

APPENDIX 7: LEVEL 1 SUBTERRANEAN FAUNA SURVEY OF THE GRUYERE GOLD PROJECT (MBS 2015)

GRUYERE PROJECT LEVEL 1 SUBTERRANEAN FAUNA SURVEY

PREPARED FOR:

GOLD ROAD RESOURCES LIMITED



AUGUST 2015

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GRUYERE PROJECT LEVEL 1 SUBTERRANEAN FAUNA SURVEY

Distribution List:

Company	Contact name	Copies	Date
Gold Road Resources Limited	Glenn Firth, Environment and Approvals Manager	[01]	11/08/2015

Document Control for Job Number: GRGFSS

Document Status	Prepared by	Authorised by	Date
Draft Report (Stygofauna Results)	Talia Warda	Lance Bosch	17/07/2015
Final Draft Report	Talia Warda	Lance Bosch	11/08/2015
Final Report	Talia Warda	Lance Bosch	11/08/2015

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EXECUTIVE SUMMARY

MBS Environmental (MBS) was engaged by Gold Road Resources (Gold Road) to identify potential subterranean habitat that may be affected by proposed mining activities at the Gruyere Project. The Gruyere Project is a greenfields gold deposit located within the Yamarna greenstone belt 160 km east of Laverton in Western Australia.

A Scoping Study completed by Gold Road in January 2015 proposes open pit mining with the potential to transition to underground mining operations at depth in the future. The proposed Gruyere Project will comprise an open pit (up to 1.8 km long and 400 m wide), processing plant, tailings storage facility (TSF), waste rock dump/s, Run of Mine (ROM) and ancillary infrastructure.

A Level 1 subterranean fauna survey was undertaken in May 2015 to ascertain the presence of troglifauna and stygofauna within the likely area of impact from the Gruyere Project. Sampling of selected exploration holes and water bores within and outside the Gruyere Project area comprised sieving the water column with nets for stygofauna and scraping and trapping methods for troglifauna. This was undertaken in accordance with Environmental Assessment Guideline 12 (for consideration of subterranean fauna), and Draft Guidance Statement 54a (for sampling of subterranean fauna) (Environmental Protection Authority (EPA) 2013, EPA 2007).

Three stygofauna species were recorded from five of ten sampling sites, demonstrating that stygofauna occur within the aquifer system associated with the Gruyere Project. Stygofauna comprised one species of Tubificida (Class Oligochaete), one species of Syncarida and one species of Copepod. The Syncarida and Copepoda are new undescribed crustacean species based on morphological differences.

The recording of the Syncarida species at two locations 2.5 km apart (one of which is outside the expected zone of dewatering drawdown) would indicate their wider distribution (and that of other stygofauna species), through hydraulic connection within the aquifer system.

No troglifauna were recorded from six sampling sites, comprising a total of six scrape and seven traps samples. The geology of the Gruyere Project area and immediate surrounds above the water table comprises of lithologies that do not typically provide subterranean habitat suited to troglifauna which is substantiated by the nil recordings.

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	OBJECTIVES	3
3.	EXISTING ENVIRONMENT	4
3.1	CLIMATE	4
3.2	GEOLOGY	4
3.2.1	Regional Geology	4
3.2.2	Project Geology	5
3.3	HYDROGEOLOGY	7
4.	METHODOLOGY	8
4.1	DESKTOP STUDY	8
4.1.1	Database Searches	8
4.1.2	Review of Existing Literature and Survey Results	8
4.1.3	Subterranean Habitat Assessment	8
4.2	SUBTERRANEAN FAUNA FIELD SURVEY	9
4.2.1	Stygofauna Survey	9
4.2.2	Troglofauna Survey	11
4.2.3	Taxonomy and Identification	14
5.	RESULTS	15
5.1	DESKTOP ASSESSMENT	15
5.1.1	Database Search Results	15
5.1.2	Subterranean Fauna Habitat Assessment	15
5.2	SAMPLING SURVEY RESULTS	15
5.2.1	Stygofauna	15
5.2.2	Troglofauna	18
5.3	WATER LEVEL AND GROUNDWATER QUALITY	18
6.	DISCUSSION	19
6.1	STYGOFAUNA	19
6.1.1	Stygofauna Presence	19
6.1.2	Potential Impacts	19
6.2	TROGLOFAUNA	20
7.	REFERENCES	21

TABLES

Table 1:	Stygofauna Sampling Sites	10
Table 2:	Troglofauna Sampling Sites	12
Table 3:	Stygofauna Results at Gruyere Project	16
Table 4:	Groundwater Quality of Stygofauna Sampling Sites	18

FIGURES

Figure 1:	Location Plan.....	2
Figure 2:	Geological Map.....	6
Figure 3:	Subterranean Fauna Sampling Locations	13
Figure 4:	Stygofauna Sampling Results for the Gruyere Project	17

PLATES

Plate 1:	Stygofauna Species.....	16
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CHARTS

Chart 1:	Monthly Mean Rainfall and Evaporation at Yamarna (1967-98) (BoM 2015)	4
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APPENDICES

Appendix 1:	Identification Results
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1. INTRODUCTION

The Gruyere Project is located within the Yamarna greenstone belt 160 km east of Laverton in Western Australia (Figure 1). A Scoping Study completed by Gold Road Resources Limited (Gold Road) in January 2015 proposes open pit mining with the potential to transition to underground mining operations at depth in the future.

The proposed Gruyere Project will comprise an open pit (up to 1.8 km long and 400 m wide), processing plant, tailings storage facility (TSF), waste rock dump/s, Run of Mine (ROM) Pad and ancillary infrastructure. Water is proposed to be supplied from existing and additional bores in the Yeo Palaeodrainage 25 km southwest of Gruyere. The water supply area does not form part of this study.

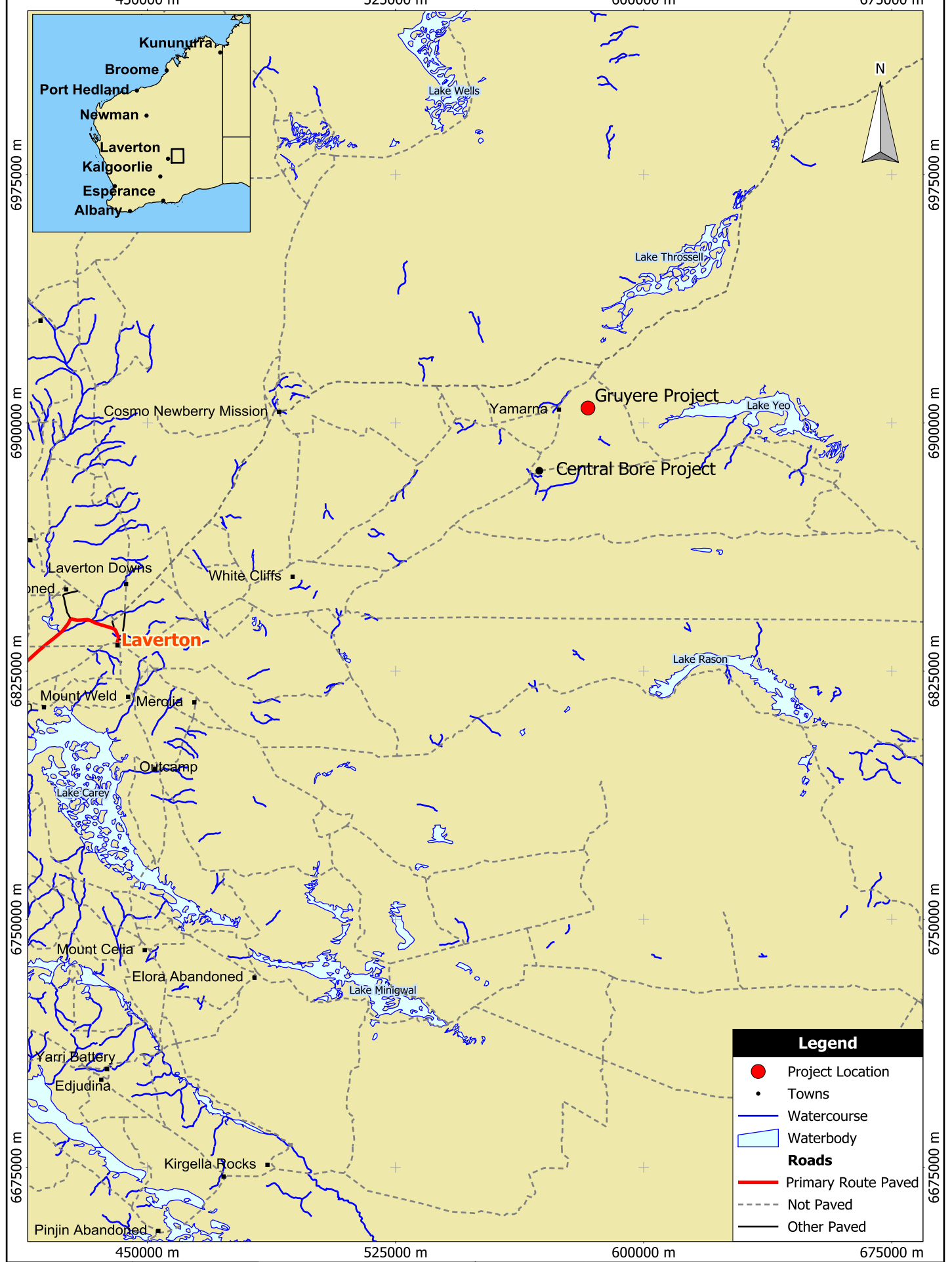
The mining operations have potential to impact on subterranean habitats (should they exist within the orebody and surrounding host rock formations), which may host troglofauna (above the water table) or stygofauna (below the water table) within local aquifers as follows:

- Excavation of the pit may permanently remove subterranean habitats supporting troglofauna and stygofauna.
- Dewatering to allow dry mining conditions may temporarily or permanently impact stygofauna within the zone of dewatering drawdown adjacent to the pit.
- Construction of TSF, waste rock dumps and ROM over large surface areas which, at closure become permanent altered landforms, may permanently impact on troglofauna.
- Any seepage from the TSF, waste rock dumps and ROM into the underlying aquifers may adversely affect water quality with the potential to impact stygofauna.
- At closure, changes in water quality within the pit lake may adversely affect groundwater within the adjoining aquifers with the potential to impact stygofauna.

