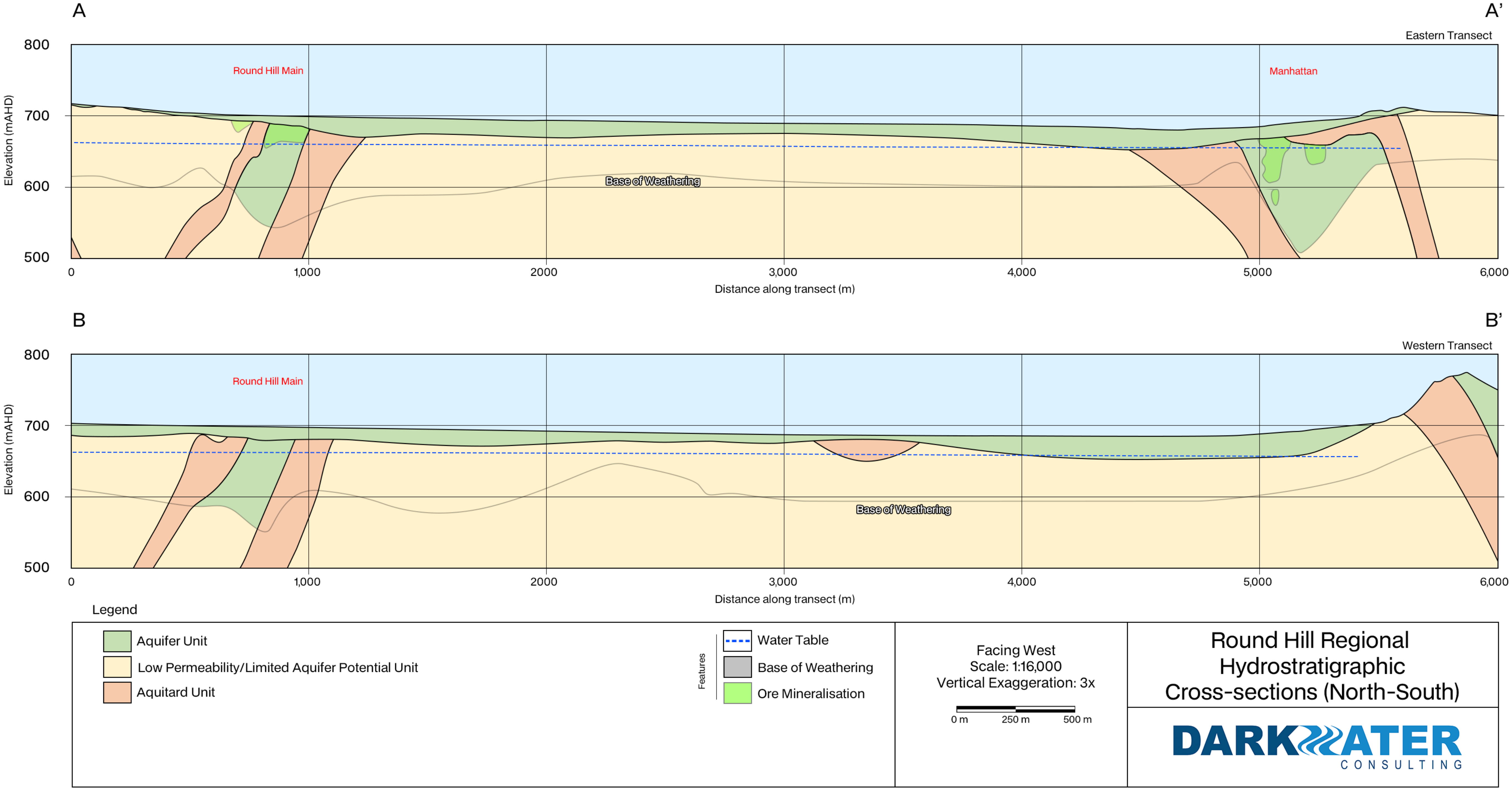


Figure 3-9: Round Hill Regional Hydrostratigraphic Cross-sections – North to South

Quaternary/Tertiary Sediments

The Tertiary Detritals and/or Quaternary alluvium and colluvium are present over a relatively large area within the Project area. The alluvium is associated with ephemeral drainage and is composed of unconsolidated silt, sand, and gravel. The colluvium is present as sheet-wash adjacent to the ironstone ridges and alluvial deposits. The Quaternary sediments may directly overlie Tertiary Detrital material in some areas.

Down-gradient of the Project area, perched aquifers have been documented in alluvial deposits along Coondiner Creek and in Tertiary calcrete deposits to the north of HD4 (MWH, 2009). Exploration drilling and interpreted groundwater depths indicate that there are limited saturated Tertiary sediments within the immediate Project area.

Wittenoom Formation

The Wittenoom Formation contains (from top to bottom): the Bee Gorge Member, Paraburdoo Member, and the West Angela Member. The Wittenoom Formation is primarily dolomite, with minor shale and BIF. It is generally low permeability where fresh but forms a part of the regional aquifer system where extensive karstic-weathering is present (primarily in the Paraburdoo Member).

Any hydraulic connection between the Brockman Iron Formation and the Wittenoom Formation is expected to be limited due to the presence of the intervening Mount McRae Shale and Mount Sylvia Formations.

3.4.1 Aquitards

Weeli Wolli Formation

Regionally, the BIFs and dolerite sills of the Weeli Wolli Formation are assumed to behave as aquitards, based on estimates derived from numerical modelling calibration (RPS, 2015) and on limited results available from aquifer testing (Kalaka, 2021).

Mount McRae Shale and Mount Sylvia Formations

The Mount McRae Shale Formation and Mount Sylvia Formation are primarily composed of low-permeability shales and are considered to be regional aquitards. However, fracturing and weathering in areas of high deformation may generate secondary permeability and facilitate flow through these units.

Whaleback Shale Member

The Whaleback Shale Member overlies the Dales Gorge Member and underlies the Joffre Member of the Brockman Iron Formation. The Whaleback Shale Member is dominantly composed of shale and is expected to act as an aquitard in absence of secondary permeability introduced via mineralisation, faulting or folding. Minor mineralisation of the Whaleback Shale Member is identified in resource modelling (HPPL, 2023), but this is constrained above the regional groundwater table. It is anticipated that the Whaleback Shale Member will act as an aquitard and further compartmentalize the Dales Gorge mineralised aquifer.

3.4.2 Structures

Geological structures can act as both localised aquifers and aquitards, creating zones of increased hydraulic connection between formations and/or hydraulic barriers to groundwater flow.

Local aquifers can be associated with specific faults and/or folds, such that their hydraulic conductivity is site specific. For example, chert horizons in the Mt Sylvia and Mt McRae Formations can form brecciated zones in tightly folded settings, such as the footwall of the Brockman Iron Formation (RPS, 2015). Similarly, faulting in orebodies can produce local zones of structurally-enhanced permeability, which can be important in connecting orebody aquifers with the regional aquifer system.

Conversely, faults can also act as hydraulic barriers, with large drops in groundwater level occurring across them. In particular, some major strike-slip faults with a northeast-southwest orientation perpendicular to the regional strike have been found to act as barriers to groundwater flow (RPS, 2015).

Finally, dolerite dykes and sills often act as hydraulic barriers, compartmentalising groundwater occurrence in the region, but also having the possibility of increased permeability along the contact zone. A northeast-southwest trending dolerite dyke is known to form a hydraulic barrier to the east of the current HD4 mining area.

Within the Project area, there are currently no identified regionally significant faults identified which may alter the flow of groundwater.

3.4.3 Aquifer Characteristics

Aquifer parameters from nearby deposits and/or similar hydrogeological settings are provided for comparison with site-specific values derived from studies completed during this study phase.

The results show that average hydraulic conductivity (K) for the Joffre Member tested at HD4 (MWH, 2009) was 6.5 m/d, with the average storativity (S) value being 7.7x10-4 (derived from the geometric mean of estimated storativity/specific yield). In the same testing program, the Dales Gorge Member was found to have an average K value of 12.5 m/d and an average S value of 5.8x10-4.

Kalaka (2021) provides a statistical analysis for hydraulic conductivity values obtained from pumping tests in the pit areas at HD4. The range presented in Kalaka indicate hydraulic conductivity (K) values range between 0.1 and 145 m/d. Taking the mean log value (to account for heavy weighting of values towards the low end of the normal curve) gives a mean K of 0.8 m/d and 1.8 m/d for the mineralised Joffre and Dale Gorge Members, respectively.

Rojas et al (2018), determined a geometric mean K value for mineralised BIF aquifers in the Pilbara region to be 3.4 m/d with a median value of 5.2 m/d, and RPS analysis, using field data and values from calibrated models, determined the mineralised Brockman Iron Formation to have K values in the order of 4.8 m/d (mean) to 3.2 m/d (median). RPS estimates for mean and median specific yield (Sy) for the mineralised Brockman were in the order of 0.06 %, with confined storativity (S) estimated to be in the order of 1.0x10-5.

Tertiary Detritals have average K values in the range of 5.2 to 10 m/d, and median values between 1.7 and 8.8 m/d. Storativity values are reported to be between 8.6x10-5 and 4.2x10-3. In the Wittenoom Formation aquifer, average K values are in the order of 1.6 to 15.7 m/d, and median values range between 5.2 and 10.7 m/d. Storativity values are reported to be between 4.0x10-2 and 1.5x10-4.

3.4.4 Groundwater Recharge and Discharge

The Project is located in the upper reaches of the Coondiner Creek catchment. Groundwater recharge occurs through a combination of direct infiltration of rainfall, and infiltration of surface water runoff, particularly along the ephemeral creek-lines and where sheet-flow occurs.

An approximately 500 km2 internally draining catchment, located west of the Round Hill Main area, represents a potentially significant source of groundwater recharge to the sub-cropping Wittenoom Formation present throughout the area. A lack of defined drainage within this area may facilitate ponding and subsequent recharge to underlying hydrostratigraphic units which are in hydraulic connection with the Round Hill Main area.

There are a number of permanent to semi-permanent water holes mapped along Coondiner Creek, north of Hope Downs 4. The general consensus is that these are surface expressions of groundwater within perched aquifer systems associated with shallow alluvial and colluvial sediments and are not hydraulically connected to the regional groundwater system.

3.4.5 Groundwater Levels and Throughflow

Groundwater levels within the Project area are in the order of 60 to 30 mbgl, or 662 to 654 mAHD, with groundwater flow broadly mirroring the topography, flowing to the north towards northerly drainage of Coondiner Creek. Groundwater levels at Hope Downs 4 were in the order of 635 mAHD prior to mining (MWH, 2009), indicative of regional groundwater flow following this trend under baseline conditions. Dewatering associated with below water table mining at Hope Downs 4 has likely increased the regional hydraulic gradient towards the north.

3.4.6 Groundwater Quality

The location of the Project area being within the upper reaches of the Coondiner Creek catchment, and the observed depths to groundwater, indicate that groundwater is likely fresh throughout the immediate area. This is supported by baseline water quality sampling as described in Section 4.2.6.

3.4.7 Groundwater Receptors

Regionally, groundwater receptors are associated with topographical lows where depth to groundwater is reduced, such as drainage lines, where groundwater may support vegetation or surface expressions of groundwater. Depths to groundwater in the area, which exceed 30 mbgl, are indicative of the low likelihood of interaction between groundwater and superficial features.

The Project area can be considered to be likely to support stygofauna, on the basis the prevalence of stygofauna in the Pilbara region and the site characteristics: fresh to brackish groundwater aquifer in fractured rock. Geological units known to provide stygofauna habitat are rock types or regolith deposits that have secondary porosity and are fully or partly saturated, usually occurring below the water table, including, but not limited to alluvial formations; calcretes (particularly when associated with paleochannel aquifers); channel iron deposits; fractured rock aquifers; karstic limestone and dolomite (EPA, 2021).

4. Site Hydrogeology

4.1 Field Investigations

4.1.0 Previous Investigations

Darkwater Consulting previously produced a Round Hill Conceptual Hydrogeological Report during the Round Hill Conceptual Study which took place in 2023.

A site visit was performed with the accompaniment of the HPPL RDG Team upon the conclusion of the Round Hill Conceptual Study in November 2023. The objectives of this site visit were to:

- Verify the status of existing groundwater infrastructure in the project area, and, if possible, collect groundwater level data and install groundwater level and barometric pressure transducers;
- Identify any open exploration drillholes and collect groundwater level data;
- Provide a list of sites which may be suitable for early collection of subterranean fauna samples; and
- Ground-truth the project area for potential drilling targets in the next study phase.

Information collected during this site visit is shown in Figure 4-1.

Water levels at existing groundwater infrastructure (HRWB0001 and HRPZ0001) were unable to be measured. HRWB0001 was equipped for exploration water supply purposes and pump infrastructure blocked access to the water table. HRPZ0001 was constructed at an insufficient depth to reach the assumed water table.

A previously unrecorded bore (JSW 2-10-2016, now referred to as HRPB0002), was identified on Project tenure. This bore was subsequently marked as a target for test pumping in advance of a dedicated hydrogeological drilling program.

Water level measurements collected supported the groundwater intercepts recorded during previous exploration drilling programs. These indicated that water levels were in the order of 660 mAHD within the Round Hill Main deposit area.

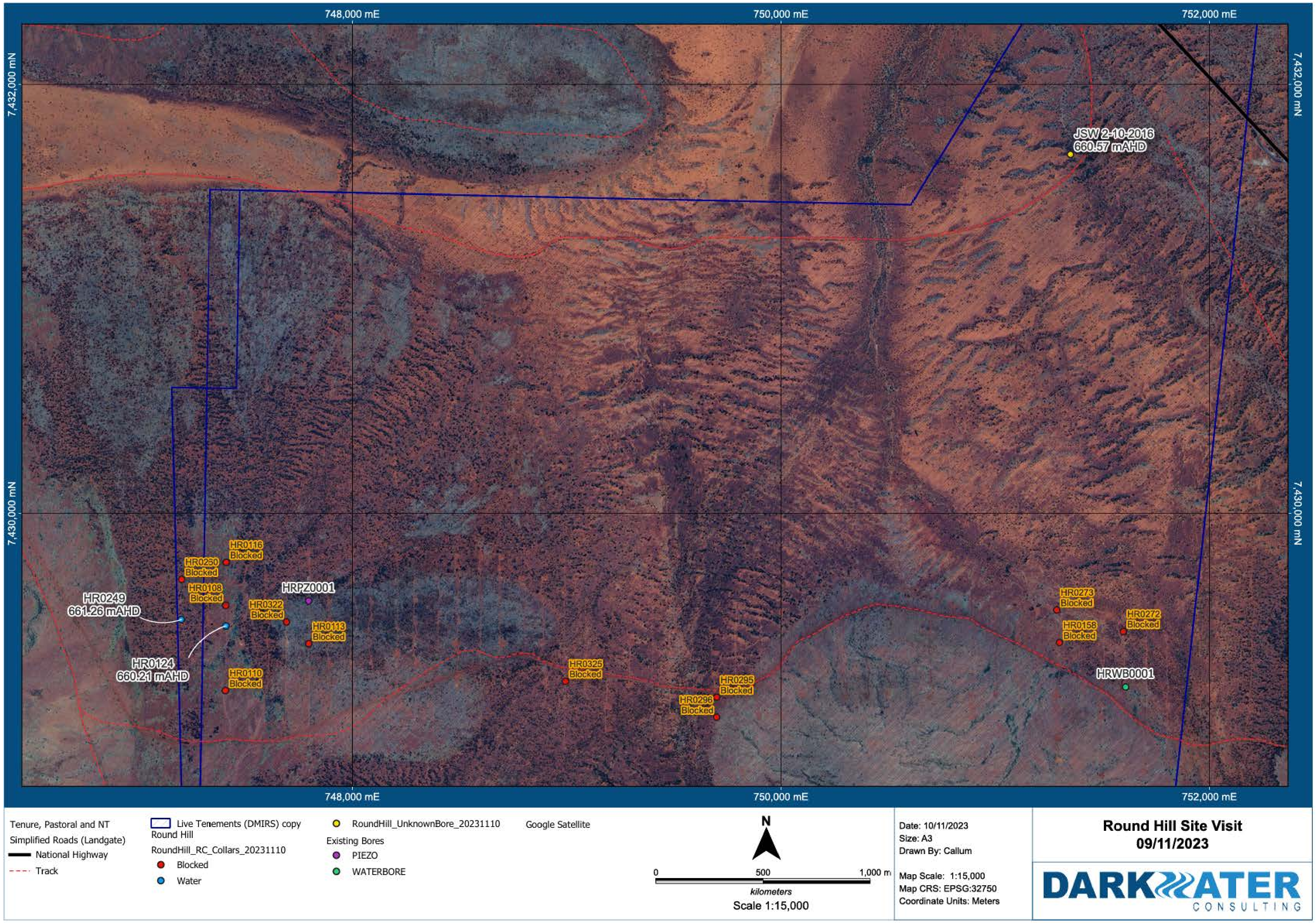


Figure 4-1: Previous Study - Round Hill Site Visit (November 2023)

4.1.1 Exploration RC Piezometer Installation Program (2024)

Planned exploration infill, extensional and sterilisation RC drilling programs were identified as an opportunity to:

- Establish a baseline groundwater monitoring network and begin collection of groundwater level and water quality data in advance of a dedicated investigative drilling program;
- Allow for preliminary testing of hydraulic parameters in various hydrostratigraphic units through falling head testing (FHT); and
- Provide monitoring sites for testing of existing bore HRPB0002.

Piezometer installations associated with this program are listed in Table 4-1 and shown in Figure 4-2.

The completed sterilisation drilling significantly changed the geological interpretation of the area north of the Round Hill Main orebody. Where previously interpreted as a relatively thick tertiary detrital sequence, this area is now interpreted as undifferentiated Wittenoom Formation overlain by a thin layer of detrital cover. The Wittenoom Formation has undergone oxidation/reduction and weathering at variable depths across the sterilisation drilling area.

Chemical analysis of samples collected during the sterilisation drilling program indicated significant intervals of high calcium oxide and magnesium oxide. These intervals have been interpreted as dolomitic beds of the Wittenoom Formation which follow the observed folding throughout the project area.

4.1.2 Round Hill Groundwater Monitoring and Hydraulic Testing (Oct/Nov 2024)

AQ2 completed a baseline groundwater monitoring and hydraulic testing program on behalf of HPPL. Field works were undertaken from the 29th of October 2024 to the 3rd of November 2024. Reporting associated with this investigation is included as Appendix A.

Activities associated with these field works included:

- Measurement of groundwater levels in all available bores;
- Collection of groundwater samples in all available bores for laboratory analysis;
- Hydraulic testing of all available bores via FHT; and,
- Installation of groundwater pressure transducers across the site to begin collection of time-series water level data.

Groundwater Level Measurements

Groundwater level measurements are listed in Table 4-2. Groundwater measurements and interpreted groundwater contours are shown in Figure 4-3. Water levels were measured using a water level dipper prior to collection of groundwater quality samples. Groundwater levels range from 60 mbgl (~662 mAHD) south of the orebody, to 30 mbgl (~656 mAHD) proximal to Great Northern Highway. Groundwater flow broadly mirrors the topography, flowing from the catchment boundary south/south-west of the orebody towards the north/north-east, and is inferred to follow the ephemeral drainage of Coondiner Creek.

Table 4-1: Round Hill Main RC Piezometer Installations

Area	Bore ID	Planned ID	Easting	Northing	Elevation (mAHD)	Stick up (magl)	Depth (mbgl)	Screened Interval (mbgl)	Hydrostratigraphic Unit
Round Hill Main Orebody	EAPZ0251	PR1225	750351.23	7429211.10	720.10	0.59	88	64-88	Whaleback Shale / Dales Gorge
	EAPZ0296	PR1293	750743.61	7429247.61	714.15	0.79	102	66-102	Dales Gorge
	EAPZ0300	PR1292	750747.24	7429445.44	701.92	0.54	72	42-72	Footwall Zone / McCrae Shale
	EAPZ0406	PR1544	751546.27	7429247.78	699.34	0.86	118	46-118	Dales Gorge
	EAPZ0412	PR1004	751599.15	7428302.68	718.88	0.57	82	64-82	Joffre
	EAPZ0458	PR1612	751842.94	7428999.49	701.48	0.77	100	46-100	Joffre
	EAPZ0471	PR1583	747441.76	7429552.91	706.63	0.80	72	48-72	Dales Gorge
	EAPZ0517	PR1465	748150.07	7429402.74	706.28	0.68	76	46-76	Dales Gorge
	EAPZ0587	PR1219	749846.18	7429296.96	698.13	0.80	70	40-70	Dales Gorge
	EAPZ0745	PR1441	748648.27	7429600.39	704.93	0.66	70	52-70	Footwall Zone / McCrae Shale
Sterilisation Area	EAPZ0607	PR0985	747596.46	7430397.80	698.80	0.86	70	46-70	Wittenoom Formation
	EAPZ0611	PR0963	747994.93	7431197.67	690.55	0.76	70	46-70	Wittenoom Formation
	EAPZ0620	PR0982	748798.61	7431167.97	689.24	0.98	76	46-76	Wittenoom Formation
	EAPZ0641	PR0967	751195.90	7431195.90	689.26	0.74	120	36-120	Wittenoom Formation
	EAPZ0642	PR0989	751191.50	7431595.05	687.81	0.90	114	48-114	Wittenoom Formation
	EAPZ0643	PR0987	751199.54	7432032.10	686.45	0.90	88	40-88	Wittenoom Formation

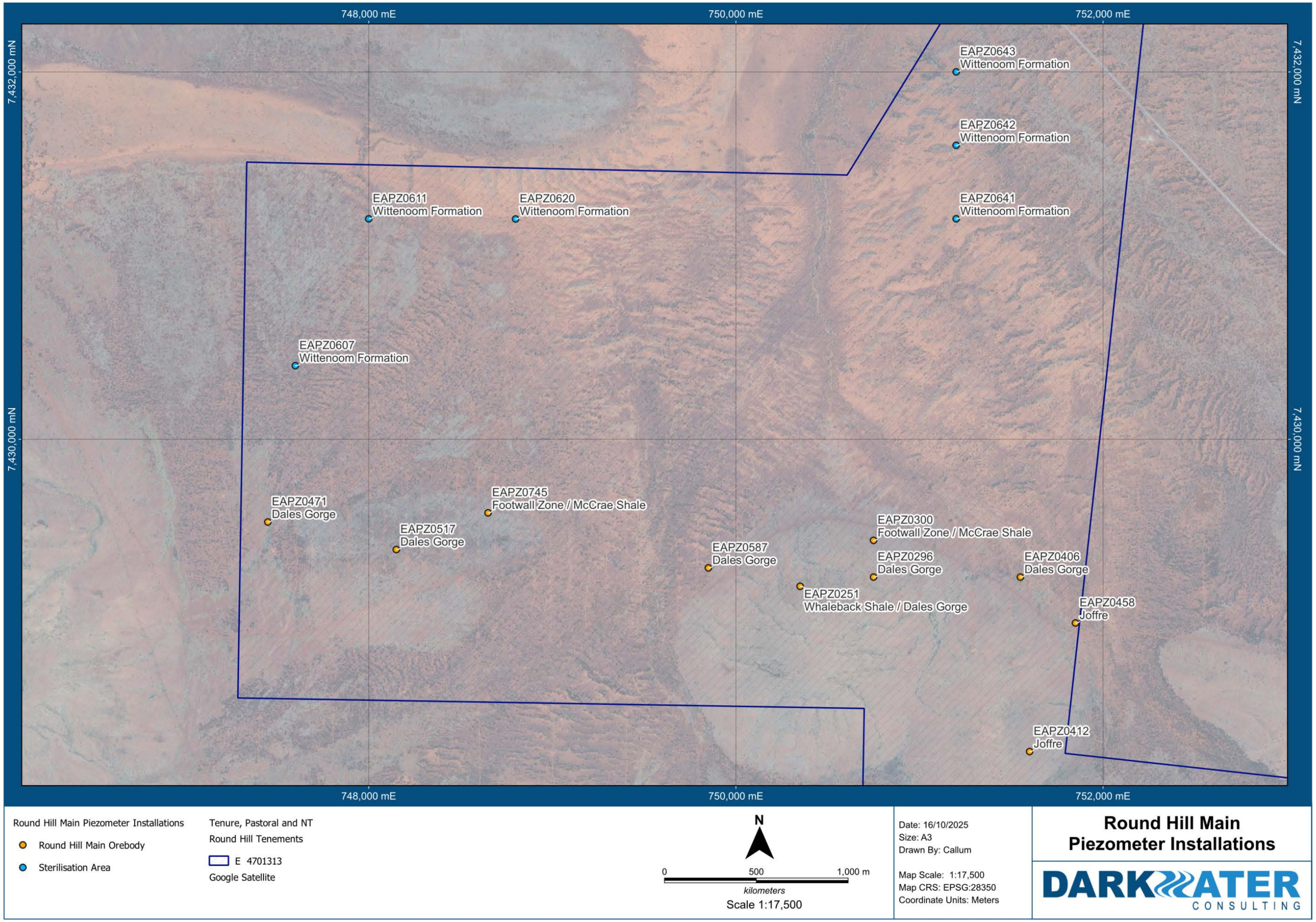
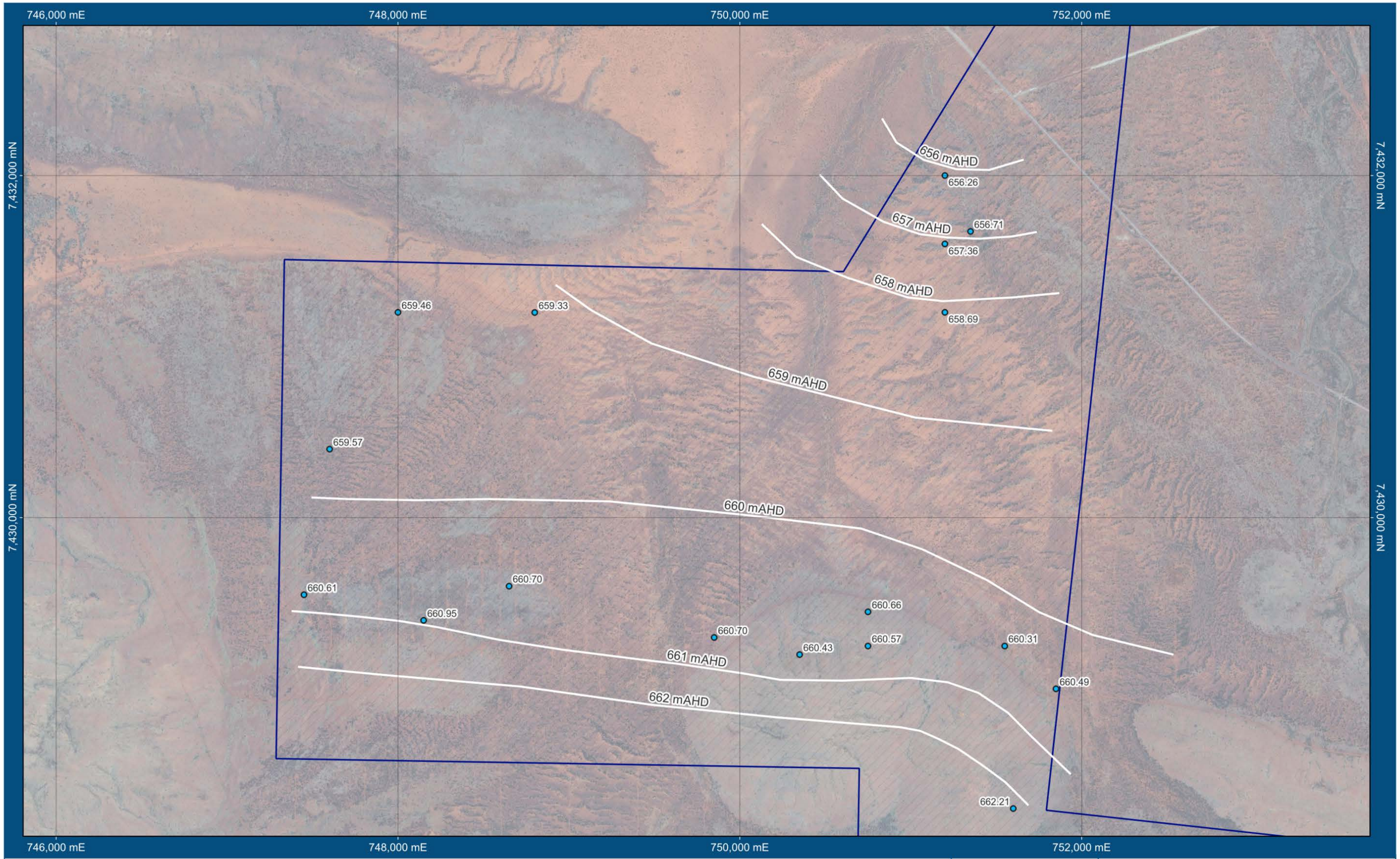


Figure 4-2: Round Hill Main Piezometer Installations

Table 4-2: Round Hill Main SWL Measurements (October 2024)

Area	Bore ID	Easting	Northing	Elevation (mAHD)	Stick up (magl)	SWL (mbgl)	SWL (mAHD)
Round Hill Main Orebody	EAPZ0251	750351.23	7429211.10	720.10	0.59	59.67	660.43
	EAPZ0296	750743.61	7429247.61	714.15	0.79	53.58	660.57
	EAPZ0300	750747.24	7429445.44	701.92	0.54	41.26	660.66
	EAPZ0406	751546.27	7429247.78	699.34	0.86	39.03	660.31
	EAPZ0412	751599.15	7428302.68	718.88	0.57	56.67	662.21
	EAPZ0458	751842.94	7428999.49	701.48	0.77	40.99	660.49
	EAPZ0471	747441.76	7429552.91	706.63	0.80	46.02	660.61
	EAPZ0517	748150.07	7429402.74	706.28	0.68	45.33	660.95
	EAPZ0587	749846.18	7429296.96	698.13	0.80	37.43	660.70
	EAPZ0745	748648.27	7429600.39	704.93	0.66	44.23	660.70
Sterilisation Area	HRPB0002	751348.69	7431673.41	687.01	0.47	30.3	656.71
	EAPZ0607	747596.46	7430397.80	698.80	0.86	39.23	659.57
	EAPZ0611	747994.93	7431197.67	690.55	0.76	31.09	659.46
	EAPZ0620	748798.61	7431167.97	689.24	0.98	29.91	659.33
	EAPZ0641	751195.90	7431195.90	689.26	0.74	30.57	658.69
	EAPZ0642	751191.50	7431595.05	687.81	0.90	30.45	657.36
	EAPZ0643	751199.54	7432032.10	686.45	0.90	30.19	656.26



Round Hill Main SWL Measurements (mAHD)

Google Satellite

Round Hill Water Level Contours

Tenure, Pastoral and NT

Round Hill Tenements

E 4701313

N

0 500 1,000 m

kilometers

Scale 1:20,000

Date: 20/11/2025
Size: A3
Drawn By: Callum

Map Scale: 1:20,000
Map CRS: EPSG:28350
Coordinate Units: Meters

Round Hill Main SWL Measurements (October 2024)

DARKWATER CONSULTING

Figure 4-3: Round Hill Main SWL Measurements (October 2024)

Groundwater Chemistry

Laboratory analysis of collected water quality samples is provided in Table 4-3. Water samples were collected through the installation of hydrasleeves into bores. Hydrasleeves remained in bores for a minimum of 24 hours before collection. Interpretation of groundwater quality is discussed in Section 4.2.

Falling Head Testing

Falling head tests (FHTs) were performed on all installed piezometers and on HRPB0002 after collection of water levels and water quality samples. Tests were conducted by rapidly injecting 100 litres of water into each bore and monitoring groundwater level response at high frequency using a pressure transducer.

Individual tests were not interpreted analytically where observed displacement was limited, or recovery occurred too quickly. While these results make deriving of hydraulic parameters less feasible, they are potentially indicative of relatively high hydraulic conductivity. Results are listed in Table 4-4. Results, inclusive of bores where limited displacement was observed, are shown spatially in Figure 4-4.

4.1.3 HRPB0002 Test Pumping (Nov 2024)

Test pumping of the existing bore HRPB0002 was performed by McArthur Drilling & Pumping (MDP), taking place from 19th to 25th November 2024. The planned testing regime consisted of a preliminary test, 4-hour step rate test (SRT), and a 72-hour constant rate test (CRT). The CRT was reduced to a 24-hour test based upon low sustainable yields observed during preliminary testing. Locations of the HRPB002 and piezometer installations utilised are shown in Figure 4-5.

Due to a lack of historical records associated with HRPB0002, intersected and screened stratigraphy had to be inferred from surrounding sterilisation drilling. It was inferred that HRPB0002 is wholly screened within weathered Wittenoom Formation.

Step rate testing parameters and analysis of step rate testing is shown in Figure 4-6. Results indicate that the well efficiency at the abstraction rate applied in constant rate testing is low.

Constant rate testing parameters and interpreted results are shown in Table 4-5. Various test methods indicate that the hydraulic conductivity is in the order of 0.1 m/day. The drawdown response observed during early stages of testing is assumed to represent a combination of depletion of well storage and poor well efficiency, abstraction rate variability, and aquifer heterogeneity. Flattening of the drawdown response in late stages potentially indicates some leakage or delayed yield. A similar response observed in the recovery response also indicates some component of leakage or delayed yield.

Monitoring in adjacent piezometers, positioned between 160 and 500 metres from HRPB0002, recorded no measurable response to abstraction during any phase of testing. As such, no storage parameters were able to be estimated.

Interpretation of HRPB0002 test pumping results indicated that this bore would not be able to sustainably provide a meaningful portion of the Project water requirements.

Table 4-3: Round Hill Water Chemistry (October - November 2024)

Analyte	Unit	LOR	BORE ID																		ADWG^	
			EAPZ0611	EAPZ0641	EAPZ0620	EAPZ0607	EAPZ0643	EAPZ0642	HRPB0002	EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296	EAPZ0745	EAPZ0517	EAPZ0406	EAPZ0471	EAPZ0458	HRWB0001	Health	Aesthetic
pH Value	pH Unit	0.01	8.1	7.8	8	7.6	7.7	7.8	7.9	7.8	8	8	7.8	7.9	7.4	7.7	7.5	7.8	7.6	7.9		6.5 – 8.5
Electrical Conductivity @ 25°C	µS/cm	1	760	850	850	720	640	660	860	1100	750	730	1100	550	640	820	630	700	630	640		
Total Dissolved Solids @180°C	mg/L	10	440	510	530	400	380	410	500	820	420	460	620	330	400	480	380	420	380	430		600
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	340	350	280	330	230	270	390	240	310	280	530	210	240	330	250	270	230	250		
Total Alkalinity as CaCO3	mg/L	1	280	290	230	270	190	220	320	190	250	230	430	170	190	270	200	220	190	210		
Silicon			18	17	14	19	27	28	25	17	16	25	28	26	28	22	27	25	27	23		
Sulfate as SO4 - Turbidimetric	mg/L	1	37	49	56	14	31	29	45	28	32	40	28	23	28	41	28	32	30	29		250
Chloride	mg/L	1	68	81	100	69	67	62	73	230	82	70	86	55	64	88	62	79	66	63	250	
Calcium	mg/L	1	41	56	58	37	30	33	59	78	53	52	69	28	31	39	33	40	30	31		
Magnesium	mg/L	1	42	46	42	40	31	33	47	49	34	36	58	25	31	39	31	31	30	32		
Sodium	mg/L	1	51	52	49	49	49	51	48	53	46	43	80	41	47	73	47	63	48	48		180
Potassium	mg/L	1	5.5	7.6	6.5	6.3	6.5	6	6.5	9.2	7.3	5.8	2.9	5.6	6.1	7.4	6.4	7.6	6.8	6.1		
Aluminium	µg/L	0.2	<5	6	<5	<5	<5	<5	6	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	6		200
Antimony	µg/L	0.05	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Arsenic	µg/L	0.1	1.1	2	1.3	1.3	0.8	<0.5	0.7	1	1.3	0.6	0.9	1.1	<0.5	4	0.8	3.2	<0.5	0.7	10	
Barium	µg/L	0.2	18	34	9.9	360	54	36	32	290	150	45	180	170	48	130	100	250	60	34	200	
Beryllium	µg/L	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	60	
Bismuth	µg/L	0.02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Boron	µg/L	1	200	190	230	230	200	230	200	170	200	210	270	200	210	270	200	210	200	210	4000	
Cadmium	µg/L	0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2	
Chromium	µg/L	0.2	2.5	3.3	11	1.4	<0.5	<0.5	2.5	0.5	<0.5	1.8	0.7	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5		
Cobalt	µg/L	0.02	<0.5	<0.5	<0.5	7.5	0.8	<0.5	<0.5	2.9	22	2	<0.5	0.6	<0.5	<0.5	<0.5	2.4	<0.5	<0.5		
Copper	µg/L	0.05	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2000	1000
Fluoride			0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3		
Hexavalent Chromium	mg/L	0.001	0.002	0.004	0.012	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Iron	µg/L	2	24	26	29	33	22	13	13	24	25	8	16	14	5	6	7	89	14	<5		300
Lanthanum	mg/L	0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0.002	
Lead	µg/L	0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	
Manganese	µg/L	0.05	9	35	6	2000	<1	4	<1	940	480	45	78	360	1	1	5	1400	<1	<1	500	100
Mercury	mg/L	0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.001	
Molybdenum	µg/L	0.05	<0.5	1.3	1	0.6	<0.5	<0.5	<0.5	3.5	4.1	0.6	1	0.9	<0.5	0.9	0.5	1.8	<0.5	<0.5	50	
Nickel	µg/L	0.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	20	
Selenium	µg/L	0.1	<1	1	1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	1	<1	<1	<1	<1		
Silver	µg/L	0.01	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	100	
Thallium	µg/L	0.01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Thorium	mg/L	0.001	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Tin	µg/L	0.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Uranium	µg/L	0.005	0.9	1.3	2.1	0.5	0.7	0.7	0.7	1.5	2.7	1	3.7	1.3	0.8	2.3	0.9	0.8	0.6	<0.5	20	
Vanadium	µg/L	0.1	0.8	1.2	2.6	<0.5	1.1	<0.5	2.3	<0.5	0.7	1.2	12	2.8	1.6	4.3	2.4	<0.5	0.6	<0.5		
Zinc	µg/L	0.5	2	2	14	8	11	3	4	6	4	3	54	27	4	3	15	2	3	2		300

^NHMRC & NRMMC (2011) ADWG Version 3.9 Updated December 2024. For reference only; may not be relevant to this assessment

	Exceedance of ADWG Health Guidelines
	Exceedance of ADWG Aesthetic Guidelines

Table 4-4: Falling Head Test Results (AQ2, 2024)

Area	Hole ID	Planned ID	Hydraulic Conductivity (Bouwer-Rice, m/d)	Hydraulic Conductivity (Hvorslev, m/d)
Round Hill Main	EAPZ0412	PR1004	0.034	0.045
	EAPZ0587	PR1219	0.099	0.142
	EAPZ0296	PR1293	0.152	0.212
	EAPZ0745	PR1441	0.837	1.178
	EAPZ0517	PR1465	0.065	0.083
	EAPZ0458	PR1612	0.098	0.158
Sterilisation Area	HRPB0002	-	0.368	0.503
	EAPZ0611	PR0963	0.476	0.58
	EAPZ0607	PR0985	0.003	0.003
	EAPZ0643	PR0987	0.018	0.025

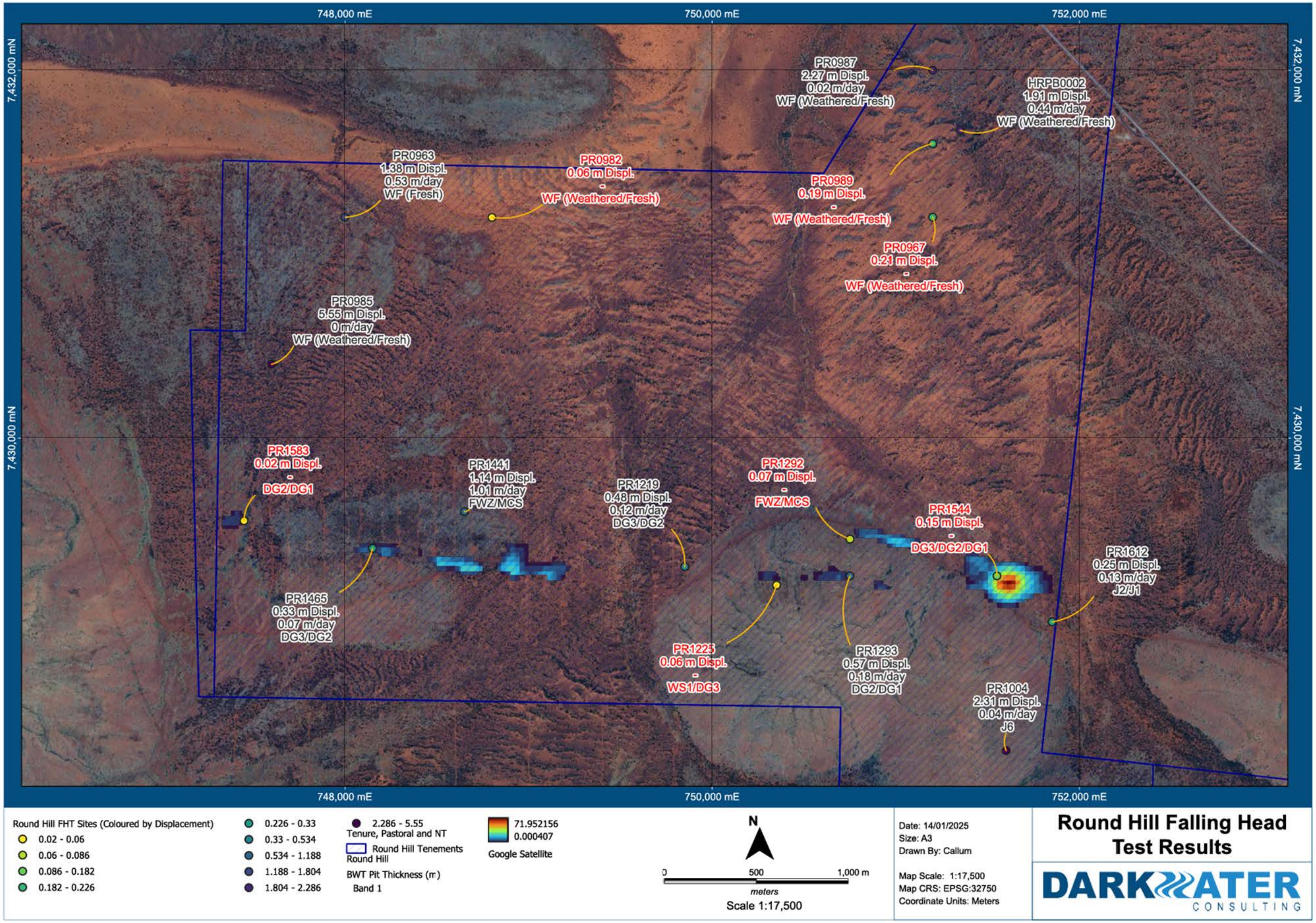


Figure 4-4: Falling Head Test Results (AQ2, 2024)

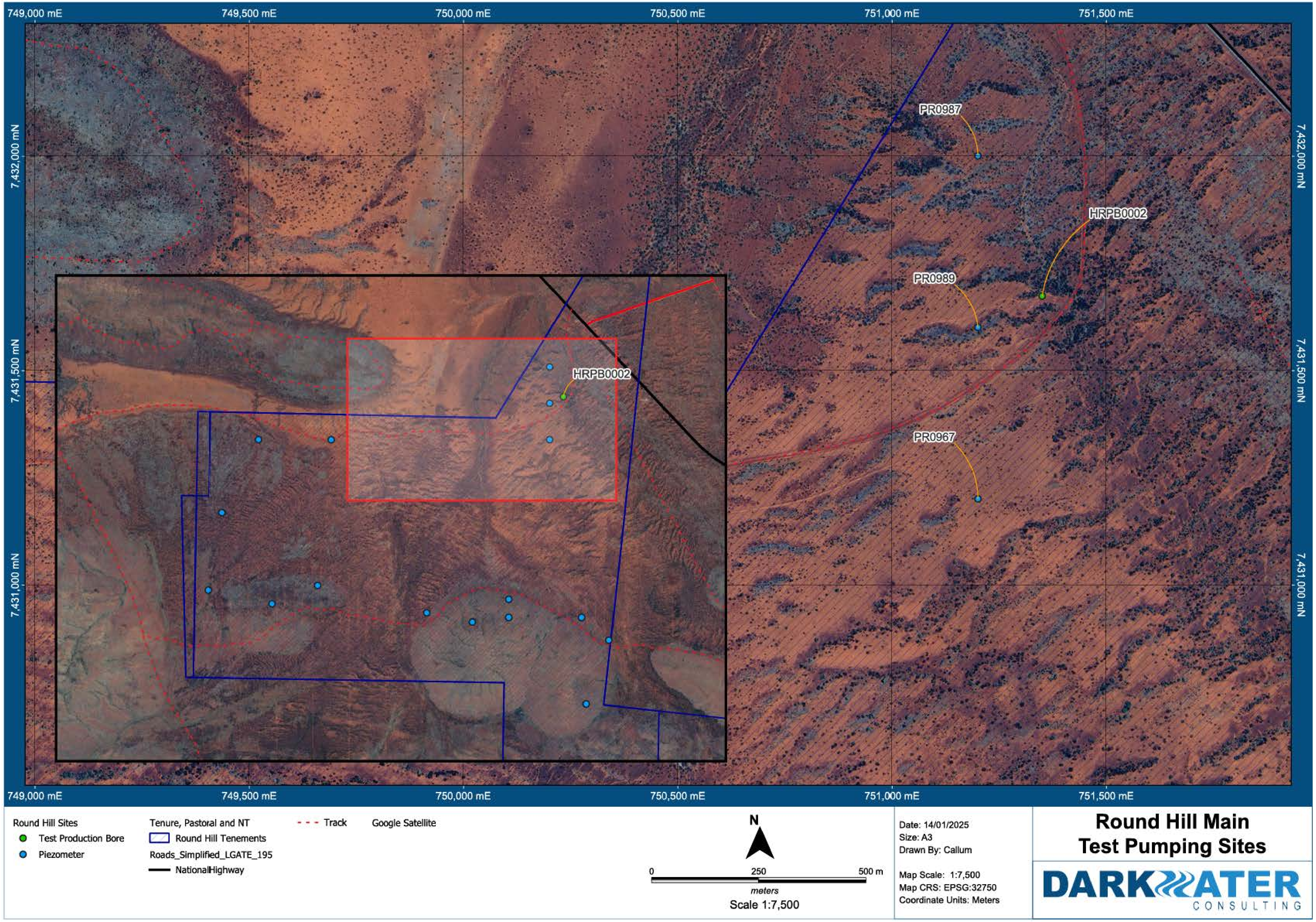
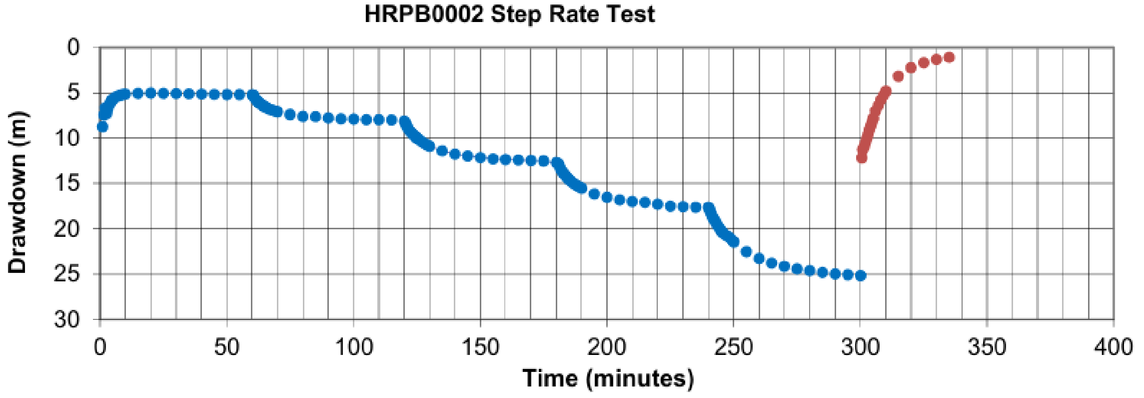
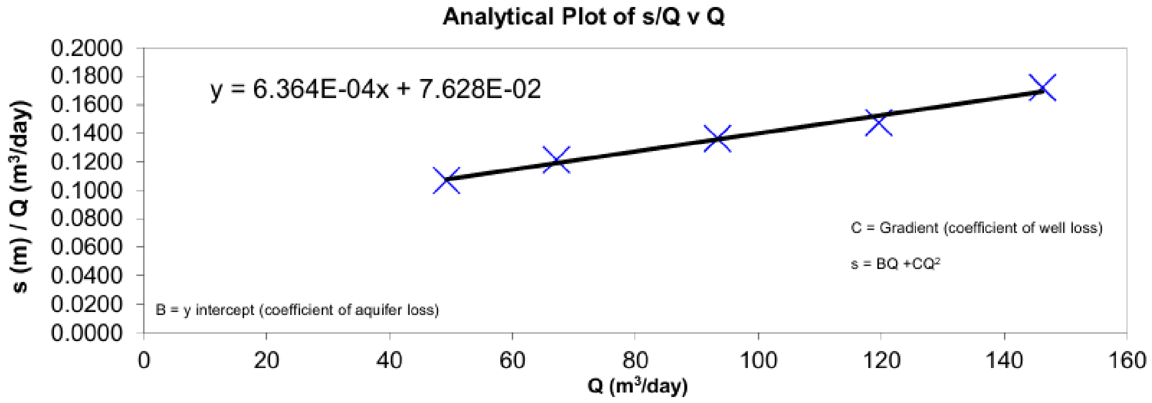


Figure 4-5: HRPB0002 Test Pumping Setup and Monitoring Sites





$s_{w(n)} = BQ_n + CQ_n^P$ (Rorabaugh's equation)

Where:
- B = Intercept with y axis (coefficient of aquifer loss or laminar flow)
- C = Gradient (coefficient of turbulent flow loss or apparent well loss)
- s = Drawdown in the borehole
- P = Value determined using Rorabaugh's method of superposition

Components of Jacob's (1947) equation BQ and CQ^2 are termed the aquifer loss and apparent well loss respectively. They give an indication of the proportion of total drawdown caused by laminar and turbulent flow.

Please note:
1. In thin or fissured aquifers large components of well loss are due to high flow velocities in the aquifer rather than inefficient bore design. Therefore, the term "apparent well loss" is better than well loss.
2. In aquifers where the flow horizons are vertically anisotropic, changes in bore performance often relate to changes in the rest water level with respect to the primary aquifer horizons.

$Ew = (BQ/(BQ + CQ^P) \times 100$

Ew or Well Efficiency represents the proportion of drawdown caused by laminar flow

From plot of s/Q v Q (trend line equation): **Intercept (B)** 7.628E-02
Gradient (C) 6.364E-04

ANALYSIS TABLE

Calculation of well efficiency and comparison of observed and predicted drawdowns

Step (60 minute duration)	Discharge (l/s)	Discharge (Q) (m^3/d)	Measured Incremental Drawdown (metres)	Corrected Drawdown (metres)	Predicted Drawdown (metres)	s/Q	Apparent Efficiency (Ew) %
1	0.6	49	5.255	5.26	5.30	0.1068	70.9
2	0.8	67	2.89	8.15	8.00	0.1212	64.1
3	1.1	93	4.58	12.73	12.66	0.1363	56.2
4	1.4	120	4.92	17.65	18.22	0.1475	50.1
5	1.7	146	7.52	25.17	24.76	0.1721	45.0
6							
7							

Figure 4-6: HRPB0002 Step Rate Testing Analysis

Table 4-5: HRPB0002 Constant Rate Testing Analysis

Pumped Bore ID	Screened Unit	Abstraction Rate (L/sec)	Test Pumping Duration (min)	Method	T (m2/d)	b (m)	K (m/d)
HRPB0002	Undifferentiated Wittenoom Formation (Weathered)	1.4	1440	Hantush-Jacob	5.73	41.95	0.14
				Hantush-Jacob Recovery	4.12	41.95	0.10
				Theis Recovery	4.42	41.95	0.11

4.1.4 Groundwater Targeting (December 2024)

A groundwater targeting assessment was completed by Darkwater in December 2024 upon completion of test pumping of HRPB0002.

Groundwater targets were identified, both within tenure and regionally, to assess all water supply options available to the Project. Based upon the revised hydrogeological conceptualisation and information collected during exploration drilling programs, four target areas were identified within Project tenure for testing. These areas were:

- The Round Hill Main orebody area, specifically the Dales Gorge Member, outside of the mining footprint (EAPB1300);
- A potentially dolomitic zone of the Wittenoom Formation, north of Round Hill Main and outside of the development footprint (EAPB1303);
- Deeply weathered Wittenoom Formation proximal to the contact with the Mount Sylvia Formation immediately north of Round Hill Main; and
- The Manhattan deposit area, specifically the Dales Gorge Member, where high airlift yields were encountered during exploration drilling (EAPB1302).

4.1.5 Satellite Deposit Piezometer Installations (April to May 2024)

Further piezometer installations were completed in satellite deposit exploration drilling across Round Hill tenure. The purpose of these sites was primarily to establish a regional monitoring network, but they also provide possible monitoring sites where hydrogeological prospectivity suggests further investigation may be warranted.

Piezometer installations associated with this program are listed in Table 4-6 and shown in Figure 4-7.

Three (3) piezometer installations were completed in the Manhattan area, located north of the Round Hill Main orebody area, on the opposite side of the Great Northern Highway. One (1) piezometer installation was completed in the Buckfast deposit, located south-east of the Round Hill Main orebody area.

4.1.6 Groundwater Investigative Drilling and Testing (May to August 2025)

Investigative drilling of previously identified water supply targets was completed between May and August 2025. Reporting associated with this investigation is included as Appendix B.

Rockwater Pty Ltd (Rockwater) were engaged to provide on-site technical supervision during groundwater exploration drilling, production bore drilling and construction, and hydraulic testing of production bores.

Pentium Hydro were engaged to perform the drilling and bore construction program. Pentium sub-contracted the scope of work to Caswell Drilling, with Pentium providing safety leadership and logistical support. Hydraulic testing was completed by McArthur Drilling & Pumping Pty Ltd (MDP).

Activities associated with these field works included:

- Drilling of four (4) of a planned eight (8) groundwater exploration targets;
- Drilling and construction of three (3) production bores;
- Hydraulic testing of three (3) production bores;
- Regular monitoring of groundwater levels in bores across the project area; and
- Collection of water quality samples in bores across the project area.

Exploration Drilling

Four (4) groundwater exploration holes (EAEX1310 to EAEX1313) were drilled. Targets were drilled as a 165 mm diameter pilot hole using conventional air drilling methods. While eight (8) exploration sites were initially specified, the first sites drilled encountered sufficient water to meet production bore targeting requirements.

Production Bore Drilling and Construction

Upon completion of exploration drilling, three (3) production bores were constructed:

- Two (2) sites in the Round Hill Main area (EAPB1300, screened in the Dales Gorge Member, and EAPB1303, screened in the Wittenoom Formation); and
- One (1) site in the Manhattan area (EAPB1302, screened in the Dales Gorge Member)

Details of production bore drilling and construction are provided in Table 4-7. Production bore locations are shown spatially in Figure 4-8.

The Manhattan site (EAPB1302) was not drilled as an exploration hole. High yields observed during mineral exploration (RC) drilling indicated that this area was sufficiently productive to warrant immediate installation of a production bore.

Each production bore was completed by drilling a 305 mm diameter hole after the installation of surface casing. EAPB1300 was drilled using air-hammer methods; however, air hammer drilling generated significant water yields during the reaming process, with associated reductions in productivity due to water management requirements. Drilling progress for EAPB1300 was frequently delayed while waiting for water from sumps to be removed by water carts before drilling could resume. Due to excessive water management requirements, EAPB1300 was only reamed to a depth of 92.5 m, short of the 110 m depth of the pilot hole (EAEX1311). Subsequent production bores EAPB1302 and EAPB1303 were drilled using mud rotary methods to reduce water management requirements and improve borehole stability during the drilling process.

Each production bore was completed with DN200 PN18 uPVC casing (192.9 mm ID, 225.3 mm OD), with a 2 mm-aperture slotted interval installed generally below the first intersection of groundwater during drilling. Co-polymer centralisers were installed at the base of the screens to allow for uniform gravel pack installation. The bore annulus was filled with +3.2 to -6.4 mm graded gravel pack from the base of the bore to approximately 4 - 6 metres above the slotted interval. A bentonite seal was then emplaced to restrict groundwater flow from overlying formations. Additional filter pack was installed from the bentonite seal up to a depth of 6 m bgl, after which the bore was sealed with cement to the surface.

Each production bore was developed by air lifting until the groundwater discharge was clear and free of sand and silt. During the airlift development, a water level logger was attached to the end of the development rods to collect water level data and measure water level recovery over time following cessation of airlifting. This recovery data was used to generate preliminary estimates of aquifer parameters and to determine appropriate pumping rates for subsequent hydraulic testing of the bores. The final airlift yields, water level measurements, and field groundwater salinity measured at the end of airlift development of production bores are summarised in Table 4-7.

Table 4-6: Round Hill Satellite Piezometer Installations

Area	Bore ID	Easting	Northing	Elevation (mAHD)	Depth (mbgl)	Top of Casing (m agl)	Screened Interval (mbgl)	Hydrostratigraphic Unit
Buckfast	EAPZ1154	757398.20	7426593.53	744.15	94	-	76 - 94	Yandicoogina Shale / Joffre
Manhattan	EAPZ1238	752102.75	7433453.62	688.00	118	0.68	61 - 118	Dales Gorge
	EAPZ1247	752297.34	7433499.06	685.22	142	0.77	76 - 142	Dales Gorge
	EAPZ1244	752289.77	7433200.70	680.99	88	0.83	64 - 88	Footwall Zone / McCrae Shale

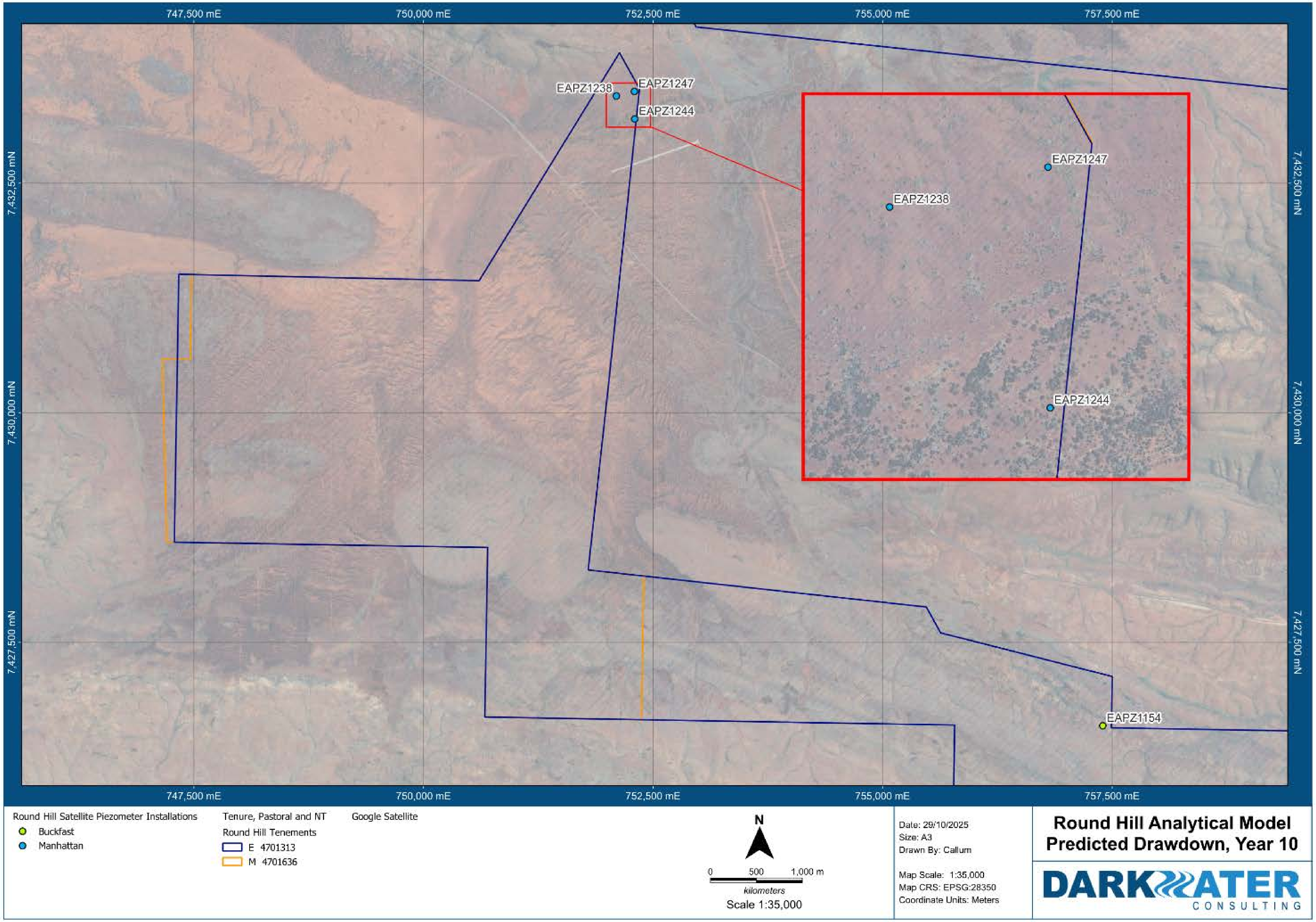


Figure 4-7: Round Hill Satellite Piezometer Installations

Table 4-7: Round Hill Production Bore Drilling and Construction Summary (Rockwater, 2025)

Bore ID	Exploration ID	Status	Screened Formation	Coordinates (GDA94, Zone 50)		Surveyed Elevation	Top of Casing	Drilled Depth	Constructed Depth	Slotted Interval	Bore Annulus			Standing Water Level	Field Electrical Conductivity	Airlift Yield
											Gravel Pack	Bentonite Seal	Cement Seal			
				mE	mN	(mAHD)	(m agl)	(m bgs)	(m bgs)	(m bgl)	(m bgl)			(m btoc)	(uS/cm)	(L/sec)
EAPB1300	EAEX1311	Production Bore	Dales Gorge (Unmineralised)	749441	7429239	698.4	0.28	92.5	92.5[1]	56.5 - 92.5	6 - 48 50 - 93	5 - 6 48 - 50	0 - 5	37.8	880	9 (15)
EAPB1302	*EAEX1314***	Production Bore	Dales Gorge (Mineralised)	752104	7433391	686.1	0.24	108	108	54 - 108	6 - 48 48 - 108	5 - 6 46 - 48	0 - 5	31.46	750	11
EAPB1303	*EAEX1301***	Production Bore	Wittenoom Formation	749657	7431236	688	0.15	89	88.5	46.5 - 88.5	6 - 37.5 39.5 - 88.5	5 - 5.5 37.5 - 39.5	0 - 5	29.47[2]	738	11
EAPB1301	EAEX1313	Decommissioned	Wittenoom Formation	749643	7431231	688	-	98	3.0[a]	-	-	-	-	22.3	656	(14)
EAPB1314	-	Decommissioned	-Dales Gorge (Mineralised)	752105	7433398	686.4	-	116	5.9[a]	-	-	-	-	-	-	(15)

1 - 165 mm Pilot hole was drilled to 110 m depth, but the production hole (305 mm) could only progress to 92.5 m due to sump capacity

2 - Measured from top of steel monument (0.69 m agl)

a - Surface casing only

* - Number in brackets indicates airlift yield observed during final reaming pass

`** - Stepped off from nearby hole

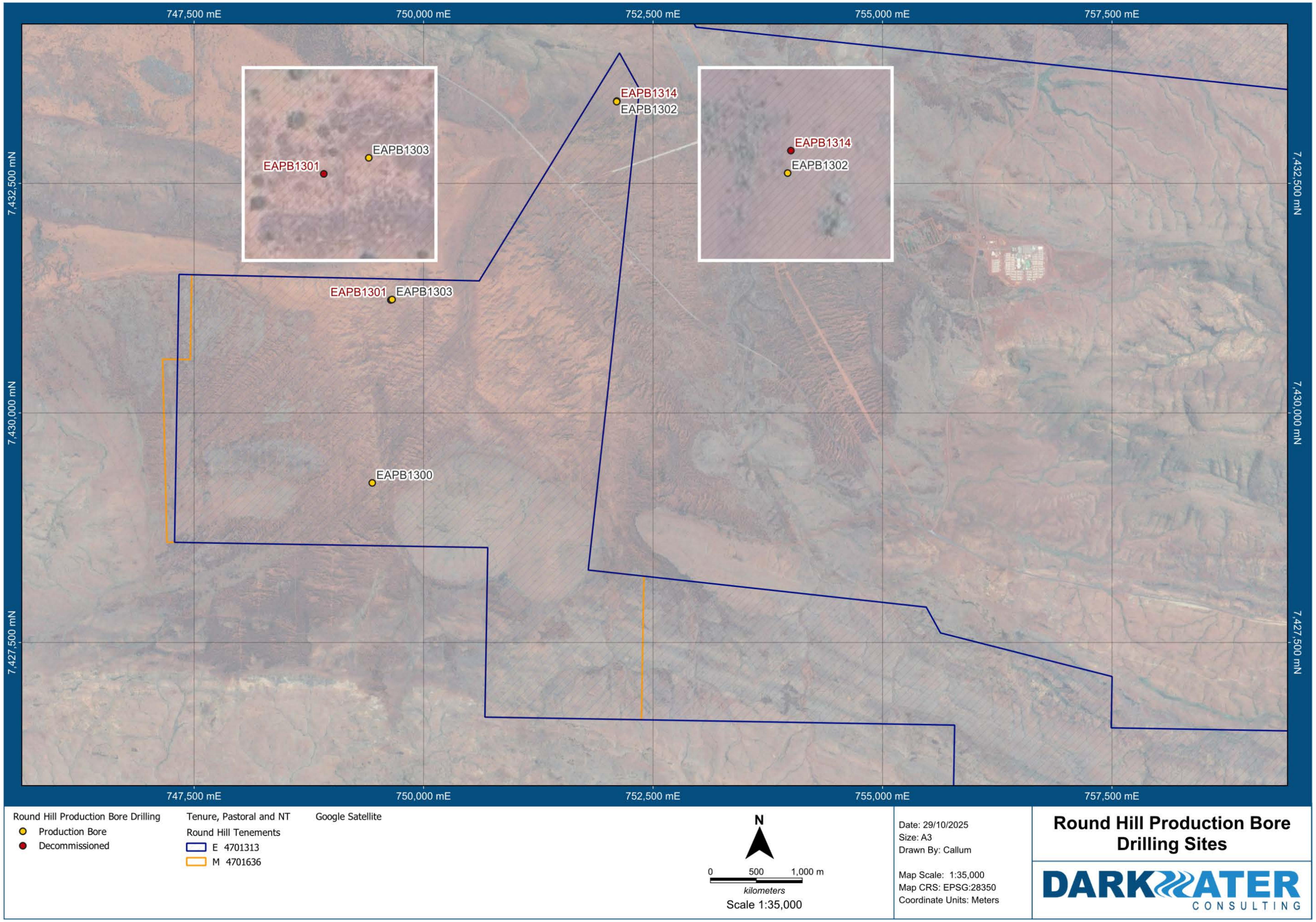


Figure 4-8: Round Hill Production Bore Drilling Sites

Test Pumping

McArthur Drilling & Pumping Pty Ltd (MDP) conducted test pumping at EAPB1300, EAPB1302 and EAPB1303 from 26 July to 8 August 2025, with HanRoy and Rockwater providing remote technical supervision.

Initial calibration runs to select step-test rates at each production bore suggested that the Franklin SR97-7 submersible pump, operated at its maximum rate (20 L/sec) for a three-day test, would maintain sufficient water above the installed pump intake (74 to 74.5 m below top of casing). The decision was made by all involved parties to omit step rate testing and instead lengthen constant rate testing to maximise aquifer stress at the highest possible abstraction rate (20 L/sec).

Constant rate testing parameters are shown in Table 4-8. Aquifer parameters derived from analytical assessments performed by Rockwater are shown in Table 4-9.

All production bores were able to be pumped at the maximum rate of 20 L/sec for the duration of test pumping (48 to 72 hours).

During test pumping of EAPB1300 (Unmineralised Dales Gorge Member), no groundwater drawdown was observed in monitoring bores EARC0745 (McRae Shale, 900 m away) and EAPZ0607 (Wittenoom Formation 2 km away), while drawdown was observed in EAPZ0517 (Dales Gorge Formation) 1.3 km away. This indicates that drawdown is constrained along strike within the Dales Gorge and the McRae Shale behaves as an aquitard.

During test pumping of EAPB1302 (Mineralised Dales Gorge Member), limited drawdown was observed at the adjacent EAPZ1238, screened in the same unit perpendicular to strike. This may be indicative of some component of anisotropy, and/or constrained drawdown associated with secondary porosity relating to structural features and mineralisation.

Groundwater Level Measurements

Groundwater levels measurements were collected over the course of the investigative drilling program. Interpreted groundwater contours are shown in Figure 4-9.

Groundwater levels range from 60 mbgl (~662 mAHD) south of the orebody, to 27 mbgl (~654 mAHD) in the Manhattan area north of the Great Northern Highway. Trends observed are similar to previous assessments, with groundwater flowing to the north/north-east, broadly mirroring the topography and associated ephemeral drainage of Coondiner Creek. Hydraulic gradients observed in the southern limb of the Wittenoom Formation are lower, which may be indicative of increased hydraulic conductivity associated with this hydrostratigraphic unit.

Groundwater Chemistry

Laboratory analysis of collected water quality samples is provided in Table 4-3. Water samples were collected through the installation of hydrasleeves into bores. Piezometer samples were collected from previously installed Hydrasleeves, while production bore samples were collected during bore development. Interpretation of groundwater quality is discussed in Section 4.2.

Table 4-8: Round Hill Test Pumping Parameters

Pumped Bore ID	Monitoring Bores	CRT Pumped Rate	Test Duration	Pre-test SWL	Pump Installation Depth	Drawdown at end of CRT
		L/sec	min	m bgl	m bgl	m
EAPB1300 (Dales Gorge)	EAPZ0251 (Dales Gorge) EAPZ0517 (Dales Gorge) EAPZ0587 (Dales Gorge) EAPZ0745* (McRae Shale) EAPZ0607* (Wittenoom Formation)	20	4320	38.06	74	4.33
EAPB1302 (Dales Gorge)	EAPZ0643* (Wittenoom Formation) EAPZ1238 (Dales Gorge) EAPZ1244 (McRae Shale) EAPZ1247 (Dales Gorge)	20	2880	31.59	74.5	6.09
EAPB1303 (Wittenoom Formation)	EAPZ0620 (Wittenoom Formation) EAPZ0641 (Wittenoom Formation) EAPZ0642 (Wittenoom Formation)	20	4080	29.03	74	7.13

* no drawdown observed during test pumping

Table 4-9: Round Hill Test Pumping Derived Parameters (Rockwater, 2025)

Pumped Bore ID	Screened Unit	Boundary Conditions / Notes	T	b	K	Storativity	Specific Yield
			m2/d	m	m/d	dimensionless	%
EAPB1300	Dales Gorge (Unmineralised)	-	646	52.38	12.33	2.00E-04	-
EAPB1300	Dales Gorge (Unmineralised)	No Flow Boundary Condition - McRae Shale (300 m north)	636	52.38	12.14	5.00E-04	-
EAPB1300	Dales Gorge (Unmineralised)	No Flow Boundary Condition - McRae Shale (300 m north) and Whaleback Shale (100 m south)	879	52.38	16.78	7.00E-09	-
EAPB1302	Dales Gorge (Mineralised)	-	403	76.41	5.27	3.00E-04	0.01179
EAPB1302	Dales Gorge (Mineralised)	-	346	76.41	4.53	5.00E-04	0.01657
EAPB1303	Wittenoom Formation	No Flow Boundary Condition - McRae Shale (300 m north)	327	59.22	5.52	3.00E-04	-

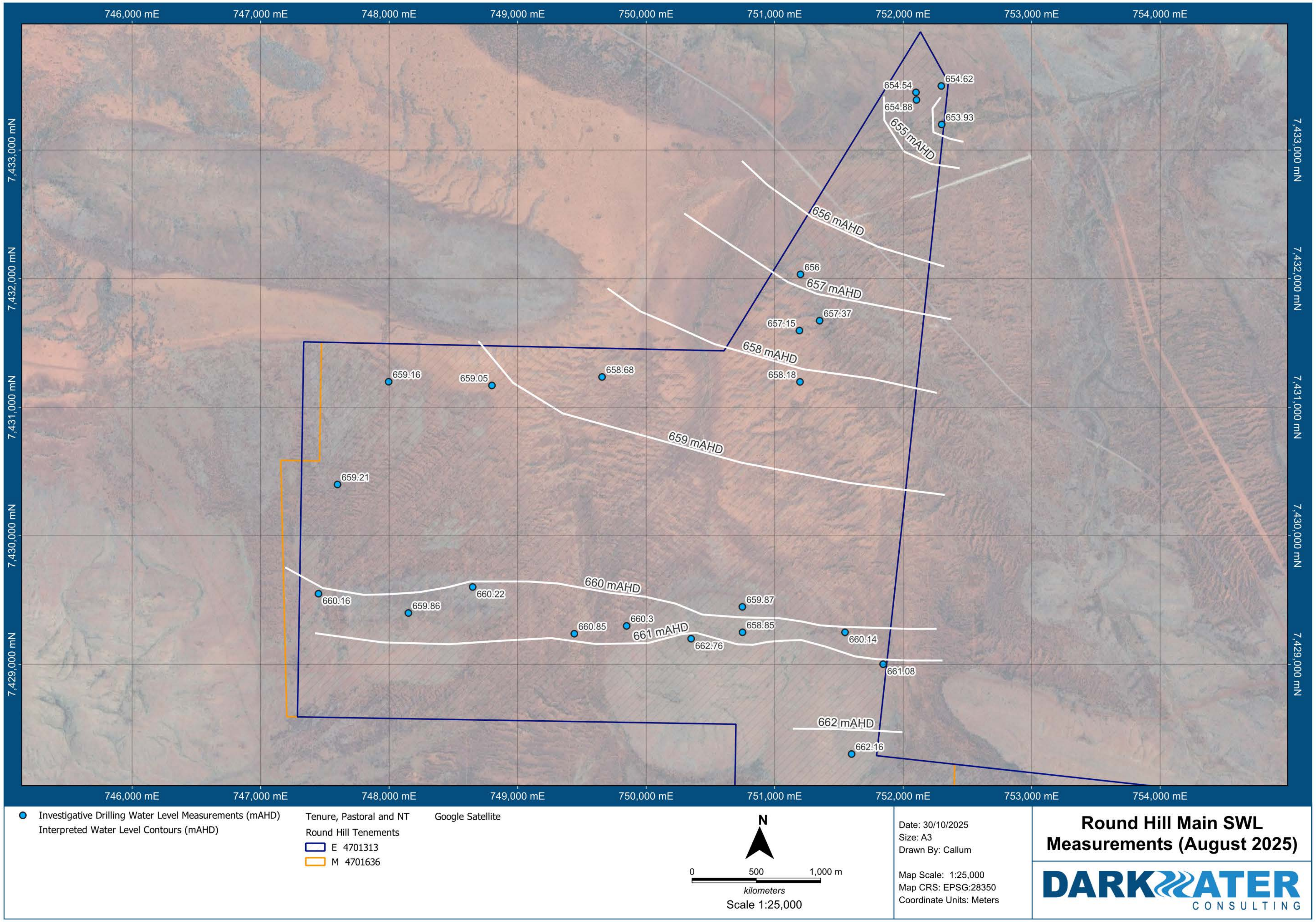


Figure 4-9: Round Hill Main SWL Measurements (August 2025)

Table 4-10: Round Hill Water Chemistry (May - August 2025)

Analyte	Unit	LOR	BORE ID									ADWG^	
			EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296	EAPZ0406	EAPZ0458	EAPZ0611	EAPZ0620	Health	Aesthetic
pH Value	pH Unit	0.01	7.98	7.67	7.75	7.82	7.65	7.7	7.62	7.95	8.09		6.5 – 8.5
Electrical Conductivity @ 25°C	µS/cm	1	1100	656	594	840	645	720	711	773	745		
Total Dissolved Solids @180°C	mg/L	10	706	400	371	520	427	429	484	446	454		600
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	421	196	190	272	205	204	224	256	238		
Total Alkalinity as CaCO3	mg/L	1	421	196	190	272	205	204	224	256	238		
Silicon													
Sulfate as SO4 - Turbidimetric	mg/L	1	26	25	22	33	24	33	27	34	32		250
Chloride	mg/L	1	80	58	52	82	57	79	66	77	62	250	
Calcium	mg/L	1	66	30	28	39	30	33	34	54	51		
Magnesium	mg/L	1	57	32	30	41	33	36	34	37	37		
Sodium	mg/L	1	79	50	46	71	50	54	55	49	45		180
Potassium	mg/L	1	3	7	6	9	7	6	6	8	6		
Aluminium	µg/L	0.2	9.8	5	4.1	11.2	5.2	1.9	6.8	1.9	0.4		200
Antimony	µg/L	0.05	0.13	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.06	<0.05		
Arsenic	µg/L	0.1	0.7	0.2	0.4	7.1	0.6	0.2	0.4	1.1	0.6	10	
Barium	µg/L	0.2	61.7	48.8	56.6	105	83.3	59.9	102	297	79.2	200	
Beryllium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	60	
Bismuth	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Boron	µg/L	1	224	190	172	261	192	206	222	212	218	4000	
Cadmium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2	
Chromium	µg/L	0.2	0.6	<0.2	<0.2	0.4	0.2	<0.2	0.3	<0.2	0.8		
Cobalt	µg/L	0.02	0.09	0.05	0.03	0.14	2.38	3.28	0.29	2.15	0.56		
Copper	µg/L	0.05	1.43	0.54	0.22	1.98	0.69	0.41	0.88	<0.05	0.18	2000	1000
Fluoride													
Trivalent Chromium													
Hexavalent Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Iron	µg/L	2	22	20	24	6	18	13	9	543	23		300
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	
Lead	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	
Manganese	µg/L	0.05	1.3	2.54	5.07	9.93	4.48	2.19	9.71	632	186	500	100
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	
Molybdenum	µg/L	0.05	0.9	0.17	0.18	0.59	0.24	0.3	0.34	2.84	0.66	50	
Nickel	µg/L	0.2	0.4	0.8	0.3	0.6	0.4	0.5	0.4	0.4	0.4	20	
Reactive Silica	mg/L	0.05	61.1	65.8	64.1	50.8	63	52.1	61.3	31.1	51.9		80
Reactive Silica as Silicon	mg/L	0.05	28.6	30.8	30	23.7	29.4	24.4	28.6	14.5	24.3	200	
Selenium	µg/L	0.1	1.3	0.8	0.7	1	0.7	1.2	0.8	<0.1	0.2		
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100	
Thallium	µg/L	0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.03	<0.01	<0.01	0.01		
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Tin	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Uranium	µg/L	0.005	3.27	0.695	0.692	1.88	0.628	0.373	0.775	2.39	0.966	20	
Vanadium	µg/L	0.1	11.5	1.5	1.2	3.7	2.3	0.2	2.2	0.3	1.4		
Zinc	µg/L	0.5	1.4	1.9	0.6	7.7	4	3	24	0.9	1.3		300
Total Anions	meq/L	0.01	11.2	6.07	5.72	8.43	6.2	6.99	6.9	7.99	7.17		
Total Cations	meq/L	0.01	11.5	6.48	6.02	8.64	6.57	7.11	7.04	8.08	7.7		
Ionic Balance	%	0.01	1.27	3.28	2.55	1.2	2.85	0.85	1.01	0.5	3.57		
Ammonia as N													
Nitrate as N													
Nitrite + Nitrate as N													
Nitrite as N													
Total Kjeldahl Nitrogen as N													
Total Nitrogen as N													
Total Phosphorus as P													
Total Phosphate													

^NHMRC & NRMMC (2011) ADWG Version 3.9 Updated December 2024. For reference only; may not be relevant to this assessment

(pink)	Exceedance of ADWG Health Guidelines
(yellow)	Exceedance of ADWG Aesthetic Guidelines

Analyte	Unit	LOR	BORE ID							ADWG^	
			EAPZ0643	EAPZ0642	EAPZ0641	EAPZ0607	EAPZ0471	EAPZ0517	EAPZ0745	Health	Aesthetic
pH Value	pH Unit	0.01	**7.96**	**8.04**	**8.08**	**8.23**	**8.18**	**8.24**	**8.2**		**6.5 – 8.5**
Electrical Conductivity @ 25°C	µS/cm	1	**1050**	**870**	**759**	**1160**	**660**	**633**	**729**		
Total Dissolved Solids @180°C	mg/L	10	**671**	**534**	**448**	**820**	**402**	**391**	**507**		**600**
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	**211**	**287**	**279**	**243**	**212**	**200**	**201**		
Total Alkalinity as CaCO3	mg/L	1	**211**	**287**	**279**	**243**	**212**	**200**	**201**		
Silicon											
Sulfate as SO4 - Turbidimetric	mg/L	1	**62**	**38**	**30**	**24**	**27**	**26**	**32**		**250**
Chloride	mg/L	1	**135**	**69**	**58**	**239**	**63**	**60**	**80**	**250**	
Calcium	mg/L	1	**68**	**55**	**42**	**82**	**31**	**30**	**33**		
Magnesium	mg/L	1	**53**	**49**	**45**	**54**	**33**	**30**	**35**		
Sodium	mg/L	1	**59**	**56**	**55**	**56**	**51**	**50**	**58**		**180**
Potassium	mg/L	1	**7**	**7**	**6**	**9**	**8**	**7**	**7**		
Aluminium	µg/L	0.2	**6.5**	**4.1**	**3.9**	**3.4**	**6.4**	**2.6**	**4.6**		**200**
Antimony	µg/L	0.05	**0.28**	**0.2**	<0.05	**0.18**	<0.05	<0.05	<0.05		
Arsenic	µg/L	0.1	**0.4**	**2**	**0.4**	**2.6**	**0.2**	**0.2**	**0.9**	**10**	
Barium	µg/L	0.2	**11.8**	**27.4**	**3.6**	**717**	**53.1**	**58.6**	**112**	**200**	
Beryllium	µg/L	0.02	**<0.02**	**<0.02**	**<0.02**	**<0.02**	**<0.02**	**<0.02**	**<0.02**	**60**	
Bismuth	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Boron	µg/L	1	**234**	**211**	**187**	**178**	**190**	**182**	**178**	**4000**	
Cadmium	µg/L	0.02	**0.32**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**2**	
Chromium	µg/L	0.2	**13.6**	**4.4**	**2**	**<0.2**	**<0.2**	**<0.2**	**0.3**		
Cobalt	µg/L	0.02	**0.05**	<0.02	**0.06**	**2.35**	**0.11**	<0.02	<0.02		
Copper	µg/L	0.05	**1.04**	**0.6**	**0.14**	**0.15**	**0.89**	**<0.05**	**0.19**	**2000**	**1000**
Fluoride	mg/L	0.1	**0.2**	**0.3**	**0.3**	-	-	-	-		
Trivalent Chromium											
Hexavalent Chromium	mg/L	0.001	<0.020	<0.010	<0.005	<0.001	<0.001	<0.001	<0.001		
Iron	µg/L	2	**3**	**4**	**7**	**3330**	**13**	**12**	**32**		**300**
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	
Lead	µg/L	0.05	**0.07**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**10**	
Manganese	µg/L	0.05	**1.69**	**0.48**	**1.17**	**1680**	**2.24**	**0.63**	**0.65**	**500**	**100**
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.001**	
Molybdenum	µg/L	0.05	**0.33**	**0.71**	**0.23**	**2.17**	**0.22**	**0.1**	**0.39**	**50**	
Nickel	µg/L	0.2	**0.3**	**0.3**	<0.2	**1**	**1.3**	<0.2	**0.2**	**20**	
Reactive Silica	mg/L	0.05	**32**	**45.9**	**43.4**	**34.7**	**63.3**	**63.2**	**65.2**		**80**
Reactive Silica as Silicon	mg/L	0.05	**15**	**21.4**	**20.3**	**16.2**	**29.6**	**29.5**	**30.5**	**200**	
Selenium	µg/L	0.1	**0.9**	**0.9**	**0.7**	**<0.1**	**0.8**	**0.8**	**1**		
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**100**	
Thallium	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01		
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Tin	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Uranium	µg/L	0.005	**1.89**	**0.749**	**0.61**	**1.19**	**0.528**	**0.486**	**0.652**	**20**	
Vanadium	µg/L	0.1	**2.5**	**1**	**0.4**	**0.2**	**0.8**	**0.4**	**2.8**		
Zinc	µg/L	0.5	**9.5**	**3.2**	**1.3**	**2.7**	**6.3**	**<0.5**	**1.1**		**300**
Total Anions	meq/L	0.01	**9.31**	**8.47**	**7.84**	**12.1**	**6.58**	**6.23**	**6.94**		
Total Cations	meq/L	0.01	**10.5**	**9.39**	**8.34**	**11.2**	**6.68**	**6.32**	**7.23**		
Ionic Balance	%	0.01	**5.98**	**5.15**	**3.15**	**3.84**	**0.84**	**0.72**	**2.05**		
Nitrate as N	mg/L	0.01	**15.7**	**4.7**	**2.03**	-	-	-	-		**11.31[1] – 50[2]**
Nitrite + Nitrate as N	mg/L	0.01	**15.7**	**4.7**	**2.03**	-	-	-	-		**11.31[1] – 50[2]**
Nitrite as N	mg/L	0.01	<0.01	<0.01	<0.01	-	-	-	-		
Total Kjeldahl Nitrogen as N											
Total Nitrogen as N											
Total Phosphorus as P											
Total Phosphate	mg/L	0.01	**0.23**	**0.45**	**0.39**	-	-	-	-		

Analyte	Unit	LOR	BORE ID				ADWG^	
			HRPB002	EAPB1303	EAPB1300	EAPB1302	Health	Aesthetic
pH Value	pH Unit	0.01	**7.77**	**7.99**	**7.54**	**8.29**		**6.5 – 8.5**
Electrical Conductivity @ 25°C	µS/cm	1	**850**	**729**	**668**	**749**		
Total Dissolved Solids @180°C	mg/L	10	**514**	**469**	**429**	**430**		**600**
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	**320**	**239**	**205**	**246**		
Total Alkalinity as CaCO3	mg/L	1	**320**	**239**	**205**	**246**		
Silicon	mg/L	0.05	**32.2**	**31**	**35.9**	**11.8**	**80**	
Sulfate as SO4 - Turbidimetric	mg/L	1	**41**	**42**	**30**	**49**		**250**
Chloride	mg/L	1	**71**	**70**	**71**	**73**	**250**	
Calcium	mg/L	1	**62**	**49**	**35**	**59**		
Magnesium	mg/L	1	**46**	**36**	**32**	**40**		
Sodium	mg/L	1	**50**	**49**	**51**	**36**		**180**
Potassium	mg/L	1	**7**	**6**	**8**	**8**		
Aluminium	mg/L	0.01	<0.01	<0.01	**0.13**	**0.03**		**200**
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	**10**	
Barium	mg/L	0.001	**0.032**	**0.006**	**0.052**	**0.02**	**200**	
Beryllium	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	**60**	
Bismuth	µg/L	0.05	<0.05	<0.05	**0.1**	<0.05		
Boron	µg/L	5	**207**	**210**	**218**	**219**	**4000**	
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**2**	
Chromium	mg/L	0.001	**0.003**	**0.003**	<0.001	**0.002**		
Cobalt	mg/L	0.001	<0.001	<0.001	**0.002**	<0.001		
Copper	mg/L	0.001	<0.001	<0.001	**0.004**	**0.002**	**2000**	**1000**
Fluoride	mg/L	0.1	**0.2**	**0.2**	**0.3**	**0.3**	**1.5**	
Trivalent Chromium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Hexavalent Chromium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Iron	mg/L	0.05	<0.05	<0.05	**0.12**	<0.05		**300**
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	**0.001**	
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	**10**	
Manganese	mg/L	0.001	<0.001	**0.002**	**0.008**	**0.007**	**500**	**100**
Mercury	mg/L	0.00004	<0.00004	<0.00004	<0.00004	<0.00004	**0.002**	
Molybdenum	mg/L	0.001	<0.001	<0.001	**0.002**	<0.001	**50**	
Nickel	mg/L	0.001	<0.001	<0.001	**0.002**	<0.001	**20**	
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	**100**	
Thallium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02		
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		
Tin	mg/L	0.001	<0.001	<0.001	**0.007**	**0.001**		
Uranium	µg/L	0.05	**0.66**	**0.61**	**0.83**	**0.85**	**20**	
Vanadium	µg/L	0.2	**2.7**	**1.3**	**2.8**	**0.4**		
Zinc	mg/L	0.005	<0.005	<0.005	**0.007**	**0.008**		**300**
Total Anions	meq/L	0.01	**9.25**	**7.62**	**6.72**	**7.99**		
Total Cations	meq/L	0.01	**9.23**	**7.69**	**6.8**	**8.01**		
Ionic Balance	%	0.01	**0.09**	**0.45**	**0.59**	**0.08**		
Ammonia as N	mg/L	0.01	<0.01	<0.01	**0.03**	<0.01		
Nitrate as N	mg/L	0.01	**1.48**	**3.91**	**3.54**	**0.84**		**11.31[1] – 50[2]**
Nitrite + Nitrate as N	mg/L	0.01	**1.48**	**4.08**	**3.55**	**0.84**		**11.31[1] – 50[2]**
Nitrite as N	mg/L	0.01	<0.01	**0.17**	**0.01**	<0.01		
Total Kjeldahl Nitrogen as N	mg/L	0.1	**0.5**	**0.7**	**1**	**0.2**		
Total Nitrogen as N	mg/L	0.1	**2**	**4.8**	**4.6**	**1**		
Total Phosphorus as P	mg/L	0.01	**0.05**	<0.01	**0.04**	**0.08**		

4.2 Site Hydrogeology Conceptual Model

A revised hydrogeological conceptualisation, incorporating findings from completed fieldwork, is presented below.

The hydrostratigraphy of the Round Hill Area is provided in Table 4-11, and conceptual hydrogeological cross-sections are shown in Figure 4-11. The location of cross-sections are shown in Figure 4-10

4.2.0 Aquifers

The primary aquifer units within the Round Hill area are associated with:

- The Dales Gorge and Joffre members of the Brockman Iron Formation, especially where secondary permeability is introduced through weathering/mineralisation;
- Tertiary detritals located within valleys, where extending below the water table; and
- Wittenoom Formation, or specific sub-units of the Wittenoom Formation, where sufficiently weathered to introduce secondary permeability.

Brockman Iron Formation

The Brockman Iron Formation is composed of broadly low permeability BIF/chert/shale. Mineralisation and weathering introduces secondary porosity and permeability, increasing aquifer prospectivity. Mineralisation at Round Hill Main and the Manhattan area is primarily hosted within the Dales Gorge Member, with minor mineralisation at Round Hill occurring in the Joffre Member and Whaleback Shale. Below water table mineralisation is primarily within the Dales Gorge Member.