The geology of the Gruyere Project area and immediate surrounds does not comprise calcretes, karstic or vuggy conditions that may typically provide subterranean habitat above the water table suited to troglofauna. Although the underlying geology still has the potential to provide some troglofauna habitat, the presence of any related troglofauna may not necessarily be significant as these habitats are likely to be widespread and not confined or unique to the Gruyere Project area.

Based on the occurrence and quality of groundwater within the aquifer/s of the Gruyere orebody and host rock it is anticipated that there is potential habitat to support stygofauna.

Other than subterranean fauna surveys undertaken for the Central Bore Project (for the proposed borefield and underground operations) located 25 km southwest of the Gruyere Project area, no subterranean fauna surveys have been undertaken within the potential areas of impact at the Gruyere Project.



Legend	
●	Project Location
•	Towns
—	Watercourse
	Waterbody
Roads	
—	Primary Route Paved
- - - -	Not Paved
	Other Paved

Scale: 1:1500000
 Original Size: A4
 Grid: Australia MGA94 (51)

0 40 km

Gold Road Resources Limited
 Gruyere Project

Figure 1

Location Plan

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2. OBJECTIVES

MBS Environmental was engaged to undertake a Level 1 Subterranean Fauna Survey of the Gruyere Project area. The objectives of the survey were to:

- Undertake a desktop review of information relating to the geology and hydrogeology and assess the likely presence of stygofauna and troglafauna habitat within and near the areas of potential impact at the Gruyere Project.
- Where suitable habitat was identified, undertake sampling to determine the presence of stygofauna and troglafauna species and likely distribution.
- Prepare a report discussing the presence (or absence) of stygofauna and troglafauna in the context of potential impacts associated with the proposed operations.

3. EXISTING ENVIRONMENT

3.1 CLIMATE

The Great Victoria Desert is characterised by an arid climate, with hot summers and cool winters. Summer maximum temperatures average about 35°C, while winter minimum temperatures are around 5°C. Rainfall is related both to locally generated thunderstorms and to dissipating tropical cyclones tracking southeast. Thunderstorm activity tends to be greatest between October and December when cool airflows from the south wedges beneath humid northwesterly winds. Cyclonic activity is greatest between January and May, reflecting the tropical wet season in the north of the state.

Average annual rainfall in the Yamarna region is 200 to 230 mm. The two mechanisms of rainfall generation in opposing seasons lead to a more evenly distributed annual rainfall distribution than in most of the state. Rainfall is highest in the cyclone season (Chart 1). While relatively evenly distributed, rainfall is very infrequent with only about 30 rain days per year. Most of the annual rainfall is often received in one or two significant events and many years have close to zero rainfall. Monthly evaporation data is available from the Bureau of Meteorology (BoM) for Yamarna and is shown in Chart 1. Yamarna operated as a weather station from 1967 to 1998, the nearest presently operating weather station is now at Laverton 160 km to the west.

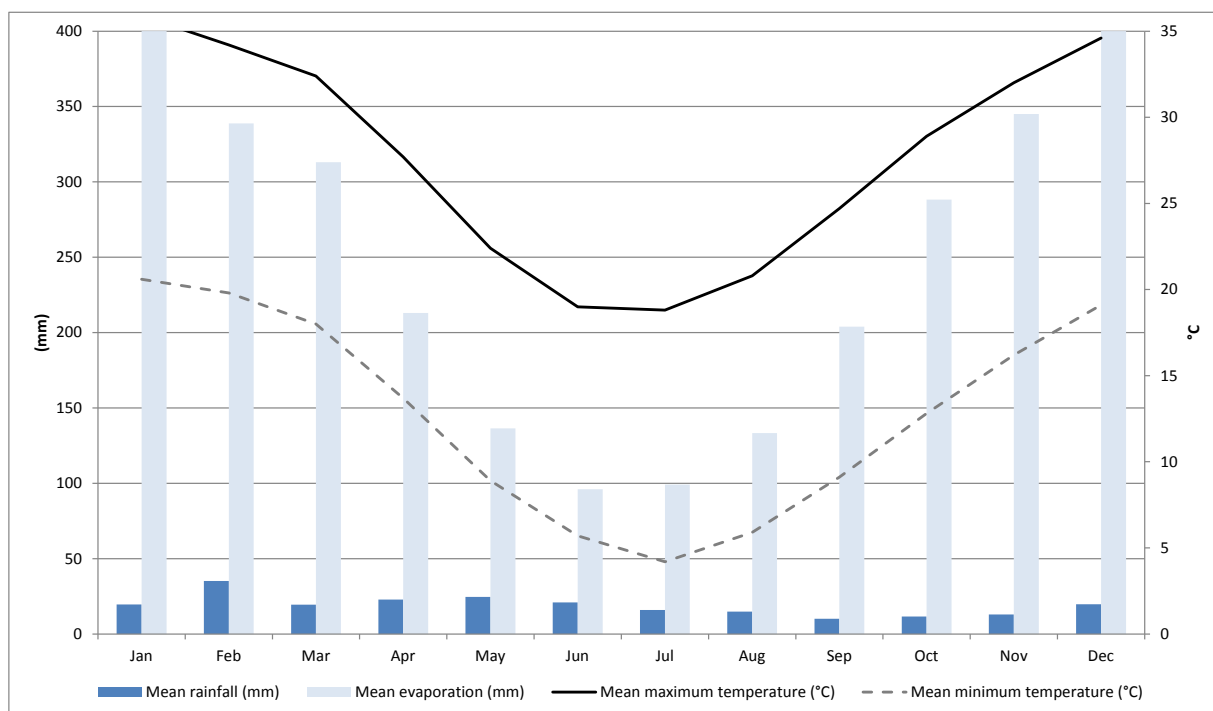


Chart 1: Monthly Mean Rainfall and Evaporation at Yamarna (1967-98) (BoM 2015)

3.2 GEOLOGY

3.2.1 Regional Geology

The Yamarna and Dorothy Hills greenstone belt forms part of the eastern-most geological province (Yamarna Terrane) of the Yilgarn Craton of Western Australia. The Yamarna and Dorothy Hills greenstone belts are aligned in a north-north westerly orientation adjacent to the 500 km long Yamarna shear zone which is considered the western boundary of the Yamarna Terrane from the Burtville Terrane to the west. The Yamarna belt felsic

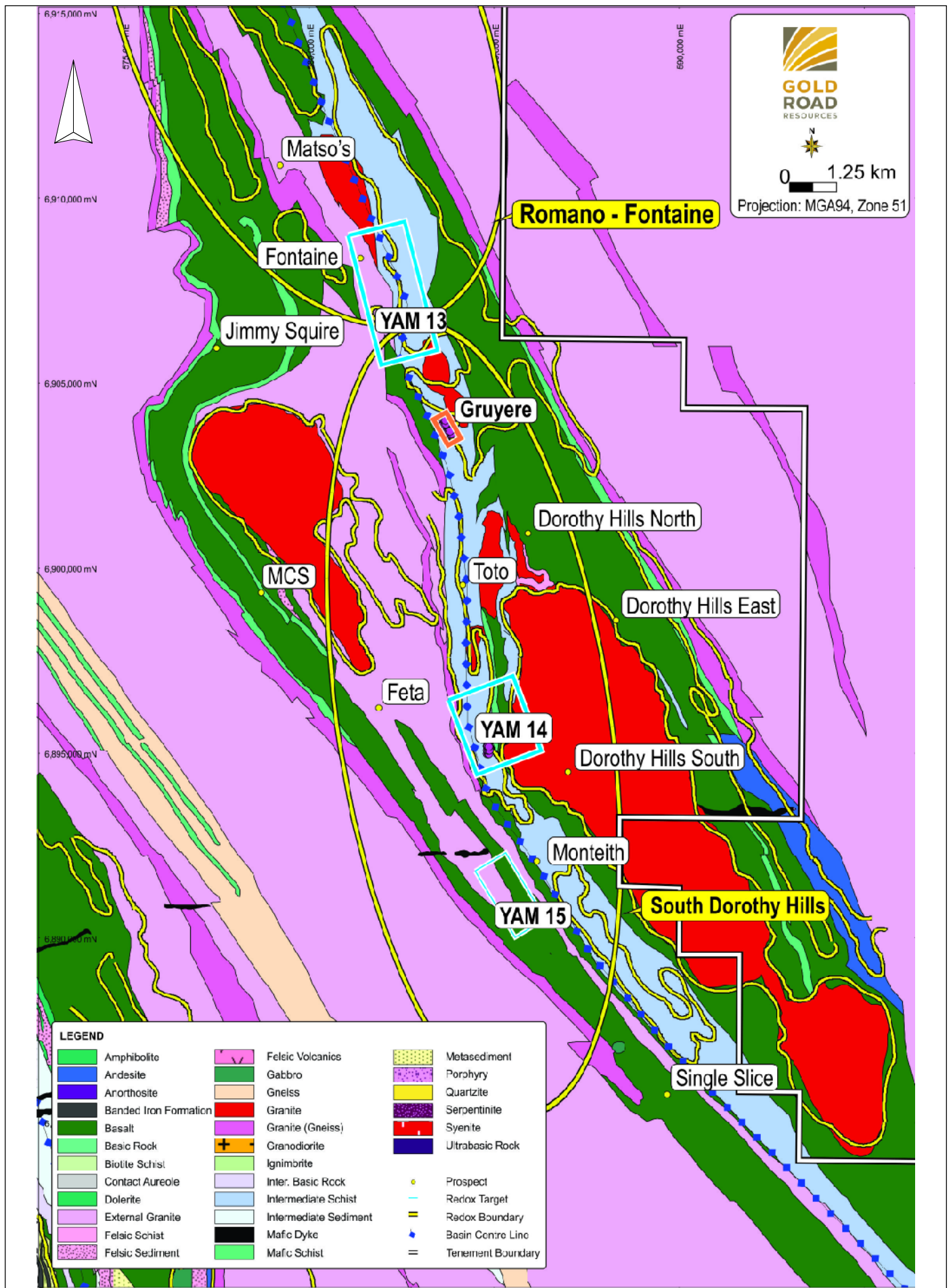
volcanic rocks have been dated as approximately 2,683 million years old (Archean), and is in faulted contact with plutonic igneous rocks of similar age, including quartz diorites, granites and quartz migmatites (Gold Road 2013). The Yamarna shear zone is host to significant gold mineralisation (Gold Road 2013). It is partially covered by Permian age glacial sediments of the Paterson Formation which is thicker at the southern portion of the Yamarna belt. The Yamarna belt is historically underexplored and highly prospective for gold mineralisation as well as other metals. The Gruyere regional geology is shown in Figure 2.

3.2.2 Project Geology

The Gruyere deposit is situated within the Gruyere Intrusive, a tonalitic intrusive dyke approximately 190 m wide and 1,800 m long dipping steeply to the northeast and aligned in a southeasterly to north westerly orientation at the surface (Gold Road 2015). Gold mineralisation is from the surface to at least 485 m deep and is open at depth. A sequence of intermediate volcanic and volcanoclastic rocks define the stratigraphy to the west of the Intrusive and mafic volcanics (basalt) occur to the east of the Intrusive. The Gruyere deposit comprises a coincident structural-geochemical target within a major regional-scale structural corridor associated with the Dorothy Hills Shear Zone. This zone occurs within the Dorothy Hills Greenstone Belt at Yamarna in the eastern part of the Archaean Yilgarn Craton. The Dorothy Hills Greenstone is the most easterly known occurrence of outcropping to sub-cropping greenstone in the Yilgarn province of Western Australia (Gold Road 2015).

Based on exploration drill logs, the area within the vicinity of the Gruyere Project comprises of sandplains and slightly undulating dunes with ground levels varying between 400 and 415 mRL. The surface is underlain almost continuously by a cover of sand averaging 3 m thick and up to 10 m of aeolian sand along ridge lines. Within this Quaternary cover are sporadic occurrences of alluvium, pisolitic and lateritic sands/soils. These soils are typically red sandy earths and deep red sands with some red loamy earths and red-brown hardpan shallow loams.

Underlying this sand cover is a variable sequence of Permian sandstones/conglomerates (up to 30 m depth) and Cainozoic saprolitic clays (up to 50 m depth), which then overlay the Gruyere Intrusive and adjoining volcanic geological units. The overlying Quaternary, Permian and Cainozoic formations appear to be laterally extensive and are not confined or unique to the Gruyere Project area.



Original Size: A4
Data Source: Gold Road Resources

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Figure 2
Regional Geology

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3.3 HYDROGEOLOGY

The hydrogeology of the Gruyere Project area is currently being investigated by hydrogeological consultants Pennington Scott Pty Ltd (Pennington Scott). The description of the hydrogeology has been prepared on the basis of a review of the geological and hydrogeological data from the exploration holes (within the orebody and proposed pit footprint) and consultation with Pennington Scott.

Within the vicinity of the Gruyere orebody the aquifer system generally occurs within the weathered profile (saprolite and saprock) and fractured bedrock. The weathered profile and underlying fractured bedrock can form moderately permeable aquifers, and locally may be highly productive. It is characterised by secondary porosity and permeability through the break-down of the primary rock material. A significant resource of groundwater is stored within the weathered profile, although the unit is not necessarily permeable. In contrast, the fractured rock aquifer contains a very small portion of groundwater relative to its volume, but can have zones of high permeability.

The weathered profile normally extends to depths of around 30 m, but can be up to about 80 m thick in areas of shear zones, lithological contacts and areas of mineralisation. In fractured rock aquifers fractures developed within bedrock below the weathered profile can form permeable aquifer zones. Large yields can be obtained from fault and shear zones through greenstone rocks, along lithological contacts, intrusive contacts, and mineralised zones. The alignment of fracture zones with tectonic elements such as shear zones and particular rock types tend to make the fractured rock aquifer highly anisotropic.

The fractured rock aquifer within the vicinity of the Gruyere Project area comprises the steeply inclined tonalitic intrusive dyke within a major regional-scale structural corridor associated with the Dorothy Hills Shear Zone, which is aligned in a southeasterly to northwesterly orientation.

Geological and hydrogeological data from exploration holes indicates that groundwater was intersected at depths varying between 35 and 100 m (average depth of 65 m) within the sequence of felsic and mafic lithologies. Water flows were, for the most part, minor with less than 15% of the holes intersecting moderate to strong flows. Standing water levels measured in exploration holes range between 30 and 40 m depth.

Nine water samples collected from three exploration drill holes within the vicinity of the Gruyere Project area in December 2013 indicate saline (5-17 mS/cm) and generally neutral (7.5-7.8 pH) groundwater.

The nearest aquifer of significance to the Gruyere Project area is the Yeo Palaeochannel, a calcrete aquifer, investigated and described by Pennington Scott (2012) in the vicinity of the Central Bore project. The Yeo Palaeochannel occurs within the Quaternary Deposits, being approximately 14 m thick, and extending from the western side of Central Bore across and north of the Gruyere orebody, into Lake Throssell and Yeo Lake. The nearest calcrete expression as indicated by the Geological Survey Western Australia 1:100,000 Yamarna is approximately 8 km northeast of the Gruyere Project area. Outside of the Yeo Palaeochannel, generally minor aquifers are present within the weathered profile (saprolite and saprock) and fractured bedrock (Pennington Scott 2012).

The aquifer system associated with the Gruyere orebody is likely to be disconnected and too distant from the Yeo Palaeochannel and associated calcrete aquifer. Consequently the mining and dewatering of the Gruyere orebody is expected to result in a localised drawdown of the water table, which will not impact on the more significant aquifers associated with the Yeo Palaeochannel. These predictions will need to be corroborated by further hydrogeological studies of the Gruyere Project.

4. METHODOLOGY

4.1 DESKTOP STUDY

A desktop study was undertaken as part of the Level 1 Subterranean Fauna Survey. This included review of database searches, existing literature, survey results and assessment of subterranean habitat. The study is described in the following subsections.

4.1.1 Database Searches

The following database searches were conducted for the Gruyere Project area:

- Department of Parks and Wildlife (DPaW) Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC) Database.
- WA Museum database.
- Threatened and Priority Fauna database.
- *Environmental Protection and Biodiversity Conservation Act (EPBC Act)* Protected Matters Database.

All searches include a 20 km buffer around a central coordinate, -27.98669 and 123.85007. DPaW expanded this search to include a 50 km buffer of the central coordinate.

4.1.2 Review of Existing Literature and Survey Results

A desktop review and pilot scale field survey of subterranean fauna (Bennelongia 2013a) and a subterranean fauna assessment (Bennelongia 2013b) were undertaken for Gold Road's Central Bore Project, which is located 25 km southwest of the Gruyere Project. The latter study focussed on two areas, in the vicinity of a proposed underground mine at the Central Bore deposit and within a possible borefield within the calcretes associated with the Yeo Palaeochannel.

No stygofauna were collected from four bores sampled within the prospective Central Bore underground deposits and the study concluded that:

- The aquifers that occur outside of the palaeovalley in the vicinity of the Central Bore deposit are considered to be poor habitat for stygofauna based on the findings of surveys elsewhere in the Yilgarn.
- Aquifers that occur in the vicinity of Central Bore are likely to be relatively well connected over a scale of, at least, tens of kilometres and are likely to be connected habitat from a stygofauna viewpoint.