The base of weathering is interpreted to represent the effective base of aquifer within the Brockman Iron Formation. The base of weathering as observed in exploration drilling is generally between 550 and 600 mAHD, which equates to a saturated thickness of 60 to 110 m.

Testing of EAPB1300, screened in an unmineralised region of the Dales Gorge Member, indicates that the Brockman Iron Formation forms a prospective, continuous aquifer outside of mineralisation within the Round Hill Main area. This could be a product of broader processes associated with mineralisation elsewhere in the area, and/or associated with extensive weathering observed throughout the unit.

Testing of EAPB1303, screened within the mineralised Dales Gorge Member, indicates regional aquifer prospectivity in the Brockman Iron Formation outside of the immediate Round Hill Main orebody. Deep weathering of the Dales Gorge Member was also identified in resource drilling.

Tertiary Sediments

Tertiary detritals and Quaternary alluvium and colluvium are present north of the Round Hill Main deposit, overlying sub-cropping Wittenoom Formation and associated with the drainage lines of Coondiner Creek.

Lithological logging and water level information indicates that there is no significant or continuous saturated tertiary aquifer within the Round Hill area. Resource drilling in the Manhattan area, and subsequent piezometer installations, did not identify any perched groundwater system associated with Coondiner Creek.

Wittenoom Formation

The Wittenoom Formation contains (from oldest to youngest): the West Angela Member, Paraburdoo Member, and Bee Gorge Member. There is no differentiation between Members of the Wittenoom Formation in the Round Hill resource model. The Wittenoom Formation is primarily dolomite, with minor shale and BIF. It is generally of low permeability except where karstic weathering of dolomite is present, in which it can form a regional aquifer.

There is evidence to support the presence of dolomite within the subcropping Wittenoom Formation north of the Round Hill Main orebody. Assay results of sterilisation drilling completed in this area indicate extensive intervals with high CaO and MgO signatures indicative of Dolomite (up to ~30% CaO and ~20% MgO by weight). Based upon proximity to the overlying Mt Sylvia Formation, this may represent the Paraburdoo Member, which is primarily dolomite, or a dolomitic sub-bed of the upper Bee Gorge Member.

EAPB1303, which intersects this zone, was highly productive during testing and displayed limited drawdown. While the broader continuity of this sub-unit has not been tested, regional geological mapping indicates it is likely laterally extensive along the strike-orientated valley.

North of this dolomitic zone, HRPB0002, and proximal piezometers, displayed significantly lower hydraulic conductivity and associated sustainable yields. The position of these sites proximal to the regional syncline hinge, and logging of BIF and shale units, indicates these are likely screened within the overlying Bee Gorge Member

EAPB1303 is therefore interpreted as being screened within east-west trending weathered Paraburdoo Member, bound by the less permeable Bee Gorge Member. There is inferred continuity to the west and east following the bedding along the southern limb of the east-plunging regional anticline structure. While drilling information along the northern limb of this regional anticline is limited, assay results from all available Wittenoom Formation drilling on the northern limb displayed high CaO and MgO signatures at depth.

The base of weathering is interpreted to represent the effective base of aquifer within the Wittenoom Formation. The base of weathering as observed in exploration drilling is in the order of 600 mAHD, which equates to a typical saturated thickness of 55 to 60 m. Depth of weathering is variable throughout the area, likely attributable to the heterolithic nature of the Wittenoom Formation.

4.2.1 Aquitards

Mount McRae Shale and Mount Sylvia Formations

The Mount McRae Shale Formation and Mount Sylvia Formation are primarily composed of low-permeability shales and are considered regional aquitards separating the Brockman Iron Formation and Wittenoom Formation.

During test pumping of EAPB1300, no drawdown was observed in the adjacent piezometer screened within this unit. There are no identified structures which may compromise the continuity of these units. As such, it is expected that they will act as a hydraulic barrier between the Brockman Iron Formation and the Wittenoom Formation.

Some drawdown was observed in EAPZ1244, screened in the Footwall Zone or Colonial Chert Member of the Mount McRae Shale, during test pumping of EAPB1302. This may represent the presence of some localised secondary permeability or may be attributed to the proximity of this piezometer to the contact with the Dales Gorge Member.

Table 4-11 Round Hill Hydrostratigraphy

Group	Formation	Member	Stratigraphy	Hydrogeological Description
Quaternary	Alluvium and Colluvium		Unconsolidated silt, sand and gravel associated with ephemeral creeks and riverbeds. Sheet wash colluvial units adjacent to main drainages.	Generally unsaturated but can be aquifer where occurs below water table
Tertiary	Duricrust		mention of calcretes, silcretes in Cainozoic sediment profiles.	Aquifer potential where saturated, laterally extensive, and secondary porosity exists
	Detritals		Cainozoic detritals observed to host mineralisation in the form of hematite-rich canga (CzD3), unconformably overlain by alluvium and minor amounts of pisolitic 'scree'.	Generally unsaturated but can be aquifer where occurs below water table dependent on clast size
Hamersley Group	Brockman Iron Formation	Joffre Member	BIF/Chert.	Aquifer potential limited to mineralised zones
		Whaleback Shale Member	Shale/Chert/BIF.	Low permeability
		Dales Gorge Member	BIF/Shale.	Aquifer potential limited to mineralised zones and/or where weathering present
	Mount McRae Shale Formation	-	Massive shales and interbedded cherts.	Low permeability with localised aquifers associated with Colonial Chert Member
	Mount Sylvia Formation	-	Shale with several BIF macrobands.	Low permeability with localised aquifers associated with Bruno's Band (chert)
	Wittenoom Formation	Bee Gorge Member	Shale with minor carbonate, chert, volcaniclastics and BIF.	Low permeability
		Paraburdoo Member	Dolomite with minor interbedded argillite and chert.	Aquifer potential where secondary permeability is introduced, can form regionally significant aquifer where extensive carbonate dissolution has occurred

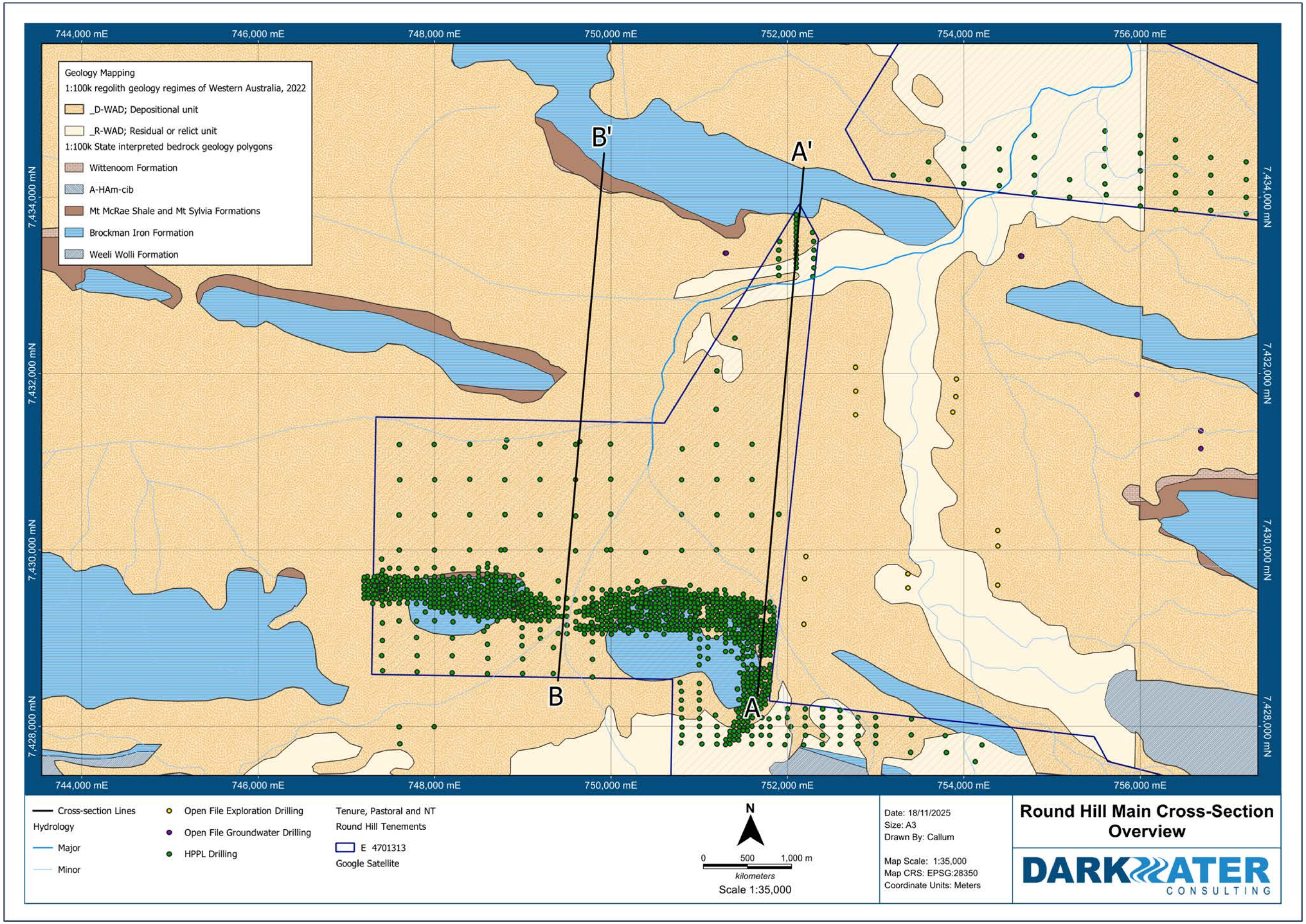


Figure 4-10: Round Hill Main Cross-Section Overview

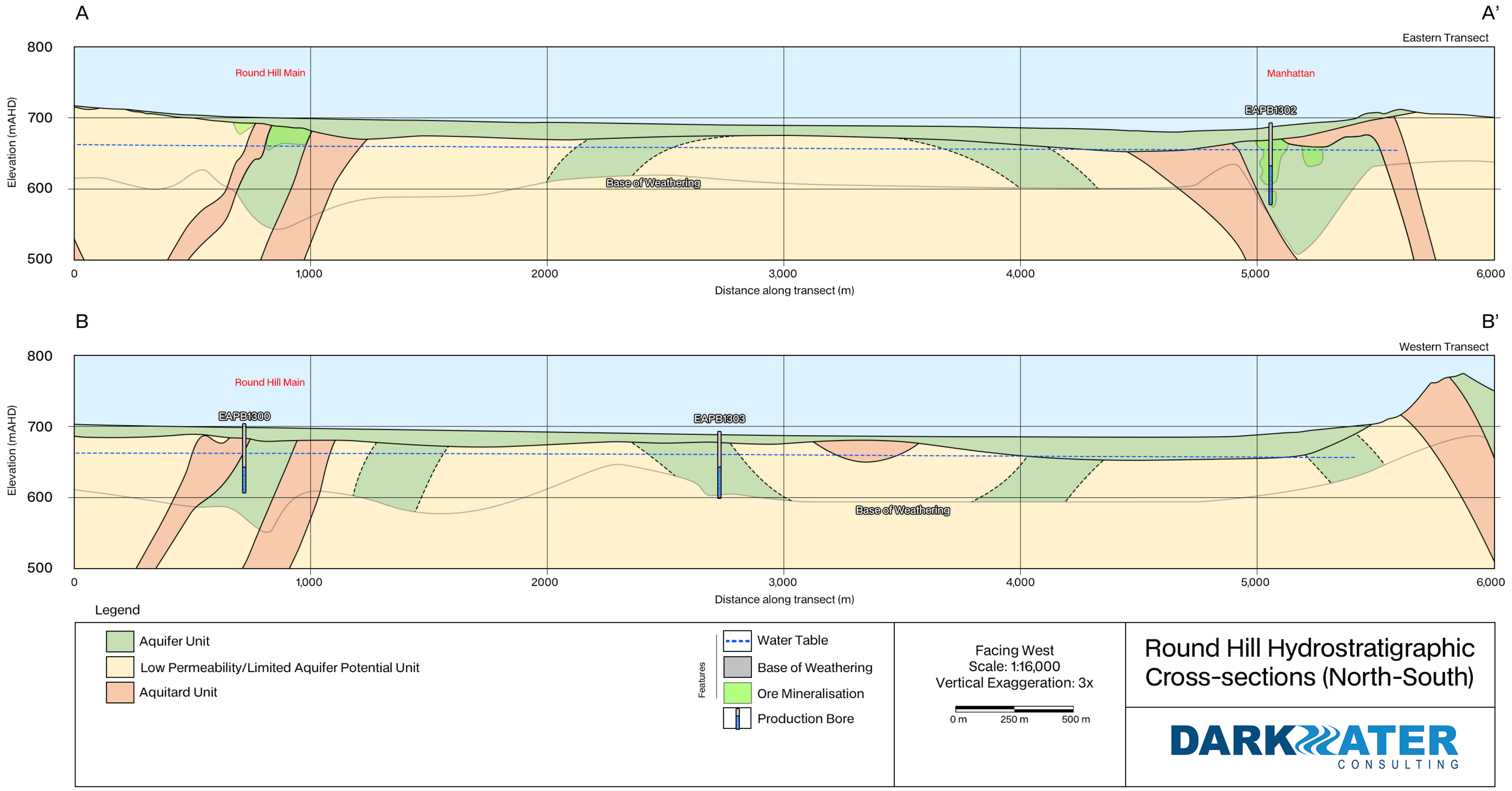


Figure 4-11: Round Hill Hydrostratigraphic Cross-section (North-South)

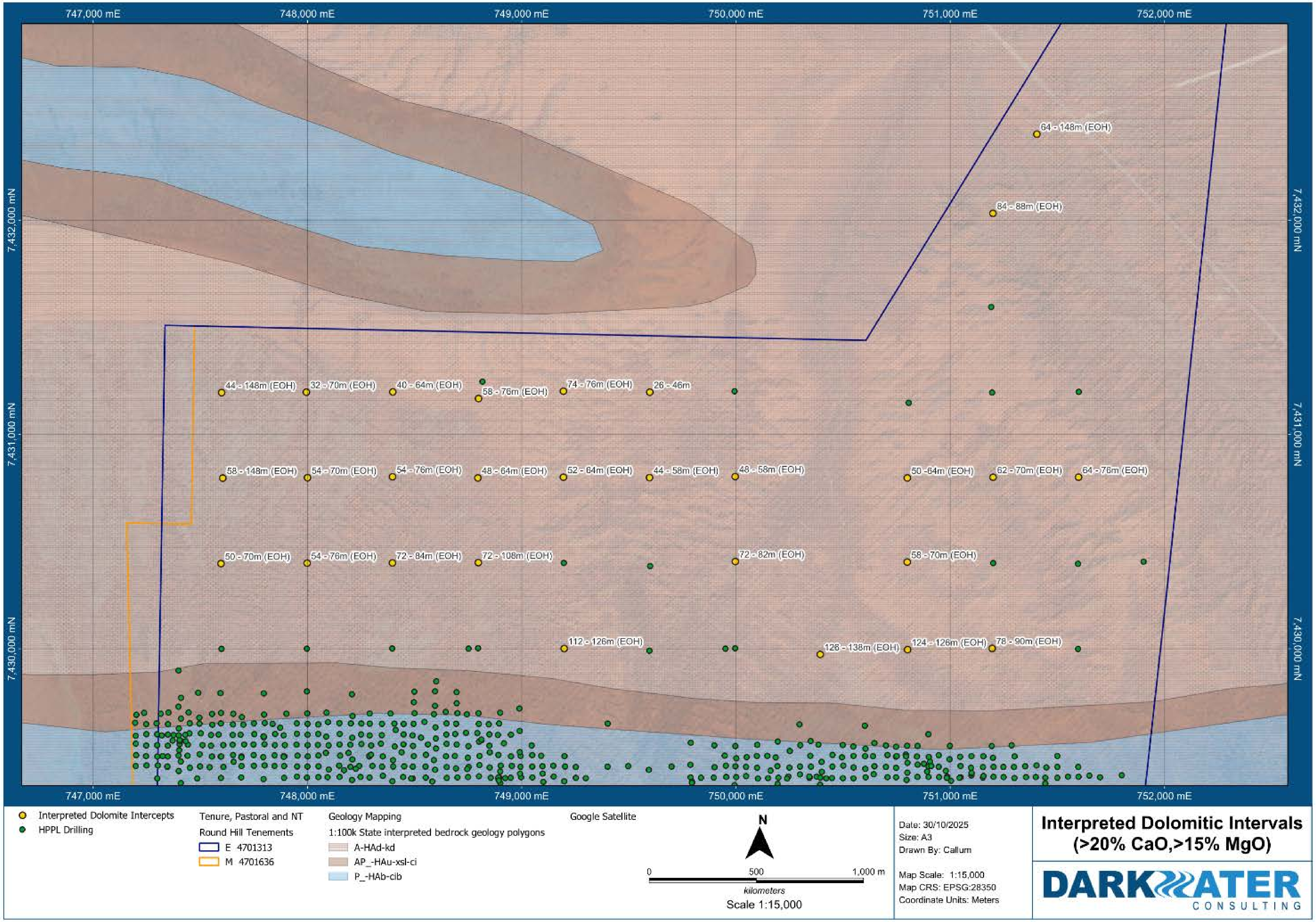


Figure 4-12: Round Hill Main Interpreted Dolomite Intersections in Wittenoom Formation

Whaleback Shale Member

The Whaleback Shale Member of the Brockman Iron Formation separates the underlying Dales Gorge Member from the overlying Joffre Member. The Whaleback Shale Member is dominantly composed of shale and expected to act as an aquitard except in areas where secondary permeability has been introduced. Minor mineralisation is observed in the unit at Round Hill Main; however, this mineralisation occurs above the water table. As such, the Whaleback Shale Member is interpreted to act as an aquitard which further compartmentalizes the Brockman Iron Formation aquifer units.

4.2.2 Structures

There are no regional-scale fault structures identified within the Project area. Three discontinuous normal faults were identified within the Round Hill Main deposit. Continuity of these faults could not be supported beyond 1 to 2 drill hole spacings and are considered inactive within the context of the resource model. There is no readily identifiable influence of linear structures on the behaviour of groundwater flow or chemistry within areas investigated during this study phase.

4.2.3 Aquifer Characteristics

During the Order of Magnitude study phase, aquifer characteristics were tested across various units via:

- Drilling and construction of production bores and subsequent test pumping (Table 4-9);
- Test pumping of an existing production bore (Table 4-5); and
- Falling head testing of installed piezometers (Table 4-4).

Test pumping analysis of the unmineralised Dales Gorge Member in the Round Hill Main area (EAPB1300) estimated hydraulic conductivity values in the order of 12.1 to 12.3 m/day, storativity values between 2 and 5 E-04, and specific yields of 0.05 to 0.14%.

Derived hydraulic conductivity values are similar to values obtained in mineralised Dales Gorge Member during testing at Hope Downs 4 (MWH, 2009). This may be indicative of high bulk permeability throughout the Dales Gorge Member at Round Hill Main, regardless of mineralisation. Zones of mineralisation may, however, disproportionately contribute to the overall aquifer unit storage. Regional assessment of hydraulic parameters performed by Kalaka (2021), observed similar normal distributions of hydraulic conductivity in both mineralized and unmineralized BIF.

Testing of mineralised Dales Gorge in the Manhattan area (EAPB1302) estimated hydraulic conductivity values in the order of 4.5 to 5.3 m/day, storativity values between 3 and 5E-04, and specific yield values of 1.2 to 1.7%. Storage parameters align with values derived from testing of mineralised Dales Gorge Member elsewhere, while hydraulic conductivity values are relatively low.

Testing of interpreted Paraburdoo Member (EAPB1303) estimated hydraulic conductivity values of 5.5 m/day, storativity values of 3E-04, and specific yield values of 0.03%. These values are significantly higher than those derived from testing of HRPB0002, interpreted as being screened within the Bee Gorge Member. A similar relationship was observed in falling head testing of piezometers screened in the Paraburdoo and Bee Gorge Members.

4.2.4 Groundwater Recharge and Discharge

The Round Hill Main area is located in the upper margins of the Coondiner Creek catchment, immediately north of the catchment divide. Groundwater recharge occurs through a combination of direct infiltration of rainfall, and through concentration of sheet-flow and subsequent infiltration along drainage lines.

The internally draining catchment, located west of the Round Hill Main area, represents a potentially significant source of groundwater recharge to the sub-cropping Wittenoom Formation present throughout this catchment. The contribution of this catchment to groundwater recharge is supported by groundwater level observations, and through hydrochemical typing of collected water samples.

There are no identified areas of groundwater discharge within the immediate Project area. Groundwater leaves the Project area as throughflow towards the north, broadly following the topography and associated Coondiner Creek catchment, ultimately reporting to the Fortescue Marsh.

Chloride mass balance assessment of water quality samples indicate recharge rates in the order of 3 to 6% of annual rainfall, or between 9 and 18 mm/annum. This is based on assessment of observed chloride concentrations in groundwater samples and a regional chloride deposition rate of approximately 3 mg/L per annum (Wilkins, et al., 2022).

Application of this recharge rate to the immediate Round Hill Main surround and up-catchment area (nominal 68 km^2) equates to 0.6 to 1.2 GL/a of recharge. Potential recharge occurring within the internally draining catchment (up to 500 km^2) immediately west of Round Hill Main, and associated throughflow, represents a significant additional component of groundwater recharge.

4.2.5 Groundwater Levels and Throughflow

Groundwater Contours

Groundwater contours, shown in Figure 4-13, display the broadly north to north-easterly flow of groundwater.

Groundwater levels range from 60 mbgl (~662 mAHD) south of the orebody, to 27 mbgl (~654 mAHD) in the Manhattan area north of the Great Northern Highway. Trends indicate groundwater flowing to the north/north-east, broadly mirroring the topography and associated ephemeral drainage of Coondiner Creek.

High hydraulic gradients are observed across the Brockman Iron Formation at Round Hill Main and Manhattan (0.002 to 0.006), attributable groundwater flow occurring perpendicular to the strike of low permeability hydrostratigraphic units.

Hydraulic gradients in the southern limb of the Wittenoom Formation, interpreted as weathered dolomite of the Paraburdoo Member, are significantly lower (~0.0005 to 0.0008), indicative of higher hydraulic conductivity in this area. Water levels in this area display some component of eastward groundwater flow, potentially representing interaction between local northward groundwater flow through the Brockman Iron Formation and a regional eastward groundwater flow component along strike through the Wittenoom Formation.

Greater hydraulic gradients are observed in the area surrounding HRPB0002 (~0.0015), indicative of reduced hydraulic conductivity across the interpreted Bee Gorge Member of the Wittenoom Formation.

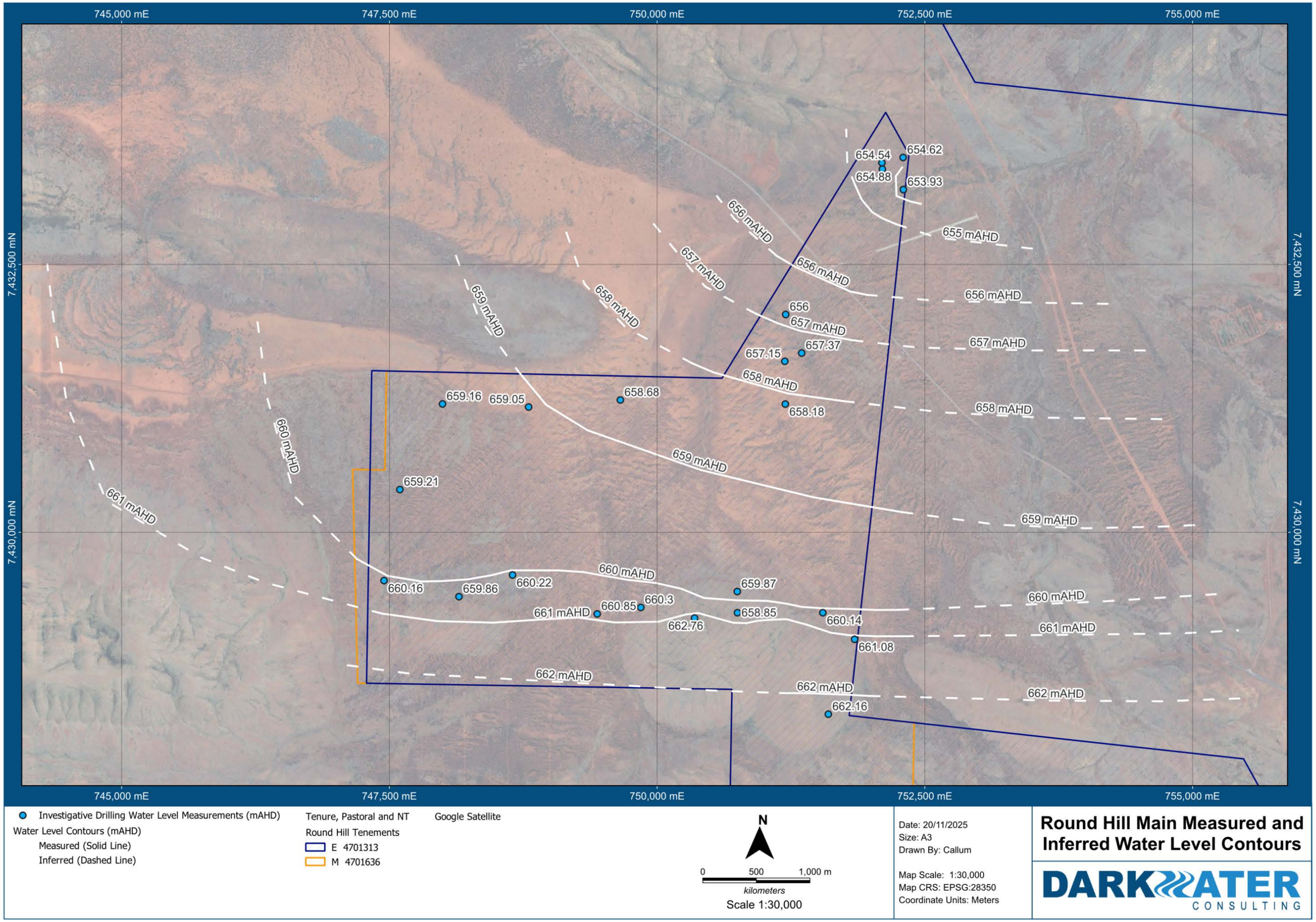


Figure 4-13: Round Hill Measured and Inferred Groundwater Contours

Groundwater Hydrographs

Transient groundwater level measurements are provided in the Round Hill Main area between November 2024 and June 2025. Monitoring bore locations are provided in Figure 4-14, and hydrographs are presented in Figure 4-15 to Figure 4-21.

Minimal variation in groundwater levels are observed across the dataset. Water levels have reduced in the order of 0.1 m across the duration of monitoring (~ 6 months). Centimetre-scale responses to recharge are observed in most sites.

Round Hill Main area sites (EAPZ0296, EAPZ0745), responded to rainfall in December 2024 (0.04 to 0.06 m response). The reduced and delayed response in EAPZ0745 may be attributable to the screened unit, as EAPZ0745 is screened in Mt McRae Shale while EAPZ0296 is screened in the Dales Gorge Member. EAPZ0412, located higher in the catchment and screened within the Joffre Member, did not display any significant response to rainfall events, indicating recharge is likely concentrated in drainage lines.

Sites screened in the Wittenoom Formation (EAPZ0611, EAPZ0620, EAPZ0641 and HRPB0002), display larger groundwater fluctuations. Timing and magnitude of rainfall responses in these bores do not align with sites screened in the Brockman Iron Formation and Mt McRae Shale. This may indicate hydraulic connection of the Wittenoom Formation to a broader area, and an aquifer response to recharge occurring outside of the immediate project area (i.e., recharge to sub-cropping Wittenoom Formation west of Round Hill Main).

Reduced fluctuations in HRPB0002 are attributable to bore construction. HRPB0002 is a 200 mm diameter bore while other sites are 50 mm piezometers.

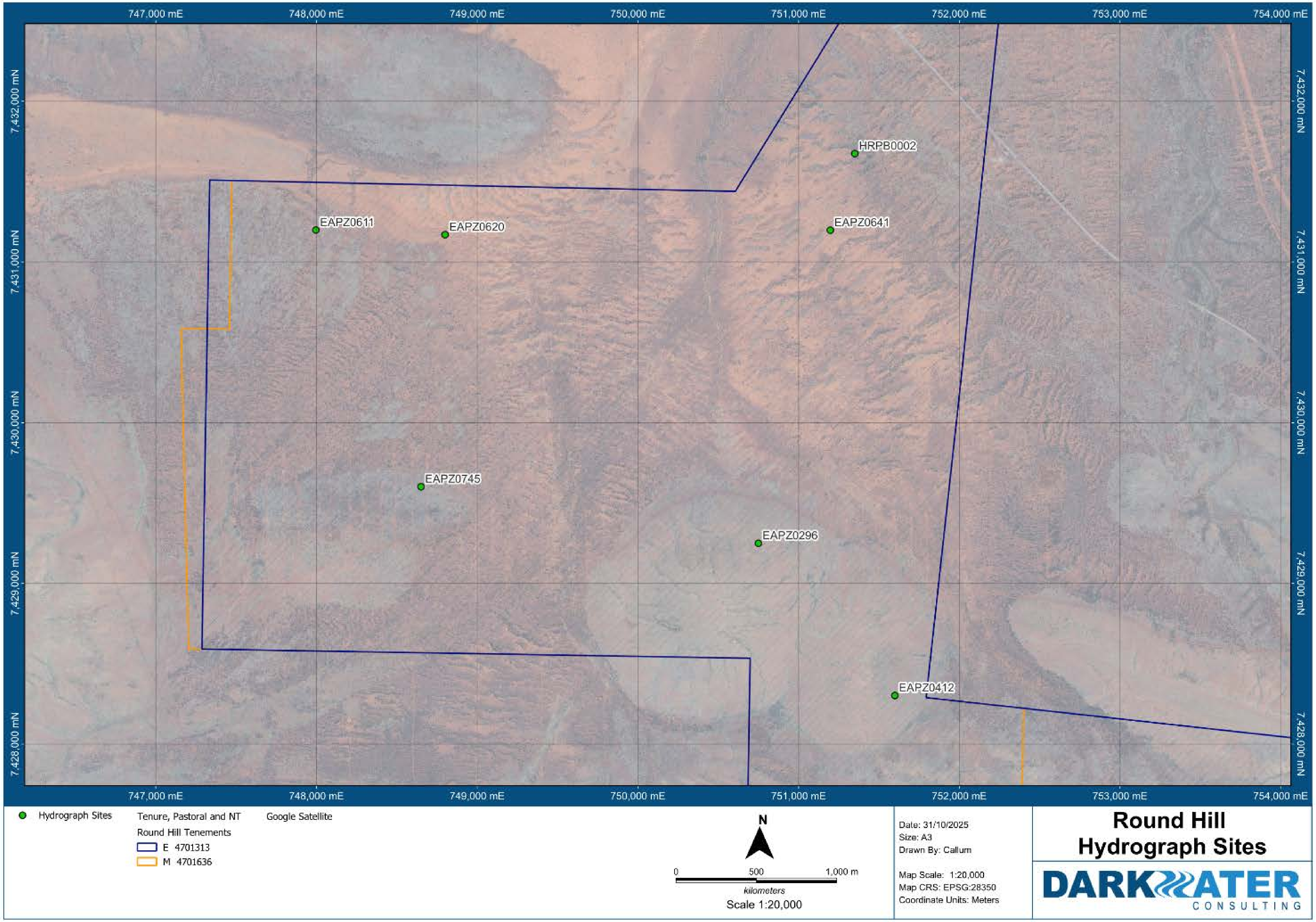


Figure 4-14: Round Hill Hydrograph Sites

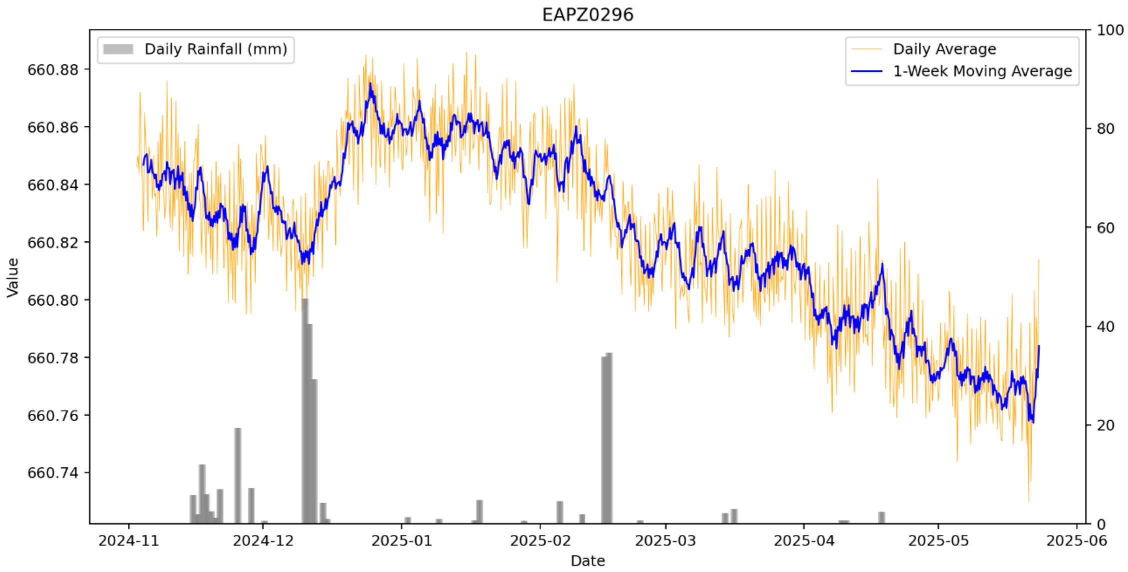


Figure 4-15: Round Hill Hydrograph - EAPZ0296

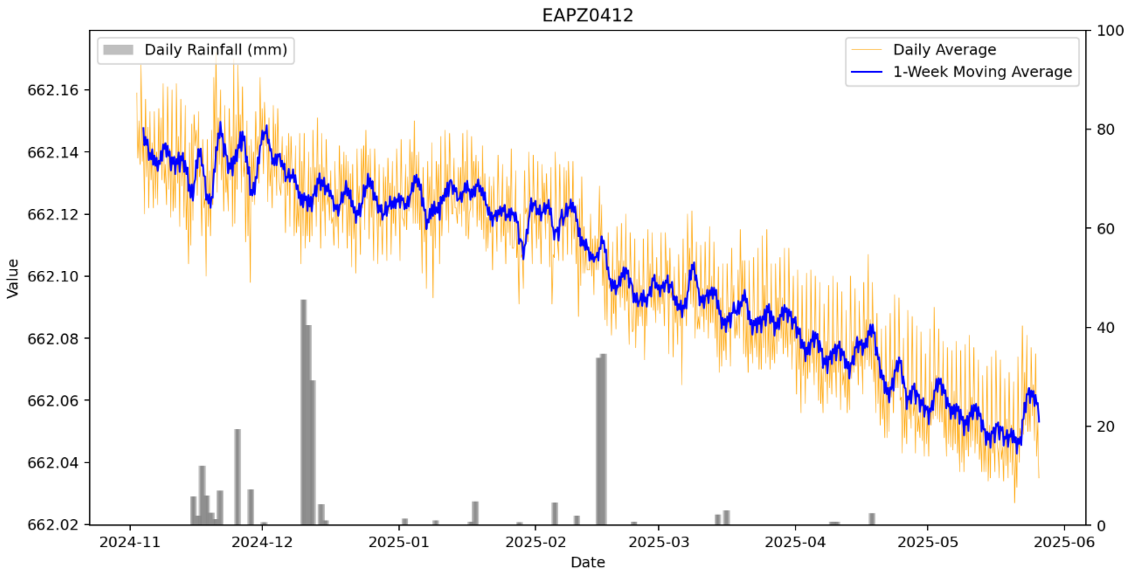


Figure 4-16: Round Hill Hydrograph - EAPZ0412

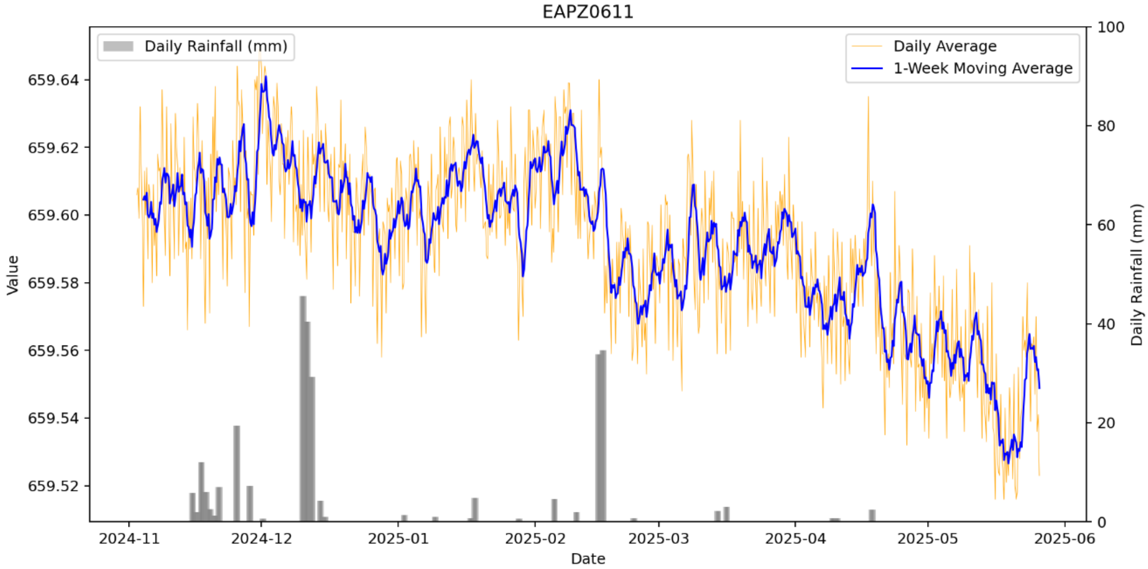


Figure 4-17: Round Hill Hydrograph - EAPZ0611

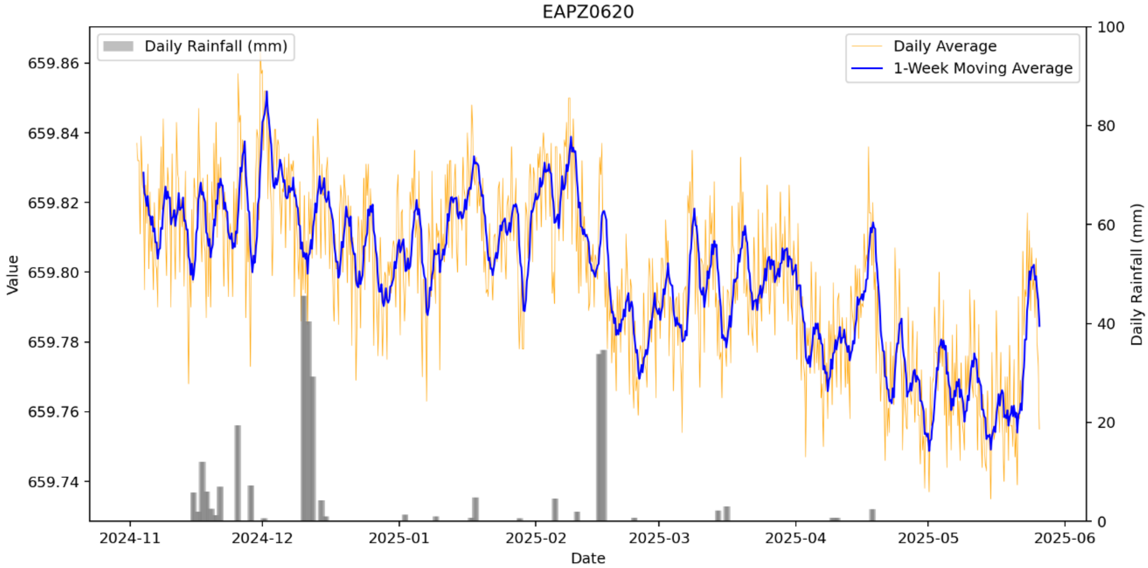


Figure 4-18: Round Hill Hydrograph - EAPZ0620

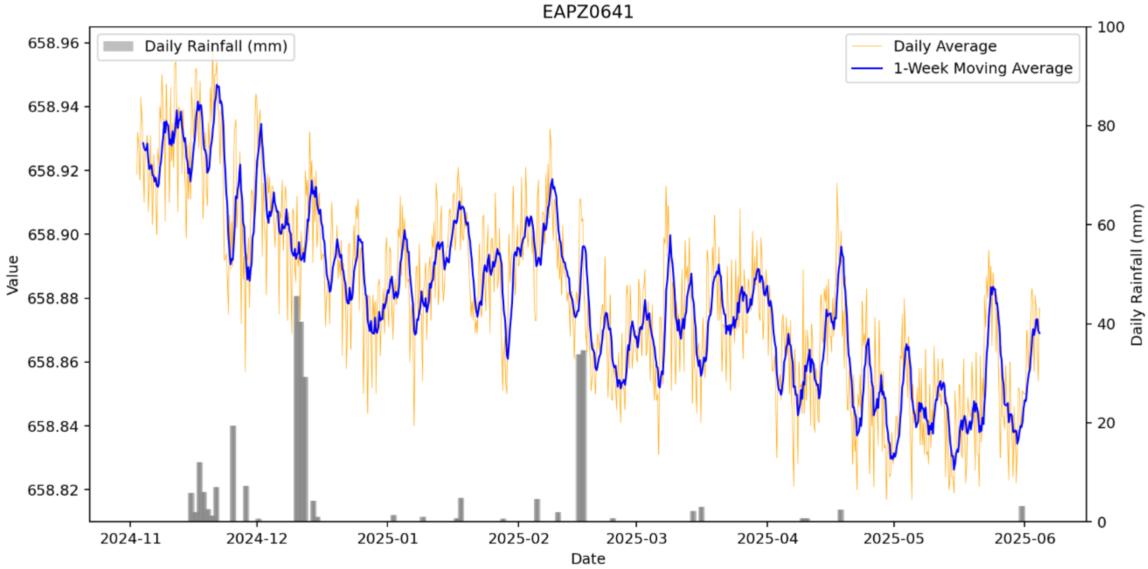


Figure 4-19: Round Hill Hydrograph - EAPZ0641

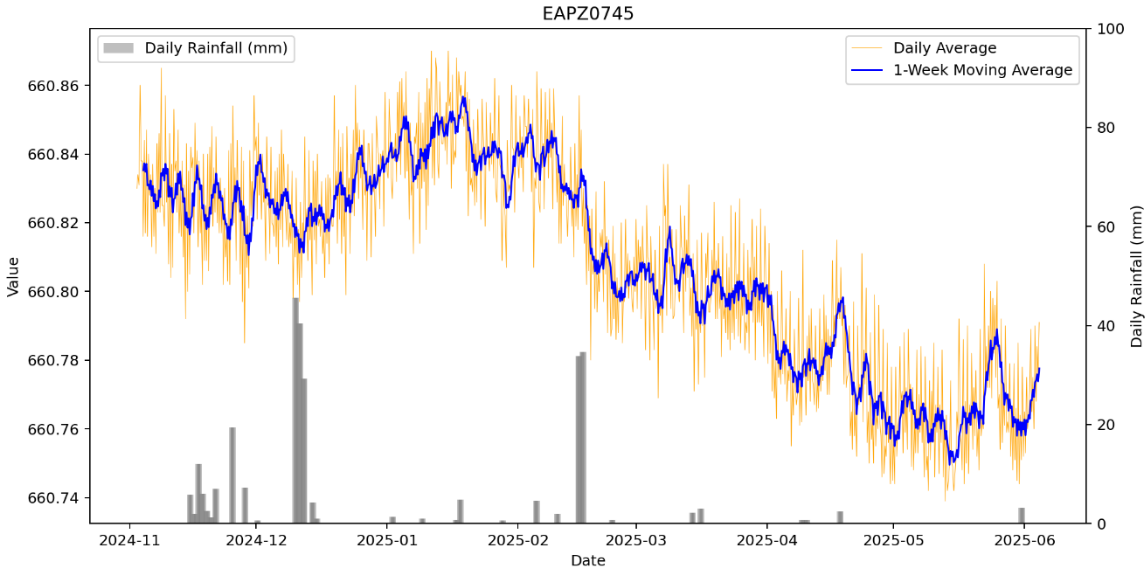


Figure 4-20: Round Hill Hydrograph - EAPZ0745

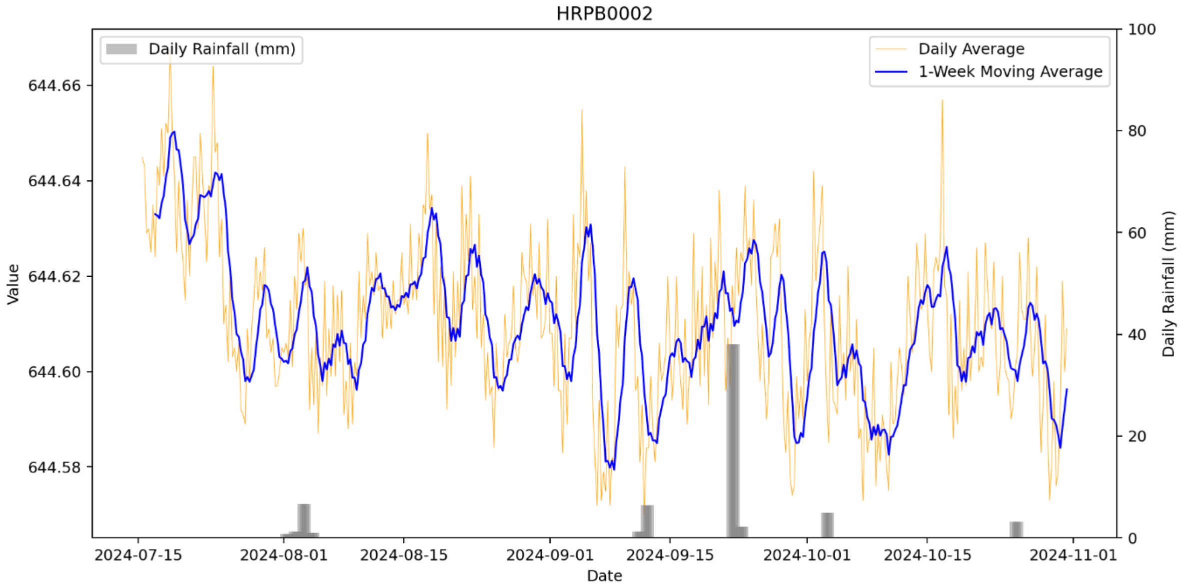


Figure 4-21: Round Hill Hydrograph - HRPB0002

4.2.6 Groundwater Quality

Results of two groundwater chemistry sampling programs, completed between October and November 2024, and May and August 2025 respectively, are provided above in Table 4-3 and Table 4-10. These results are discussed in greater detail below.

Major ion chemistry of sampling programs are presented as Piper diagrams in Figure 4-22 through Figure 4-24.

Spatial distribution of TDS values during the 2025 sampling program are shown in Figure 4-25. Groundwater quality is fresh across the project area, ranging between 371 and 820 mg/L. The highest value observed at EAPZ0607, screened in the Wittenoom Formation, was significantly different to 2024 observations (400 mg/L). This variability is expected to be related to sampling error and is not viewed as representative of temporal variability in water quality.

There is no distinct correlation between the direction of groundwater flow and TDS. There appears to be some degree of correlation with interpreted hydraulic conductivity of hydrostratigraphic units. This may indicate the influence of relatively uniform recharge across the project area and the influence of residence times in less permeable units.

Samples are broadly bicarbonate and calcium/magnesium dominant. The most distinct trend in samples appears to be an increase in relative proportion of calcium and magnesium in Wittenoom Formation samples, and in down-gradient samples collected in EAPB1302 in the Manhattan area.

The concentration of Ca and Mg relative to HCO3 and SO4 in collected water quality samples is presented in Figure 4-27. Wittenoom Formation samples indicate that water quality is influenced by the dissolution of dolomite.

Calcium and magnesium percentages are shown spatially in Figure 4-26. Relative freshness in piezometers interpreted as being screened in the Paraburdoo Member, and the calcium/magnesium signature observed in the Dales Gorge Member down-gradient, may demonstrate the influence of flow through the weathered Paraburdoo Member on the regional groundwater system.

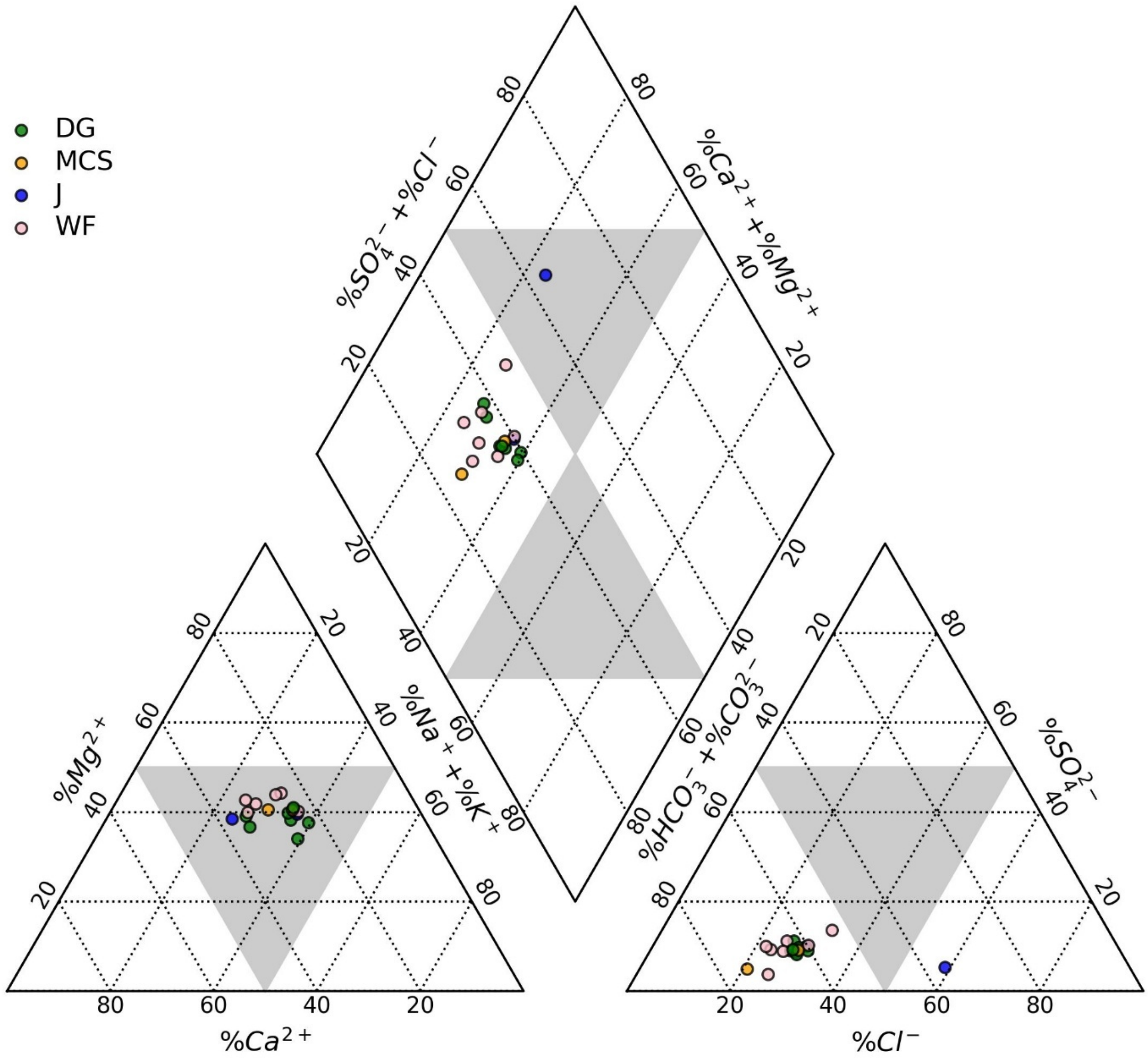


Figure 4-22: Major Ion Chemistry - Oct/Nov 2024, Grouped by Stratigraphy

DG = Dales Gorge; MCS = McRae Shale; J = Joffre; WF= Wittenoom Formation

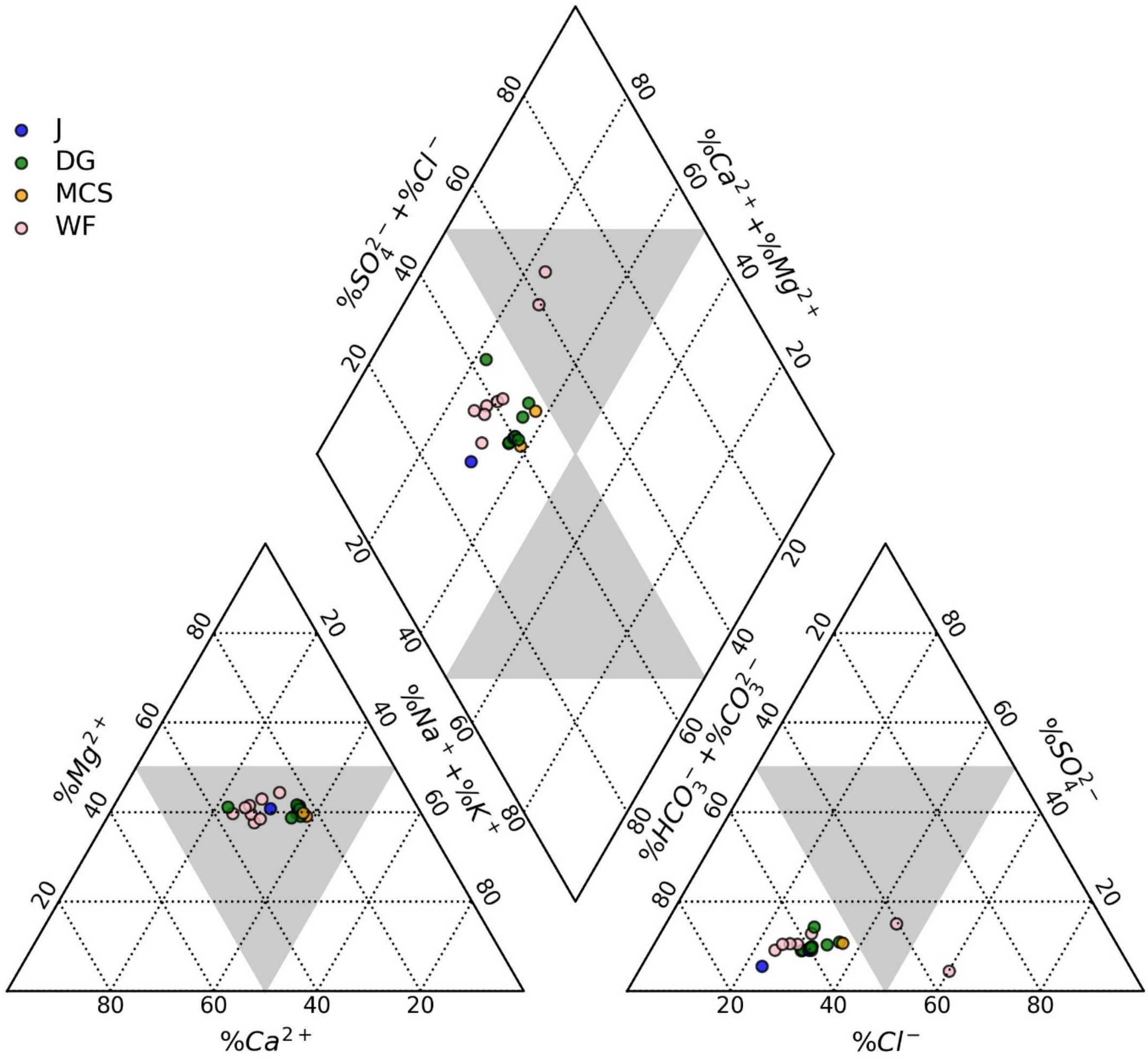


Figure 4-23: Major Ion Chemistry - May/Aug 2025, Grouped by Stratigraphy

DG = Dales Gorge; MCS = McRae Shale; J = Joffre; WF= Wittenoom Formation

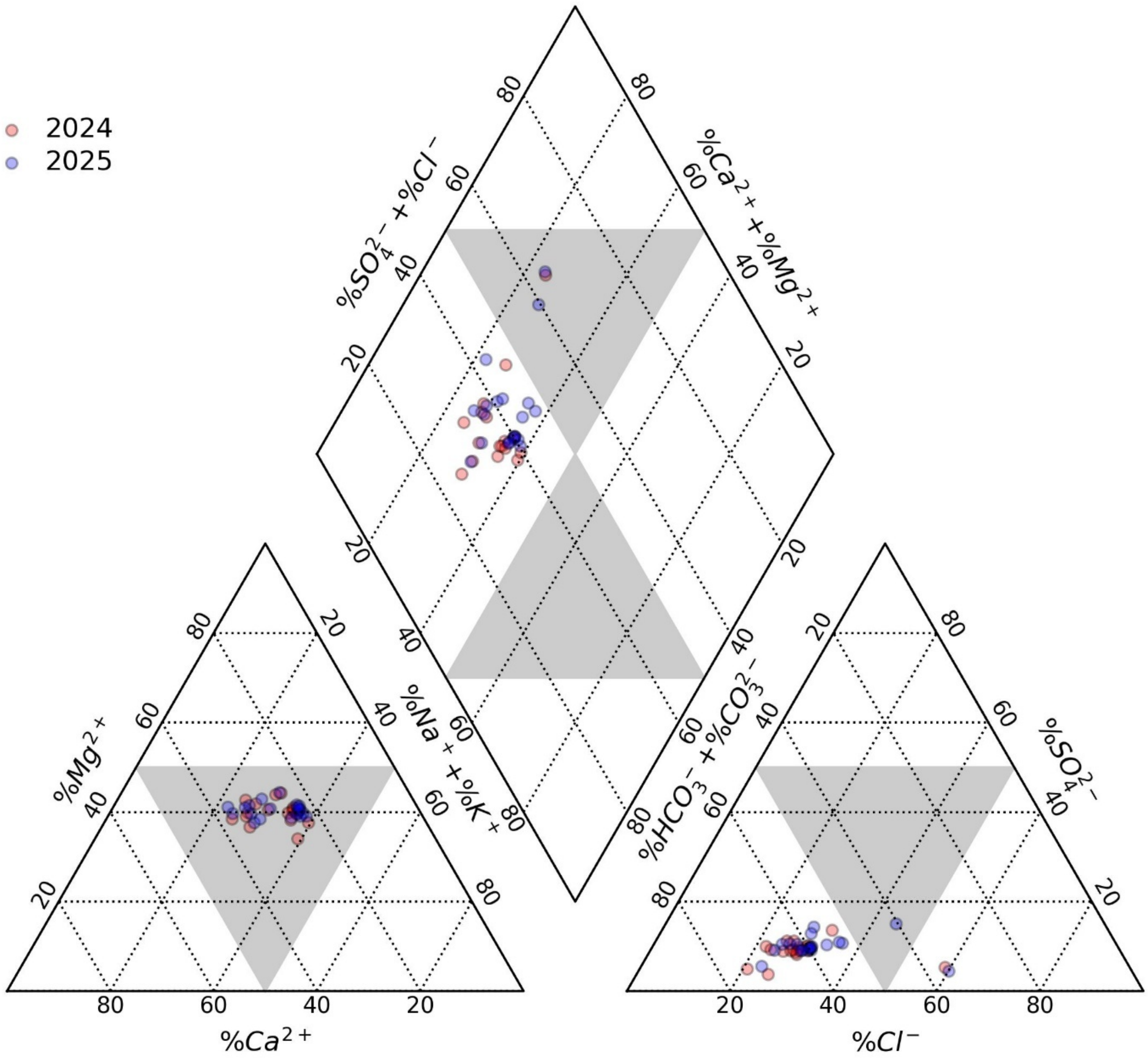


Figure 4-24: Major Ion Chemistry - All Samples, Grouped by Program

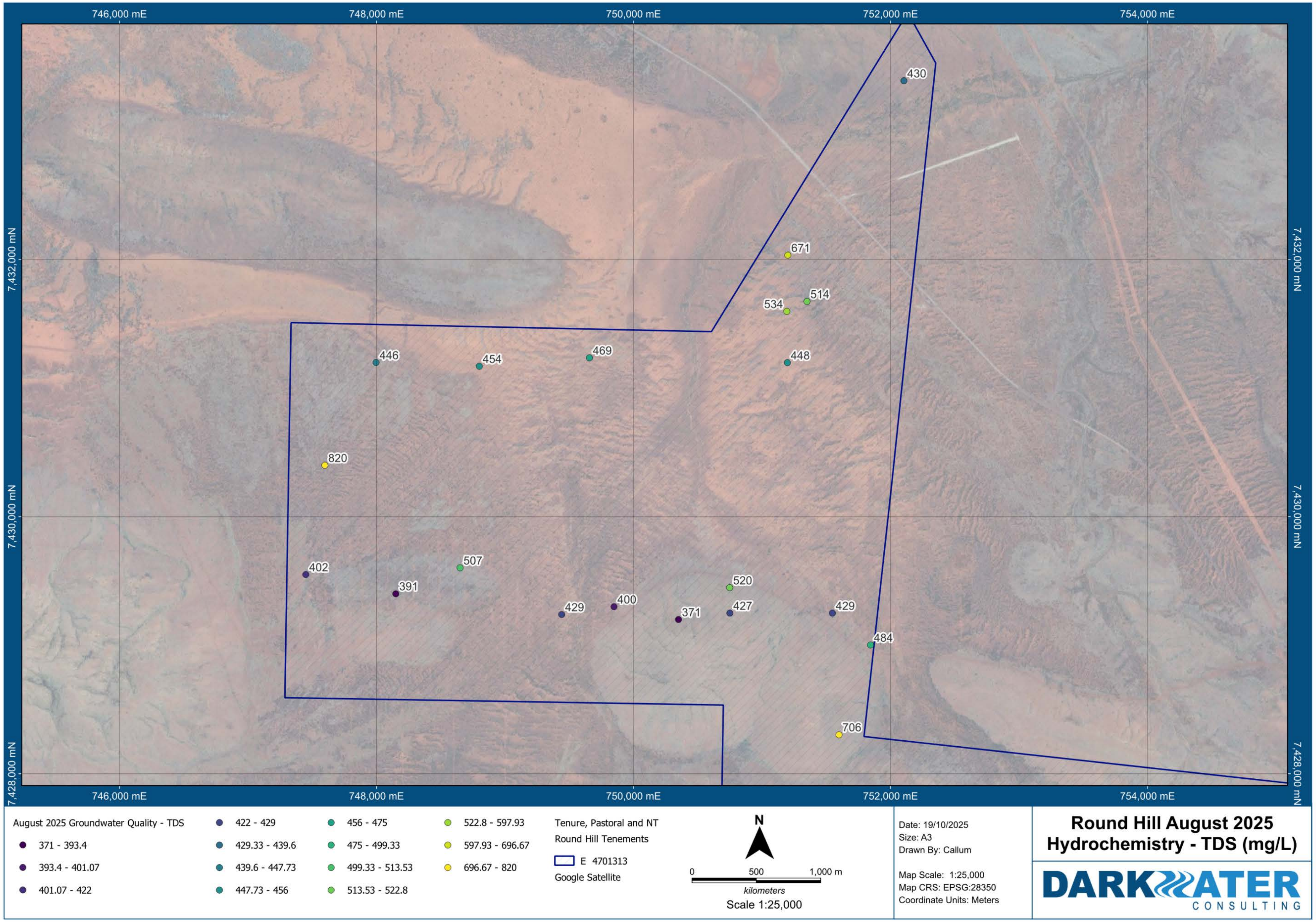


Figure 4-25: Round Hill August 2025 - TDS (mg/L)

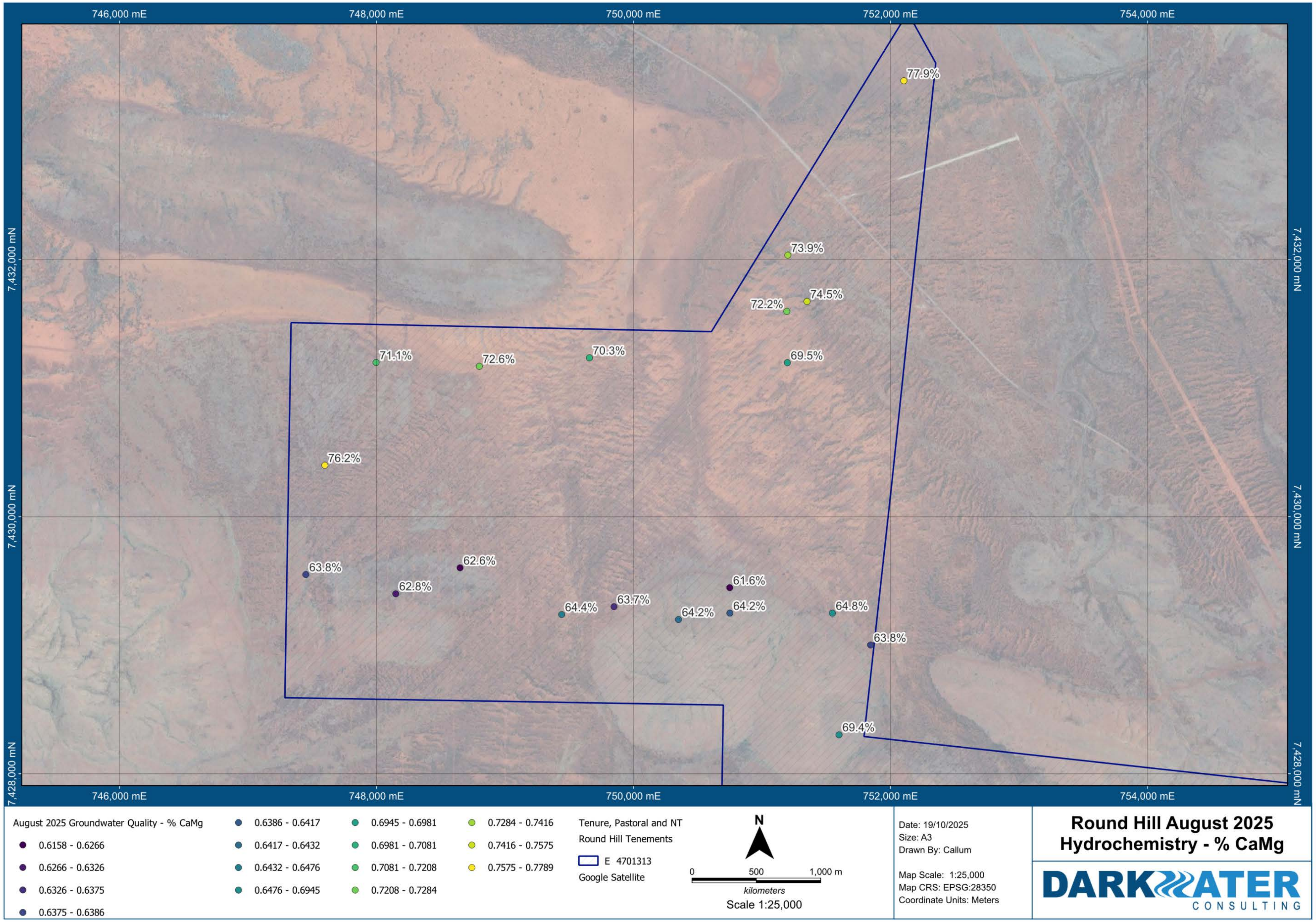


Figure 4-26: Round Hill August 2025 - %Ca + Mg

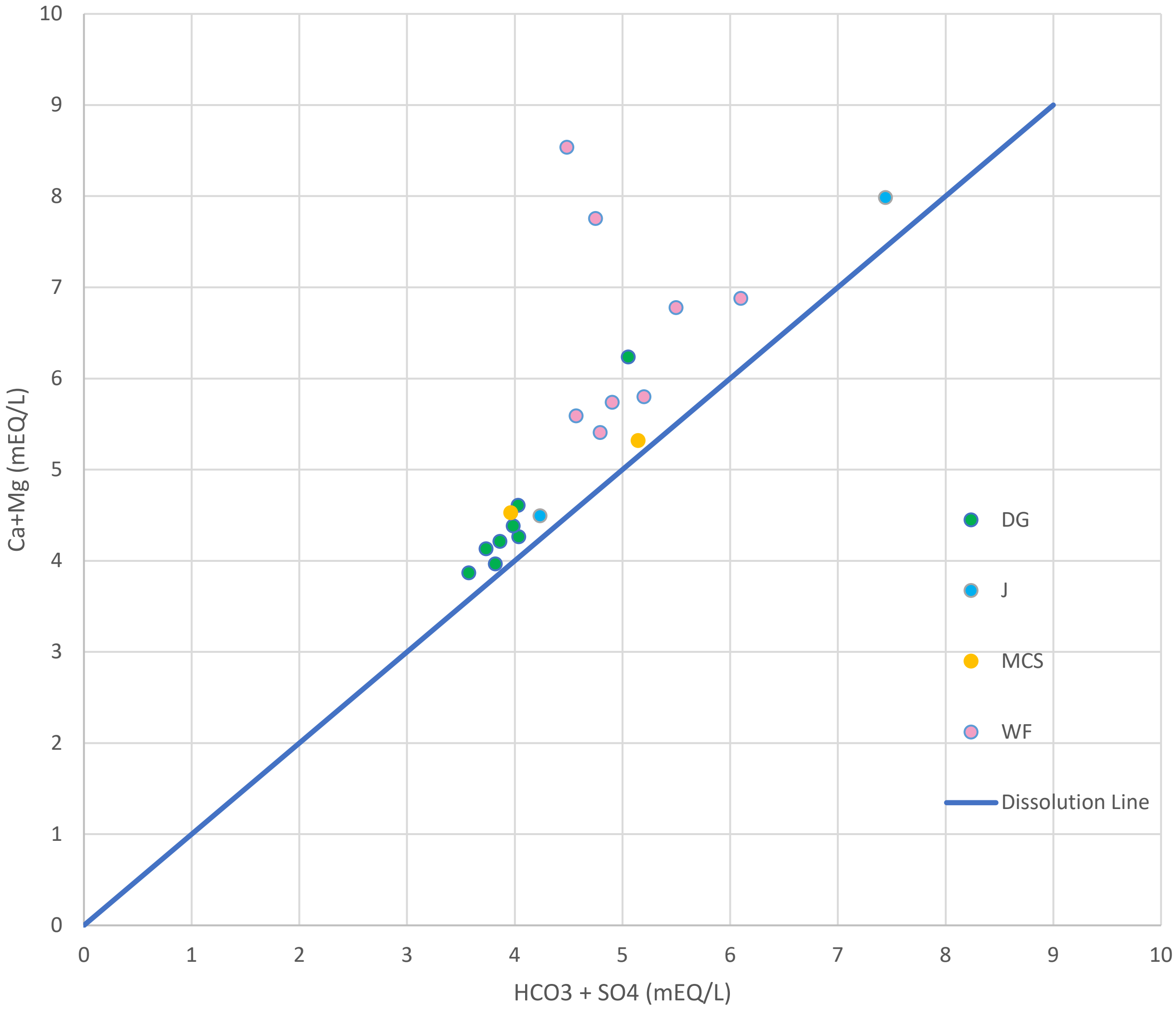


Figure 4-27: Round Hill August 2025 – Ca + Mg vs HCO3 + SO4 (mEQ/L)

4.2.7 Groundwater Receptors

Detailed flora and vegetation surveys completed during this Study have identified no groundwater dependent vegetation within the project area. Observed depths to groundwater (60 to 27 mbgl), and a lack of saturated alluvium in drainage channels, such as Coondiner Creek, support the finding that groundwater dependent vegetation are absent in the project area.

Identified regional pools, located north and east of the Project area and proximal to Hope Downs 4 Operations, are likely to be fed by local alluvial sedimentary units associated with creek beds, and are believed to be hydraulically disconnected from the bedrock aquifer. The distance from the Project area (in excess of 15 km), and the presence of significant, intervening thicknesses of low permeability hydrostratigraphic units, indicate the local groundwater system is disconnected from these receptors.

The various investigated aquifer units are likely to support subterranean fauna assemblages. Subterranean fauna baseline surveys completed by Bennelongia (2025), identified a moderately rich stygofauna assemblage within the Brockman Iron Formation aquifer in the Round Hill Main area. It is expected that the stygofauna community characterised by the field survey will extend outside of the project boundaries and into surrounding habitats in the regional area.

This is supported by the only moderately rich stygofauna community collected, the connectivity of habitats east west across the project area, extending beyond the development boundaries, and the ranges, or predicted ranges, of the species collected, as theorised using all available knowledge of ecological characteristics and hydrogeological profiles. No species of conservation significance were identified to be restricted, or being expected to be restricted, to the project area within this field survey (Bennelongia, 2025).

5. Licencing and Existing Water Users

The Round Hill Project is located within the Hamersley – Fractured Rock Licensing Area and is managed under the Pilbara Groundwater Allocation Plan (DoW, 2013). There is no allocation limit for this licensing area, and groundwater licenses are reviewed on a case-by-case basis. License applications in fractured rock licensing areas are required to:

- demonstrate their ability to abstract water;
- identify and demonstrate their ability to manage any impacts on groundwater-dependent values over the life of the project; and
- assess the potential impacts on overlying or nearby alluvial aquifers.

Existing groundwater licences associated with operations in the vicinity of the Round Hill project are shown in Figure 5-1. The primary adjacent user is the Hope Downs 4 Mine (A RTIO/HPPL JV), who currently have an allocation of 23 GL/a under GWL 172872.

Abstraction under this license includes the Hope Downs 4 Camp water supply, which is the closest identified existing abstraction to the Round Hill project. The scale of abstraction associated with the Hope Downs 4 camp is not known but is likely to be relatively small.

Additional groundwater licenses associated with infrastructure corridors are held by BHP Iron Ore Pty Ltd, though any usage adjacent to the Round Hill project is undefined.

There is an existing groundwater license associated with the Round Hill Project (GWL 205198), held by HPPL. This license has an annual allocation of 20,000 kL/a (0.02 GL/a) and has been used to meet exploration water demands. This license also includes other HPPL exploration tenements in the Hamersley Region.

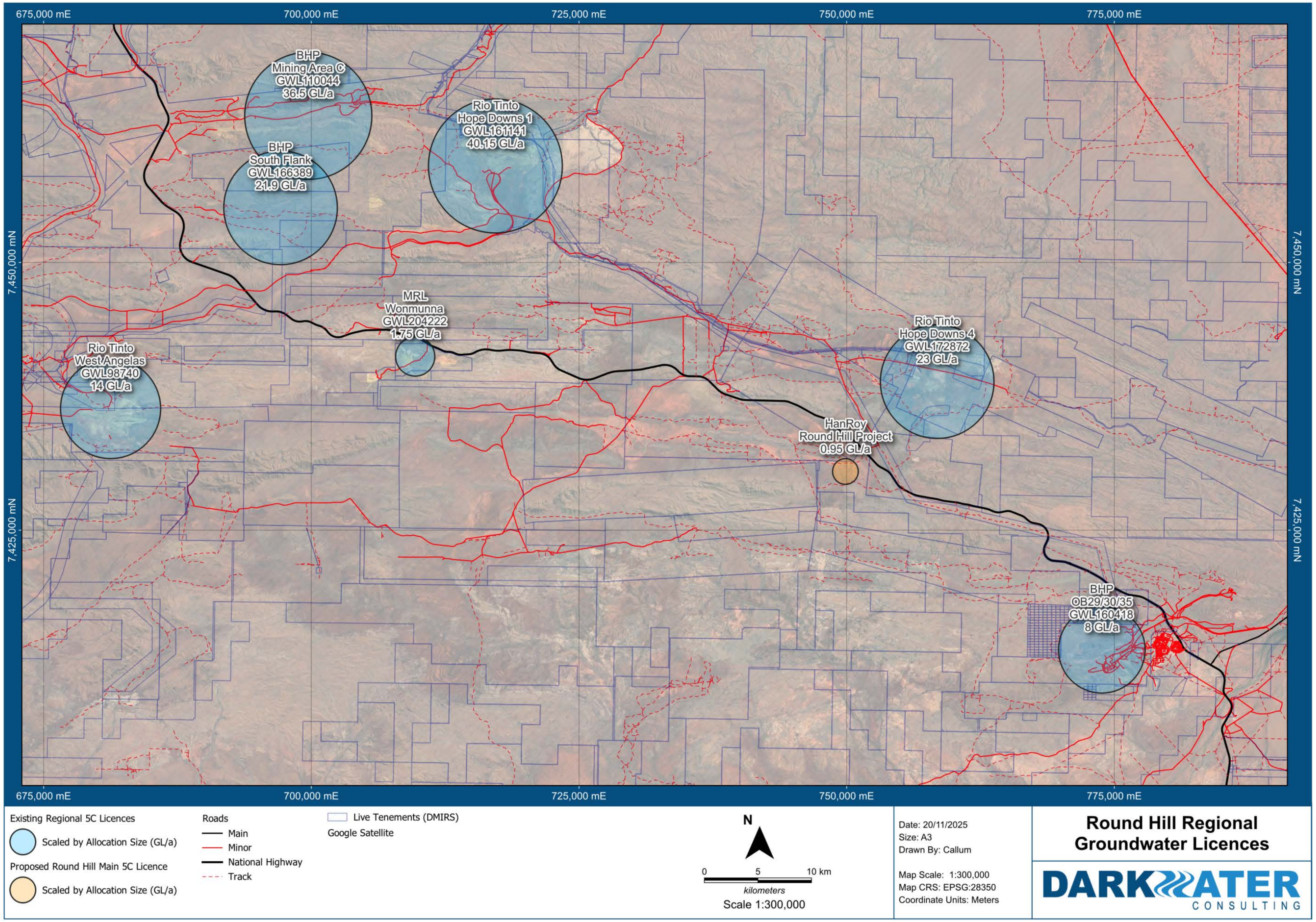


Figure 5-1: Existing Groundwater Licenses (over 1 GL/a)

6. Mine Water Management

6.1 Mine Water Balance

A mine water balance has been constructed to assess water supply requirements for the Project. As there is no below water table (BWT) component associated with the Project, the water demand estimate is directly tied to the Project water supply requirements, and no assessment of surplus disposal is required.

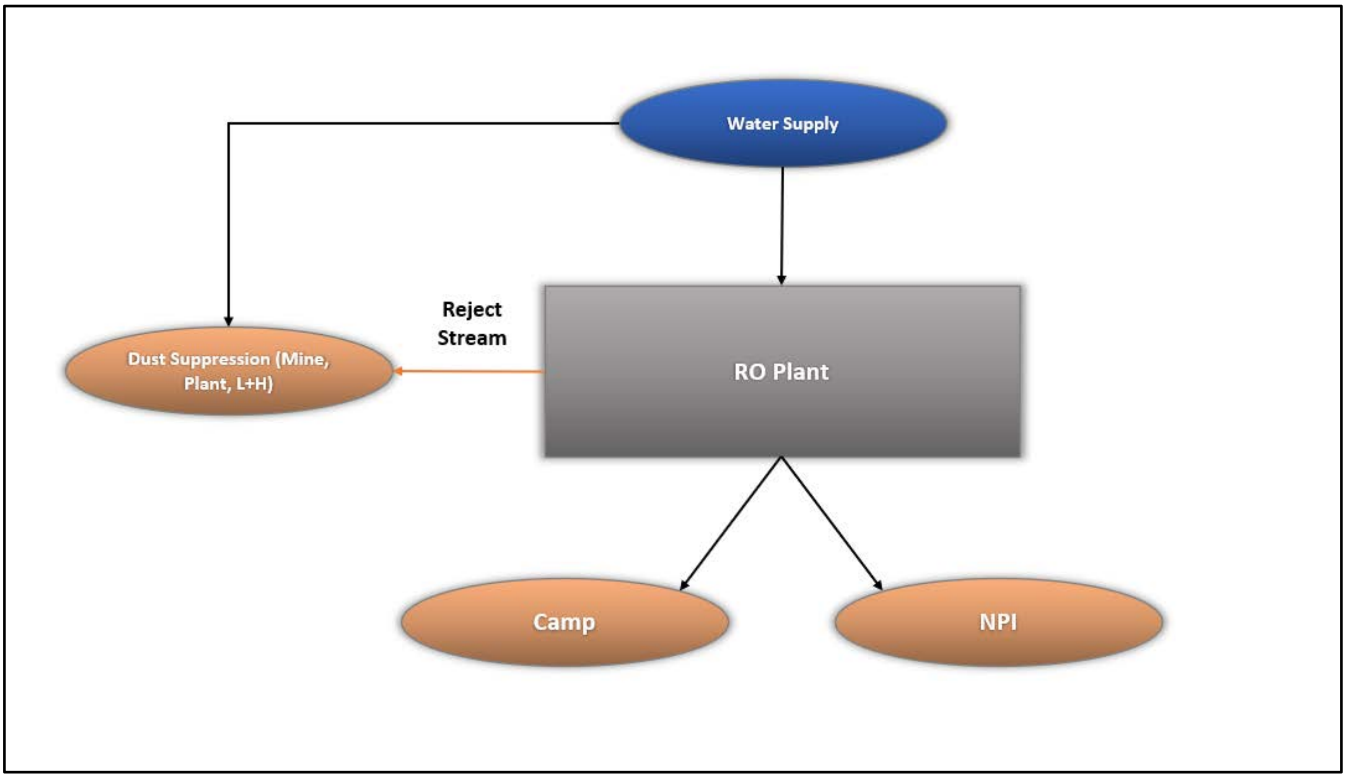


Figure 6-1: Conceptual Water Balance for Round Hill Project

6.1.0 Inputs

Inputs to the water balance have been provided by relevant stakeholders across various aspects of the project. Water balance inputs are summarised below and in Table 6-1.

Mining Dust Suppression

Mining dust suppression requirements were provided by the HPPL Mine Planning Team. Water demand is based upon a mining fleet containing two (2) CAT-777 water trucks, each with an approximate 75 kL capacity, operating within the active mining areas.

It is assumed that water trucks will be operational for 15.9 hours per day, with an average fill-and-spray cycle of 1.25 hours, equating to a maximum potential water usage of 1,908 kL/day. 75% of this value (1,431 kL/day) was provided as a more likely operational water demand, accounting for reduced use during night shifts and periods where two water trucks may not be required.

Dust suppression associated with drilling forms a minor water balance component. The water demand associated with drilling is estimated to be 4.1 kL/day.

Ore Processing

Ore processing water estimates were provided by Agilitus. Plant water requirements are estimated to be 120 kL/day, based upon 5 Mtpa of ore throughput. Plant water usage is mainly driven by crusher dust suppression and product moisture content requirements.

Loading and Haulage

Loading and haulage dust suppression estimates were provided by Agilitus. These estimates cover dust suppression associated with the loading of product into road trains, and dust suppression along the main access corridor. A nominal value of 360 kL/day was provided. Requirements are anticipated to be reduced due to the main access road being sealed.

Camp/NPI

Camp size requirements have not been finalized at this stage. It is anticipated that the camp size will be in the order of 150 personnel. A total water demand of 78.1 kL/day was provided by HPPL, accounting for the estimated efficiency of the RO plant. This water demand is also assumed to encompass additional RO water requirements, such a vehicle wash bays.

Based upon anticipated personnel requirements, this equates to 520 L per person per day. This value is seen as appropriately conservative when compared to NPI requirements at existing operations.

6.1.1 Water Demand Scenarios

Water demand components and resultant total water demand is provided in Table 6-1. As water demand inputs are constant and not attached to any project variables (i.e., total material movement), the total water demand is constant and assumed to remain the same for the duration of operations (nominally up to 8-years dependent on product strategy).

Estimated project water demand is approximately 0.73 GL/a (23 L/sec). Inclusion of a nominal 30% buffer, to capture any uncertainty in component estimates, increases the project water demand to 0.95 GL/a (30 L/sec).

This water balance does not account for the potential reductions in dust suppression requirements associated with direct rainfall over the project area or capture of rainfall and/or surface water runoff by the mining void. These intercepted volumes would offset abstraction requirements and reduce the overall Project water demand.

Table 6-1: Round Hill Water Demand Components and Estimated Total Water Demand

Water Balance Component	Subunit	Source	Water Requirement		Comments
			kL/day	GL/a	
Operational Water Requirements	Mining Dust Suppression	HanRoy Mine Planning (2025)	1,431	0.522	Assumed 2 x CAT-777 water trucks at 75% operational capacity, operating within active mining areas
	Plant Dust Suppression	Agilitus (2025)	120	0.044	Water usage in plant to meet dust suppression and product moisture content requirements
	Haulage Dust Suppression	Agilitus (2025)	360	0.131	Dust suppression component associated with dust suppression of product stockpiles, loading of road trains, and maintaining access road between loading area and Great Northern Highway
	Drilling	HPPL (2023)	4.1	0.001	Additional water demand for wet drilling
Potable	Camp	Agilitus (2025)	78.1	0.029	Value provided by HanRoy - Inclusive of efficiency losses due to RO process
Total			**1,993**	**0.728**	
Total (Inclusive of 30% buffer)			**2,591**	**0.946**	

6.2 Water Supply Strategy

6.2.0 Water Supply Sites

Proposed water supply sites are listed in Table 6-2 and shown in Figure 6-2. Assessment of production bores established during the investigative drilling phase of this study indicates that these sites will be able to collectively meet the water supply requirements of the Project (Rockwater, 2025).

It is proposed that the two near-mine abstraction bores, EAPB1300 and EAPB1303, are used as the primary water supply sites due to their proximity to the Round Hill Main footprint, and the ability to monitor drawdown within the Project tenure.

Based upon the adopted hydrogeological conceptualisation, there is potential for aquifer heterogeneity, and the presence of barriers to groundwater flow, to influence sustainable abstraction rates in bores over the duration of the project.

As such, it is important that there is flexibility in the distribution of abstraction between the three (3) established water supply sites. It is proposed that all sites are equipped at the operational capacity at which they were tested (20 L/sec) to allow for the ability for any one site to meet a majority of the project water demands.

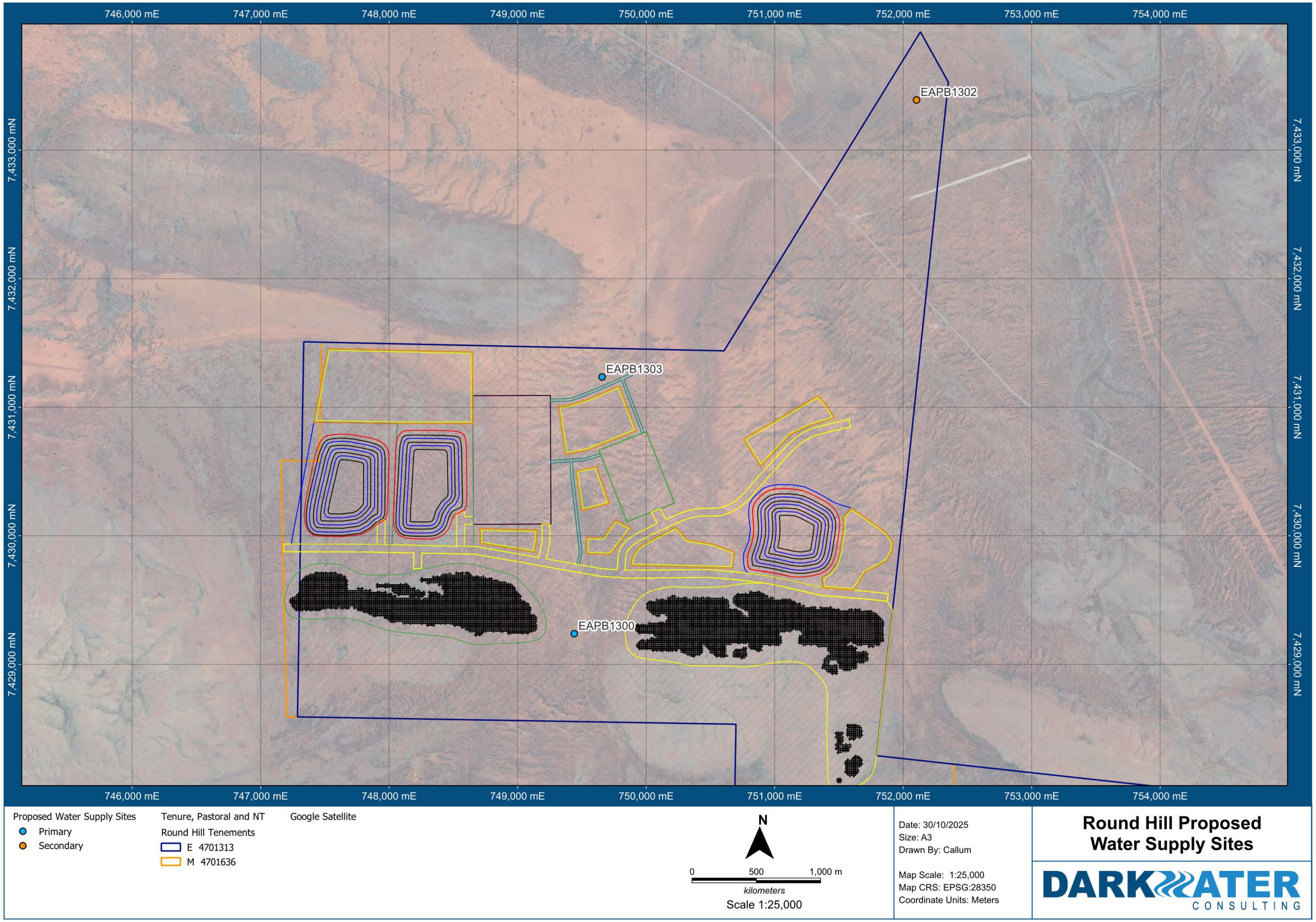


Figure 6-2: Round Hill Proposed Water Supply Sites

Table 6-2: Round Hill Proposed Water Supply Sites

Bore ID	Status	Coordinates (GDA94, Zone 50)		Surveyed Elevation	Top of Casing	Constructed Depth	Casing Internal Diameter	Slotted Interval	Standing Water Level	Required Abstraction Rate	Pump Intake Depth
		mE	mN	(mAHD)	(m agl)	(m bgs)	(mm)	(m bgl)	(m btoc)	(L/sec)	(m bgl)
EAPB1300	Primary Water Supply Bore	749441	7429239	698.4	0.28	92.5	192.9	56.5 - 92.5	37.8	20	85
EAPB1303	Primary Water Supply Bore	749657	7431236	688	0.15	88.5	192.9	46.5 - 88.5	29.47	20	80
EAPB1302	Secondary Water Supply Bore	752104	7433391	686.1	0.24	108	192.9	54 - 108	31.46	20	100

6.2.1 Engineering Requirements

The two proposed primary water supply sites, EAPB1300 and EAPB1303, are proximal to operational areas associated with the bulk of water demand. It is expected that incorporation of these sites into the water network will be straightforward.