While, in contrast to the Central Bore aquifers, seven of the eight bores sampled within the calcretes of the Yeo Palaeochannel yielded 26 stygofauna species of which, it was concluded, a high proportion of the 20 undescribed species could be restricted to the calcrete and associated aquifers in which the possible borefield lies.

Stygofauna surveys within saprolite rock at the Duketon Gold Project (approximately 125 km west of Gruyere) revealed an extremely depauperate stygofauna community (Bennelongia 2010c).

4.1.3 Subterranean Habitat Assessment

A habitat assessment for the Gruyere Project area was based on review of existing literature and consultation with Gold Road geologists and groundwater consultants (Pennington Scott) regarding exploration and hydrogeological drilling undertaken within the vicinity of the Gruyere deposit. This assessment included lithology, structural features, water level, water quality, aquifers encountered and presence of voids and vughs within the target geology.

4.2 SUBTERRANEAN FAUNA FIELD SURVEY

The Level 1 Subterranean Fauna Survey was conducted by MBS Environmental between 18 and 22 May 2015. On 21 July 2015, troglofauna traps left in situ by MBS Environmental were subsequently collected by Gold Road personnel and returned to Perth for assessment and specimen identification purposes.

The survey was developed and undertaken in accordance with the methodology contained in the Environmental Protection Authority's (EPA) Environmental Assessment Guideline 12 *Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia* (EPA 2013) and Draft Guidance Statement 54a *Sampling Methods for Survey Considerations for Subterranean Fauna in Western Australia* (EPA 2007). Subterranean fauna sampling was undertaken in accordance with DPaW Licence to Take Fauna for Scientific Purposes Number SF010300 issued to MBS Environmental.

4.2.1 Stygofauna Survey

4.2.1.1 Sampling Sites

Sampling sites, comprising RC exploration holes (140 mm diameter) and water bores (140 mm diameter), were selected on the basis of their location within the pit, vertical alignment (dip varying between 60 and 90°) and suitable physical condition for sampling. The sampling sites (within the pit area) are anticipated to have intersected the aquifers associated with the Gruyere orebody.

A total of nine sites were sampled for stygofauna. Seven sampling sites were located within the anticipated zone of impact and two sites were located outside of the potential zone of impact to provide a regional context. Details of sampling sites, inclusive of standing water levels, sampling depths and inferred aquifers are provided Table 1. The locations of the sampling sites are shown in Figure 3.

Table 1: Stygofauna Sampling Sites

Hole ID	Northing	Easting	Hole Depth (m)	Dip (°)	Inferred Aquifer	Depth to Water Table (m) #	Pit Area	Sampling Method	Comments
14GYRC0026	584014.16	6902696.81	415	-61.71	Saprock/Saprolite & Fractured Rock	30.3	No	Sieving	800 m south of pit, blocked at 100 m.
14GYRC0007	583839.64	6903592.62	414	-62.86	Saprock/Saprolite & Fractured Rock	41.5	Yes	Sieving	Blocked at 114 m depth.
14GYRC0130	583773.87	6903668.12	413	-80	Saprock/Saprolite & Fractured Rock	33.77	Yes	Sieving	Nil.
14GYRC0133	583548.83	6904018.36	409	-69.3	Saprock/Saprolite & Fractured Rock	32.57	Yes	Sieving	Nil.
14GYWB0001	583659.68	6904010.23	409	-90	Saprock/Saprolite & Fractured Rock	-	Yes	Sieving	Fitted with pump and tank.
14GYWB0002	583352.72	6904292.41	407	-90	Saprock/Saprolite & Fractured Rock	29.2	Yes	Sieving	Nil.
14GYWB0003	583300.77	6904606.83	406	-90	Saprock/Saprolite & Fractured Rock	29.32	Yes	Sieving	Nil.
14GYWB0004	583286.13	6904921.4	403	-90	Saprock/Saprolite & Fractured Rock	-	Yes	Pumping	Fitted with pump.
9EYRB0259 (Ziggy's Bore)	586664.45	6898600.08	35	-	Unknown	-	No	Pumping	Windmill with storage tank. Approx. 7 km south east of pit.

= Water levels could not be recorded at three bores.

4.2.1.2 Sampling Method

Each site was sampled using custom-made stygofauna nets. The net design and sampling procedure was based upon Draft Guidance Statement 54a *Sampling Methods for Survey Considerations for Subterranean Fauna in Western Australia* (EPA 2007).

Sieving of the Water Column

The water column within the holes and bores (where accessible) was sieved a total of six times to depths of 100 m at each site with alternating use of a 50 µm and 150 µm mesh net.

For one of the bores, sieving of the water column or pumping was not possible as a water pump and tank had been installed and was operational at the time of the survey. A 50 µm net was allowed to sink to the base of the tank and then jerked up and down four times to stir up the bottom contents of the tank. The net was then pulled out of the tank.

The samples were then washed into a collection vial and kept on ice until they could be transferred to a minimum of 98% ethanol solution.

Pumping

In two bores, sieving of the water column was not possible as a water pump had been installed and was operational at the time of the survey. A different method, the pumping method of sampling, was therefore applied.

A 50 µm net was placed over the bore pump outlet for approximately 20 minutes, such that more than 100 L of water passed through the net. The content in the net was then washed into a collection vial and kept on ice.

Water Quality

Water was collected for onsite water quality measurement from all holes sampled for stygofauna using either a 1 L bailer or taken directly from the bore pump outlet at the two bores fitted with pumping equipment.

No water samples were taken for external laboratory analysis.

4.2.2 Troglifauna Survey

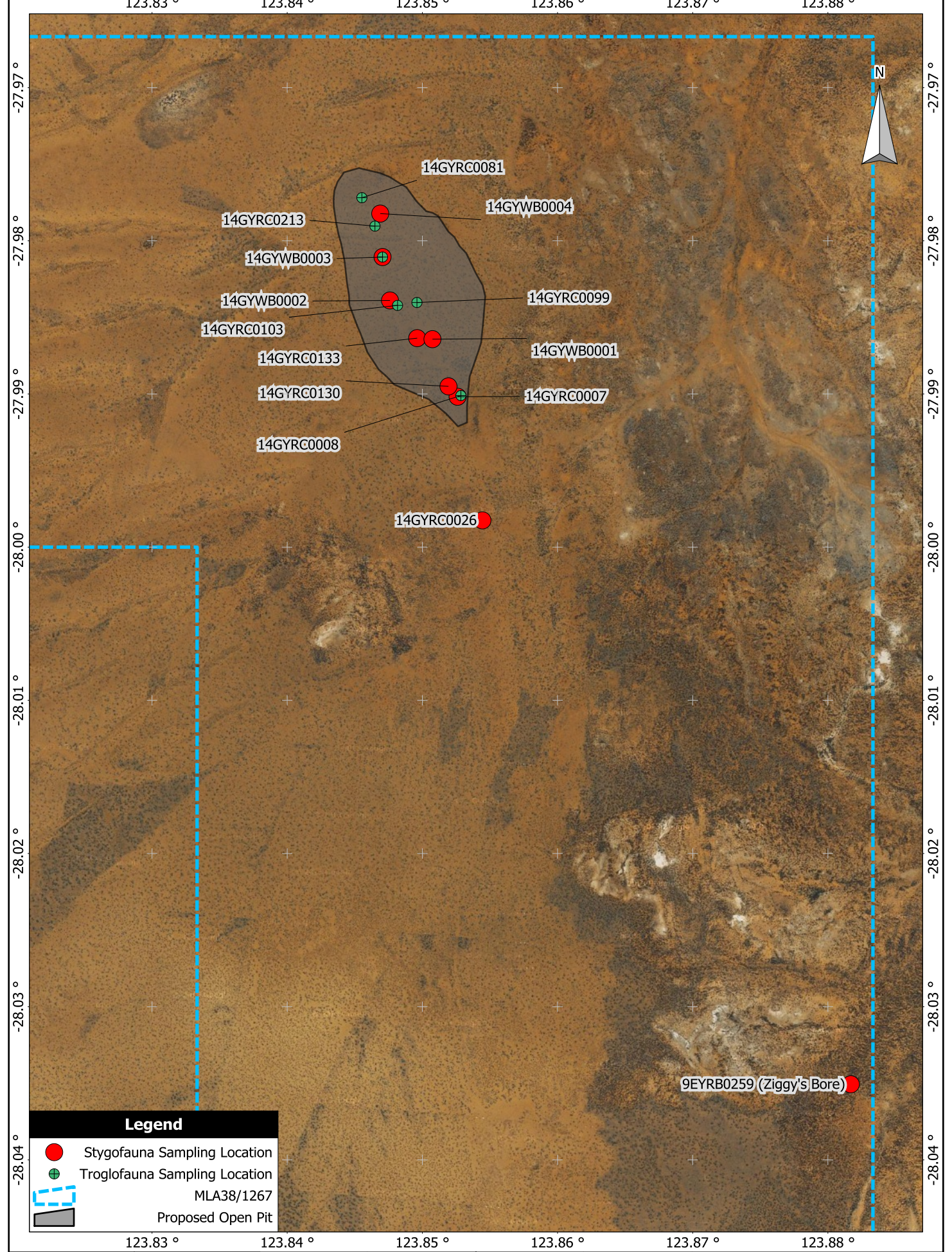
4.2.2.1 Sampling Sites

Sampling sites, comprising RC exploration holes (140 mm diameter) and water bores (140 mm diameter), were selected on the basis of their location within the pit and, vertical alignment (dip varying between 60 and 90°) and suitable physical condition for sampling. These sampling sites are anticipated to be representative of the lithological units underlying the pit footprint and above the standing water table within the holes sampled.