Incorporation of EAPB1302, located on the opposite side of the Great Northern Highway to the Round Hill Main, into the abstraction network, will require either:

- Conveying of water underneath the Great Northern Highway; or
- Loading of water trucks on the opposite side of Great Northern Highway.

While not addressed in this assessment, the mining void may capture direct rainfall and/or surface water runoff where diversion is infeasible. Capacity to capture and convey water out of the pit area using in-pit sumps will need to be maintained during mining operations.

7. Environmental Factors

7.1 EPA Environmental Factors and Objectives

This document refers to the EPA environmental factor of "Inland Waters". This environmental factor is defined as:

The occurrence, distribution, connectivity, movement, and quantity (hydrological regimes) of inland water including its chemical, physical, biological and aesthetic characteristics (quality).

The EPA's objective for this factor is:

To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.

7.2 Policy and Guidance

The following EPA policy and guidance have been considered during the preparation of this document:

- Environmental Factor Guidelines – Inland Waters (EPA, 2018)
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2024)

7.3 Receiving Environment

The receiving environment for changes associated with the Project water supply comprises the targeted aquifer units, the Brockman Iron Formation and Paraburdoo Member of the Wittenoom Formation, and potentially the broader regional groundwater system primarily associated with weathered Wittenoom Formation.

Assessment to date indicates there is no apparent interconnection between the groundwater system and surface water features or groundwater dependent vegetation.

7.4 Potential Environmental Impacts

Implementation of this proposal will lower groundwater levels locally and possibly further afield. Based upon the conceptual hydrogeological understanding presented in Section 4, this might impact environmental values associated with the Inland Waters environmental factors for the following:

- Subterranean Fauna - it is possible that the lowering of groundwater levels associated with abstraction might impact the available habitat for subterranean fauna associated with target aquifer units. The saturated thickness of targeted aquifers, and in turn the available habitat, will be reduced within the cone of depression generated by abstraction.
- Other users - abstraction might impact groundwater levels of other users, namely the Hope Downs 4 camp water supply located approximately 7 km from the Project area. The Hope Downs 4 camp water supply is inferred to abstract from the Wittenoom Formation also targeted for the Project water supply.

8. Hydrogeological Change Assessment

8.1 Basis of Assessment

Section 7 describes the mechanisms by which the Proposal might impact environmental values associated with the EPA Inland Waters environmental factor. An analytical assessment was undertaken to assess the ability for identified aquifers to physically meet the Project water demands, and in turn assess the impact abstraction will have on the available saturated thickness of aquifer units, and the potential impact on other identified groundwater users (Hope Downs 4 Camp).

Due to the influence of low permeability units on the distribution and scale of drawdown, an assessment method which allowed for representation of these units was adopted.

8.2 Methodology

A groundwater analytical model was developed by Darkwater using AnAqSim, an analytical element method (AEM) modelling software package, to assess the propagation of drawdown associated with abstraction for the purpose of meeting the Project water supply requirements.

8.2.0 Conceptual Model Representation

The hydrogeological conceptualisation presented in Section 4 of this report was used as the basis for definition of hydrogeological domains and boundary conditions. The model domain and boundaries are shown in Figure 8-1.

The modelled groundwater system is represented as a single layer. Base of aquifer depths are tied to the screened depths of production bores in each of the three areas (Round Hill Main, Wittenoom Formation, Manhattan).

Boundaries between hydrostratigraphic units were derived from a regional geological model constructed in LeapFrog Geo, using the intersection of the geological model with a plane representing the regional groundwater surface.

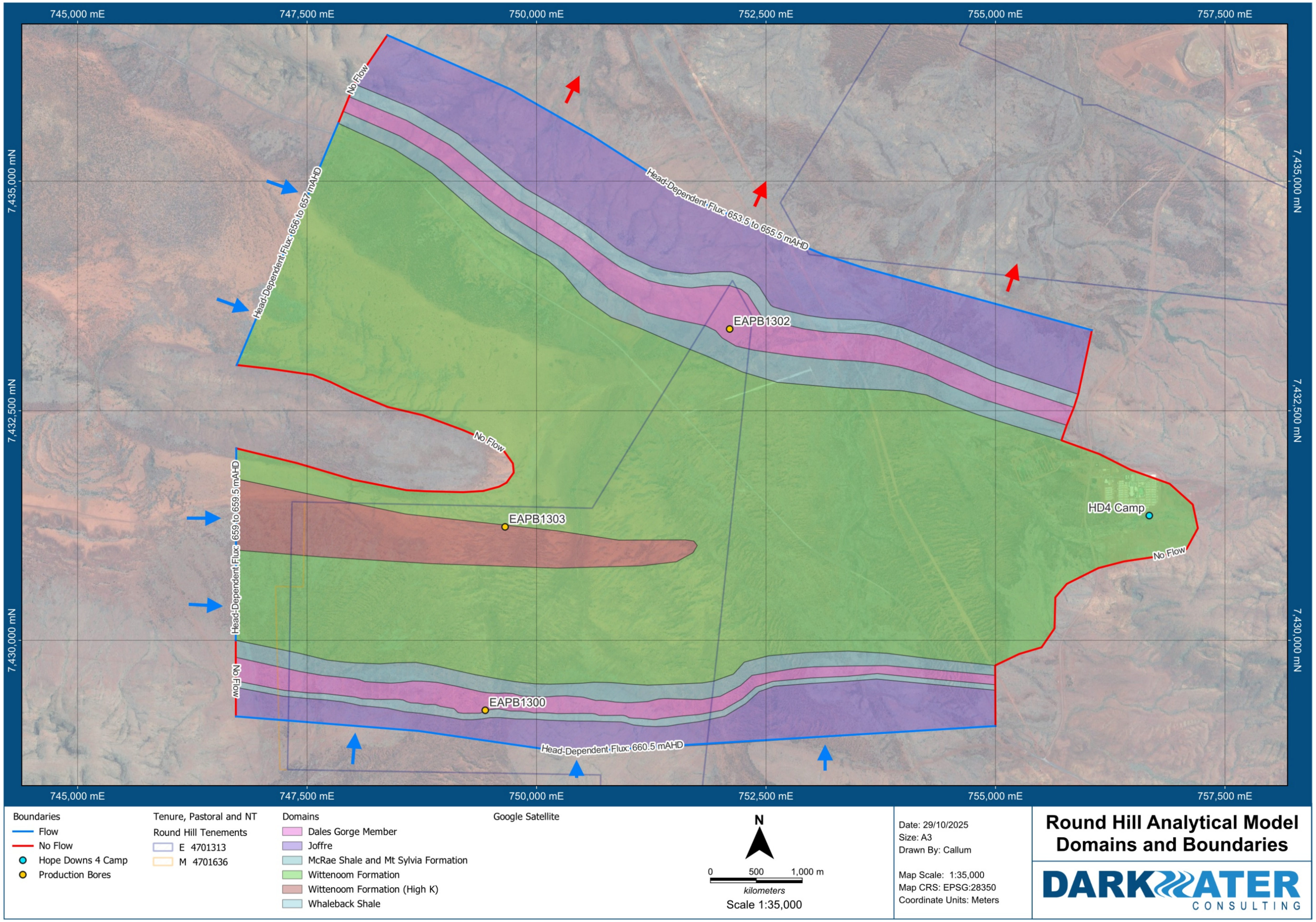


Figure 8-1: Analytical Assessment Model Domains and Boundaries

8.2.1 Groundwater Elevation and Boundary Conditions

Boundary conditions were selected to represent the hydrogeological conceptualisation and replicate observed groundwater measurements and associated flow. Groundwater levels range from 660.5 mAHD within the Joffre Member at the southern boundary of the model, to 653.5 mAHD where the Joffre Member overlaps the Coondiner Creek drainage at the northern boundary of the model. There is additional flow into the model along the western boundaries of Wittenoom Formation.

Head boundary conditions were represented using head-dependent normal flux with reduced conductance across boundaries. This was done to reduce the influence of inflow boundaries on assessed drawdown associated with abstraction. No flow boundaries were used along strike in Brockman Iron Formation units, and along the eastern margin of the Wittenoom Formation, proximal to Hope Downs 4 Camp. This was viewed as conservative and limiting the influence of poorly understood aquifer dynamics outside of the Project area.

Differences in modelled and observed groundwater levels under baseline model conditions are shown in Figure 8-2. The largest differences are associated with observation bores screened in the Wittenoom Formation, north of EAPB1303 (EAPZ0642 and EAPZ0643), and in Round Hill Main orebody piezometers (EAPZ0251). These discrepancies are attributable to heterogeneity present throughout the area which cannot be replicated in a model of this limited complexity.

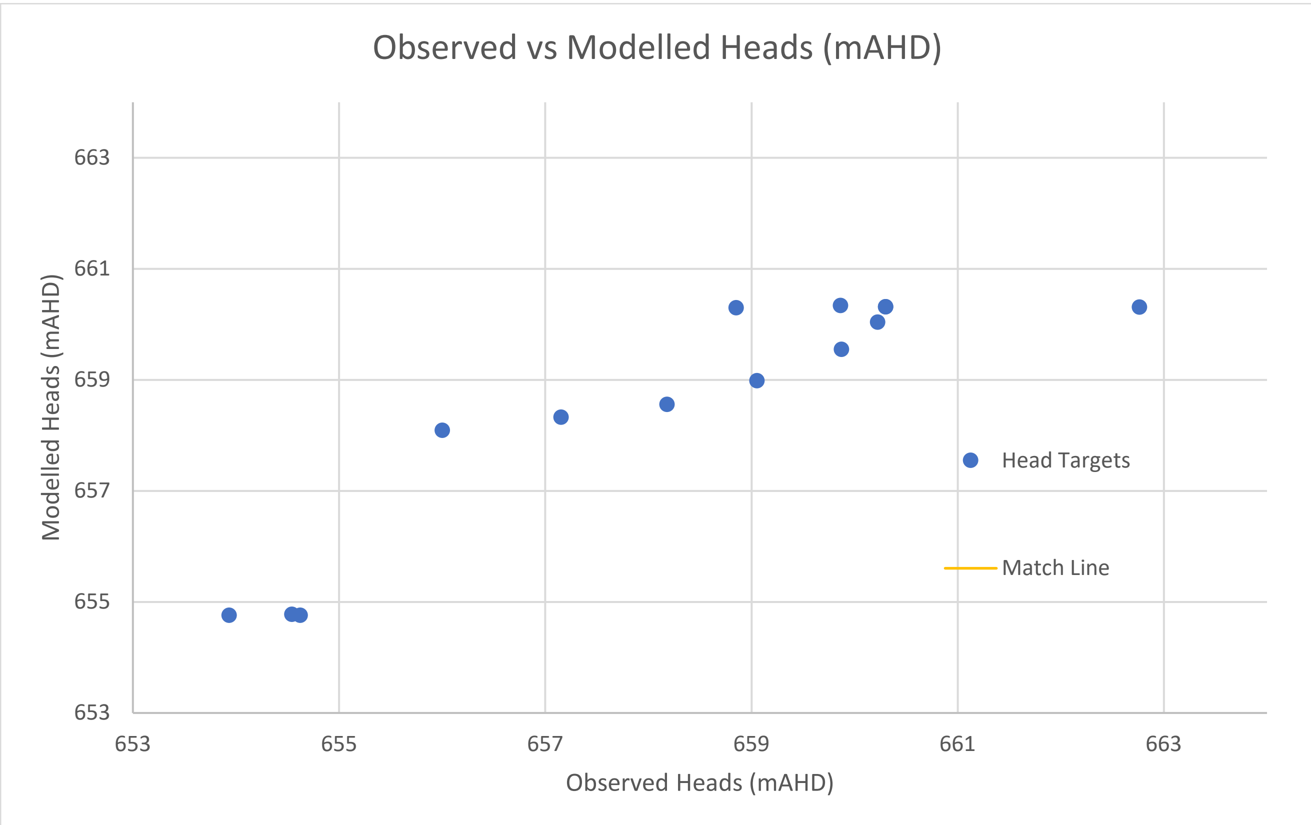


Figure 8-2: Observed vs Modelled Baseline Heads (mAHD)

8.2.2 Aquifer Parameters

Applied aquifer parameters are provided in Table 8-1. Where possible, aquifer parameters were derived through replication of test pumping responses at production bore within the analytical model set-up. Where site-specific aquifer parameters were not available, values derived from testing elsewhere in the Pilbara were applied.

Modelling of test pumping results are shown in Figure 8-3 to Figure 8-5. The trend in modelled drawdown tends to be greater than the observed values, where pumping results indicate large early drawdown, likely associated with well efficiency, and a leveling off in the rate of drawdown soon after, suggesting the modelled drawdowns are conservative in relation to drawdown impact.

Table 8-1: Aquifer Parameters used in Analytical Modelling Exercise.

Unit	Sy	S	K (m/d)	Source
Dales Gorge Member (Round Hill Main)	0.025	5.00E-04	15	EAPB1300 Test Pumping
McRae Shale & Mt Sylvia Formation	0.00001	1.00E-04	0.01	RPS, 2015
Whaleback Shale Member	0.0001	2.00E-04	0.1	RPS, 2015
Joffre Member	0.00003	1.00E-05	0.2	RPS, 2015
Dales Gorge Member (Manhattan)	0.02	4.00E-04	5	EAPB1302 Test Pumping
Wittenoom Formation (Bulk)	0.0002	1.00E-04	0.5	HRPB0002 Test Pumping & Falling Head Testing
Wittenoom Formation (High K Zone)	0.0045	2.68E-04	8	EAPB1303 Test Pumping

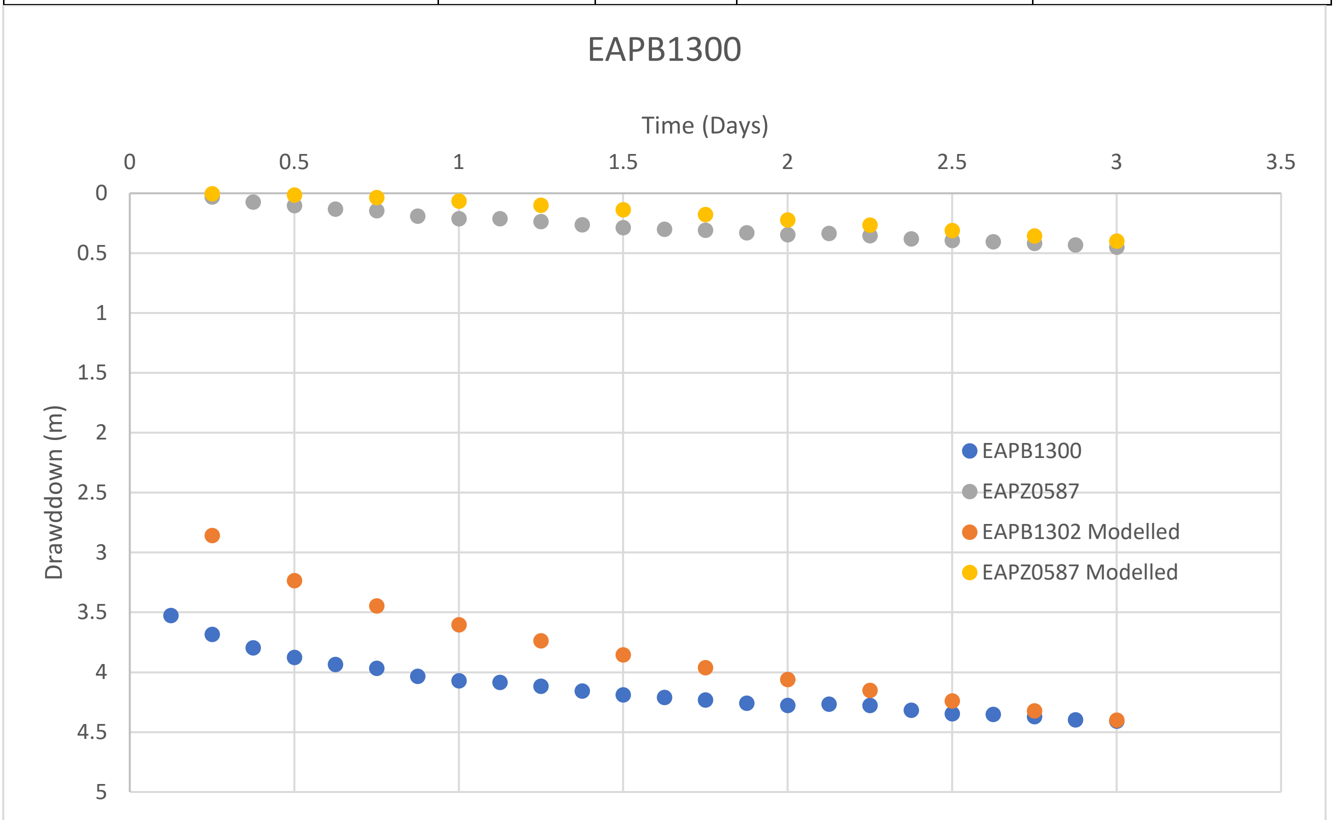


Figure 8-3: Modelled EAPB1300 Test Pumping

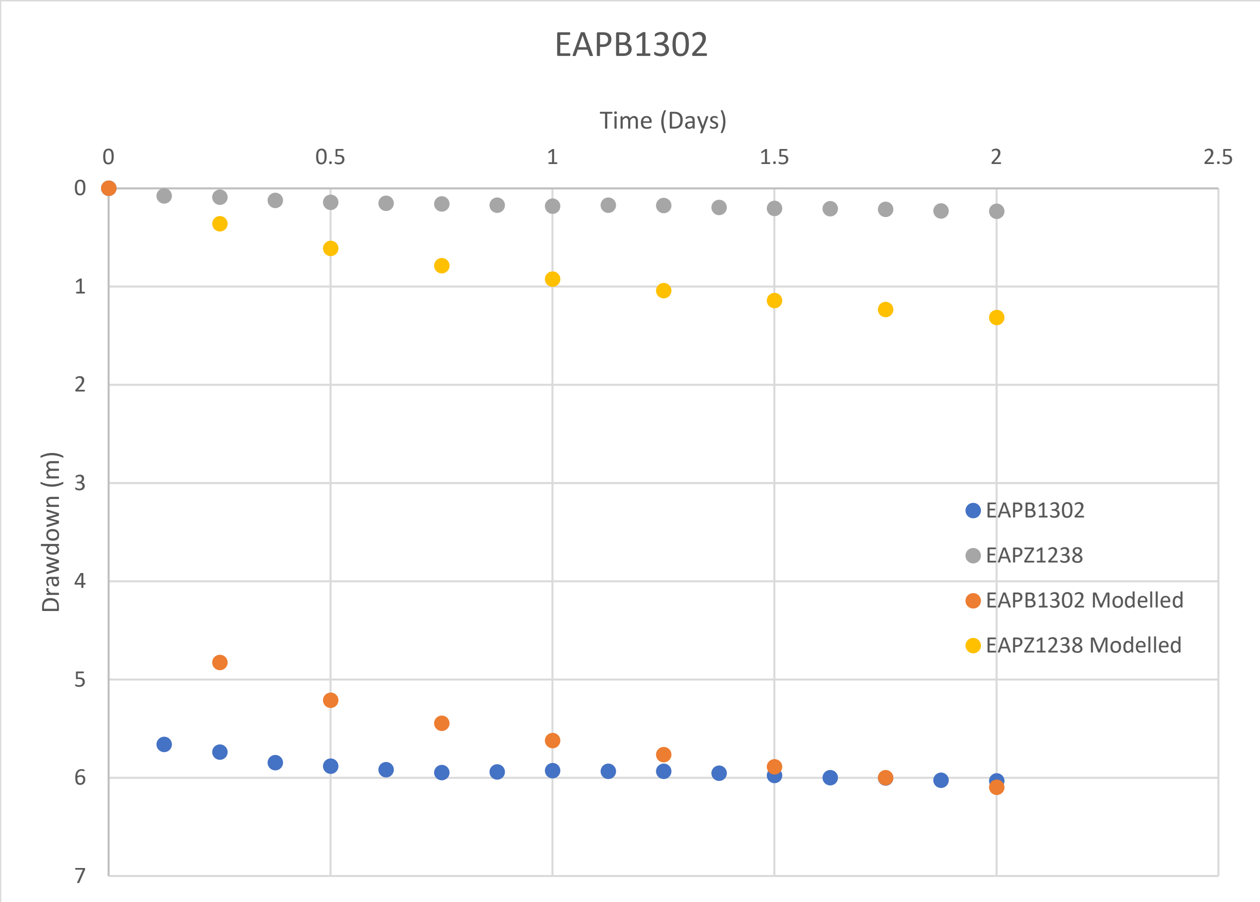


Figure 8-4: Modelled EAPB1302 Test Pumping

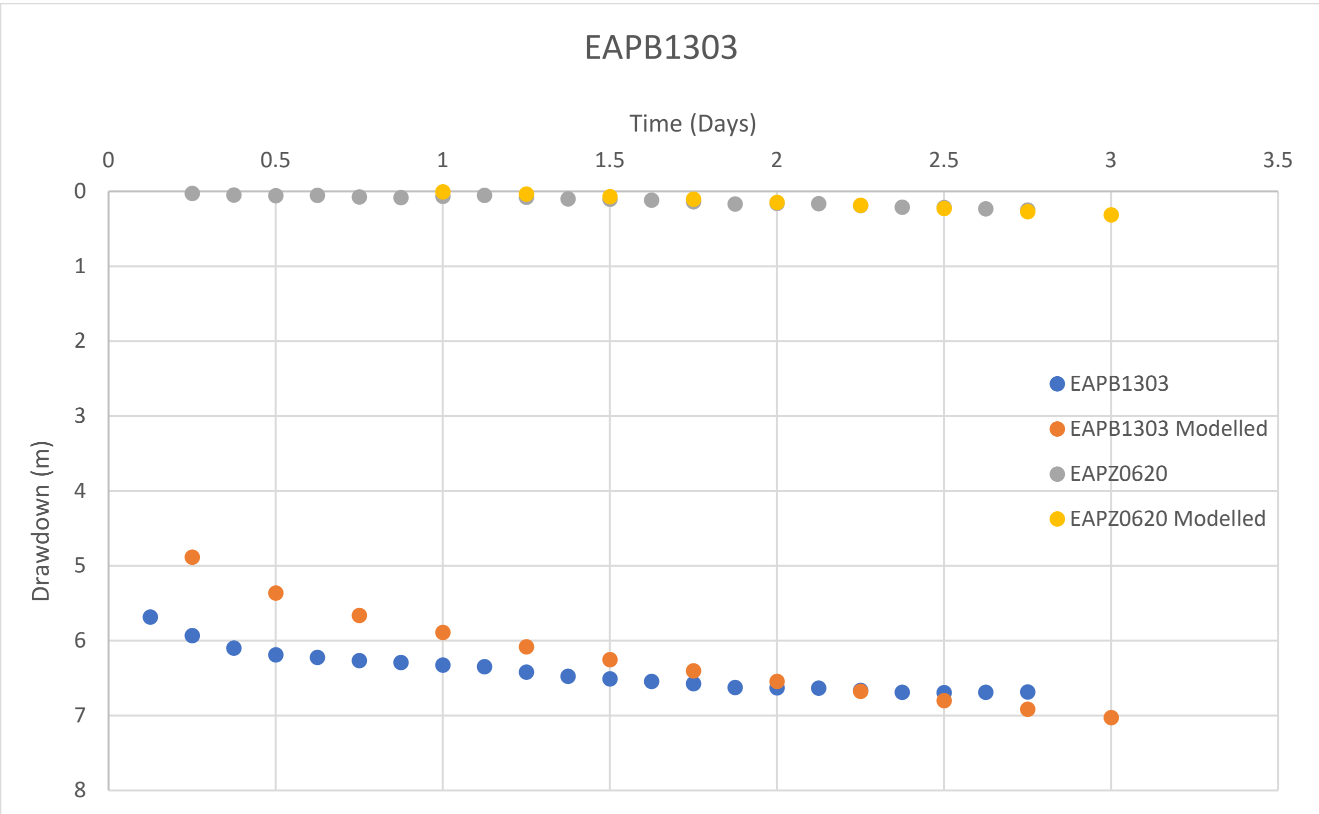


Figure 8-5: Modelled EAPB1303 Test Pumping

8.2.3 Modelled Abstraction

An abstraction rate of 15 L/sec was applied to EAPB1300 and EAPB1303, for a total abstraction rate of 30 L/sec, as per the water supply strategy described in Section 6.2.

This abstraction was maintained for a period of 10 years. While the longest product strategy currently indicates a mine life of 8 years, this longer abstraction period was maintained to account for any potential construction period and associated water supply requirements.

8.3 Potential Operational Impacts

8.3.0 Groundwater Levels

Drawdown contours at the end of the abstraction period (Year 10) are shown in Figure 8-6. Hydrographs showing drawdown at production bores and at Hope Downs 4 Camp are shown in Figure 8-7.

Predictions show that drawdown associated with abstraction from EAPB1300 and EAPB1303 will propagate both along strike within the Brockman Iron Formation and regionally within the Wittenoom Formation. Low permeability units which bound the abstraction areas will constrain impacts to the project area, preventing propagation of drawdown beyond the regional anticline structure.

Model runs predicted a drawdown of approximately 15 m at EAPB1300, and approximately 12.5 m at EAPB1303. Using the installed base of screen depths, this represents a 28% reduction in saturated thickness at EAPB1300, and a 21% reduction in saturated thickness at EAPB1303.

More broadly, drawdown generated in the Dales Gorge Member through abstraction at EAPB1300 equates to a reduction in saturated thickness of approximately 16% across the modelled extent of the unit. Drawdown generated in the Wittenoom Formation through abstraction at EAPB1303 equates to a reduction in saturated thickness of approximately 17% across the modelled extent of the unit. These values assume the base of aquifer is represented by the completed depth of the relevant production bores, which is conservative based upon interpreted depths to weathering in exploration logging.

Construction details registered in the DWER Water Information Reporting database describe the Hope Downs 4 Camp water supply bores as being screened at depths of up to 124 and 130 mbgl, or approximately 590 to 584 mAHD. A predicted 5.5 m drawdown in the Hope Downs 4 Camp area, attributable to Round Hill abstraction, would equate to an approximate 8% reduction in saturated aquifer thickness intersected by these bores.

Based upon these factors, there is a low likelihood of changes to groundwater levels associated with abstraction having a significant impact on regional subterranean fauna habitat and groundwater users.

8.3.1 Groundwater Quality

Based upon groundwater chemistry characterisation, there is limited variability in water quality across the site. Conceptually, there are no identified features which would cause a significant change in groundwater quality resulting from abstraction for water supply purposes. As such, this was not addressed in this analytical assessment.

These assumptions will be validated through regular monitoring of groundwater quality during the operation of the Project water supply to measure and manage any water quality impacts derived from abstraction.

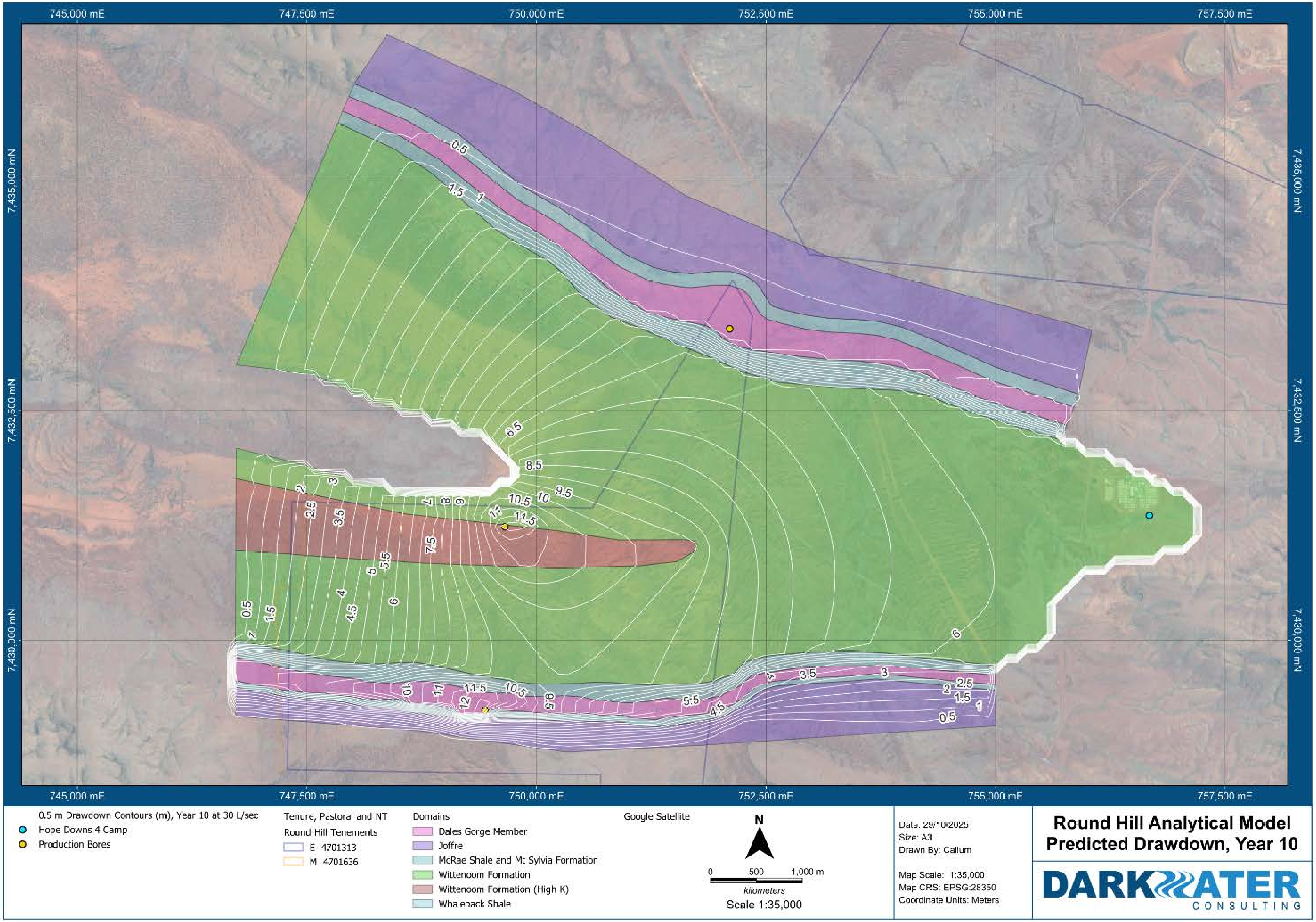


Figure 8-6: Round Hill Analytical Model - Predicted Drawdown, Year 10

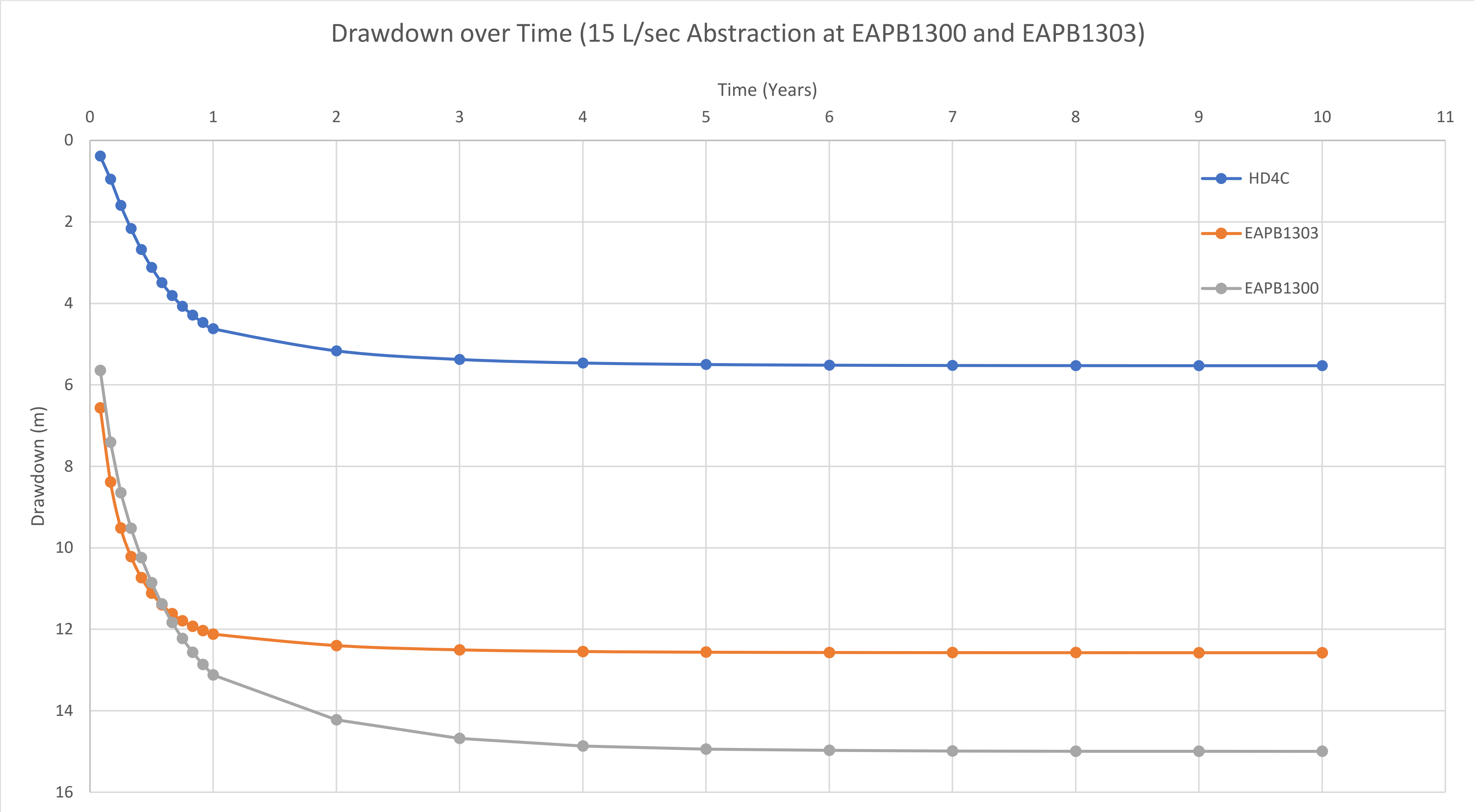


Figure 8-7: Drawdown Hydrographs at Production Bores and Hope Downs 4 Camp Water Supply.

8.4 Model Sensitivity

A number of model runs were performed with changes to model parameters and boundaries in order to assess the influence these changes would have on predicted drawdowns. Where using model parameters, increases and reductions were one order of magnitude. These scenarios and their resultant observed drawdowns are provided in Table 8-2.

The greatest observed model sensitivities were associated with the interaction of drawdown and model boundary conditions. Increases in storage parameters caused a slight reduction in drawdown at Hope Downs 4 Camp. Both increases and decreases in Wittenoom Formation hydraulic conductivity (excluding the high-K domain) reduced modelled drawdown at Hope Downs 4 Camp. This can be attributed to interception of greater throughflow by EAPB1303, and reduced propagation of drawdown towards Hope Downs 4 Camp, under these respective scenarios.

Reduced boundary conductance caused greater observed drawdowns at all sites due to reduced capacity for groundwater to enter the model domain.

Inclusion of hydraulic continuity along the Brockman Iron Formation via opening of boundary conditions along strike reduced observed drawdown at EAPB1300 and at Hope Downs 4 Camp. Modelling of continuity along strike results in reduced drawdown in the Dales Gorge Member, which in turn reduces propagation of drawdown into other Brockman Formation units, and into the Wittenoom Formation.

Inclusion of regional throughflow along the eastern margin of the model effectively eliminates the impact of drawdown at Hope Downs 4 Camp. While this is likely influenced by the proximity of the camp to this model boundary, it is conceptually expected that there is some component of recharge or throughflow not fully represented in the south-eastern boundary of the Wittenoom Formation.

Table 8-2: Analytical Assessment Sensitivity Runs and Resultant Change in Modelled Drawdown

Run Description	Observed Drawdown at Year 10 (m)			Difference to Base Case (m)		
	EAPB1300	EAPB1303	Hope Downs 4 Camp	EAPB1300	EAPB1303	Hope Downs 4 Camp
Base case	15.00	12.58	5.53	-	-	-
Wittenoom Formation - Higher S, Sy	14.99	12.53	5.32	0.01	0.05	0.21
Wittenoom Formation - Lower S, Sy	15.00	12.58	5.53	0.00	0.00	0.00
Wittenoom Formation - Higher K	14.45	5.54	2.63	0.54	7.03	2.90
Wittenoom Formation - Lower K	15.03	16.35	3.08	-0.03	-3.77	2.45
Boundaries - Higher Conductance	14.94	12.40	5.45	0.06	0.18	0.08
Boundaries - Lower Conductance	15.56	14.01	6.16	-0.56	-1.43	-0.63
Boundaries - Open Brockman Iron Formation	11.78	12.26	4.79	3.22	0.32	0.74
Boundaries - Open East Wittenoom Boundary	14.89	12.06	0.38	0.11	0.51	5.16

8.5 Risk Assessment

Assessment of various risks to the Project water supply are summarised in Table 8-3.

Residual risks to the Project water supply security, and the associated scale of impacts, relate to the lateral extent of higher permeability conditions as measured in the hydraulic testing of the proposed water supply bores. This is addressed in this analytical assessment by applied variation in hydraulic parameters, domain geometry, and the defined hydraulic boundaries.

Within the Round Hill Main orebody aquifer, applied hydraulic parameters were derived from test pumping of unmineralised Dales Gorge Member. These values are higher than regionally observed, potentially indicating extensive secondary permeability introduced by both weathering and mineralisation throughout the Dales Gorge Member within the orebody area. However, this degree of weathering may not be extensive along strike, reducing the overall sustainability of longer-term abstraction from this unit.

Within the Wittenoom Formation, higher permeability units intersected by EAPB1303 are interpreted to be weathered dolomite of the Paraburdoo member. Based upon geological understanding of the region, these dolomitic beds are likely to be laterally continuous despite not being modelled as such within the model domain. However, continuity of the extensive weathering observed within the Project area is not confirmed outside of the Project footprint.

Efforts have been made to address these risks in this analytical assessment exercise through:

- Testing of a conservatively high water supply rate inclusive of a 30% buffer;
- Testing of a longer water supply period, a nominal 10-year period in comparison to the up to 8-year production based upon provided product strategies;
- Application of no-flow boundaries along strike within the Brockman Iron Formation hydrostratigraphic units; and
- A lack of Paraburdoo Member continuity east of Round Hill tenure.

Under these conditions, there still remains significant intervals of saturated aquifer thickness within aquifer units intersected by the proposed water supply bores.

These risks are to be addressed in the Groundwater Operating Strategy framework, through continued monitoring of drawdown and continued interpretation of the aquifer response for the duration of operation. The distribution of abstraction between sites, and the incorporation of contingency water supply sites, will also be regularly assessed to manage groundwater impacts.

Table 8-3: Round Hill Groundwater Risk Assessment Summary

Risk Component	Description	Risk Rating	Risk Treatments
Groundwater Dependent Vegetation	• No groundwater dependent vegetation is identified within the domain of predicted groundwater impacts • Observed depths to groundwater (60 to 27 mbgl) support a lack of interaction between groundwater and vegetation	N/A	N/A
Surface Expression of Groundwater (e.g., Pools)	• No permanent/semi-permanent surface water features are identified within the domain of predicted groundwater impacts • Observed depths to groundwater (60 to 27 mbgl) support a lack of interaction between regional groundwater system and any surface features	N/A	N/A
Subterranean Fauna	• Groundwater level reductions resulting from Project abstraction will reduce the saturated thickness of units which support subterranean fauna communities (stygofauna) • Subterranean fauna characterisation studies indicate these species are likely continuous along strike within targeted hydrostratigraphic units • Predicted drawdowns in hydrostratigraphic units equates to a nominal 16 to 17% reduction in saturated thickness within analytical model bounds • Water levels predicted to recover within time-frame equivalent to project life post-mining	Low	• Application of conservative approach to impact assessment • Continued monitoring of groundwater levels and quality, and comparison to predicted impacts • Adaptive management of abstraction network to mitigate impacts where necessary
Other Users	• Groundwater level reductions resulting from Project abstraction will reduce the saturated thickness of units which are targeted by Hope Downs 4 Camp abstraction • Predicted impacts represent an approximate 8% reduction in saturated thickness in Hope Downs 4 Camp abstraction bores, based upon available bore construction information	Low	• Application of conservative approach to impact assessment • Continued monitoring of groundwater levels and comparison to predicted impacts • Adaptive management of abstraction network to mitigate impacts where necessary
Water Supply Continuity	• Assessment of project water supply sustainability is based upon testing of production bores and the hydrogeological conceptualisation of the groundwater system • Continuity of tested hydraulic parameters along strike has resultant impact on scale of drawdown and potential contingency measures • Limited drawdown estimated relative to total saturated aquifer thickness	Low	• Application of conservative approach to impact assessment • Continued monitoring of groundwater levels and comparison to predicted aquifer response • Adaptive management of abstraction network to ensure continuity of water supply
Cumulative Impacts	• Based on available information, the proposed Round Hill abstraction represents a 4% increase in total licenced abstraction, which is negligible in the regional catchment context • The geological stratigraphy and structures within the region limit interaction between the proposed Round Hill abstraction and third-party abstraction	Low	• Application of conservative approach to impact assessment • Continued monitoring of groundwater levels and comparison to predicted aquifer response • Adaptive management of abstraction network to ensure continuity of water supply

8.6 Post Abstraction Groundwater Recovery

A range of methods were applied to frame the magnitude of abstraction relative to regional recharge, and to estimate the length of time required for groundwater levels to recover upon cessation of abstraction.

The proposed abstraction rate (0.95 GL/a) falls within the range of estimated recharge over the immediate Project catchment (0.6 to 1.2 GL/a). The internally draining catchment located west of Round Hill Main represents an additional source of recharge to the local groundwater system at a similar or greater magnitude to recharge within the Project domain (i.e., a further 0.6 to 1.2 GL/a of recharge). The total proposed abstraction (9.5 GL, as 0.95 GL/a over a period of 10 years) is equivalent to 4-to-8 years of recharge over areas which contribute groundwater to the Project domain.

The analytical model constructed to assess drawdown was also used to assess the rate of groundwater recovery, with results shown in Figure 8-8. Groundwater levels in abstraction bores recovered to within baseline levels in a similar timescale to the length of proposed abstraction i.e., within a 10-year period.

Conceptualisation of recovery times are also supported by available test pumping data, with all tested bores being observed to recover to within 90% of pre-testing groundwater levels in less than 24-hours after cessation of pumping.

In conclusion, the proposed abstraction is deemed to be sustainable based upon the volume of abstraction relative to groundwater recharge. It is anticipated that the groundwater system will recover from abstraction within a similar timeframe to the length of proposed abstraction i.e., within 10-years post-abstraction.

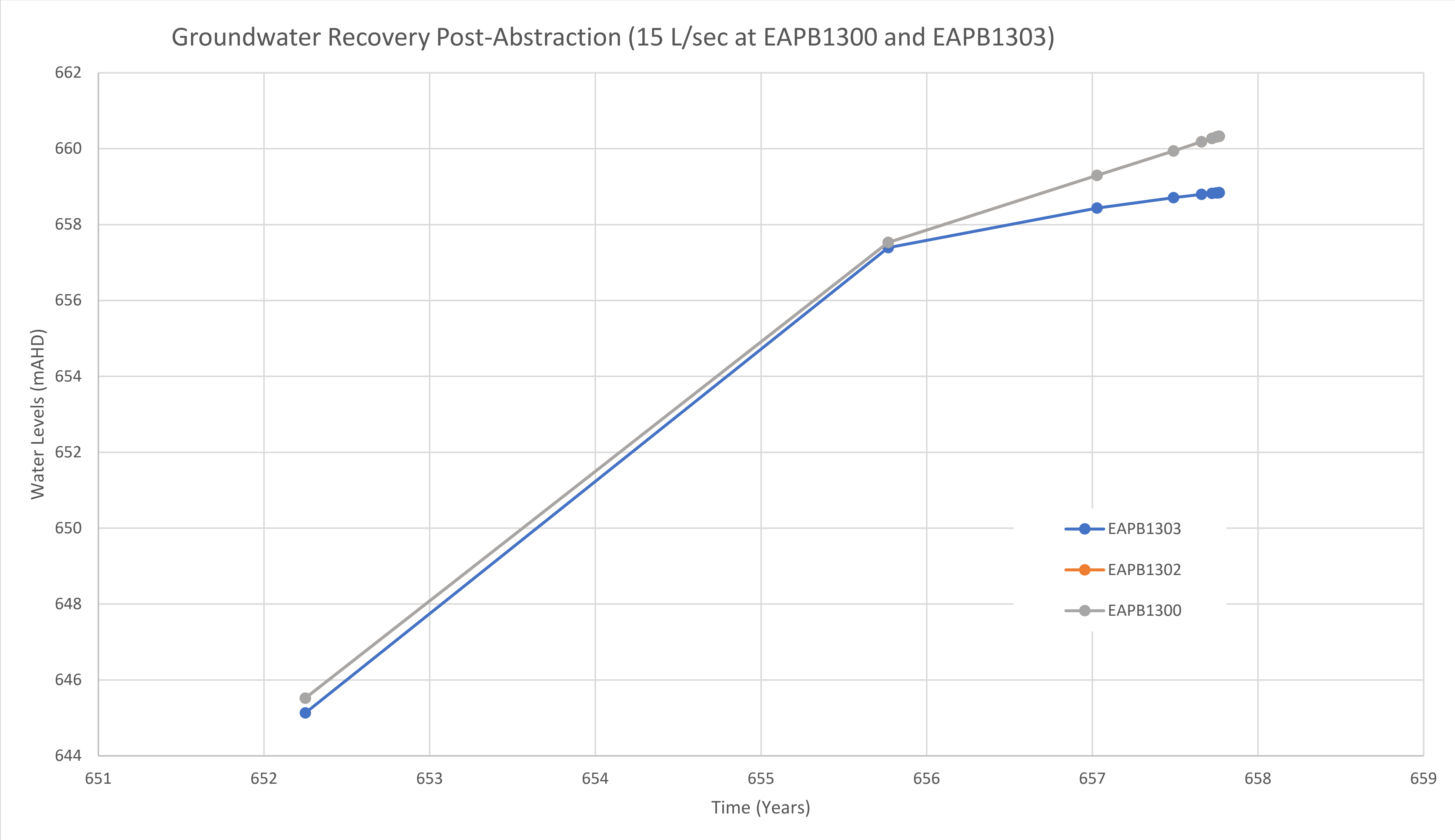


Figure 8-8: Analytical Assessment Groundwater Recovery Post-Abstraction

9. Groundwater Operating Strategy Framework

This section describes a generalised groundwater operating strategy (GWOS) framework for the Project. This framework will be described in greater detail during application for 5C groundwater licenses. The GWOS will be prepared in accordance with the DWER policy for use of operating strategies in the water licensing process (DWER, 2020).

The GWOS may also need to address other aspects of the Project water supply, such as incorporation of waste through the RO reject stream into dust suppression feed waters.

9.1 Water Supply Sites & Hierarchy

Proposed water supply sites and the associated hierarchy are previously described in Section 6.2, and details are provided in Table 6-2. It is proposed that the two near-mine abstraction bores, EAPB1300 and EAPB1303, are used as the primary water supply sites due to their proximity to the Round Hill Main footprint, and the ability to monitor drawdown within the Project tenure. Abstraction bore EAPB1302 will be maintained as a contingency water supply to allow for operational flexibility in meeting the water supply management outcomes.

While it is anticipated that sites will operate at between 10 and 15 L/sec, all abstraction bores are proposed to be equipped to operate at a maximum abstraction rate of 20 L/sec. This will allow for redistribution of abstraction when required to meet operational and environmental management outcomes.

9.2 Proposed Monitoring Sites

Proposed monitoring sites are listed in Table 9-1. The location of these sites relative to water supply sites and the proposed Project footprint are shown in Figure 9-1. Proposed locations are preliminary and may be revised to minimise interaction with the proposed Project footprint or to incorporate improved hydrogeological understanding.

The purpose of the proposed monitoring network is to:

- Measure drawdown associated with abstraction bores, in order to assess impacts to groundwater levels and validate predictions;
- Assess aquifer performance and improve understanding of aquifer units, allowing for borefield optimization and assess requirements for contingency measures; and
- Regularly monitor groundwater quality to identify any water quality changes attributable to abstraction.

Where possible, existing monitoring infrastructure has been incorporated into the monitoring network. However, overlapping of some existing infrastructure with the proposed Project footprint will require establishment of new monitoring sites.

Proposed monitoring activities will involve:

- Regular monitoring of bore abstraction rates, field water level measurements and field water quality parameters;
- Regular collection of field water levels at monitoring bores;
- Continuous monitoring of groundwater levels in all sites using pressure transducers; and
- Regular collection of water samples at all sites for laboratory analysis.

Table 9-1: Round Hill Proposed Monitoring Network

Associated Production Bore	Bore ID	mE	mN	Status	Targeted Unit	Purpose
EAPB1300	EAMB0001	747224	7429581	Proposed	Dales Gorge (Brockman Iron Formation)	Monitoring along strike of EAPB1300, Tenement boundary monitoring
	EAMB0002	751879	7429295	Proposed	Dales Gorge (Brockman Iron Formation)	Monitoring along strike of EAPB1300, Tenement boundary monitoring
EAPB1303	EAPZ0620	748800	7431170	Existing	Paraburdoo Member (Wittenoom Formation)	Monitoring along strike of EAPB1303
	EAPZ0641	751197	7431198	Existing	Bee Gorge Member (Wittenoom Formation	Monitoring along strike of EAPB1303
	EAMB0003	747388	7431254	Proposed	Paraburdoo Member (Wittenoom Formation)	Monitoring along strike of EAPB1303, Tenement boundary monitoring
	EAMB0004	751937	7430999	Proposed	Paraburdoo Member (Wittenoom Formation)	Monitoring along strike of EAPB1303, Tenement boundary monitoring
EAPB1302	EAPZ1247	752297	7433500	Existing	Dales Gorge (Brockman Iron Formation)	Monitoring along strike of EAPB1302
	EAMB0005	752115	7432776	Proposed	Bee Gorge Member (Wittenoom Formation	Monitoring of any drawdown propagation associated with EAPB1302

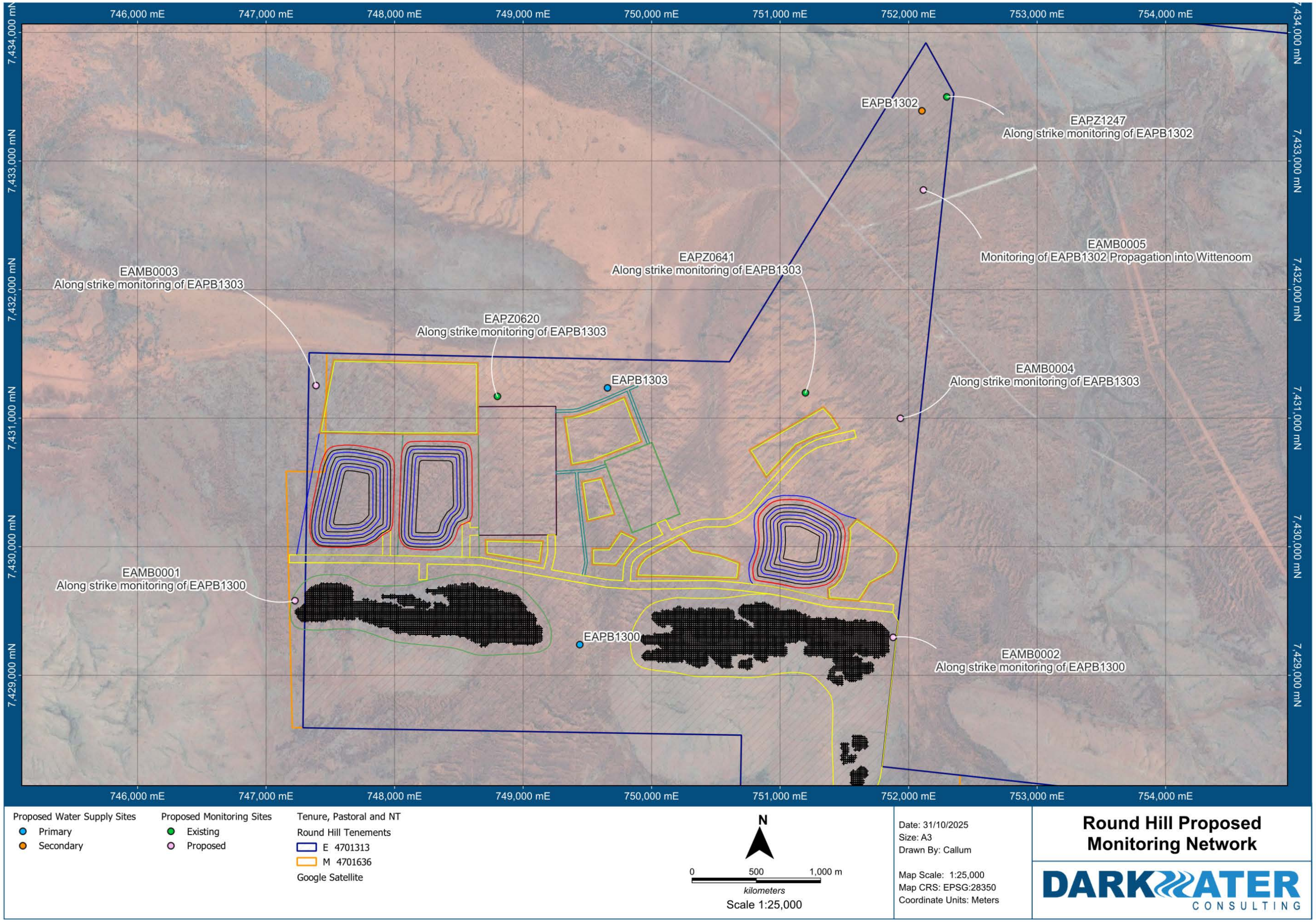


Figure 9-1: Round Hill Proposed Monitoring Network

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Appendix A: Round Hill Hydraulic Testing & Groundwater Monitoring Report (AQ2, 2024)

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Memo

To	Bobak Willis-Jones & Luke Dunn	Company	HanRoy Iron Ore Projects Pty Ltd
From	Gareth Lottreaux	Job No.	575B
Date	3rd December 2024	Doc No.	008c
Subject	Round Hill Hydraulic Testing & Groundwater Monitoring Report		

1. INTRODUCTION

AQ2 was contracted by HanRoy on behalf of Hancock Prospecting (HPPL) to undertake hydraulic testing and baseline groundwater monitoring on their proposed Round Hill Iron Ore mining project in support of the on-going order of magnitude and environmental impact assessment projects. The project is located approximately 30 km northwest of Newman 10 km southwest of Hope Downs 4 Mine in Western Australia (Figure 1). The groundwater sampling and hydraulic testing fieldwork program was undertaken from the 29th of October 2024 to the 3rd of November 2024.

2. GROUNDWATER SAMPLING

A groundwater monitoring network has been installed across the project site, with 10 monitoring bores installed in the ore body area, and a further 6 monitoring bores installed in the northern sterilisation area. Additionally, a historic production bore (HRPB002) has been located in the northern sterilisation area and has been included in the study. The bore details are provided in Table 1, and their locations are shown in Figure 4.

Hydrasleeves were installed in the screened sections of all monitoring bores and the production bore in order to collect groundwater samples and establish baseline groundwater quality conditions. The hydrasleeves were left in the bores for a minimum of 24 hours prior to retrieval. In addition to the monitoring and production bores, a sample was collected from the exploration supply bore (HRWB0001) being used to provide water to the current drilling operations. The supply bore sample was collected from the storage tanks. As the sampling of HRPB0002 and HRWB0001 were not part of the original scope of work, specific sample bottles for nitrate, nitrite and phosphorus analyses were not available, and as a result these analytes were not included for those samples. Duplicate samples were collected at the following bores for QA/QC purposes:

- PR1465 — Duplicate 1.
- PR0982 — Duplicate 2.
- PR1441 — Duplicate 3.
- PR1219 — Duplicate 4.

Expanded Durov plots were drawn for the ore body and northern sterilisation areas in order to classify the water type(s) in the study area. The majority of samples plot in area 2, indicating bicarbonate- and magnesium-dominated waters, typical of dolomitic areas. The only exception to is EARC0607 (PR0985), which plots in area 8, indicating chloride dominant water. The expanded Durov plots are shown in Figure 2 and Figure 3.

Samples were collected in laboratory supplied containers and were sent to SGS in Perth for analysis. The results are presented in Table 2, and the laboratory analysis certificate and chain of custody form are attached in Appendix A.

Hydrasleeves were re-installed in all monitoring bores after completion of the hydraulic testing to facilitate sampling on future monitoring programs. No hydrasleeve was installed in HRPB0002, as HPPL have scheduled a pumping test to be conducted in that bore.

3. GROUNDWATER LEVELS

Groundwater levels were measured using a water level dipper prior to installation of the hydrasleeves. Groundwater levels range from approximately 60 metres below ground level (≈662 mRL) in the southern (ore body area) portion of the project, to approximately 30 metres below ground level (≈656 mRL), in the northern (northern sterilisation area) portion, with groundwater flow from southwest to northeast, predominantly following surface topography and drainage patterns. The hydraulic gradient is relatively gentle, with the groundwater level dropping approximately 6 metres over 3 km across the project area. The groundwater levels and flow directions are shown in Figure 5.

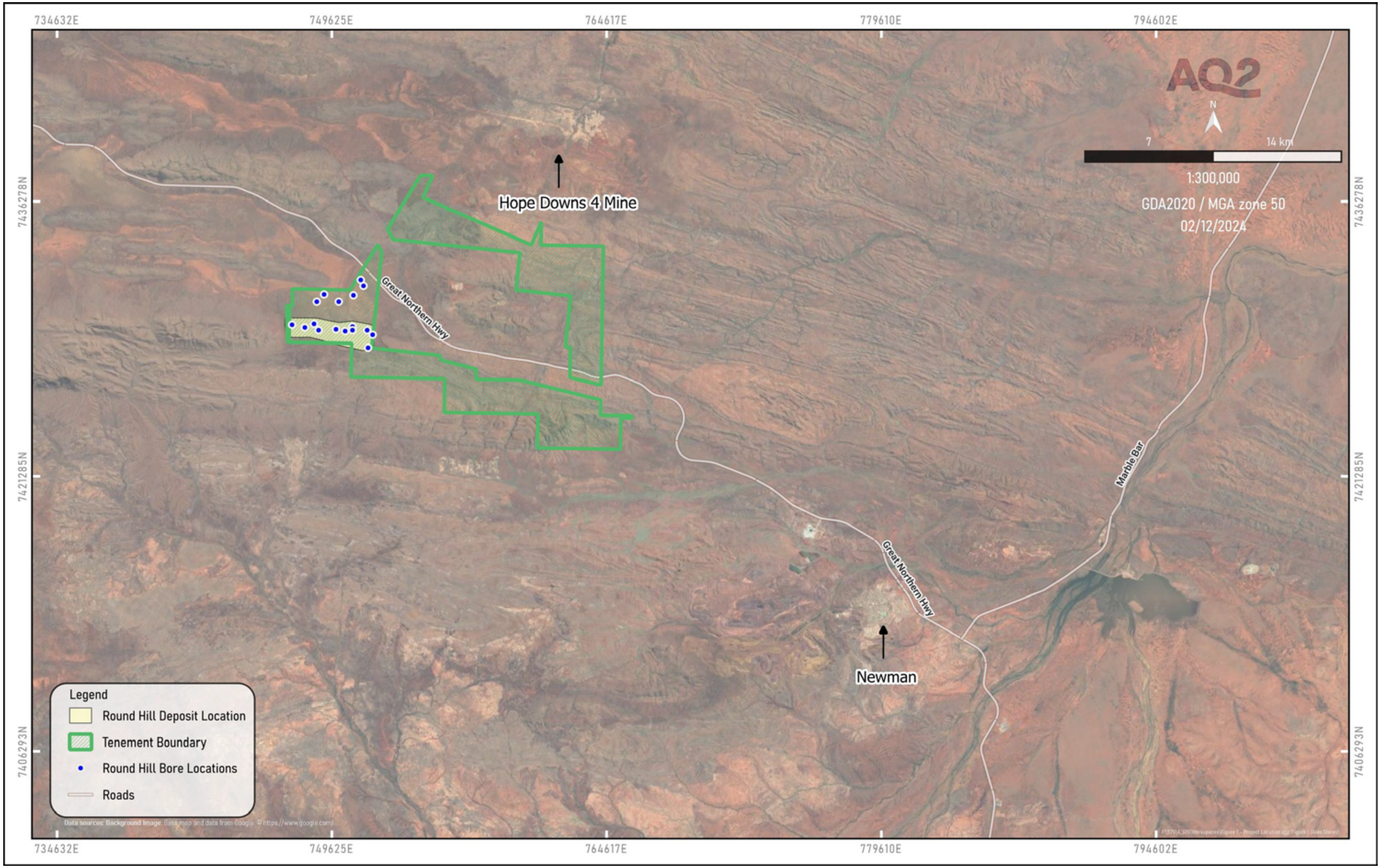
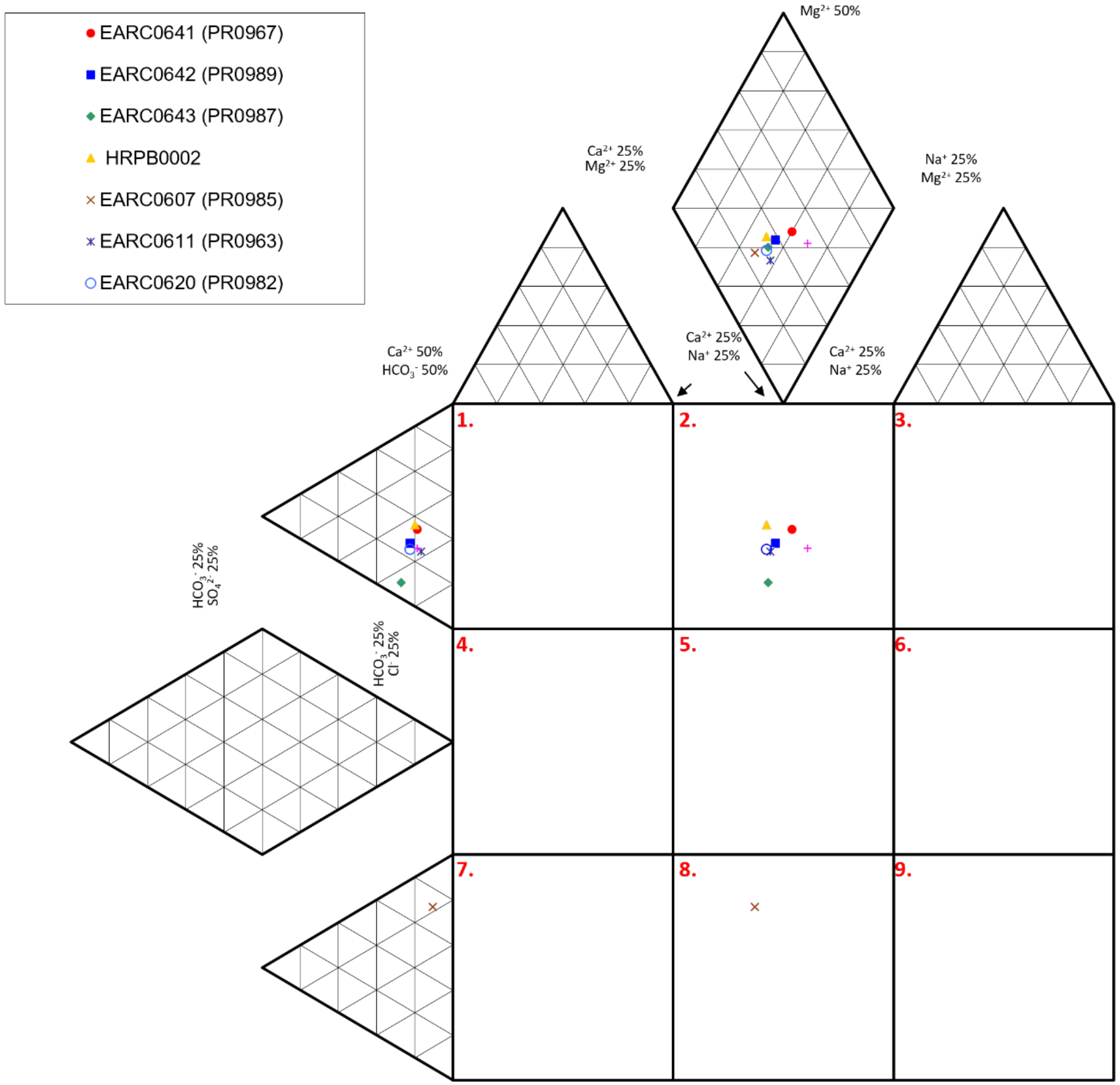


Figure 1 Regional Setting

Table 1 Round Hill Monitoring Bores

Area	Hole ID	Planned ID	Type	[1]Easting	[1]Northing	Elevation (mRL)	Stick up (magl)	SWL (mbgl)	SWL (mRL)	Depth (mbgl)	Screened Interval (mbgl)	Hydrasleeve install depth (mbgl)
Ore Body	EARC0412	PR1004	Piezometer	751599.13	7428303.02	718.74	0.45	56.67	662.07	82	64 - 88	76
	EARC0587	PR1219	Piezometer	749848.09	7429299.48	697.57	0.78	37.43	660.14	70	40 - 70	55
	EARC0251	PR1225	Piezometer	[2]750350.00	[2]7429200.00	722.3	0.60	59.67	662.63	88	64 - 82	73
	EARC0300	PR1292	Piezometer	750748.84	7429447.76	701.36	0.41	41.26	660.10	72	42 - 72	57
	EARC0296	PR1293	Piezometer	[2]750750.00	[2]7429250.00	712.25	0.79	53.58	658.67	102	58 - 94	76
	EARC0745	PR1441	Piezometer	748650.16	7429602.24	704.34	0.69	44.23	660.11	70	46 - 58	52
	EARC0517	PR1465	Piezometer	[2]748150.00	[2]7429400.00	706.07	0.80	45.33	660.74	78	46 - 76	61
	EARC0406	PR1544	Piezometer	751547.82	7429249.97	698.93	0.84	39.03	659.90	118	46 - 118	82
	EARC0471	PR1583	Piezometer	[2]747450.00	[2]7429550.00	706.23	0.81	46.02	660.21	72	48 - 72	60
	EARC0458	PR1612	Piezometer	751844.48	7429001.88	700.96	0.76	40.99	659.97	100	46 - 100	73
Northern Sterilisation	HRPB0002	-	Bore	751350.00	7431674.00	687.20	0.47	30.30	656.90	72	48 - 72	60
	EARC0611	PR0963	Piezometer	747996.20	7431199.04	690.01	0.81	31.09	658.92	70	46 - 70	58
	EARC0641	PR0967	Piezometer	751197.41	7431197.81	688.63	0.67	30.57	658.06	120	36 - 120	78
	EARC0620	PR0982	Piezometer	748800.12	7431170.08	688.65	0.86	29.91	658.74	76	34 - 76	55
	EARC0607	PR0985	Piezometer	747597.99	7430399.80	698.12	0.88	39.23	658.89	70	46 - 70	58
	EARC0643	PR0987	Piezometer	751201.00	7432034.06	685.84	0.91	30.19	655.65	88	40 - 88	64
	EARC0642	PR0989	Piezometer	751192.89	7431597.07	687.23	1.00	30.45	656.78	114	48 - 114	81

[1] Coordinate System = MGA94 Zone 50, mbgl = Meters Below Ground Level, magl = Meters Above Ground Level, SWL = Static Water Level
[2] Planned coordinates (bore collar surveys pending)



1. HCO_3^- and Ca^{2+} dominant, frequently indicates recharging waters in limestone, sandstone and many other aquifers.

2. HCO_3^- dominant and eight Mg^{2+} dominant or cations indiscriminant, with Mg^{2+} dominant or Ca^{2+} and Mg^{2+} important, indicates waters often associated with dolomites; where Ca^{2+} and Na^+ are important partial ion exchange may be indicated.

3. HCO_3^- and Na^+ dominant, normally indicates ion-exchanged waters although the generation of CO_2 at depth can produce HCO_3^- where Na^+ is dominant under certain circumstances.

4. SO_4^{2-} dominant or anions indiscriminant and Ca^{2+} dominant, Ca^{2+} and SO_4^{2-} dominant frequently indicates a recharge water in lavas and gypiferous deposits; otherwise a mixed water or a water exhibiting simple dissolution may be indicated.

5. No dominant anion or cation, indicates waters exhibiting simple dissolution or mixing.

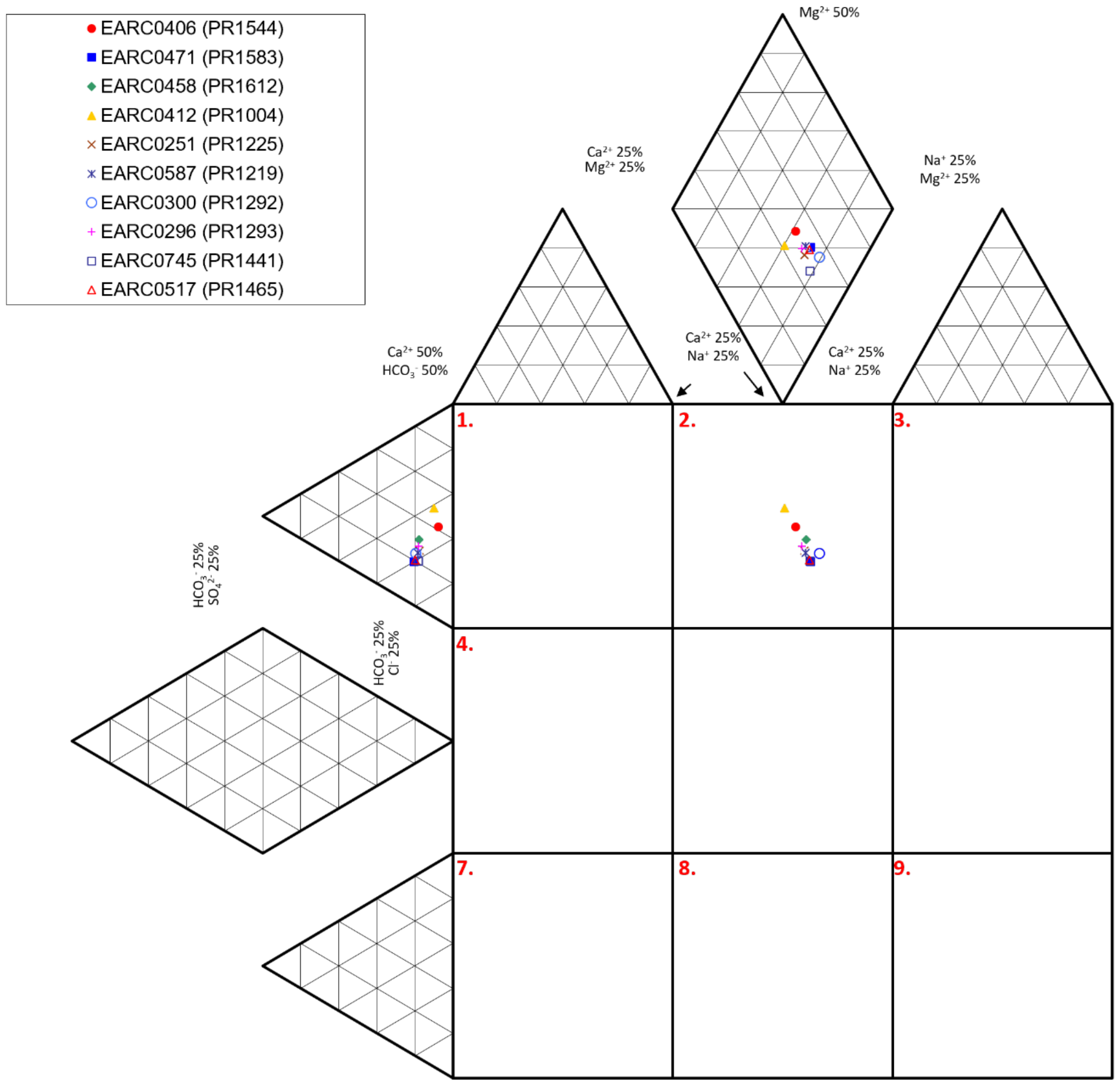
6. SO_4^{2-} dominant or anions indiscriminant and Na^+ dominant, is a water type not frequently encountered and indicates probable mixing influences.

7. Cl^- and Ca^{2+} dominant, is infrequently encountered unless cement pollution is present in a well; otherwise the waters may result from reverse ion exchange of Na^+ - Cl^- waters.

8. Cl^- dominant and no dominant cation indicates that the groundwaters may be related to reverse ion exchange of Na^+ - Cl^- waters.

9. Cl^- and Na^+ dominant frequently indicates end-point waters. The Durov diagram does not permit much distinction between Na^+ - Cl^- waters.

Figure 2 Expanded Durov Diagram – Northern Sterilisation Area



1. HCO_3^- and Ca^{2+} dominant, frequently indicates recharging waters in limestone, sandstone and many other aquifers.

2. HCO_3^- dominant and eight Mg^{2+} dominant or cations indiscriminant, with Mg^{2+} dominant or Ca^{2+} and Mg^{2+} important, indicates waters often associated with dolomites; where Ca^{2+} and Na^{+} are important partial ion exchange may be indicated.

3. HCO_3^- and Na^{+} dominant, normally indicates ion-exchanged waters although the generation of CO_2 at depth can produce HCO_3^- where Na^{+} is dominant under certain circumstances.

4. SO_4^{2-} dominant or anions indiscriminant and Ca^{2+} dominant, Ca^{2+} and SO_4^{2-} dominant frequently indicates a recharge water in lavas and gypiferous deposits; otherwise a mixed water or a water exhibiting simple dissolution may be indicated.

5. No dominant anion or cation, indicates waters exhibiting simple dissolution or mixing.

6. SO_4^{2-} dominant or anions indiscriminant and Na^{+} dominant, is a water type not frequently encountered and indicates probable mixing influences.

7. Cl^- and Ca^{2+} dominant, is infrequently encountered unless cement pollution is present in a well; otherwise the waters may result from reverse ion exchange of Na^{+} - Cl^- waters.

8. Cl^- dominant and no dominant cation indicates that the groundwaters may be related to reverse ion exchange of Na^{+} - Cl^- waters.

9. Cl^- and Na^{+} dominant frequently indicates end-point waters. The Durov diagram does not permit much distinction between Na^{+} - Cl^- waters.

Figure 3 Expanded Durov Diagram – Ore Body Area

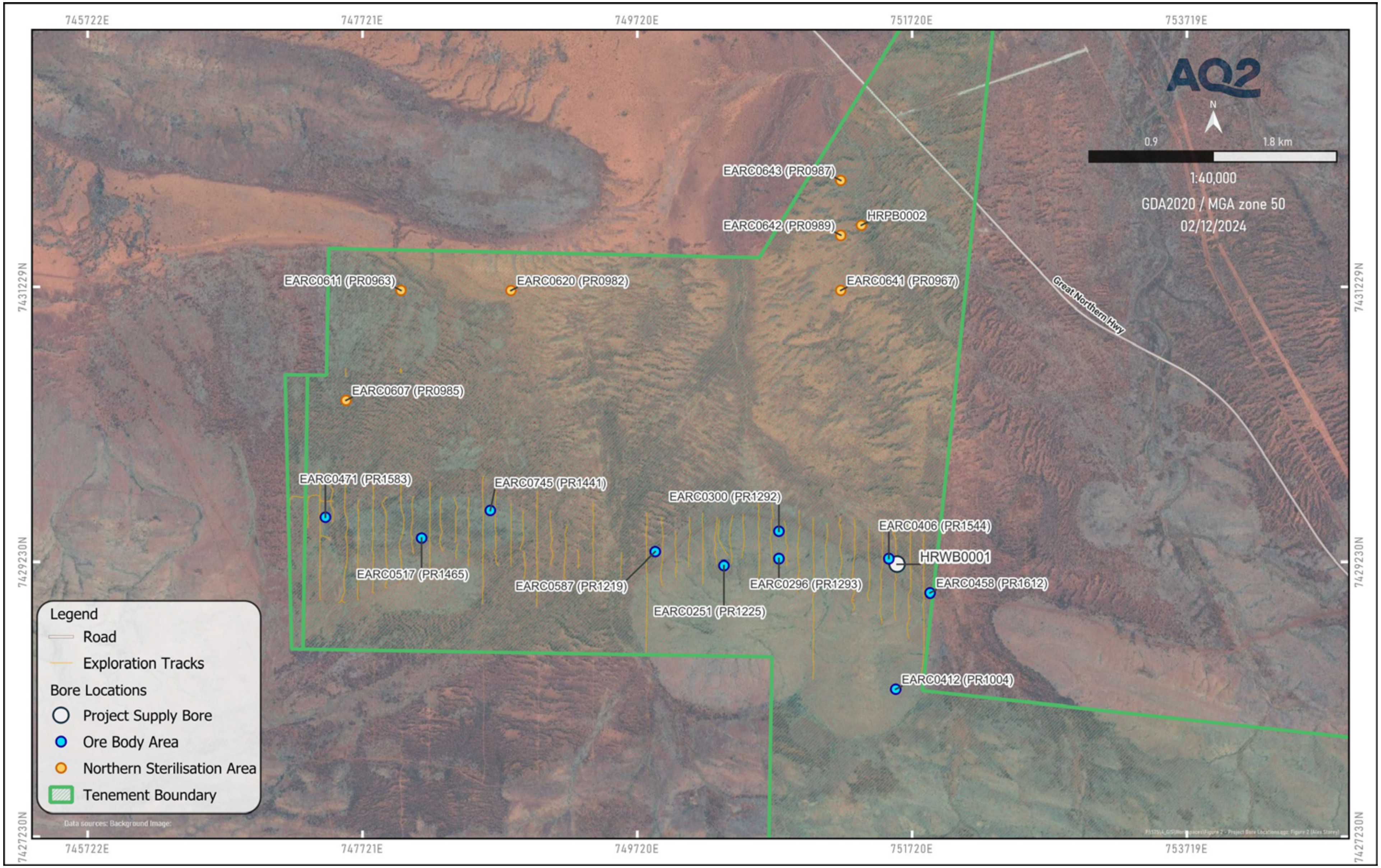


Figure 4 Monitoring Bore Locations

Table 2 Laboratory Analysis

Analyte	Hole ID	EARC0611	EARC0641	EARC0620	EARC0607	EARC0643	EARC0642	HRPB002	EARC0412	EARC0587	EARC0251	EARC0300	EARC0296	EARC0745	EARC0517	EARC0406	EARC0471	EARC0458	HRWB001	Duplicate 1	Duplicate 2	Duplicate 3	Duplicate 4
	Planned ID	PR0967	PR0989	PR0987	PR1544	PR1583	PR1612	HRPB002	PR0985	PR0963	PR0982	PR1004	PR1225	PR1219	PR1292	PR1293	PR1441	PR1465	Supply Bore				
	Units	31/10/2024 9:40	31/10/2024 9:00	31/10/2024 8:30	1/11/2024 12:30	30/10/2024 12:30	1/11/2024 13:00	2/11/2024 12:40	31/10/2024 12:20	31/10/2024 11:40	31/10/2024 10:50	2/11/2024 8:30	2/11/2024 7:20	1/11/2024 9:45	1/11/2024 11:30	1/11/2024 10:50	1/11/2024 8:30	30/10/2024 13:40	2/11/2024 14:40	Duplicate of PR1465	Duplicate of PR0982	Duplicate of PR1441	Duplicate of PR1219
pH	pH units	8.1	7.8	8	7.6	7.7	7.8	7.9	7.8	8	8	7.8	7.9	7.4	7.7	7.5	7.8	7.6	7.9	7.5	8	7.6	7.5
Conductivity	µS/cm	760	850	850	720	640	660	860	1100	750	730	1100	550	640	820	630	700	630	640	630	730	710	640
Total Dissolved Solids	mg/L	440	510	530	400	380	410	500	820	420	460	620	330	400	480	380	420	380	430	410	470	470	390
Total Alkalinity as $CaCO_3$	mg/L	280	290	230	270	190	220	320	190	250	230	430	170	190	270	200	220	190	210	190	230	230	190
Carbonate Alkalinity as CO_3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO_3	mg/L	340	350	280	330	230	270	390	240	310	280	530	210	240	330	250	270	230	250	230	280	280	230
Sulphate, SO_4	mg/L	37	49	56	14	31	29	45	28	32	40	28	23	28	41	28	32	30	29	30	44	32	28
Chloride, Cl	mg/L	68	81	100	69	67	62	73	230	82	70	86	55	64	88	62	79	66	63	66	69	79	64
Calcium, Ca	mg/L	41	56	58	37	30	33	59	78	53	52	69	28	31	39	33	40	30	31	30	53	39	31
Potassium, K	mg/L	5.5	7.6	6.5	6.3	6.5	6	6.5	9.2	7.3	5.8	2.9	5.6	6.1	7.4	6.4	7.6	6.8	6.1	6.6	5.6	7.4	6.1
Magnesium, Mg	mg/L	42	46	42	40	31	33	47	49	34	36	58	25	31	39	31	31	30	32	30	35	30	31
Sodium, Na	mg/L	51	52	49	49	49	51	48	53	46	43	80	41	47	73	47	63	48	48	48	42	54	47
Silicon, Si	mg/L	18	17	14	19	27	28	25	17	16	25	28	26	28	22	27	25	27	23	27	25	24	28
Hexavalent Chromium, Cr^{6+}	mg/L	0.002	0.004	0.012	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminium	µg/L	<5	6	<5	<5	<5	<5	6	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	6	<5	<5	<5	<5
Arsenic	µg/L	1.1	2	1.3	1.3	0.8	<0.5	0.7	1	1.3	0.6	0.9	1.1	<0.5	4	0.8	3.2	<0.5	0.7	<0.5	0.5	3.1	0.6
Boron	µg/L	200	190	230	230	200	230	200	170	200	210	270	200	210	270	200	210	200	210	200	210	200	210
Barium	µg/L	18	34	9.9	360	54	36	32	290	150	45	180	170	48	130	100	250	60	34	58	35	230	47
Beryllium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	µg/L	<0.5	<0.5	<0.5	7.5	0.8	<0.5	<0.5	2.9	22	2	<0.5	0.6	<0.5	<0.5	<0.5	2.4	<0.5	<0.5	<0.5	<0.5	2.4	<0.5
Copper	µg/L	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5
Iron	µg/L	24	26	29	33	22	13	13	24	25	8	16	14	5	6	7	89	14	<5	6	10	74	6
Lanthanum	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	9	35	6	2000	<1	4	<1	940	480	45	78	360	1	1	5	1400	<1	<1	<1	41	1300	2
Molybdenum	µg/L	<0.5	1.3	1	0.6	<0.5	<0.5	<0.5	3.5	4.1	0.6	1	0.9	<0.5	0.9	0.5	1.8	<0.5	<0.5	<0.5	<0.5	1.7	<0.5
Nickel	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Antimony	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	µg/L	<1	1	1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thorium	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Uranium	µg/L	0.9	1.3	2.1	0.5	0.7	0.7	0.7	1.5	2.7	1	3.7	1.3	0.8	2.3	0.9	0.8	0.6	<0.5	0.6	0.8	0.8	0.7
Vanadium	µg/L	0.8	1.2	2.6	<0.5	1.1	<0.5	2.3	<0.5	0.7	1.2	12	2.8	1.6	4.3	2.4	<0.5	0.6	<0.5	0.7	1	<0.5	1.5
Zinc	µg/L	2	2	14	8	11	3	4	6	4	3	54	27	4	3	15	2	3	2	2	1	1	2

Analyte	Hole ID	EARC0611	EARC0641	EARC0620	EARC0607	EARC0643	EARC0642	HRPB002	EARC0412	EARC0587	EARC0251	EARC0300	EARC0296	EARC0745	EARC0517	EARC0406	EARC0471	EARC0458	HRWB001	Duplicate 1	Duplicate 2	Duplicate 3	Duplicate 4
	Planned ID	PR0967	PR0989	PR0987	PR1544	PR1583	PR1612	HRPB002	PR0985	PR0963	PR0982	PR1004	PR1225	PR1219	PR1292	PR1293	PR1441	PR1465	Supply Bore				
	Units	31/10/2024 9:40	31/10/2024 9:00	31/10/2024 8:30	1/11/2024 12:30	30/10/2024 12:30	1/11/2024 13:00	2/11/2024 12:40	31/10/2024 12:20	31/10/2024 11:40	31/10/2024 10:50	2/11/2024 8:30	2/11/2024 7:20	1/11/2024 9:45	1/11/2024 11:30	1/11/2024 10:50	1/11/2024 8:30	30/10/2024 13:40	2/11/2024 14:40	Duplicate of PR1465	Duplicate of PR0982	Duplicate of PR1441	Duplicate of PR1219
Mercury	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	2	4.4	7.7	0.28	2.8	4.5	N.A.	<0.05	<0.05	5	2.2	2.7	5.4	3.1	3.9	<0.05	2.9	N.A.	2.9	3.7	<0.05	5.4
Nitrite Nitrogen, NO_2 as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	N.A.	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	N.A.	<0.05	0.07	<0.05	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	2	4.4	7.7	0.27	2.8	4.5	N.A.	<0.05	<0.05	5	2.1	2.6	5.4	3.1	3.9	<0.05	2.9	N.A.	2.9	3.7	<0.05	5.4
Total Phosphorus as P	mg/L	0.29	0.24	0.08	0.09	0.55	0.05	N.A.	0.03	0.46	0.09	1.1	0.22	<0.02	0.06	0.04	0.08	0.43	N.A.	0.48	<0.02	0.11	0.03
Fluoride	mg/L	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3
Total Chromium	µg/L	2.5	3.3	11	1.4	<0.5	<0.5	2.5	0.5	<0.5	1.8	0.7	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5

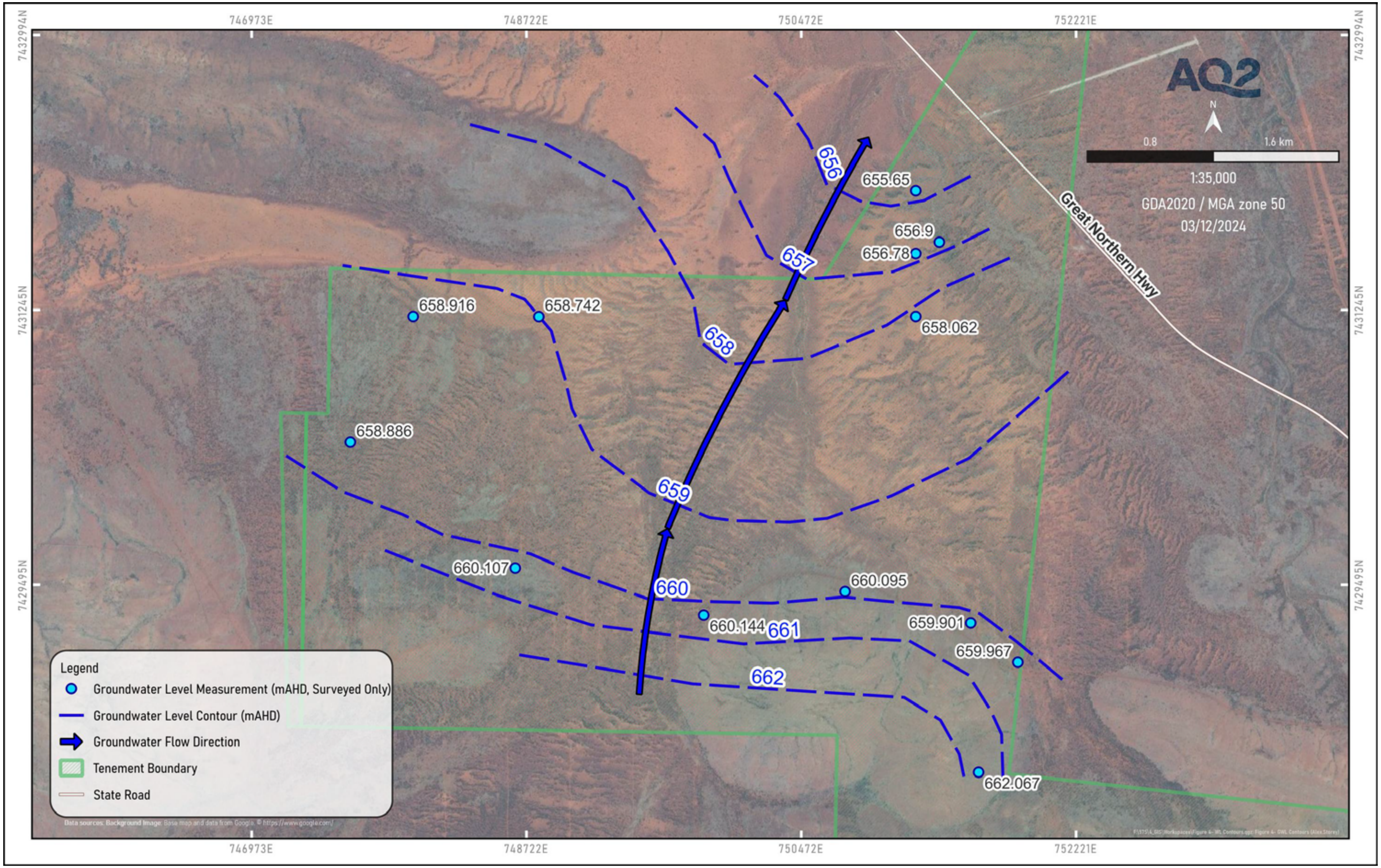


Figure 5 Groundwater Levels and Flow Directions

4. HYDRAULIC TESTING

Falling head tests were conducted on all monitoring bores and on the production bore after completion of the groundwater sampling in order to calculate the hydraulic conductivity (K) of the aquifer units. Falling head tests were conducted by rapidly injecting 100 litres of water into each bore and monitoring the response using a pressure transducer, which was installed 5 to 10 metres below the water table. The falling head test data were analysed using AQTESOLV software. AQTESOLV uses the screen length (i.e. the length of the screened section of the bore below the water table) for calculation of the hydraulic conductivity, as the screen length is directly tied to the portion of the bore where water exchange with the aquifer occurs, rather than the saturated interval, which refers to the cased portion of the bore below the water table, and included any sections of solid casing.

The responses of the bores to the falling head tests were varied, with some bores showing a noticeable rise in head post injection, followed by a typical recovery period, while others had a limited rise in head followed by a much more rapid recovery. The latter case makes analysis of the data difficult, and the subsequent interpretation of hydraulic conductivity values less reliable. Based on the responses to injection, the confidence levels of results have been divided into high, moderate and low, as shown in Table 3. Only the results with high and moderate confidence have been reported, as the low confidence results (i.e. the bores with very rapid recovery and/or limited displacement after injection) may be misleading. It may be useful to conduct different hydraulic tests on the moderate and low confidence bores, such as airlift recovery tests, in order to calculate the K values with a higher degree of confidence. The interpreted K values for the moderate and high confidence bores are shown in Table 4. Additionally, a plot showing the initial displacement of water vs the calculated hydraulic conductivity was drawn (Figure 6). The full set of AQTESOLV analysis plots are attached in Appendix B.