A total of six sites were sampled for troglifauna, comprising scraping the side walls of each hole/bore and installing a total of eight traps of which two of the sites had an additional trap (one shallow and one deep). Details of sampling sites, inclusive of standing water levels, sampling depths and lithological profiles are provided Table 2. The locations of the sampling sites are shown in Figure 3.

Table 2: Troglifauna Sampling Sites

Bore ID	Northing	Easting	NAT_RL (m)	Dip (°)	Standing Water Level (mBGL)	Pit Area	Sampling Method	Depth Range (m)	Geological Profile Encountered within Sample Zone#
14GYRC008	583863.61	6903600.85	415.528	-62.08	41.5	Yes	Scraping side walls Traps (x2)	0 - 41.5	<ul style="list-style-type: none"> • Sand (Aeolian) • Sandstone/Conglomerate • Claystone/Siltstone • Basalt
14GYRC0081	583153.34	6905037.20	403.27	-61.15	29.1	Yes	Scraping side walls Traps (x2)	0 - 29.1	<ul style="list-style-type: none"> • Sand (Aeolian) • Sandstone/Conglomerate • Saprolite Clay
14GYRC0099	583548.71	6904276.25	409.493	-60	28	Yes	Scraping side walls Trap (x1)	0 - 28	<ul style="list-style-type: none"> • Sand (Aeolian) • Sandstone/Conglomerate • Basic rock
14GYRC0103	583407.53	6904256.26	408.19	-60.2	30.1	Yes	Scraping side walls Trap (x1)	0 - 30.1	<ul style="list-style-type: none"> • Alluvium • Sand • Saprolite Clay
14GYRC0213	583247	6904831	405.58		30.35	Yes	Scraping side walls Trap (x1)	0 - 30.35	Not available
14GYWB003	583300.77	6904606.8	406.645	-90	29.32	Yes	Scraping side walls Trap (x1)	0 - 29.32	<ul style="list-style-type: none"> • Sand (Aeolian) • Sandstone/Conglomerate • Saprolite Clay • Tonalite



Scale: 1:40000
 Original Size: A4
 Air Photo Source: Google Earth
 Grid: Mercator
 0 1 km

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Figure 3
**Subterranean Fauna
 Sampling Locations**

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4.2.2.2 *Sampling Method*

Each site was sampled using custom-made troglofauna scraping nets and traps. The net design and sampling procedure was based upon Draft Guidance Statement 54a *Sampling Methods for Survey Considerations for Subterranean Fauna in Western Australia* (EPA 2007).

Scraping

The bore hole was scraped a total of four times at each site during the sampling round with use of a 150 µm mesh troglofauna net. The sample was then washed into a collection vial and kept on ice until they could be transferred to a minimum of 98% ethanol solution.

Trapping

Each trap was filled with decomposed leaf litter collected from the project area. At each bore the trap was secured onto a rope and slowly lowered into each bore to approximately 2 m above the water table (deep trap) while two of the sites had a second (shallower) trap installed. The rope was secured on the ground and the bore capped. The traps were left undisturbed for a period of eight weeks prior to retrieval by Gold Road personnel. The traps were retrieved by slowly pulling the trap out of the bore before placing into a label zip-locked bag and kept on ice to enable live specimen identification.

One of the deep traps (in 14GYRC0081) was lost during retrieval while the remaining seven traps were successfully retrieved.

4.2.3 **Taxonomy and Identification**

On completion of the survey, all samples were transported to Perth for sorting and taxonomic identification by Bennelongia Pty Ltd.

5. RESULTS

5.1 DESKTOP ASSESSMENT

5.1.1 Database Search Results

No TECs or PECs pertinent to the subterranean environment were identified by the DPaW TEC and PEC database search nor any species listed within the EPBC Act Protected Matters Database Search Tool. Similarly no subterranean fauna records were held within the DPaW Threatened and Priority Fauna database or WA Museum database for the search areas provided.

5.1.2 Subterranean Fauna Habitat Assessment

The geology of Gruyere Project area and immediate surrounds does not comprise calcretes, karstic or vuggy conditions, which may typically provide subterranean habitat above the water table suited to troglofauna. Although the underlying geology still has the potential to provide some troglofauna habitat, the presence of any related troglofauna is not necessarily significant as these habitats would be expected to be widespread and not confined or unique to the Gruyere Project area.

Based on the occurrence of and quality of groundwater within the aquifer/s of the Gruyere orebody and host rock, it is anticipated that there is potential habitat to support stygofauna which may be impacted by the proposed dewatering operations.

5.2 SAMPLING SURVEY RESULTS

5.2.1 Stygofauna

In addition to the nine stygofauna sampling sites surveyed another site (14GYRC0213) which was scraped for troglofauna collected 2 stygofauna specimens as by-catch. Three stygofauna species were recorded from five of the ten holes sampled during the Level 1 Subterranean Fauna Survey. A detailed listing of results is provided in Appendix 1 and summarised in Table 3 with the locations of stygofauna recorded during this survey shown in Figure 4.

In summary:

- One species of Tubificida (*Enchytraeidae* sp) was recorded in 14GYWB002 and 14GYWB003. The specimens were immature and only identified to the family level.
- One new species of Syncarida (*nr Atopobathynella* sp. B19) was recorded in 14GYRC0026 and 14GYRC0213.
- One new Copepoda species, (*Parastenocaris* sp. B30), was recorded from 14GYRC0130.

A photograph of each of these species is provided in Plate 1.

Table 3: Stygofauna Results at Gruyere Project

Bore ID	Sample Date	Stygofauna (Count)		
		Crustacea		Oligochaeta
		Copepod	Syncarid	Tubificida
		(<i>Parastenocaris</i> sp. B30)	(nr <i>Atopobathynella</i> sp. B19)	(<i>Enchytraeidae</i> sp)
14GYWB0001	20-May-15	-	-	-
14GYWB002	20-May-15	-	-	2
14GYWB003	19-May-15	-	-	20
14GYWB0004	20-May-15	-	-	-
14GYRC0007	20-May-15	-	-	-
14GYRC0026	20-May-15	-	98	-
14GYRC0130	19-May-15	5	-	-
14GYRC0133	19-May-15	-	-	-
14GYRC0213 #	21-May-15	-	2	-
9EYRB0259 (Ziggy's Bore)	20-May-15	-	-	-

Collected as by-catch while scraping for troglofauna

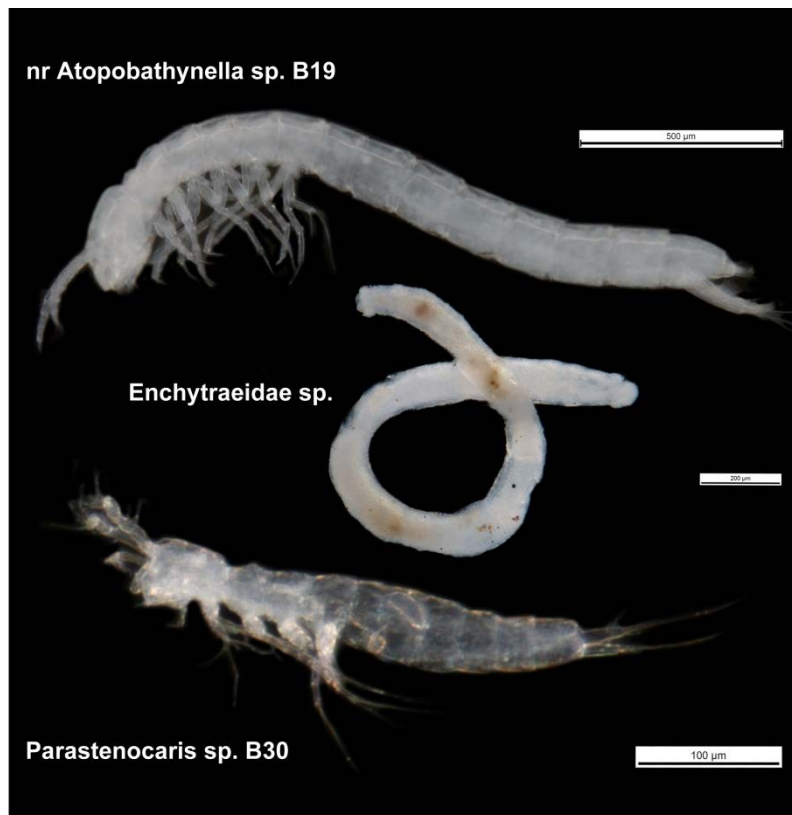
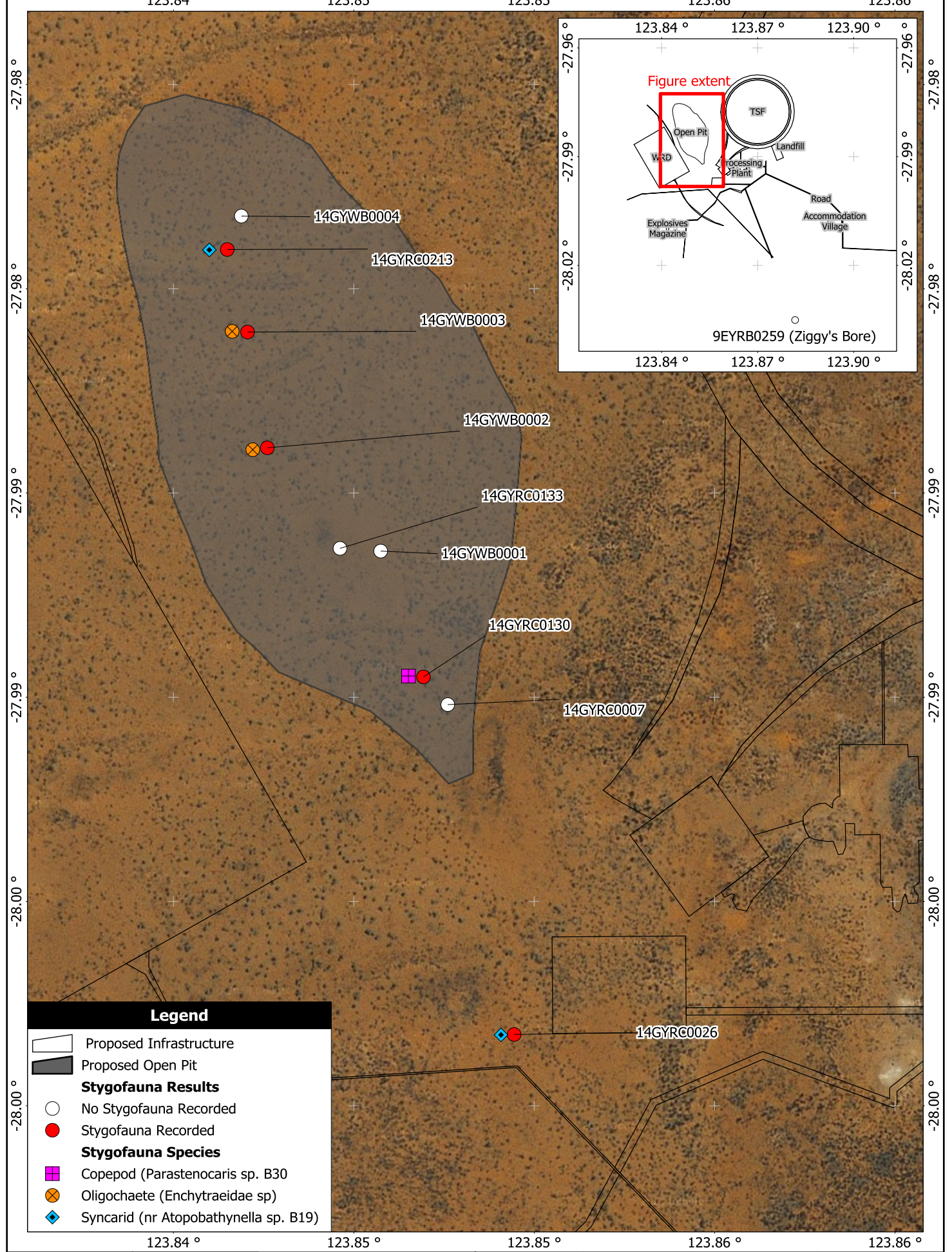


Plate 1: Stygofauna Species



Legend

- Proposed Infrastructure
- Proposed Open Pit
- Stygofauna Results**
- No Stygofauna Recorded
- Stygofauna Recorded
- Stygofauna Species**
- Copepod (*Parastenocaris* sp. B30)
- Oligochaete (*Enchytraeidae* sp)
- Syncarid (nr *Atopobathynella* sp. B19)

Scale: 1:15000
 Original Size: A4
 Air Photo: Google Earth Image
 Grid: Mercator

0 >200 m

Gold Road Resources Limited
 Gruyere Project
 Subterranean Fauna
 Survey Report

Figure 4

**Stygofauna Results
 at Gruyere Project**

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5.2.2 Troglifauna

No troglifauna species were recorded from the six holes sampled during the Level 1 Subterranean Fauna Survey which comprised of six scraped samples and seven retrieved trap samples.

The nil recordings for troglifauna require no further description.

5.3 WATER LEVEL AND GROUNDWATER QUALITY

During stygofauna sampling, water was collected either by bailing open exploration holes to depths of up to 100 m or where a bore was fitted with a pump from the outflow point of tanks and pumps. Groundwater quality analysis of all samples was undertaken in the field and is presented in Table 4.

Table 4: Groundwater Quality of Stygofauna Sampling Sites

Bore ID	Date	Temp (°C)	DO (%Sat)	pH	TDS (mg/L)	EC (mS/cm)
Likely Within the Dewatering Zone of Impact						
14GYRC0007	20-May-15	23.4	47.3	7.36	2,015	3.10
14GYRC0130	19-May-15	25.4	66.5	7.27	2,411	3.71
14GYRC0133	19-May-15	24.2	45.1	7.23	2,795	4.31
14GYWB0001	20-May-15	-	-	-	-	-
14GYWB0002	20-May-15	24.6	51.2	7.22	5,928	9.13
14GYWB0003	19-May-15	22.6	48.1	7.15	5,603	8.62
14GYWB0004	20-May-15	22.4	0.8	6.88	13,956	21.4
Potentially Outside of the Dewatering Zone of Impact						
14GYRC0026	20-May-15	22.1	36.3	7.52	2,002	3.08
9EYRB0259	20-May-15	15.3	67.0	7.97	1,722	2.65

Temperature is measured in °C

DO = dissolved oxygen is measured as a percentage of oxygen present in the water (percentage saturation)

TDS = total dissolved solids

EC = electrical conductivity

mS/cm = milliSiemens per centimetre

6. DISCUSSION

6.1 STYGOFAUNA

6.1.1 Stygofauna Presence

Three stygofauna species were recorded from five of ten sampling sites, demonstrating that stygofauna occur within the aquifer system associated with the Gruyere Project. Stygofauna comprised one species of Tubificida (Class Oligochaete), one species of Syncarida and one species of Copepod. The Syncarida and Copepoda are new undescribed crustacean species based on morphological differences.

The tubificida worm (*Enchytraeidae* sp.) was collected from two locations (14GYWB002 and 14GYWB003) within the pit footprint. These specimens were immature and were only identified to the family level. Enchytraeidae are regarded as being widespread having been recorded in the Pilbara and South Coast bioregions (Subterranean Ecology Pty Ltd 2010; Rockwater Pty Ltd 2006) as well as 20 km northwest of Laverton at the Windarra Nickel Project (MBS Environmental, 2011) and within the Northern Goldfields at Gidjee (MBS Environmental, 2013).

The new species of Syncarida (nr *Atopobathynella* sp. B19) was collected in two locations (14GYRC0026 and 14GYRC0213). The two sampling holes are located up to 2.5 km apart and hole ID 14GYRC0026 is approximately 800 m south and outside of the proposed pit footprint. The recording of this species at these locations would indicate their wider distribution, through hydraulic connection within the aquifer system.

The new Copepoda species (*Parastenocaris* sp. B30) was collected from 14GYRC0130. The *Parastenocaris* sp. is a widespread species known from a number of locations across Western Australia including West Kimberley, East Kimberley, Pilbara and Murchison and Northeastern Goldfields as well as 20 km northwest of Laverton at the Windarra Nickel Project (MBS Environmental, 2011) The recording of this species at the southern extremity of the pit footprint between the two recorded locations of the Syncarida species would indicate that the Copepoda species is likely to be more widely distributed through hydraulic connection within the aquifer system.

The recording of Syncarida (nr *Atopobathynella* sp. B19) at two locations 2.5 km apart (one of which is outside the expected zone of dewatering drawdown) would indicate their wider distribution (and that of other stygofauna species), through hydraulic connection within the aquifer system.

The low number of species recorded during this Level 1 stygofauna survey should not necessarily be construed as representing low stygofauna diversity, but rather representative of a subset of the potential stygofauna population that may exist within the aquifer system of the Gruyere Project area.

Stygofauna which were recorded within the Yeo Palaeochannel 25 km west of the Gruyere Project comprised of a species rich copepod-dominated community, which is generally typical of surveys in the Yilgarn calcretes (Bennelongia 2013b). None of these stygofauna species were recorded at the Gruyere Project. This is not unexpected as the hydrogeology of the Gruyere orebody is likely to be disconnected and too distant from the Yeo Palaeochannel and associated calcrete aquifer.

6.1.2 Potential Impacts

Impacts on stygofauna may occur from permanent loss of habitat through excavation of the pit and temporary loss of habitat as a result of dewatering activities.