Table 3 Confidence Levels on Falling Head Tests

Hole ID	Planned ID	Confidence Level
HRPB0002	-	High
EARC0607	PR0985	
EARC0412	PR1004	
EARC0643	PR0987	
EARC0611	PR0963	Moderate
EARC0587	PR1219	
EARC0296	PR1293	
EARC0745	PR1441	
EARC0517	PR1465	
EARC0458	PR1612	
EARC0641	PR0967	Low
EARC0620	PR0982	
EARC0642	PR0989	
EARC0251	PR1225	
EARC0300	PR1292	
EARC0406	PR1544	
EARC0471	PR1583	

Table 4 Falling Head Test Analysis

Area	Hole ID	Planned ID	Bouwer-Rice Hydraulic Conductivity K (m/d)	Hvorslev Hydraulic Conductivity K (m/d)
Ore Body	EARC0412	PR1004	0.034	0.045
	EARC0587	PR1219	0.099	0.142
	EARC0296	PR1293	0.152	0.212
	EARC0745	PR1441	0.837	1.178
	EARC0517	PR1465	0.065	0.083
	EARC0458	PR1612	0.098	0.158
Northern Sterilisation Area	HRPB0002	HRPB0002	0.368	0.503
	EARC0611	PR0963	0.476	0.580
	EARC0607	PR0985	0.003	0.003
	EARC0643	PR0987	0.018	0.025

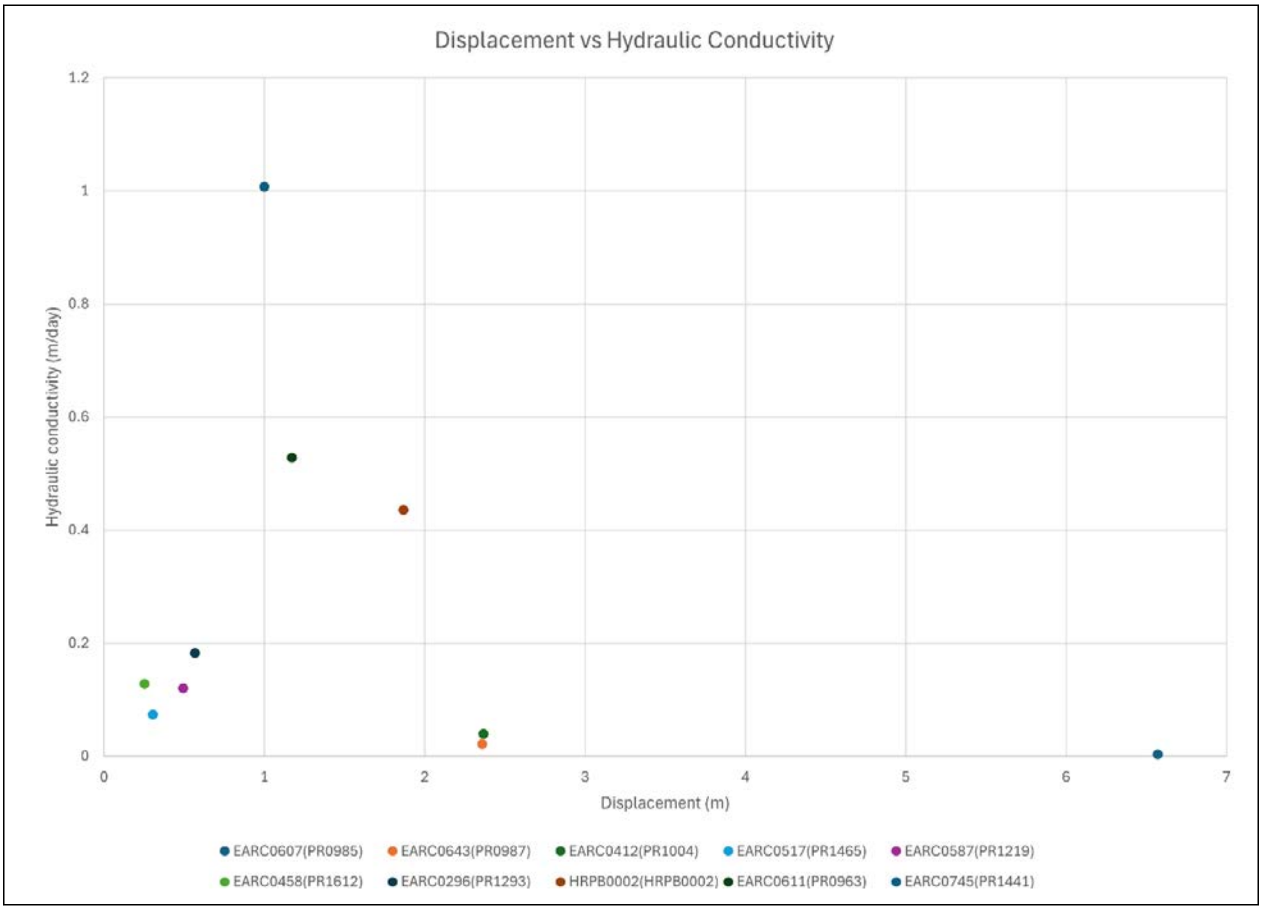


Figure 6 Displacement vs Hydraulic Conductivity

5. GROUNDWATER PRESSURE TRANSDUCER INSTALLATIONS

Groundwater pressure transducers were installed in 7 of the monitoring bores, with the existing transducer and baro logger in the production (HRPB0002) left in place. The logger previously installed in PR1544 (SN1030424) was removed and reinstalled in PR1004. Loggers were set to record at 6-hour intervals. The installation depths and serial numbers of the loggers are shown in Table 5.

Table 5 Logger Installation Details

Area	Hole ID	Planned ID	Easting	Northing	Elevation	Logger Serial Number	Logger Install Depth (m)
Ore Body	EARC0412	PR1004	751599.13	7428303.02	718.74	1030424	69
	EARC0587	PR1219	749848.09	7429299.48	697.57	1136923	49
	EARC0296	PR1293	[1]750750.00	[1]7429250.00	712.25	1136948	62
	EARC0745	PR1441	748650.16	7429602.24	704.70	1136243	55
Northern Sterilisation Area	HRPB0002 (logger)	-	751350.00	7431674.00	687.20	1034063	35
	HRPB0002 (baro)	-	751350.00	7431674.00	687.20	1044205	0.5
	EARC0611	PR0963	747996.20	7431199.04	690.01	1135435	41
	EARC0641	PR0967	751197.41	7431197.81	688.63	1136978	40
	EARC0620	PR0982	748800.12	7431170.08	688.65	1136225	41

[1]Planned coordinates (bore collar surveys pending)

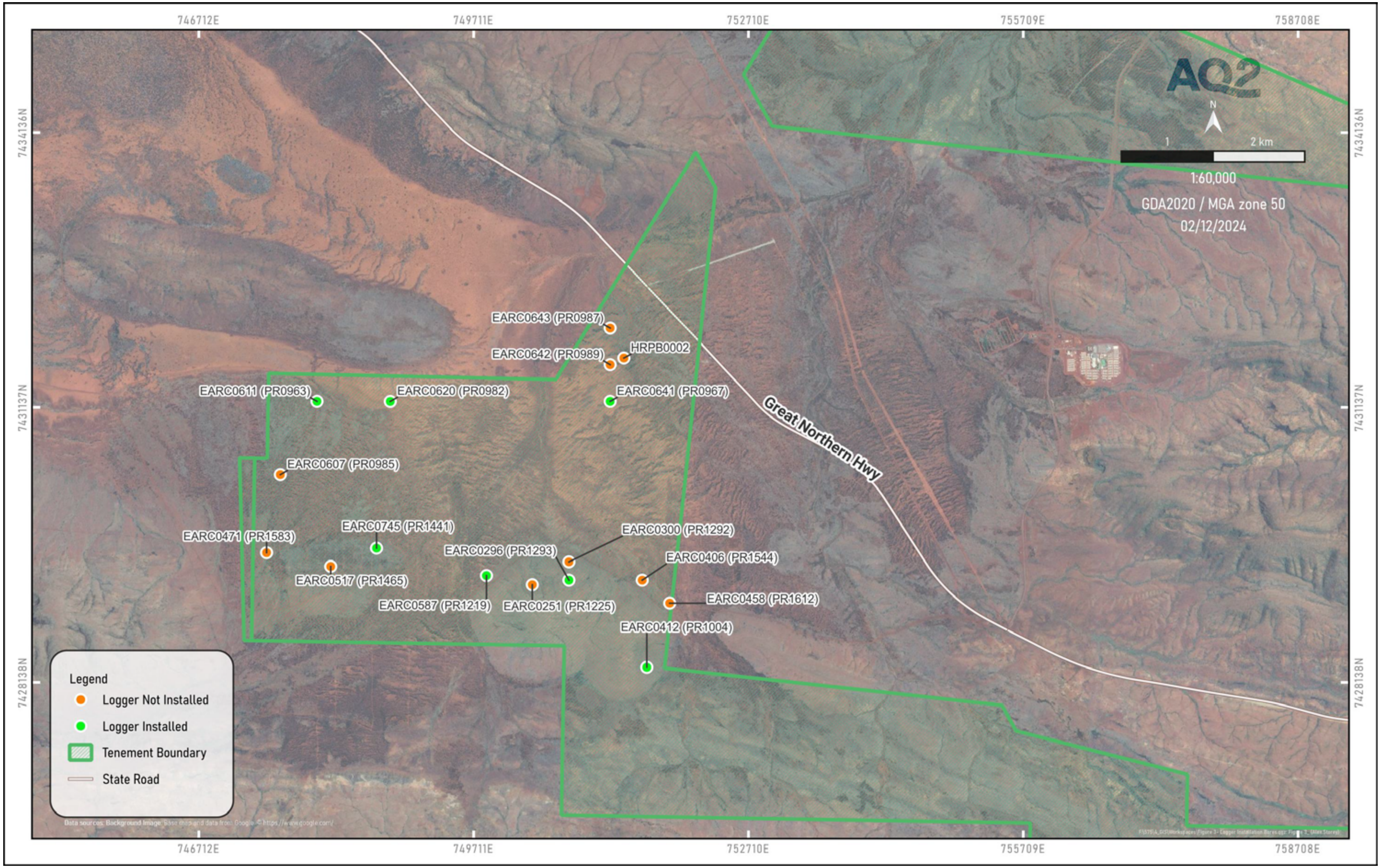


Figure 7 Logger Installation Bores

Should you require any additional information, please do not hesitate to contact us.

Regards,

Gareth Lottreaux	*Alex Storey*
Consulting Hydrogeologist	Hydrogeologist

Author:	GL	(3/12/24)
Checked:	ATS	(3/12/24)
Reviewed:	AGH	(3/12/24)

Attached:

Appendix A SGS Sample Analysis Certificate & SGS Chain of Custody
Appendix B FHT Analysis Plots

APPENDIX A
SGS SAMPLE ANALYSIS CERTIFICATE & SGS CHAIN OF CUSTODY

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Alex Storey
Client	AQ2
Address	PO BOX 976 SOUTH PERTH WA 6951
Telephone	0417 183224
Facsimile	(Not specified)
Email	Alex.Storey@aq2.com.au
Project	**575B Round Hill**
Order Number	**575B3**
Samples	22

LABORATORY DETAILS

Manager	Merene Hwang
Laboratory	SGS Perth Environmental
Address	28 Reid Rd Perth Airport WA 6105
Telephone	(08) 9373 3500
Facsimile	(08) 9373 3556
Email	au.environmental.perth@sgs.com
SGS Reference	**PE179202 R0**
Date Received	04 Nov 2024
Date Reported	12 Nov 2024

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(898/20210).

Nitrate and Nitrite analysed out of holding time.
Hexavalent Chromium>Total Chromium, Confirmed by reanalysis.
Metals: The over range results on ICPMS Method AN318 were reported using ICPOES method AN320.

SIGNATORIES

Louise HOPE
Laboratory Technician

Melissa WHITE
Laboratory Technician

Ohmar DAVID
Metals Chemist

Sanaa HUSSAIN
Chemist

Parameter	Units	LOR	PE179202.001 Water 31/10/24 9:40 PR0967	PE179202.002 Water 31/10/24 9:00 PR0989	PE179202.003 Water 31/10/24 8:30 PR0987	PE179202.004 Water 1/11/24 12:30 PR1544

Sample Number / Sample Matrix / Sample Date / Sample Name

pH in water   Method: AN101   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
pH**	No unit	0.1	8.1	7.8	8.0	7.6

Conductivity and TDS by Calculation - Water   Method: AN106   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Conductivity @ 25 C	µS/cm	2	760	850	850	720

Total Dissolved Solids (TDS) in water   Method: AN113   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Total Dissolved Solids Dried at 175-185°C	mg/L	10	440	510	530	400

Alkalinity   Method: AN135   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Total Alkalinity as CaCO3	mg/L	5	280	290	230	270
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	340	350	280	330

Sulfate in water   Method: AN275   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Sulfate, SO4	mg/L	1	37	49	56	14

Chloride by Discrete Analyser in Water   Method: AN274   Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Chloride, Cl	mg/L	1	68	81	100	69

Parameter	Units	LOR	Sample Number: PE179202.001 Sample Matrix: Water Sample Date: 31/10/24 9:40 Sample Name: PR0967	PE179202.002 Water 31/10/24 9:00 PR0989	PE179202.003 Water 31/10/24 8:30 PR0987	PE179202.004 Water 1/11/24 12:30 PR1544

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Calcium, Ca	mg/L	0.2	41	56	58	37
Magnesium, Mg	mg/L	0.1	42	46	42	40
Potassium, K	mg/L	0.1	5.5	7.6	6.5	6.3
Silicon, Si	mg/L	0.05	18	17	14	19
Sodium, Na	mg/L	0.5	51	52	49	49

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Hexavalent Chromium, Cr6+	mg/L	0.001	0.002	0.004	0.012	<0.001

Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Aluminium	µg/L	5	<5	6	<5	<5
Antimony	µg/L	1	<1	<1	<1	<1
Arsenic	µg/L	0.5	1.1	2.0	1.3	1.3
Barium	µg/L	0.2	18	34	9.9	360
Beryllium	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Boron	µg/L	5	200	190	230	230
Cadmium	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	µg/L	0.5	<0.5	<0.5	<0.5	7.5
Copper	µg/L	0.5	<0.5	<0.5	0.6	<0.5
Iron	µg/L	5	24	26	29	33
Lead	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Lanthanum*	µg/L	1	<1	<1	<1	<1
Manganese	µg/L	1	9	35	6	2000
Molybdenum	µg/L	0.5	<0.5	1.3	1.0	0.6
Nickel	µg/L	1	<1	<1	<1	<1
Selenium	µg/L	1	<1	1	1	<1
Silver	µg/L	1	<1	<1	<1	<1
Thallium	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Thorium	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Tin	µg/L	1	<1	<1	<1	<1
Uranium	µg/L	0.5	0.9	1.3	2.1	0.5
Vanadium	µg/L	0.5	0.8	1.2	2.6	<0.5
Zinc	µg/L	1	2	2	14	8

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Mercury	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	2.0	4.4	7.7	0.28
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	<0.05	<0.05	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	2.0	4.4	7.7	0.27

Parameter	Units	LOR	PE179202.001	PE179202.002	PE179202.003	PE179202.004
Sample Number			PE179202.001	PE179202.002	PE179202.003	PE179202.004
Sample Matrix			Water	Water	Water	Water
Sample Date			31/10/24 9:40	31/10/24 9:00	31/10/24 8:30	1/11/24 12:30
Sample Name			PR0967	PR0989	PR0987	PR1544
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 6/11/2024						
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.29	0.24	0.08	0.09
Fluoride by Ion Selective Electrode in Water Method: AN141 Tested: 7/11/2024						
Fluoride by ISE	mg/L	0.1	0.3	0.3	0.2	0.3
Trace Metals (Total) in Water by ICPMS TQe Method: AN022/AN318 Tested: 7/11/2024						
Total Chromium	μg/L	0.5	2.5	3.3	11	1.4

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Sample Matrix			Water	Water	Water	Water
Sample Date			30/10/24 12:30	1/11/24 13:00	2/11/24 12:40	31/10/24 12:20
Sample Name			PR1583	PR1612	HRPB0002	PR0985

pH in water Method: AN101 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
pH**	No unit	0.1	7.7	7.8	7.9	7.8

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Conductivity @ 25 C	µS/cm	2	640	660	860	1100

Total Dissolved Solids (TDS) in water Method: AN113 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Total Dissolved Solids Dried at 175-185°C	mg/L	10	380	410	500	820

Alkalinity Method: AN135 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Total Alkalinity as CaCO3	mg/L	5	190	220	320	190
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	230	270	390	240

Sulfate in water Method: AN275 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Sulfate, SO4	mg/L	1	31	29	45	28

Chloride by Discrete Analyser in Water Method: AN274 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Chloride, Cl	mg/L	1	67	62	73	230

Parameter	Units	LOR	PE179202.005 Water 30/10/24 12:30 PR1583	PE179202.006 Water 1/11/24 13:00 PR1612	PE179202.007 Water 2/11/24 12:40 HRPB0002	PE179202.008 Water 31/10/24 12:20 PR0985
Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024						
Calcium, Ca	mg/L	0.2	30	33	59	78
Magnesium, Mg	mg/L	0.1	31	33	47	49
Potassium, K	mg/L	0.1	6.5	6.0	6.5	9.2
Silicon, Si	mg/L	0.05	27	28	25	17
Sodium, Na	mg/L	0.5	49	51	48	53
Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024						
Hexavalent Chromium, Cr6+	mg/L	0.001	<0.001	<0.001	0.001	<0.001
Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024						
Aluminium	μg/L	5	<5	<5	6	<5
Antimony	μg/L	1	<1	<1	<1	<1
Arsenic	μg/L	0.5	0.8	<0.5	0.7	1.0
Barium	μg/L	0.2	54	36	32	290
Beryllium	μg/L	0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Boron	μg/L	5	200	230	200	170
Cadmium	μg/L	0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	μg/L	0.5	0.8	<0.5	<0.5	2.9
Copper	μg/L	0.5	<0.5	<0.5	1.4	<0.5
Iron	μg/L	5	22	13	13	24
Lead	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Lanthanum*	μg/L	1	<1	<1	<1	<1
Manganese	μg/L	1	<1	4	<1	940
Molybdenum	μg/L	0.5	<0.5	<0.5	<0.5	3.5
Nickel	μg/L	1	<1	<1	<1	<1
Selenium	μg/L	1	<1	<1	<1	1
Silver	μg/L	1	<1	<1	<1	<1
Thallium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Thorium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Tin	μg/L	1	<1	<1	<1	<1
Uranium	μg/L	0.5	0.7	0.7	0.7	1.5
Vanadium	μg/L	0.5	1.1	<0.5	2.3	<0.5
Zinc	μg/L	1	11	3	4	6
Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024						
Mercury	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024						
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	2.8	4.5	-	<0.05
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	<0.05	-	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	2.8	4.5	-	<0.05

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Sample Matrix			Water	Water	Water	Water
Sample Date			30/10/24 12:30	1/11/24 13:00	2/11/24 12:40	31/10/24 12:20
Sample Name			PR1583	PR1612	HRPB0002	PR0985

Total Phosphorus by Kjeldahl Digestion DA in Water   Method: AN279/AN293(Sydney only)   Tested: 6/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.55	0.05	-	0.03

Fluoride by Ion Selective Electrode in Water   Method: AN141   Tested: 7/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Fluoride by ISE	mg/L	0.1	0.3	0.3	0.2	0.2

Trace Metals (Total) in Water by ICPMS TQe   Method: AN022/AN318   Tested: 7/11/2024

Parameter	Units	LOR	PE179202.005	PE179202.006	PE179202.007	PE179202.008
Total Chromium	μg/L	0.5	<0.5	<0.5	2.5	0.5

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Sample Matrix			Water	Water	Water	Water
Sample Date			31/10/24 11:40	31/10/24 10:50	2/11/24 8:30	2/11/24 7:20
Sample Name			PR0963	PR0982	PR1004	PR1225
pH in water Method: AN101 Tested: 5/11/2024						
pH**	No unit	0.1	8.0	8.0	7.8	7.9
Conductivity and TDS by Calculation - Water Method: AN106 Tested: 5/11/2024						
Conductivity @ 25 C	µS/cm	2	750	730	1100	550
Total Dissolved Solids (TDS) in water Method: AN113 Tested: 5/11/2024						
Total Dissolved Solids Dried at 175-185°C	mg/L	10	420	460	620	330
Alkalinity Method: AN135 Tested: 5/11/2024						
Total Alkalinity as CaCO3	mg/L	5	250	230	430	170
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	310	280	530	210
Sulfate in water Method: AN275 Tested: 5/11/2024						
Sulfate, SO4	mg/L	1	32	40	28	23
Chloride by Discrete Analyser in Water Method: AN274 Tested: 5/11/2024						
Chloride, Cl	mg/L	1	82	70	86	55

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Sample Matrix			Water	Water	Water	Water
Sample Date			31/10/24 11:40	31/10/24 10:50	2/11/24 8:30	2/11/24 7:20
Sample Name			PR0963	PR0982	PR1004	PR1225

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Calcium, Ca	mg/L	0.2	53	52	69	28
Magnesium, Mg	mg/L	0.1	34	36	58	25
Potassium, K	mg/L	0.1	7.3	5.8	2.9	5.6
Silicon, Si	mg/L	0.05	16	25	28	26
Sodium, Na	mg/L	0.5	46	43	80	41

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Hexavalent Chromium, Cr6+	mg/L	0.001	<0.001	0.003	<0.001	<0.001

Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Aluminium	μg/L	5	<5	<5	<5	6
Antimony	μg/L	1	1	<1	<1	<1
Arsenic	μg/L	0.5	1.3	0.6	0.9	1.1
Barium	μg/L	0.2	150	45	180	170
Beryllium	μg/L	0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Boron	μg/L	5	200	210	270	200
Cadmium	μg/L	0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	μg/L	0.5	22	2.0	<0.5	0.6
Copper	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Iron	μg/L	5	25	8	16	14
Lead	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Lanthanum*	μg/L	1	<1	<1	<1	<1
Manganese	μg/L	1	480	45	78	360
Molybdenum	μg/L	0.5	4.1	0.6	1.0	0.9
Nickel	μg/L	1	<1	<1	<1	<1
Selenium	μg/L	1	<1	<1	1	<1
Silver	μg/L	1	<1	<1	<1	<1
Thallium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Thorium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Tin	μg/L	1	<1	<1	<1	<1
Uranium	μg/L	0.5	2.7	1.0	3.7	1.3
Vanadium	μg/L	0.5	0.7	1.2	12	2.8
Zinc	μg/L	1	4	3	54	27

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Mercury	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	<0.05	5.0	2.2	2.7
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	<0.05	<0.05	0.08
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	<0.05	5.0	2.1	2.6

Parameter	Units	LOR	PE179202.009	PE179202.010	PE179202.011	PE179202.012
		Sample Matrix	Water	Water	Water	Water
		Sample Date	31/10/24 11:40	31/10/24 10:50	2/11/24 8:30	2/11/24 7:20
		Sample Name	PR0963	PR0982	PR1004	PR1225
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 6/11/2024						
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.46	0.09	1.1	0.22
Fluoride by Ion Selective Electrode in Water Method: AN141 Tested: 7/11/2024						
Fluoride by ISE	mg/L	0.1	0.2	0.2	0.6	0.4
Trace Metals (Total) in Water by ICPMS TQe Method: AN022/AN318 Tested: 7/11/2024						
Total Chromium	μg/L	0.5	<0.5	1.8	0.7	<0.5

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Sample Matrix			Water	Water	Water	Water
Sample Date			1/11/24 9:45	1/11/24 11:30	1/11/24 10:50	1/11/24 8:30
Sample Name			PR1219	PR1292	PR1293	PR1441
pH in water Method: AN101 Tested: 5/11/2024						
pH**	No unit	0.1	7.4	7.7	7.5	7.8
Conductivity and TDS by Calculation - Water Method: AN106 Tested: 5/11/2024						
Conductivity @ 25 C	µS/cm	2	640	820	630	700
Total Dissolved Solids (TDS) in water Method: AN113 Tested: 5/11/2024						
Total Dissolved Solids Dried at 175-185°C	mg/L	10	400	480	380	420
Alkalinity Method: AN135 Tested: 5/11/2024						
Total Alkalinity as CaCO3	mg/L	5	190	270	200	220
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	240	330	250	270
Sulfate in water Method: AN275 Tested: 5/11/2024						
Sulfate, SO4	mg/L	1	28	41	28	32
Chloride by Discrete Analyser in Water Method: AN274 Tested: 5/11/2024						
Chloride, Cl	mg/L	1	64	88	62	79

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Sample Matrix			Water	Water	Water	Water
Sample Date			1/11/24 9:45	1/11/24 11:30	1/11/24 10:50	1/11/24 8:30
Sample Name			PR1219	PR1292	PR1293	PR1441

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Calcium, Ca	mg/L	0.2	31	39	33	40
Magnesium, Mg	mg/L	0.1	31	39	31	31
Potassium, K	mg/L	0.1	6.1	7.4	6.4	7.6
Silicon, Si	mg/L	0.05	28	22	27	25
Sodium, Na	mg/L	0.5	47	73	47	63

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Hexavalent Chromium, Cr6+	mg/L	0.001	<0.001	<0.001	<0.001	<0.001

Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Aluminium	μg/L	5	<5	<5	<5	<5
Antimony	μg/L	1	<1	<1	<1	<1
Arsenic	μg/L	0.5	<0.5	4.0	0.8	3.2
Barium	μg/L	0.2	48	130	100	250
Beryllium	μg/L	0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Boron	μg/L	5	210	270	200	210
Cadmium	μg/L	0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	μg/L	0.5	<0.5	<0.5	<0.5	2.4
Copper	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Iron	μg/L	5	5	6	7	89
Lead	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Lanthanum*	μg/L	1	<1	<1	<1	<1
Manganese	μg/L	1	1	1	5	1400
Molybdenum	μg/L	0.5	<0.5	0.9	0.5	1.8
Nickel	μg/L	1	<1	<1	<1	<1
Selenium	μg/L	1	<1	1	<1	<1
Silver	μg/L	1	<1	<1	<1	<1
Thallium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Thorium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Tin	μg/L	1	<1	<1	<1	<1
Uranium	μg/L	0.5	0.8	2.3	0.9	0.8
Vanadium	μg/L	0.5	1.6	4.3	2.4	<0.5
Zinc	μg/L	1	4	3	15	2

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Mercury	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	5.4	3.1	3.9	<0.05
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	<0.05	<0.05	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	5.4	3.1	3.9	<0.05

Parameter	Units	LOR	PE179202.013	PE179202.014	PE179202.015	PE179202.016
Sample Number			PE179202.013	PE179202.014	PE179202.015	PE179202.016
Sample Matrix			Water	Water	Water	Water
Sample Date			1/11/24 9:45	1/11/24 11:30	1/11/24 10:50	1/11/24 8:30
Sample Name			PR1219	PR1292	PR1293	PR1441
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 6/11/2024						
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	<0.02	0.06	0.04	0.08
Fluoride by Ion Selective Electrode in Water Method: AN141 Tested: 7/11/2024						
Fluoride by ISE	mg/L	0.1	0.3	0.3	0.3	0.3
Trace Metals (Total) in Water by ICPMS TQe Method: AN022/AN318 Tested: 7/11/2024						
Total Chromium	μg/L	0.5	<0.5	0.6	<0.5	<0.5

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Sample Matrix			Water	Water	Water	Water
Sample Date			30/10/24 13:40	2/11/24 14:40	Duplicate 1	Duplicate 2
Sample Name			PR1465	Supply Bore		

pH in water Method: AN101 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
pH**	No unit	0.1	7.6	7.9	7.5	8.0

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Conductivity @ 25 C	µS/cm	2	630	640	630	730

Total Dissolved Solids (TDS) in water Method: AN113 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Total Dissolved Solids Dried at 175-185°C	mg/L	10	380	430	410	470

Alkalinity Method: AN135 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Total Alkalinity as CaCO3	mg/L	5	190	210	190	230
Carbonate Alkalinity as CO3	mg/L	1	<1	<1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	230	250	230	280

Sulfate in water Method: AN275 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Sulfate, SO4	mg/L	1	30	29	30	44

Chloride by Discrete Analyser in Water Method: AN274 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Chloride, Cl	mg/L	1	66	63	66	69

Parameter	Units	LOR	Sample Number / Sample Matrix / Sample Date / Sample Name	PE179202.017 Water 30/10/24 13:40 PR1465	PE179202.018 Water 2/11/24 14:40 Supply Bore	PE179202.019 Water Duplicate 1	PE179202.020 Water Duplicate 2

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Calcium, Ca	mg/L	0.2	30	31	30	53
Magnesium, Mg	mg/L	0.1	30	32	30	35
Potassium, K	mg/L	0.1	6.8	6.1	6.6	5.6
Silicon, Si	mg/L	0.05	27	23	27	25
Sodium, Na	mg/L	0.5	48	48	48	42

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Hexavalent Chromium, Cr6+	mg/L	0.001	<0.001	<0.001	<0.001	<0.001

Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Aluminium	μg/L	5	<5	6	<5	<5
Antimony	μg/L	1	<1	<1	<1	<1
Arsenic	μg/L	0.5	<0.5	0.7	<0.5	0.5
Barium	μg/L	0.2	60	34	58	35
Beryllium	μg/L	0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Boron	μg/L	5	200	210	200	210
Cadmium	μg/L	0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Copper	μg/L	0.5	<0.5	<0.5	1.0	<0.5
Iron	μg/L	5	14	<5	6	10
Lead	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Lanthanum*	μg/L	1	<1	<1	<1	<1
Manganese	μg/L	1	<1	<1	<1	41
Molybdenum	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Nickel	μg/L	1	<1	<1	<1	<1
Selenium	μg/L	1	<1	<1	<1	<1
Silver	μg/L	1	<1	<1	<1	<1
Thallium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Thorium	μg/L	0.5	<0.5	<0.5	<0.5	<0.5
Tin	μg/L	1	<1	<1	<1	<1
Uranium	μg/L	0.5	0.6	<0.5	0.6	0.8
Vanadium	μg/L	0.5	0.6	<0.5	0.7	1.0
Zinc	μg/L	1	3	2	2	1

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Mercury	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	2.9	-	2.9	3.7
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	-	<0.05	0.07
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	2.9	-	2.9	3.7

Parameter	Units	LOR	PE179202.017	PE179202.018	PE179202.019	PE179202.020
Sample Matrix			Water	Water	Water	Water
Sample Date			30/10/24 13:40	2/11/24 14:40	Duplicate 1	Duplicate 2
Sample Name			PR1465	Supply Bore		
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 6/11/2024						
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.43	-	0.48	<0.02
Fluoride by Ion Selective Electrode in Water Method: AN141 Tested: 7/11/2024						
Fluoride by ISE	mg/L	0.1	0.3	0.3	0.3	0.2
Trace Metals (Total) in Water by ICPMS TQe Method: AN022/AN318 Tested: 7/11/2024						
Total Chromium	μg/L	0.5	<0.5	<0.5	<0.5	2.1

Parameter	Units	LOR	PE179202.021 Water Duplicate 3	PE179202.022 Water Duplicate 4
		Sample Number / Sample Matrix / Sample Name		

pH in water Method: AN101 Tested: 5/11/2024

pH**	No unit	0.1	7.6	7.5

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 5/11/2024

Conductivity @ 25 C	µS/cm	2	710	640

Total Dissolved Solids (TDS) in water Method: AN113 Tested: 6/11/2024

Total Dissolved Solids Dried at 175-185°C	mg/L	10	470	390

Alkalinity Method: AN135 Tested: 5/11/2024

Total Alkalinity as CaCO3	mg/L	5	230	190
Carbonate Alkalinity as CO3	mg/L	1	<1	<1
Bicarbonate Alkalinity as HCO3	mg/L	5	280	230

Sulfate in water Method: AN275 Tested: 5/11/2024

Sulfate, SO4	mg/L	1	32	28

Chloride by Discrete Analyser in Water Method: AN274 Tested: 5/11/2024

Chloride, Cl	mg/L	1	79	64

Parameter	Units	LOR	Sample Number: PE179202.021 Sample Matrix: Water Sample Name: Duplicate 3	Sample Number: PE179202.022 Sample Matrix: Water Sample Name: Duplicate 4

Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/11/2024

Parameter	Units	LOR	Duplicate 3	Duplicate 4
Calcium, Ca	mg/L	0.2	**39**	**31**
Magnesium, Mg	mg/L	0.1	**30**	**31**
Potassium, K	mg/L	0.1	**7.4**	**6.1**
Silicon, Si	mg/L	0.05	**24**	**28**
Sodium, Na	mg/L	0.5	**54**	**47**

Hexavalent Chromium in water by Discrete Analyser Method: AN283 Tested: 5/11/2024

Parameter	Units	LOR	Duplicate 3	Duplicate 4
Hexavalent Chromium, Cr6+	mg/L	0.001	<0.001	<0.001

Trace Metals (Dissolved) in Water by ICPMS TQe Method: AN318 Tested: 7/11/2024

Parameter	Units	LOR	Duplicate 3	Duplicate 4
Aluminium	µg/L	5	<5	<5
Antimony	µg/L	1	<1	<1
Arsenic	µg/L	0.5	**3.1**	**0.6**
Barium	µg/L	0.2	**230**	**47**
Beryllium	µg/L	0.1	<0.1	<0.1
Bismuth	µg/L	0.5	<0.5	<0.5
Boron	µg/L	5	**200**	**210**
Cadmium	µg/L	0.05	<0.05	<0.05
Cobalt	µg/L	0.5	**2.4**	<0.5
Copper	µg/L	0.5	<0.5	<0.5
Iron	µg/L	5	**74**	**6**
Lead	µg/L	0.5	<0.5	<0.5
Lanthanum*	µg/L	1	<1	<1
Manganese	µg/L	1	**1300**	**2**
Molybdenum	µg/L	0.5	**1.7**	<0.5
Nickel	µg/L	1	<1	<1
Selenium	µg/L	1	<1	<1
Silver	µg/L	1	<1	<1
Thallium	µg/L	0.5	<0.5	<0.5
Thorium	µg/L	0.5	<0.5	<0.5
Tin	µg/L	1	<1	<1
Uranium	µg/L	0.5	**0.8**	**0.7**
Vanadium	µg/L	0.5	<0.5	**1.5**
Zinc	µg/L	1	**1**	**2**

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 12/11/2024

Parameter	Units	LOR	Duplicate 3	Duplicate 4
Mercury	mg/L	0.00005	<0.00005	<0.00005

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: AN258 Tested: 5/11/2024

Parameter	Units	LOR	Duplicate 3	Duplicate 4
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.05	<0.05	**5.4**
Nitrite Nitrogen, NO_2 as N	mg/L	0.05	<0.05	<0.05
Nitrate Nitrogen, NO_3 as N	mg/L	0.05	<0.05	**5.4**

Parameter	Units	LOR	PE179202.021 Water Duplicate 3	PE179202.022 Water Duplicate 4
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 6/11/2024				
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	**0.11**	**0.03**
Fluoride by Ion Selective Electrode in Water Method: AN141 Tested: 7/11/2024				
Fluoride by ISE	mg/L	0.1	**0.3**	**0.3**
Trace Metals (Total) in Water by ICPMS TQe Method: AN022/AN318 Tested: 7/11/2024				
Total Chromium	µg/L	0.5	<0.5	<0.5

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Alkalinity **Method: ME-(AU)-[ENV]AN135**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Alkalinity as CaCO3	LB223405	mg/L	5	<5	1 - 3%	99 - 104%
Carbonate Alkalinity as CO3	LB223405	mg/L	1	<1		
Bicarbonate Alkalinity as HCO3	LB223405	mg/L	5	<5		

Chloride by Discrete Analyser in Water **Method: ME-(AU)-[ENV]AN274**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Chloride, Cl	LB223311	mg/L	1	<1	0 - 4%	101%	104%

Conductivity and TDS by Calculation - Water **Method: ME-(AU)-[ENV]AN106**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB223406	µS/cm	2	<2	0%	100%

Fluoride by Ion Selective Electrode in Water **Method: ME-(AU)-[ENV]AN141**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Fluoride by ISE	LB223339	mg/L	0.1	<0.1	0 - 7%	102%	100 - 112%

Hexavalent Chromium in water by Discrete Analyser **Method: ME-(AU)-[ENV]AN283**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexavalent Chromium, Cr6+	LB223340	mg/L	0.001	<0.001	0 - 14%	95 - 97%	104%

Mercury (dissolved) in Water **Method: ME-(AU)-[ENV]AN311(Perth)/AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB223601	mg/L	0.00005	<0.00005	0%	100%	98%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Metals in Water (Dissolved) by ICPOES   Method: ME-(AU)-[ENV]AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Calcium, Ca	LB223353	mg/L	0.2	<0.2	1%	106%	101%
Magnesium, Mg	LB223353	mg/L	0.1	<0.1	1 - 2%	104%	99%
Potassium, K	LB223353	mg/L	0.1	<0.1	0 - 1%	104%	100%
Silicon, Si	LB223353	mg/L	0.05	<0.05	0 - 1%	95%	120%
Sodium, Na	LB223353	mg/L	0.5	<0.5	0 - 3%	98%	90%

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA   Method: ME-(AU)-[ENV]AN258

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Nitrate/Nitrite Nitrogen, NOx as N	LB223338	mg/L	0.05	<0.05	0 - 1%	109%
Nitrite Nitrogen, NO_2 as N	LB223338	mg/L	0.05	<0.05	0%	92 - 93%
Nitrate Nitrogen, NO_3 as N	LB223338	mg/L	0.05	<0.05	0 - 1%	NA

pH in water   Method: ME-(AU)-[ENV]AN101

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH**	LB223406	No unit	0.1	5.4 - 5.8	0 - 2%	100%

Sulfate in water   Method: ME-(AU)-[ENV]AN275

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Sulfate, SO4	LB223311	mg/L	1	<1	0 - 9%	107 - 108%	104%

Total Dissolved Solids (TDS) in water   Method: ME-(AU)-[ENV]AN113

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Total Dissolved Solids Dried at 175-185°C	LB223336	mg/L	10	<10	0 - 2%	100%	98%	1%
	LB223356	mg/L	10	<10	0%	100%	98%	1%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Phosphorus by Kjeldahl Digestion DA in Water   Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Phosphorus (Kjeldahl Digestion) as P	LB223357	mg/L	0.02	<0.02	0 - 2%	107%

Trace Metals (Dissolved) in Water by ICPMS TQe   Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Aluminium	LB223415	µg/L	5	<5	0%	101%	62%
Antimony	LB223415	µg/L	1	<1	0%	100%	
Arsenic	LB223415	µg/L	0.5	<0.5	2 - 11%	97%	-261%
Barium	LB223415	µg/L	0.2	<0.2	3%	120%	
Beryllium	LB223415	µg/L	0.1	<0.1	0%	84%	
Bismuth	LB223415	µg/L	0.5	<0.5	0%	118%	
Boron	LB223415	µg/L	5	<5	1%	98%	
Cadmium	LB223415	µg/L	0.05	<0.05	0%	100%	97%
Cobalt	LB223415	µg/L	0.5	<0.5	0%	107%	
Copper	LB223415	µg/L	0.5	<0.5	0%	111%	96%
Iron	LB223415	µg/L	5	<5	0 - 8%	120%	10%
Lead	LB223415	µg/L	0.5	<0.5	0%	107%	
Lanthanum*	LB223415	µg/L	1	<1	0%	NA	
Manganese	LB223415	µg/L	1	<1	2 - 7%	104%	113%
Molybdenum	LB223415	µg/L	0.5	<0.5	0%	105%	
Nickel	LB223415	µg/L	1	<1	0%	103%	
Selenium	LB223415	µg/L	1	<1	0 - 12%	97%	
Silver	LB223415	µg/L	1	<1	0%	88%	
Thallium	LB223415	µg/L	0.5	<0.5	0%	110%	
Thorium	LB223415	µg/L	0.5	<0.5	0%	80%	
Tin	LB223415	µg/L	1	<1	0%	104%	
Uranium	LB223415	µg/L	0.5	<0.5	3%	101%	
Vanadium	LB223415	µg/L	0.5	<0.5	4%	99%	
Zinc	LB223415	µg/L	1	<1	3%	116%	85%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Trace Metals (Total) in Water by ICPMS TQe Method: ME-(AU)-[ENV]AN022/AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Chromium	LB223414	µg/L	0.5	<0.5	10 - 13%	NA	NA

METHOD	METHODOLOGY SUMMARY
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B.
AN106	Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN113	The Total Dissolved Solids residue may also be ignited at 550 C and volatile TDS (Organic TDS) and non-volatile TDS (Inorganic) can be determined.
AN135	Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN141	Determination of Fluoride by ISE: A fluoride ion selective electrode and reference electrode combination, in the presence of a pH/complexation buffer, is used to determine the fluoride concentration. The electrode millivolt response is measured logarithmically against fluoride concentration. Reference APHA F- C.
AN258	Nitrate and Nitrite by FIA: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Without the cadmium reduction only the original nitrite is determined. Reference APHA 4500-NO3- F.
AN274	Chloride by Discrete Analyse: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Reference APHA 4500Cl-
AN275	Sulfate by Discrete Analyse: sulfate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulfate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275.
AN279/AN293(Sydney)	The sample is digested with Sulphuric acid, K2SO4 and CuSO4. All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis.
AN283	Hexavalent Chromium via Discrete Analyser: Soluble hexavalent chromium forms a red/violet colour with diphenylcarbazide in acidic solution. This procedure is very sensitive and nearly specific for Cr6+. If total chromium is also measured the trivalent form of chromium Cr3+ can be calculated from the difference (Total Cr - Cr6+). Reference APHA3500CrB.

METHOD	METHODOLOGY SUMMARY
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
Calculation	Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported. APHA4500CO2 D.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

Lab ID Number: ____________________ *(please quote on all correspondence)*

Please remember to fill in your company details below or attach business card.

SGS Environmental Services
28 Reid Road,
Perth Airport

SGS Perth Environmental

PE179202 COC
Received: 04 – Nov – 2024

Company Name:	AQ2	**Project Name/No:**	575B Round Hill
Address:	AQ2 Ground Floor 1 Howard Street Perth, WA 6000	**Purchase Order No:**	575B3
Contact Name:	Alex Storey	**Results Required Date:**	ASAP
Site Contact:		**Telephone:**	0417 183 224
SGS Client Contact:	Freya Day	**Email Results to:**	Alex.storey@aq2.com.au
Laboratory Quotation No:	AQ2 - IE - SEP 24 - 1808436	**Email Invoice to:**	Alex.storey@aq2.com.au, Helen.Meyer@aq2.com.au

SGS ID	Client Sample ID	Sample Description	Sampling Date/Time *(field record sheet number)*	*Tick as Appropriate*			PRESERVATIVE	NO. OF ITEMS	**ANALYSIS REQUESTED**. SPECIFY & TICK AS APPROPRIATE									Dissolved Metals			Notes/Guidelines/LOR/ Special instructions
				Solid Sample	Liquid Sample	Other:			**Phys Chem 1000**	**Phys Chem 500**	Metals 125	**Nutients**									
1	**PR0967**	**Groundwater**	**31/10/24 09:40**		**X**			**3**		**x**	**x**	**X**									
2	**PR0989**	**Groundwater**	**31/10/24 09:00**		**X**			**3**		**x**	**x**	**x**									
3	**PR0987**	**Groundwater**	**31/10/24 08:30**		**X**			**3**		**x**	**x**	**X**									
4	**PR1544**	**Groundwater**	**1/11/24 12:30**		**X**			**3**		**x**	**x**	**x**									
5	**PR1583**	**Groundwater**	**30/10/24 12:30**		**X**			**3**		**x**	**x**	**x**									
6	**PR1612**	**Groundwater**	**1/11/24 13:00**		**X**			**3**		**x**	**x**	**x**									
7	**HRPB0002**	**Groundwater**	**2/11/24 12:40**		**X**			**1**	**x**												**Ran out of bottles**
8	**PR0985**	**Groundwater**	**31/10/24 12:20**		**X**			**3**		**x**	**x**	**x**									
9	**PR0963**	**Groundwater**	**31/10/24 11:40**		**X**			**3**		**x**	**x**	**x**									
10	**PR0982**	**Groundwater**	**31/10/24 10:50**		**X**			**3**		**x**	**x**	**x**									
11	**PR1004**	**Groundwater**	**2/11/24 08:30**		**X**			**3**		**x**	**x**	**x**									
12	**PR1225**	**Groundwater**	**2/11/24 07:20**		**X**			**3**		**x**	**x**	**x**									
13	**PR1219**	**Groundwater**	**1/11/24 09:45**		**X**			**3**		**x**	**x**	**x**									
14	**PR1292**	**Groundwater**	**1/11/24 11:30**		**X**			**3**		**x**	**x**	**x**									
15	**PR1293**	**Groundwater**	**1/11/24 10:50**		**X**			**3**		**x**	**x**	**x**									

16	**PR1441**	**Groundwater**	**1/11/24 08:30**		**X**			**3**		**x**	**x**	**x**									
17	**PR1465**	**Groundwater**	**30/10/24 13:40**		**X**			**3**		**x**	**x**	**x**									
18	**Supply Bore**	**Groundwater**	**2/11/24 14:40**		**X**			**1**	**x**												**Ran out of bottles**
19	**Duplicate 1**	**Groundwater**			**X**			**3**		**x**	**x**	**x**									
20	**Duplicate 2**	**Groundwater**			**X**			**3**		**x**	**x**	**x**									
21	**Duplicate 3**	**Groundwater**			**X**			**3**		**x**	**x**	**x**									
22	**Duplicate 4**	**Groundwater**			**X**			**3**		**x**	**x**	**x**									

Relinquished By: L. Storey	Date/Time: 04/11/24	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Samples Intact: *Yes / No*	Temperature: *Ambient / Chilled / NA*	Sample Security Sealed: *Yes / No*	Quarantine: *Yes / No*
Sampling by SGS (circle) : *Yes / No*	**Sampler ID:**	**Sampling Method (circle):** AN902, Bore or AN906, Grab	
Comments / Subcontracting details: *i.e. samples subcontracted to SGS Sydney due to TAT requested*			Hazards: *e.g. may contain Asbestos*

REGISTRATION DETAILS
Bottle Map

Doc. No.	PF-AU-ENVLTS-PAP-QU101
Rev. No.	8.0 DRAFT
Date	08/03/2022

Sample Numbers:	1L Plastic Green	500mL Plastic Green	250mL Plastic Green	125mL Plastic Green	125mL UF/F Plastic Red	1L Amber Green	500mL Amber Green	100mL Amber Green	40mL Glass Vial VOC	40mL Glass Vial HAA	250mL Plastic Purple	500mL Plastic Blue	500mL Amber Orange	250mL Plastic Orange	125mL Plastic Brown	1L Plastic Yellow	250mL Glass Jar	125mL Glass Jar	Ziplock Bag/ Other
1		1			1									1					
2		1			1									1					
3		1			1									1					
4		1			1									1					
5		1			1									1					
6	1				1									1					
7	1																		
8		1			1									1					
9		1			1									1					
10		1			1									1					
11		1			1									1					
12	1				1									1					

Job Number: PE 179202

# of Eskies: 3

Temp (°C):

- ☐ IB:
- ☐ ICE:
- ☐ None: 19-20

Tray Numbers:
W437
W438
MFGS
SH1

Registration comments by local team (For GBS):

4/11/24 15:20

Pre-registration/ unpacking comments for local team:

☐ Green dot on metal bottle

Is this a Boomerang Esky?	Y or N	Boomerang Due Date:		Pre-registered By: ED	Unpacked By: AR

SGS

REGISTRATION DETAILS
Bottle Map

Doc. No.	PF-AU-ENVLTS-PAP-QU101
Rev. No.	8.0 DRAFT
Date	08/03/2022

Sample Numbers:	1L Plastic Green	500mL Plastic Green	250mL Plastic Green	125mL Plastic Green	125mL UF/F Plastic Red	1L Amber Green	500mL Amber Green	100mL Amber Green	40mL Glass Vial VOC	40mL Glass Vial HAA	250mL Plastic Purple	500mL Plastic Blue	500mL Amber Orange	250mL Plastic Orange	125mL Plastic Brown	1L Plastic Yellow	250mL Glass Jar	125mL Glass Jar	Ziplock Bag/ Other
13		1			1									1					
14		1			1									1					
15		1			1									1					
16		1			1									1					
17		1			1									1					
18	1																		
19		1			1									1					
20		1			1									1					
21		1			1									1					
22		1			1									1					

Job Number: PE

# of Eskies:

Temp (°C):

☐ IB:

☐ ICE:

☐ None:

Tray Numbers:

Registration comments by local team (For GBS):

Pre-registration/ unpacking comments for local team:

Only 1 bottle provided for samples 7 & 18.

☐ Green dot on metal bottle

Is this a Boomerang Esky?	Y or N	Boomerang Due Date:		Pre-registered By:	Unpacked By: AR

SGS

SGS AUSTRALIA PROPOSAL FOR SERVICES

QUOTE NUMBER: **AQ2 - IE - SEP 24 - 1808436**

Number of Samples: 20

Quote issued Date: 19/09/2024

Quote Valid Until: 31/12/2024

Organisation: AQ2

Contact Name: Alex Storey

Email: Alex.Storey@aq2.com.au

Phone: 0417 183 224

Project Reference: Groundwater testing

SGS

PRICING

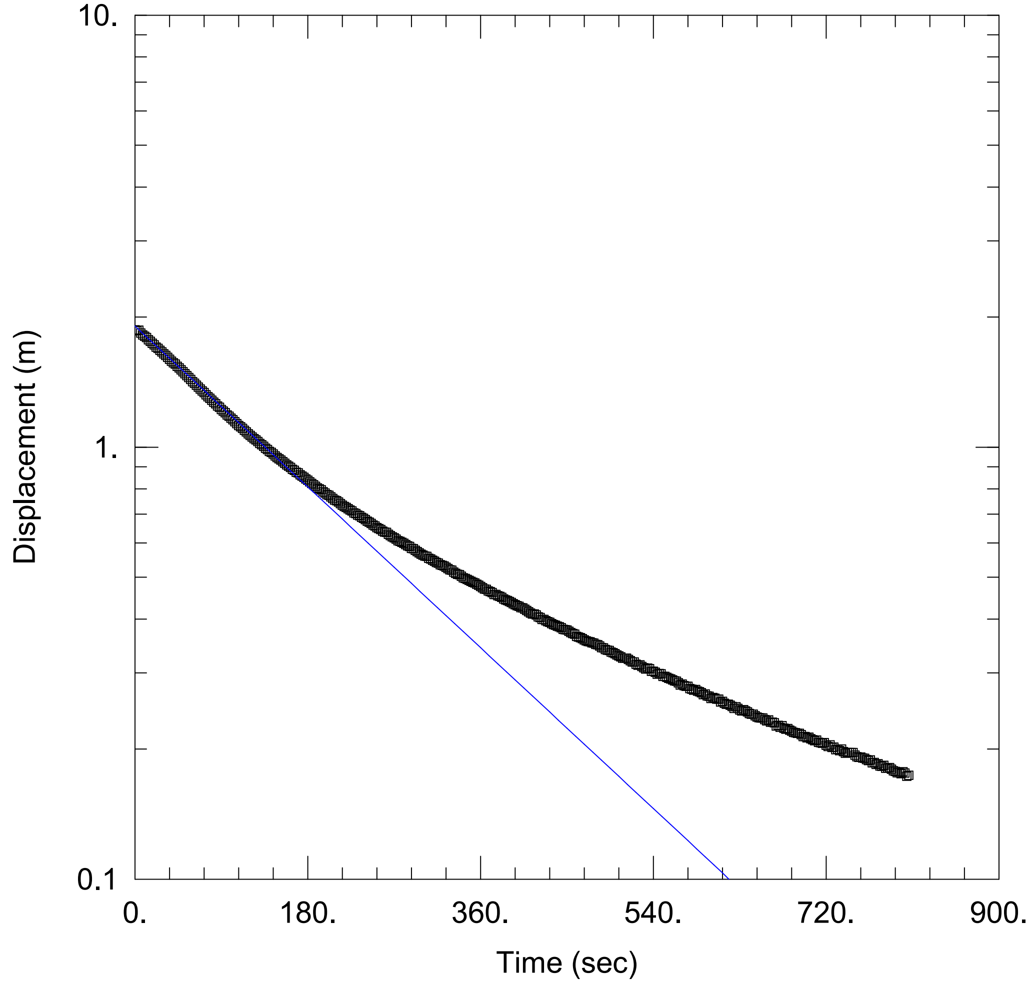
Table 1: Groundwater testing

PARAMETER	REFERENCE	LOR (µg/L)	UNIT PRICE	UNITS	COST
WQ1 Basic Water Physicals			**$8.80**	**20**	**$176.00**
pH	APHA 4500 H	0.1 pH units			
Conductivity (EC)	APHA 2510B	2 µS/cm			
Solids, total dissolved (TDS, 180°C)	APHA 2540 C	10 mg/L	$14.30	20	$286.00
AN1 Major Anions			**$30.25**	**20**	**$605.00**
Alkalinity - HCO3, CO3, CaCo3	APHA 2320B	5 mg CaCO3/L			
Sulfate (SO4)	APHA 4500 SO42-	1 mg/L			
Chloride (Cl)	APHA 4500 Cl-	1 mg/L			
CA1 Major Cations			**$16.94**	**20**	**$338.80**
Ca, K, Mg, Na	USEPA 6020/APHA3120B	0.1; 0.5 mg/L			
Hexavalent Chromium	APHA 3500 Cr B	0.05 mg/L	$24.64	20	$492.80
25 Dissolved Metals			**$63.58**	**20**	**$1,271.60**
Ag, Al, As, B, Ba, Be, Bi, Cd, Co, Cu, Fe, Hg, La, Mn, Mo, Ni, Pb, Si, Sb, Se, Sn, Th, Tl, U, V, Zn	USEPA 200.8/3050/6010B	0.1-5			
Nitrate as N + NOX	APHA 4500 NO3-	0.05 mg/L	$20.57	20	$411.40
Nitrite as N	APHA 4500 NO2-	0.05 mg/L	$12.32	20	$246.40
Phosphorus (total)	APHA 4500 P	0.02 mg/L	$16.50	20	$330.00
Fluoride in Water	APHA 4500 F-	0.1 mg/L	$12.10	20	$242.00
Total Cr	USEPA 200.8/3050/6010B/6020	0.1-5	$2.42	20	$48.40
Administration Fee (Per Batch)			$40.00	1	$40.00
Disposal Fees (Per Sample)			$1.00	20	$20.00
TOTAL (Excluding GST)					$4,508.40

Bottles Required per sample

Bottle	Size	Material	Preservative	Label	Quantity
Phys Chem 1000	1000ml	HDPE	Exclude Air	Green	1
Phys Chem 500	500ml	HDPE	Exclude Air	Green	1
Metals 125	125ml	HDPE	Acid Washed	Red	1
Nutrients	125ml	HDPE	H2SO4	Orange	1

APPENDIX B
FHT ANALYSIS PLOTS



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\HRPB0002.aqt
Date: 11/13/24 Time: 09:40:50

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: HRPB0002
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 41.6 m
Anisotropy Ratio (Kz/Kr): 1.

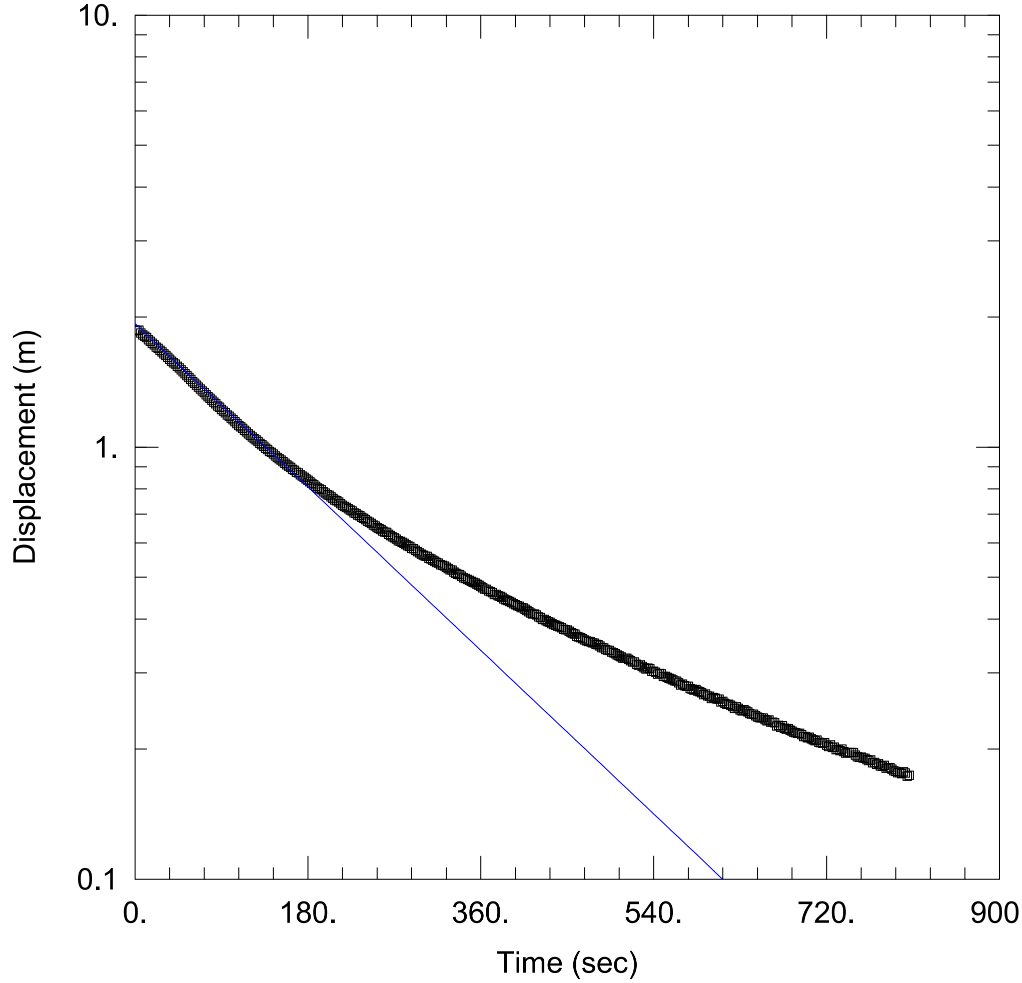
WELL DATA (New Well)

Initial Displacement: 1.867 m
Total Well Penetration Depth: 41.6 m
Casing Radius: 0.1 m
Static Water Column Height: 41.6 m
Screen Length: 24. m
Well Radius: 0.15 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.3677 m/day
y0 = 1.905 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\HRPB0002.aqt
Date: 11/13/24 Time: 09:41:41

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: HRPB0002
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 41.6 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

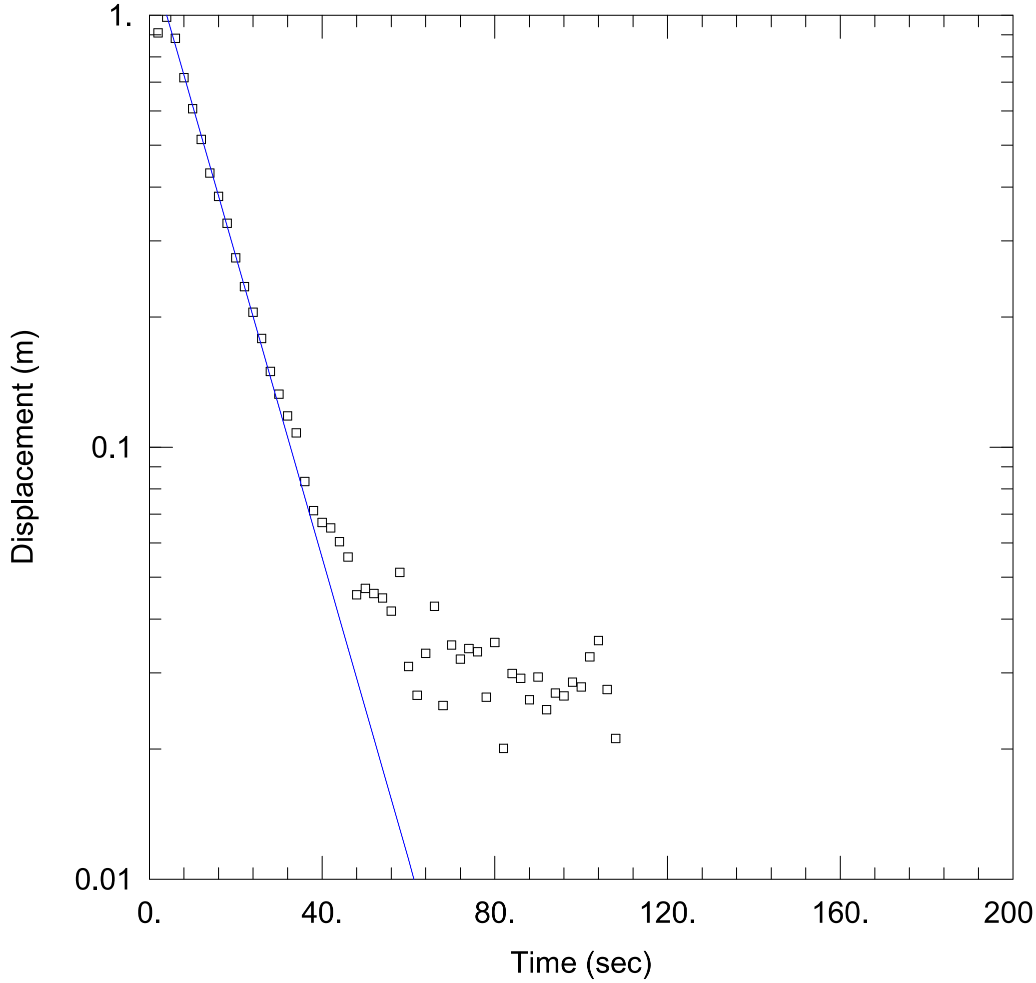
Initial Displacement: 1.867 m
Total Well Penetration Depth: 41.6 m
Casing Radius: 0.1 m

Static Water Column Height: 41.6 m
Screen Length: 24. m
Well Radius: 0.15 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.5025 m/day y0 = 1.932 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0963.aqt
Date: 11/13/24 Time: 08:54:49

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0963
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 39.16 m Anisotropy Ratio (Kz/Kr): 1.

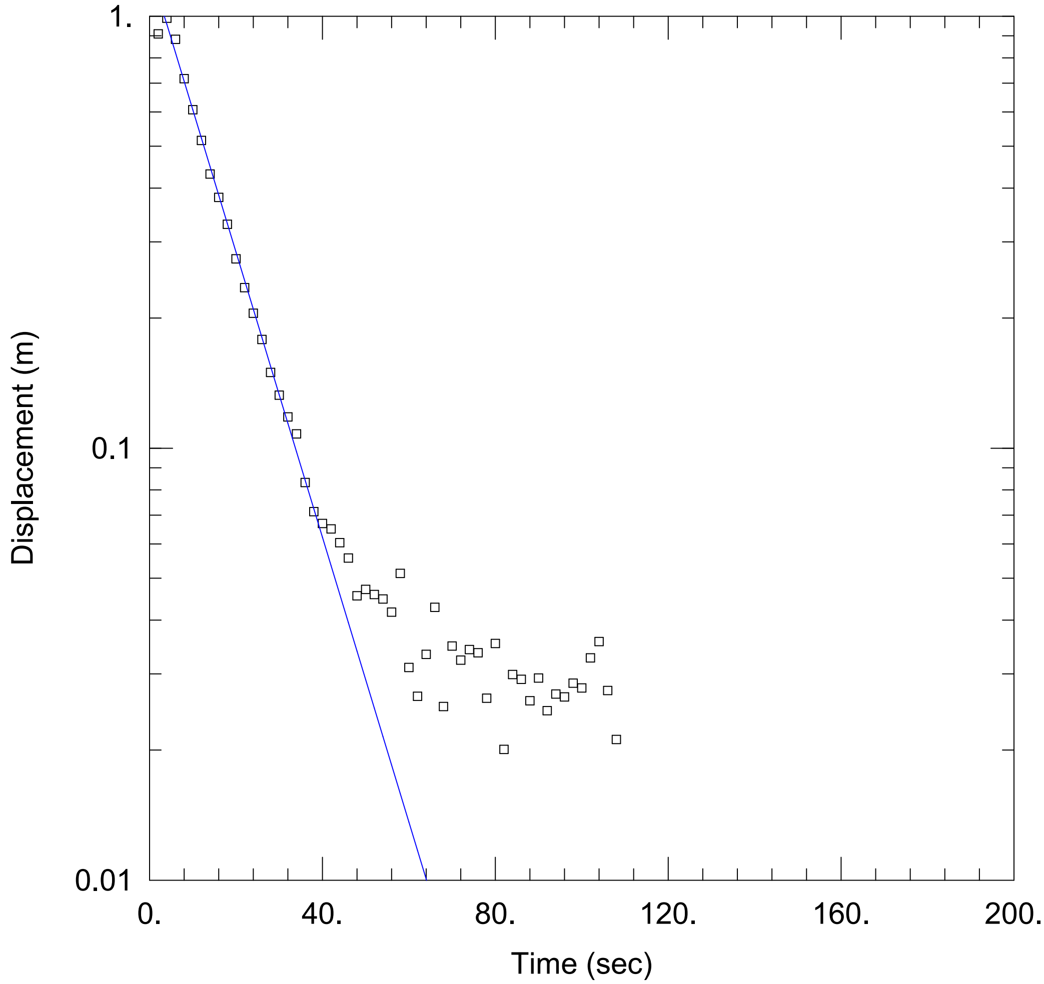
WELL DATA (New Well)

Initial Displacement: 1.171 m Static Water Column Height: 39.16 m
Total Well Penetration Depth: 39.16 m Screen Length: 24. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.4761 m/day y0 = 1.38 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0963.aqt
Date: 11/13/24 Time: 08:53:32

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0963
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 39.16 m Anisotropy Ratio (Kz/Kr): 1.

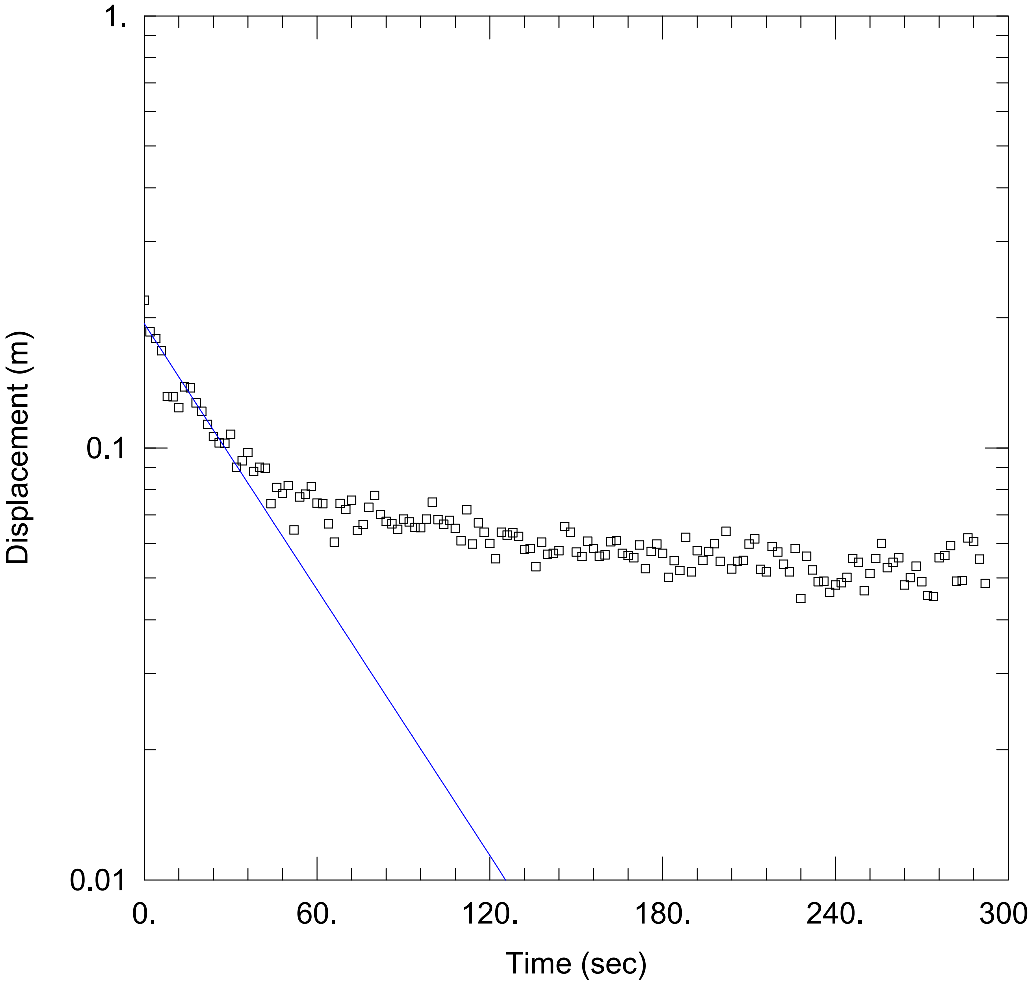
WELL DATA (New Well)

Initial Displacement: 1.171 m Static Water Column Height: 39.16 m
Total Well Penetration Depth: 39.16 m Screen Length: 24. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.5799 m/day y0 = 1.297 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0967.aqt
Date: 11/13/24 Time: 08:58:23

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0967
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 89.41 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

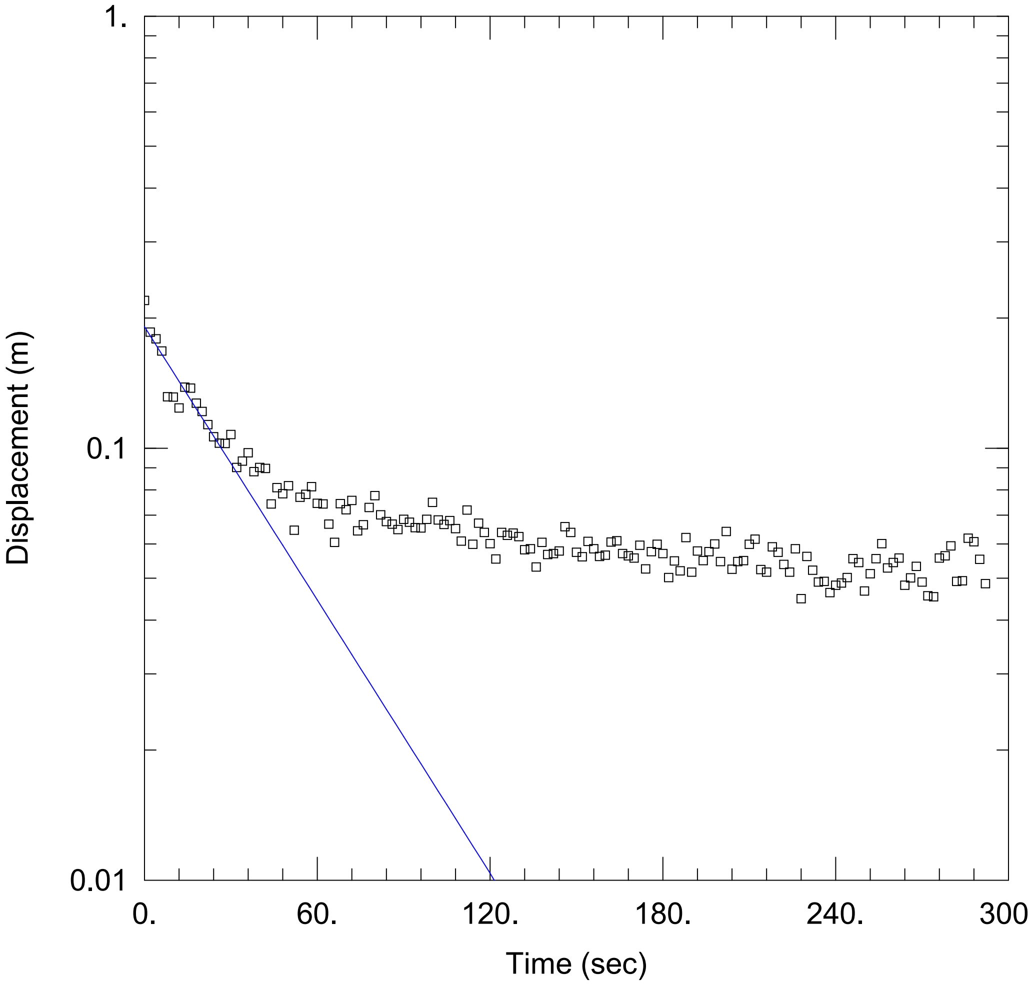
Initial Displacement: 0.2196 m
Total Well Penetration Depth: 89.41 m
Casing Radius: 0.025 m

Static Water Column Height: 89.41 m
Screen Length: 84. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04846 m/day y0 = 0.1939 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0967.aqt
Date: 11/13/24 Time: 08:57:36

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0967
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 89.41 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

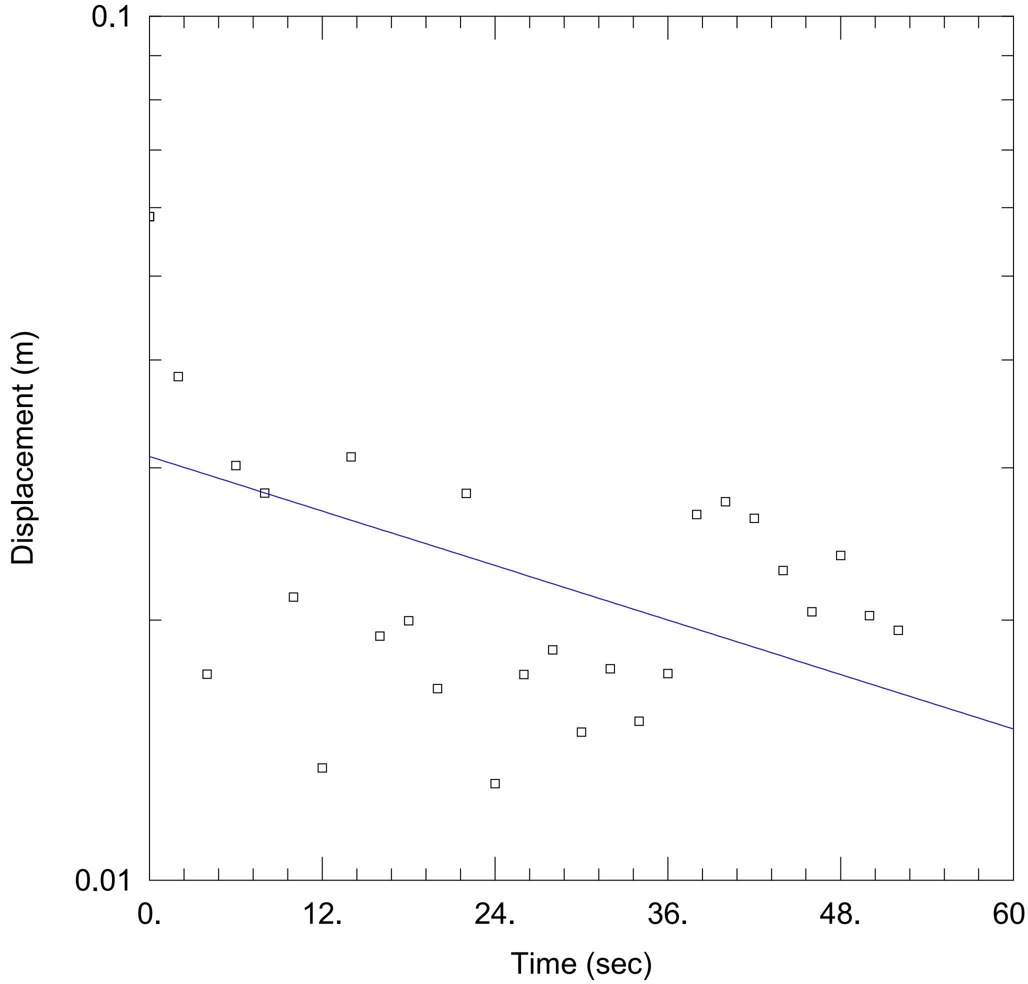
Initial Displacement: 0.2196 m
Total Well Penetration Depth: 89.41 m
Casing Radius: 0.025 m

Static Water Column Height: 89.41 m
Screen Length: 84. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.06274 m/day y0 = 0.1909 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0982.aqt
Date: 11/13/24 Time: 10:25:03

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0982
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 46.41 m Anisotropy Ratio (Kz/Kr): 1.

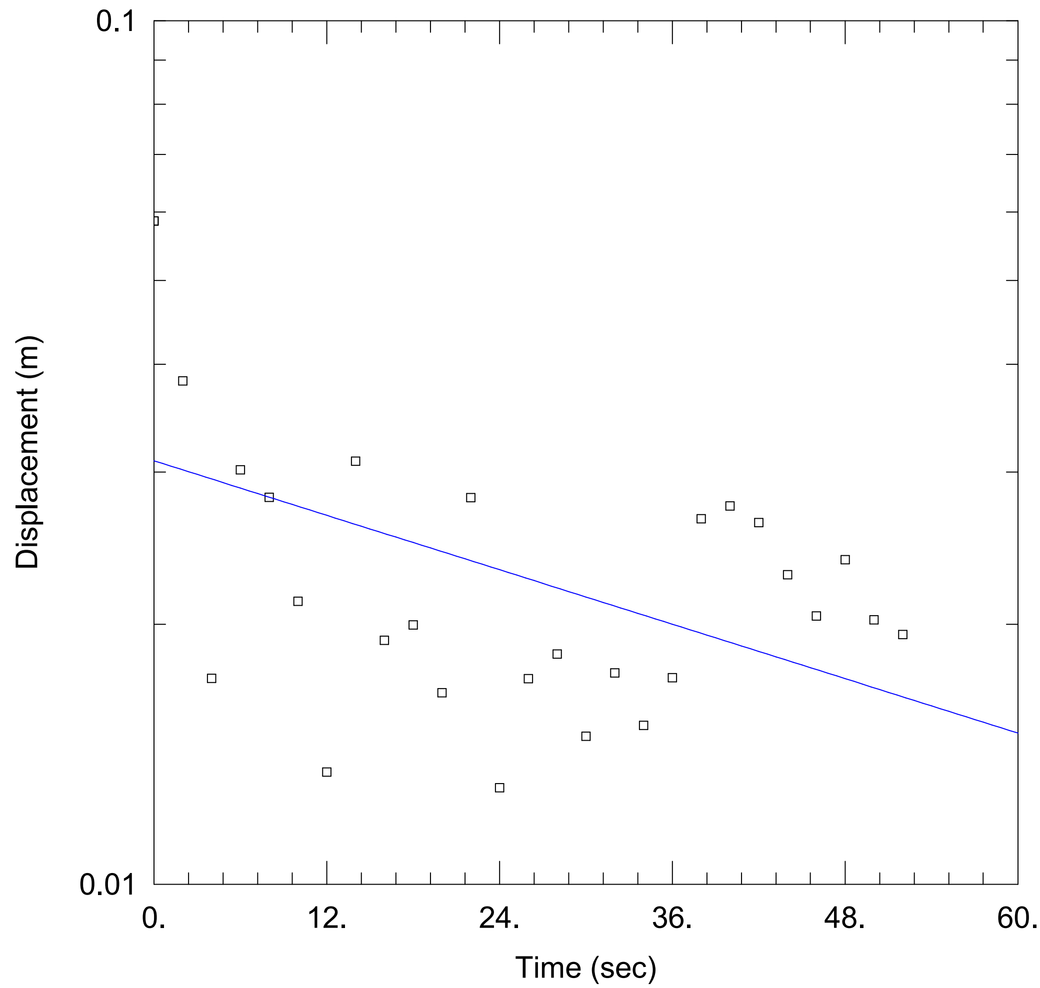
WELL DATA (New Well)

Initial Displacement: 0.05861 m Static Water Column Height: 46.41 m
Total Well Penetration Depth: 46.41 m Screen Length: 42. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04369 m/day y0 = 0.03092 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0982.aqt
Date: 11/13/24 Time: 10:25:42

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0982
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 46.41 m
Anisotropy Ratio (Kz/Kr): 1.

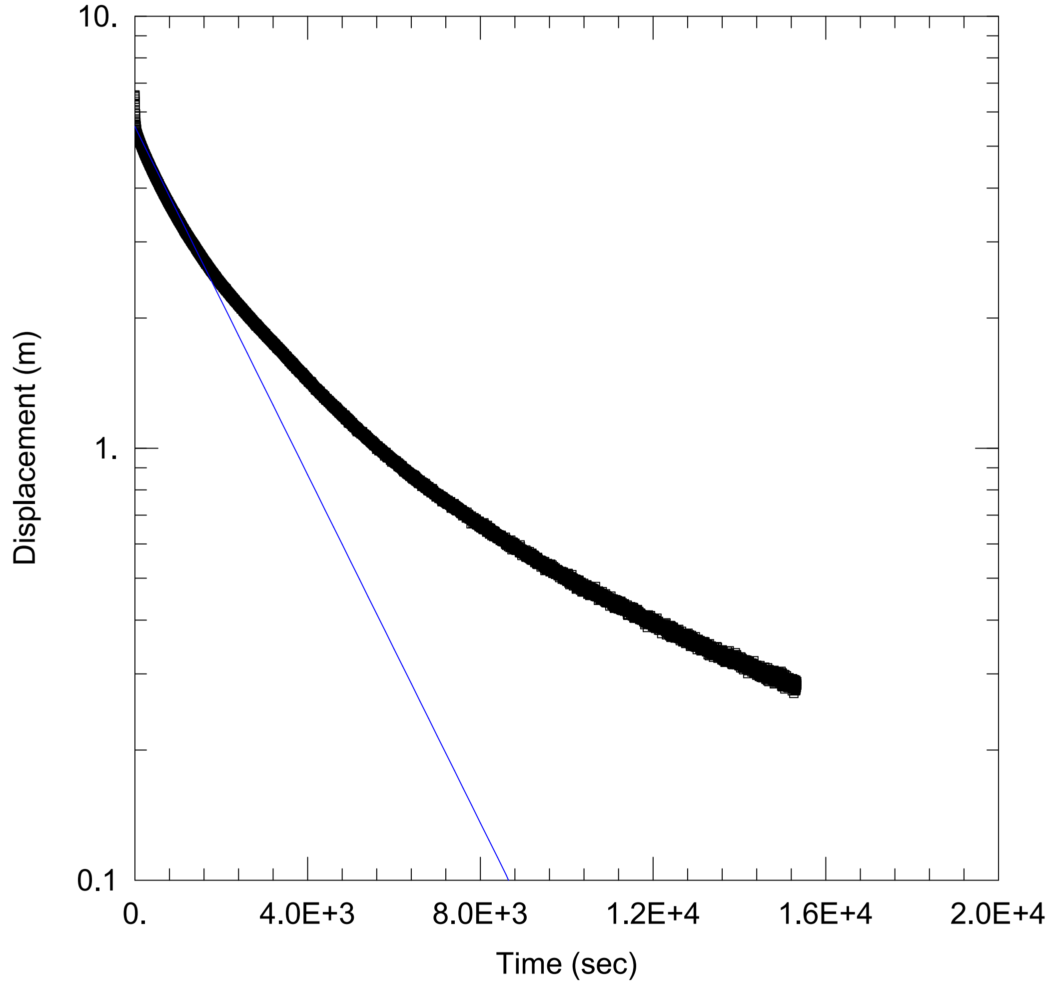
WELL DATA (New Well)

Initial Displacement: 0.05861 m
Total Well Penetration Depth: 46.41 m
Casing Radius: 0.025 m
Static Water Column Height: 46.41 m
Screen Length: 42. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.05717 m/day
y0 = 0.03092 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0985.aqt
Date: 11/13/24 Time: 09:34:36

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0985
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 31.08 m
Anisotropy Ratio (Kz/Kr): 1.

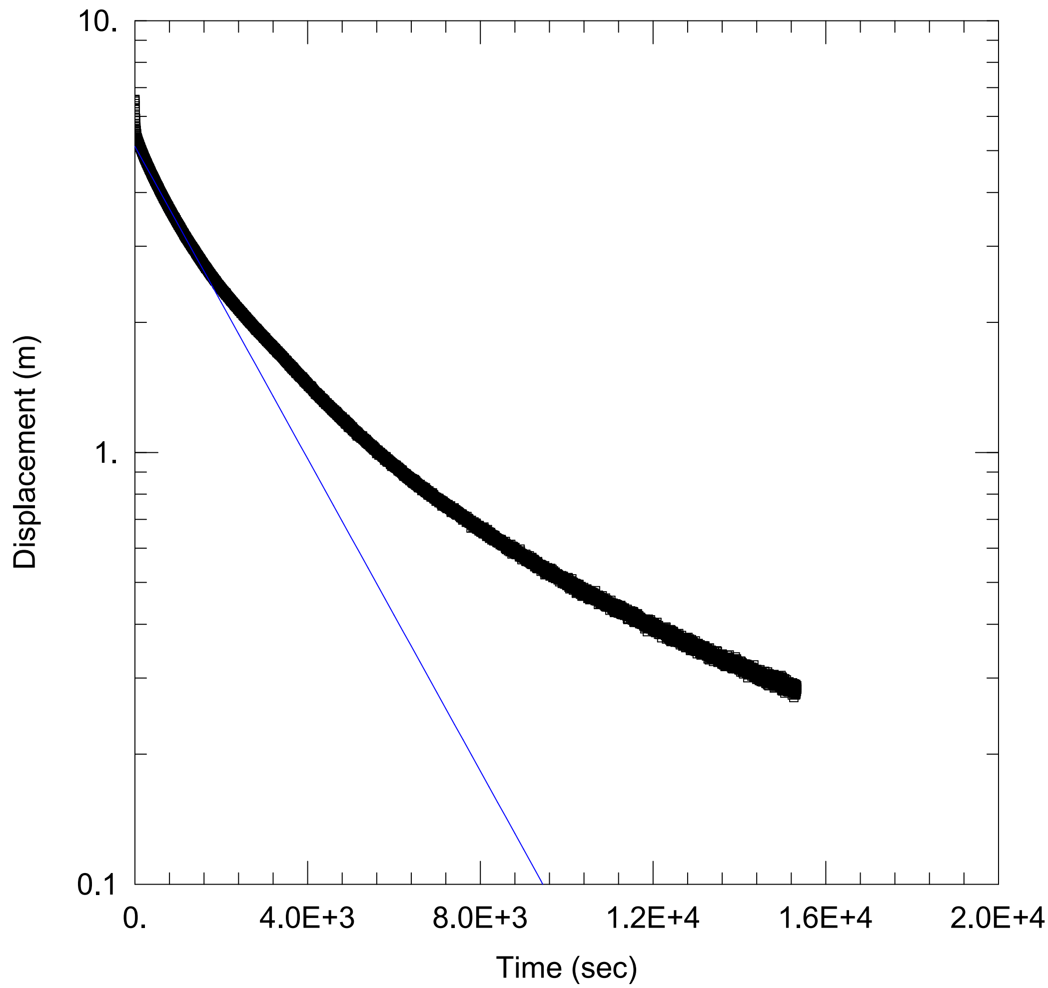
WELL DATA (New Well)

Initial Displacement: 6.571 m
Total Well Penetration Depth: 31.08 m
Casing Radius: 0.025 m
Static Water Column Height: 31.08 m
Screen Length: 24. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.002663 m/day
y0 = 5.546 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0985.aqt
Date: 11/13/24 Time: 09:32:25

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0985
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 31.08 m Anisotropy Ratio (Kz/Kr): 1.

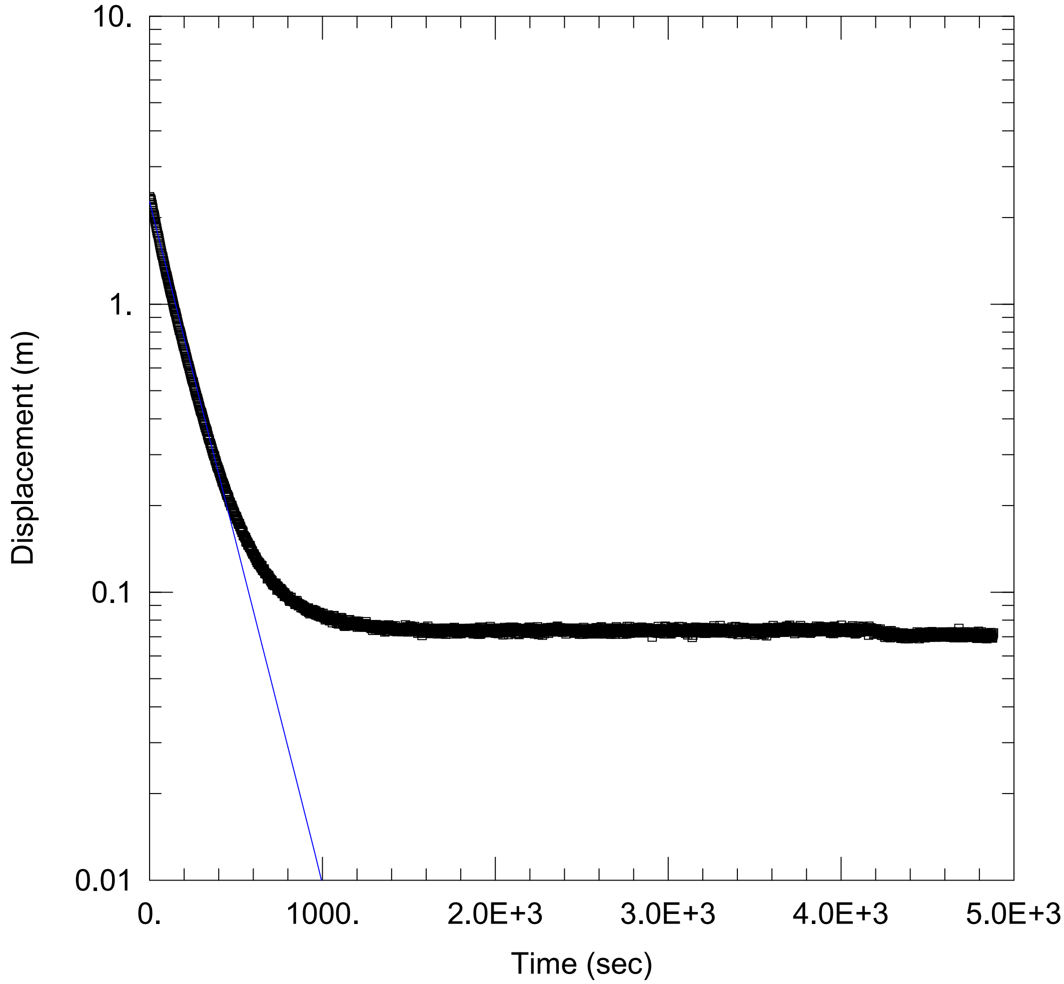
WELL DATA (New Well)

Initial Displacement: 6.571 m Static Water Column Height: 31.08 m
Total Well Penetration Depth: 31.08 m Screen Length: 24. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.003181 m/day y0 = 5.113 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0987.aqt
Date: 11/13/24 Time: 09:36:19

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0987
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 58.15 m
Anisotropy Ratio (Kz/Kr): 1.