Initial hydrogeological assessment of the Gruyere aquifer system indicates that:

- A steep cone of depression is expected to form as a result of dewatering with the effects of drawdown limited to distances of less than 800 m outside of the pit footprint.
- The aquifer system extends several kilometres along strike northwest and southeast of the pit footprint and outside of the expected influence of dewatering drawdown.
- The Gruyere aquifer system is not in hydrogeological connection with the more distant, shallow calcretes which comprise the Yeo Palaeochannel.

On the basis of the Level 1 stygofauna sampling results and proposed mining and dewatering operations, it can be concluded that:

- There will be permanent loss of stygofaunal habitat from excavation of the pit.
- Dewatering of the pit and any future underground mine will result in the temporary loss of stygofaunal habitat within the immediate vicinity of the pit/underground footprint.
- The aquifer system will provide stygofaunal habitat outside the zone of dewatering impact and during mining operations.
- Following cessation of mining and dewatering operations at the Gruyere Project, it is anticipated that the recovery of water levels will result in a pit lake and return of stygofaunal habitat within the previously dewatered adjoining aquifer system.
- Stygofauna will be able to recolonise the dewatered aquifers through hydraulic connection of groundwater with the adjoining unaffected aquifers.
- Dewatering associated with the Gruyere Project is unlikely to threaten stygofauna conservation values of the Yeo Palaeochannel.

6.2 TROGLOFAUNA

No troglofauna were recorded from sampling of six exploration holes/water bores, comprising a total of six scrape and seven traps samples. Sampling was undertaken throughout the hole/bore profile above the standing water table (i.e. depths varying between 30 and 40 m).

The geology of the Gruyere Project area and immediate surrounds above the water table comprises aeolian sands up to 10 m thick overlying sandstones/conglomerates, saprolitic clays and basalts/basic rock. These lithologies do not typically provide subterranean habitat suited to troglofauna, which is substantiated by the nil recordings of the Level 1 troglofauna survey.

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APPENDICES

APPENDIX 1: IDENTIFICATION RESULTS

IDENTIFICATION RESULTS

Field Bore Code	Phylum - Subphylum	Class - Subclass	Order_	Family	Genus	Species	Lowest ID	No.	Type (Stygofauna / Troglifauna)
14GYRC0213	Arthropoda - Crustacea	Malacostraca - Eumalacostraca	Syncarida	Parabathynellidae	<i>nr Atopobathynella</i>	sp. B19	<i>nr Atopobathynella sp. B19</i>	2	Stygofauna
14GYRC007							No Invertebrates	0	No
14GYRC0103							No Invertebrates	0	No
14GYWB004							No Invertebrates	0	No
14GYRC008	Arthropoda - Hexapoda	Entognatha -	Collembola			sp.	<i>Collembola sp.</i>	2	No
14GYWB002	Annelida -	Clitellata - Oligochaeta	Enchytraeida	Enchytraeidae		sp.	<i>Enchytraeidae sp.</i>	2	Stygofauna
14GYRC0026	Arthropoda - Crustacea	Malacostraca - Eumalacostraca	Syncarida	Parabathynellidae	<i>nr Atopobathynella</i>	sp. B19	<i>nr Atopobathynella sp. B19</i>	98	Stygofauna
14GYRC0133	Arthropoda - Hexapoda	Entognatha -	Collembola			sp.	<i>Collembola sp.</i>	2	No
14GYWB001							No Invertebrates	0	No
14GYWB003							No Invertebrates	0	No
14GYWB003	Annelida -	Clitellata - Oligochaeta	Enchytraeida	Enchytraeidae		sp.	<i>Enchytraeidae sp.</i>	20	Stygofauna
9EYRB0259							No Invertebrates	0	No
14GYRC0081	Arthropoda - Hexapoda	Entognatha -	Collembola			sp.	<i>Collembola sp.</i>	1	No
14GYRC0130	Arthropoda - Crustacea	Maxillopoda - Copepoda	Harpacticoida	Parastenocarididae	<i>Parastenocaris</i>	sp. B30	<i>Parastenocaris sp. B30</i>	5	Stygofauna
14GYRC0099							No Invertebrates	0	No

Sample Types:	<input type="checkbox"/>	Scrape	<input type="checkbox"/>	Net
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APPENDIX 8: BASELINE STYGOFUNA SURVEY OF THE GRUYERE GOLD PROJECT BOREFIELDS (BENNELONGIA 2016)

Gruyere Gold Project: Borefields Stygofauna Assessment



Final Report

Prepared for Gold Road Resources
by Bennelongia Pty Ltd

March 2016



Gruyere Gold Project: Borefields Stygofauna Assessment

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February 2016

Report 2016/257

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Report	Version	Prepared by	Checked by	Submitted to Client	
				Method	Date
Draft report	Vers. 1	Rowan Lymbery Andrew Trotter	Stuart Halse	email	8.v.2013
	Vers. 2	Danilo Harms Mike Scanlon	Stuart Halse	email	15.ii.2016
Final report		Stuart Halse		email	2.iii.2016

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EXECUTIVE SUMMARY

The Gruyere Project is located approximately 150 km east-north-east of Laverton in Western Australia. The Project lies at the western edge of the Great Victoria Desert and the eastern margin of the Yilgarn Craton. Gold Road Resources proposes to mine gold at the Gruyere Project. Large volumes of water will be required for ore-processing and other mine purposes. This report documents the stygofauna community in the Yeo Palaeochannel and adjacent uplands in the vicinity of the Gruyere Project.

A total of 118 stygofauna samples were collected during six rounds of sampling between July 2012 and January 2016. This work complemented a subterranean fauna survey conducted separately in the proposed Gruyere mine pit area by MBS Environmental in 2015.

Sampling collected 42 species of stygofauna representing 12 higher taxonomic groups. Thirty-six species were collected in the Yeo Palaeochannel, while six species were recorded only from upland areas. Thirty of the species collected are likely to be restricted to the vicinity of the Yeo Palaeochannel and adjacent uplands in the vicinity of the Gruyere Project. Eight of these 30 species are known only from a single bore, three are known from two bores (but sometimes many samples) and 19 species are known from three or more bores. Twenty-eight species are known only from the Yeo Palaeochannel.

Surveys elsewhere in the Yilgarn suggest it is likely that most of the 28 species known only from the Yeo Palaeochannel are restricted to the Yeo Palaeochannel in the vicinity of the Gruyere Project, although species' ranges may extend beyond the area sampled in the surveys reported here.

CONTENTS

EXECUTIVE SUMMARY	III
1. INTRODUCTION	5
2. STYGOFAUNA	5
3. YEO PALAEOCHANNEL HYDROGEOLOGY	7
3.1. AQUIFER CHARACTERISTICS	7
3.2. GROUNDWATER SALINITY.....	7
3.3. PROSPECTIVE STYGOFAUNA HABITAT	10
4. STYGOFAUNA SURVEYS	11
4.1. SAMPLING METHOD	11
4.2. SAMPLING LOCATIONS AND FREQUENCY	11
4.3. OTHER SAMPLING	11
4.4. SPECIES SORTING AND IDENTIFICATION	12
4.5. COMPILING SPECIES LISTS	12
4.6. PERSONNEL	12
5. SURVEY RESULTS	12
5.1. SPECIES COLLECTED	12
5.2. DISTRIBUTION PATTERNS	15
6. DISCUSSION	15
7. REFERENCES	16
8. APPENDICES	17
<i>Appendix 1. Stratigraphy of the Yeo Palaeochannel (Upper Panel); Pre-Quaternary geology in the Project Area (Lower Panel)</i>	18
<i>Appendix 2. Bores Sampled for Stygofauna</i>	19
<i>Appendix 4. Bores that Yielded Positive and Negative for Stygofauna</i>	21

LIST OF FIGURES

FIGURE 2-1. LOCATION OF THE GRUYERE PROJECT	6
FIGURE 3-1. BORES SAMPLED IN THE YEO PALAEOCHANNEL AND ADJACENT UPLAND AREAS.	8
FIGURE 3-2. PROFILE THROUGH THE YEO PALAEOCHANNEL (FROM PENNINGTON SCOTT 2016)..	9
FIGURE 3-3. LONGITUDINAL AND CROSS SECTION OF THE YEO PALAEOCHANNEL.	9
FIGURE 3-4.. GROUNDWATER SALINITY AT DEPTH IN THE YEO PALAEOCHANNEL.....	10
FIGURE 5-1. NUMBER OF BORES FROM WHICH ‘RESTRICTED’ STYGOFAUNA SPECIES WERE COLLECTED.	15

LIST OF TABLES

TABLE 4.1. SAMPLE EFFORT FOR STYGOFAUNA AT THE PROJECT.....	ERROR! BOOKMARK NOT DEFINED.
TABLE 5.1. STYGOFAUNA SPECIES RECORDED IN THE TWO BOREFIELDS AND THEIR SURROUNDS.	13
TABLE 5.2. HIGHER LEVEL IDENTIFICATIONS OF STYGOFAUNA COLLECTED AT THE PROJECT.	14

1. INTRODUCTION

The Gruyere Project is a greenfields gold deposit in the Yamarna greenstone belt of Western Australia (Figure 1-1) and is owned by Gold Road Resources Limited (Gold Road). The Yamarna greenstone belt is a newly discovered gold region covering approximately 5,000 km² on the eastern side of the Yilgarn Craton. Gold Road aims to develop an open pit mining operation to extract and process gold from the Gruyere Deposit, which is located within the Yamarna Pastoral Lease. This lease is wholly owned and managed by Gold Road.