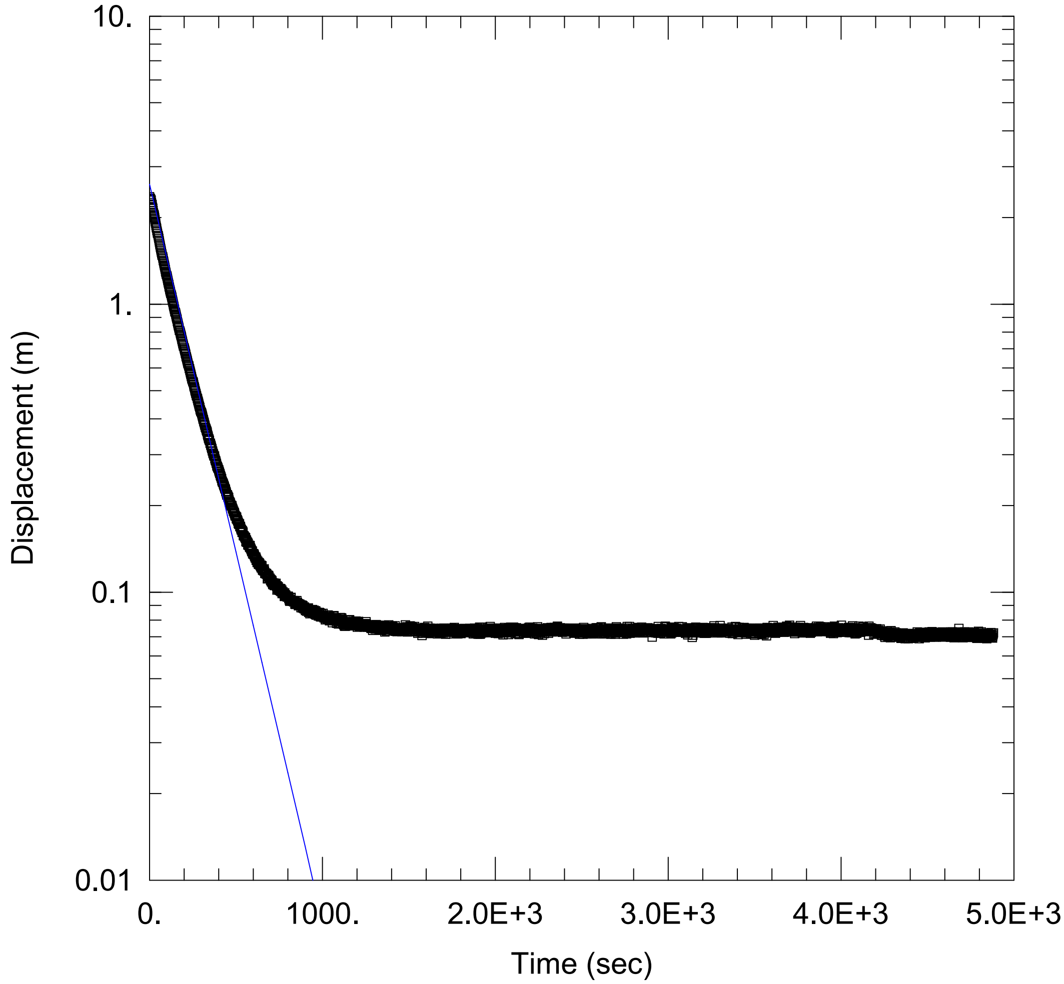
WELL DATA (New Well)

Initial Displacement: 2.358 m
Static Water Column Height: 58.15 m
Total Well Penetration Depth: 58.15 m
Screen Length: 48. m
Casing Radius: 0.025 m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0179 m/day
y0 = 2.27 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR0987.aqt
Date: 11/13/24 Time: 09:35:46

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0987
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 58.15 m Anisotropy Ratio (Kz/Kr): 1.

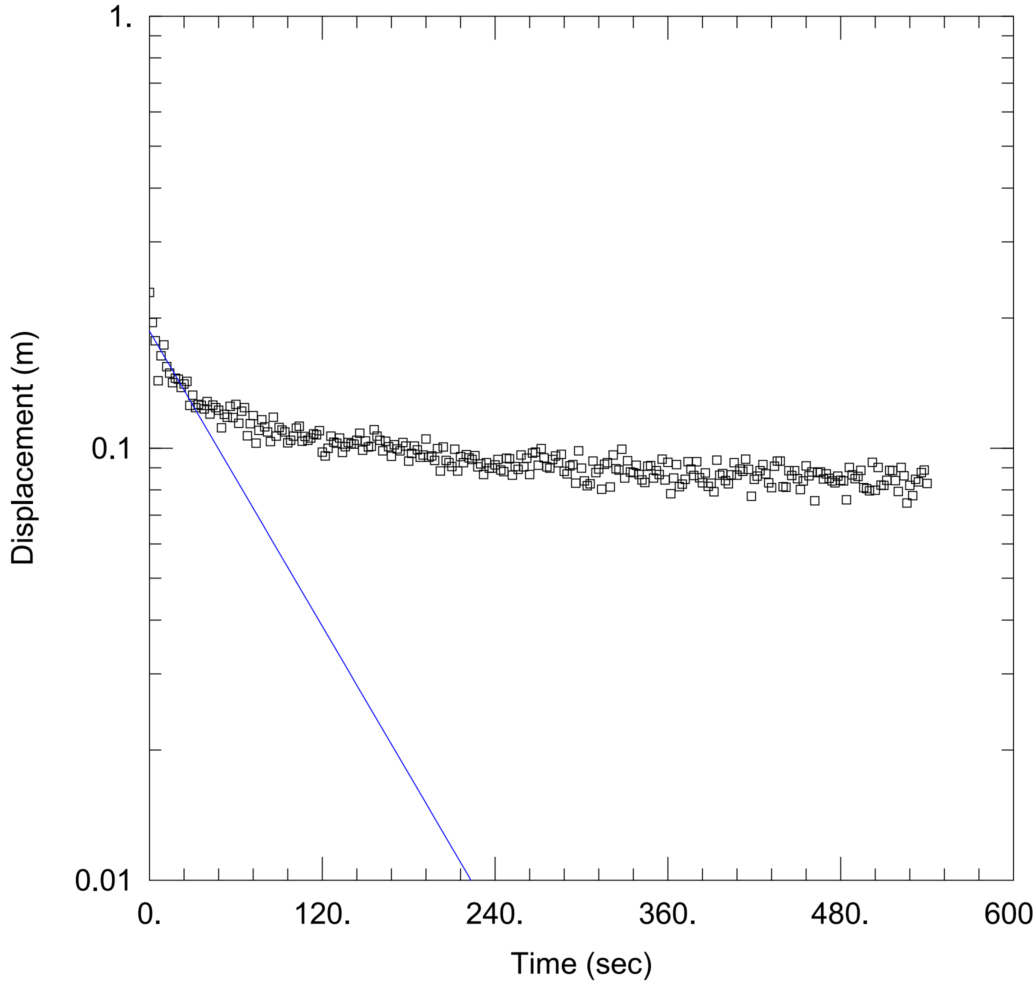
WELL DATA (New Well)

Initial Displacement: 2.358 m Static Water Column Height: 58.15 m
Total Well Penetration Depth: 58.15 m Screen Length: 48. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.02475 m/day y0 = 2.604 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR989.aqt
Date: 11/13/24 Time: 09:43:56

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0989
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 83.85 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

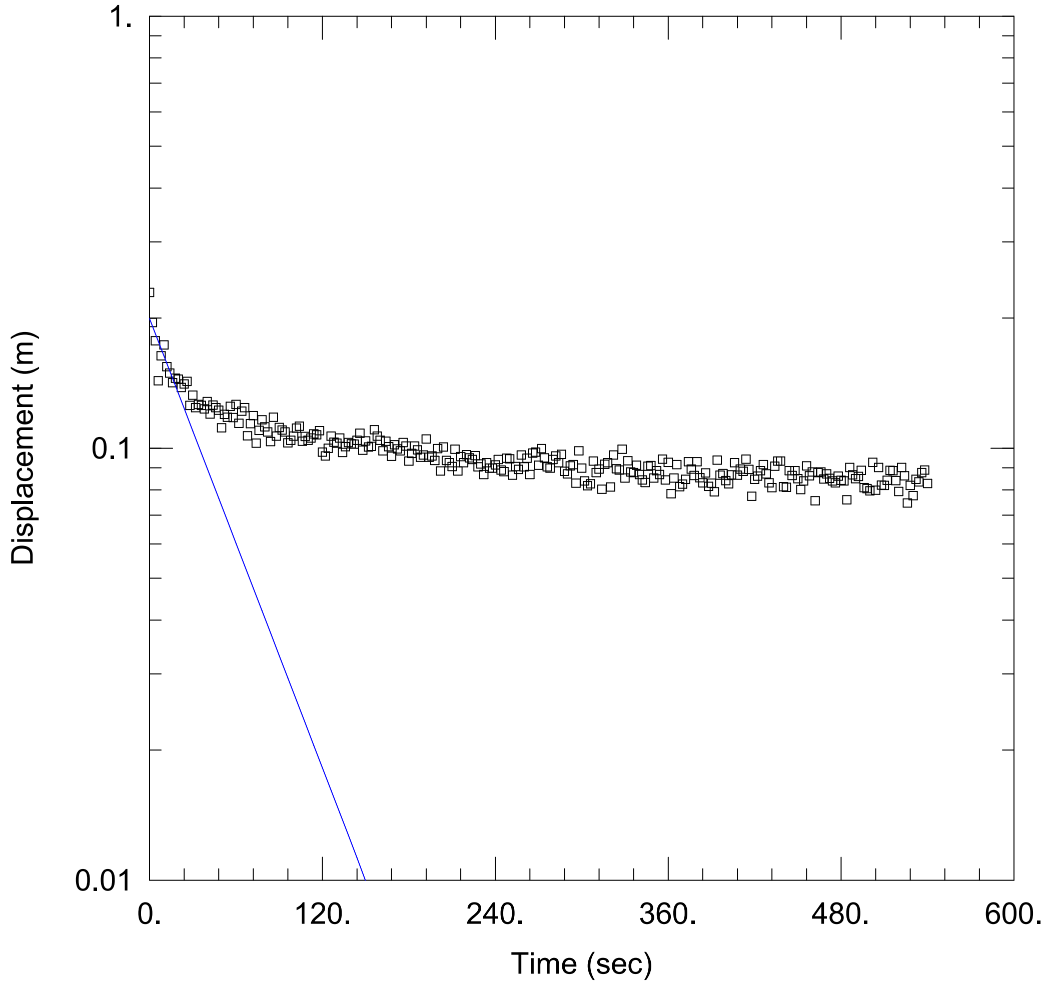
Initial Displacement: 0.2295 m
Total Well Penetration Depth: 83.85 m
Casing Radius: 0.025 m

Static Water Column Height: 83.85 m
Screen Length: 66. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0335 m/day y0 = 0.1865 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR989.aqt
Date: 11/13/24 Time: 09:43:03

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR0989
Test Date: 31/10/2024

AQUIFER DATA

Saturated Thickness: 83.85 m
Anisotropy Ratio (Kz/Kr): 1.

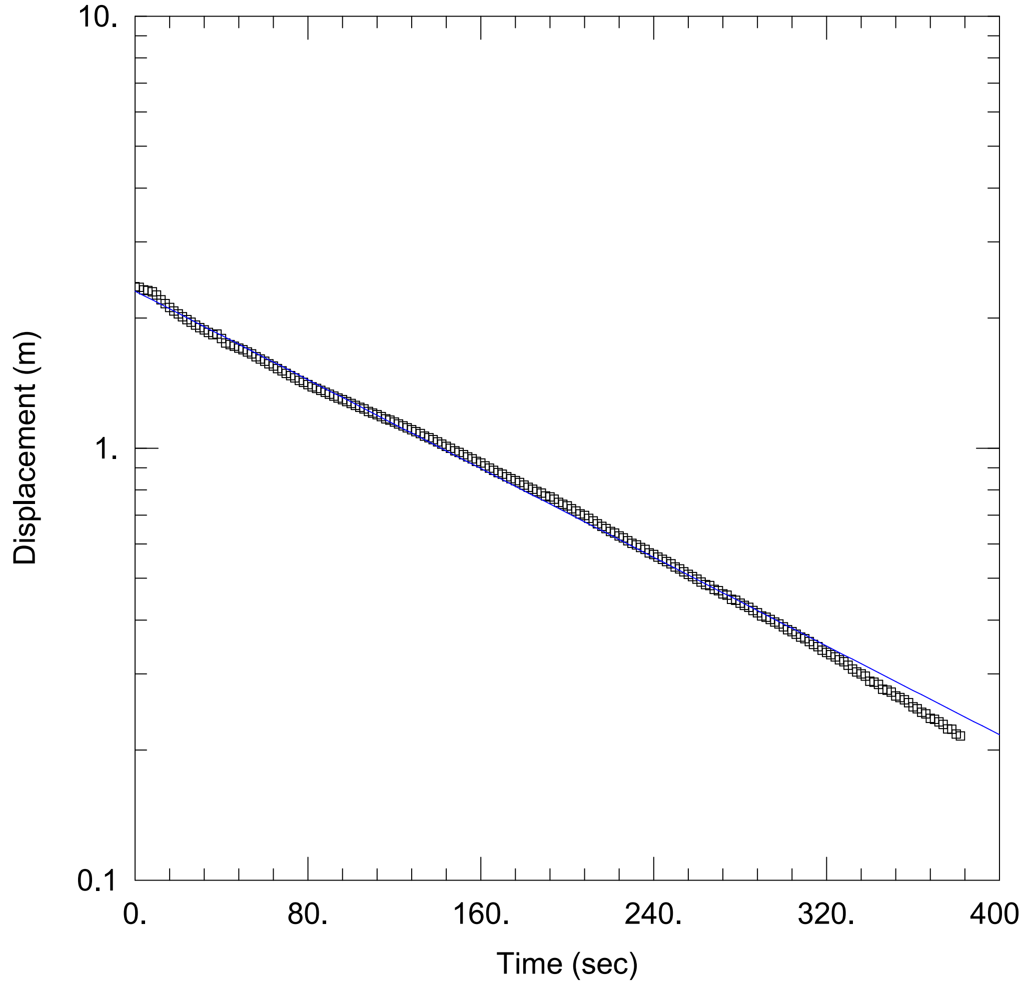
WELL DATA (New Well)

Initial Displacement: 0.2295 m
Total Well Penetration Depth: 83.85 m
Casing Radius: 0.025 m
Static Water Column Height: 83.85 m
Screen Length: 66. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0637 m/day
y0 = 0.1995 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1004.aqt
Date: 11/13/24 Time: 09:46:01

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1004
Test Date: 02/11/2024

AQUIFER DATA

Saturated Thickness: 31.18 m Anisotropy Ratio (Kz/Kr): 1.

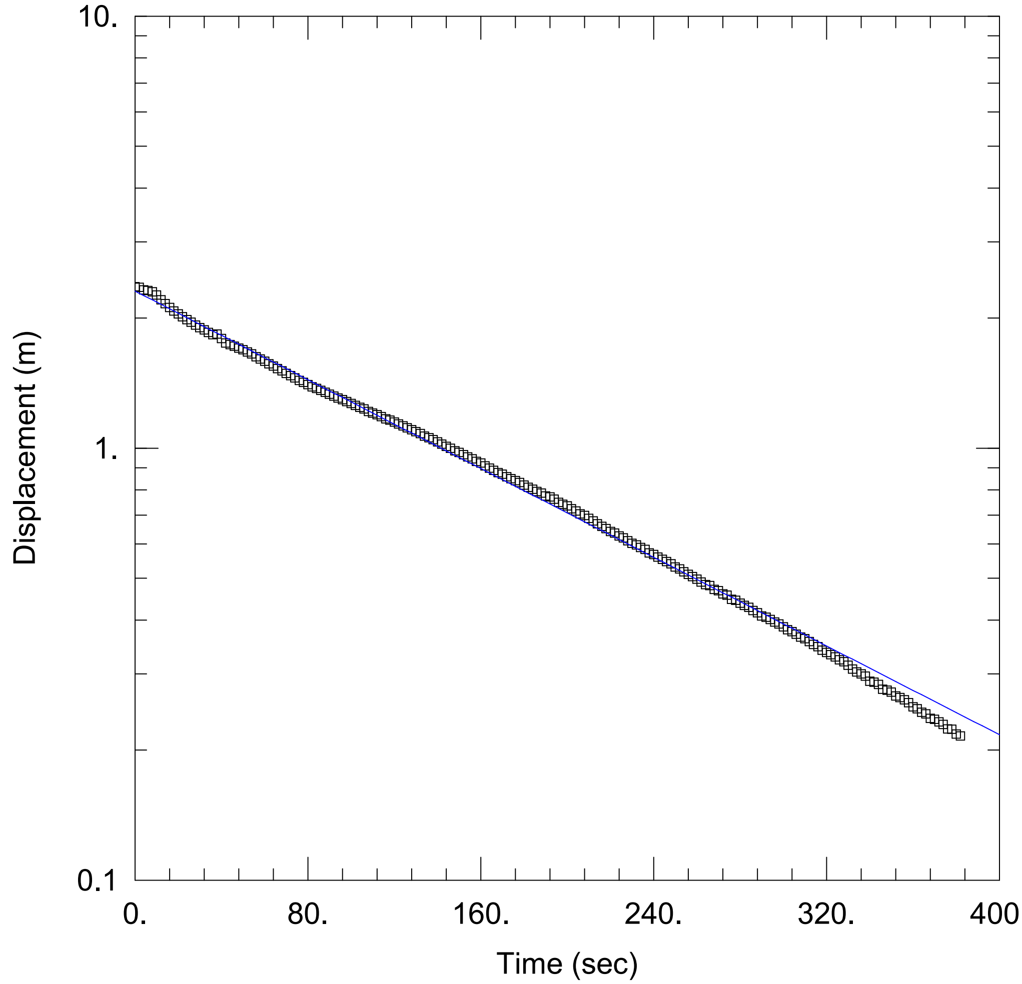
WELL DATA (New Well)

Initial Displacement: 2.366 m
Total Well Penetration Depth: 31.18 m
Casing Radius: 0.025 m
Static Water Column Height: 31.18 m
Screen Length: 24. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.03395 m/day y0 = 2.31 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1004.aqt
Date: 11/13/24 Time: 09:45:15

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1004
Test Date: 02/11/2024

AQUIFER DATA

Saturated Thickness: 31.18 m
Anisotropy Ratio (Kz/Kr): 1.

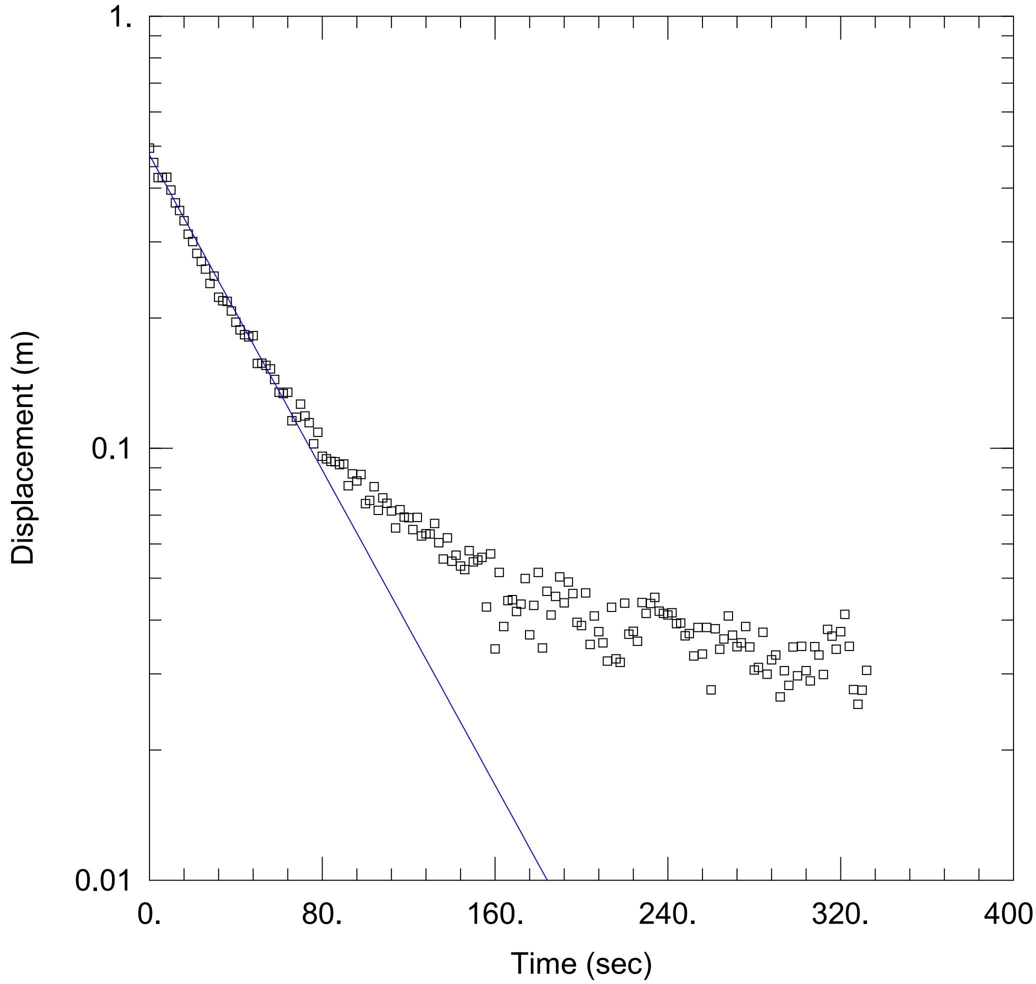
WELL DATA (New Well)

Initial Displacement: 2.366 m
Total Well Penetration Depth: 31.18 m
Casing Radius: 0.025 m
Static Water Column Height: 31.18 m
Screen Length: 24. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.04516 m/day
y0 = 2.31 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1219.aqt
Date: 11/13/24 Time: 09:48:07

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1219
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 32.68 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

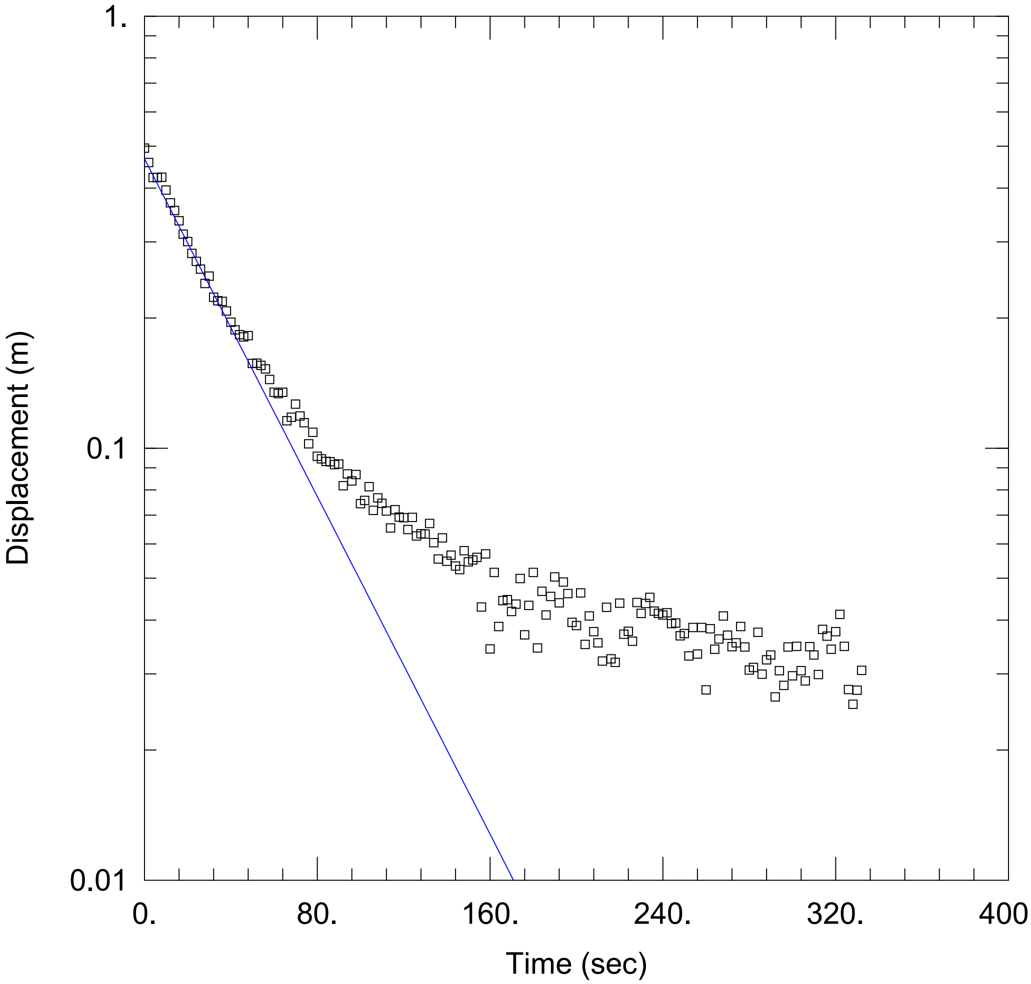
Initial Displacement: 0.4946 m
Total Well Penetration Depth: 32.68 m
Casing Radius: 0.025 m

Static Water Column Height: 32.68 m
Screen Length: 30. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.09868 m/day y0 = 0.4767 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1219.aqt
Date: 11/13/24 Time: 09:46:51

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1219
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 32.68 m
Anisotropy Ratio (Kz/Kr): 1.

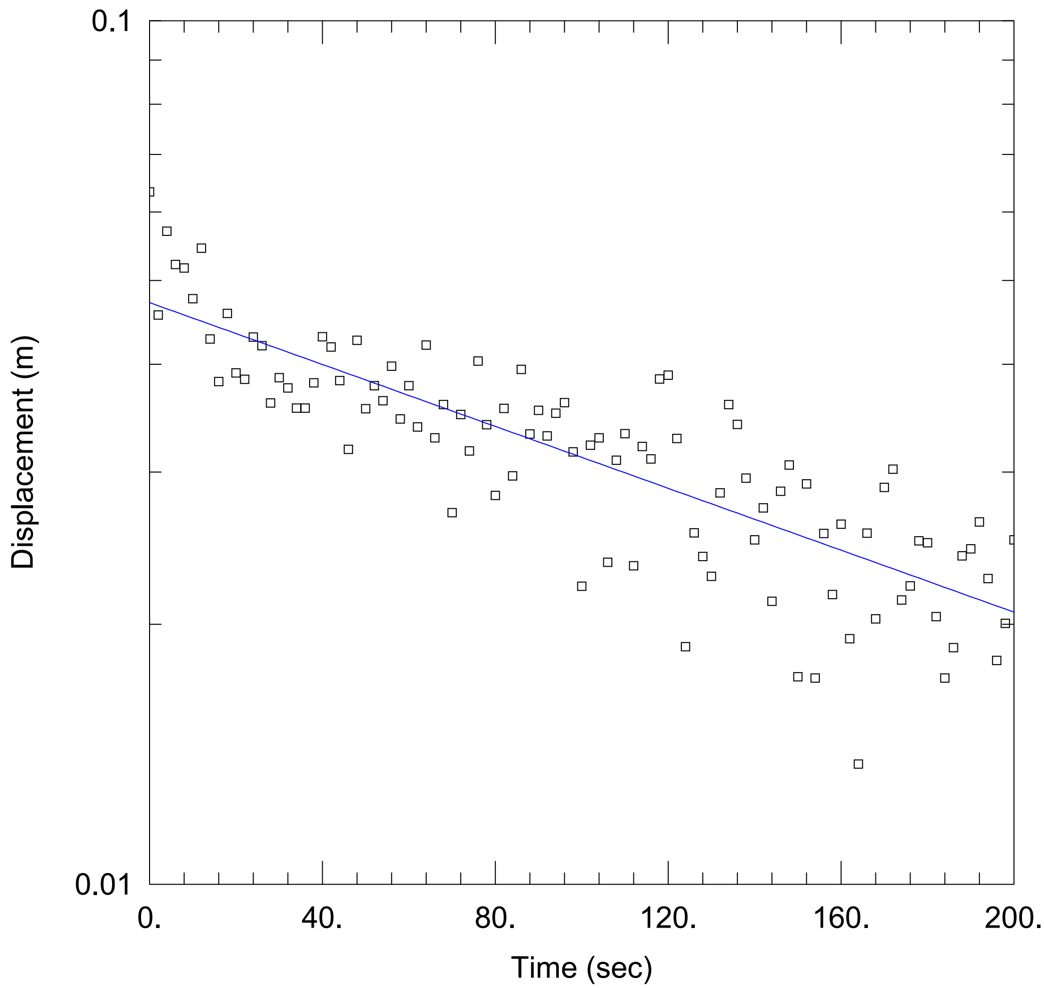
WELL DATA (New Well)

Initial Displacement: 0.4946 m
Total Well Penetration Depth: 32.68 m
Casing Radius: 0.025 m
Static Water Column Height: 32.68 m
Screen Length: 30. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.142 m/day
y0 = 0.4676 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1225.aqt
Date: 11/13/24 Time: 09:49:28

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1225
Test Date: 02/11/2024

AQUIFER DATA

Saturated Thickness: 22.36 m Anisotropy Ratio (Kz/Kr): 1.

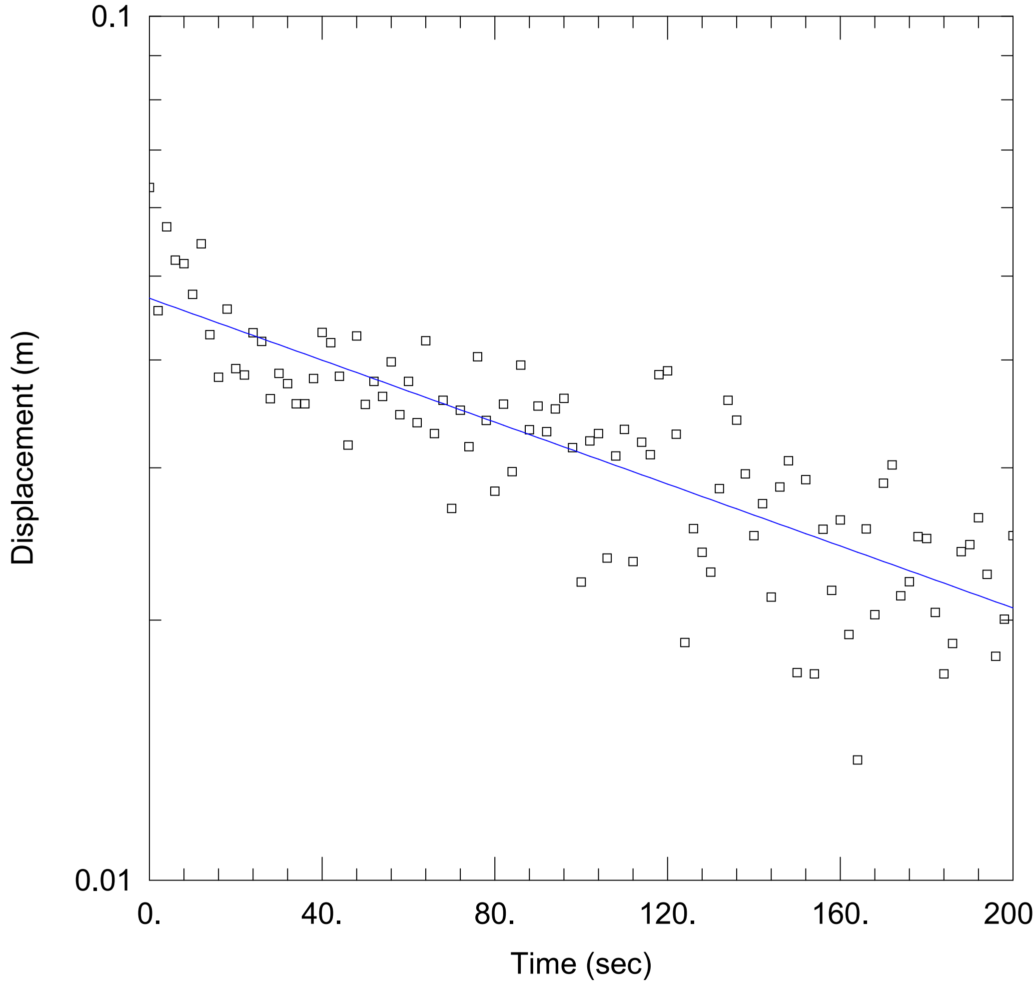
WELL DATA (New Well)

Initial Displacement: 0.06333 m Static Water Column Height: 22.36 m
Total Well Penetration Depth: 22.36 m Screen Length: 18. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.02952 m/day y0 = 0.04715 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1225.aqt
Date: 11/13/24 Time: 09:48:55

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1225
Test Date: 02/11/2024

AQUIFER DATA

Saturated Thickness: 22.36 m
Anisotropy Ratio (Kz/Kr): 1.

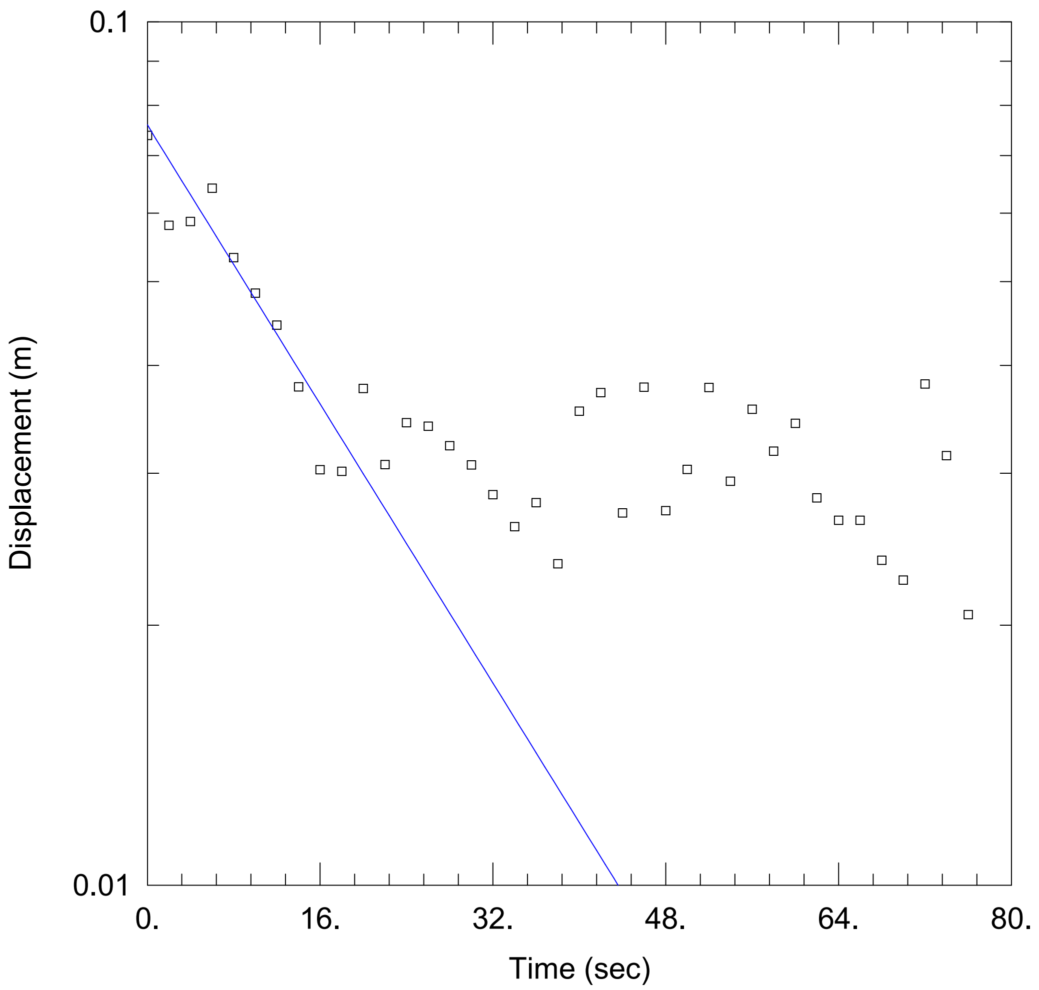
WELL DATA (New Well)

Initial Displacement: 0.06333 m
Total Well Penetration Depth: 22.36 m
Casing Radius: 0.025 m
Static Water Column Height: 22.36 m
Screen Length: 18. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.04025 m/day
y0 = 0.04715 m



WELL TEST ANALYSIS

Data Set:
Date: 11/13/24 Time: 07:56:08

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1292
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 30.57 m
Anisotropy Ratio (Kz/Kr): 1.

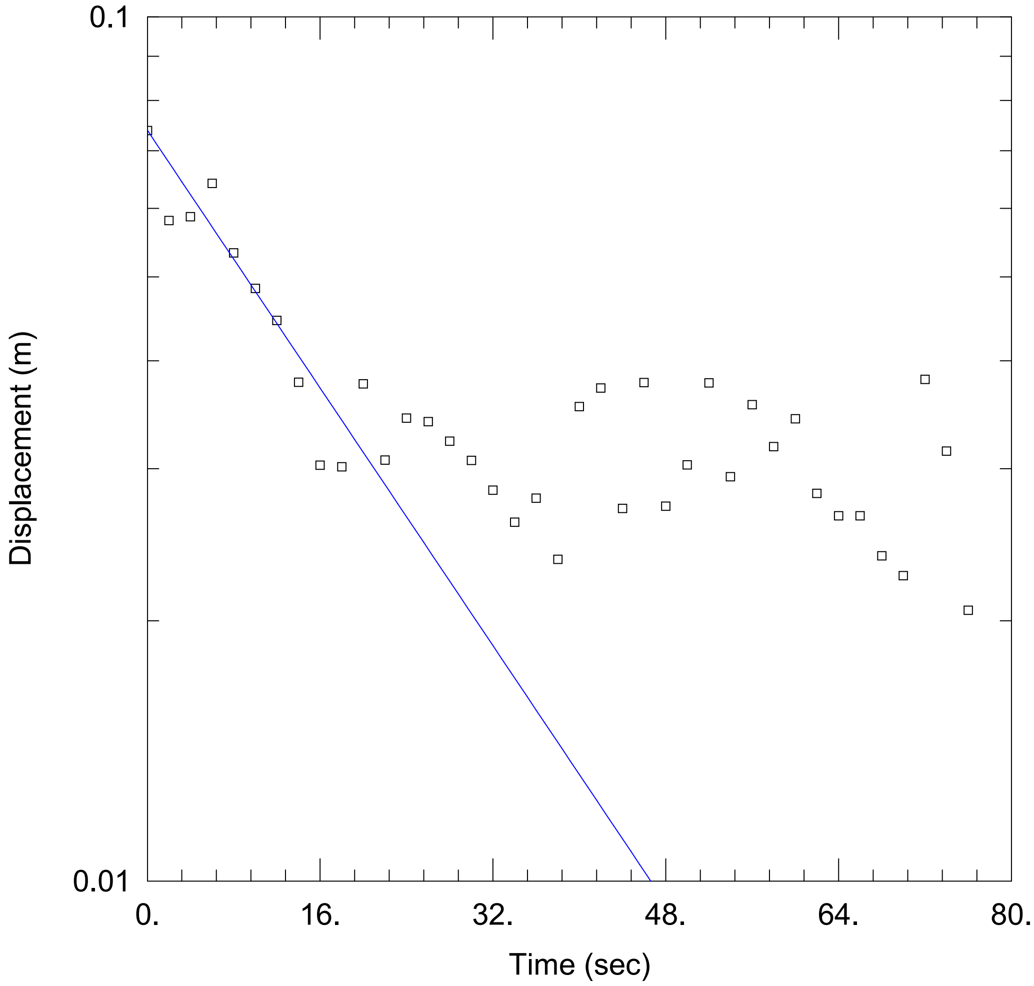
WELL DATA (New Well)

Initial Displacement: 0.07386 m
Static Water Column Height: 30.57 m
Total Well Penetration Depth: 30.57 m
Screen Length: 30. m
Casing Radius: 0.025 m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.2166 m/day
y0 = 0.07594 m



WELL TEST ANALYSIS

Data Set:
Date: 11/13/24 Time: 08:04:28

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1292
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 30.57 m Anisotropy Ratio (Kz/Kr): 1.

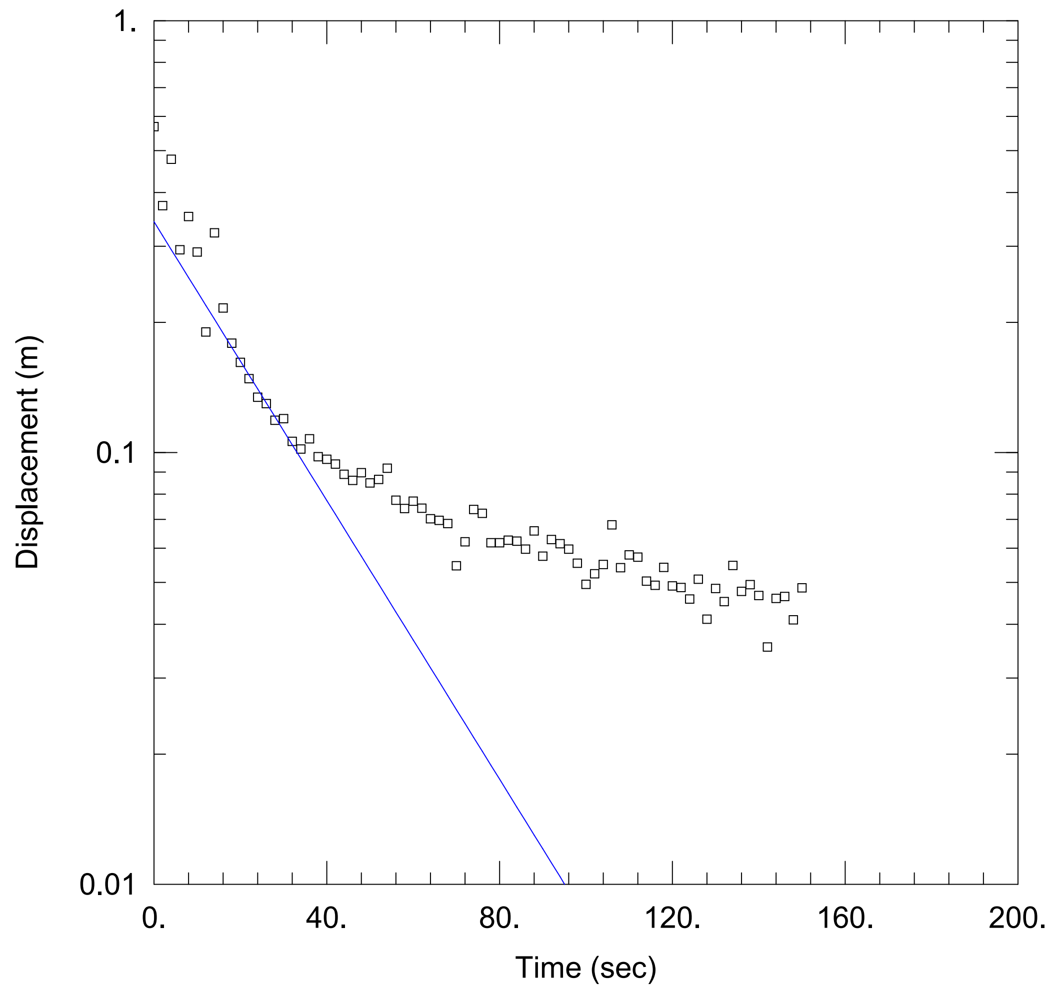
WELL DATA (New Well)

Initial Displacement: 0.07386 m Static Water Column Height: 30.57 m
Total Well Penetration Depth: 30.57 m Screen Length: 30. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.2709 m/day y0 = 0.07393 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1293.aqt
Date: 11/13/24 Time: 09:51:08

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1293
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 40.63 m Anisotropy Ratio (Kz/Kr): 1.

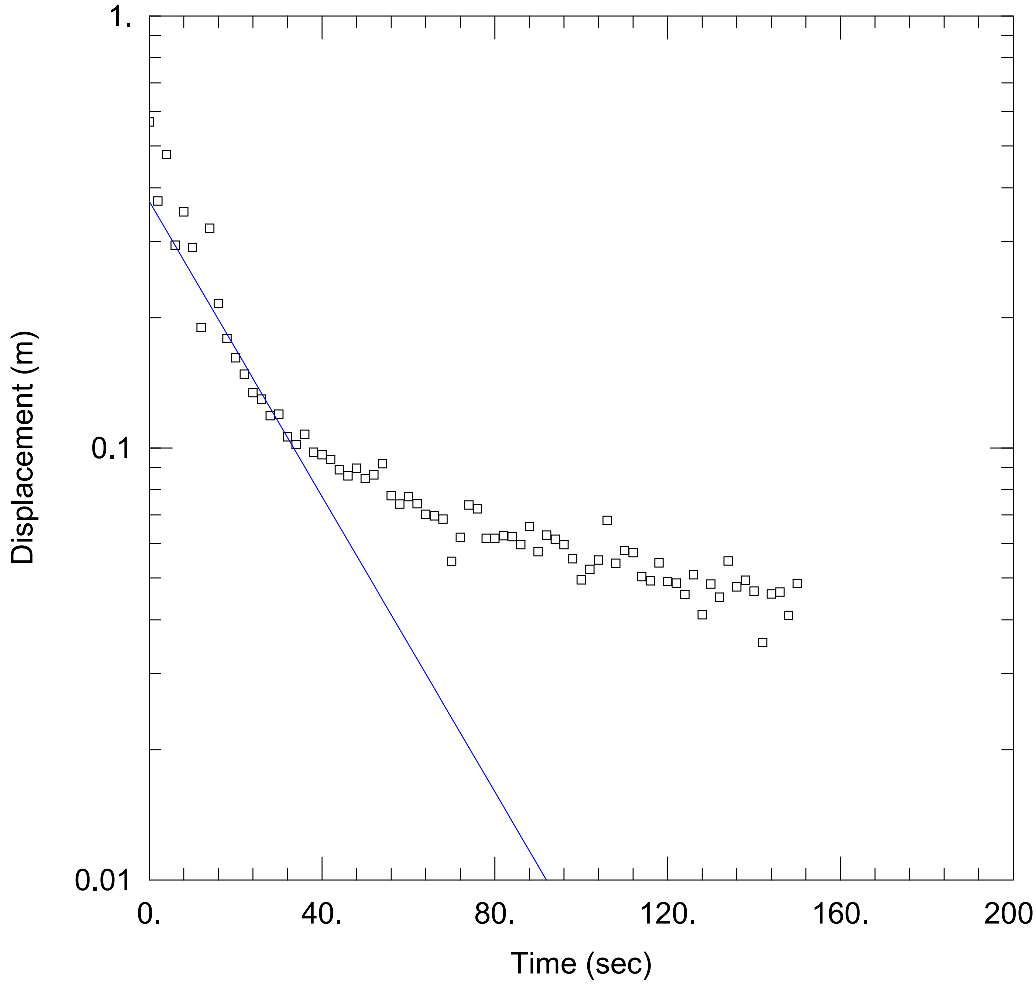
WELL DATA (New Well)

Initial Displacement: 0.5678 m Static Water Column Height: 40.63 m
Total Well Penetration Depth: 40.63 m Screen Length: 36. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.152 m/day y0 = 0.3421 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1293.aqt
Date: 11/13/24 Time: 09:50:43

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1293
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 40.63 m
Anisotropy Ratio (Kz/Kr): 1.

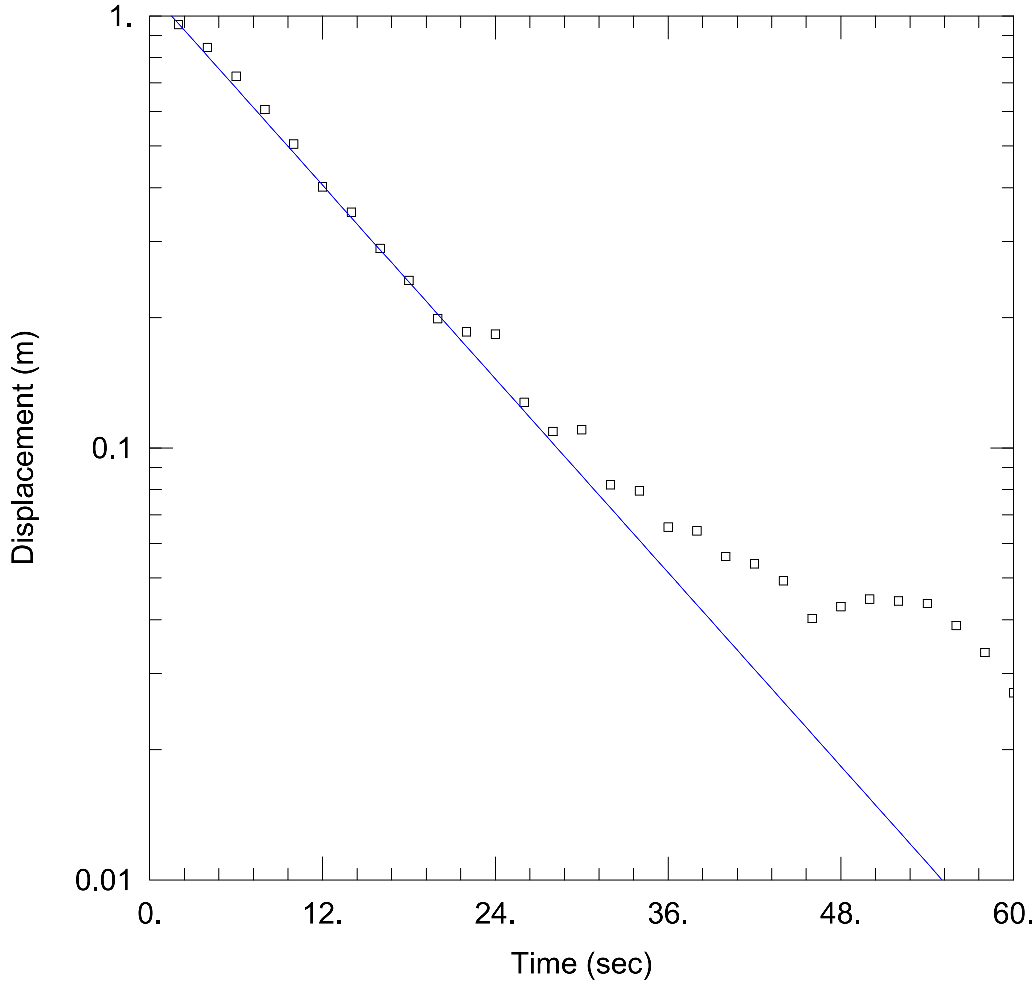
WELL DATA (New Well)

Initial Displacement: 0.5678 m
Total Well Penetration Depth: 40.63 m
Casing Radius: 0.025 m
Static Water Column Height: 40.63 m
Screen Length: 36. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.2123 m/day
y0 = 0.3722 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1441.aqt
Date: 11/13/24 Time: 09:53:41

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1441
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 13.87 m
Anisotropy Ratio (Kz/Kr): 1.

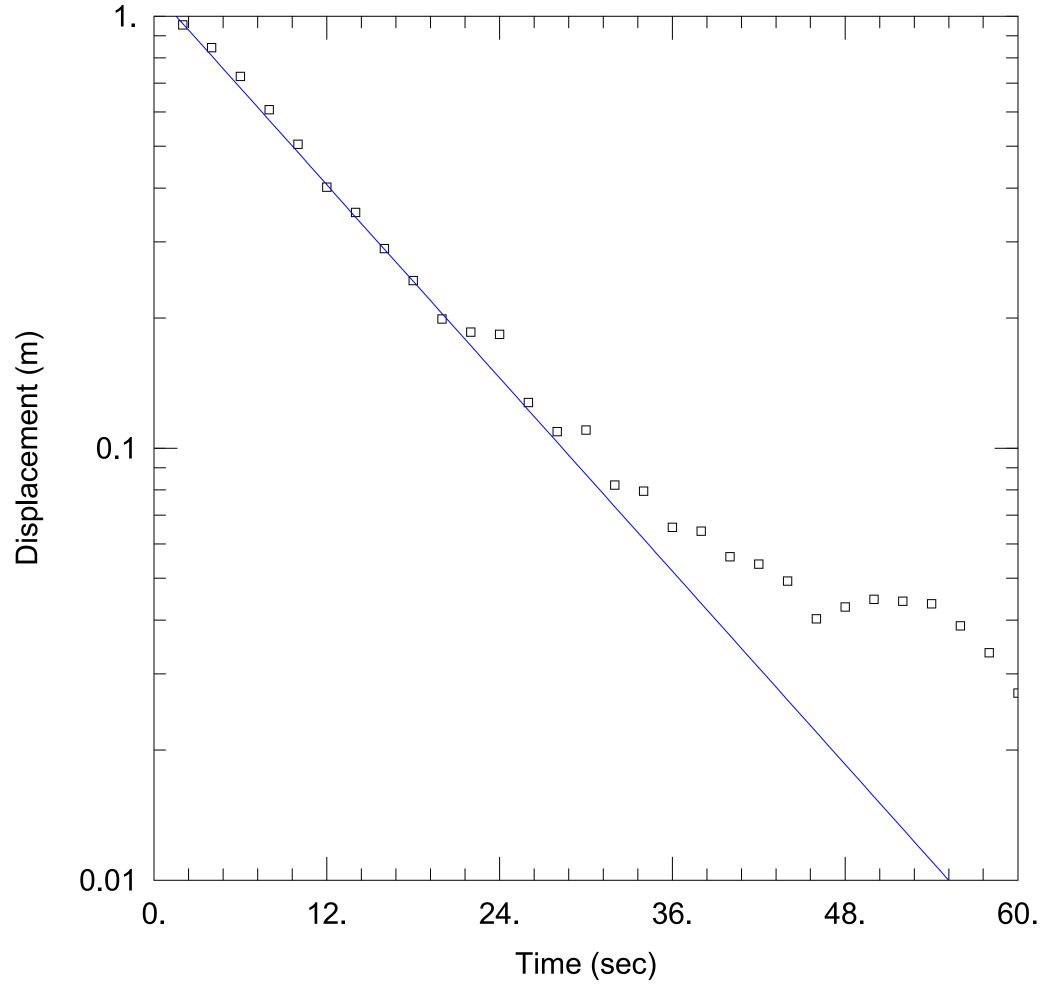
WELL DATA (New Well)

Initial Displacement: 1.001 m
Total Well Penetration Depth: 13.87 m
Casing Radius: 0.025 m
Static Water Column Height: 13.87 m
Screen Length: 12. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.8371 m/day
y0 = 1.14 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1441.aqt
Date: 11/13/24 Time: 09:52:15

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1441
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 13.87 m Anisotropy Ratio (Kz/Kr): 1.

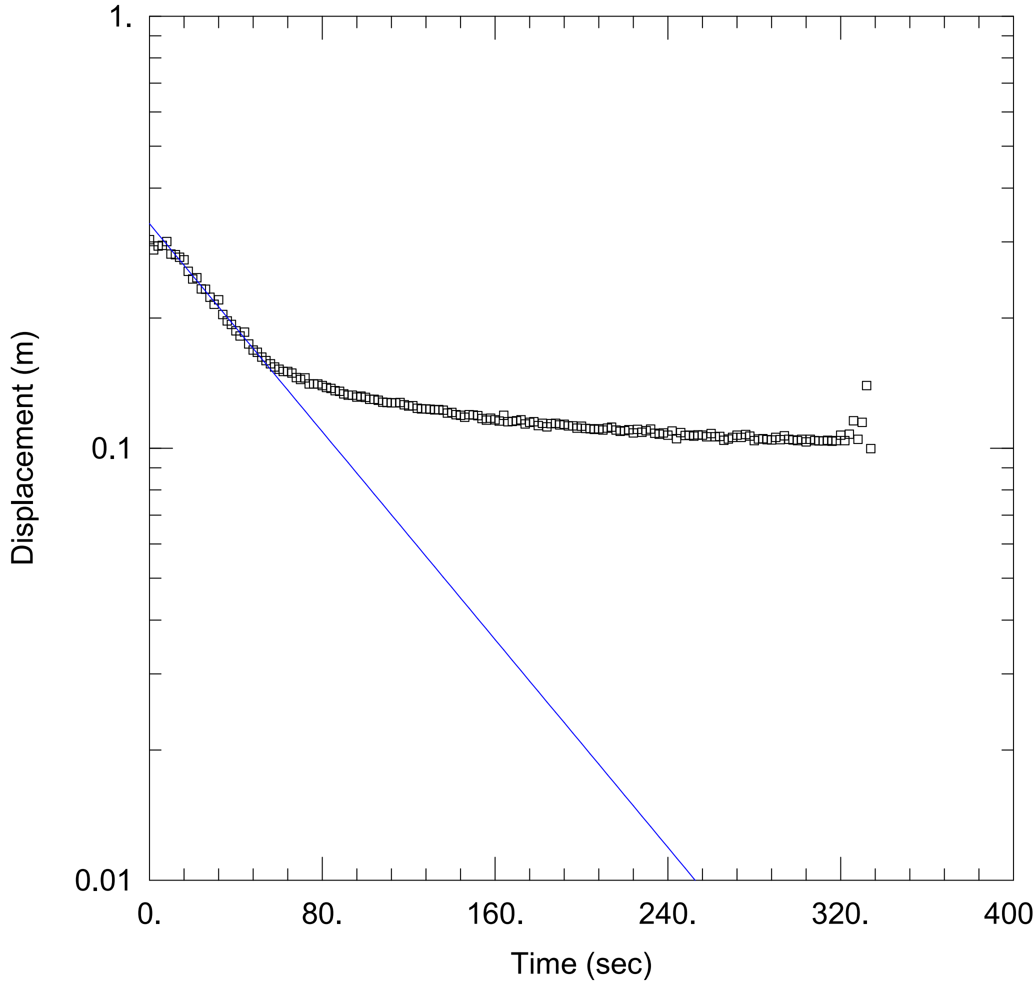
WELL DATA (New Well)

Initial Displacement: 1.001 m Static Water Column Height: 13.87 m
Total Well Penetration Depth: 13.87 m Screen Length: 12. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 1.178 m/day y0 = 1.141 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1465.aqt
Date: 11/13/24 Time: 09:55:47

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1465
Test Date: 30/10/2024

AQUIFER DATA

Saturated Thickness: 30.9 m
Anisotropy Ratio (Kz/Kr): 1.

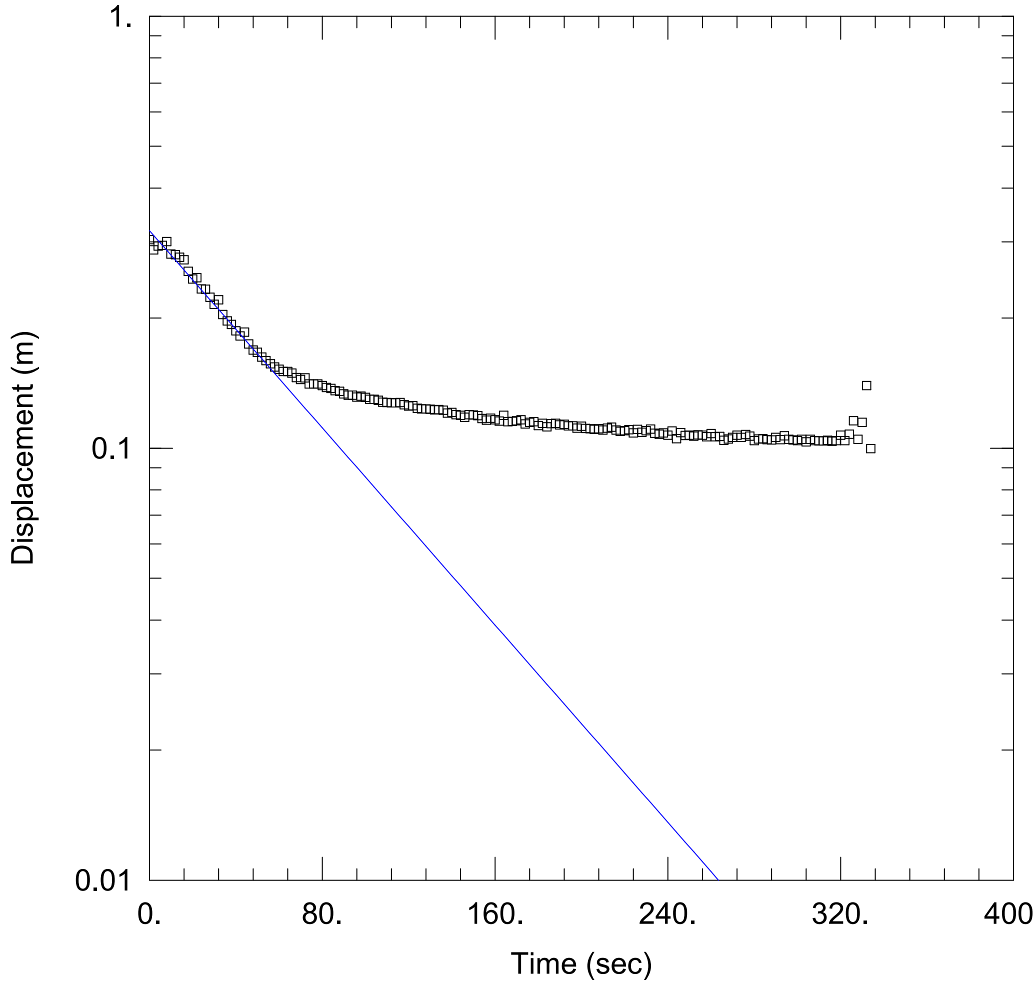
WELL DATA (New Well)

Initial Displacement: 0.3039 m
Total Well Penetration Depth: 30.9 m
Casing Radius: 0.025 m
Static Water Column Height: 30.9 m
Screen Length: 30. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0646 m/day
y0 = 0.3306 m



WELL TEST ANALYSIS

Data Set: F:\575\2_TECH\Analysis\FHTs\AQTESOLV\PR1465.aqt
Date: 11/13/24 Time: 09:54:50

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1465
Test Date: 30/10/2024

AQUIFER DATA

Saturated Thickness: 30.9 m
Anisotropy Ratio (Kz/Kr): 1.

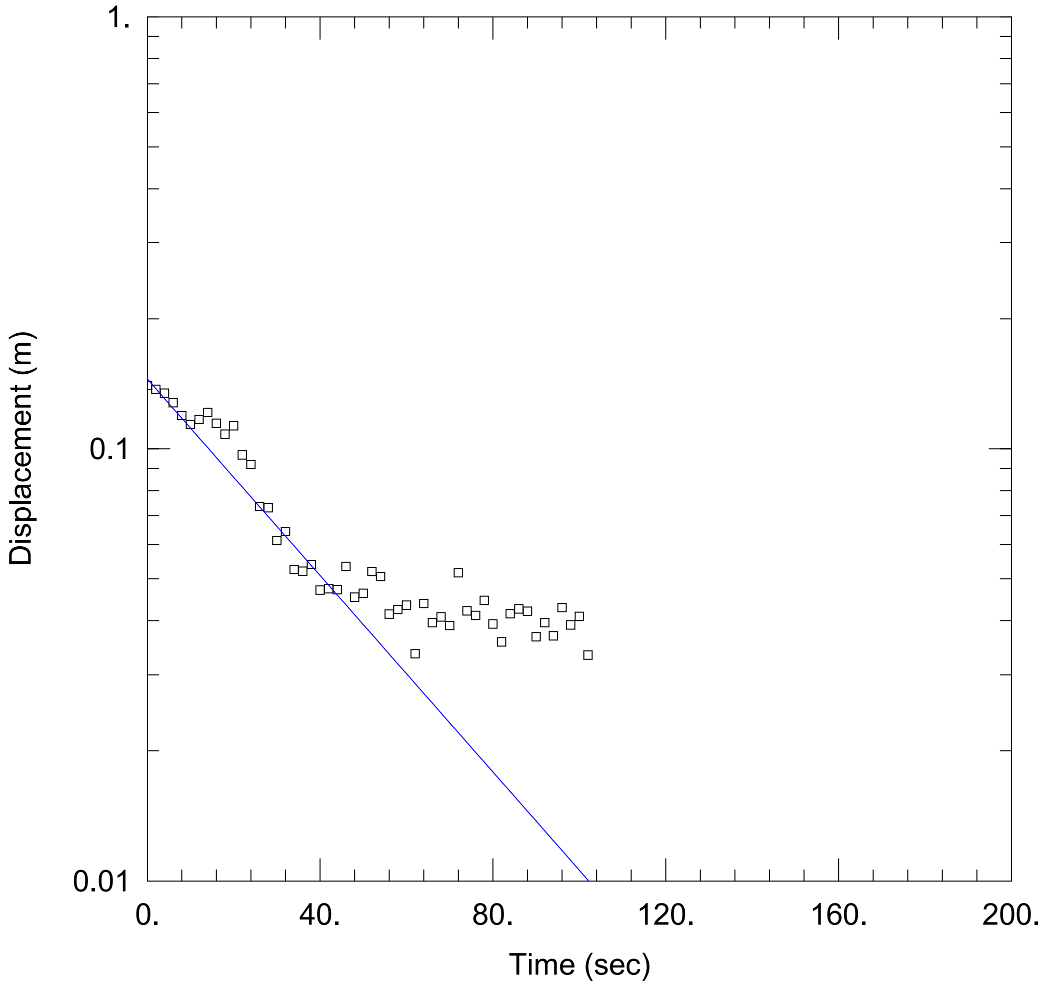
WELL DATA (New Well)

Initial Displacement: 0.3039 m
Total Well Penetration Depth: 30.9 m
Casing Radius: 0.025 m
Static Water Column Height: 30.9 m
Screen Length: 30. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.08295 m/day
y0 = 0.3188 m



WELL TEST ANALYSIS

Data Set:
Date: 11/13/24 Time: 08:13:35

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1544
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 79.24 m Anisotropy Ratio (Kz/Kr): 1.

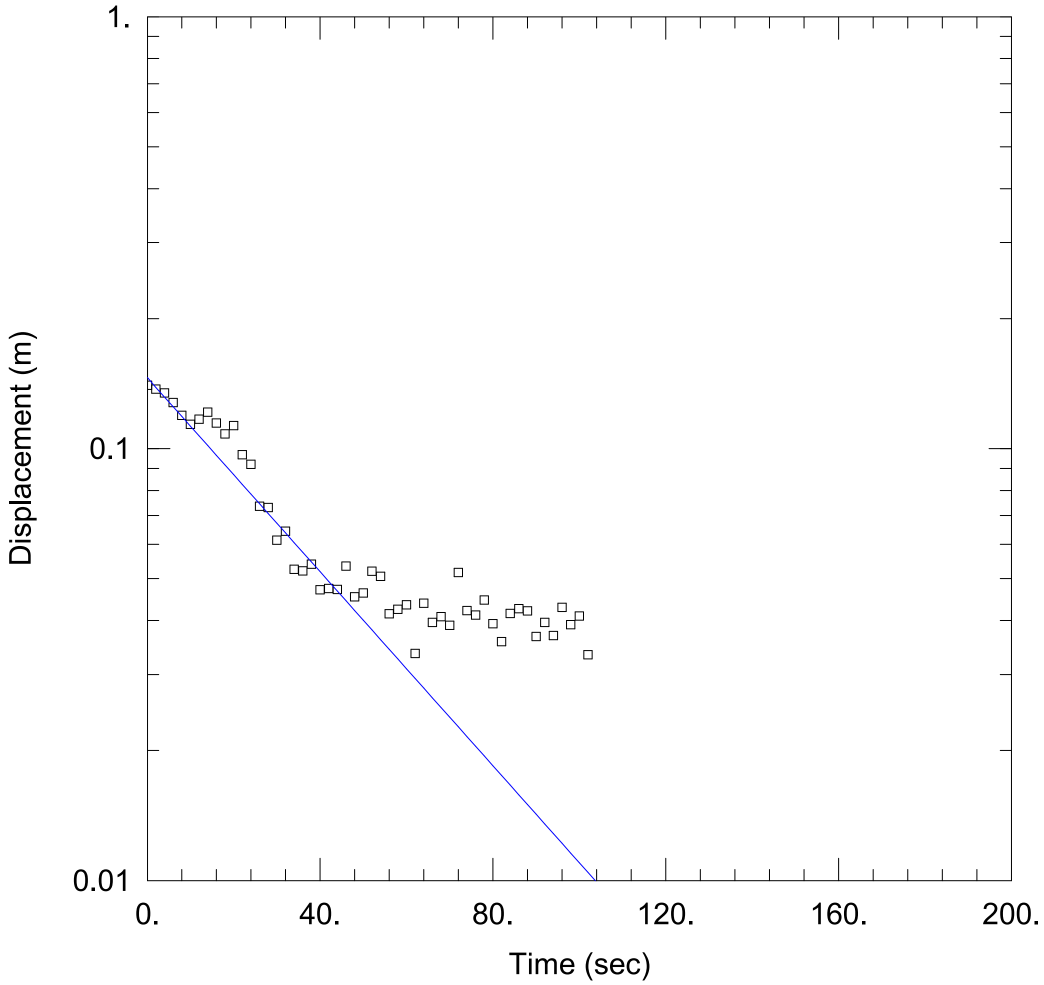
WELL DATA (New Well)

Initial Displacement: 0.1402 m
Total Well Penetration Depth: 79.24 m
Casing Radius: 0.025 m
Static Water Column Height: 79.24 m
Screen Length: 72. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.06119 m/day y0 = 0.1451 m



WELL TEST ANALYSIS

Data Set:
Date: 11/13/24 Time: 08:14:24

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1544
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 79.24 m
Anisotropy Ratio (Kz/Kr): 1.

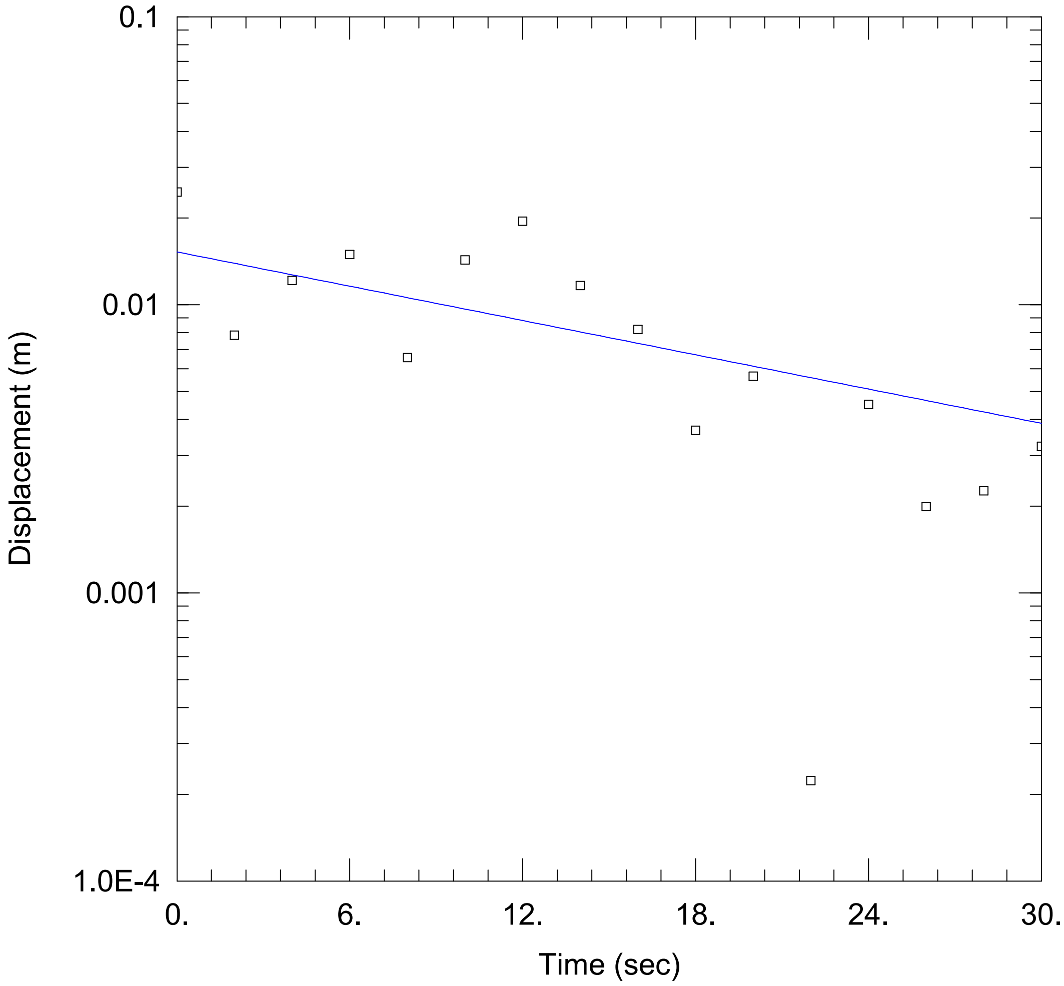
WELL DATA (New Well)

Initial Displacement: 0.1402 m
Static Water Column Height: 79.24 m
Total Well Penetration Depth: 79.24 m
Screen Length: 72. m
Casing Radius: 0.025 m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.0765 m/day
y0 = 0.146 m



WELL TEST ANALYSIS

Data Set:
Date: 11/13/24 Time: 08:28:17

PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1583
Test Date: 30/10/2024

AQUIFER DATA

Saturated Thickness: 26.22 m Anisotropy Ratio (Kz/Kr): 1.

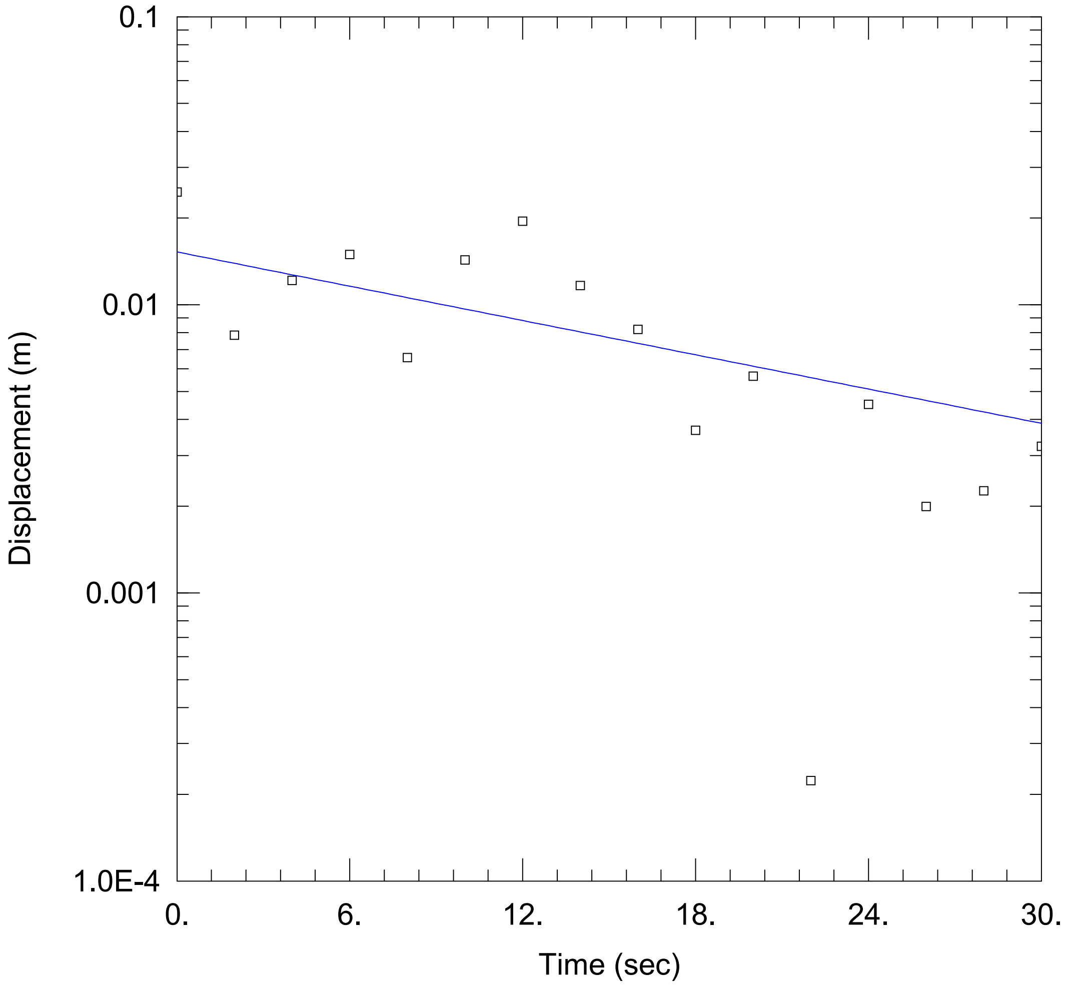
WELL DATA (New Well)

Initial Displacement: 0.02466 m Static Water Column Height: 26.22 m
Total Well Penetration Depth: 26.22 m Screen Length: 24. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.256 m/day y0 = 0.01526 m



WELL TEST ANALYSIS

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PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1583
Test Date: 30/10/2024

AQUIFER DATA

Saturated Thickness: 26.22 m Anisotropy Ratio (Kz/Kr): 1.

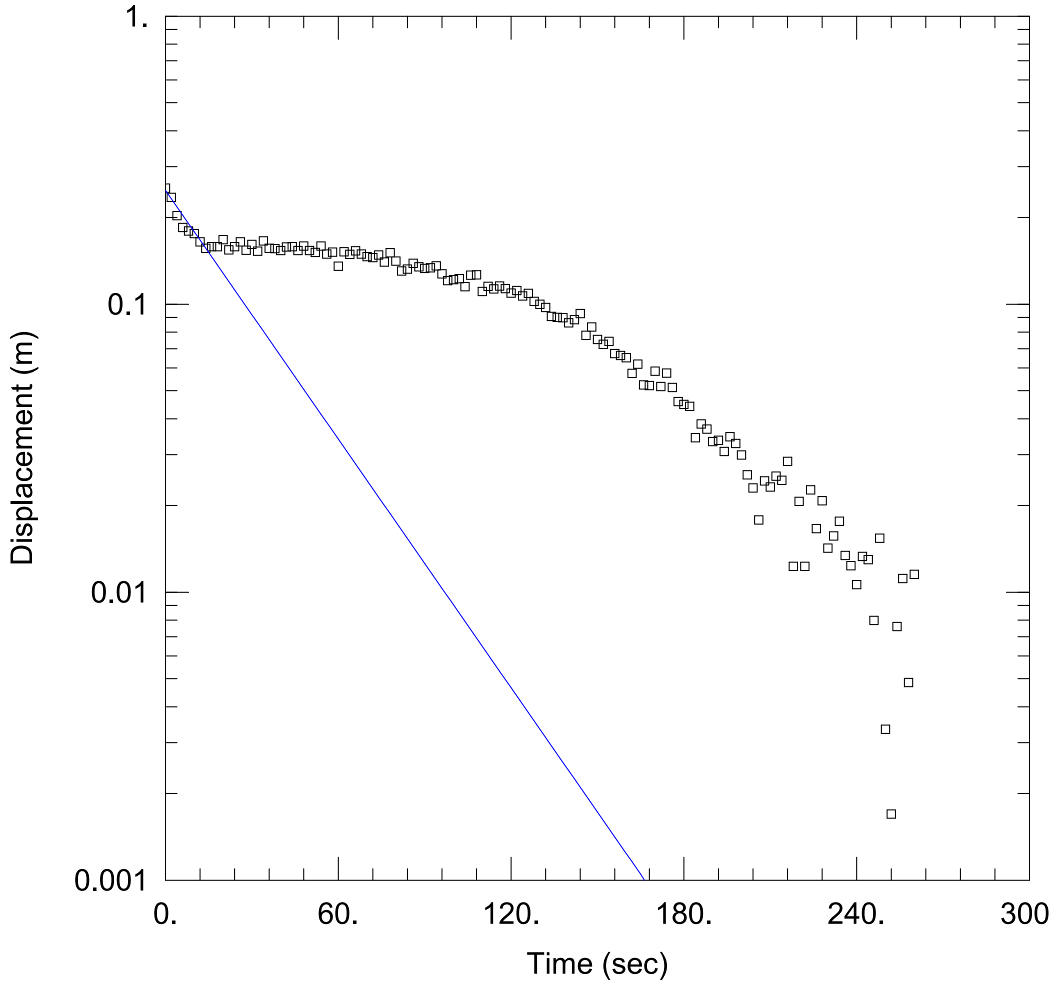
WELL DATA (New Well)

Initial Displacement: 0.02466 m Static Water Column Height: 26.22 m
Total Well Penetration Depth: 26.22 m Screen Length: 24. m
Casing Radius: 0.025 m Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.3489 m/day y0 = 0.01526 m



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PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1612
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 59.21 m
Anisotropy Ratio (Kz/Kr): 1.

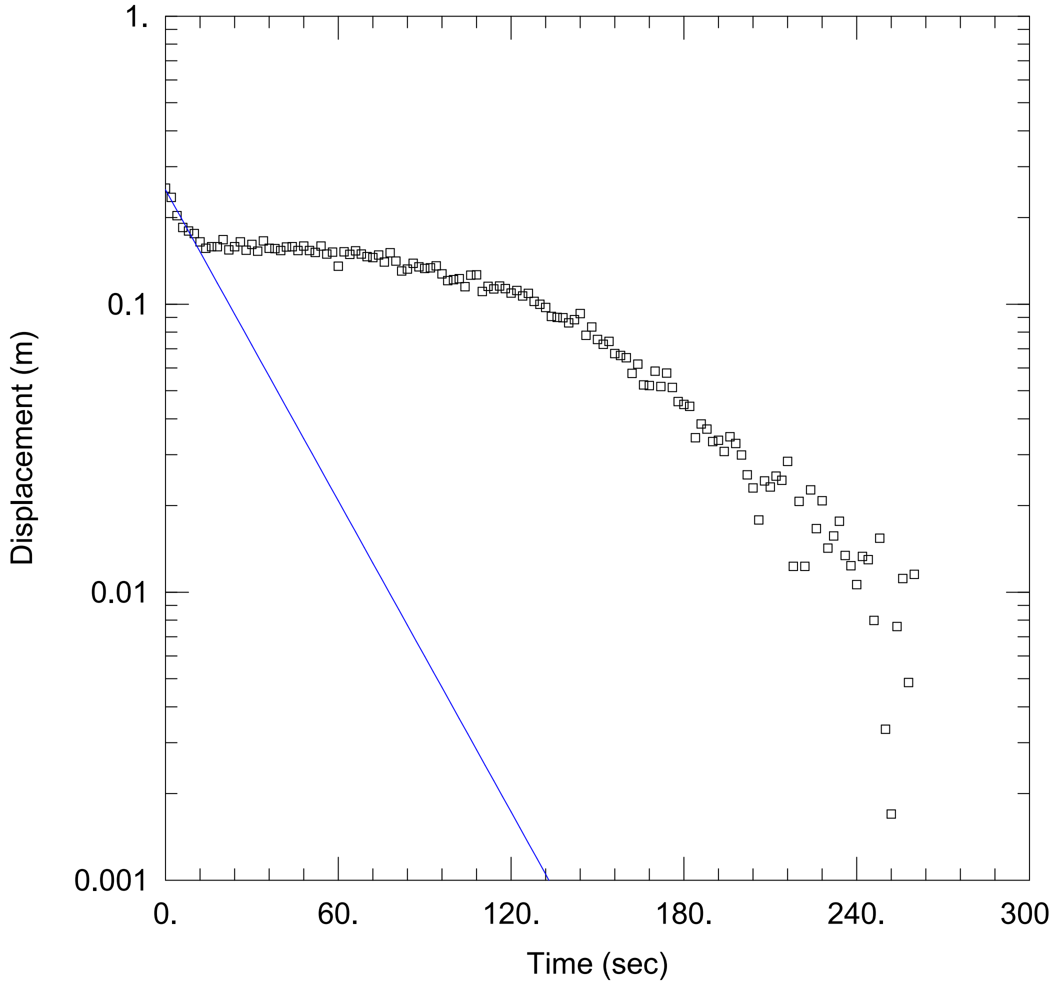
WELL DATA (New Well)

Initial Displacement: 0.2527 m
Total Well Penetration Depth: 59.21 m
Casing Radius: 0.025 m
Static Water Column Height: 59.21 m
Screen Length: 54. m
Well Radius: 0.054 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.09774 m/day
y0 = 0.2483 m



WELL TEST ANALYSIS

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PROJECT INFORMATION

Company: AQ2
Client: HanRoy Iron Ore Projects Pty L
Project: 575B
Location: Round Hill Iron Ore Project
Test Well: PR1612
Test Date: 01/11/2024

AQUIFER DATA

Saturated Thickness: 59.21 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 0.2527 m
Total Well Penetration Depth: 59.21 m
Casing Radius: 0.025 m

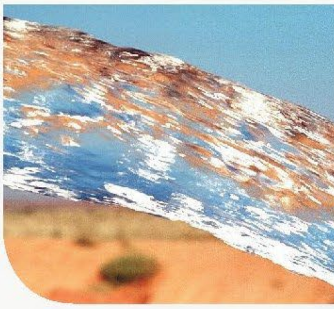
Static Water Column Height: 59.21 m
Screen Length: 54. m
Well Radius: 0.054 m

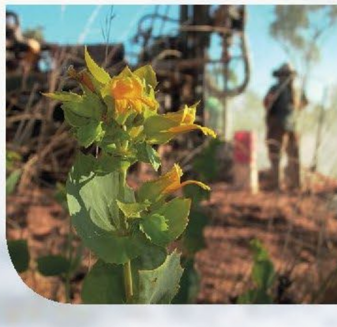
SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev

K = 0.1575 m/day
y0 = 0.2496 m

Appendix B: Round Hill Project Hydrogeology Conceptual Study (Rockwater, 2025)





ROUND HILL PROJECT

HYDROGEOLOGY CONCEPTUAL STUDY

REPORT FOR
HANCOCK RESOURCE DEVELOPMENT GROUP

NOVEMBER 2025

Report No. 180.1/25/01

Rockwater
HYDROGEOLOGICAL AND ENVIRONMENTAL CONSULTANTS

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REVISION	AUTHOR	REVIEW	AUTHORISED	ISSUED
Draft	SO/PK	SB	SB	15/08/2025
RevB	PK	SB	SB	1/09/2025
RevC	PK	SB	SB	5/09/2025
Final	PK	SB	SB	22/09/2025
Final_v2	PK	PK	PK	27/11/2025

1 INTRODUCTION

Hancock RDG Pty Ltd (RDG) is developing the Round Hill Iron Ore Project located approximately 30 km north-west of Newman (Figure 1). It estimated that the project would have a life-of-mine (LOM) water demand of between 0.6 and 0.7 GL/a, primarily for dust suppression purposes.

Between May and August 2025 RDG undertook groundwater resource investigations to support development of a water supply for the Round Hill Iron Ore Project (the Project). Four 165 mm diameter exploration holes were drilled, and three 200 mm ND diameter production bores were constructed at the Project area, with one of production bores constructed in the Manhattan area north of the Great Northern Highway . The aim of the water exploration drilling and production bore installation was to:

- Refine the lithology and stratigraphy of the target areas;
- Measure yield of prospective water bearing units;
- Develop high yielding exploration holes into production bores; and
- Undertake test pumping of the bores to determine hydraulic parameters of the target aquifers to update the hydrogeological conceptual model for the Project area.

RDG contracted Rockwater to provide on-site technical supervision during groundwater exploration drilling, production bore drilling and construction, and hydraulic testing of the production bores. In addition, Rockwater undertook sampling of existing monitoring bores and is engaged to provide updates to the Round Hill conceptual model. This Conceptual Report Update Report (Report) summarises drilling, bore construction, hydraulic testing, sampling, and monitoring activities undertaken from 15 May 2025 to 8 August 2025 and updates the conceptual hydrogeological model initially completed by Darkwater (2023).

2 PROJECT SETTING

2.1 CLIMATE

The climate at Round Hill is characterised by hot summers and mild winters. The region receives a mean annual rainfall of 316 mm with most rainfall occurring during the wet season from December to March. The mean annual evaporation is 3,189 mm and exceeds rainfall in every month of the year and exceeds the mean annual rainfall by about an order of magnitude. The average rainfall and evaporation data at Round Hill derived from the SILO database is shown in Chart 1.

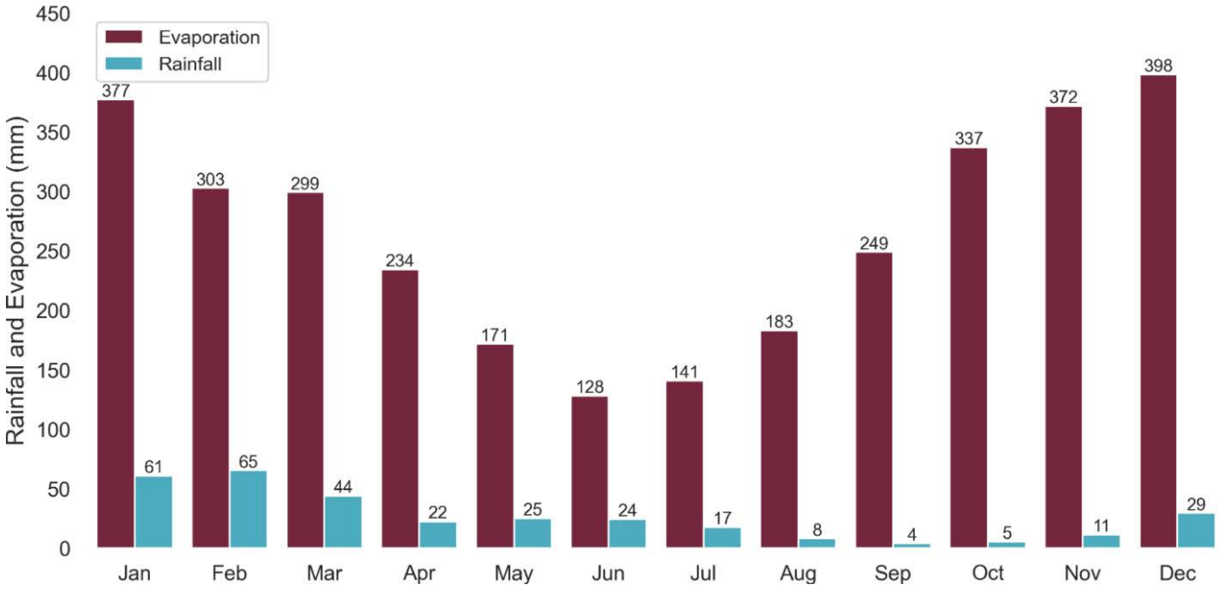

Chart 1: Climate at the Round Hill project area

2.2 TOPOGRAPHY AND DRAINAGE

The Round Hill deposit area is predominantly of low relief, with extensive colluvial and alluvial cover. The landscape is characterised as hardpan plains supporting Mulga shrublands and spinifex (Tille, 2006). Rolling hills associated with the east–west striking Brockman Iron Formation are present within the immediate Round Hill Main deposit area and along strike (HPPL, 2023).

Elevation in the Round Hill Main area ranges from 795 mAHD at the peak of Round Hill, to 690 mAHD on the hardpan plains north of the deposit. In the Round Hill North area, elevation ranges from approximately 700 mAHD in the outcropping Brockman Iron Formation hills to the west, to 650 mAHD in the Coondiner Creek channel to the north-east. Round Hill topography is shown in Figure 2.

The Round Hill deposit is situated in the upper margins of the Coondiner Creek catchment, and immediately north of the Western Creek and Homestead Creek catchments. The Coondiner Creek flows northward through the Hope Downs 4 mine site, before reporting to the southern boundary of the Fortescue Marsh. Western Creek and Homestead Creek flow to the south-east and east, before turning north through the Newman area and reporting to the Fortescue River.

Watercourses in the project area are ephemeral, with surface flows occurring only during significant rainfall events. Drainage is poorly defined in the Round Hill Main deposit area, whereas the Coondiner Creek becomes more defined north of the Great Northern Highway. A minor tributary runs through the Round Hill North deposit, discharging into the Coondiner Creek immediately downstream to the east.

North of the project area, the Coondiner Creek watercourse has been partially diverted by mining infrastructure associated with the Hope Downs 4 mine site (Strategen, 2010).

2.3 GEOLOGY

Geological information for the Round Hill Project area has been largely derived from the Round Hill Modelling & Resource Report (Hancock Prospecting, 2023) and the Round Hill Hydrogeology Conceptual Study (Darkwater Consulting, 2023) and has been updated with observations from the 2025 hydrogeological drilling program. A map of the Project surrounding area geology is provided as Figure 3. Table 1 below presents a typical stratigraphic sequence in the Round Hill Project area.

Table 1: Stratigraphy of Round Hill project area

Group	Formation	Member	Stratigraphy
Quaternary	**Alluvium and Colluvium**	-	Unconsolidated silt, sand and gravel associated with ephemeral creeks and riverbeds. Sheet wash colluvial units adjacent to main drainages
Tertiary	**Detrital**	-	Calcretes, silcretes and goethite rich detritals Cainozoic detritals may host minor mineralisation in the form of hematite-rich canga (CzD3), unconformably overlain by alluvium and minor amounts of pisolitic 'scree'
Hamersley Group	**Brockman Iron Formation**	Joffre Member	BIF/Chert. Minor mineralisation
		Whaleback Shale Member	Shale/Chert/BIF. Minor mineralisation
		Dales Gorge Member	BIF/Shale. Primary mineralisation host
	Mount McRae Shale Formation	-	Massive shales and interbedded cherts
	Mount Sylvia Formation	-	Shale with several BIF macroband
	Wittenoom Formation	-	Dolomite, chert, and shale. Commonly heavily weathered at the contact

Round Hill is situated within the Hamersley Province which covers an area of approximately 80,000 square kilometres in the Pilbara region of Western Australia. The Proterozoic-aged Hamersley Group is characterised by iron-bearing sedimentary rock units (Banded Iron Formation-BIF) including the Brockman, Marra Mamba and Boolgeeda Iron Formations which host economically significant iron mineralisation. Various shale and volcanogenic dominant formations occur between the iron rich formations.

Geological strata in the project area generally dip at 40°- 50° to the south, with parasitic folding evident in both mapped outcrop and drill hole data. Faulting is evident in both drill hole data and aerial magnetics imagery. A moderate scale normal fault is present in the central part of the project area and may explain why the mineralisation is split into two zones; it is estimated this fault has approximately 25 m of offset. A second fault is interpreted from magnetic data at the east of the project.

Surface cover at Round Hill is comprised of Cainozoic alluvium and colluvium. These deposits generally extend to 18 m depth but can be up to 40 m thick in some areas. The surface cover comprises unconsolidated silt, sand and gravel associated with surface drainage and ephemeral creeks. Calcrete, silcrete and goethite rich detrital are also common throughout the Cainozoic deposits. Tertiary detrital sediments were encountered in most holes drilled in this programme.

Iron mineralisation at Round Hill is predominantly within the Brockman Iron Formation which conformably overlies the McRae Shale Formation. The Brockman Iron Formation comprises three distinct members, the upper Joffre member which is defined by alternating subdivisions of BIF and shaley BIF, the central Whaleback Shale unit characterised by massive shale with some minor interbedded cherts and BIF, and the lower Dales Gorge member BIF. The Dales Gorge (DG) Member contains three subdivisions. The lower portion DG1 is characterised by BIF microbands, while the central DG2 contains higher shale content, and the upper DG3 again characterised by BIF microbands.

Mt McRae Shale is an approximately 50 m succession dominated by massive shales with interbedded cherts. The lower 30 m comprises stacked facies including high-energy bedded turbidite flows and low-energy pyritic, carbonaceous shales with intercalated cherts, grading down into a lower 10–15 m interval of yellow/purple carbonate-bearing mudstones.

The Mt Sylvia Formation is roughly 40 m thick and is characterised by predominantly massive shales punctuated by several BIF macrobands that serve as stratigraphic markers. The upper 4–6 m contains a BIF horizon known as “Bruno’s Band”. The central portion is typically massive shale that oxidises purple or red, while the lower part contains two BIF macrobands termed the “Tram Tracks” (about 2–4 m thick) separated by several metres of shale.

The Wittenoom Formation contains (from oldest to youngest): the West Angela Member, Paraburdoo Member, and Bee Gorge Member. There is no differentiation between Members of the Wittenoom Formation in the Round Hill resource model. The Wittenoom Formation is primarily dolomite, with minor shale and BIF.

Both regional and local faults mapped by Hancock are present within the study area (Figure 3). To the north the Coondawanna Fault is a major NW–SE trending structure, while to the east, the NE–SW trending Cathedral Gorge Fault displaces the Brockman Iron Formation and juxtaposes it with the Wittenoom Formation, however it is unknown if the fault forms a hydraulic barrier or conduit between these formations. In the eastern Round Hill area, several local scale SW–NE trending faults intersect the Brockman, McRae, Mount Sylvia, and Wittenoom Formations.

3 HYDROGEOLOGICAL FIELD INVESTIGATIONS

A groundwater exploration, and production bore construction program was undertaken at Round Hill from May to July 2025. Bores in the following sections are designated prefixes to indicate their location and type:

- “EAEX” – East Angeles Exploration Bore
- “EARC” – East Angeles Reverse Circulation
- “EAPZ” – East Angeles Piezometer (installed in RC hole)
- “EAPB” – East Angeles Production Bore

Pentium Hydro (Pentium) was engaged by RDG to undertake the Round Hill drilling and bore construction program and sub-contracted this scope of work to Caswell Drilling (with Pentium providing safety leadership and logistical support). Caswell employed a Schramm T685W drill rig, capable of air-hammer and mud rotary methods, to complete the drill program. The drilling and construction of these bores was authorised under Department of Water and Environmental Regulation (DWER) Section 26D Licence to construct or Alter Well CAW 209385(1) (Appendix I).

The groundwater supply investigation program planned eight groundwater exploration targets (EAEX bores) in the Round Hill area. The location of the bores is shown in Figure 4. However, as sufficient water was encountered in the first four drilled holes, the remaining targets were not required. Three production bores were completed during the drill program; EAPB1300 and EAPB1303 in the Round Hill area and EAPB1302 in the Manhattan area. Details of the Exploration drilling is discussed in Section 3.1 and the subsequent bore construction is detailed in Section 3.2.

3.1 GROUNDWATER EXPLORATION HOLES

Four groundwater exploration holes (EAEX1310 to EAEX1313) were drilled in this programme. The sites were selected by RDG using observed water intersections, fracture intercepts from nearby RC and diamond drilling, information from the previous hydrogeology conceptual study (Darkwater 2023), and correlation of these data with available geophysical data.

The selected groundwater targets were drilled as a 165 mm diameter pilot hole using air hammer methods. Two of the exploration holes were completed as production bores (refer to Section 3.2) and the remaining exploration holes were decommissioned by backfilling with grout to prevent potential contamination of groundwater. Results of the exploration drilling are presented in Table 2 and Appendix II, while drill logs for the decommissioned targets are provided in Figure 5, 6 and 7.

Table 2: Groundwater of exploration target details

Hole ID	Status	Coordinates (MGA 95, Zn 50)		Elevation	Drilled Depth	Airlift Yield	Water Quality		Standing Water Level
		Easting	Northing	m AHD	(m)	L/s	EC (µS/cm)	pH	m bgl
EAEX1310	Decommissioned	751,551	7,429,175	701.044	140	8.5	805	7.93	-
EAEX1311	Converted to EAPB1300	749,441	7,429,239	698.365	110	8	880	8.15	37.80
EAEX1312	Decommissioned	748,752	7,430,000	696.258	108	Dry	Dry	Dry	Dry
EAEX1313	Converted to EAPB1301, then decommissioned	749,643	7,431,231	688.017	98	11	656	8.00	22.30

3.2 BORE CONSTRUCTION

Upon completion of the exploration drilling, three production bores were constructed, two in the Round Hill area (EAPB1300 and EAPB1303) and one in the in the Manhattan area (EAPB1302).

RDG selected two of the four exploration holes drilled at the start of the program at Round Hill (Section 3.1) for conversion into production bores. An additional production bore was constructed at the Manhattan area. The Manhattan bore was drilled directly (no exploration hole) as a production bore, based on historical drilling data indicating consistently high groundwater yields in the area.

Two of the boreholes could not be completed using air hammer methods due to excessive water and erosion, causing significant fallback within the drill hole. In such cases, a new hole was drilled a few metres away using mud rotary methods and successfully completed as a production bore. Details of these sites are as follows:

- Round Hill area:
  - Exploration hole EAEX1311 converted to production bore EAPB1300.
  - An attempt to convert exploration hole EAEX1313 into production bore EAPB1301 failed when EAPB1301 repeatedly collapsed during drilling; it was subsequently replaced by redrilling and constructing EAPB1303 ten meters from the original borehole.
- Manhattan area:
  - No exploration hole was drilled at this location. EAPB1314 was initially drilled at Manhattan using air-hammer methods to a depth of 116 m bgl, but repeatedly collapsed to 38.5 m bgl near the water table due to high water yields and relatively unconsolidated lithologies. EAPB1314 was subsequently decommissioned, and a replacement bore, EAPB1302, was drilled and constructed using mud rotary methods seven meters from the original drill hole.

Bore construction details are summarised in Table 3 and bore completion details provided in Appendix III. The location of each bore is shown in Figure 4 with bore construction diagrams presented in Figures 8 to 11.

3.2.1 SURFACE CASING

A Schedule 10 steel surface casing with an internal diameter of 346.04 mm and an outer diameter of 355.6 mm was initially installed at each production bore to a depth of 6.0 m. This was done by drilling a 305 mm diameter hole using air hammer methods, followed by reaming the hole to 444.5 mm diameter with a tri-cone bit, and placing the casing with a cement-grouted annulus. The exception is EAPB1302, where a deeper surface casing was required to stabilise the hole; in this case, the casing was installed to a depth of 38.19 m.

3.2.2 DRILLING METHOD

Each production bore was completed by drilling a 305 mm diameter hole after the installation of surface casing. EAPB1300 was drilled using air-hammer methods; however, air hammer drilling generated significant water yields during the reaming process, requiring extensive and time-consuming water management. Drilling progress for EAPB1300 was frequently delayed while waiting for water from sumps to be removed by water carts before drilling could resume. Due to excessive water management requirements, EAPB1300 was only reamed to a depth of 92.5 m, short of the 110 m depth of the pilot hole (EAEX1311). Subsequent production bores EAPB1302 and EAPB1303 were drilled using mud rotary methods to reduce water management requirements and improve borehole stability during the drilling process.

3.2.3 PRODUCTION CASING

Each production bore was completed with DN200 PN18 uPVC casing (192.9 mm ID, 225.3 mm OD), with 2.0 mm-aperture slotted interval installed generally below the first intersection of groundwater during drilling. Co-polymer centralisers were installed at the base of the screens to allow for uniform gravel pack installation. The bore annulus was filled with +3.2 to -6.4 mm graded gravel pack from the base of the bore to approximately 4–6 metres above the slotted interval. A bentonite seal was then emplaced to restrict groundwater flow from overlying formations. Additional filter pack was installed from the bentonite seal up to a depth of 6 m bgl, after which the bore was sealed with cement to the surface.

3.2.4 AIRLIFT DEVELOPMENT

Each production bore was developed by air lifting until the groundwater discharge was clear and free of sand and silt. During the airlift development, a Seametrics LevelSCOUT water level logger was attached to the end of the development rods to collect water level data and measure water level recovery over time following cessation of airlifting. This recovery data was used to generate preliminary estimates of aquifer parameters and to determine appropriate pumping rates for subsequent hydraulic testing of the bores. The final airlift yields, water level measurements and field groundwater salinity measured at the end of airlift development of production bore are summarised in Table 3.

Table 3: Production bore drilling and construction summary

Bore ID	Exploration ID	Status	Screened formation	Coordinates (GDA94, Zn 50)		Surveyed Elevation	Top of Casing	Drilled Depth	Constructed Depth	Slotted (open) interval	Bore Annulus			Standing Water Level	Preliminary Electrical Conductivity (field)	Airlift Yield*
											Gravel Pack	Bentonite Seal	Cement Seal			
				mE	mN	(m AHD)	(m agl)	(m bgs)	(m bgs)	(m bgl)	(m bgl)			(m btc)	(mS/cm)	(L/s)
EAPB1300	*EAEX1311*	Production bore	Dales Gorge Member 3	749,441	7,429,239	698.4	0.28	92.5[1]	92.5	56.5-92.5	6-48 50-93	5-6 48-50	0-5	37.80	0.880	9 (15)
EAPB1302	*EAPB1314***	Production bore	Dales Gorge Member 1 and 2	752,104	7,433,391	686.1	0.24	108	108.0	54-108	6-48 48-108	5-6 46-48	0-5	31.46	0.750	11
EAPB1303	*EAPB1301***	Production bore	Wittenoom Formation (West Angelas)	749,657	7,431,236	688.0	0.15	89	88.5	46.5-88.5	6-37.5 39.5-88.5	5-5.5 37.5-39.5	0-5	29.47[2]	0.738	11
EAPB1301	*EAEX1313*	Decommissioned	-	749,643	7,431,231	688.0	-	98	3.0[a]	-	-	-	-	22.30	0.656	(14)
EAPB1314	-	Decommissioned	-	752,105	7,433,398	686.4	-	116	5.9[a]	-	-	-	-	-	-	(15)

1 - 165 mm Pilot was drilled to 110 m depth, but the production hole (305 mm) could only progress to 92.5 m due to sump capacity
2 - Measured from top of steel monument 0.69 m AGL
a – Surface casing only
* - (15) bracket indicates airlift yield observed during final reaming pass
** - stepped off from nearby hole

3.3 GROUNDWATER LEVEL MONITORING

Groundwater levels were monitored throughout the duration of the program. Monitoring bores and production bores were regularly dipped using a water level indicator. Groundwater level data was retrieved from six InSitu Level TROLL 400 loggers deployed by Hancock RDG in January 2024, including a barometric logger installed in HRPB002 for atmospheric pressure correction. The location of data loggers at Round Hill and water level measurements from these bores at the time of data download and installed logger depths are presented in Table 4 and Figure 4, and all logger data downloaded was provided to RDG.

At the conclusion of hydraulic testing, InSitu Level TROLL 400 loggers were installed in each of the new production bores (EAPB1300, EAPB1302, and EAPB1303).

Table 4: Groundwater logger data at Round Hill

BoreID	Easting	Northing	Elevation	Stickup	SWL
	(m E)	(m N)	(m RL)	(m agl)	(m btoc)
HRPB002	751,350	7,431,674	687.2	0.47	30.3
EAPZ0412	751,599	7,428,303	718.74	0.45	57.4
EAPZ0296	750,750	7,429,250	712.25	0.79	54.14
EAPZ0745	748,650	7,429,602	704.34	0.69	44.83
EAPZ0611	747,996	7,431,199	690.01	0.81	31.65
EAPZ0641	751,197	7,431,198	688.63	0.67	31.11
EAPZ0620	748,800	7,431,170	688.65	0.86	30.45
EAPB1300	749,441	7,429,239	698.37	0.28	37.80
EAPB1302	752,104	7,433,391	686.1	0.24	31.46
EAPB1303	749,657	7,431,236	688.0	0.15	29.47

3.4 HYDRAULIC TESTING AND ANALYSIS

Test pumping was carried out on the production bores to determine the hydraulic parameters of the intersected formations. The tests aim to induce and measure water-level changes in the screened aquifer, with the timing and magnitude of the water level responses used to estimate aquifer properties.

McArthur Drilling & Pumping Pty Ltd (MDP) conducted test pumping at EAPB1300, EAPB1302 and EAPB1303 from 26 July to 8 August 2025, with RDG and Rockwater providing remote technical supervision. Initial calibration runs to select step-test rates at each production bore suggested that the Franklin SR97-7 submersible pump, operated at its maximum rate (20 L/s) for a three-day test, would not lower water levels to the installed pump intake (74–74.5 m below top of casing).

RDG, MDP and Rockwater therefore agreed to omit step tests and proceed directly to an extended constant-rate test (CRT) at 20 L/s. Drawdown was measured in the pumped bore and nearby observation bores, and water level recovery was monitored following cessation of pumping.

During test pumping of EAPB1300 of the Dales Gorge Member, no groundwater drawdown was observed from monitoring bores EARC0745 (McRae Shale, 900 m away) and EAPZ0607 (Wittenoom Formation 2 km away), but drawdown was observed in EAPZ0517 the Dales Gorge Formation 1.3 km away. This suggests that drawdown is constrained along strike within the Dales Gorge and the McRae Shale behaves as an aquitard.

Hydraulic conductivity and storativity were determined from the drawdown response using the Moench (1997) method for unconfined aquifers in Aqtesolv. The Moench method is based on the following assumptions:

- aquifer has infinite areal extent
- aquifer has uniform thickness
- aquifer potentiometric surface is initially horizontal
- wells are fully or partially penetrating
- flow is unsteady
- water is released instantaneously from storage with decline of hydraulic head.

Curve matching focused on monitoring bores within the same formation as the production bores (e.g., EAPB1300 [DG3] with EAPZ0251 [DG3]). Drawdown and recovery plots are provided in Appendix IV, with test duration and aquifer analysis results summarised in Table 5. The hydraulic conductivity results are summarised and discussed in Section 4.5.

Table 5: Summary of test pumping parameters

Pumped Bore ID	Monitoring bores	CRT pumped rate	Test duration	Pre-test SWL	Pump depth	Drawdown at the end of CRT
		L/s	min	m bgl	m	m
EAPB1300 (DG3)	EAPZ0251 (DG3) EAPZ0517 (DG2/DG3) EAPZ0587 (DG2) EARC0745* (MCS) EAPZ0607*(WF)	20	4320	38.06	74	4.33
EAPB1302 (DG1/DG2)	EAPZ0643 (BG)* EAPZ1238 (DG1/DG2) EAPZ1244 (FWZ/MCS) EAPZ1247 (DG1/DG2)	20	2880	31.59	74.5	6.09
EAPB1303 (WF-WA)	EAPZ0620 (WA) EAPZ0641 (BG) EAPZ0642 (BG)	20	4080	29.03	74	7.13

m bgl = metres below ground level; SWL = vertical standing water level; b = saturated thickness;
K = hydraulic conductivity, * no drawdown observed
DG2/3 = Dales Gorge Member subdivisions, BI = Brockman Iron Formation, WF = Wittenoom Formation, MCS = McRae Shale, WA = West Angelas, BG = Bee Gorge

3.5 GROUNDWATER SAMPLING

Water samples were collected from a total of 16 monitoring bores and four production bores and submitted to NATA-accredited Australian Laboratory Services (ALS). Laboratory certificates for the analyses are provided in Appendix V. Groundwater quality results are discussed in Section 4.6.

4 CONCEPTUAL HYDROGEOLOGICAL MODEL UPDATE

The hydrogeological model for Round Hill described in this section has been largely derived from the conceptual study completed by Darkwater Consulting (2023) and updated with findings from the hydrogeological investigation program described in Section 3.

4.1 HYDROSTRATIGRAPHY

The hydrostratigraphy of the Project area is summarised in Table 6. The characterisation of geological units is based on previous hydrogeological studies (MWH, 2009; RPS, 2015; WRC, 2001) as well as the most recent field investigations discussed in Section 3. A schematic cross-section of the Round Hill Main Deposit is presented in Chart 2.

Table 6: Hydrostratigraphic units

Group	Formation	Member	Stratigraphy	Hydrogeological Description
Quaternary	Alluvium and Colluvium		Unconsolidated silt, sand and gravel associated with ephemeral creeks and riverbeds. Sheet wash colluvial units adjacent to main drainages	**Limited aquifer** Generally unsaturated but can be an aquifer where occurs below water table
	Detritals		Cainozoic detritals observed to host mineralisation in the form of hematite-rich canga (CrD3), unconformably overlain by alluvium and minor amounts of pisolitic 'scree'	**Limited aquifer** Generally unsaturated but may host an aquifer where the unit extends below the water table. Where saturated, detrital may be in hydraulic connection to the underlying formations
Hamersley Group	Brockman Iron Formation	Joffre Member	BIF/Chert	**Aquifer** Aquifer potential limited to mineralised zones
		Whaleback Shale Member	Shale/Chert/BIF	**Conceptual aquitard** Low permeability
		Dales Gorge Member	BIF/Shale	**Known aquifer** Moderate to high permeability aquifer, especially within mineralised zones
	Mount McRae Shale Formation		Massive shales and interbedded cherts	**Known aquitard** Low permeability with localised aquifers associated with Colonial Chert Member
	Mount Sylvia Formation		Shale with several BIF macrobands	**Known aquitard** Low permeability with localised aquifers associated with Bruno's Band (chert)
	Wittenoom Formation		Dolomite, chert, and shale. Members/weathering undifferentiated	**Known aquifer** Moderate permeability, potential to form a regional aquifer where karstic weathering present

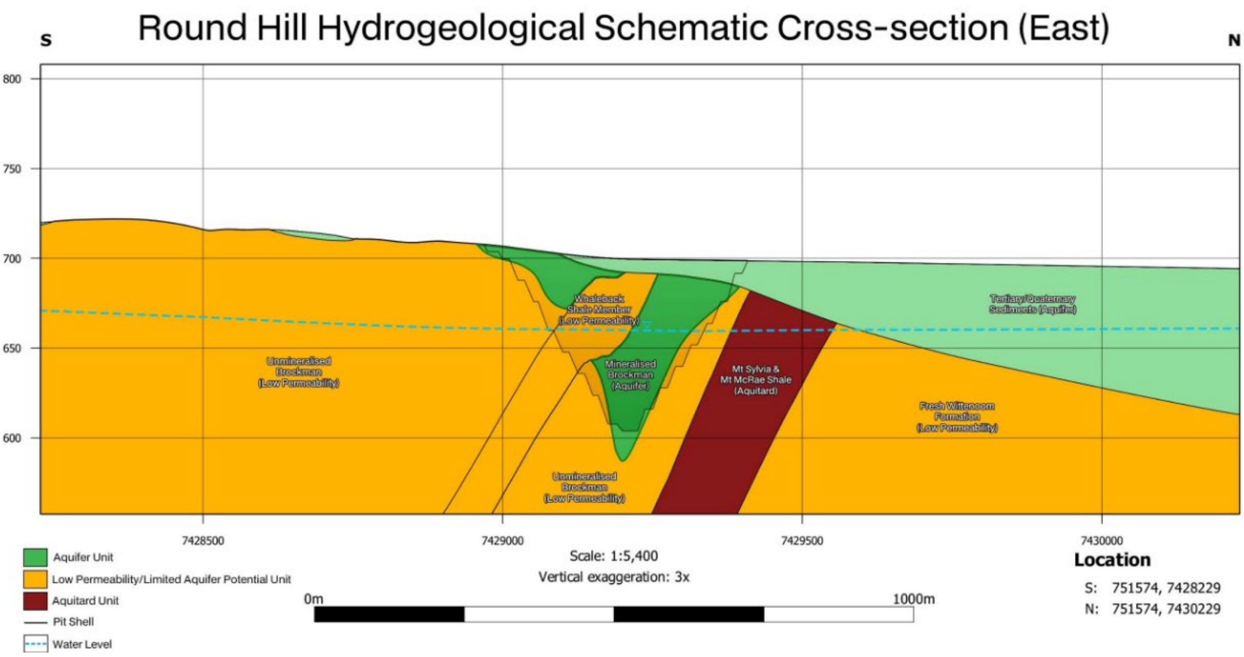

Chart 2: Round Hill hydrostratigraphic cross-section (from Darkwater, 2023)

4.2 AQUIFER AND AQUITARD PROPERTIES

4.2.1 BROCKMAN IRON FORMATION

The Brockman Iron Formation comprises BIF, chert, and shale. The supergene iron enrichment process enhances secondary porosity and permeability, resulting in localised zone of with hydraulic conductivities (>10 m/d). At Round Hill, mineralisation is primarily hosted within the Dales Gorge Member, with minor occurrences in the Joffre Member and Whaleback Shale Member. Below water table mineralisation is constrained to the Dales Gorge Member and high groundwater airlift yields (>10 L/s) were recorded across much of the member.

The Whaleback Shale Member is regionally characterised as an aquitard separating the Joffre and Dales Gorge Members. There is a low potential for it to form an aquifer even where mineralisation is hosted, or where extensive structural deformation has occurred.

4.2.2 QUATERNARY/TERTIARY SEDIMENTS

Tertiary detritals and Quaternary alluvium and colluvium are present north of the Round Hill deposit. Alluvium is associated with an ephemeral drainage and is comprises unconsolidated silt, sand, and gravel. Colluvium is present as sheet-wash adjacent to alluvial deposits. These Quaternary sediments directly overlay Tertiary detrital material. Calcrete and silcrete lenses are present within the Tertiary sediments.

The detrital sediments at Round Hill are unsaturated. Regionally where saturated they form a relatively high permeability and high-storage aquifer and are likely in hydraulic connectivity with the overlying formations (Johnson and Wright, 2001).

The Brockman Iron Formation aquifer is expected to be isolated from the Quaternary and Tertiary aquifers by the Mount McRae Shale and Mount Sylvia Formations. Where these units overlie the Brockman Iron Formation they are unsaturated (Section 4.6).

4.2.3 WITTENOOM FORMATION

The Wittenoom Formation contains (from oldest to youngest): the West Angela Member, Paraburdoo Member, and Bee Gorge Member. The West Angela member, often referred to as the West Angela Shale is comprised of shale and BIF units, with varying degrees of mineralisation. The overlying Paraburdoo Member (often referred to as the Paraburdoo dolomite comprises thick-bedded dolomite with minor amounts of chert and argillite, and the youngest, Bee Gorge Member, is comprised of Argillite, dolomite, limestone and BIF. There is no differentiation between Members of the Wittenoom Formation in the Round Hill resource model. It is generally of moderate permeability but is expected to be higher where karstic weathering of dolomite is present, in which it can form a regional aquifer.

Hydraulic connection between the Brockman Iron Formation and Wittenoom Formation to the north of the Round Hill deposits is limited by the intervening Mount McRae Shale and Mount Sylvia Formations, except where local faults potentially disrupt the aquitard continuity (Section 4.6). Where saturated Tertiary detrital formations extend the across the Mount McRae Shale and Mount Sylvia Formations there may be a hydraulic connection through the Tertiary aquifer, however this has not been identified at Round Hill.

4.3 AQUITARDS

4.3.1 MOUNT MCRAE SHALE AND MOUNT SYLVIA FORMATIONS

The Mount McRae Shale and Mount Sylvia Formations are predominantly comprised of low-permeability shales and are considered regional aquitards. Test pumping of the Brockman Iron Formation, together with groundwater level monitoring in the McRae and Mount Sylvia Formations (Section 4.6), indicates that their low permeability is unlikely to be compromised. These formations are therefore expected to act as aquitards separating the Brockman Iron Formation aquifer from the Quaternary/Tertiary sedimentary aquifer and the Wittenoom aquifer (where present)

4.3.2 WHALEBACK SHALE MEMBER

The Whaleback Shale Member overlies the Dales Gorge Member and underlies the Joffre Member of the Brockman Iron Formation. It is predominantly comprised of shale and is expected to act as an aquitard, further compartmentalising the mineralised Dales Gorge aquifer.

4.4 GROUNDWATER LEVELS AND FLOW

The depth to groundwater is approximately 40 m bgl within the Round Hill area and 30 m bgl within the Manhattan area dependant on surface undulations. The deeper groundwater level observed at Round Hill is attributed to the comparatively higher topography. The depth to groundwater levels for the Project area are presented in Figure 12.

Groundwater levels, reduced to m AHD, are contoured and presented in Figure 13. The contours indicate that groundwater flow broadly follows surface topography, flowing north to northeast along Coondiner Creek the groundwater levels range from 661 m AHD at the south to 656 m AHD at the north of the Project. At several locations (EAPB1302, EAPB1303, and EARC0296), residual differences of 1–2 m between measured and contoured water levels are observed, likely due recent drilling activities.

Approximately 12 km northeast of the Round Hill Project area, groundwater levels at the Hope Downs 4 Mine Site were reported at 636 m AHD in 2009 (MWH, 2009), consistent with a regional flow trend aligned with the Coondiner Creek catchment. Mining activities at Hope Downs 4 are likely to have progressively lowered groundwater levels in that area since 2009.

4.5 HYDRAULIC PARAMETERS

The hydraulic parameters derived from test pumping analyses outlined in Section 3.4 is presented in Table 7. These parameters represent a scale of approximately 1–2 km, based on curve matching of responses observed in monitoring bores at those distances.

Horizontal hydraulic conductivity is highest in the mineralised Dales Gorge DG3 Member at EAPB1300 (12-17 m/d), while the DG1 and DG2 units at EAPB1302, which are less mineralised and have a higher shale content, exhibit moderate hydraulic conductivity (5 m/d). The Bee Gorge member of the Wittenoom Formation similarly shows moderate hydraulic conductivity (5 m/d). Storativity values for all formations tested are in the order of 10^{-4}.

Table 7: Summary of aquifer parameters

Pumped Bore ID	Screened unit	Boundary condition / Notes	T	b	K	Storativity	Specific yield
			m^2/d	m	m/day	dimensionless	%
EAPB1300	Dales Gorge Member 3 (mineralised)	-	646	52.38	12.33	2×10^{-4}	-
EAPB1300	Dales Gorge Member 3 (mineralised)	No flow BC: McRae Shale (300 m north)	636	52.38	12.14	5×10^{-4}	-
EAPB1300	Dales Gorge Member 3 (mineralised)	No flow BC (strip aquifer): McRae Shale (300 m north) Whaleback Shale (100 m south)	879	52.38	16.78	7×10^{-9}	-
EAPB1302	Dales Gorge Member 1 and 2 (mineralised)	No significant change to parameters northern MCS boundary	403	76.41	5.27	3×10^{-4}	0.01179
EAPB1302	Dales Gorge Member 1 and 2	Likely similar to FWZ/MCS locally	346	76.41	4.53	5×10^{-4}	0.01657
EAPB1303	Wittenoom Formation (West Angelas)	No flow BC: McRae Shale (300 m north) Delayed yield from overlying weathered clays	327	59.22	5.52	3×10^{-4}	-

4.5.1 DISCUSSION

Alternative assessments of the aquifer tests, based on simplified conceptual boundaries, were undertaken and are discussed further in Section 4.6. In all cases, except for the 'strip aquifer' scenario applied to pumping from EAPB1300, hydraulic parameters remained unchanged when an impermeable boundary condition representing the McRae Shale was included.

EAPB1300

The strip aquifer scenario required recalibration of hydraulic parameter values (Kh, S, Sy) to achieve a suitable match to the observed CRT data. No satisfactory curve match could be achieved when a strip aquifer scenario was assumed, and therefore no forward groundwater pumping projection was assumed in this scenario.

EAPB1302

Comparison of curve fitting analysis for EAPB1302 (Dales Gorge unit 1 and 2) and its monitoring bore EAPZ1244 (FWZ/MCS) yielded similar hydraulic conductivity regardless of the match priorities to each other; this suggests an apparent hydraulic continuity between the DG 1/2 members with the underlying Footwall Zone and the McRae Shale, at least locally around EAPB1302 at the Manhattan area. Conversely, no suitable curve match could be obtained for CRT data EAPB1302 with monitoring bores EAPZ1238 and EAPZ1247, which are screened in the same members (DG1/2) without using unrealistic parameters in Aqtesolv.

EAPB1303

Groundwater level responses in monitoring bores EAPZ0641 and EAPZ0620 during test pumping of EAPB1303 show drawdown flattening towards the end of the test. Both bores are screened across the detritals and the Wittenoom Formation, and the subdued drawdown response is likely due to delayed yield from leakage within the clays of the overlying weathered formation. The hydraulic parameters assessed do not consider this leakage (i.e. only representative of the Wittenoom Formation).

4.6 STRUCTURAL FEATURES

Based on groundwater level responses during test pumping (Sections 3.4 and 4.6), and groundwater chemistry data (Section 4.6), there is reasonable field evidence that the Mount McRae Shale Formation, and possibly the Mount Sylvia Formation, act as aquitards in the Round Hill area.

There are no notable differences in water levels and salinity across the local faults at Round Hill. The faults do not appear to have an influence on the groundwater levels or salinity locally, although the hydraulic behaviour of these faults may not be apparent in steady state due to the high recharge rates homogenising salinity and water levels at Round Hill.

4.7 RECOMMENDED WATER SUPPLY AND DRAWDOWN

Forward projection of the aquifer assessment results indicates that EAPB1300, EAPB1302 and EAPB1303 production bores could sustainably yield 20 L/s or more for up to 10 years, with drawdown not exceeding 10 m, assuming a homogeneous, isotropic aquifer with simplified boundary conditions representing the McRae Shale or Whaleback shale was applied (Table 8). The drawdown in the Brockman Iron Formation, south of the McRae Shale at EAPB1300 do not interact with drawdown from EAPB1302 and EAPB1303 due to the assumed no flow boundary applied along the McRae Shale outcrop.

Table 8: Estimates of sustainable pumping rates assuming boundary conditions

Pumped Bore ID	Screened unit	Assumed boundary condition	Sustainable rate	Available drawdown	2 m drawdown extent
			L/s	(m)	m
EAPB1300	Dales Gorge Member 3 (mineralised)	McRae Shale (300 m north)	20	57.7	4400*
EAPB1302	Dales Gorge Member 1 and 2	McRae Shale (300 m north)	20	76.54	3200*
EAPB1303	Wittenoom Formation (West Angelas)	N/A	20	59.03	6500
EAPB1302 & EAPB1303	As above, assumes continuous aquifer^	McRae Shale to the south			5000 - 6600

* = minimum estimate, as Aqtesolv does not account for elongate drawdown
^ = hydraulic parameters as per EAPB1302 (slightly more transmissive)

4.8 GROUNDWATER CHEMISTRY

The TDS, pH and major anions from groundwater samples taken from Round Hill and Manhattan were plotted using an expanded Durov diagram in Chart 4. Groundwater at the Round Hill Main Project area is fresh to marginal, with salinities ranging from 371 to 820 mg/L TDS and is slightly alkaline (pH 7.54–8.29). The Durov diagram indicates that groundwater predominantly dominated by bicarbonate-type anions with no dominant cation type.

Figure 14 shows groundwater salinity (TDS in mg/L) across the study area. Slightly higher TDS values at EAPZ0607 (820 mg/L) and EAPZ0412 (706 mg/L) locally may indicate lower groundwater recharge away from drainage lines. Further discussion of groundwater recharge is provided in Section 4.9.

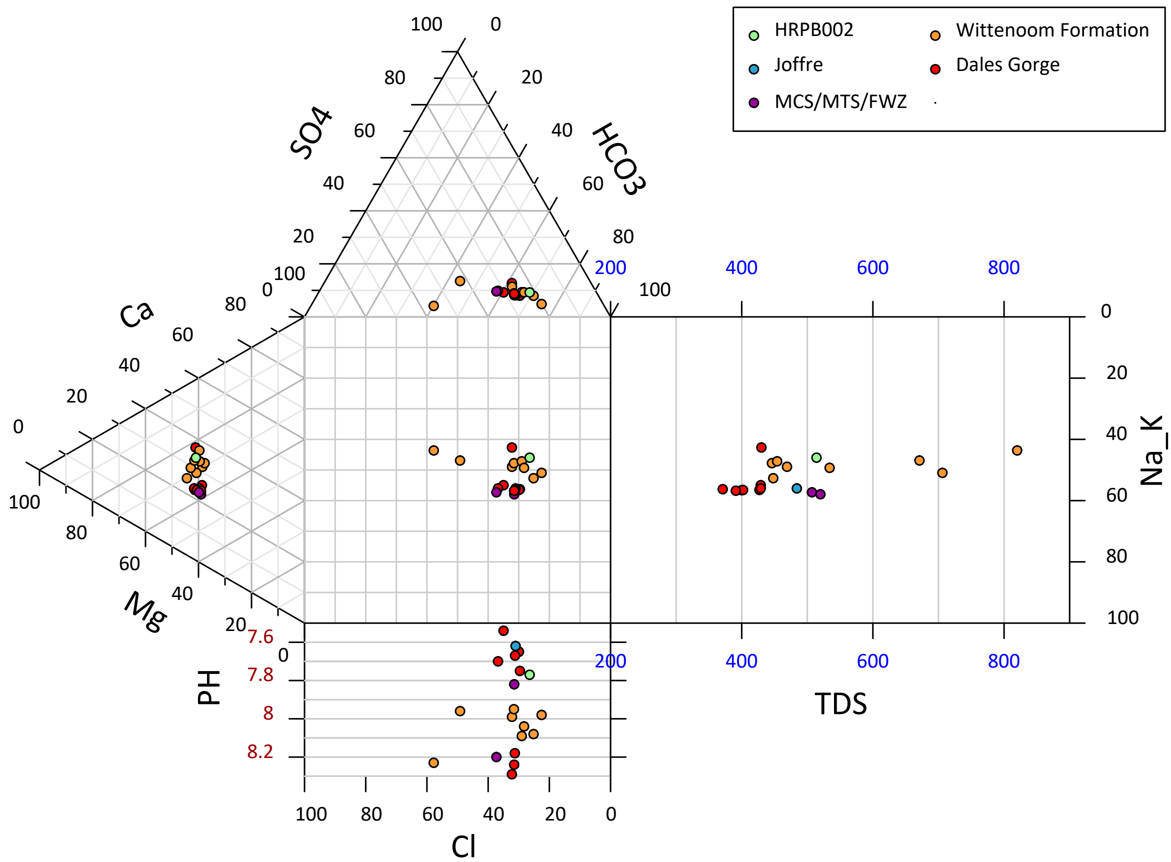

Chart 3: Expanded Durov diagram

The diagram indicates that groundwater salinity in the Dales Gorge member is generally lower than in the Wittenoom Formation likely reflecting the lower permeability of the Wittenoom Formation. Summary statistics of laboratory groundwater analyses were calculated for each aquifer, with Joffre member data grouped with the Dales Gorge member. Insufficient data were available to calculate statistics for the McRae and Mount Sylvia Shales.

Median values of groundwater pH, Mg, Ca, alkalinity are higher in the Wittenoom Formation than in the Dales Gorge member. This is likely resultant from the weathering of dolomitic units within the Paraburdoo Member.

Higher nitrate levels were observed in the Wittenoom Formation than in the Dales Gorge member. High concentrations of nitrate in groundwater are common in central Australia and have been attributed to nitrate-fixing bacteria associated with soil crusts and termite mounds (Jacobson, 1993) and to nitrate-fixing vegetation (Allen, 1996). It is most likely that nitrogen fixing has occurred in the Tertiary aquifer, and this has percolated into the underlying Wittenoom Formation. The Tertiary aquifer does not overlie the Dales Gorge member.

Table 9: Summary statistics of groundwater quality for Dales Gorge and Joffre Members

Parameter	count	mean	std	min	25%	50%	75%	max
Electrical Conductivity @ 25°C (µS/cm)	9	671	48	594	645	660	711	749
Total Dissolved Solids @180°C (mg/L)	9	418	32	371	400	427	429	484
pH Value (pH Unit)	9	7.85	0.30	7.54	7.65	7.70	8.18	8.29
Calcium (mg/L)	9	34	9	28	30	31	34	59
Magnesium (mg/L)	9	33	3	30	32	33	34	40
Potassium (mg/L)	9	7	1	6	6	7	8	8
Sodium (mg/L)	9	49	6	36	50	50	51	55
Bicarbonate Alkalinity as CaCO3 (mg/L)	9	209	17	190	200	205	212	246
Carbonate Alkalinity as CaCO3 (mg/L)	9	1	0	1	1	1	1	1
Chloride (mg/L)	9	64	9	52	58	63	71	79
Fluoride (mg/L)	2	0	0	0	0	0	0	0
Hydroxide Alkalinity as CaCO3 (mg/L)	9	1	0	1	1	1	1	1
Sulfate as SO4 - Turbidimetric (mg/L)	9	29	8	22	25	27	30	49
Total Alkalinity as CaCO3 (mg/L)	9	209	17	190	200	205	212	246
Ammonia as N (mg/L)	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nitrate as N (mg/L)	2	2.2	1.9	0.8	1.5	2.2	2.9	3.5
Nitrite + Nitrate as N (mg/L)	2	2.2	1.9	0.8	1.5	2.2	2.9	3.6
Nitrite as N (mg/L)	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Kjeldahl Nitrogen as N (mg/L)	2	0.6	0.6	0.2	0.4	0.6	0.8	1.0
Total Nitrogen as N (mg/L)	2	2.8	2.5	1.0	1.9	2.8	3.7	4.6
Total Phosphorus as P (mg/L)	2	0.1	0.0	0.0	0.1	0.1	0.1	0.1
Ionic Balance (%)	9	1.4	1.2	0.1	0.7	0.9	2.6	3.3

Table 10: Summary statistics of groundwater quality for Wittenoom Formation (BG, WA, Paraburdoo) and Detritals

Parameter	count	mean	std	min	25%	50%	75%	max
Electrical Conductivity @ 25°C (µS/cm)	8	898	177	729	756	822	1063	1160
Total Dissolved Solids @180°C (mg/L)	8	569	145	446	453	502	680	820
pH Value (pH Unit)	8	8.04	0.09	7.95	7.98	8.02	8.08	8.23
Calcium (mg/L)	8	58	13	42	51	55	67	82
Magnesium (mg/L)	8	46	9	36	37	47	53	57
Potassium (mg/L)	8	7	2	3	6	7	7	9
Sodium (mg/L)	8	56	10	45	49	56	57	79
Bicarbonate Alkalinity as CaCO3 (mg/L)	8	272	65	211	239	250	281	421
Carbonate Alkalinity as CaCO3 (mg/L)	8	1	0	1	1	1	1	1
Chloride (mg/L)	8	99	62	58	67	74	94	239
Fluoride (mg/L)	4	0	0	0	0	0	0	0
Hydroxide Alkalinity as CaCO3 (mg/L)	8	1	0	1	1	1	1	1
Sulfate as SO4 - Turbidimetric (mg/L)	8	36	12	24	29	33	39	62
Total Alkalinity as CaCO3 (mg/L)	8	272	65	211	239	250	281	421
Ammonia as N (mg/L)	1	0.01		0.01	0.01	0.01	0.01	0.01
Nitrate as N (mg/L)	4	6.59	6.18	2.03	3.44	4.31	7.45	15.70
Nitrite + Nitrate as N (mg/L)	4	6.63	6.16	2.03	3.57	4.39	7.45	15.70
Nitrite as N (mg/L)	4	0.05	0.08	0.01	0.01	0.01	0.05	0.17
Total Kjeldahl Nitrogen as N (mg/L)	1	0.70		0.70	0.70	0.70	0.70	0.70
Total Nitrogen as N (mg/L)	1	4.80		4.80	4.80	4.80	4.80	4.80
Total Phosphate (mg/L)	3	0.36	0.11	0.23	0.31	0.39	0.42	0.45
Total Phosphorus as P (mg/L)	1	0.01		0.01	0.01	0.01	0.01	0.01
Ionic Balance (%)	8	2.99	2.08	0.45	1.08	3.36	4.17	5.98

4.8.1 COMPARISON WITH AUSTRALIAN DRINKING WATER GUIDELINES

Groundwater analytes were assessed against the Australian Drinking Water Guidelines (NHMRC & NRMMC, 2011; updated 2024). Most analyte concentrations were below guideline values, with the following exceptions:

- EAPZ0412, EAPZ0607 and EAPZ643 exceeded the ADWG aesthetic guideline of 600 mg/L for TDS.
- EAPZ0607 recorded elevated manganese (1,680 µg/L), exceeding the ADWG health guideline.
- EAPZ0643 exceeded the ADWG health guideline for NOx (11.31 mg/L)

4.9 GROUNDWATER RECHARGE AND GROUNDWATER-SURFACE WATER INTERACTION

The aquifers at Round Hill are predominantly recharged by rainfall infiltrating through surface water pathways, including creeks and fault zones, particularly during and following the wet season. Water quality analyses of the main aquifer (Section 4.6) indicate fresh, actively recharged conditions.

Groundwater flows north-northeast approximately following Coondiner Creek towards the Fortescue River and eventually Fortescue Marsh, where regionally the groundwater system ultimately discharges. Locally, the water table generally exceeds 30 m depth. As a result, groundwater is not expected to discharge locally into Coondiner Creek. The significant depth to groundwater also implies minimal groundwater loss via evapotranspiration.

5 SUMMARY AND RECOMMENDATIONS

Hancock RDG Pty Ltd (RDG) is developing the Round Hill Iron Ore Project, approximately 30 km northwest of Newman. Between May and August 2025, RDG engaged Rockwater to undertake hydrogeological investigations and update the conceptual model previously prepared by Darkwater (2023). Field activities included the project management and technical supervision of the drilling of four, 165 mm diameter exploration holes and the construction of three 200 mm diameter production bores, including one in the Manhattan area north of the Great Northern Highway. The objectives of the field investigations were to refine the lithology and stratigraphy, assess aquifer yields, develop exploration holes into production bores, and derive aquifer parameters from test pumping.

The Brockman Iron Formation (BIF, comprising chert and shale) forms the dominant geological unit at Round Hill, with the McRae Shale, Mt Sylvia, and Wittenoom Formations also present to the north. Iron mineralisation is primarily hosted in the Dales Gorge member of the Brockman BIF, with the geological strata dipping 40–50° to the south and local faults intersecting planned pit areas.

High groundwater yields (>10 L/s) were recorded from the mineralised Dales Gorge Member and the West Angela Member of the Wittenoom Formation. The mineralised Brockman Iron Formation is a major aquifer, with hydraulic conductivities of 5–12 m/d. The Wittenoom Formation may form a regional aquifer where karstic weathering occurs. Quaternary alluvium and Tertiary detritals north of Round Hill, particularly in the Manhattan area, may also form a high-permeability aquifer. The detritals are largely unsaturated, but where saturated is likely to be hydraulically connected to the underlying aquifers.

Hydraulic connection between Brockman and Wittenoom aquifers is largely restricted by the Mount McRae Shale and Mount Sylvia Formations which form regional, aquitards, however local faults mapped by RDG may breach these aquitards and create a hydraulic connection between the Wittenoom and Brockman aquifers.

Groundwater at Round Hill and Manhattan is fresh to marginal (TDS 371–820 mg/L), slightly alkaline, and predominantly bicarbonate type. Recharge occurs mainly via rainfall infiltrating creeks and fault zones, particularly during and after the wet season. Chloride-based analyses suggest active recharge at approximately 12 mm/a (~4% of annual rainfall). Groundwater flows north-northeast toward the Fortescue River and Marsh. With typical water table depths exceeding 30 m, the system is disconnected from surface waters at Round Hill, resulting in negligible baseflow and evapotranspiration losses.

Forward projections indicate that production bores EAPB1300, EAPB1302 and EAPB1303 could sustainably yield 20 L/s for up to 10 years, with a 2 m drawdown radius of 3,200–6,500 m. These estimates do not account for interference from simultaneous pumping or if EAPB1300 behaves as a strip aquifer which would result in additional local drawdown.

Dated: 27 November 2025

Rockwater Pty Ltd

Steven Ossim
Project Hydrogeologist

Peter Khor
Principal Hydrogeologist

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FIGURES

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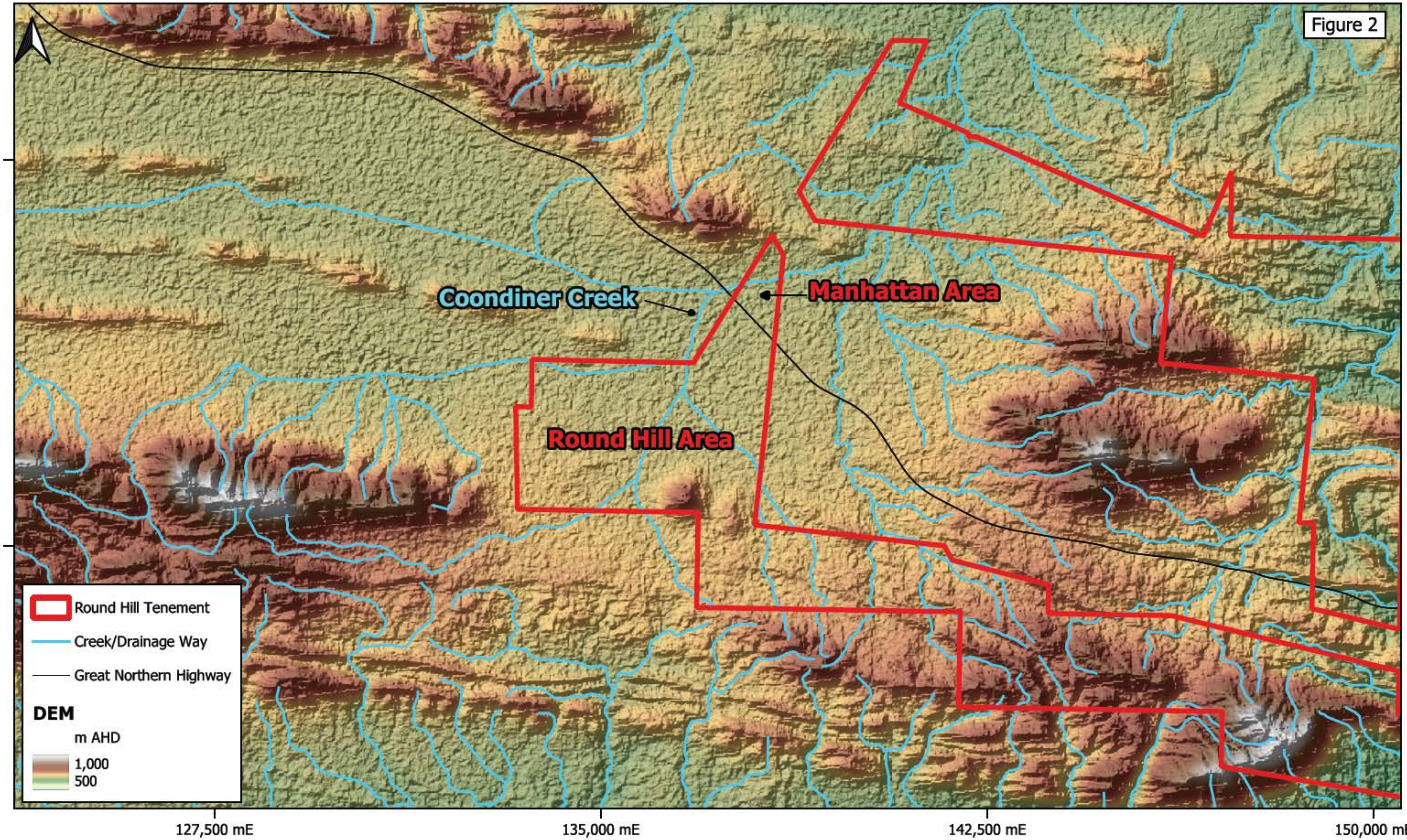
		Figure Number	180-1/25-01/01	



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Rockwater

0 2 4 km

Coordinate System: GDA 2020 MGA Zone 50

Project	Round Hill Hydrogeology Conceptual Study Update
Client	Hancock RDG
Date	November 2025
Figure Number	180-1/25-01/02

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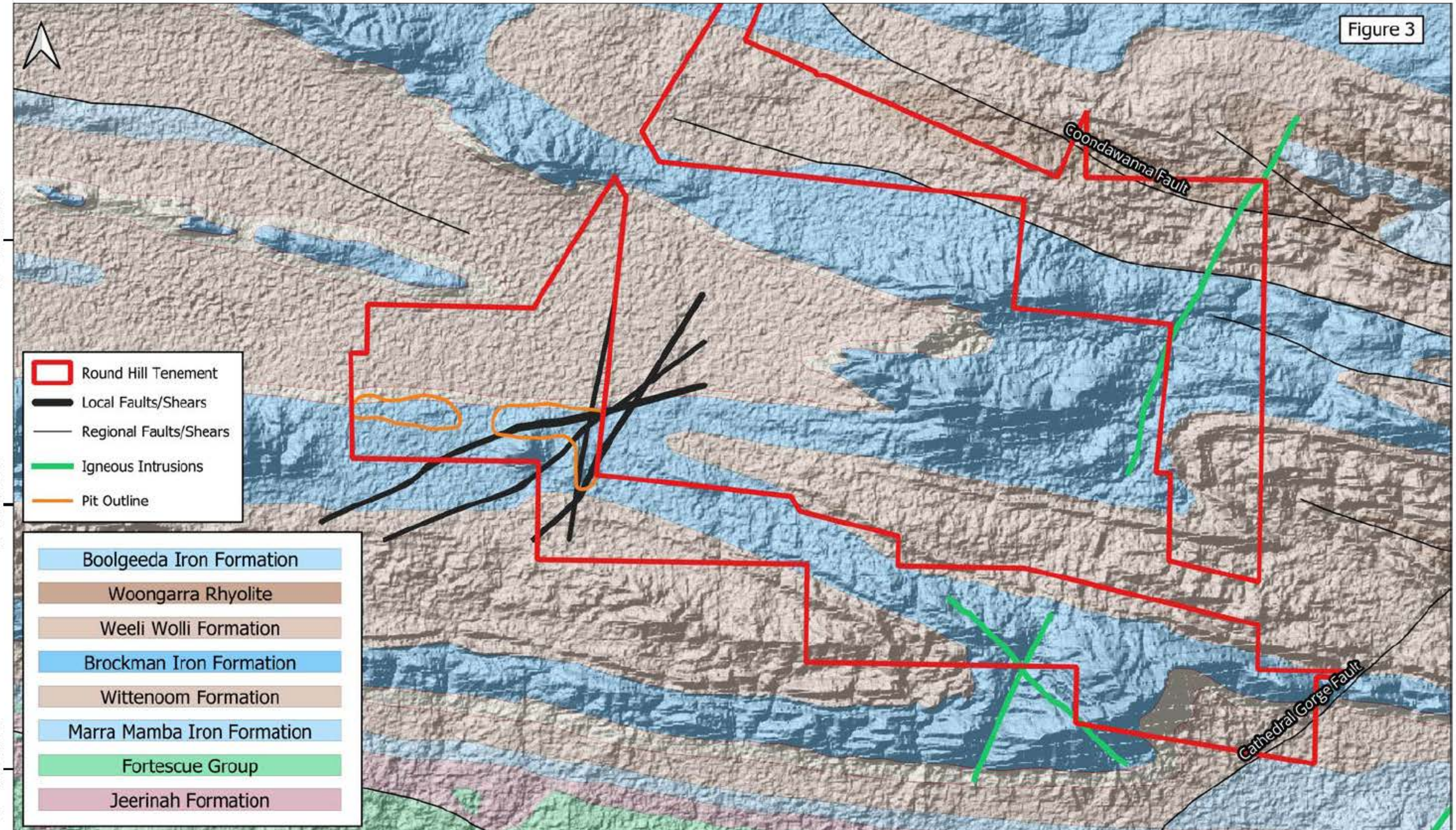

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Rockwater

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Coordinate System: GDA 2020 MGA Zone 50

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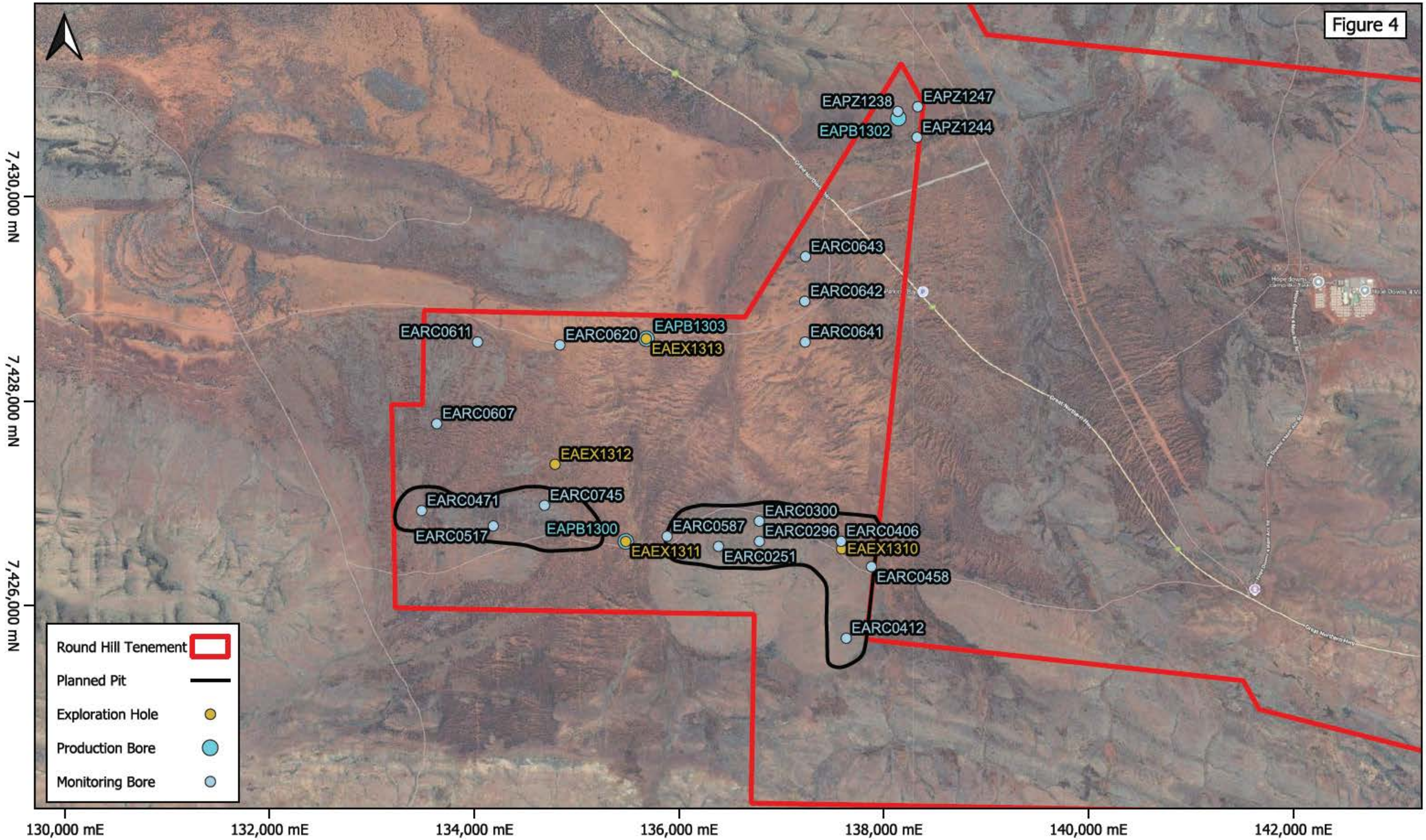
Date	November 2025
Figure Number	180-1/25-01/03

GEOLOGY



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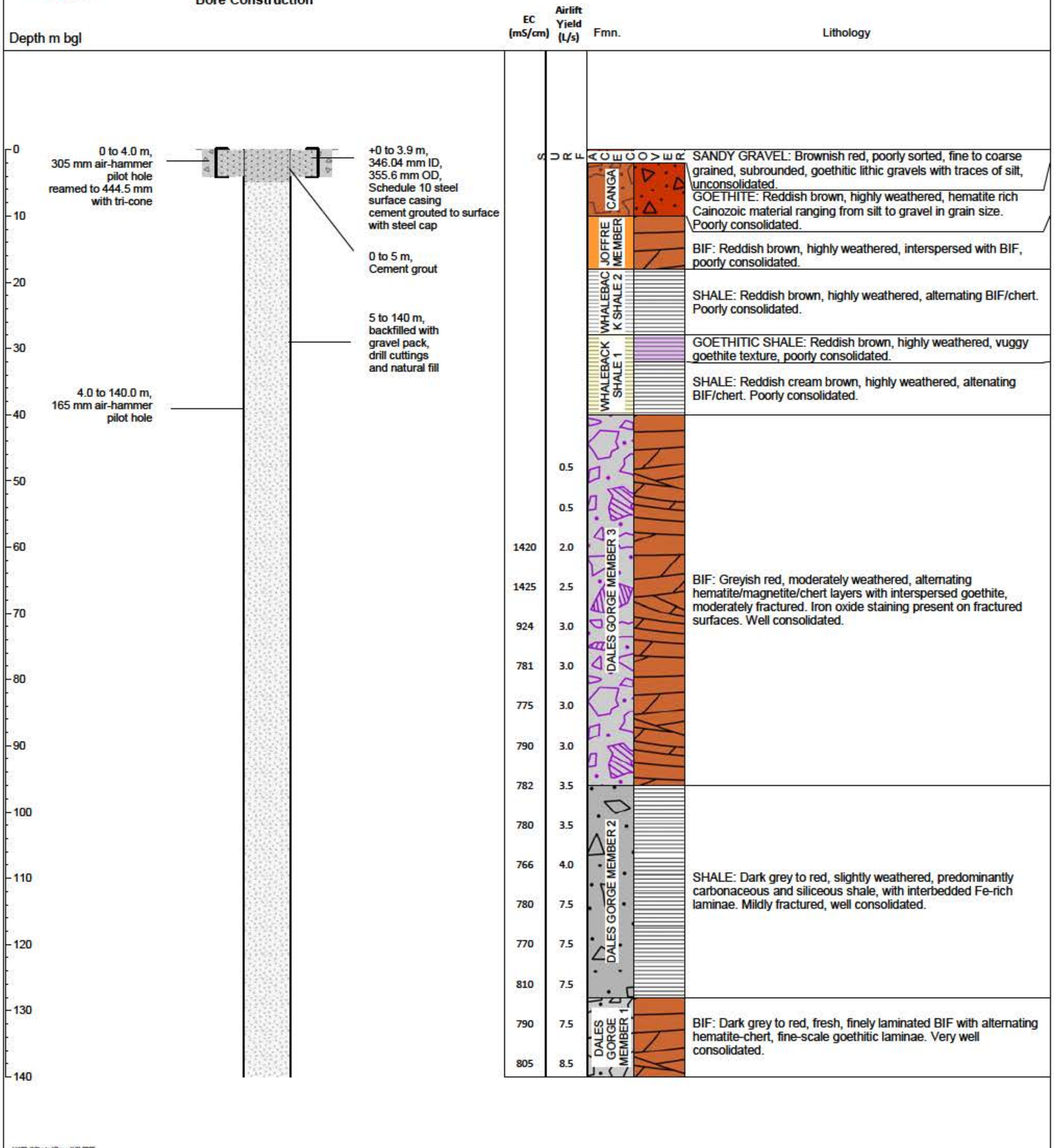
		Date	November 2025	
		Figure Number	180-1/25-01/04	

Figure 5

Bore Construction



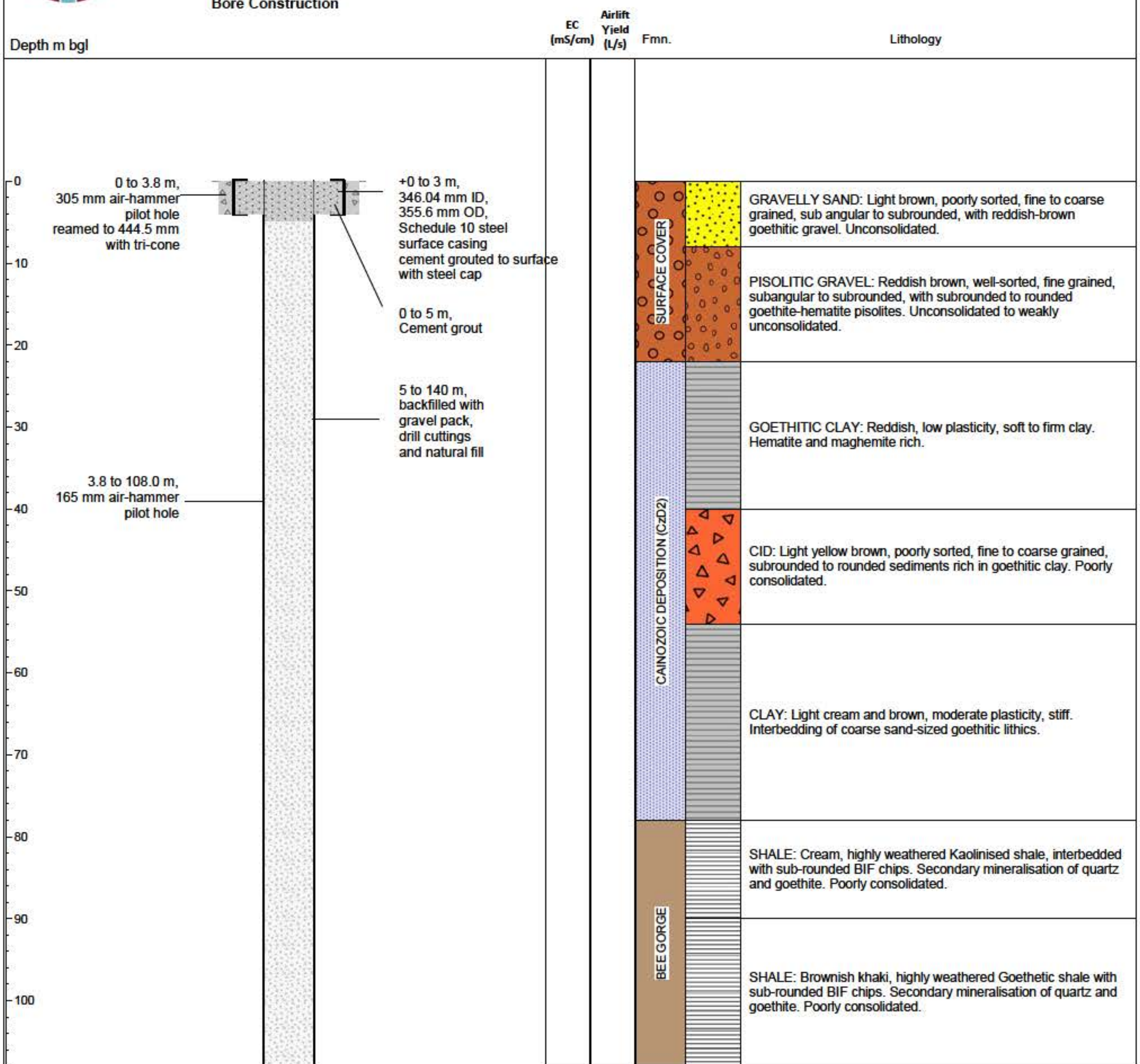
Construction Date:	18-04-2025 to 20-04-2025	Depth Drilled (m bgl):	140	SWL (m bgl):	NA (Hole Collapsed)
Easting:	751,550.9	Top of Casing (m agl):	+0.00	Final Water Chemistry:	0.805 mS/cm, 7.93 pH
Northing:	7,429,174.9	Cased Depth (m bgl):	3.9	Max. Airlift Yield (L/s):	~8.5
Elevation:	701.0 m AHD	Slotted Depth (m bgl):	NA	Drilled By:	Caswell Drilling, Peter Smith (Lic #406)

Client:	Hancock RDG
Project:	Round Hill Hydrogeology Conceptual Study Update
Date:	November 2025
Dwg. No:	180-1/25-01/05

EAEX1310
INVESTIGATION HOLE
COMPLETION DIAGRAM

Figure 6

Rockwater
CONSULTANT HYDROGEOLOGISTS



Construction Date:	26-06-2025 to 28-06-2025	Depth Drilled (m bgl):	108	SWL (m bgl):	NA (Bore dry)
Easting:	748,752.1	Top of Casing (m agl):	+0.00	Final Water Chemistry:	NA
Northing:	7,430,000.6	Cased Depth (m bgl):	3.8	Max. Airlift Yield (L/s):	NA
Elevation:	696.3 m AHD	Slotted Depth (m bgl):	NA	Drilled by:	Caswell Drilling, Conrad Brown (Lic#334)

Client:	Hancock RDG
Project:	Round Hill Hydrogeology Conceptual Study Update
Date:	November 2025
Dwg. No:	180-1/25-01/06

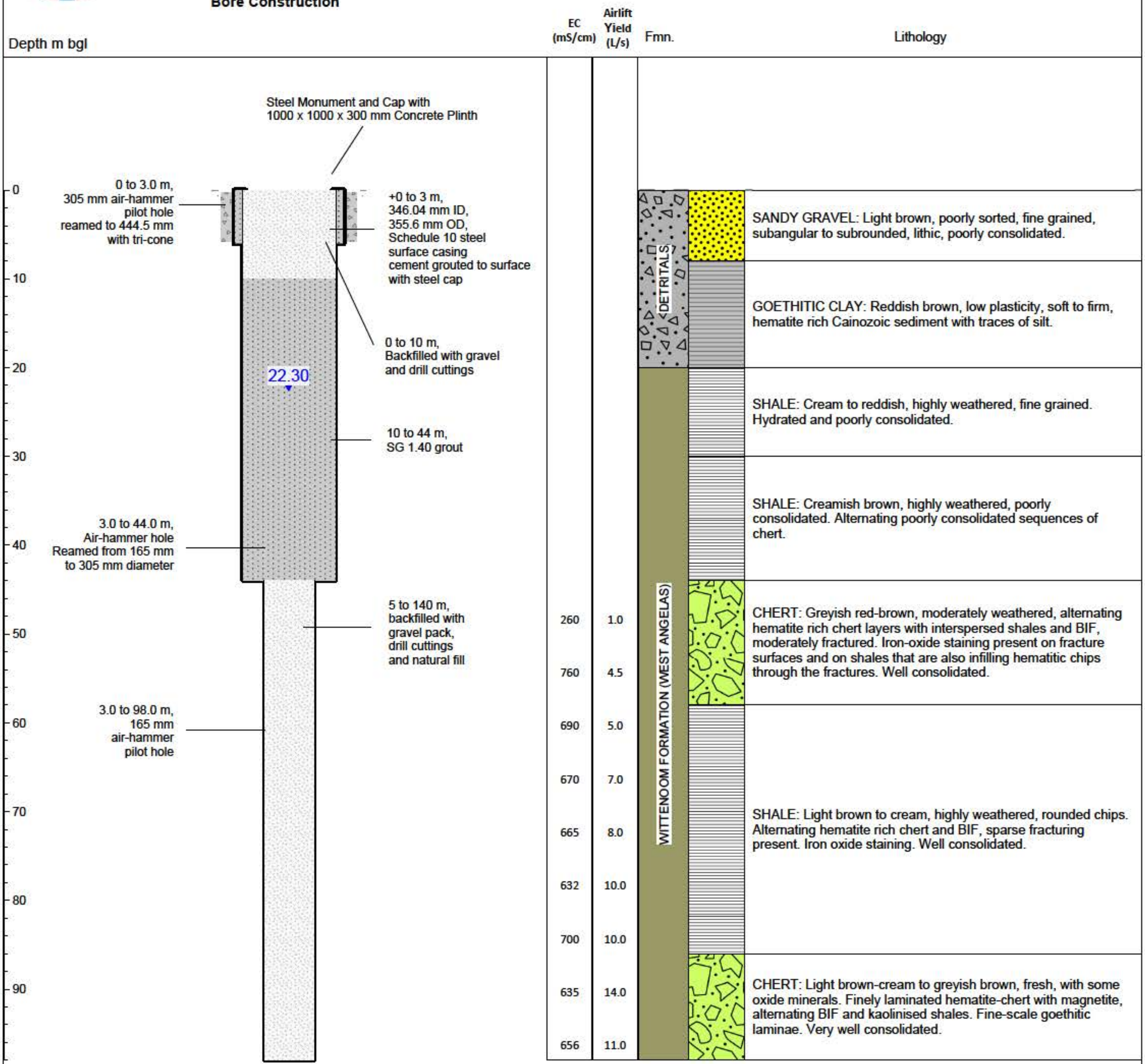
EAEX1312
INVESTIGATION HOLE
COMPLETION DIAGRAM

Rockwater

Figure 7

Rockwater
CONSULTANT HYDROGEOLOGISTS

Bore Construction



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Construction Date:	26-06-2025 to 01-07-2025	Depth Drilled (m bgl):	98	SWL (m bgl):	22.3
Easting:	749,643	Top of Casing (m agl):	+0.00	Final Water Chemistry:	0.656 mS/cm, 8.00 pH
Northing:	7,431,231	Cased Depth (m bgl):	6.0	Max. Airlift Yield (L/s):	~14
Elevation:	688 m AHD	Slotted Depth (m bgl):	NA	Drilled By:	Caswell Drilling, Peter Smith (Lic #406)

Client: Hancock RDG

Project: Round Hill Bore Completion Report Update

Date: November 2025

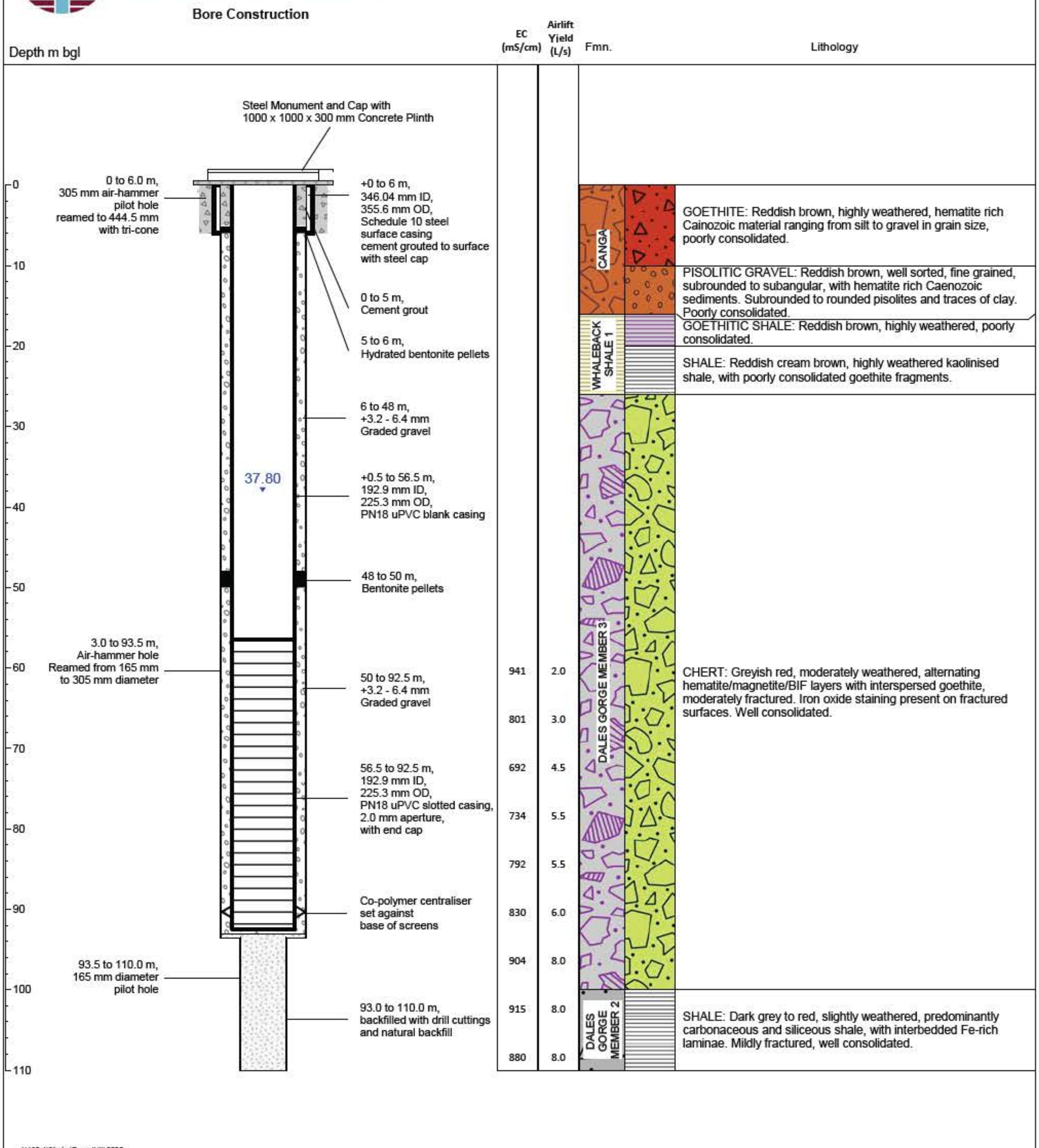
Dwg. No: 180-1/25-01/07

EAEX1313 / EAPB1301
PRELIMINARY PRODUCTION BORE
CONSTRUCTION DIAGRAM

Rockwater PROPRIETARY LIMITED

Rockwater
CONSULTANT HYDROGEOLOGISTS

Figure 8



Construction Date:	15-06-2025 to 21-06-2025	Depth Drilled (m bgl):	110	SWL (m bgl):	37.8
Easting:	749,440.9	Top of Casing (m agl):	+0.28	Final Water Chemistry:	0.650 mS/cm, 7.80 pH
Northing:	7,429,239.0	Cased Depth (m bgl):	92.5	Max. Airlift Yield (L/s):	~9 (15)
Elevation:	698.4 m AHD	Slotted Depth (m bgl):	56.5 - 92.5	Drilled By:	Caswell Drilling, Peter Smith (Lic #406)

Client: Hancock RDG

Project: Round Hill Hydrogeology Conceptual Study Update

Date: November 2025

Dwg. No: 180-1/25-01/08

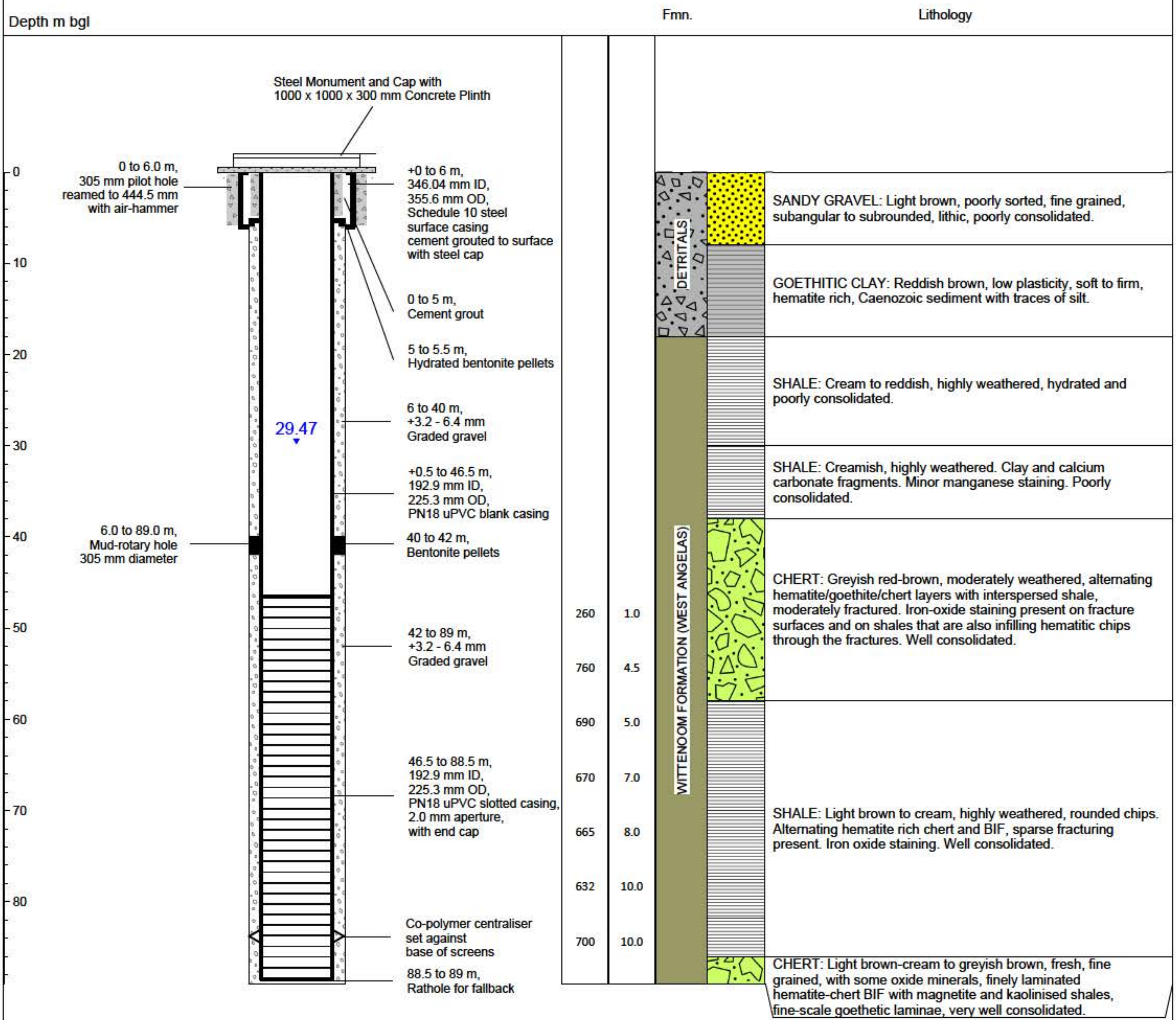
EAPB1300
PRODUCTION BORE
CONSTRUCTION DIAGRAM

Rockwater PROPRIETARY LIMITED

Figure 9

Rockwater
CONSULTANT HYDROGEOLOGISTS

Bore Construction



I:\180-1\Strater\RoundHill 2025

Construction Date:	02-07-2025 to 10-07-2025	Depth Drilled (m bgl):	89.0	SWL (m bgl):	29.47
Easting:	749,656.6	Top of Casing (m agl):	+0.15	Final Water Chemistry:	0.738 mS/cm, 8.15 pH
Northing:	7,431,235.8	Cased Depth (m bgl):	88.5	Max. Airlift Yield (L/s):	~11
Elevation:	687.97 m AHD	Slotted Depth (m bgl):	46.5 - 88.5	Drilled By:	Caswell Drilling, Conrad Brown (Lic#334)

Client: Hancock RDG

Project: Round Hill Hydrogeology Conceptual Study Update

Date: November 2025

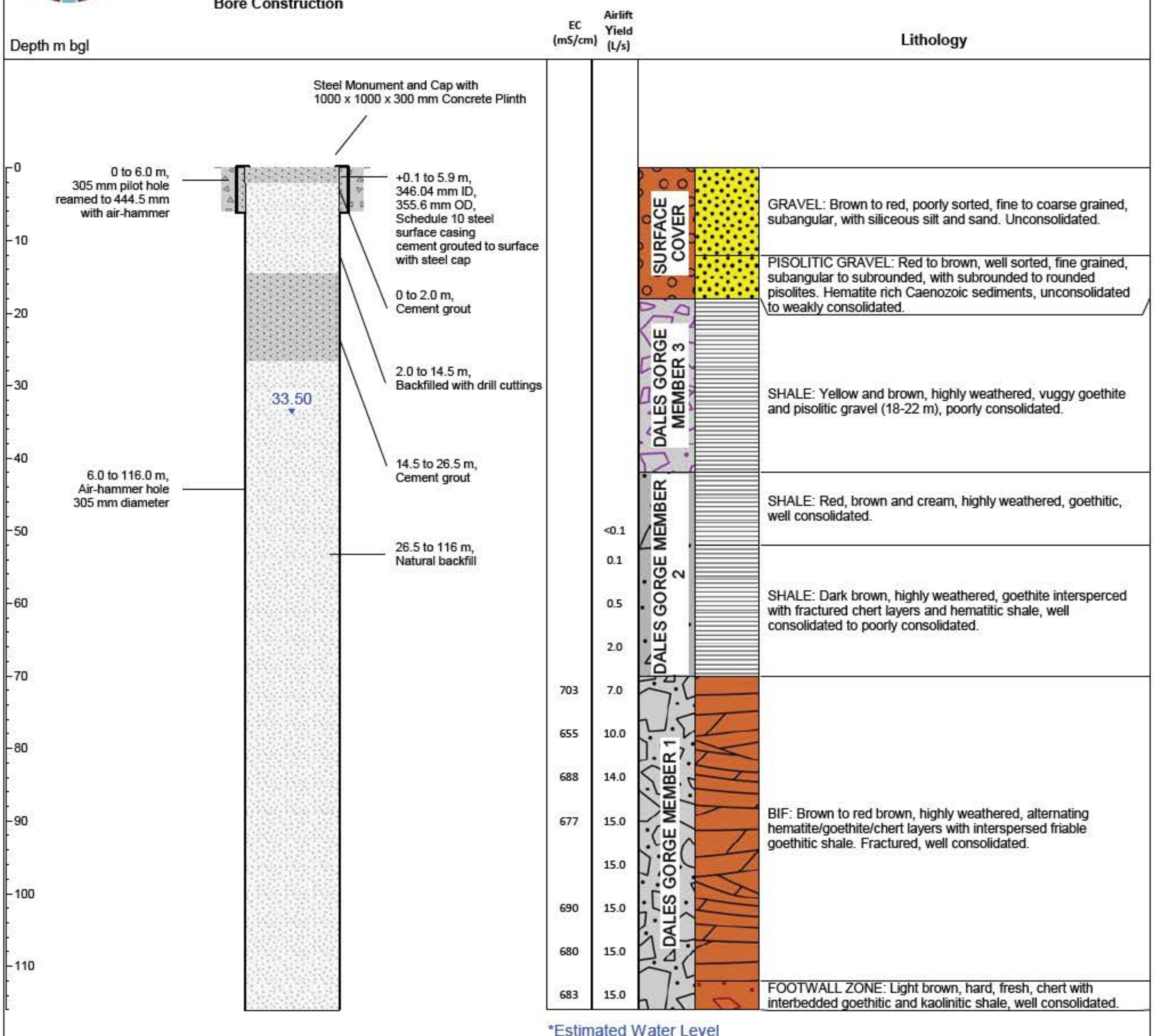
Dwg. No: 180-1/25-01/09

EAPB1303
PRODUCTION BORE
CONSTRUCTION DIAGRAM

Rockwater
PROPRIETARY LIMITED

Figure 10

Rockwater
CONSULTANT HYDROGEOLOGISTS



Depth (m bgl)	EC (mS/cm)	Airlift Yield (L/s)
50		<0.1
		0.1
60		0.5
		2.0
70	703	7.0
	655	10.0
80	688	14.0
90	677	15.0
		15.0
100	690	15.0
110	680	15.0
	683	15.0

*Estimated Water Level

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Construction Date:	02-06-2025 to 13-06-2025	Depth Drilled (m bgl):	116	SWL (m bgl):	NA (hole collapsed)
Easting:	752,105.4	Top of Casing (m agl):	NA	Final Water Chemistry:	0.683 mS/cm, 8.13 pH
Northing:	7,433,397.8	Cased Depth (m bgl):	NA	Max. Airlift Yield (L/s):	~15
Elevation:	686.4 m AHD	Slotted Depth (m bgl):	NA	Drilled By:	Caswell Drilling, Peter Smith (Lic #406)

Client:	Hancock RDG
Project:	Round Hill Hydrogeology Conceptual Study Update
Date:	November 2025
Dwg. No:	180-1/25-01/10

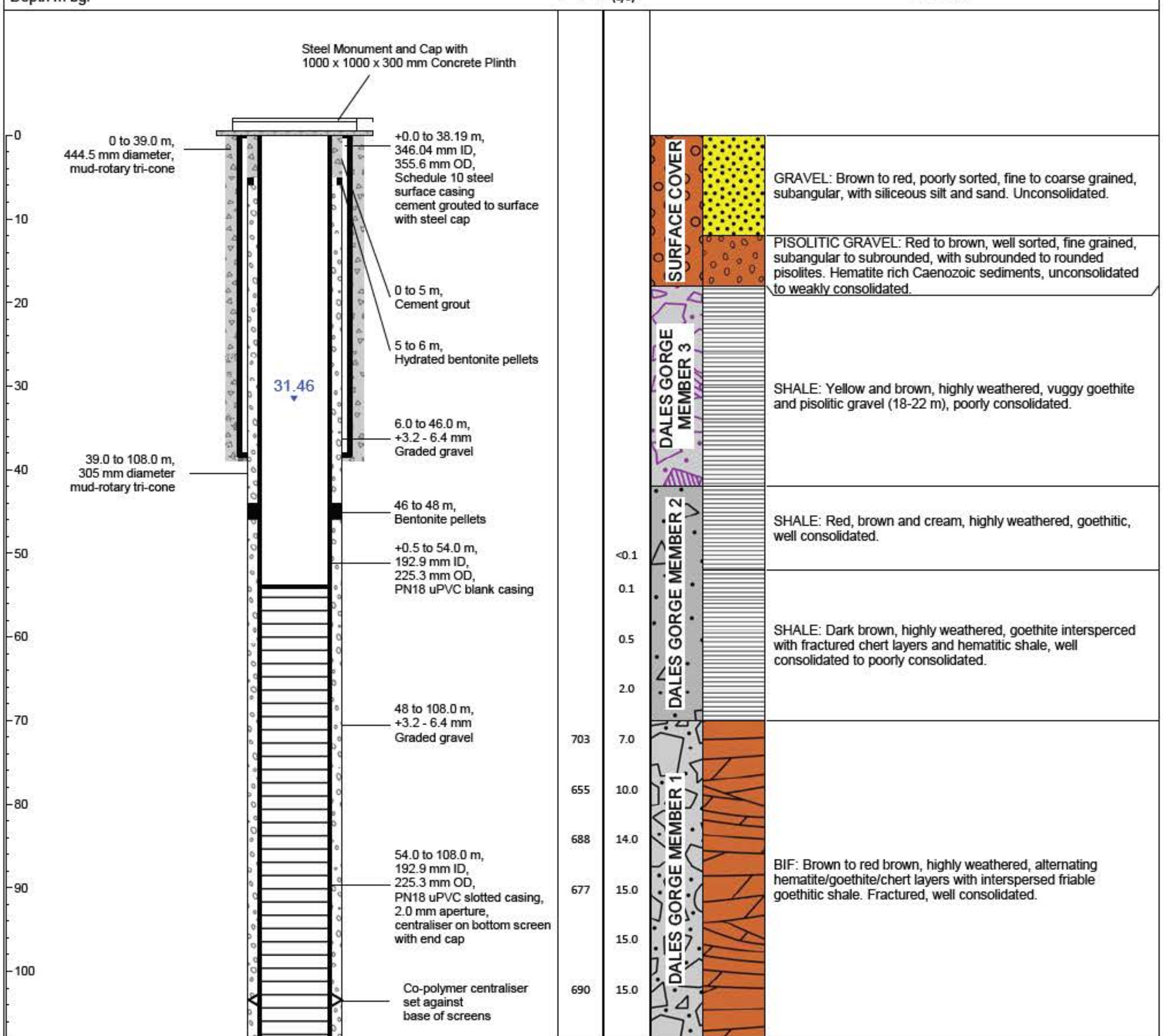
EAPB1314
ABANDONED PRODUCTION BORE DIAGRAM

Rockwater PROPRIETARY LIMITED

Figure 11

Rockwater
CONSULTANT HYDROGEOLOGISTS

Bore Construction



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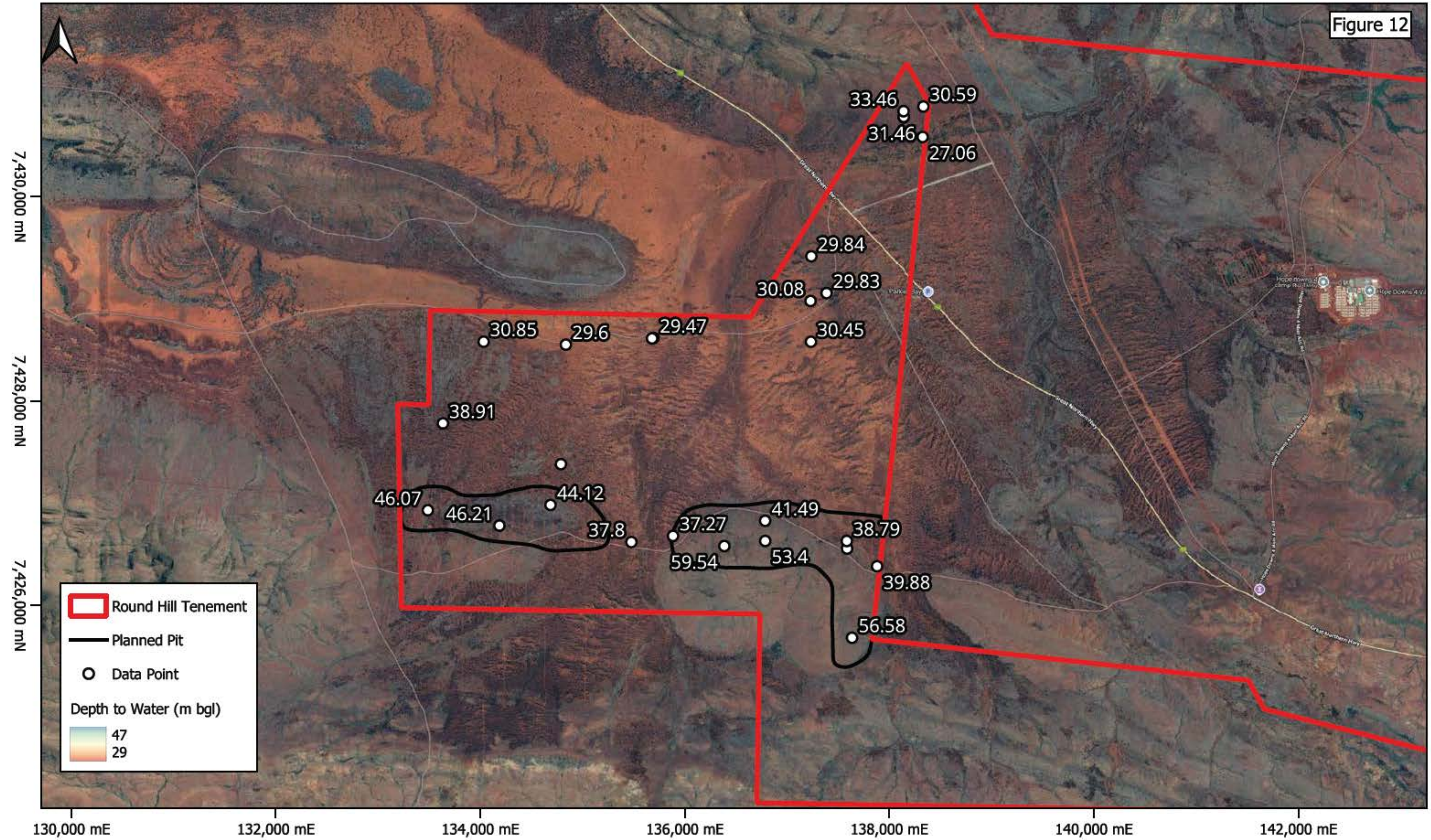
Construction Date:	02-06-2025 to 22-07-2025	Depth Drilled (m bgl):	108	SWL (m bgl):	31.46
Easting:	752,104.4	Top of Casing (m agl):	+0.24	Final Water Chemistry:	0.750 mS/cm, 8.01 pH
Northing:	7,433,391.1	Cased Depth (m bgl):	108.0	Max. Airlift Yield (L/s):	~11
Elevation:	686.12 m AHD	Slotted Depth (m bgl):	54.0 - 108.0	Drilled By:	Caswell Drilling, Peter Smith (Lic #406)

Client:	Hancock RDG
Project:	Round Hill Hydrogeology Conceptual Study Update
Date:	November 2025
Dwg. No:	180-1/25-01/11

EAPB1302
PRODUCTION BORE
CONSTRUCTION DIAGRAM

Rockwater



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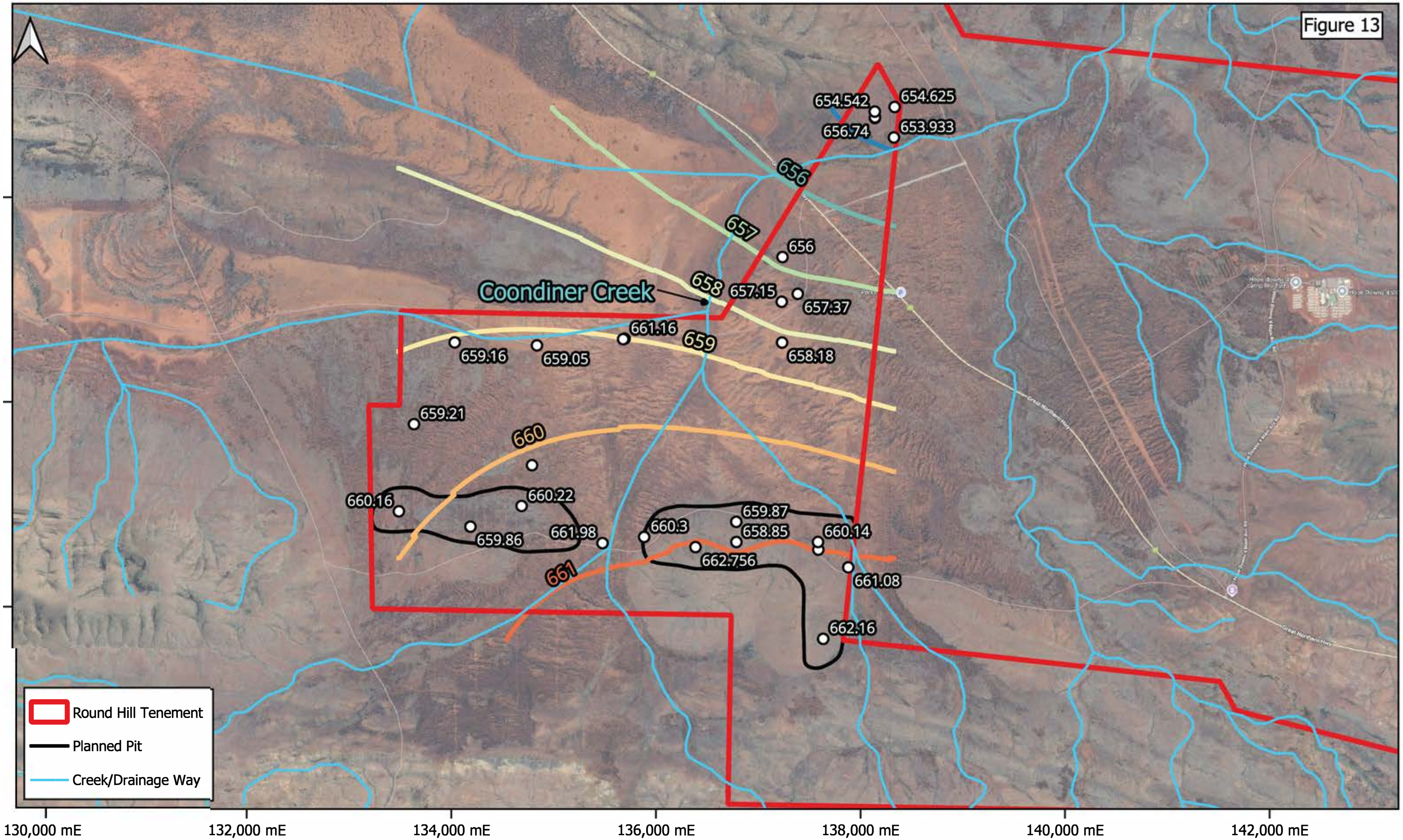
Rockwater

0 1 2 km

Coordinate System: GDA 2020 MGA Zone 50

Project	Round Hill Hydrogeology Conceptual Study Update
Client	Hancock RDG
Date	November 2025
Figure Number	180-1/25-01/12

DEPTH TO GROUNDWATER



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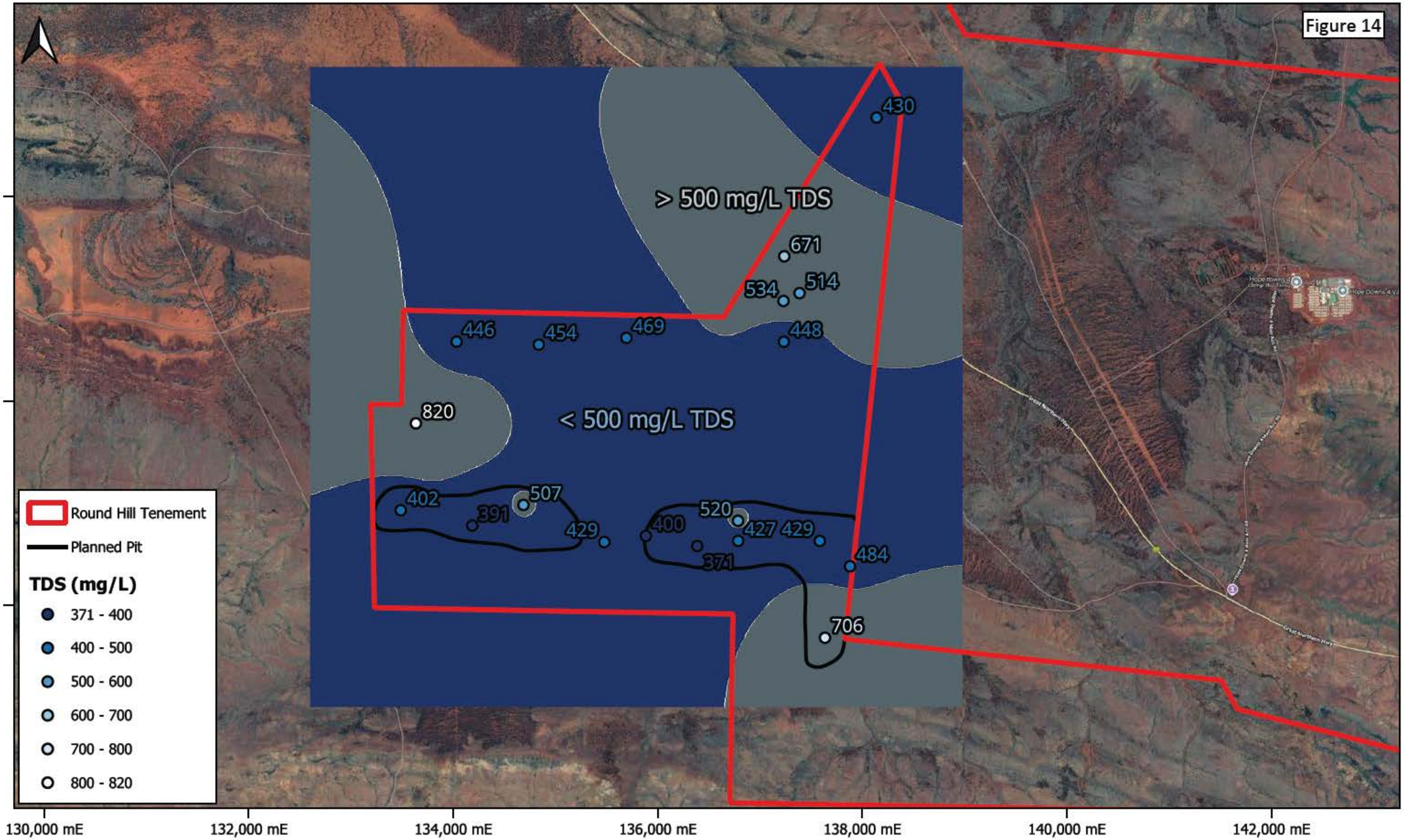
Rockwater

0 1 2 km

Coordinate System: GDA 2020 MGA Zone 50

Project	Round Hill Hydrogeology Conceptual Study Update
Client	Hancock RDG
Date	November 2025
Figure Number	180-1/25-01/13

GROUNDWATER CONTOUR



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Rockwater	0 1 2 km Coordinate System: GDA 2020 MGA Zone 50	Project	Round Hill Hydrogeology Conceptual Study Update	GROUNDWATER TOTAL DISSOLVED SOLIDS
		Client	Hancock RDG	
		Date	November 2025	
		Figure Number	180-1/25-01/14	

APPENDIX I

DEPARTMENT OF WATER AND ENVIRONMENTAL REGULATION (DWER) SECTION 26D LICENCE

File No: RF926-02~8

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Instrument No. CAW209385(1)

LICENCE TO CONSTRUCT OR ALTER WELL

Granted by the Minister under section 26D of the Rights in Water and Irrigation Act 1914

Licensee(s)	Hancock Prospecting Pty Ltd
Description of Water Resource	Pilbara Hamersley - Fractured Rock
Location of Well(s)	E47/1308-I E47/1313-I

Authorised Activities	**Activity**	**Location of Activity**
	Construct as many as required monitoring well(s) for mining or public supply.	E47/1308-I E47/1313-I
	Construct as many as required non-artesian well(s) for mining or public supply.	E47/1308-I E47/1313-I
	Construct as many as required exploratory well(s) for mining or public supply.	E47/1308-I E47/1313-I
Duration of Licence	From 7 December 2023 to 6 December 2025	

This Licence is subject to the following terms, conditions and restrictions:

1. The well must be constructed by a driller having a current class 1 water well drillers certificate issued by the Western Australian branch of the Australian Drilling Industry Association or equivalent certification recognised nationally by the Australian Drilling Industry Association.

2. No well shall be constructed within 400 metres of an existing well without the written permission of the owner of that well.

End of terms, conditions and restrictions

This Licence is granted subject to the Rights in Water and Irrigation Regulations 2000.

APPENDIX II

EXPLORATION DRILLING DATA SHEETS

INVESTIGATION HOLE DATA – EAEX1310

Project:	Round Hill – Water Supply Investigation
Hole No.	EAEX1310
Site No.	HYD_RH_003
Location:	Round Hill
Local Mine Grid:	751,553 mE and 7,429,175 mN
Status:	Investigation Hole
Date Commenced:	18 May 2025
Date Completed:	20 May 2025
Drilling Contractor:	Caswell
Drilling Rig:	T685 Series Schramm
Depth Drilled:	140 m
Drilling Details:	0-4 m, 305 mm (pilot hole)
	0-4 m; 444.5 mm tri-cone (reaming pass)
	4-140 m; 165 mm air-hammer pilot hole
Casing/Screen Details:	+0.10-3.9 m, 323.9 mm OD, 314.7 mm ID, schedule 10 steel surface casing
Annular Details:	0.0-4.0 m, rapid set grout in 444.5 mm hole
	0.0-6.0 m, cement grout in 165 mm hole
	6.0-140.0 m, backfilled with drill cuttings and gravel pack in 165 mm hole
Water Level:	NA (Hole collapsed)
Water Quality:	7.93 pH, 805 µS/cm

Lithological Description

From	To	Formation	Lithology	Description
0	2	SURFACE COVER	CLAY, SILT, GRAVEL	CLAY/SILT/GRAVEL: Unconsolidated silt, sand and gravel associated with ephemeral creeks and riverbeds. Brownish red, loose
2	10	CANGA	DURICRUST	DURICRUST: Reddish brown, highly weathered, hematite rich Cainozoic sediment ranging from silt to gravel in size
10	18	JOFFRE MEMBER	BIF/CHERT/SHALE	BIF: Reddish brown, highly weathered, interspersed with BIF, poorly consolidated
18	28	WHALEBACK SHALE 2	SHALE	SHALE: Reddish brown, highly weathered, poorly consolidated, shale fragments with BIF/Chert
28	32	WHALEBACK SHALE 1	GOETHITE	GOETHITIC SHALE: Reddish brown, highly weathered goethite that is vuggy, with poorly consolidated shale fragments
32	40		SHALE	SHALE: Reddish cream brown, highly weathered, BIF/Chert, with poorly consolidated shale fragments
40	94	DALES GORGE 3	BIF	BIF: Greyish red, moderately weathered, alternating hematite/magnetite/chert layers with interspersed goethite, moderately fractured, iron oxide staining present on fractured surfaces, well consolidated
94	128	DALES GORGE 2	SHALE	SHALE: Dark grey to red, slightly weathered, predominantly carbonaceous and siliceous shale, with interbedded Fe-rich laminae mildly fractured, well consolidated
128	140	DALES GORGE 1	BIF	BIF: Dark grey to red, fresh, finely laminated BIF with hematite-chert, fine-scale laminae, very well consolidated

Hydro Data:

Hole ID	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temperature (°C)	Comments
EAEX1310	50.0	0.5				First water at 49m, not enough to sample
EAEX1310	56.0	0.5				Light brown
EAEX1310	62.0	2.0	1420	8.17	26.5	Light brown
EAEX1310	68.0	2.5	1425	8.10	26.7	Light brown
EAEX1310	74.0	3.0	924	8.07	26.2	Light brown
EAEX1310	80.0	3.0	781	7.56	25.6	Light brown
EAEX1310	86.0	3.0	775	7.63	25.8	Light brown
EAEX1310	92.0	3.0	790	7.70	25.5	Light brown
EAEX1310	98.0	3.5	782	7.80	25.7	Light brown
EAEX1310	104.0	3.5	780	7.86	25.6	Light brown
EAEX1310	110.0	4.0	766	7.73	25.8	Light brown
EAEX1310	116.0	7.5	780	7.83	25.7	Light brown
EAEX1310	122.0	7.5	770	7.76	26.3	Light brown
EAEX1310	128.0	7.5	810	7.82	25.6	Light brown
EAEX1310	134.0	7.5	790	7.90	25.9	Light brown
EAEX1310	140.0	8.5	805	7.93	25.8	Light brown

MONITORING BORE DATA – EAEX1312

Project:	Round Hill – Water Supply Investigation
Hole No.	EAEX1312
Site No.	HYD_RH_005
Location:	Round Hill
Local Mine Grid:	748,755 mE and 7,429,999 mN
Status:	Investigation Hole
Date Commenced:	26 May 2025
Date Completed:	29 May 2025
Drilling Contractor:	Caswell
Drilling Rig:	T685 Series Schramm
Depth Drilled:	108 m (Hole collapsed)
Drilling Details:	0.4 m; 305 mm air-hammer (pilot hole) 0-4 m; 444.5 mm tri-cone (reaming pass) 4.0-108 m; 165 mm air-hammer
Casing/Screen Details:	+0.0-3.8 m, 323.9 mm OD, 314.7 mm ID, schedule 10 steel surface casing
Annular Details:	0.0-3.8 m, rapid set grout in 444.5 mm hole 0.0-5.0 m, grout in 165 mm hole 5.0-108 m, backfilled with drill cuttings and gravel pack in 165 mm hole
Water Level:	NA (hole dry, hole collapsed)
Water Quality:	NA (hole dry)

Lithological Description

From	To	Formation	Lithology	Description
0	10	SURFACE COVER	GRAVEL	GRAVEL: Unconsolidated sand and gravel light brown, loose
8	22	SURFACE COVER	DURICRUST	DURICRUST: Reddish brown, highly weathered, hematite rich Cainozoic sediment ranging from fine sand to gravel in size. Goethite-hematite pebbles with no plasticity
22	40	SURFACE COVER	DURICRUST - SCREE	DURICRUST/SCREE:Reddish highly weathered and hematitic and maghemite rich, poorly consolidated, low plasticity and firm, Fine grained sediments ranging from clay to gravel in size
40	54	CAINOZOIC DEPOSITION 2 (CZD2)	CHANNEL IRON DEPOSIT	CID: Light yellow brown, highly weathered, clay and goethetic rich with sub rounded to rounded sediments that range from fine sand to gravel in size, with poorly consolidated goethite fragments
54	78	CAINOZOIC DEPOSITION 2 (CZD2)	BASAL CLAY	CLAY: Light cream and brown, moderately weathered, poorly consolidated, clay rich, moderate plasticity, stiff, and grain size varying from clay to coarse sand. Secondary fragments include mainly goethite
78	90	WF (BEE GORGE)	BIF/SHALE	BIF/SHALE: Cream, highly weathered Kaolinised shale, sub- rounded chips. Secondary mineralisation of quartz and goethite. Poorly consolidated
90	108	WF (BEE GORGE)	BIF/SHALE	BIF/SHALE: Brownish Khaki, highly weathered Goethetic shale, sub-rounded chips. Secondary mineralisation of quartz and goethite. Poorly consolidated

INVESTIGATION HOLE DATA – EAEX1313 (EAPB1301)

Project:	Round Hill – Water Supply Investigation
Hole No.	EAEX1313
Site No.	HYD_RH_006
Location:	Round Hill
Local Mine Grid:	749,646 mE and 7,431,229 mN
Status:	Abandoned – Failed production bore
Date Commenced:	29 May 2025 Pilot Hole (23/06/2025 failed production bore)
Date Completed:	31 May 2025 Pilot Hole (01/07/2025 failed production bore)
Drilling Contractor:	Caswell
Drilling Rig:	T685 Series Schramm
Depth Drilled:	98 m
Drilling Details:	0-3 m, 305 mm air-hammer (pilot hole)
	0-3 m; 444.5 mm tri-cone (reaming pass)
	3-98 m; 165 mm air hammer (pilot hole)
	3-44 m 305 mm air-hammer (reaming pass)
Casing/Screen Details:	+0.0-3.0 m, 323.9 mm OD, 314.7 mm ID, schedule 10 steel surface casing
Annular Details:	0.0-4.0 m, cement grout in 444.5 mm hole
	10-44.0 m, cement grout in 305 mm hole
	0-10 m, gravel pack and drill cuttings in 305 mm hole
	44.0-98.0 m, hole collapsed, natural fill
Water Level:	NA (Hole collapsed)
Water Quality:	8.00 pH, 656 µS/cm

Lithological Description

From	To	Formation	Lithology	Description
0	8	SURFACE COVER	GRAVEL	GRAVEL: Sandy, light brown, poorly sorted, fine, subangular to subrounded, lithic, poorly consolidated
8	18	SURFACE COVER	DURICRUST	DURICRUST: Reddish brown, highly weathered as clay, hematite rich Cainozoic sediment ranging from clay to silt. Soft with low plasticity. Goethite as secondary mineral. Poorly consolidated
18	22	DETRITAL BASAL CLAY	CLAY	Clay: White and cream, highly weathered and hydrated, very fine grained and high plasticity, poorly consolidated with a mixture of gravelly pisolites
22	38	DETRITAL CALCRETE	CALCRETE/CLAY	Calcrete: Cream and brown, highly weathered. Clay and calcium carbonate fragments. Minor manganese staining. Poorly consolidated. Mixture of gravelly pisolites
38	58	PARABURDOO	BIF/CHERT/SHALE	BIF/CHERT: Greyish red-brown, moderately weathered, alternating hematite/Goethite/chert layers with interspersed Shale, moderately fractured, iron-oxide staining present on fracture surfaces and on shales that are also infilling hematitic chips through the fractures, well consolidated
58	86	PARABURDOO	BIF/CHERT/SHALE	BIF/CHERT/SHALE: Brown to cream, highly weathered. Shales with iron oxide and manganese staining. Sparse fracturing present, well consolidated
86	89	PARABURDOO	BIF/CHERT/SHALE	BIF/CHERT/SHALE: Light brown-cream to greyish brown, fresh, with some oxide minerals, finely laminated hematite-chert BIF with magnetite and kaolinised shales, fine-scale goethetic laminae, very well consolidated

Hydro Data:

Hole	165 mm diameter drill hole						
	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temp. (°C)	Pen. rate (min/rod)	Comments
EAEX1313	2.0	0.0				15	Dry, no water
EAEX1313	8.0	0.0				20	Dry, no water
EAEX1313	14.0	0.0				20	Dry, no water
EAEX1313	20.0	0.0				20	Dry, no water
EAEX1313	26.0	0.0				15	Dry, no water
EAEX1313	32.0	0.0				15	Dry, no water
EAEX1313	38.0	0.0				15	Dry, no water
EAEX1313	44.0	0.0				15	Dry, no water
EAEX1313	50.0	1.0	260	7.49	23.0	15	white brown, frothy
EAEX1313	56.0	4.5	760	7.15	22.7	15	light brown
EAEX1313	62.0	5.0	690	7.80	26.7	15	light brown
EAEX1313	68.0	7.0	670	7.60	26.7	20	light brown
EAEX1313	74.0	8.0	665	8.05	27.6	10	light brown
EAEX1313	80.0	10.0	632	7.95	28.2	10	light brown
EAEX1313	86.0	10.0	700	7.92	28.7	15	light brown
EAEX1313	92.0	14.0	635	8.00	28.3	30	light brown
EAEX1313	98.0	11.0	656	8.00	28.5	60	light brown

FAILED PRODUCTION BORE DATA – EAPB1314

Project:	Round Hill – Water Supply Investigation
Hole No.	EAEPB1314
Site No.	HYD_RH_008
Location:	Round Hill
Local Mine Grid:	752,107 mE and 7,433,386 mN
Status:	Abandoned – Failed production bore UP TO HERE
Date Commenced:	2 June 2025
Date Completed:	13 June 2025
Drilling Contractor:	Caswell
Drilling Rig:	T685 Series Schramm
Depth Drilled:	116 m
Drilling Details:	0-6 m, 305 mm air-hammer (pilot hole)
	0-6 m; 444.5 mm tri-cone (reaming pass)
	6-86 m 305 mm air-hammer production hole
Casing/Screen Details:	+0.0-6.0 m, 323.9 mm OD, 314.7 mm ID, schedule 10 steel surface casing
Annular Details:	0.0-6.0 m, cement grout in 444.5 mm hole
	0-2.0 m, cement grout in 305 mm hole
	2-14.5 m, drill cuttings in 305 mm hole
	14.5-26.5 m, cement grout in 305 mm hole
	26.5-116.0 m, natural backfill in 305 mm hole
Water Level:	NA (Hole collapsed)
Water Quality:	8.13 pH, 683 µS/cm

Lithological Description

From	To	Formation	Lithology	Description
0	12	SURFACE COVER	GRAVEL	GRAVEL: Brown to red, poorly sorted, very fine to gravel sized grains, subangular, siliceous, unconsolidated gravel with silt a
12	18		DURICRUST	DURICRUST: Red to brown, highly weathered, rounded to well rounded pisolites. Hematite rich Cainozoic sediments ranging from si
18	38	DALES GORGE 3	SHALE	SHALE: Yellow and brown, highly weathered, very fine to fine grained, vuggy goethite and pisolitic gravel (18-22 m), poorly con
38	52		GOETHITIC SHALE	GOETHITIC SHALE: Red, brown and cream, highly weathered, very fine grained, well consolidated
52	70	DALES GORGE 2	HEMATITIC GOETHITE	HEMATITIC GOETHITE: Dark brown, highly weathered, fractured, well consolidated with poorly consolidated shale fragments
70	112	DALES GORGE 1	GOETHITE	GOETHITE: Brown to red brown, highly weathered, minor chert and goethetic shale, well consolidated and fractured
112	116		FOOTWALL ZONE	FOOTWALL ZONE: Light brown, hard, fresh, chert with interbedded goethitic and kaolinitic shale, well consolidated

Hydro Data:

Hole	305 mm diameter drill hole						
	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temp. (°C)	Pen. rate (min/rod)	Comments
EAEX1314	2.0	0.0				15	
EAEX1314	8.0	0.0				10	
EAEX1314	14.0	0.0				25	
EAEX1314	20.0	0.0				20	
EAEX1314	26.0	0.0				33	
EAEX1314	32.0	0.0				14	
EAEX1314	38.0	0.0				20	
EAEX1314	44.0	0.0				18	
EAEX1314	50.0	0.0				17	
EAEX1314	56.0	0.1				20	Water cut at 52m
EAEX1314	62.0	0.5				22	too much foam
EAEX1314	68.0	2.0				20	too much foam
EAEX1314	74.0	7.0	703	7.53	26.0	31	
EAEX1314	80.0	10.0	655	8.13	27.5	34	
EAEX1314	86.0	14.0	688	8.08	26.5	41	
EAEX1314	92.0	15.0	677	8.10	27.8	19	
EAEX1314	98.0	15.0				59	Water quality missed due to organising water cart and excavator
EAEX1314	104.0	15.0	690	8.11	27.6	28	
EAEX1314	110.0	15.0	680	8.08	27.8	33	
EAEX1314	116.0	15.0	683	8.13	27.8	18	

APPENDIX III

BORE COMPLETION DATA SHEETS

PRODUCTION BORE DATA – EAPB1302

Project:	Round Hill – Water Supply Investigation
Hole No.	EAPB1302
Site No.	HYD_RH_010
Location:	Round Hill
Local Mine Grid:	752,104 mE and 7,433,391 mN, , 686.12 m AHD
Status:	Production Bore
Date Commenced:	13 July 2025
Date Completed:	22 July 2025
Drilling Contractor:	Caswell Drilling
Drilling Rig:	T685 Series Schramm
Depth Drilled:	108 m
Drilling Details:	0-39 m; 444.5 mm air hammer (surface hole)
	39-108 m; 305 mm air hammer (production hole)
Casing/Screen Details:	+0.1-38.19 m, 355.6 mm OD, 346.04 mm ID, schedule 10 carbon steel surface casing
	+0.43-0.0 m, 330 mm OD, 311 mm ID lockable steel cap +0.24-54.0 m, 225.3 mm OD, 192.9 mm ID, PN18 uPVC blank casing
	54.0-108.0 m, 225.3 mm OD, 192.9 mm ID, PN18 uPVC blank casing
Annular Details:	0.0-39 m, SG 1.6 grout in 444.5 mm hole
	0.0-5.0 m, SG 1.5 grout in 305 mm hole
	5.0-6.0 m, hydrated bentonite pellets
	6.0-46.0 m, +3.2 – 6.4 mm graded gravel pack
	46.0-48.0 m, bentonite pellets
	48.0-108.0 m, +3.2 – 6.4 mm graded gravel pack
Water Level:	31.46 m bgl (654.66 mAHD)
Water quality:	8.01 pH, 0.75 mS/cm

Lithological Description:

From	To	Formation	Lithology	Description
0	12	SURFACE COVER	GRAVEL	GRAVEL: Brown to red, poorly sorted, fine to coarse grained, subangular, with siliceous silt and sand. Unconsolidated
12	18	SURFACE COVER	PISOLITIC GRAVEL	PISOLITIC GRAVEL: Red to brown, well sorted, fine grained, subangular to subrounded, with subrounded to rounded pisolites. Hematite rich Caenozoic sediments, unconsolidated to weakly consolidated
18	42	DALES GORGE MEMBER 3	SHALE	SHALE: Yellow and brown, highly weathered, vuggy goethite and pisolitic gravel (18-22 m), poorly consolidated.
42	52	DALES GORGE MEMBER 2	SHALE	SHALE: Red, brown and cream, highly weathered, goethitic, well consolidated
52	70	DALES GORGE MEMBER 2	SHALE	SHALE: Dark brown, highly weathered, goethite intersperced with fractured chert layers and hematitic shale, well consolidated
70	108	DALES GORGE MEMBER 1	BIF	BIF: Brown to red brown, highly weathered, alternating hematite/goethite/chert layers with interspersed friable goethitic shale

Development Data:

Hole	192.9 mm ID Class 18 uPVC casing						
	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temp. (°C)	Sediment (mg/l)	Comments
EAPB1302	56	2.00	752	8..34	24.0	3.00	Brown water, dark gray v.fine sand / silt
EAPB1302	62	3.00	754	8.26	25.6	3.00	Brown water, dark gray v.fine sand / silt
EAPB1302	68	5.00	750	8.23	24.7	3.00	Brown water, dark gray v.fine sand / silt
EAPB1302	74	7.00	750	8.17	24.6	3.00	Brown water, dark gray v.fine sand / silt
EAPB1302	80	9.00	761	8.33	26.0	2.50	Brown water, dark gray v.fine sand / silt
EAPB1302	80	9.00	752	8.36	26.1	2.50	Brown water, dark gray v.fine sand / silt
EAPB1302	80	9.00	730	8.31	24.2	2.50	Brown water, dark gray v.fine sand / silt
EAPB1302	86	10.00	740	8.32	25.2	2.50	Brown water, dark gray v.fine sand / silt
EAPB1302	92	10.00	752	8.26	25.7	2.00	Light Brown water, dark gray v fine sand / silt
EAPB1302	102	10.00	740	7.96	28.0	2.00	Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	10.00	720	7.99	27.8	1.50	Translucent Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	10.00	760	8.00	27.7	1.00	Translucent Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	11.00	750	8.06	27.5	0.75	Nearly Clear Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	11.00	715	7.99	27.8	0.75	Nearly Clear Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	11.00	720	8.00	28.0	0.50	Nearly Clear Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	11.00	760	8.03	28.1	0.50	Nearly Clear Light Brown water; dark grey v.fine sand / silt
EAPB1302	102	11.00	750	8.01	28.0	0.50	Nearly Clear Light Brown water; dark grey v.fine sand / silt

PRODUCTION BORE DATA – EAPB1303

Project:	Round Hill – Water Supply Investigation
Hole No.	EAPB1303
Location:	Round Hill
Local Mine Grid:	749,657 mE and 7,431,236 mN, 687.87 m AHD
Status:	Production Bore
Date Commenced:	2 July 2025
Date Completed:	11 July 2025
Drilling Contractor:	Caswell Drilling
Drilling Rig:	T685 Series Schramm
Depth Drilled:	89 m
Drilling Details:	0-8 m; 305 mm mud-rotary (surface casing)
	0-6 m; 381 mm mud-rotary (surface casing reaming pass)
	6-89 m, 305 mm mud-rotary (production hole)
Casing/Screen Details:	+0.0-6.0 m, 323.9 mm OD, 314.7 mm ID, schedule 10 carbon steel surface casing
	+0.47-0.0 m, 330 mm OD, 311 mm ID lockable steel cap +0.15-46.5 m, 225.3 mm OD, 192.9 mm ID, Class 18 uPVC blank casing
	46.5-88.5 m, 225.3 mm OD, 192.9 mm ID, Class 18 uPVC slotted casing, 2 mm aperture with end cap
Annular Details:	0.0-6 m, SG 1.6 grout in 444.5 mm hole
	0.0-5.0 m, SG 1.5 grout in 305 mm hole
	5-5.5 Hydrated bentonite
	5.5-37.5 m, +1.6 – 3.2 mm graded gravel pack
	37.5-39.5, bentonite
	39.5-89.0, +1.6 – 3.2 mm graded gravel pack
Water Level:	29.47 m bgl (658.5 m AHD; 12/07/2025)
Water quality:	8.15 pH, 0.738 µS/cm

Lithological Description:

From	To	Formation	Lithology	Description
0	8	DETRITALS	GRAVEL	SANDY GRAVEL: Light brown, poorly sorted, fine grained, subangular to subrounded, lithic, poorly consolidated
8	18	DETRITALS	CLAY	GOETHITIC CLAY: Reddish brown, low plasticity, soft to firm, hematite rich, Caenozoic sediment with traces of silt
18	30	WITTENOOM FORMATION (WEST ANGELAS)	SHALE	SHALE: Cream to reddish, highly weathered, hydrated and poorly consolidated
30	38	WITTENOOM FORMATION (WEST ANGELAS)	SHALE	SHALE: Creamish, highly weathered. Clay and calcium carbonate fragments. Minor manganese staining. Poorly consolidated
38	58	WITTENOOM FORMATION (WEST ANGELAS)	CHERT	CHERT: Greyish red-brown, moderately weathered, alternating hematite/goethite/chert layers with interspersed shale, moderately fractured. Iron-oxide staining present on fracture surfaces and on shales that are also infilling hematitic chips through the fractures. Well consolidated
58	86	WITTENOOM FORMATION (WEST ANGELAS)	SHALE	SHALE: Light brown to cream, highly weathered, rounded chips. Alternating hematite rich chert and BIF, sparse fracturing present. Iron oxide staining. Well consolidated
86	89	WITTENOOM FORMATION (WEST ANGELAS)	CHERT	CHERT: Light brown-cream to greyish brown, fresh, fine grained, with some oxide minerals, finely laminated hematite-chert BIF with magnetite and kaolinised shales, fine-scale goethetic laminae, very well consolidated

Development Data:

Hole	192.9 mm ID Class 18 uPVC casing						
	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temp. (°C)	Sediment (mg/l)	Comments
EAPB1303	42	4	518	8.50	25.2	0.1	Slightly cloudy
EAPB1303	42	4	723	8.19	26.3	0.1	Slightly cloudy
EAPB1303	42	4	729	8.23	25.5	0.1	Slightly cloudy
EAPB1303	42	4	725	8.12	25.5	Trace	v. slightly cloudy
EAPB1303	48	6	719	8.18	26.0	0.1	Light brown
EAPB1303	48	6	744	8.11	25.4	0.2	Light brown
EAPB1303	48	6	714	8.22	25.7	0.1	v. slightly cloudy
EAPB1303	48	6	724	8.17	24.8	Trace	Clear
EAPB1303	54	6	722	8.19	26.0	0.1	v. slightly cloudy
EAPB1303	54	6	726	8.14	25.6	Trace	Clear
EAPB1303	60	8	724	8.17	26.6	0.1	v. slightly cloudy
EAPB1303	60	8	733	8.17	24.7	Trace	Clear
EAPB1303	66	9	723	8.17	25.8	0.1	v. slightly cloudy
EAPB1303	66	9	726	8.11	26.1	trace	Clear
EAPB1303	72	10	726	8.17	26.3	Trace	Clear
EAPB1303	78	11	735	8.12	26.6	0.1	v. light brown
EAPB1303	78	11	735	8.21	25.6	Trace	Clear
EAPB1303	84	11	734	8.13	26.8	0.1	Clear
EAPB1303	84	11	733	8.15	26.8	Trace	Clear
EAPB1303	42	4	727	8.25	26.8	Trace	Clear
EAPB1303	48	6	736	8.13	26.8	Trace	Clear
EAPB1303	54	6	736	8.18	25.9	Trace	Clear
EAPB1303	60	8	738	8.14	26.4	Trace	Clear
EAPB1303	66	9	737	8.15	26.4	Trace	Clear
EAPB1303	72	10	736	8.15	26.6	Trace	Clear
EAPB1303	78	11	737	8.15	26.4	Trace	Clear
EAPB1303	84	11	738	8.15	26.4	trace	Clear

PRODUCTION BORE DATA – EAPB1300

Project:	Round Hill – Water Supply Investigation
Hole No.	EAPB1300
Location:	Round Hill
Local Mine Grid:	749,443 mE and 7,429,242 mN, 698.4 mAHD
Status:	Production Bore
Date Commenced:	21 May 2025 (Pilot Hole) 14 June 2025 (Production Bore)
Date Completed:	25 May 2025 (Pilot Hole) 22 June 2025 (Production Bore)
Drilling Contractor:	Caswell Drilling
Drilling Rig:	T685 Series Schramm
Depth Drilled:	110 m
Drilling Details:	0-3 m; 305 mm air-hammer (surface casing)
	0-3 m; 381 mm air-hammer (reaming pass)
	6-110 m; 165 mm air hammer (pilot hole)
	6-93.5 m, 305 mm air hammer ream (reaming pass)
Casing/Screen Details:	+0.0-3.0 m, 355.6 mm OD, 346.04 mm ID, schedule 10 carbon steel surface casing
	+0.44-0.0 m, 330 mm OD, 311 mm ID lockable steel cap +0.28-56.5 m, 225.3 mm OD, 192.9 mm ID, class 18, uPVC blank casing
	56.5-92.5 m, 225.3 mm OD, 192.9 mm ID, class 18, uPVC slotted casing, 2 mm aperture
Annular Details:	0.0-3 m, SG 1.4 grout in 444.5 mm hole
	0.0-5.0 m, SG 1.5 grout in 305 mm hole
	5.0-6.0 m, hydrated bentonite pellets
	6.0-38.0 m, +3.2 – 6.4 mm graded gravel pack
	38.0-40.0 m, bentonite pellets
	40.0-93.0 m, +3.2 – 6.4 mm graded gravel pack
	93.0 to 110.0 m, natural backfill
Water Level:	37.8 m bgl (660.5 m AHD)
Water quality:	7.80 pH, 650 µS/cm

Lithological Description:

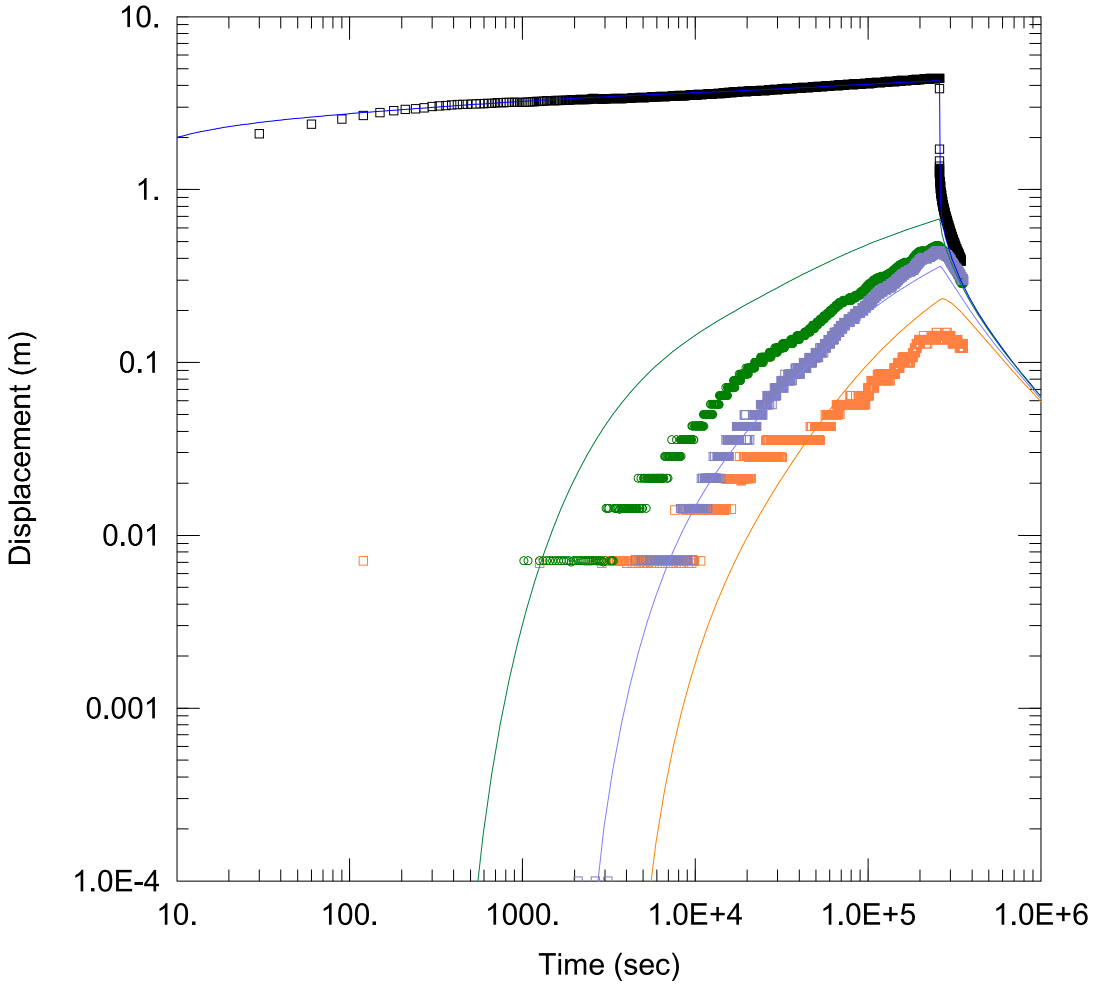
From	To	Formation	Lithology	Description
0	10	CANGA	GOETHITE	GOETHITE: Reddish brown, highly weathered, hematite rich Cainozoic material ranging from silt to gravel in grain size, poorly consolidated
10	16		PISOLITIC GRAVEL	PISOLITIC GRAVEL: Reddish brown, well sorted, fine grained, subrounded to subangular, with hematite rich Caenozoic sediments. Subrounded to rounded pisolites and traces of clay. Poorly consolidated
16	20	WHALEBACK SHALE 1	GOETHITIC SHALE	GOETHITIC SHALE: Reddish brown, highly weathered, poorly consolidated
20	26		SHALE	SHALE: Reddish cream brown, highly weathered kaolinised shale, with poorly consolidated goethite fragments
26	100	DALES GORGE 3	CHERT	CHERT: Greyish red, moderately weathered, alternating hematite/magnetite/BIF layers with interspersed goethite, moderately fractured. Iron oxide staining present on fractured surfaces. Well consolidated
100	110	DALES GORGE 2	SHALE	SHALE: Dark grey to red, slightly weathered, predominantly carbonaceous and siliceous shale, with interbedded Fe-rich laminae

Development Data:

Hole ID	165 mm hole					
	Depth (m)	Yield (L/s)	EC (mS/cm)	pH	Temperature (°C)	Comments
EAPB1300	54	3.00	630	8.10	25.1	Clear within 5-10 minutes
EAPB1300	54	3.00	610	8.01	25.3	Clear within 5-10 minutes
EAPB1300	54	3.00	530	8.17	25.4	Clear within 5-10 minutes
EAPB1300	60	5.00	660	8.12	25.0	Clear within 5-10 minutes
EAPB1300	66	7.00	730	7.96	26.0	Clear within 5-10 minutes
EAPB1300	72	7.00	625	8.27	26.5	Clear within 5-10 minutes
EAPB1300	78	9.00	620	8.10	26.4	Clear within 5-10 minutes
EAPB1300	78	9.00	584	8.01	27.2	Clear within 5-10 minutes
EAPB1300	84	9.00	530	7.91	26.7	Clear within 5-10 minutes
EAPB1300	84	9.00	502	7.87	26.0	Clear within 5-10 minutes
EAPB1300	90	9.00	489	7.84	26.9	Clear within 5-10 minutes
EAPB1300	90	9.00	493	7.82	27.1	Clear within 5-10 minutes
EAPB1300	54	2.00	670	8.07	28.1	Clear from beginning
EAPB1300	60	3.00	645	8.04	27.3	Clear from beginning
EAPB1300	78	5.00	655	8.01	27.1	Clear from beginning
EAPB1300	90	9.00	670	7.83	27.4	Clear from beginning
EAPB1300	90	9.00	660	7.82	27.1	Clear from beginning
EAPB1300	90	9.00	645	7.81	27.2	Clear from beginning
EAPB1300	90	9.00	648	7.79	27.3	Clear from beginning

APPENDIX IV

ANALYSES OF TEST PUMPING



AQUIFER DATA

Saturated Thickness: 52.38 m

Anisotropy Ratio (Kz/Kr): 3.284

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1300 DG3	749441	7429239

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1300 DG3	749441	7429239
□ EAPZ0517 DG2/DG3	748150	7429400
○ EAPZ0587 DG2	749848	7429299
□ EAPZ0251 DG3	750350	7429200

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 646.3 m^2/day

Sy = 0.0005981

Sw = 0.55

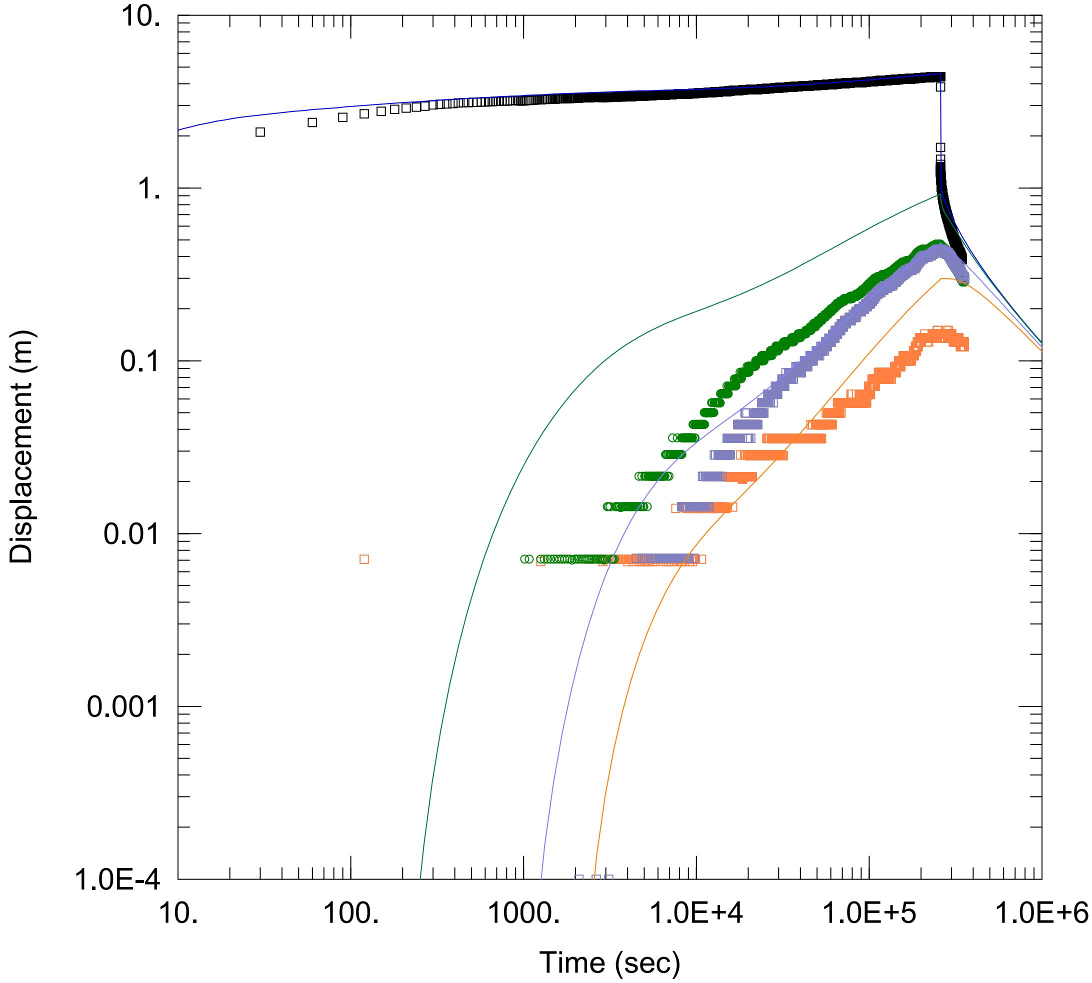
r(c) = 0.1 m

S = 0.000503

Kz/Kr = 3.284

r(w) = 0.15 m

alpha = 7.709E-5 sec^{-1}



AQUIFER DATA

Saturated Thickness: 52.38 m

Anisotropy Ratio (Kz/Kr): 1.219

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1300 DG3 (North boun	749441	7429239

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1300 DG3 (North bou	749441	7429239
□ EAPZ0517 DG2/DG3	748150	7429400
○ EAPZ0587 DG2	749848	7429299
□ EAPZ0251 DG3	750350	7429200

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 636. m^2/day

Sy = 0.001463

Sw = 0.55

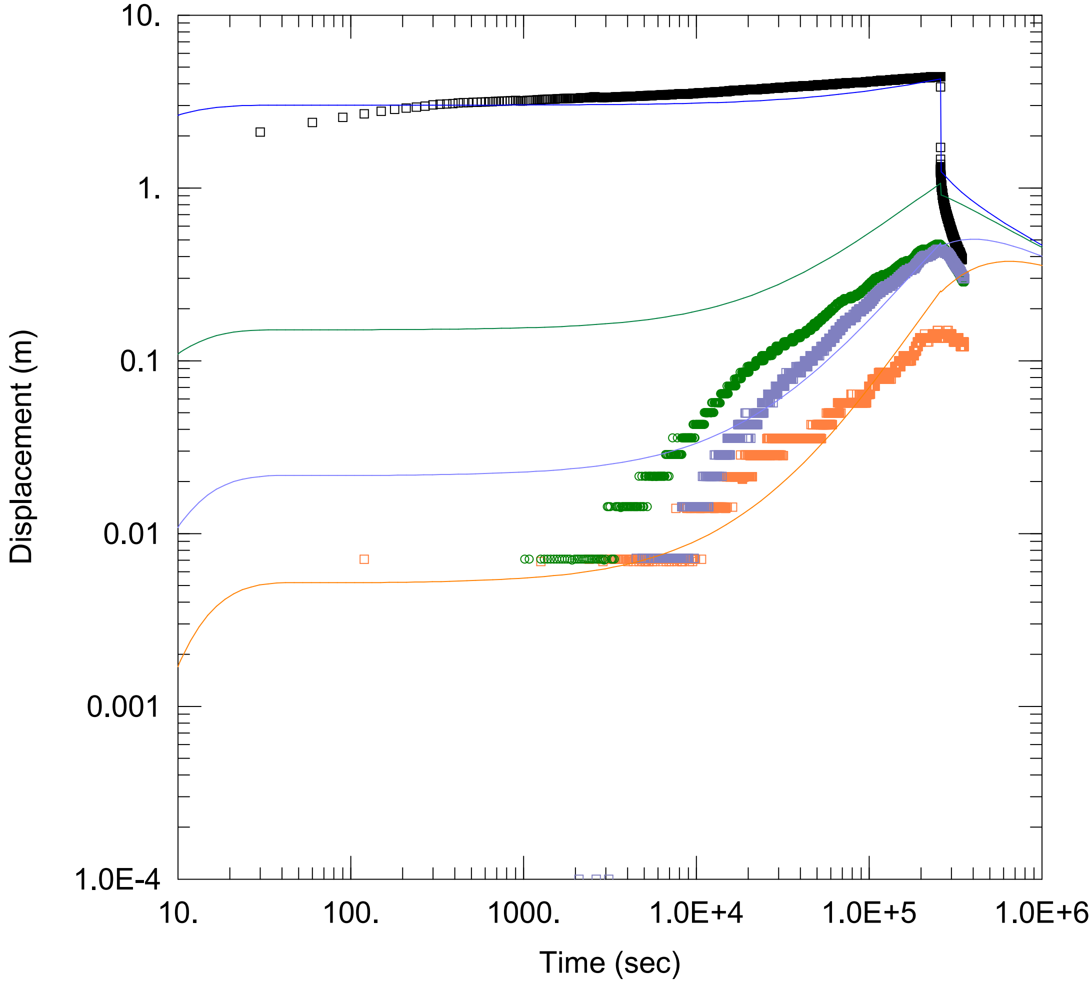
r(c) = 0.1 m

S = 0.0002234

Kz/Kr = 1.219

r(w) = 0.15 m

alpha = 4.345E-5 sec^{-1}



AQUIFER DATA

Saturated Thickness: 52.38 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1300 DG3 (strip aquifer	749441	7429239

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1300 DG3 (strip aquif	749441	7429239
□ EAPZ0517 DG2/DG3	748150	7429400
○ EAPZ0587 DG2	749848	7429299
□ EAPZ0251 DG3	750350	7429200

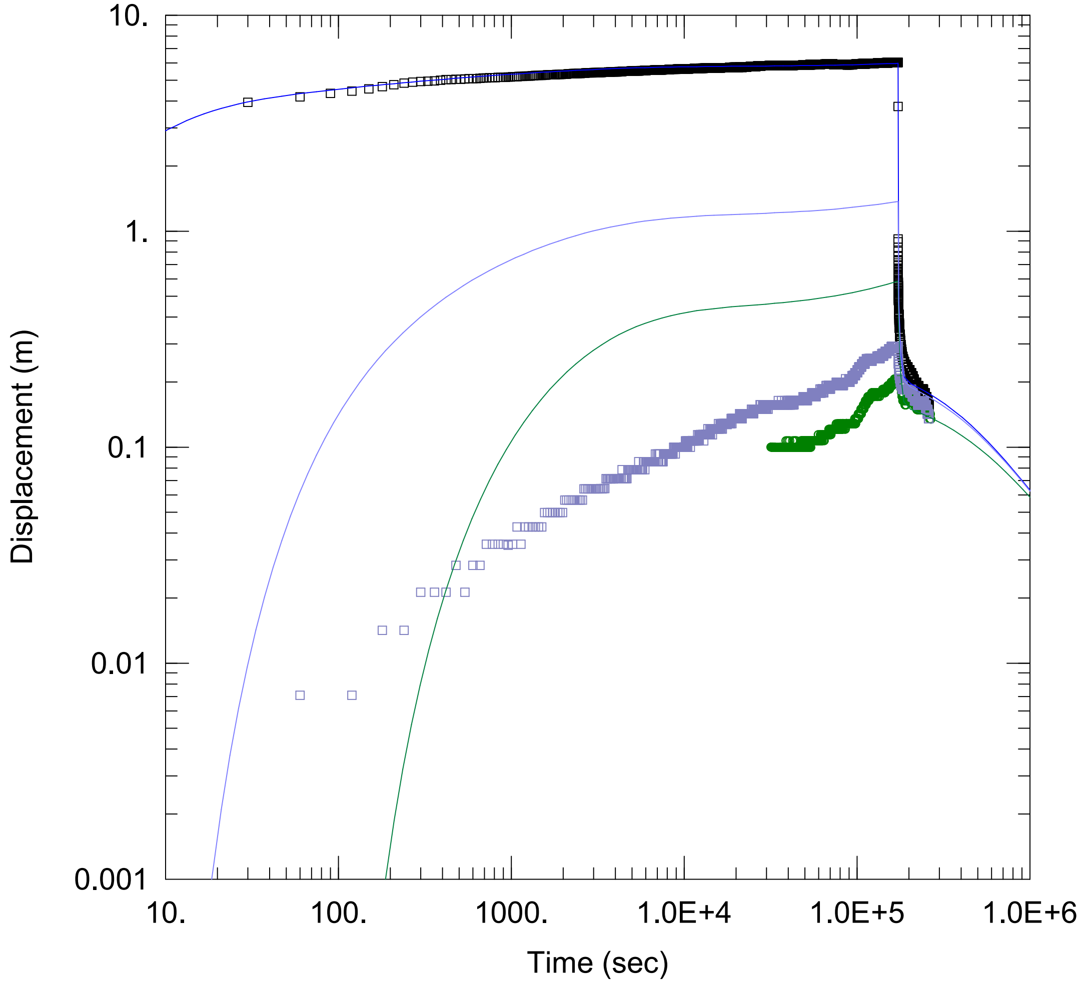
SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 879.2 m^2/day
Sy = 0.005715
Sw = 0.55
r(c) = 0.1 m

S = 4.51E-7
Kz/Kr = 1.
r(w) = 0.15 m
alpha = 2.449E-5 sec^{-1}



AQUIFER DATA

Saturated Thickness: 76.41 m

Anisotropy Ratio (Kz/Kr): 0.5012

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1302 (DG1/2)	752104	7433391

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1302 (DG1/2)	752104	7433391
○ EAPZ1247 (BI)	752297	7433499
□ EAPZ1238 (BI)	752103	7433454

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 403.1 m^2/day

Sy = 0.01179

Sw = 1.075

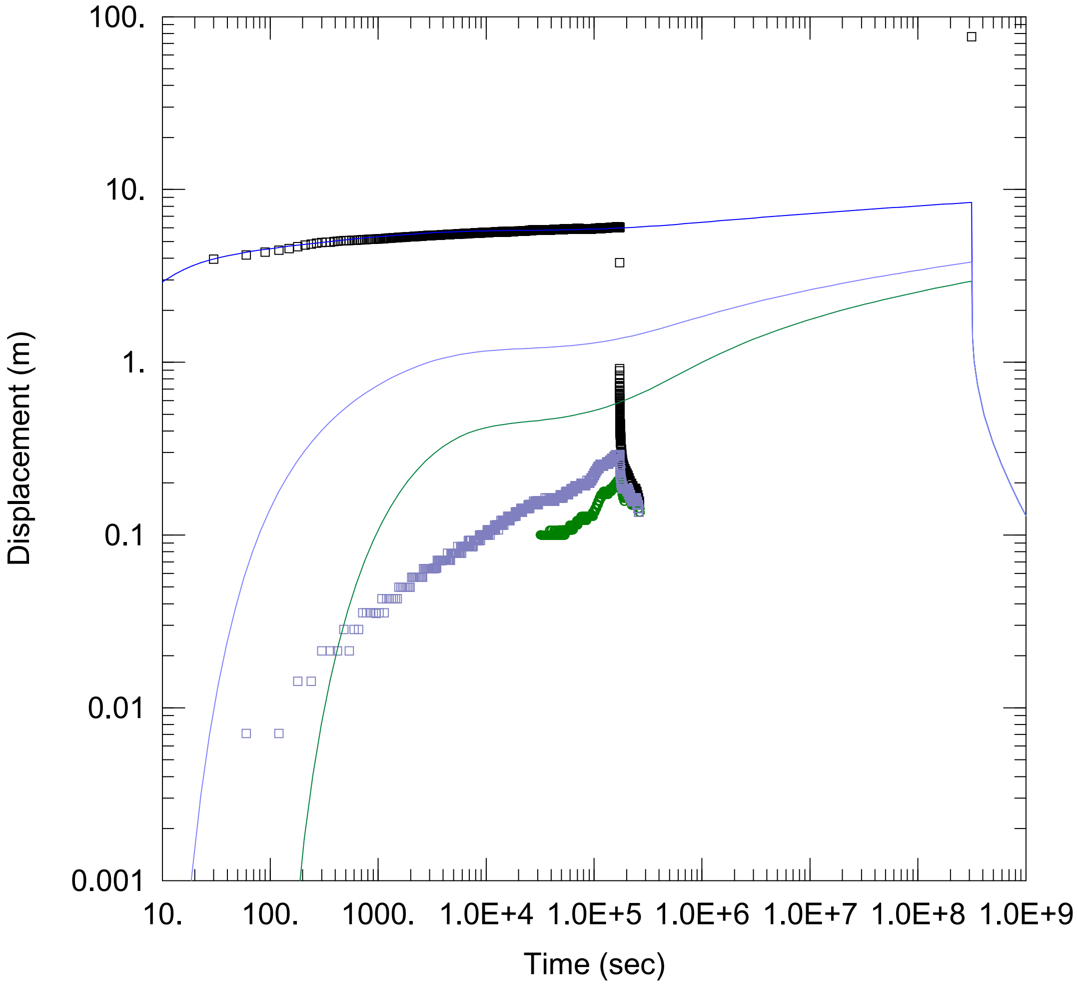
r(c) = 0.1 m

S = 0.0002788

Kz/Kr = 0.5012

r(w) = 0.2119 m

alpha = 4.385E-6 sec^{-1}



AQUIFER DATA

Saturated Thickness: 76.41 m

Anisotropy Ratio (Kz/Kr): 0.5012

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1302 (DG1/2)	752104	7433391

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1302 (DG1/2)	752104	7433391
○ EAPZ1247 (BI)	752297	7433499
□ EAPZ1238 (BI)	752103	7433454

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 403.1 m^2/day

Sy = 0.01179

Sw = 1.075

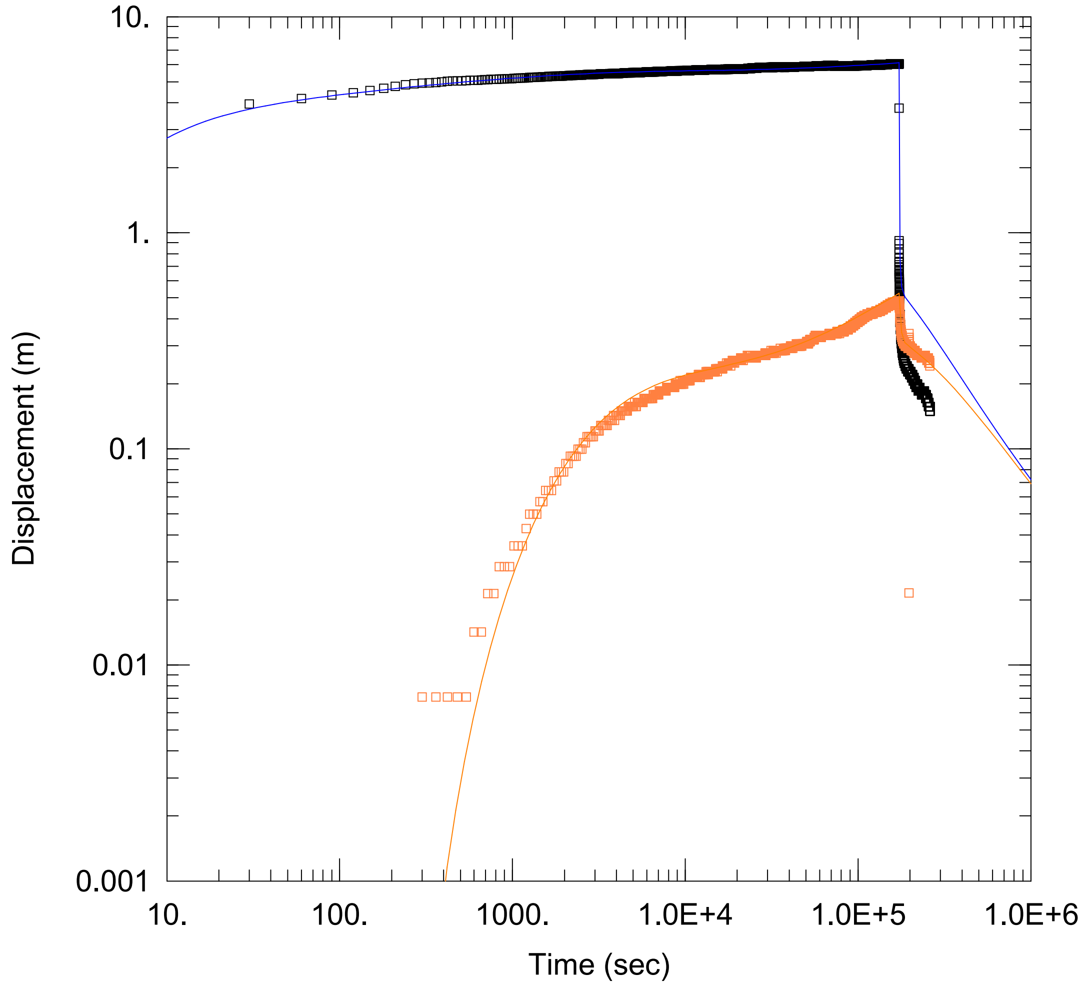
r(c) = 0.1 m

S = 0.0002788

Kz/Kr = 0.5012

r(w) = 0.2119 m

alpha = 4.385E-6 sec^{-1}



AQUIFER DATA

Saturated Thickness: 76.41 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1302 (DG1/2)	752104	7433391

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1302 (DG1/2)	752104	7433391
□ EAPZ1244 (FWZ/MCS)	752290	7433201

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 362.4 m^2/day

Sy = 0.007379

Sw = 0.025

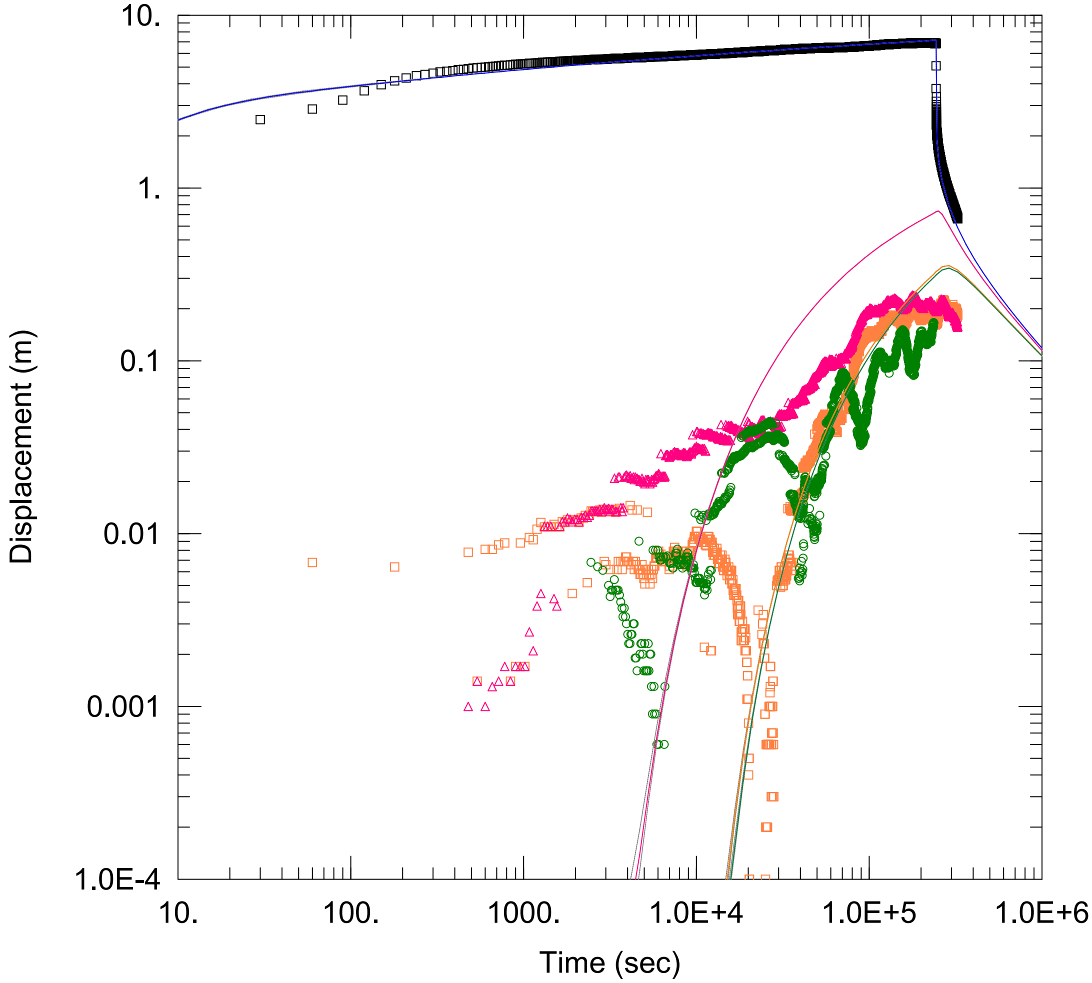
r(c) = 0.1 m

S = 0.0003888

Kz/Kr = 1.

r(w) = 0.15 m

alpha = 1.38E-5 sec^{-1}



AQUIFER DATA

Saturated Thickness: 59.2 m

Anisotropy Ratio (Kz/Kr): 1.558

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1303 (WF-WA)	749656	7431237

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1303 (WF-WA)	749656	7431237
□ EAPZ0641 (BG)	751197	7431198
△ EAPZ0620 (WA)	748800	7431170
○ EAPZ0642 (BG)	751193	7431597

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 326.9 m^2/day

Sy = 0.00029

Sw = -0.95

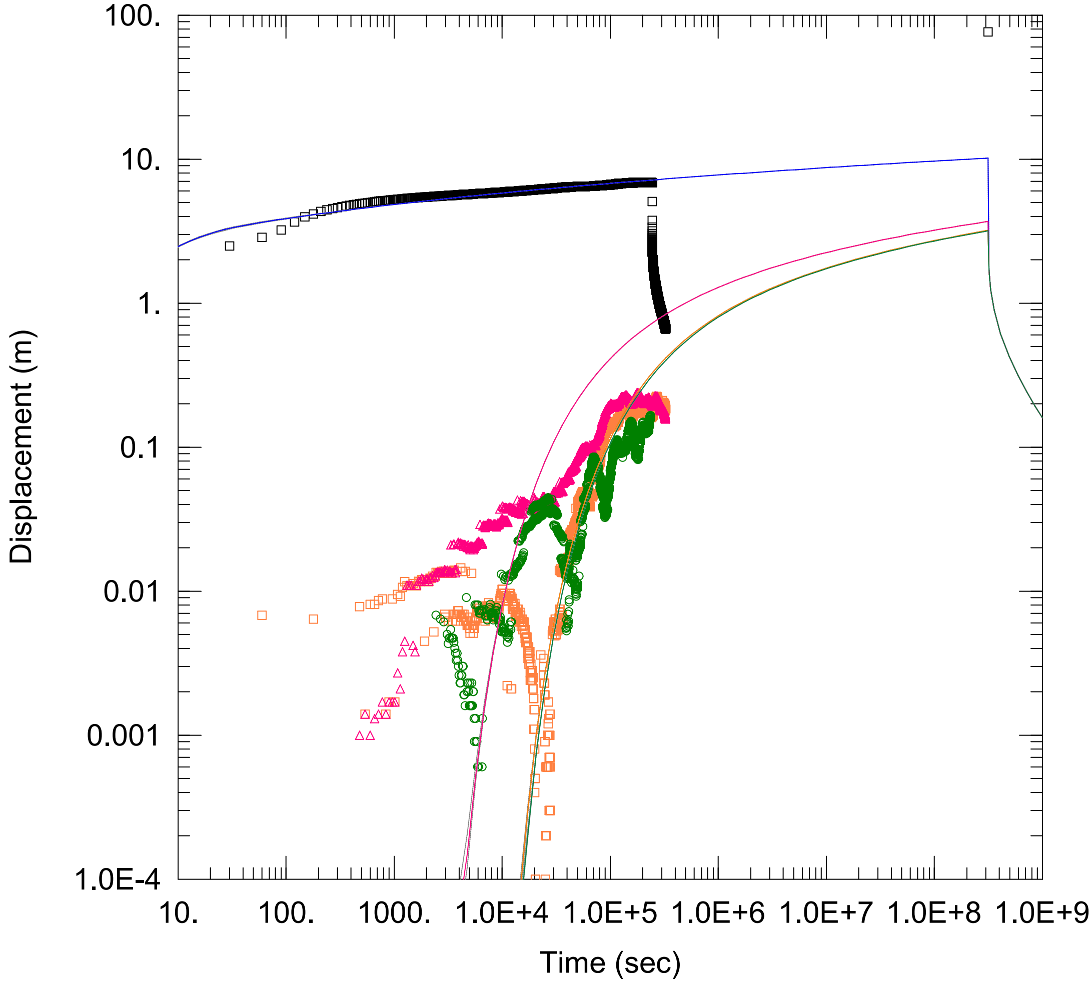
r(c) = 0.1 m

S = 0.0002684

Kz/Kr = 1.558

r(w) = 0.15 m

alpha = 13.06 sec^{-1}



AQUIFER DATA

Saturated Thickness: 59.2 m

Anisotropy Ratio (Kz/Kr): 1.558

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
EAPB1303 (WF-WA)	749656	7431237

Observation Wells

Well Name	X (m)	Y (m)
□ EAPB1303 (WF-WA)	749656	7431237
□ EAPZ0641 (BG)	751197	7431198
△ EAPZ0620 (WA)	748800	7431170
○ EAPZ0642 (BG)	751193	7431597

SOLUTION

Aquifer Model: Unconfined

Solution Method: Moench

T = 326.9 m^2/day

S = 0.0002684

Sy = 0.00029

Kz/Kr = 1.558

Sw = -0.95

r(w) = 0.15 m

r(c) = 0.1 m

alpha = 13.06 sec^{-1}

APPENDIX V

LABORATORY ANALYSIS OF GROUNDWATER

Analyte	Unit	LOR	BORE ID									ADWG^	
			EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296	EAPZ0406	EAPZ0458	EAPZ0611	EAPZ0620	Health	Aesthetic
pH Value	pH Unit	0.01	7.98	7.67	7.75	7.82	7.65	7.70	7.62	7.95	8.09		6.5 – 8.5
Electrical Conductivity @ 25°C	µS/cm	1	1100	656	594	840	645	720	711	773	745		
Total Dissolved Solids @180°C	mg/L	10	706	400	371	520	427	429	484	446	454		600
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	421	196	190	272	205	204	224	256	238		
Total Alkalinity as CaCO3	mg/L	1	421	196	190	272	205	204	224	256	238		
Sulfate as SO4 - Turbidimetric	mg/L	1	26	25	22	33	24	33	27	34	32		250
Chloride	mg/L	1	80	58	52	82	57	79	66	77	62	250	
Calcium	mg/L	1	66	30	28	39	30	33	34	54	51		
Magnesium	mg/L	1	57	32	30	41	33	36	34	37	37		
Sodium	mg/L	1	79	50	46	71	50	54	55	49	45		180
Potassium	mg/L	1	3	7	6	9	7	6	6	8	6		
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	
Hexavalent Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Reactive Silica	mg/L	0.05	61.1	65.8	64.1	50.8	63.0	52.1	61.3	31.1	51.9		80
Reactive Silica as Silicon	mg/L	0.05	28.6	30.8	30.0	23.7	29.4	24.4	28.6	14.5	24.3	200	
Aluminium	µg/L	0.2	9.8	5.0	4.1	11.2	5.2	1.9	6.8	1.9	0.4		200
Iron	µg/L	2	22	20	24	6	18	13	9	543	23		300
Antimony	µg/L	0.05	0.13	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.06	<0.05		
Selenium	µg/L	0.1	1.3	0.8	0.7	1.0	0.7	1.2	0.8	<0.1	0.2		
Arsenic	µg/L	0.1	0.7	0.2	0.4	7.1	0.6	0.2	0.4	1.1	0.6	10	
Barium	µg/L	0.2	61.7	48.8	56.6	105	83.3	59.9	102	297	79.2	200	
Beryllium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	60	
Boron	µg/L	1	224	190	172	261	192	206	222	212	218	4000	
Bismuth	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Cadmium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2	
Chromium	µg/L	0.2	0.6	<0.2	<0.2	0.4	0.2	<0.2	0.3	<0.2	0.8		
Cobalt	µg/L	0.02	0.09	0.05	0.03	0.14	2.38	3.28	0.29	2.15	0.56		
Copper	µg/L	0.05	1.43	0.54	0.22	1.98	0.69	0.41	0.88	<0.05	0.18	2000	1000
Lead	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	
Manganese	µg/L	0.05	1.30	2.54	5.07	9.93	4.48	2.19	9.71	632	186	500	100
Molybdenum	µg/L	0.05	0.90	0.17	0.18	0.59	0.24	0.30	0.34	2.84	0.66	50	
Nickel	µg/L	0.2	0.4	0.8	0.3	0.6	0.4	0.5	0.4	0.4	0.4	20	
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100	
Thallium	µg/L	0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.03	<0.01	<0.01	0.01		
Tin	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Uranium	µg/L	0.005	3.27	0.695	0.692	1.88	0.628	0.373	0.775	2.39	0.966	20	
Vanadium	µg/L	0.1	11.5	1.5	1.2	3.7	2.3	0.2	2.2	0.3	1.4		
Zinc	µg/L	0.5	1.4	1.9	0.6	7.7	4.0	3.0	24.0	0.9	1.3		300
Total Anions	meq/L	0.01	11.2	6.07	5.72	8.43	6.20	6.99	6.90	7.99	7.17		
Total Cations	meq/L	0.01	11.5	6.48	6.02	8.64	6.57	7.11	7.04	8.08	7.70		
Ionic Balance	%	0.01	1.27	3.28	2.55	1.20	2.85	0.85	1.01	0.50	3.57		

^NHMRC & NRMMC (2011) ADWG Version 3.9 Updated December 2024. For reference only; may not be relevant to this assessment

	Exceedance of ADWG Health Guidelines
	Exceedance of ADWG Aesthetic Guidelines

Analyte	Unit	LOR	BORE ID							ADWG^	
			EAPZ0643	EAPZ0642	EAPZ0641	EARC0607	EARC0471	EARC0517	EARC0745	Health	Aesthetic
pH Value	pH Unit	0.01	7.96	8.04	8.08	8.23	8.18	8.24	8.20		6.5 – 8.5
Electrical Conductivity @ 25°C	µS/cm	1	1050	870	759	1160	660	633	729		
Total Dissolved Solids @180°C	mg/L	10	671	534	448	820	402	391	507		600
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	211	287	279	243	212	200	201		
Total Alkalinity as CaCO3	mg/L	1	211	287	279	243	212	200	201		
Sulfate as SO4 - Turbidimetric	mg/L	1	62	38	30	24	27	26	32		250
Chloride	mg/L	1	135	69	58	239	63	60	80	250	
Calcium	mg/L	1	68	55	42	82	31	30	33		
Magnesium	mg/L	1	53	49	45	54	33	30	35		
Sodium	mg/L	1	59	56	55	56	51	50	58		180
Potassium	mg/L	1	7	7	6	9	8	7	7		
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	
Hexavalent Chromium	mg/L	0.001	<0.020	<0.010	<0.005	<0.001	<0.001	<0.001	<0.001		
Reactive Silica	mg/L	0.05	32.0	45.9	43.4	34.7	63.3	63.2	65.2		80
Reactive Silica as Silicon	mg/L	0.05	15.0	21.4	20.3	16.2	29.6	29.5	30.5	200	
Aluminium	µg/L	0.2	6.5	4.1	3.9	3.4	6.4	2.6	4.6		200
Iron	µg/L	2	3	4	7	3330	13	12	32		300
Antimony	µg/L	0.05	0.28	0.20	<0.05	0.18	<0.05	<0.05	<0.05		
Selenium	µg/L	0.1	0.9	0.9	0.7	<0.1	0.8	0.8	1.0		
Arsenic	µg/L	0.1	0.4	2.0	0.4	2.6	0.2	0.2	0.9	10	
Barium	µg/L	0.2	11.8	27.4	3.6	717	53.1	58.6	112	200	
Beryllium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	60	
Boron	µg/L	1	234	211	187	178	190	182	178	4000	
Bismuth	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		
Cadmium	µg/L	0.02	0.32	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	2	
Chromium	µg/L	0.2	13.6	4.4	2.0	<0.2	<0.2	<0.2	0.3		
Cobalt	µg/L	0.02	0.05	<0.02	0.06	2.35	0.11	<0.02	<0.02		
Copper	µg/L	0.05	1.04	0.60	0.14	0.15	0.89	<0.05	0.19	2000	1000
Lead	µg/L	0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	
Manganese	µg/L	0.05	1.69	0.48	1.17	1680	2.24	0.63	0.65	500	100
Molybdenum	µg/L	0.05	0.33	0.71	0.23	2.17	0.22	0.10	0.39	50	
Nickel	µg/L	0.2	0.3	0.3	<0.2	1.0	1.3	<0.2	0.2	20	
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	100	
Thallium	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01		
Tin	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
Uranium	µg/L	0.005	1.89	0.749	0.610	1.19	0.528	0.486	0.652	20	
Vanadium	µg/L	0.1	2.5	1.0	0.4	0.2	0.8	0.4	2.8		
Zinc	µg/L	0.5	9.5	3.2	1.3	2.7	6.3	<0.5	1.1		300
Flouride	mg/L	0.1	0.2	0.3	0.3	-	-	-	-		
Nitrite as N	mg/L	0.01	<0.01	<0.01	<0.01	-	-	-	-		
Nitrate as N	mg/L	0.01	15.7	4.70	2.03	-	-	-	-		11.31[1] – 50[2]
Nitrite + Nitrate as N	mg/L	0.01	15.7	4.70	2.03	-	-	-	-		11.31[1] – 50[2]
Total Phosphate	mg/L	0.01	0.23	0.45	0.39	-	-	-	-		
Total Anions	meq/L	0.01	9.31	8.47	7.84	12.1	6.58	6.23	6.94		
Total Cations	meq/L	0.01	10.5	9.39	8.34	11.2	6.68	6.32	7.23		
Ionic Balance	%	0.01	5.98	5.15	3.15	3.84	0.84	0.72	2.05		

1. Guideline values are provided as NOx. A nitrate guideline value of 50 mg/L NO3 is equivalent to 11 mg/L N.
2. 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.

Analyte	Unit	LOR	BORE ID				ADWG^	
			HRPB002	EAPB1303	EAPB1300	EAPB1302	Health	Aesthetic
pH Value	pH Unit	0.01	7.77	7.99	7.54	8.29		6.5 – 8.5
Electrical Conductivity @ 25°C	µS/cm	1	850	729	668	749		
Total Dissolved Solids @180°C	mg/L	10	514	469	429	430		600
Hydroxide Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1		
Carbonate Alkalinity as CaCO3	mg/L	1	<1	<1	<1	<1		
Bicarbonate Alkalinity as CaCO3	mg/L	1	320	239	205	246		
Total Alkalinity as CaCO3	mg/L	1	320	239	205	246		
Silicon	mg/L	0.05	32.2	31.0	35.9	11.8	80	
Sulfate as SO4 - Turbidimetric	mg/L	1	41	42	30	49		250
Chloride	mg/L	1	71	70	71	73	250	
Calcium	mg/L	1	62	49	35	59		
Magnesium	mg/L	1	46	36	32	40		
Sodium	mg/L	1	50	49	51	36		180
Potassium	mg/L	1	7	6	8	8		
Aluminium	mg/L	0.01	<0.01	<0.01	0.13	0.03		200
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		
Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	10	
Barium	mg/L	0.001	0.032	0.006	0.052	0.020	200	
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	2	
Chromium	mg/L	0.001	0.003	0.003	<0.001	0.002		
Cobalt	mg/L	0.001	<0.001	<0.001	0.002	<0.001		
Copper	mg/L	0.001	<0.001	<0.001	0.004	0.002	2000	1000
Lanthanum	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.001	
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	10	
Manganese	mg/L	0.001	<0.001	0.002	0.008	0.007	500	100
Molybdenum	mg/L	0.001	<0.001	<0.001	0.002	<0.001	50	
Nickel	mg/L	0.001	<0.001	<0.001	0.002	<0.001	20	
Selenium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Thorium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		
Tin	mg/L	0.001	<0.001	<0.001	0.007	0.001		
Zinc	mg/L	0.005	<0.005	<0.005	0.007	0.008		300
Iron	mg/L	0.05	<0.05	<0.05	0.12	<0.05		300
Mercury	mg/L	0.00004	<0.00004	<0.00004	<0.00004	<0.00004	0.002	
Trivalent Chromium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Hexavalent Chromium	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		
Beryllium	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	60	
Boron	µg/L	5	207	210	218	219	4000	
Bismuth	µg/L	0.05	<0.05	<0.05	0.10	<0.05		
Silver	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	100	
Thallium	µg/L	0.02	<0.02	<0.02	<0.02	<0.02		
Uranium	µg/L	0.05	0.66	0.61	0.83	0.85	20	
Vanadium	µg/L	0.2	2.7	1.3	2.8	0.4		
Fluoride	mg/L	0.1	0.2	0.2	0.3	0.3	1.5	
Ammonia as N	mg/L	0.01	<0.01	<0.01	0.03	<0.01		
Nitrite as N	mg/L	0.01	<0.01	0.17	0.01	<0.01		
Nitrate as N	mg/L	0.01	1.48	3.91	3.54	0.84		11.31[1] – 50[2]
Nitrite + Nitrate as N	mg/L	0.01	1.48	4.08	3.55	0.84		11.31[1] – 50[2]
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.5	0.7	1.0	0.2		
Total Nitrogen as N	mg/L	0.1	2.0	4.8	4.6	1.0		
Total Phosphorus as P	mg/L	0.01	0.05	<0.01	0.04	0.08		
Total Anions	meq/L	0.01	9.25	7.62	6.72	7.99		
Total Cations	meq/L	0.01	9.23	7.69	6.80	8.01		
Ionic Balance	%	0.01	0.09	0.45	0.59	0.08		

CERTIFICATE OF ANALYSIS

Work Order	: **EP2508632**	Page	: 1 of 8
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 30-May-2025 12:50
Order number	: ----	Date Analysis Commenced	: 04-Jun-2025
C-O-C number	: ----	Issue Date	: 11-Jun-2025 15:30
Sampler	: Steven Ossim		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 9		
No. of samples analysed	: 9		

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.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.
- EG094: Mn results for EP2508632 -008 and -009 have been confirmed by re-preparation and re-analysis.
- 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	EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296
			Sampling date / time	28-May-2025 09:00	28-May-2025 11:15	28-May-2025 12:50	28-May-2025 13:15	28-May-2025 14:00
Compound	CAS Number	LOR	Unit	EP2508632-001	EP2508632-002	EP2508632-003	EP2508632-004	EP2508632-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.98**	**7.67**	**7.75**	**7.82**	**7.65**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1100**	**656**	**594**	**840**	**645**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**706**	**400**	**371**	**520**	**427**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**421**	**196**	**190**	**272**	**205**
Total Alkalinity as CaCO3	----	1	mg/L	**421**	**196**	**190**	**272**	**205**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**26**	**25**	**22**	**33**	**24**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**80**	**58**	**52**	**82**	**57**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**66**	**30**	**28**	**39**	**30**
Magnesium	7439-95-4	1	mg/L	**57**	**32**	**30**	**41**	**33**
Sodium	7440-23-5	1	mg/L	**79**	**50**	**46**	**71**	**50**
Potassium	7440-09-7	1	mg/L	**3**	**7**	**6**	**9**	**7**
EG020F: Dissolved Metals by ICP-MS								
Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level								
Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**61.1**	**65.8**	**64.1**	**50.8**	**63.0**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296
Sampling date / time				28-May-2025 09:00	28-May-2025 11:15	28-May-2025 12:50	28-May-2025 13:15	28-May-2025 14:00
				EP2508632-001	EP2508632-002	EP2508632-003	EP2508632-004	EP2508632-005
				Result	Result	Result	Result	Result
EG052G: Silica by Discrete Analyser - Continued								
Reactive Silica as Silicon	----	0.05	mg/L	**28.6**	**30.8**	**30.0**	**23.7**	**29.4**
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Aluminium	7429-90-5	0.2	µg/L	**9.8**	**5.0**	**4.1**	**11.2**	**5.2**
Antimony	7440-36-0	0.05	µg/L	**0.13**	<0.05	<0.05	**0.08**	<0.05
Arsenic	7440-38-2	0.1	µg/L	**0.7**	**0.2**	**0.4**	**7.1**	**0.6**
Barium	7440-39-3	0.2	µg/L	**61.7**	**48.8**	**56.6**	**105**	**83.3**
Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Boron	7440-42-8	1	µg/L	**224**	**190**	**172**	**261**	**192**
Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Cadmium	7440-43-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium	7440-47-3	0.2	µg/L	**0.6**	<0.2	<0.2	**0.4**	**0.2**
Cobalt	7440-48-4	0.02	µg/L	**0.09**	**0.05**	**0.03**	**0.14**	**2.38**
Copper	7440-50-8	0.05	µg/L	**1.43**	**0.54**	**0.22**	**1.98**	**0.69**
Iron	7439-89-6	2	µg/L	**22**	**20**	**24**	**6**	**18**
Lead	7439-92-1	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	7439-96-5	0.05	µg/L	**1.30**	**2.54**	**5.07**	**9.93**	**4.48**
Molybdenum	7439-98-7	0.05	µg/L	**0.90**	**0.17**	**0.18**	**0.59**	**0.24**
Nickel	7440-02-0	0.2	µg/L	**0.4**	**0.8**	**0.3**	**0.6**	**0.4**
Selenium	7782-49-2	0.1	µg/L	**1.3**	**0.8**	**0.7**	**1.0**	**0.7**
Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	**0.02**	<0.01	<0.01
Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Uranium	7440-61-1	0.005	µg/L	**3.27**	**0.695**	**0.692**	**1.88**	**0.628**
Vanadium	7440-62-2	0.1	µg/L	**11.5**	**1.5**	**1.2**	**3.7**	**2.3**
Zinc	7440-66-6	0.5	µg/L	**1.4**	**1.9**	**0.6**	**7.7**	**4.0**
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**11.2**	**6.07**	**5.72**	**8.43**	**6.20**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

			Sample ID	EAPZ0412	EAPZ0587	EAPZ0251	EAPZ0300	EAPZ0296
			Sampling date / time	28-May-2025 09:00	28-May-2025 11:15	28-May-2025 12:50	28-May-2025 13:15	28-May-2025 14:00
Compound	CAS Number	LOR	Unit	EP2508632-001	EP2508632-002	EP2508632-003	EP2508632-004	EP2508632-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**11.5**	**6.48**	**6.02**	**8.64**	**6.57**
ø Ionic Balance	----	0.01	%	**1.27**	**3.28**	**2.55**	**1.20**	**2.85**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EAPZ0406	EAPZ0458	EAPZ0611	EAPZ0620	----
			Sampling date / time	28-May-2025 14:40	28-May-2025 15:00	28-May-2025 08:00	28-May-2025 08:30	----
Compound	CAS Number	LOR	Unit	EP2508632-006	EP2508632-007	EP2508632-008	EP2508632-009	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.70**	**7.62**	**7.95**	**8.09**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**720**	**711**	**773**	**745**	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**429**	**484**	**446**	**454**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**204**	**224**	**256**	**238**	----
Total Alkalinity as CaCO3	----	1	mg/L	**204**	**224**	**256**	**238**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**33**	**27**	**34**	**32**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**79**	**66**	**77**	**62**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**33**	**34**	**54**	**51**	----
Magnesium	7439-95-4	1	mg/L	**36**	**34**	**37**	**37**	----
Sodium	7440-23-5	1	mg/L	**54**	**55**	**49**	**45**	----
Potassium	7440-09-7	1	mg/L	**6**	**6**	**8**	**6**	----
EG020F: Dissolved Metals by ICP-MS								
Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level								
Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**52.1**	**61.3**	**31.1**	**51.9**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EAPZ0406	EAPZ0458	EAPZ0611	EAPZ0620	----
			Sampling date / time	28-May-2025 14:40	28-May-2025 15:00	28-May-2025 08:00	28-May-2025 08:30	----
Compound	CAS Number	LOR	Unit	EP2508632-006	EP2508632-007	EP2508632-008	EP2508632-009	--------
				Result	Result	Result	Result	----
EG052G: Silica by Discrete Analyser - Continued								
Reactive Silica as Silicon	----	0.05	mg/L	**24.4**	**28.6**	**14.5**	**24.3**	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Aluminium	7429-90-5	0.2	µg/L	**1.9**	**6.8**	**1.9**	**0.4**	----
Antimony	7440-36-0	0.05	µg/L	<0.05	<0.05	**0.06**	<0.05	----
Arsenic	7440-38-2	0.1	µg/L	**0.2**	**0.4**	**1.1**	**0.6**	----
Barium	7440-39-3	0.2	µg/L	**59.9**	**102**	**297**	**79.2**	----
Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Boron	7440-42-8	1	µg/L	**206**	**222**	**212**	**218**	----
Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Cadmium	7440-43-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Chromium	7440-47-3	0.2	µg/L	<0.2	**0.3**	<0.2	**0.8**	----
Cobalt	7440-48-4	0.02	µg/L	**3.28**	**0.29**	**2.15**	**0.56**	----
Copper	7440-50-8	0.05	µg/L	**0.41**	**0.88**	<0.05	**0.18**	----
Iron	7439-89-6	2	µg/L	**13**	**9**	**543**	**23**	----
Lead	7439-92-1	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
Manganese	7439-96-5	0.05	µg/L	**2.19**	**9.71**	**632**	**186**	----
Molybdenum	7439-98-7	0.05	µg/L	**0.30**	**0.34**	**2.84**	**0.66**	----
Nickel	7440-02-0	0.2	µg/L	**0.5**	**0.4**	**0.4**	**0.4**	----
Selenium	7782-49-2	0.1	µg/L	**1.2**	**0.8**	<0.1	**0.2**	----
Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Thallium	7440-28-0	0.01	µg/L	**0.03**	<0.01	<0.01	**0.01**	----
Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	----
Uranium	7440-61-1	0.005	µg/L	**0.373**	**0.775**	**2.39**	**0.966**	----
Vanadium	7440-62-2	0.1	µg/L	**0.2**	**2.2**	**0.3**	**1.4**	----
Zinc	7440-66-6	0.5	µg/L	**3.0**	**24.0**	**0.9**	**1.3**	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**6.99**	**6.90**	**7.99**	**7.17**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EAPZ0406	EAPZ0458	EAPZ0611	EAPZ0620	----
			Sampling date / time	28-May-2025 14:40	28-May-2025 15:00	28-May-2025 08:00	28-May-2025 08:30	----
Compound	CAS Number	LOR	Unit	EP2508632-006	EP2508632-007	EP2508632-008	EP2508632-009	--------
				Result	Result	Result	Result	----
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**7.11**	**7.04**	**8.08**	**7.70**	----
ø Ionic Balance	----	0.01	%	**0.85**	**1.01**	**0.50**	**3.57**	----

QUALITY CONTROL REPORT

Work Order	: **EP2508632**	Page	: 1 of 7
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 30-May-2025
Order number	: ----	Date Analysis Commenced	: 04-Jun-2025
C-O-C number	: ----	Issue Date	: 11-Jun-2025
Sampler	: Steven Ossim		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 9		
No. of samples analysed	: 9		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 6624720)									
EP2508592-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.85	7.83	0.3	0% - 20%
EP2508632-007	EAPZ0458	EA005-P: pH Value	----	0.01	pH Unit	7.62	7.66	0.5	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 6624718)									
EP2508592-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	12100	12000	0.6	0% - 20%
EP2508632-007	EAPZ0458	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	711	703	1.0	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 6623389)									
EP2508602-002	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1520	1590	4.5	0% - 20%
EP2508632-006	EAPZ0406	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	429	431	0.5	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 6624719)									
EP2508592-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	201	201	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	201	201	0.0	0% - 20%
EP2508632-007	EAPZ0458	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	224	233	3.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	224	233	3.9	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6630499)									
EP2508632-001	EAPZ0412	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	26	26	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6630500)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 6630500) - continued									
EP2508632-001	EAPZ0412	ED045G: Chloride	16887-00-6	1	mg/L	80	80	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6625610)									
EP2508632-004	EAPZ0300	ED093F: Calcium	7440-70-2	1	mg/L	39	38	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	41	40	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	71	71	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	9	9	0.0	No Limit
EP2508627-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	880	877	0.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1450	1430	1.6	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	7300	7100	2.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	189	184	3.0	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6625613)									
EP2508632-004	EAPZ0300	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2508627-005	Anonymous	EG020B-F: Thorium	7440-29-1	0.001 (0.005) *	mg/L	<0.005	<0.005	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6625616)									
EP2508632-004	EAPZ0300	EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2508627-005	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001 (0.005) *	mg/L	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6625619)									
EP2508632-001	EAPZ0412	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP2508632-007	EAPZ0458	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QC Lot: 6634176)									
EP2508632-001	EAPZ0412	EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 6630498)									
EP2508632-001	EAPZ0412	EG052G: Reactive Silica	----	0.05	mg/L	61.1	61.0	0.2	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6625537)									
EP2508632-001	EAPZ0412	EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	1.3	1.4	0.0	0% - 50%
		EG094B-F_LL: Iron	7439-89-6	2	µg/L	22	24	10.0	0% - 50%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6625538)									
EP2508632-001	EAPZ0412	EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	3.27	3.30	1.0	0% - 20%
		EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	0.09	0.09	0.0	No Limit
		EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	0.13	0.13	0.0	No Limit
		EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	1.43	1.39	3.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6625538) - continued									
EP2508632-001	EAPZ0412	EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	1.30	1.29	0.8	0% - 20%
		EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	0.90	0.90	0.0	0% - 50%
		EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	0.7	0.7	0.0	No Limit
		EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	11.5	11.5	0.0	0% - 20%
		EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	9.8	10.2	3.6	0% - 20%
		EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	61.7	61.0	1.2	0% - 20%
		EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	0.6	0.6	0.0	No Limit
		EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	0.4	0.4	0.0	No Limit
		EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	1.4	1.3	0.0	No Limit
		EG094A-F_LL: Boron	7440-42-8	1	µg/L	224	227	1.7	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6625539)									
EP2508632-001	EAPZ0412	EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 6624720)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.5	102
				----	7 pH Unit	100	98.5	102
EA010P: Conductivity by PC Titrator (QCLot: 6624718)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	101	92.1	105
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 6623389)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	97.6	80.0	120
				<10	293 mg/L	100	80.0	120
				<10	2470 mg/L	103	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 6624719)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	112	85.1	126
				<1	200 mg/L	100.0	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6630499)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	95.6	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 6630500)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.2	88.6	113
				<1	1000 mg/L	99.8	88.6	113
ED093F: Dissolved Major Cations (QCLot: 6625610)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	101	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.4	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.4	84.6	108
EG020F: Dissolved Metals by ICP-MS (QCLot: 6625613)								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	91.0	88.1	135
EG020F: Dissolved Metals by ICP-MS (QCLot: 6625616)								
EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	0.01 mg/L	101	82.1	118
EG035F: Dissolved Mercury by FIMS (QCLot: 6625619)								

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG035F: Dissolved Mercury by FIMS (QCLot: 6625619) - continued								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.005 mg/L	98.8	85.6	120
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6634176)								
EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	0.05 mg/L	96.9	90.9	109
EG052G: Silica by Discrete Analyser (QCLot: 6630498)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	103	94.6	110
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6625537)								
EG094B-F_LL: Iron	7439-89-6	2	µg/L	<2	50 µg/L	117	80.0	120
EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	<0.1	10 µg/L	90.3	80.0	120
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6625538)								
EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	<0.2	50 µg/L	107	87.1	110
EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	<0.05	2 µg/L	84.4	73.6	124
EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	<0.1	10 µg/L	102	87.1	116
EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	<0.2	10 µg/L	100	85.4	111
EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	10 µg/L	102	80.0	129
EG094A-F_LL: Boron	7440-42-8	1	µg/L	<1	50 µg/L	104	80.0	120
EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	10 µg/L	99.3	80.0	120
EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	<0.02	10 µg/L	97.4	89.5	107
EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	103	77.0	111
EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	<0.02	10 µg/L	98.9	72.2	114
EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	<0.05	10 µg/L	97.1	75.9	114
EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	<0.05	10 µg/L	102	80.6	105
EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	<0.05	10 µg/L	99.0	85.4	109
EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	<0.05	10 µg/L	101	85.2	112
EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	98.2	80.9	119
EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	10 µg/L	102	76.0	120
EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	10 µg/L	109	85.1	109
EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	<0.005	10 µg/L	103	83.7	108
EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	<0.1	10 µg/L	103	82.0	111
EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	<0.5	10 µg/L	112	76.2	124
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6625539)								
EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	2 µg/L	94.8	83.6	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6630499)							
EP2508632-001	EAPZ0412	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	106	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 6630500)							
EP2508632-001	EAPZ0412	ED045G: Chloride	16887-00-6	200 mg/L	105	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6625616)							
EP2508627-006	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.1 mg/L	108	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6625619)							
EP2508632-002	EAPZ0587	EG035F: Mercury	7439-97-6	0.005 mg/L	93.9	70.0	130
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6634176)							
EP2508632-001	EAPZ0412	EG050G: Hexavalent Chromium	18540-29-9	0.05 mg/L	115	70.0	130
EG052G: Silica by Discrete Analyser (QCLot: 6630498)							
EP2508632-002	EAPZ0587	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70.0	116
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6625538)							
EP2508632-002	EAPZ0587	EG094A-F_LL: Arsenic	7440-38-2	50 µg/L	104	70.0	130
		EG094A-F_LL: Barium	7440-39-3	50 µg/L	99.8	70.0	130
		EG094A-F_LL: Beryllium	7440-41-7	50 µg/L	83.0	70.0	130
		EG094A-F_LL: Cadmium	7440-43-9	12.5 µg/L	98.9	70.0	130
		EG094A-F_LL: Chromium	7440-47-3	50 µg/L	96.0	70.0	130
		EG094A-F_LL: Cobalt	7440-48-4	50 µg/L	97.5	70.0	130
		EG094A-F_LL: Copper	7440-50-8	50 µg/L	96.9	70.0	130
		EG094A-F_LL: Lead	7439-92-1	50 µg/L	92.8	70.0	130
		EG094A-F_LL: Manganese	7439-96-5	50 µg/L	93.5	70.0	130
		EG094A-F_LL: Nickel	7440-02-0	50 µg/L	96.2	70.0	130
		EG094A-F_LL: Vanadium	7440-62-2	50 µg/L	95.5	70.0	130
		EG094A-F_LL: Zinc	7440-66-6	50 µg/L	101	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2508632**	Page	: 1 of 8
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 30-May-2025
Site	: ----	Issue Date	: 11-Jun-2025
Sampler	: Steven Ossim	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG052G: Silica by Discrete Analyser	EP2508632--002	EAPZ0587	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)		Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
EAPZ0412,	EAPZ0587,	----	----	----	05-Jun-2025	28-May-2025	**8**
EAPZ0251,	EAPZ0300,						
EAPZ0296,	EAPZ0406,						
EAPZ0458,	EAPZ0611,						
EAPZ0620							

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P)								
EAPZ0412,	EAPZ0587,	**28-May-2025**	**----**	----	----	**05-Jun-2025**	28-May-2025	✘
EAPZ0251,	EAPZ0300,							
EAPZ0296,	EAPZ0406,							
EAPZ0458,	EAPZ0611,							
EAPZ0620								

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**05-Jun-2025**	25-Jun-2025	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**04-Jun-2025**	04-Jun-2025	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**05-Jun-2025**	11-Jun-2025	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**09-Jun-2025**	25-Jun-2025	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**09-Jun-2025**	25-Jun-2025	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**06-Jun-2025**	25-Jun-2025	✓

Work Order : EP2508632
Client : ROCKWATER PTY LTD
Project : Round Hill Groundwater Supply Investigation

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020D-F) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**06-Jun-2025**	24-Nov-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**06-Jun-2025**	25-Jun-2025	✓
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level							
Clear Plastic Bottle - NaOH Filtered (EG050G LL-F) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**11-Jun-2025**	25-Jun-2025	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**09-Jun-2025**	25-Jun-2025	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG094A-F_LL) EAPZ0412, EAPZ0587, EAPZ0251, EAPZ0300, EAPZ0296, EAPZ0406, EAPZ0458, EAPZ0611, EAPZ0620	**28-May-2025**	**----**	----	----	**05-Jun-2025**	24-Nov-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / *Analytical Methods*	*Method*	*Count* QC	*Count* Regular	*Rate (%)* Actual	*Rate (%)* Expected	Evaluation	*Quality Control Specification*
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Solids (High Level)	EA015H	3	14	**21.43**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite D	EG020D-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	WATER	In house: Referenced to APHA 3500 Cr-A & B. Samples are 0.45µm filtered prior to analysis. Hexavalent chromium is determined directly on water sample by Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EP2508632**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: pkhor@rockwater.com.au	E-mail	: ALSEnviro.Perth@alsglobal.com
Telephone	: ----	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: Round Hill Groundwater Supply Investigation	Page	: 1 of 3
Order number	: ----	Quote number	: EP2025ROCWAT0001 (EP25ROCWAT0001)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Steven Ossim		

Dates

Date Samples Received	: 30-May-2025 12:50	Issue Date	: 30-May-2025
Client Requested Due Date	: 10-Jun-2025	Scheduled Reporting Date	: **10-Jun-2025**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 12.7 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 9 / 9

General Comments

- This report contains the following information:
    - Sample Container(s)/Preservation Non-Compliances
    - Summary of Sample(s) and Requested Analysis
    - Proactive Holding Time Report
    - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Perth, NATA accreditation no. 825, site no. 15847.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG035F Dissolved Mercury	WATER - EG050G LL-F Dissolved Hexavalent Chromium - Low Level	WATER - EG052G Si Silica as Si
EP2508632-001	28-May-2025 09:00	EAPZ0412	✓	✓	✓	✓	✓	✓	✓
EP2508632-002	28-May-2025 11:15	EAPZ0587	✓	✓	✓	✓	✓	✓	✓
EP2508632-003	28-May-2025 12:50	EAPZ0251	✓	✓	✓	✓	✓	✓	✓
EP2508632-004	28-May-2025 13:15	EAPZ0300	✓	✓	✓	✓	✓	✓	✓
EP2508632-005	28-May-2025 14:00	EAPZ0296	✓	✓	✓	✓	✓	✓	✓
EP2508632-006	28-May-2025 14:40	EAPZ0406	✓	✓	✓	✓	✓	✓	✓
EP2508632-007	28-May-2025 15:00	EAPZ0458	✓	✓	✓	✓	✓	✓	✓
EP2508632-008	28-May-2025 08:00	EAPZ0611	✓	✓	✓	✓	✓	✓	✓
EP2508632-009	28-May-2025 08:30	EAPZ0620	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EG094-AgF Ultra trace Filtered Silver to meet ANZECC 99%	WATER - EG094-F_LL Dissolved Metals in Fresh Water by ORC-ICPMS	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2508632-001	28-May-2025 09:00	EAPZ0412	✓	✓	✓
EP2508632-002	28-May-2025 11:15	EAPZ0587	✓	✓	✓
EP2508632-003	28-May-2025 12:50	EAPZ0251	✓	✓	✓
EP2508632-004	28-May-2025 13:15	EAPZ0300	✓	✓	✓
EP2508632-005	28-May-2025 14:00	EAPZ0296	✓	✓	✓
EP2508632-006	28-May-2025 14:40	EAPZ0406	✓	✓	✓
EP2508632-007	28-May-2025 15:00	EAPZ0458	✓	✓	✓
EP2508632-008	28-May-2025 08:00	EAPZ0611	✓	✓	✓
EP2508632-009	28-May-2025 08:30	EAPZ0620	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method		Due for extraction	Due for analysis	Samples Received		Instructions Received	
Client Sample ID(s)	Container			Date	Evaluation	Date	Evaluation
EA005-P: pH by Auto Titrator							
EAPZ0251	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0296	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0300	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0406	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0412	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0458	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0587	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0611	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----
EAPZ0620	Clear Plastic Bottle - Natural	----	28-May-2025	30-May-2025	✘	----	----

Requested Deliverables

CONSULT

- *AU Certificate of Analysis - NATA (COA)	Email	consult@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	consult@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	consult@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	consult@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	consult@rockwater.com.au
- EDI Format - ESDAT (ESDAT)	Email	consult@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	consult@rockwater.com.au

DANAE RONEY

- *AU Certificate of Analysis - NATA (COA)	Email	droney@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	droney@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	droney@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	droney@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	droney@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	droney@rockwater.com.au
- EDI Format - ESDAT (ESDAT)	Email	droney@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	droney@rockwater.com.au

Peter Khor

- *AU Certificate of Analysis - NATA (COA)	Email	pkhor@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	pkhor@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	pkhor@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	pkhor@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	pkhor@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	pkhor@rockwater.com.au

ROCKWATER Pty Ltd

CONSULTANT HYDROGEOLOGISTS

1st Floor, 76 Jersey Street, Jolimont WA 6014
PO Box 201, Wembley WA 6913
consult@rockwater.com.au
Tel (08) 9284 0222 Fax (08) 9284 1785
A.C.N. 008 804 653

CHAIN OF CUSTODY AND ANALYSIS REQUEST

CLIENT: Hancock RDG	**CLIENT No.:** 180-1	**ALS (Australian Lab. Services)**
PROJECT NAME: Round Hill Groundwater Supply Investigation	**COLLECTOR'S NAME:** Steven Ossim	**26 Rigali Way, Wangara WA 6065**
PROJECT MANAGER: Peter Khor	**ORDER/QUOTE No.:** EP25ROCWATER001	**Ph: 9406 1301**
LABORATORY JOB No.:	(use EP23ROCWAT0002-V3 if 1 of 3 normal suites* is analysed)	

General Sample Information							Preservation Method			Analyses Required							Additional Notes/Comments
Sample I.D.	Lab. No.	Sample Date	Sample Time	Field EC µS/cm	Field pH	No. of Containers	Ice	Acidified	Other (name)	Major Components Analysis*	Comprehensive Analysis*	Environmental Disposal*	As Per Custom Suite - see attached				
EAPZ0412	1	28/5/25	900	890	7.25	3	X						X				Results to be in EnviroSys format
EAPZ0587	2	28/5/25	1115	625	7.8	3	X						X				Results to be in EnviroSys format
EAPZ0251	3	28/5/25	1250	820	8.1	3	X						X				Results to be in EnviroSys format
EAPZ0300	4	28/5/25	1315	708	7.11	3	X						X				Results to be in EnviroSys format
EAPZ0296	5	28/5/25	1400	561	6.62	3	X						X				Results to be in EnviroSys format
EAPZ0406	6	28/5/25	1440	662	6.58	3	X						X				Results to be in EnviroSys format
EAPZ0458	7	28/5/25	1500	702	6.7	3	X						X				Results to be in EnviroSys format
EAPZ0611	8	29/5/25	800	722	6.69	3	X						X				Results to be in EnviroSys format
EAPZ0620	9	29/5/25	830	780	6.75	3	X						X				Results to be in EnviroSys format

*Please direct **ALL** correspondance and queries to **Project Manager & Default***

Relinquished by:	Steven Ossim	Received by:	Matthew Vear
Date/Time:	0745 on 30/05/25	Date/Time:	0745 on 30/05/2
Relinquished by:	Matthew Vear	Received by:	Brian
Date/Time:	0830 on 30/05/25	Date/Time:	30/5@ 12:50

nents:

nents:

Environmental Division
Perth
Work Order Reference
EP2508632

Telephone : + 61-8-9406 1301

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2509305**

Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: pkhor@rockwater.com.au	E-mail	: ALSEnviro.Perth@alsglobal.com
Telephone	: ----	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: Round Hill Groundwater Supply Investigation	Page	: 1 of 3
Order number	: ----	Quote number	: EP2025ROCWAT0001 (EP25ROCWAT0001)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: MATTHEW VEAR		

Dates

Date Samples Received	: 11-Jun-2025 13:30	Issue Date	: 12-Jun-2025
Client Requested Due Date	: 19-Jun-2025	Scheduled Reporting Date	: **19-Jun-2025**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 13.2 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Perth, NATA accreditation no. 825, site no. 15847.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG035F Dissolved Mercury	WATER - EG050G LL-F Dissolved Hexavalent Chromium - Low Level	WATER - EG052G Si Silica as Si
EP2509305-001	09-Jun-2025 13:00	EAP20643	✓	✓	✓	✓	✓	✓	✓
EP2509305-002	09-Jun-2025 13:20	EAP20642	✓	✓	✓	✓	✓	✓	✓
EP2509305-003	09-Jun-2025 13:40	EAP20641	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EG094-AgF Ultra trace Filtered Silver to meet ANZECC 99%	WATER - EG094-F_LL Dissolved Metals in Fresh Water by ORC-ICPMS	WATER - EK040-P Fluoride (Auto Titrator)	WATER - EK067G-PO4 Total Phosphate by DA	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity	WATER - NT-04 Nitrite and Nitrate
EP2509305-001	09-Jun-2025 13:00	EAP20643	✓	✓	✓	✓	✓	✓
EP2509305-002	09-Jun-2025 13:20	EAP20642	✓	✓	✓	✓	✓	✓
EP2509305-003	09-Jun-2025 13:40	EAP20641	✓	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EA005-P: pH by Auto Titrator							
EAP20641	Clear Plastic Bottle - Natural	----	09-Jun-2025	11-Jun-2025	✘	----	----
EAP20642	Clear Plastic Bottle - Natural	----	09-Jun-2025	11-Jun-2025	✘	----	----
EAP20643	Clear Plastic Bottle - Natural	----	09-Jun-2025	11-Jun-2025	✘	----	----

Requested Deliverables

CONSULT

- *AU Certificate of Analysis - NATA (COA)	Email	consult@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	consult@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	consult@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	consult@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	consult@rockwater.com.au
- EDI Format - ENVIROSYS (ENVIROSYS)	Email	consult@rockwater.com.au
- EDI Format - ESDAT (ESDAT)	Email	consult@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	consult@rockwater.com.au

DANAE RONEY

- *AU Certificate of Analysis - NATA (COA)	Email	droney@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	droney@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	droney@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	droney@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	droney@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	droney@rockwater.com.au
- EDI Format - ENVIROSYS (ENVIROSYS)	Email	droney@rockwater.com.au
- EDI Format - ESDAT (ESDAT)	Email	droney@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	droney@rockwater.com.au

Peter Khor

- *AU Certificate of Analysis - NATA (COA)	Email	pkhor@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	pkhor@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	pkhor@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	pkhor@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	pkhor@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	pkhor@rockwater.com.au
- EDI Format - ENVIROSYS (ENVIROSYS)	Email	pkhor@rockwater.com.au
- EDI Format - ESDAT (ESDAT)	Email	pkhor@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	pkhor@rockwater.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **EP2509305**	Page	: 1 of 5
Amendment	: **1**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 11-Jun-2025 13:30
Order number	: ----	Date Analysis Commenced	: 12-Jun-2025
C-O-C number	: ----	Issue Date	: 30-Jun-2025 09:52
Sampler	: MATTHEW VEAR		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 3		
No. of samples analysed	: 3		

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.

Signatories	*Position*	*Accreditation Category*
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.
- EG050G LL-F (Low-Level Dissolved Hexavalent Chromium): LOR raised for samples EP2509305-001, 002, & 003 due to possible matrix interference.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Amendment (30/06/2025): This report has been amended as a result of a request to change sample identification numbers (IDs) received from Peter Khor on 25/06/2025, for samples 001 (EAPZ0643), 002 (EAPZ0642) and 003 (EAPZ0641). All analysis results are as per the previous report.
- 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	EAPZ0643	EAPZ0642	EAPZ0641	----	----
			Sampling date / time	09-Jun-2025 13:00	09-Jun-2025 13:20	09-Jun-2025 13:40	----	----
Compound	CAS Number	LOR	Unit	EP2509305-001	EP2509305-002	EP2509305-003	--------	--------
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.96**	**8.04**	**8.08**	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1050**	**870**	**759**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**671**	**534**	**448**	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**211**	**287**	**279**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**211**	**287**	**279**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**62**	**38**	**30**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**135**	**69**	**58**	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**68**	**55**	**42**	----	----
Magnesium	7439-95-4	1	mg/L	**53**	**49**	**45**	----	----
Sodium	7440-23-5	1	mg/L	**59**	**56**	**55**	----	----
Potassium	7440-09-7	1	mg/L	**7**	**7**	**6**	----	----
EG020F: Dissolved Metals by ICP-MS								
Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level								
Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.020	<0.010	<0.005	----	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**32.0**	**45.9**	**43.4**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EAPZ0643	EAPZ0642	EAPZ0641	----	----
			Sampling date / time	09-Jun-2025 13:00	09-Jun-2025 13:20	09-Jun-2025 13:40	----	----
Compound	CAS Number	LOR	Unit	EP2509305-001	EP2509305-002	EP2509305-003	--------	--------
				Result	Result	Result	----	----
EG052G: Silica by Discrete Analyser - Continued								
Reactive Silica as Silicon	----	0.05	mg/L	**15.0**	**21.4**	**20.3**	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Aluminium	7429-90-5	0.2	µg/L	**6.5**	**4.1**	**3.9**	----	----
Antimony	7440-36-0	0.05	µg/L	**0.28**	**0.20**	<0.05	----	----
Arsenic	7440-38-2	0.1	µg/L	**0.4**	**2.0**	**0.4**	----	----
Barium	7440-39-3	0.2	µg/L	**11.8**	**27.4**	**3.6**	----	----
Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Boron	7440-42-8	1	µg/L	**234**	**211**	**187**	----	----
Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Cadmium	7440-43-9	0.02	µg/L	**0.32**	<0.02	<0.02	----	----
Chromium	7440-47-3	0.2	µg/L	**13.6**	**4.4**	**2.0**	----	----
Cobalt	7440-48-4	0.02	µg/L	**0.05**	<0.02	**0.06**	----	----
Copper	7440-50-8	0.05	µg/L	**1.04**	**0.60**	**0.14**	----	----
Iron	7439-89-6	2	µg/L	**3**	**4**	**7**	----	----
Lead	7439-92-1	0.05	µg/L	**0.07**	<0.05	<0.05	----	----
Manganese	7439-96-5	0.05	µg/L	**1.69**	**0.48**	**1.17**	----	----
Molybdenum	7439-98-7	0.05	µg/L	**0.33**	**0.71**	**0.23**	----	----
Nickel	7440-02-0	0.2	µg/L	**0.3**	**0.3**	<0.2	----	----
Selenium	7782-49-2	0.1	µg/L	**0.9**	**0.9**	**0.7**	----	----
Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	<0.2	----	----
Uranium	7440-61-1	0.005	µg/L	**1.89**	**0.749**	**0.610**	----	----
Vanadium	7440-62-2	0.1	µg/L	**2.5**	**1.0**	**0.4**	----	----
Zinc	7440-66-6	0.5	µg/L	**9.5**	**3.2**	**1.3**	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.2**	**0.3**	**0.3**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EAPZ0643	EAPZ0642	EAPZ0641	----	----
			Sampling date / time	09-Jun-2025 13:00	09-Jun-2025 13:20	09-Jun-2025 13:40	----	----
Compound	CAS Number	LOR	Unit	EP2509305-001	EP2509305-002	EP2509305-003	--------	--------
				Result	Result	Result	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**15.7**	**4.70**	**2.03**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**15.7**	**4.70**	**2.03**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphate	----	0.10	mg/L	**0.23**	**0.45**	**0.39**	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**9.31**	**8.47**	**7.84**	----	----
ø Total Cations	----	0.01	meq/L	**10.5**	**9.39**	**8.34**	----	----
ø Ionic Balance	----	0.01	%	**5.98**	**5.15**	**3.15**	----	----

QUALITY CONTROL REPORT

Work Order	: **EP2509305**	Page	: 1 of 9
Amendment	: **1**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 11-Jun-2025
Order number	: ----	Date Analysis Commenced	: 12-Jun-2025
C-O-C number	: ----	Issue Date	: 30-Jun-2025
Sampler	: MATTHEW VEAR		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 3		
No. of samples analysed	: 3		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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.

Signatories	*Position*	*Accreditation Category*
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA005P: pH by PC Titrator (QC Lot: 6654742)									
EP2509271-031	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.53	7.52	0.1	0% - 20%
EP2509294-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.53	7.55	0.3	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 6657492)									
EP2509303-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.76	7.75	0.1	0% - 20%
EP2509346-005	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.50	7.48	0.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 6654743)									
EP2509271-031	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3450	3420	0.9	0% - 20%
EP2509294-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3580	3570	0.3	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 6657489)									
EP2509303-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	922	912	1.1	0% - 20%
EP2509346-005	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	6430	6450	0.3	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 6650566)									
EP2509213-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	672	670	0.2	0% - 20%
EP2509303-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	404	402	0.4	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 6654745)									
EP2509271-031	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	95	95	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	95	95	0.0	0% - 20%
EP2509294-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
ED037P: Alkalinity by PC Titrator (QC Lot: 6654745) - continued									
EP2509294-004	Anonymous	ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	38	45	17.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	38	45	17.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 6657491)									
EP2509303-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	365	369	1.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	365	369	1.3	0% - 20%
EP2509346-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	55	55	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	55	55	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6645389)									
EP2509319-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	42	43	0.0	0% - 20%
EP2509293-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3110	3200	2.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6645388)									
EP2509319-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	110	114	3.7	0% - 20%
EP2509293-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	13500	13500	0.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6657694)									
EP2509294-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	5	6	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	9	10	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	202	207	2.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	34	35	3.2	0% - 20%
EP2509436-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	3	2	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	3	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6657692)									
EP2509294-001	Anonymous	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2509436-001	Anonymous	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6657693)									
EP2509294-001	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	0.001	0.001	0.0	No Limit
EP2509436-001	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6657695)									
EP2509305-003	EAPZ0641	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP2509436-008	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QC Lot: 6657214)									
EP2509303-001	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2509305-003	EAPZ0641	EG050G: Hexavalent Chromium	18540-29-9	0.001 (0.005) *	mg/L	<0.005	<0.005	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 6645387)									
EP2509293-001	Anonymous	EG052G: Reactive Silica	----	0.05	mg/L	47.5	47.5	0.0	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6645640)									
EP2509305-001	EAPZ0643	EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	0.9	0.9	0.0	No Limit
		EG094B-F_LL: Iron	7439-89-6	2	µg/L	3	2	0.0	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6645641)									
EP2509305-001	EAPZ0643	EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	1.89	1.78	5.9	0% - 20%
		EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	0.32	0.30	4.2	0% - 50%
		EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	0.05	0.05	0.0	No Limit
		EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	0.28	0.28	0.0	No Limit
		EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	1.04	1.02	1.7	0% - 20%
		EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	0.07	<0.05	34.4	No Limit
		EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	1.69	1.59	6.0	0% - 20%
		EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	0.33	0.32	4.0	No Limit
		EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	0.4	0.4	0.0	No Limit
		EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	2.5	2.4	0.0	0% - 20%
		EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	6.5	5.6	16.1	0% - 20%
		EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	11.8	11.8	0.0	0% - 20%
		EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	13.6	12.9	5.2	0% - 20%
		EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	0.3	0.3	0.0	No Limit
		EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	9.5	8.5	11.0	0% - 50%
		EG094A-F_LL: Boron	7440-42-8	1	µg/L	234	256	8.7	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6645642)									
EP2509305-001	EAPZ0643	EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 6654744)									
EP2509271-031	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.6	0.6	0.0	No Limit
EP2509294-004	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.8	0.8	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 6657490)									
EP2509303-002	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.4	0.4	0.0	No Limit
EP2509346-005	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.7	0.7	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6645385)									
EP2509319-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP2509293-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	1.69	1.71	1.2	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6645709)									
EP2509305-002	EAPZ0642	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.70	4.68	0.4	0% - 20%
EP2509354-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 6654742)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.5	102
				----	7 pH Unit	100	98.5	102
EA005P: pH by PC Titrator (QCLot: 6657492)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	101	98.5	102
				----	7 pH Unit	100	98.5	102
EA010P: Conductivity by PC Titrator (QCLot: 6654743)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	98.0	92.1	105
EA010P: Conductivity by PC Titrator (QCLot: 6657489)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	98.2	92.1	105
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 6650566)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.2	80.0	120
				<10	293 mg/L	102	80.0	120
				<10	2470 mg/L	104	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 6654745)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	107	85.1	126
				<1	200 mg/L	96.8	90.5	111
ED037P: Alkalinity by PC Titrator (QCLot: 6657491)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	117	85.1	126
				<1	200 mg/L	103	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6645389)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	91.4	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 6645388)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED045G: Chloride by Discrete Analyser (QCLot: 6645388) - continued								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	95.0	88.6	113
				<1	1000 mg/L	98.9	88.6	113
ED093F: Dissolved Major Cations (QCLot: 6657694)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.5	84.6	108
EG020F: Dissolved Metals by ICP-MS (QCLot: 6657692)								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	102	88.1	135
EG020F: Dissolved Metals by ICP-MS (QCLot: 6657693)								
EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	0.01 mg/L	96.2	82.1	118
EG035F: Dissolved Mercury by FIMS (QCLot: 6657695)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.005 mg/L	98.8	85.6	120
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6657214)								
EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	0.05 mg/L	102	90.9	109
EG052G: Silica by Discrete Analyser (QCLot: 6645387)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	101	94.6	110
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6645640)								
EG094B-F_LL: Iron	7439-89-6	2	µg/L	<2	50 µg/L	113	80.0	120
EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	<0.1	10 µg/L	85.7	80.0	120
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6645641)								
EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	<0.2	50 µg/L	99.9	87.1	110
EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	<0.05	2 µg/L	75.1	73.6	124
EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	<0.1	10 µg/L	101	87.1	116
EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	<0.2	10 µg/L	100	85.4	111
EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	10 µg/L	112	80.0	129
EG094A-F_LL: Boron	7440-42-8	1	µg/L	<1	50 µg/L	115	80.0	120
EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	10 µg/L	94.4	80.0	120
EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	<0.02	10 µg/L	98.8	89.5	107
EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	98.8	77.0	111
EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	<0.02	10 µg/L	105	72.2	114
EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	<0.05	10 µg/L	96.7	75.9	114
EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	<0.05	10 µg/L	99.2	80.6	105
EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	<0.05	10 µg/L	96.4	85.4	109

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6645641) - continued								
EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	<0.05	10 µg/L	102	85.2	112
EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	98.2	80.9	119
EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	10 µg/L	98.3	76.0	120
EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	10 µg/L	103	85.1	109
EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	<0.005	10 µg/L	101	83.7	108
EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	<0.1	10 µg/L	98.0	82.0	111
EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	<0.5	10 µg/L	107	76.2	124
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6645642)								
EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	2 µg/L	100	83.6	110
EK040P: Fluoride by PC Titrator (QCLot: 6654744)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	104	86.0	116
EK040P: Fluoride by PC Titrator (QCLot: 6657490)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	103	86.0	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6645385)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	88.7	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6645709)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	90.5	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6645389)							
EP2509303-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	106	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 6645388)							
EP2509303-002	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	101	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6657693)							
EP2509294-002	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.05 mg/L	88.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6657695)							
EP2509305-002	EAPZ0642	EG035F: Mercury	7439-97-6	0.005 mg/L	89.1	70.0	130
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6657214)							
EP2509303-001	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.05 mg/L	90.1	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG052G: Silica by Discrete Analyser (QCLot: 6645387)							
EP2509305-001	EAPZ0643	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70.0	116
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6645641)							
EP2509305-002	EAPZ0642	EG094A-F_LL: Arsenic	7440-38-2	50 µg/L	120	70.0	130
		EG094A-F_LL: Barium	7440-39-3	50 µg/L	110	70.0	130
		EG094A-F_LL: Beryllium	7440-41-7	50 µg/L	102	70.0	130
		EG094A-F_LL: Cadmium	7440-43-9	12.5 µg/L	113	70.0	130
		EG094A-F_LL: Chromium	7440-47-3	50 µg/L	106	70.0	130
		EG094A-F_LL: Cobalt	7440-48-4	50 µg/L	117	70.0	130
		EG094A-F_LL: Copper	7440-50-8	50 µg/L	107	70.0	130
		EG094A-F_LL: Lead	7439-92-1	50 µg/L	96.6	70.0	130
		EG094A-F_LL: Manganese	7439-96-5	50 µg/L	104	70.0	130
		EG094A-F_LL: Nickel	7440-02-0	50 µg/L	108	70.0	130
		EG094A-F_LL: Vanadium	7440-62-2	50 µg/L	106	70.0	130
		EG094A-F_LL: Zinc	7440-66-6	50 µg/L	116	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 6654744)							
EP2509271-032	Anonymous	EK040P: Fluoride	16984-48-8	4.9 mg/L	101	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 6657490)							
EP2509303-003	Anonymous	EK040P: Fluoride	16984-48-8	4.9 mg/L	106	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6645385)							
EP2509303-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	104	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6645709)							
EP2509305-001	EAPZ0643	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2509305**	Page	: 1 of 9
Amendment	: **1**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 11-Jun-2025
Site	: ----	Issue Date	: 30-Jun-2025
Sampler	: MATTHEW VEAR	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG052G: Silica by Discrete Analyser	EP2509305--001	EAPZ0643	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP2509305--001	EAPZ0643	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	**Days overdue**	Date analysed	Due for analysis	**Days overdue**
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural EAPZ0643,	EAPZ0642	----	----	----	18-Jun-2025	09-Jun-2025	**9**
Clear Plastic Bottle - Natural EAPZ0641		----	----	----	19-Jun-2025	09-Jun-2025	**10**
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural EAPZ0643, EAPZ0641	EAPZ0642,	----	----	----	12-Jun-2025	11-Jun-2025	**1**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Natural EAPZ0643, EAPZ0641	EAPZ0642,	----	----	----	12-Jun-2025	11-Jun-2025	**1**
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Natural EAPZ0643, EAPZ0641	EAPZ0642,	19-Jun-2025	11-Jun-2025	**8**	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER** Evaluation: × = Holding time breach ; ✓ = Within holding time.

Work Order : EP2509305 Amendment 1
Client : ROCKWATER PTY LTD
Project : Round Hill Groundwater Supply Investigation

Matrix: **WATER**

Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) EAPZ0643, EAPZ0642	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	09-Jun-2025	✗
Clear Plastic Bottle - Natural (EA005-P) EAPZ0641	**09-Jun-2025**	**----**	----	----	**19-Jun-2025**	09-Jun-2025	✗
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) EAPZ0643, EAPZ0642	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	07-Jul-2025	✓
Clear Plastic Bottle - Natural (EA010-P) EAPZ0641	**09-Jun-2025**	**----**	----	----	**19-Jun-2025**	07-Jul-2025	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**16-Jun-2025**	16-Jun-2025	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) EAPZ0643, EAPZ0642	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	23-Jun-2025	✓
Clear Plastic Bottle - Natural (ED037-P) EAPZ0641	**09-Jun-2025**	**----**	----	----	**19-Jun-2025**	23-Jun-2025	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**12-Jun-2025**	07-Jul-2025	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**12-Jun-2025**	07-Jul-2025	✓
ED093F: Dissolved Major Cations							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (ED093F) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	07-Jul-2025	✓
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020D-F) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	06-Dec-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F) EAPZ0643, EAPZ0642, EAPZ0641	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	07-Jul-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level								
Clear Plastic Bottle - NaOH Filtered (EG050G LL-F) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**----**	----	----	**19-Jun-2025**	07-Jul-2025	✓
EG052G: Silica by Discrete Analyser								
Clear Plastic Bottle - Natural (EG052G) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	07-Jul-2025	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F_LL) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**----**	----	----	**13-Jun-2025**	06-Dec-2025	✓
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P) EAPZ0643,	EAPZ0642	**09-Jun-2025**	**----**	----	----	**18-Jun-2025**	07-Jul-2025	✓
Clear Plastic Bottle - Natural (EK040P) EAPZ0641		**09-Jun-2025**	**----**	----	----	**19-Jun-2025**	07-Jul-2025	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**----**	----	----	**12-Jun-2025**	11-Jun-2025	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Natural (EK059G) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**----**	----	----	**12-Jun-2025**	11-Jun-2025	×
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Natural (EK067G) EAPZ0643, EAPZ0641	EAPZ0642,	**09-Jun-2025**	**19-Jun-2025**	11-Jun-2025	×	**19-Jun-2025**	17-Jul-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / Analytical Methods	Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Evaluation	Quality Control Specification
Laboratory Control Samples (LCS) - Continued							
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	16	**18.75**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite D	EG020D-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	WATER	In house: Referenced to APHA 3500 Cr-A & B. Samples are 0.45µm filtered prior to analysis. Hexavalent chromium is determined directly on water sample by Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Fluoride by Auto Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

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CHAIN OF CUSTODY AND ANALYSIS REQUEST

CLIENT:	Hancock RDG	**CLIENT No.:**	180-1
PROJECT NAME:	Round Hill Groundwater Supply Investigation	**COLLECTOR'S NAME:**	MATTHEW VEAR
PROJECT MANAGER:	Peter Khor	**ORDER/QUOTE No.:**	EP25ROCWATER001
LABORATORY JOB No.:		(use EP23ROCWAT0002-V3 if 1 of 3 normal suites* is analysed)	

ALS (Australian Lab. Services)
26 Rigali Way, Wangara WA 6065
Ph: 9406 1301

	General Sample Information						Preservation Method			Analyses Required						Additional Notes/Comments
Sample I.D.	Lab. No.	Sample Date	Sample Time	Field EC µS/cm	Field pH	No. of Containers	Ice	Acidified	Other (name)	Major Components Analysis*	Comprehensive Analysis*	Environmental Disposal*	As Per Custom Suite - see attached			
1 EAP20643		09/06/25	1300	814	7.51	3	X						X			Results to be in EnviroSys format
2 EAP20642		09/06/25	1320	902	7.56	3	X						X			
3 EAP20641		09/06/25	1340	866	7.53	3	Y						X			

Please direct ***ALL*** *corresp*
Manager & Default

Relinquished by: M.Vear Date/Time: 11/6/25 0800	Received by: LS Date/Time: 1330 11/6	Comments:
Relinquished by: Date/Time:	Received by: Date/Time:	Comments:

Page: 1

Environmental Division
Perth
Work Order Reference
EP2509305

Telephone : +61-8-9406 1301

Analytes	Required LoR (mg/L)
pH	-
EC (µS/cm)	-
TDS (evap)	1
Major Cations: *Ca, K, Mg, Na*	0.1
Major Anions: *Cl, F, NO_3 as N, NO_2 as N, $NO_3 + NO_2$ as N, PO_4 as P, SO_4, Alkalinity (HCO as $CaCO_3$, CO_3 as $CaCO_3$, Total Alkalinity as $CaCO_3$)*	0.1
Dissolved Metals	
Ag	0.00005
Al	0.055
As	0.001
B	0.1
Ba	0.001
Be	0.0001
Bi	0.0005
Cd	0.0001
Co	0.001
Total Cr	0.001
Cr VI	0.001
Cu	0.001
Fe	0.1
Hg	0.0006
La	0.00001
Mn	0.1
Mo	0.01
Ni	0.001
Pb	0.001
Si	0.1
Sb	0.005
Se	0.01
Sn	0.001
Th	0.001
Thallium	0.00001
U	0.0005
V	0.005
Zn	0.005

CERTIFICATE OF ANALYSIS

Work Order	: **EP2510209**	Page	: 1 of 5
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 25-Jun-2025 12:10
Order number	: ----	Date Analysis Commenced	: 30-Jun-2025
C-O-C number	: ----	Issue Date	: 04-Jul-2025 17:44
Sampler	: S.O.		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

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.

Signatories	*Position*	*Accreditation Category*
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- 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	EARC0607	EARC0471	EARC0517	EARC0745	----
			Sampling date / time	24-Jun-2025 10:00	24-Jun-2025 10:30	24-Jun-2025 11:00	24-Jun-2025 11:30	----
Compound	CAS Number	LOR	Unit	EP2510209-001	EP2510209-002	EP2510209-003	EP2510209-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**8.23**	**8.18**	**8.24**	**8.20**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**1160**	**660**	**633**	**729**	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**820**	**402**	**391**	**507**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**243**	**212**	**200**	**201**	----
Total Alkalinity as CaCO3	----	1	mg/L	**243**	**212**	**200**	**201**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**24**	**27**	**26**	**32**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**239**	**63**	**60**	**80**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**82**	**31**	**30**	**33**	----
Magnesium	7439-95-4	1	mg/L	**54**	**33**	**30**	**35**	----
Sodium	7440-23-5	1	mg/L	**56**	**51**	**50**	**58**	----
Potassium	7440-09-7	1	mg/L	**9**	**8**	**7**	**7**	----
EG020F: Dissolved Metals by ICP-MS								
Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level								
Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	**34.7**	**63.3**	**63.2**	**65.2**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EARC0607	EARC0471	EARC0517	EARC0745	----
			Sampling date / time	24-Jun-2025 10:00	24-Jun-2025 10:30	24-Jun-2025 11:00	24-Jun-2025 11:30	----
Compound	CAS Number	LOR	Unit	EP2510209-001	EP2510209-002	EP2510209-003	EP2510209-004	--------
				Result	Result	Result	Result	----
EG052G: Silica by Discrete Analyser - Continued								
Reactive Silica as Silicon	----	0.05	mg/L	**16.2**	**29.6**	**29.5**	**30.5**	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Aluminium	7429-90-5	0.2	µg/L	**3.4**	**6.4**	**2.6**	**4.6**	----
Antimony	7440-36-0	0.05	µg/L	**0.18**	<0.05	<0.05	<0.05	----
Arsenic	7440-38-2	0.1	µg/L	**2.6**	**0.2**	**0.2**	**0.9**	----
Barium	7440-39-3	0.2	µg/L	**717**	**53.1**	**58.6**	**112**	----
Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Boron	7440-42-8	1	µg/L	**178**	**190**	**182**	**178**	----
Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Cadmium	7440-43-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Chromium	7440-47-3	0.2	µg/L	<0.2	<0.2	<0.2	**0.3**	----
Cobalt	7440-48-4	0.02	µg/L	**2.35**	**0.11**	<0.02	<0.02	----
Copper	7440-50-8	0.05	µg/L	**0.15**	**0.89**	<0.05	**0.19**	----
Iron	7439-89-6	2	µg/L	**3330**	**13**	**12**	**32**	----
Lead	7439-92-1	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
Manganese	7439-96-5	0.05	µg/L	**1680**	**2.24**	**0.63**	**0.65**	----
Molybdenum	7439-98-7	0.05	µg/L	**2.17**	**0.22**	**0.10**	**0.39**	----
Nickel	7440-02-0	0.2	µg/L	**1.0**	**1.3**	<0.2	**0.2**	----
Selenium	7782-49-2	0.1	µg/L	<0.1	**0.8**	**0.8**	**1.0**	----
Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	<0.01	**0.01**	----
Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	----
Uranium	7440-61-1	0.005	µg/L	**1.19**	**0.528**	**0.486**	**0.652**	----
Vanadium	7440-62-2	0.1	µg/L	**0.2**	**0.8**	**0.4**	**2.8**	----
Zinc	7440-66-6	0.5	µg/L	**2.7**	**6.3**	<0.5	**1.1**	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**12.1**	**6.58**	**6.23**	**6.94**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	EARC0607	EARC0471	EARC0517	EARC0745	----
			Sampling date / time	24-Jun-2025 10:00	24-Jun-2025 10:30	24-Jun-2025 11:00	24-Jun-2025 11:30	----
Compound	*CAS Number*	*LOR*	*Unit*	EP2510209-001	EP2510209-002	EP2510209-003	EP2510209-004	--------
				Result	Result	Result	Result	----
EN055: Ionic Balance - Continued								
ø Total Cations	----	0.01	meq/L	**11.2**	**6.68**	**6.32**	**7.23**	----
ø Ionic Balance	----	0.01	%	**3.84**	**0.84**	**0.72**	**2.05**	----

QUALITY CONTROL REPORT

Work Order	: **EP2510209**	Page	: 1 of 7
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 25-Jun-2025
Order number	: ----	Date Analysis Commenced	: 30-Jun-2025
C-O-C number	: ----	Issue Date	: 04-Jul-2025
Sampler	: S.O.		
Site	: ----		
Quote number	: EP25ROCWAT0001		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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.

Signatories	*Position*	*Accreditation Category*
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	***Sample ID***	***Method: Compound***	***CAS Number***	***LOR***	***Unit***	***Original Result***	***Duplicate Result***	***RPD (%)***	***Acceptable RPD (%)***
EA005P: pH by PC Titrator (QC Lot: 6691271)									
EP2510095-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.90	7.89	0.1	0% - 20%
EP2510142-013	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.10	8.07	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 6691272)									
EP2510095-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	4270	4270	0.1	0% - 20%
EP2510142-013	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	4930	4920	0.1	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 6682478)									
EP2510182-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	54400	52500	3.6	0% - 20%
EP2510226-004	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	<10	0.0	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 6691270)									
EP2510095-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	61	61	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	61	61	0.0	0% - 20%
EP2510142-013	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	112	112	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	112	112	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6682728)									
EP2510209-001	EARC0607	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	24	24	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6682729)									
EP2510209-001	EARC0607	ED045G: Chloride	16887-00-6	1	mg/L	239	239	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6691179)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 6691179) - continued									
EP2509951-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	59	56	4.5	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	71	72	1.4	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	284	287	0.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.0	No Limit
EP2510168-010	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	203	193	4.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	149	148	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	105	104	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	19	19	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6691176)									
EP2509951-001	Anonymous	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2510168-010	Anonymous	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6691180)									
EP2510168-011	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	0.035	0.034	0.0	0% - 20%
EP2510168-010	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	0.035	0.035	0.0	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 6691174)									
EP2510209-001	EARC0607	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP2510320-006	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QC Lot: 6682780)									
EP2510021-001	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EG052G: Silica by Discrete Analyser (QC Lot: 6682727)									
EP2510209-001	EARC0607	EG052G: Reactive Silica	----	0.05	mg/L	34.7	35.1	1.1	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6692967)									
EP2510209-001	EARC0607	EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EG094B-F_LL: Iron	7439-89-6	2	µg/L	3330	3320	0.3	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6692968)									
EP2510209-001	EARC0607	EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	1.19	1.22	2.3	0% - 20%
		EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	2.35	2.34	0.6	0% - 20%
		EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	0.18	0.19	0.0	No Limit
		EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	0.15	0.16	0.0	No Limit
		EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	1680	1600	4.6	0% - 20%
		EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	2.17	2.30	5.7	0% - 20%
		EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	2.6	2.6	0.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6692968) - continued									
EP2510209-001	EARC0607	EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	0.2	0.2	0.0	No Limit
		EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	3.4	3.4	0.0	0% - 50%
		EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	717	726	1.2	0% - 20%
		EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	1.0	1.0	0.0	No Limit
		EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	<0.2	0.0	No Limit
		EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	2.7	2.7	0.0	No Limit
		EG094A-F_LL: Boron	7440-42-8	1	µg/L	178	183	3.1	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6692969)									
EP2510209-001	EARC0607	EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 6691271)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.5	102
				----	7 pH Unit	100	98.5	102
EA010P: Conductivity by PC Titrator (QCLot: 6691272)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	98.3	92.1	105
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 6682478)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	101	80.0	120
				<10	293 mg/L	105	80.0	120
				<10	2470 mg/L	104	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 6691270)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	98.0	85.1	126
				<1	200 mg/L	103	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6682728)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	89.9	112
				<1	500 mg/L	95.0	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 6682729)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	103	88.6	113
				<1	1000 mg/L	103	88.6	113
ED093F: Dissolved Major Cations (QCLot: 6691179)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	107	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	84.6	108
EG020F: Dissolved Metals by ICP-MS (QCLot: 6691176)								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	107	88.1	135
EG020F: Dissolved Metals by ICP-MS (QCLot: 6691180)								
EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	0.01 mg/L	102	82.1	118
EG035F: Dissolved Mercury by FIMS (QCLot: 6691174)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG035F: Dissolved Mercury by FIMS (QCLot: 6691174) - continued								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.005 mg/L	98.8	85.6	120
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6682780)								
EG050G: Hexavalent Chromium	18540-29-9	0.001	mg/L	<0.001	0.05 mg/L	106	90.9	109
EG052G: Silica by Discrete Analyser (QCLot: 6682727)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	102	94.6	110
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6692967)								
EG094B-F_LL: Iron	7439-89-6	2	µg/L	<2	50 µg/L	117	80.0	120
EG094B-F_LL: Selenium	7782-49-2	0.1	µg/L	<0.1	10 µg/L	85.7	80.0	120
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6692968)								
EG094A-F_LL: Aluminium	7429-90-5	0.2	µg/L	<0.2	50 µg/L	99.8	87.1	110
EG094A-F_LL: Antimony	7440-36-0	0.05	µg/L	<0.05	2 µg/L	80.1	73.6	124
EG094A-F_LL: Arsenic	7440-38-2	0.1	µg/L	<0.1	10 µg/L	104	87.1	116
EG094A-F_LL: Barium	7440-39-3	0.2	µg/L	<0.2	10 µg/L	96.6	85.4	111
EG094A-F_LL: Beryllium	7440-41-7	0.02	µg/L	<0.02	10 µg/L	96.6	80.0	129
EG094A-F_LL: Boron	7440-42-8	1	µg/L	<1	50 µg/L	114	80.0	120
EG094A-F_LL: Bismuth	7440-69-9	0.02	µg/L	<0.02	10 µg/L	94.4	80.0	120
EG094A-F_LL: Cadmium	7440-43-9	0.02	µg/L	<0.02	10 µg/L	95.4	89.5	107
EG094A-F_LL: Chromium	7440-47-3	0.2	µg/L	<0.2	10 µg/L	97.9	77.0	111
EG094A-F_LL: Cobalt	7440-48-4	0.02	µg/L	<0.02	10 µg/L	99.7	72.2	114
EG094A-F_LL: Copper	7440-50-8	0.05	µg/L	<0.05	10 µg/L	96.8	75.9	114
EG094A-F_LL: Lead	7439-92-1	0.05	µg/L	<0.05	10 µg/L	94.5	80.6	105
EG094A-F_LL: Manganese	7439-96-5	0.05	µg/L	<0.05	10 µg/L	94.0	85.4	109
EG094A-F_LL: Molybdenum	7439-98-7	0.05	µg/L	<0.05	10 µg/L	102	85.2	112
EG094A-F_LL: Nickel	7440-02-0	0.2	µg/L	<0.2	10 µg/L	97.6	80.9	119
EG094A-F_LL: Thallium	7440-28-0	0.01	µg/L	<0.01	10 µg/L	95.8	76.0	120
EG094A-F_LL: Tin	7440-31-5	0.2	µg/L	<0.2	10 µg/L	100	85.1	109
EG094A-F_LL: Uranium	7440-61-1	0.005	µg/L	<0.005	10 µg/L	100	83.7	108
EG094A-F_LL: Vanadium	7440-62-2	0.1	µg/L	<0.1	10 µg/L	97.9	82.0	111
EG094A-F_LL: Zinc	7440-66-6	0.5	µg/L	<0.5	10 µg/L	105	76.2	124
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6692969)								
EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	2 µg/L	103	83.6	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6682728)							
EP2510209-001	EARC0607	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	120	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 6682729)							
EP2510209-001	EARC0607	ED045G: Chloride	16887-00-6	200 mg/L	113	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6691180)							
EP2510168-003	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.05 mg/L	97.8	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6691174)							
EP2510209-001	EARC0607	EG035F: Mercury	7439-97-6	0.005 mg/L	99.0	70.0	130
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level (QCLot: 6682780)							
EP2510021-001	Anonymous	EG050G: Hexavalent Chromium	18540-29-9	0.05 mg/L	114	70.0	130
EG052G: Silica by Discrete Analyser (QCLot: 6682727)							
EP2510209-002	EARC0471	EG052G: Reactive Silica	----	5 mg/L	# Not Determined	70.0	116
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6692968)							
EP2510209-002	EARC0471	EG094A-F_LL: Arsenic	7440-38-2	50 µg/L	110	70.0	130
		EG094A-F_LL: Barium	7440-39-3	50 µg/L	96.7	70.0	130
		EG094A-F_LL: Beryllium	7440-41-7	50 µg/L	77.0	70.0	130
		EG094A-F_LL: Cadmium	7440-43-9	12.5 µg/L	100.0	70.0	130
		EG094A-F_LL: Chromium	7440-47-3	50 µg/L	93.3	70.0	130
		EG094A-F_LL: Cobalt	7440-48-4	50 µg/L	103	70.0	130
		EG094A-F_LL: Copper	7440-50-8	50 µg/L	101	70.0	130
		EG094A-F_LL: Lead	7439-92-1	50 µg/L	88.4	70.0	130
		EG094A-F_LL: Manganese	7439-96-5	50 µg/L	91.8	70.0	130
		EG094A-F_LL: Nickel	7440-02-0	50 µg/L	101	70.0	130
		EG094A-F_LL: Vanadium	7440-62-2	50 µg/L	94.8	70.0	130
		EG094A-F_LL: Zinc	7440-66-6	50 µg/L	106	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2510209**	Page	: 1 of 7
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 25-Jun-2025
Site	: ----	Issue Date	: 04-Jul-2025
Sampler	: S.O.	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG052G: Silica by Discrete Analyser	EP2510209--002	EARC0471	**Reactive Silica**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural EARC0607, EARC0471, EARC0517, EARC0745	----	----	----	02-Jul-2025	24-Jun-2025	**8**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	24-Jun-2025	✘
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**30-Jun-2025**	01-Jul-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	08-Jul-2025	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
ED093F: Dissolved Major Cations							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (ED093F) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020D-F) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	21-Dec-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
EG050G LL-F: Dissolved Hexavalent Chromium by Discrete Analyser - Low Level							
Clear Plastic Bottle - NaOH Filtered (EG050G LL-F) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**03-Jul-2025**	22-Jul-2025	✓
EG052G: Silica by Discrete Analyser							
Clear Plastic Bottle - Natural (EG052G) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**02-Jul-2025**	22-Jul-2025	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094A-F_LL) EARC0607, EARC0471, EARC0517, EARC0745	**24-Jun-2025**	**----**	----	----	**03-Jul-2025**	21-Dec-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	5	**40.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Total Dissolved Solids (High Level)	EA015H	3	14	**21.43**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F_LL	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F_LL	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of \`filterable\` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite D	EG020D-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Hexavalent Chromium by DA - Low Level	EG050G LL-F	WATER	In house: Referenced to APHA 3500 Cr-A & B. Samples are 0.45µm filtered prior to analysis. Hexavalent chromium is determined directly on water sample by Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS (LL)	EG094A-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS (LL)	EG094B-F LL	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

ROCKWATER Pty Ltd

CONSULTANT HYDROGEOLOGISTS

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A.C.N. 008 804 653

CHAIN OF CUSTODY AND ANALYSIS REQUEST

CLIENT: Hancock RDG	CLIENT No.: 180-1		ALS (Australian Lab. Services)
PROJECT NAME: Round Hill Groundwater Supply Investigation	COLLECTOR'S NAME: Steve Ossm		26 Rigali Way, Wangara WA 6065
PROJECT MANAGER: Peter Khor	ORDER/QUOTE No.: EP25ROCWATER001		Ph: 9406 1301
LABORATORY JOB No.:	(use EP23ROCWAT0002-V3 if 1 of 3 normal suites* is analysed)		

	General Sample Information							Preservation Method			Analyses Required						
	Sample I.D.	Lab. No.	Sample Date	Sample Time	Field EC µS/cm	Field pH	No. of Containers	Ice	Acidified	Other (name)	Major Components Analysis*	Comprehensive Analysis*	Environmental Disposal*	As Per Custom Suite - see attached			
1	EARC0607		24.6.25	1000	545	7.83	3	✓						✓			
2	EARC0471		↓	1030	610	7.91	3	✓						✓			
3	EARC0517		↓	1100	580	7.94	3	✓						✓			
4	EARC0745		↓	1130	620	7.81	3	✓						✓			

Additional Notes/Comments

Results to be in EnviroSys format

Environmental Division
Perth
Work Order Reference
EP2510209

Telephone : + 61-8-9406 1301

*Please direct **ALL** correspondance and queries to **Project Manager & Default***

Relinquished by: [signature] Date/Time: 25.6 900	Received by: [signature] Date/Time: 25/6 9:00	Comments:
Relinquished by: Date/Time:	Received by: AR Date/Time: 25/6 1210	Comments:

Page: 1 of 1

CERTIFICATE OF ANALYSIS

Work Order	: **EP2511759**	Page	: 1 of 5
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 23-Jul-2025 13:10
Order number	: ----	Date Analysis Commenced	: 23-Jul-2025
C-O-C number	: ----	Issue Date	: 30-Jul-2025 18:22
Sampler	: Steve Ossim		
Site	:		
Quote number	: EP23ROCWAT0002_V4		
No. of samples received	: 4		
No. of samples analysed	: 4		

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.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Stephanie Tilson	Instrument Chemist	Perth Inorganics, Wangara, WA

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)

Compound	CAS Number	LOR	Unit	HRPB002	EAPB1303	EAPB1300	EAPB1302	----
			Sampling date / time	21-Jul-2025 12:30	21-Jul-2025 13:00	21-Jul-2025 13:30	22-Jul-2025 12:00	----
				EP2511759-001	EP2511759-002	EP2511759-003	EP2511759-004	--------
				Result	Result	Result	Result	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**7.77**	**7.99**	**7.54**	**8.29**	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**850**	**729**	**668**	**749**	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**514**	**469**	**429**	**430**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	**320**	**239**	**205**	**246**	----
Total Alkalinity as CaCO3	----	1	mg/L	**320**	**239**	**205**	**246**	----
ED040F: Dissolved Major Anions								
Silicon	7440-21-3	0.05	mg/L	**32.2**	**31.0**	**35.9**	**11.8**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**41**	**42**	**30**	**49**	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**71**	**70**	**71**	**73**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**62**	**49**	**35**	**59**	----
Magnesium	7439-95-4	1	mg/L	**46**	**36**	**32**	**40**	----
Sodium	7440-23-5	1	mg/L	**50**	**49**	**51**	**36**	----
Potassium	7440-09-7	1	mg/L	**7**	**6**	**8**	**8**	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	**0.13**	**0.03**	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Barium	7440-39-3	0.001	mg/L	**0.032**	**0.006**	**0.052**	**0.020**	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	HRPB002	EAPB1303	EAPB1300	EAPB1302	----
Sampling date / time				21-Jul-2025 12:30	21-Jul-2025 13:00	21-Jul-2025 13:30	22-Jul-2025 12:00	----
				EP2511759-001	EP2511759-002	EP2511759-003	EP2511759-004	--------
				Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS - Continued								
Chromium	7440-47-3	0.001	mg/L	**0.003**	**0.003**	<0.001	**0.002**	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	**0.004**	**0.002**	----
Lanthanum	7439-91-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Manganese	7439-96-5	0.001	mg/L	<0.001	**0.002**	**0.008**	**0.007**	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	**0.002**	<0.001	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	**0.007**	**0.001**	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	**0.007**	**0.008**	----
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	**0.12**	<0.05	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	<0.00004	<0.00004	----
EG049F: Dissolved Trivalent Chromium								
Trivalent Chromium	16065-83-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
EG050F: Dissolved Hexavalent Chromium								
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Beryllium	7440-41-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Boron	7440-42-8	5	µg/L	**207**	**210**	**218**	**219**	----
Bismuth	7440-69-9	0.05	µg/L	<0.05	<0.05	**0.10**	<0.05	----
Silver	7440-22-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Thallium	7440-28-0	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Uranium	7440-61-1	0.05	µg/L	**0.66**	**0.61**	**0.83**	**0.85**	----
Vanadium	7440-62-2	0.2	µg/L	**2.7**	**1.3**	**2.8**	**0.4**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	HRPB002	EAPB1303	EAPB1300	EAPB1302	----
			Sampling date / time	21-Jul-2025 12:30	21-Jul-2025 13:00	21-Jul-2025 13:30	22-Jul-2025 12:00	----
Compound	CAS Number	LOR	Unit	EP2511759-001	EP2511759-002	EP2511759-003	EP2511759-004	--------
				Result	Result	Result	Result	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**0.2**	**0.2**	**0.3**	**0.3**	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	**0.03**	<0.01	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	**0.17**	**0.01**	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**1.48**	**3.91**	**3.54**	**0.84**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**1.48**	**4.08**	**3.55**	**0.84**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.5**	**0.7**	**1.0**	**0.2**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**2.0**	**4.8**	**4.6**	**1.0**	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.05**	<0.01	**0.04**	**0.08**	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**9.25**	**7.62**	**6.72**	**7.99**	----
ø Total Cations	----	0.01	meq/L	**9.23**	**7.69**	**6.80**	**8.01**	----
ø Ionic Balance	----	0.01	%	**0.09**	**0.45**	**0.59**	**0.08**	----

QUALITY CONTROL REPORT

Work Order	: **EP2511759**	Page	: 1 of 9
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 23-Jul-2025
Order number	: ----	Date Analysis Commenced	: 23-Jul-2025
C-O-C number	: ----	Issue Date	: 30-Jul-2025
Sampler	: Steve Ossim		
Site	:		
Quote number	: EP23ROCWAT0002_V4		
No. of samples received	: 4		
No. of samples analysed	: 4		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Stephanie Tilson	Instrument Chemist	Perth Inorganics, Wangara, WA

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.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA005P: pH by PC Titrator (QC Lot: 6741107)									
EP2511759-002	EAPB1303	EA005-P: pH Value	----	0.01	pH Unit	7.99	8.03	0.5	0% - 20%
EP2511759-003	EAPB1300	EA005-P: pH Value	----	0.01	pH Unit	7.54	7.51	0.4	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 6741108)									
EP2511759-003	EAPB1300	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	668	670	0.3	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 6742877)									
EP2511589-005	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	646	649	0.5	0% - 20%
EP2511759-003	EAPB1300	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	429	418	2.5	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 6741109)									
EP2511759-003	EAPB1300	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	205	209	1.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	205	209	1.9	0% - 20%
ED040F: Dissolved Major Anions (QC Lot: 6740119)									
EP2511755-011	Anonymous	ED040F: Silicon	7440-21-3	0.05	mg/L	42.0	40.9	2.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6740117)									
EP2511755-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	144	156	7.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6740118)									
EP2511755-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	210	209	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6749432)									
EP2511761-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	41	40	0.0	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 6749432) - continued									
EP2511761-001	Anonymous	ED093F: Magnesium	7439-95-4	1	mg/L	46	47	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	201	204	1.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	17	17	0.0	0% - 50%
EP2511867-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	139	139	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	552	550	0.4	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	20400	20500	0.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	411	420	2.2	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6749433)									
EP2511761-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0007	0.0007	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.052	0.052	0.0	0% - 20%
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.011	0.011	0.0	0% - 50%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.064	0.063	0.0	0% - 20%
		EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.023	0.023	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EP2511867-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0010)*	mg/L	<0.0010	<0.0010	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.010) *	mg/L	0.633	0.642	1.4	0% - 20%
		EG020A-F: Barium	7440-39-3	0.001 (0.010) *	mg/L	0.083	0.085	2.5	No Limit
		EG020A-F: Chromium	7440-47-3	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6749433) - continued									
EP2511867-001	Anonymous	EG020A-F: Lead	7439-92-1	0.001 (0.010)*	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001 (0.010)*	mg/L	0.010	0.012	18.4	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001 (0.010)*	mg/L	0.086	0.088	3.1	No Limit
		EG020A-F: Nickel	7440-02-0	0.001 (0.010)*	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Tin	7440-31-5	0.001 (0.010)*	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005 (0.050)*	mg/L	<0.050	<0.050	0.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (0.50)*	mg/L	<0.50	<0.50	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6749434)									
EP2511761-001	Anonymous	EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
EP2511867-001	Anonymous	EG020B-F: Thorium	7440-29-1	0.001 (0.010)*	mg/L	<0.010	<0.010	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6749435)									
EP2511867-001	Anonymous	EG020D-F: Lanthanum	7439-91-0	0.001 (0.010)*	mg/L	<0.010	<0.010	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6742687)									
EP2511319-001	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004 (0.00008)*	mg/L	<0.00008	<0.00008	0.0	No Limit
EP2511747-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	<0.00004	0.0	No Limit
EG050F: Dissolved Hexavalent Chromium (QC Lot: 6742259)									
EP2511516-001	Anonymous	EG050G-F: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6743124)									
EP2511703-001	Anonymous	EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.00001 mg/L	<0.01	0.0	No Limit
EP2511703-011	Anonymous	EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.00001 mg/L	<0.01	0.0	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 6743127)									
EP2511747-004	Anonymous	EG094A-F: Thallium	7440-28-0	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EG094A-F: Bismuth	7440-69-9	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EG094A-F: Uranium	7440-61-1	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EG094A-F: Beryllium	7440-41-7	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EG094A-F: Vanadium	7440-62-2	0.2	µg/L	0.2	0.2	0.0	No Limit
		EG094A-F: Boron	7440-42-8	5	µg/L	45	42	5.9	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EK040P: Fluoride by PC Titrator (QC Lot: 6741110)									
EP2511759-002	EAPB1303	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.0	No Limit
EP2511759-003	EAPB1300	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6740136)									
EP2511747-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.68	0.69	0.0	0% - 20%
EP2511759-004	EAPB1302	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6740116)									
EP2511755-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP2511755-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6740135)									
EP2511747-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP2511759-004	EAPB1302	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.84	0.82	1.6	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6744920)									
EP2511667-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (0.5)*	mg/L	95.7	86.0	10.7	0% - 20%
EP2511747-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.7	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 6744921)									
EP2511759-004	EAPB1302	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6744919)									
EP2511667-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01 (0.05)*	mg/L	10.9	10.4	4.2	0% - 20%
EP2511747-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.08	14.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 6744922)									
EP2511780-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01 (0.10)*	mg/L	0.52	0.33	45.9	No Limit
EP2511759-004	EAPB1302	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.09	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 6741107)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	98.5	102
				----	7 pH Unit	100	98.5	102
EA010P: Conductivity by PC Titrator (QCLot: 6741108)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	102	92.1	105
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 6742877)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	95.8	80.0	120
				<10	293 mg/L	102	80.0	120
				<10	2470 mg/L	106	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 6741109)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	20 mg/L	108	85.1	126
				----	200 mg/L	102	90.5	111
ED040F: Dissolved Major Anions (QCLot: 6740119)								
ED040F: Silicon	7440-21-3	0.05	mg/L	<0.05	10 mg/L	110	88.5	112
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6740117)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	89.9	112
				<1	500 mg/L	107	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 6740118)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	97.7	88.6	113
				<1	1000 mg/L	96.7	88.6	113
ED093F: Dissolved Major Cations (QCLot: 6749432)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.5	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	103	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.6	84.6	108
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749433)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	104	90.2	111
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	79.9	73.2	141
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	90.3	113
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	103	88.5	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	89.7	108

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749433) - continued								
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	87.3	107
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	100	88.8	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.4	88.9	108
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.7	89.4	106
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.6	87.6	106
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	102	91.1	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.4	87.2	108
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.6	83.8	102
EG020A-F: Tin	7440-31-5	0.001	mg/L	<0.001	0.1 mg/L	104	92.9	120
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	89.5	112
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.9	89.9	120
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749434)								
EG020B-F: Thorium	7440-29-1	0.001	mg/L	<0.001	0.1 mg/L	103	88.1	135
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749435)								
EG020D-F: Lanthanum	7439-91-0	0.001	mg/L	<0.001	0.01 mg/L	94.5	82.1	118
EG035F: Dissolved Mercury by FIMS (QCLot: 6742687)								
EG035F-LL: Mercury	7439-97-6	0.00004	mg/L	<0.00004	0.005 mg/L	99.8	85.7	118
EG050F: Dissolved Hexavalent Chromium (QCLot: 6742259)								
EG050G-F: Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	0.5 mg/L	99.3	92.9	108
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6743124)								
EG094-AgF: Silver	7440-22-4	0.01	µg/L	<0.01	2 µg/L	97.0	83.6	110
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6743127)								
EG094A-F: Beryllium	7440-41-7	0.1	µg/L	<0.1	10 µg/L	105	78.9	123
EG094A-F: Boron	7440-42-8	5	µg/L	<5	50 µg/L	103	69.0	137
EG094A-F: Bismuth	7440-69-9	0.05	µg/L	<0.05	10 µg/L	92.6	68.2	121
EG094A-F: Thallium	7440-28-0	0.02	µg/L	<0.02	10 µg/L	101	89.1	107
EG094A-F: Uranium	7440-61-1	0.05	µg/L	<0.05	10 µg/L	103	90.8	111
EG094A-F: Vanadium	7440-62-2	0.2	µg/L	<0.2	10 µg/L	101	91.5	111
EK040P: Fluoride by PC Titrator (QCLot: 6741110)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	105	86.0	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6740136)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	86.2	111
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6740116)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	88.7	113

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6740135)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	90.5	110
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6744920)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	90.6	80.0	115
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6744921)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	91.9	80.0	115
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6744919)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.3	70.0	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6744922)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.1	70.0	110

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6740117)							
EP2511755-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	100	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 6740118)							
EP2511755-010	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	86.5	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749433)							
EP2511759-002	EAPB1303	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	107	70.0	130
		EG020A-F: Barium	7440-39-3	0.2 mg/L	105	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	105	70.0	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.8	70.0	130
		EG020A-F: Cobalt	7440-48-4	0.2 mg/L	102	70.0	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	99.7	70.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	101	70.0	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	98.3	70.0	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	101	70.0	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	105	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6749435)							
EP2511759-002	EAPB1303	EG020D-F: Lanthanum	7439-91-0	0.05 mg/L	92.4	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 6742687)							
EP2511319-002	Anonymous	EG035F-LL: Mercury	7439-97-6	0.01 mg/L	79.5	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG050F: Dissolved Hexavalent Chromium (QCLot: 6742259)							
EP2511516-001	Anonymous	EG050G-F: Hexavalent Chromium	18540-29-9	0.5 mg/L	96.5	70.0	130
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 6743127)							
EP2511747-005	Anonymous	EG094A-F: Beryllium	7440-41-7	50 µg/L	103	66.2	135
		EG094A-F: Vanadium	7440-62-2	50 µg/L	108	74.1	129
EK040P: Fluoride by PC Titrator (QCLot: 6741110)							
EP2511759-004	EAPB1302	EK040P: Fluoride	16984-48-8	4.9 mg/L	107	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6740136)							
EP2511747-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	107	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6740116)							
EP2511755-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	114	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6740135)							
EP2511747-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.6	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6744920)							
EP2511682-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.0	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 6744921)							
EP2511761-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.0	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6744919)							
EP2511682-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	89.1	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 6744922)							
EP2511761-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	89.5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2511759**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Telephone	: +61-8-9406 1301
Project	: Round Hill Groundwater Supply Investigation	Date Samples Received	: 23-Jul-2025
Site	:	Issue Date	: 30-Jul-2025
Sampler	: Steve Ossim	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	----	----	----	25-Jul-2025	21-Jul-2025	**4**
Clear Plastic Bottle - Natural EAPB1302	----	----	----	25-Jul-2025	22-Jul-2025	**3**
EK055G: Ammonia as N by Discrete Analyser						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	----	----	----	23-Jul-2025	22-Jul-2025	**1**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	----	----	----	24-Jul-2025	23-Jul-2025	**1**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	----	----	----	24-Jul-2025	23-Jul-2025	**1**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	29-Jul-2025	22-Jul-2025	**7**	----	----	----
Clear Plastic Bottle - Natural EAPB1302	29-Jul-2025	23-Jul-2025	**6**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser						
Clear Plastic Bottle - Natural HRPB002, EAPB1303, EAPB1300	29-Jul-2025	23-Jul-2025	**6**	----	----	----
Clear Plastic Bottle - Natural EAPB1302	29-Jul-2025	24-Jul-2025	**5**	----	----	----

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**25-Jul-2025**	21-Jul-2025	✘
Clear Plastic Bottle - Natural (EA005-P) EAPB1302		**22-Jul-2025**	**----**	----	----	**25-Jul-2025**	22-Jul-2025	✘
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**25-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - Natural (EA010-P) EAPB1302		**22-Jul-2025**	**----**	----	----	**25-Jul-2025**	19-Aug-2025	✓
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**25-Jul-2025**	28-Jul-2025	✓
Clear Plastic Bottle - Natural (EA015H) EAPB1302		**22-Jul-2025**	**----**	----	----	**25-Jul-2025**	29-Jul-2025	✓
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**25-Jul-2025**	04-Aug-2025	✓
Clear Plastic Bottle - Natural (ED037-P) EAPB1302		**22-Jul-2025**	**----**	----	----	**25-Jul-2025**	05-Aug-2025	✓
ED040F: Dissolved Major Anions								
Clear Plastic Bottle - Natural (ED040F) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**29-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - Natural (ED040F) EAPB1302		**22-Jul-2025**	**----**	----	----	**29-Jul-2025**	19-Aug-2025	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**24-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - Natural (ED041G) EAPB1302		**22-Jul-2025**	**----**	----	----	**24-Jul-2025**	19-Aug-2025	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) HRPB002, EAPB1300	EAPB1303,	**21-Jul-2025**	**----**	----	----	**24-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - Natural (ED045G) EAPB1302		**22-Jul-2025**	**----**	----	----	**24-Jul-2025**	19-Aug-2025	✓

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
Container */ Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
ED093F: Dissolved Major Cations							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (ED093F) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**29-Jul-2025**	18-Aug-2025	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (ED093F) EAPB1302	**22-Jul-2025**	**----**	----	----	**29-Jul-2025**	19-Aug-2025	✓
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020D-F) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**29-Jul-2025**	17-Jan-2026	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020D-F) EAPB1302	**22-Jul-2025**	**----**	----	----	**29-Jul-2025**	18-Jan-2026	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**24-Jul-2025**	18-Aug-2025	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F-LL) EAPB1302	**22-Jul-2025**	**----**	----	----	**24-Jul-2025**	19-Aug-2025	✓
EG050F: Dissolved Hexavalent Chromium							
Clear Plastic Bottle - NaOH Filtered (EG050G-F) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**24-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - NaOH Filtered (EG050G-F) EAPB1302	**22-Jul-2025**	**----**	----	----	**24-Jul-2025**	19-Aug-2025	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094-AgF) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**28-Jul-2025**	17-Jan-2026	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094-AgF) EAPB1302	**22-Jul-2025**	**----**	----	----	**28-Jul-2025**	18-Jan-2026	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**25-Jul-2025**	18-Aug-2025	✓
Clear Plastic Bottle - Natural (EK040P) EAPB1302	**22-Jul-2025**	**----**	----	----	**25-Jul-2025**	19-Aug-2025	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK055G) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**----**	----	----	**23-Jul-2025**	22-Jul-2025	✘
Clear Plastic Bottle - Natural (EK055G) EAPB1302	**22-Jul-2025**	**----**	----	----	**23-Jul-2025**	23-Jul-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	----	----	----	**24-Jul-2025**	23-Jul-2025	×
Clear Plastic Bottle - Natural (EK057G) EAPB1302	**22-Jul-2025**	----	----	----	**24-Jul-2025**	24-Jul-2025	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Natural (EK059G) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	----	----	----	**24-Jul-2025**	23-Jul-2025	×
Clear Plastic Bottle - Natural (EK059G) EAPB1302	**22-Jul-2025**	----	----	----	**24-Jul-2025**	24-Jul-2025	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Natural (EK061G) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**29-Jul-2025**	22-Jul-2025	×	**29-Jul-2025**	26-Aug-2025	✓
Clear Plastic Bottle - Natural (EK061G) EAPB1302	**22-Jul-2025**	**29-Jul-2025**	23-Jul-2025	×	**29-Jul-2025**	26-Aug-2025	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Natural (EK067G) HRPB002, EAPB1303, EAPB1300	**21-Jul-2025**	**29-Jul-2025**	23-Jul-2025	×	**29-Jul-2025**	26-Aug-2025	✓
Clear Plastic Bottle - Natural (EK067G) EAPB1302	**22-Jul-2025**	**29-Jul-2025**	24-Jul-2025	×	**29-Jul-2025**	26-Aug-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type / Analytical Methods	Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Evaluation	Quality Control Specification
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Dissolved	EG050G-F	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Dissolved	ED040F	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	4	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	30	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Dissolved	EG050G-F	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Major Anions - Dissolved	ED040F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	16	**18.75**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite B	EG020B-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Dissolved	EG050G-F	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Anions - Dissolved	ED040F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS - Low Level	EG035F-LL	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite D	EG020D-F	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by Auto Titrator	EK040P	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Hexavalent Chromium by Discrete Analyser - Dissolved	EG050G-F	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. Auto Titrator) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Major Anions - Dissolved	ED040F	WATER	In house: Referenced to APHA 3120. The 0.45µm filtered samples are determined by ICP/AES for Sulfur and/or Silicon content and reported as Sulfate and/or Silica after conversion by gravimetric factor.
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite B	EG020B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals by ICP-MS - Suite D	EG020D-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Dissolved Mercury by FIMS - Low Level	EG035F-LL	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Trivalent Chromium - Dissolved	EG049G-F	WATER	In house: Referenced to APHA 3500 Cr-B & 3120/3125. Trivalent Chromium is the difference between total dissolved and dissolved hexavalent chromium.
Hexavalent Chromium by Discrete Analyser - Dissolved	EG050G-F	WATER	In house: Referenced to APHA 3500 Cr-A & B. Samples are 0.45µm filtered prior to analysis. Hexavalent chromium is determined directly on water sample by Descrete Analyser as received by pH adjustment and colour development using dephenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM Schedule B(3).
Dissolved Metals in Fresh Water -Suite A by ORC-ICPMS	EG094A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Low-Level Dissolved Silver in Fresh Water by ORC-ICPMS	EG094-AgF	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM Schedule B(3).
Fluoride by Auto Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EP2511759**		
Client	: **ROCKWATER PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: Peter Khor	Contact	: Customer Services EP
Address	: 1ST FLOOR, 76 JERSEY ST WEMBLEY WA, AUSTRALIA 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: pkhor@rockwater.com.au	E-mail	: ALSEnviro.Perth@alsglobal.com
Telephone	: ----	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: Round Hill Groundwater Supply Investigation	Page	: 1 of 3
Order number	: ----	Quote number	: EP2023ROCWAT0002_V4 (EP23ROCWAT0002_V4)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	: Steve Ossim		

Dates

Date Samples Received	: 23-Jul-2025 13:10	Issue Date	: 24-Jul-2025
Client Requested Due Date	: 30-Jul-2025	Scheduled Reporting Date	: **30-Jul-2025**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 11.5 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 4 / 4

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Unless otherwise stated, analytical work for this work order will be conducted at ALS Perth, NATA accreditation no. 825, site no. 15847.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA005P pH (Auto Titrator)	WATER - EA010P Electrical Conductivity (Auto Titrator)	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG049G-F Dissolved Trivalent Chromium by ICP & DA	WATER - NT-01 & 02A Ca, Mg, Na, K, Chloride, SO4, Alkalinity &	WATER - NT-08 Total Nitrogen + NO2 + NO3 + NH3 + Total P
EP2511759-001	21-Jul-2025 12:30	HRPB002	✓	✓	✓	✓	✓	✓	✓
EP2511759-002	21-Jul-2025 13:00	EAPB1303	✓	✓	✓	✓	✓	✓	✓
EP2511759-003	21-Jul-2025 13:30	EAPB1300	✓	✓	✓	✓	✓	✓	✓
EP2511759-004	22-Jul-2025 12:00	EAPB1302	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - ED040F Dissolved Major Anions	WATER - EG035F-LL Dissolved Mercury - Low Level	WATER - EG050G-F Dissolved Hexavalent Chromium	WATER - EG094-AgF Ultra trace Filtered Silver to meet ANZECC 99%	WATER - EG094-F Dissolved Metals by ORC - Ultra Trace in Fresh
EP2511759-001	21-Jul-2025 12:30	HRPB002	✓	✓	✓	✓	✓
EP2511759-002	21-Jul-2025 13:00	EAPB1303	✓	✓	✓	✓	✓
EP2511759-003	21-Jul-2025 13:30	EAPB1300	✓	✓	✓	✓	✓
EP2511759-004	22-Jul-2025 12:00	EAPB1302	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✓ = Within holding time.

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received Date	Samples Received Evaluation	Instructions Received Date	Instructions Received Evaluation
EK061G: Total Kjeldahl Nitrogen as N By Discrete Analyser							
EAPB1300	Clear Plastic Bottle - Natural	22-Jul-2025	19-Aug-2025	23-Jul-2025	✘	----	----
EAPB1303	Clear Plastic Bottle - Natural	22-Jul-2025	19-Aug-2025	23-Jul-2025	✘	----	----
HRPB002	Clear Plastic Bottle - Natural	22-Jul-2025	19-Aug-2025	23-Jul-2025	✘	----	----

Requested Deliverables

CONSULT

- *AU Certificate of Analysis - NATA (COA)	Email	consult@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	consult@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	consult@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	consult@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	consult@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	consult@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	consult@rockwater.com.au

DANAE RONEY

- *AU Certificate of Analysis - NATA (COA)	Email	droney@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	droney@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	droney@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	droney@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	droney@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	droney@rockwater.com.au
- EDI Format - ENVIROSYS (ENVIROSYS)	Email	droney@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	droney@rockwater.com.au

Peter Khor

- *AU Certificate of Analysis - NATA (COA)	Email	pkhor@rockwater.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	pkhor@rockwater.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	pkhor@rockwater.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	pkhor@rockwater.com.au
- A4 - AU Tax Invoice (INV)	Email	pkhor@rockwater.com.au
- Chain of Custody (CoC) (COC)	Email	pkhor@rockwater.com.au
- EDI Format - ENVIROSYS (ENVIROSYS)	Email	pkhor@rockwater.com.au
- EDI Format - XTab (XTAB)	Email	pkhor@rockwater.com.au

ROCKWATER Pty Ltd

CONSULTANT HYDROGEOLOGISTS

1st Floor, 76 Jersey Street, Jolimont WA 6014
PO Box 201, Wembley WA 6913
consult@rockwater.com.au
Tel (08) 9284 0222 Fax (08) 9284 1785
A.C.N. 008 804 653

CHAIN OF CUSTODY AND ANALYSIS REQUEST

CLIENT:	Hancock RDG	**CLIENT No.:**	180-1	**ALS (Australian Lab. Services)**
PROJECT NAME:	Round Hill Groundwater Supply Investigation	**COLLECTOR'S NAME:**	Steven Ossim	**26 Rigali Way, Wangara WA 6065**
PROJECT MANAGER:	Peter Khor	**ORDER/QUOTE No.:**	EP23ROCWAT0002	**Ph: 9406 1301**
LABORATORY JOB No.:		(use EP23ROCWAT0002-V3 if 1 of 3 normal suites* is analysed)		

General Sample Information							Preservation Method			Analyses Required							Additional Notes/Comments
Sample I.D.	Lab. No.	Sample Date	Sample Time	Field EC µS/cm	Field pH	No. of Containers	Ice	Acidified	Other (name)	Major Components Analysis*	Comprehensive Analysis*	Environmental Disposal*	As per Custom Suite - see attached				
HRPB002	1	21.7.25	1230	640	7.81	3	X						X				Results to be in EnviroSys format
GAPB1303	2	21.7.25	1300	581	7.74	3	X						X				Results to be in EnviroSys format
GAPB1300	3	21.7.25	1330	614	7.89	3	X						X				Results to be in EnviroSys format
GAPB1302	4	22.7.25	1200	690	8.31	3	X						X				Results to be in EnviroSys format

Environmental Division
Perth
Work Order Reference
EP2511759

Telephone : +61-8-9406 1301

Please direct ***ALL*** *correspondance and queries to* ***Project Manager & Default***

Relinquished by: Date/Time:	Received by: Brian Currey Date/Time: 23/7 @ 1310	Comments:
Relinquished by: Date/Time:	Received by: Date/Time:	Comments:

Table 3: Groundwater Sample Analysis Suite

Dissolved parameter (mg/L)	Required LORs (mg/L)
pH	-
EC (µS/cm)	-
TDS (evap)	1
Major cations: Ca, K, Mg, Na	0.1
Major anions: Cl, F, NO_3 as N, NO_2 as N, NO_3 + NO_2 as N, PO_4 as P, SO_4, Alkalinity (HCO_3 as $CaCO_3$, CO_3 as $CaCO_3$, Tot Alk as $CaCO_3$)	0.1
Dissolved Metals	
Ag	0.00005
Al	0.055
As	0.001
B	0.1
Ba	0.001
Be	0.0001
Bi	0.000 5
Cd	0.000 1
Co	0.001
Tot Cr	0.001
Cr VI	0.001
Cu	0.001
Fe	0.1
Hg	0.000 6
La	0.00001
Mn	0.1
Mo	0.01
Ni	0.001
Pb	0.001
Si	0.1
Sb	0.005
Se	0.01
Sn	0.001
Th	0.001
Thallium	0.00001
U	0.0005
V	0.005
Zn	0.005