The Gruyere Project will require one or more sources of groundwater to supply water for mine operations, ore processing and camp supplies. This report documents the stygofauna species present in groundwater within the sections of the Yeo Palaeochannel and adjacent uplands near to the Gruyere Project. Stygofauna are aquatic animals that live in groundwater.

2. STYGOFAUNA

Stygofauna occur in an array of different groundwater habitats including porous, karstic and fractured rock aquifers, springs and hyporheos of streams (Eberhard *et al.* 2005). Stygofauna inhabit interstitial spaces, fissures and voids in aquifers (Gibert and Deharveng 2002) and, in general terms, the likelihood of them occurring in an aquifer is directly related to its transmissivity.

The physiochemical tolerances of stygofauna have not been well defined, although some information is available on salinity tolerances and more can be inferred from salinity tolerance information for surface wetland species. Stygofauna have mostly been recorded in fresh to brackish groundwater but may possibly occur in salinities up to 50,000 mg/L TDS (Watts and Humphreys 2006; Reeves *et al.* 2007).

Calcrete and alluvium are typically considered to be productive habitats for stygofauna because the fissures and voids in groundwater aquifers provide highly suitable habitat for small aquatic invertebrates. The calcrete bodies in the palaeovalleys of the Yilgarn have been identified as areas rich in stygofauna species, with many species being restricted to single calcretes (Guzik *et al.* 2008, Karanovic and Cooper 2011, Karanovic *et al.* 2014). The belief that most stygofauna species are restricted to individual calcretes is often termed the 'calcrete island' hypothesis (Cooper *et al.* 2002). It is suggested that calcretes have endemic faunas because the fine alluvial and clay deposits that occur around the calcrete bodies have limited voids or spaces through which the animals can move, therefore providing a barrier to dispersal for subterranean species. In many cases, high salinities may also provide barriers to movement of stygofauna between different calcretes. Many of the stygofauna communities restricted to individual calcretes have been listed as either Threatened Ecological Communities (TECs) or Priority Ecological Communities (DPaW 2015). In both cases, the communities are seen as having high conservation value during any environmental impact assessment process. The mapped calcretes of the Yeo Palaeochannel in the vicinity of the Gruyere Project are not listed as TECs or PECs.

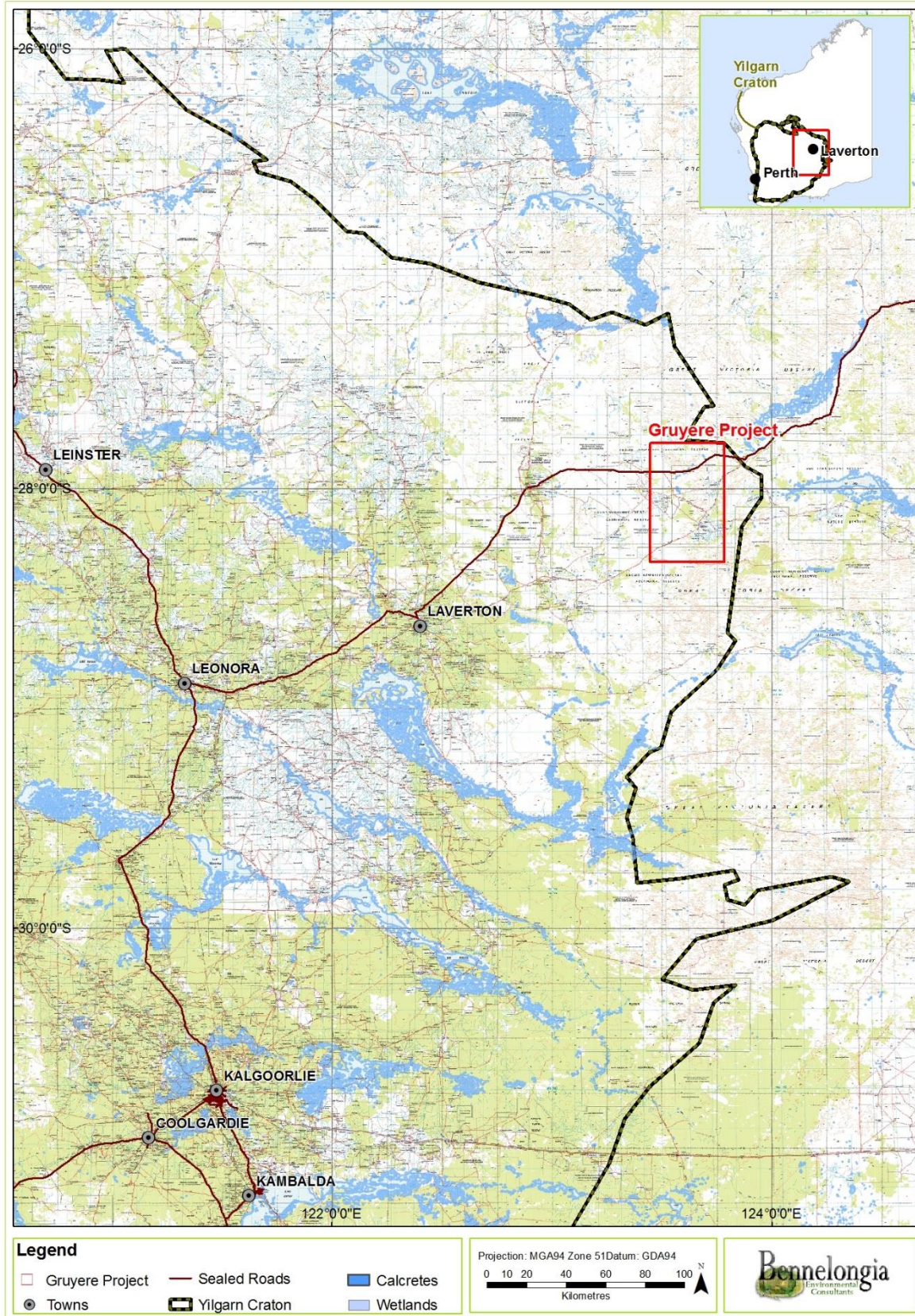


Figure 2-1. Location of the Gruyere Project.

3. YEO PALAEOCHANNEL HYDROGEOLOGY

3.1. Aquifer Characteristics

The Yeo Palaeochannel represents an ancient river system, flowing east for about 60 km to Lake Yeo (Figure 3.1) and then ultimately discharging into the Eucla Basin. The palaeochannel varies from 2 to 12 km in width, with calcrete and halite deposits occurring at intervals along its length.

The Yeo Palaeochannel extends to a depth of 130 to 150 m and typically consists of a basal sand and gravel unit up to 40 m thick, overlain by interbedded clayey sequences of colluvium and alluvium with minor sand lenses (Commander *et al.* 1992 in Pennington Scott 2012). Although the surface expression of the palaeochannel is 2 to 12 km across, the buried channels are less than 1.5 km wide. Outside the central trunk, the surface colluvium and alluvium rapidly thins out to have a depth of less than 20 m (Johnson *et al.* 1999; ANL 2000 in Pennington Scott 2012). The extensive calcrete deposits can be up to 1.5 km wide and over 5 km in length, with depths of 4 to 14 m. The calcrete is cavernous in places with high permeability and groundwater storage, although most of the calcrete occurs as a matrix that binds the dominant sand substrate (Pennington Scott 2012, 2016).

The most significant aquifers in the Yeo Palaeochannel lie within the Quaternary detritals and within the thicker Werillup Formation. Areas of calcrete occur within the Quaternary detritals aquifer, which contains brackish to saline water. The Werillup Formation aquifer lies within sand, gravel and clay and contains saline to hypersaline water. The Perkolilli Shale, which consists of clay and silt, forms an aquitard between the Quaternary detritals aquifer and Werillup Formation aquifer, which would be expected to be a barrier to stygofauna movement (Figure 3-2; Appendix 1).

In broad terms, the depth from the surface to the water table is approximately 8 m in much of the Yeo Palaeochannel. On average, the Quaternary detritals aquifer is about 4 m thick although its thickness ranges from 0 to 12 m (Figure 3-3). The Perkolilli Shale aquitard is about 20 m thick and the deeper Werillup Formation is on average about 90 m thick and underlain by saprolite formed by weathering of the Archean Basin rock.

3.2. Groundwater Salinity

Groundwater salinities in the Yeo Palaeochannel increase as groundwater flows from catchment headwaters towards Lake Yeo (Figure 3-3). Groundwater salinity at depth is approximately 5,000-10,000 mg L⁻¹ in the eastern tributary of the Yeo Palaeochannel, where carbonate content is relatively high. Groundwater salinity at depth in the main trunk of the Yeo Palaeochannel west of the Gruyere Deposit is approximately 15,000-50,000 mg L⁻¹.

There is often a vertical gradient of salinity in the Yeo Palaeochannel, with the top metre of groundwater having a salinity that is approximately half that found at depth. Groundwater in the valley flanks outside the palaeochannel is fresh.

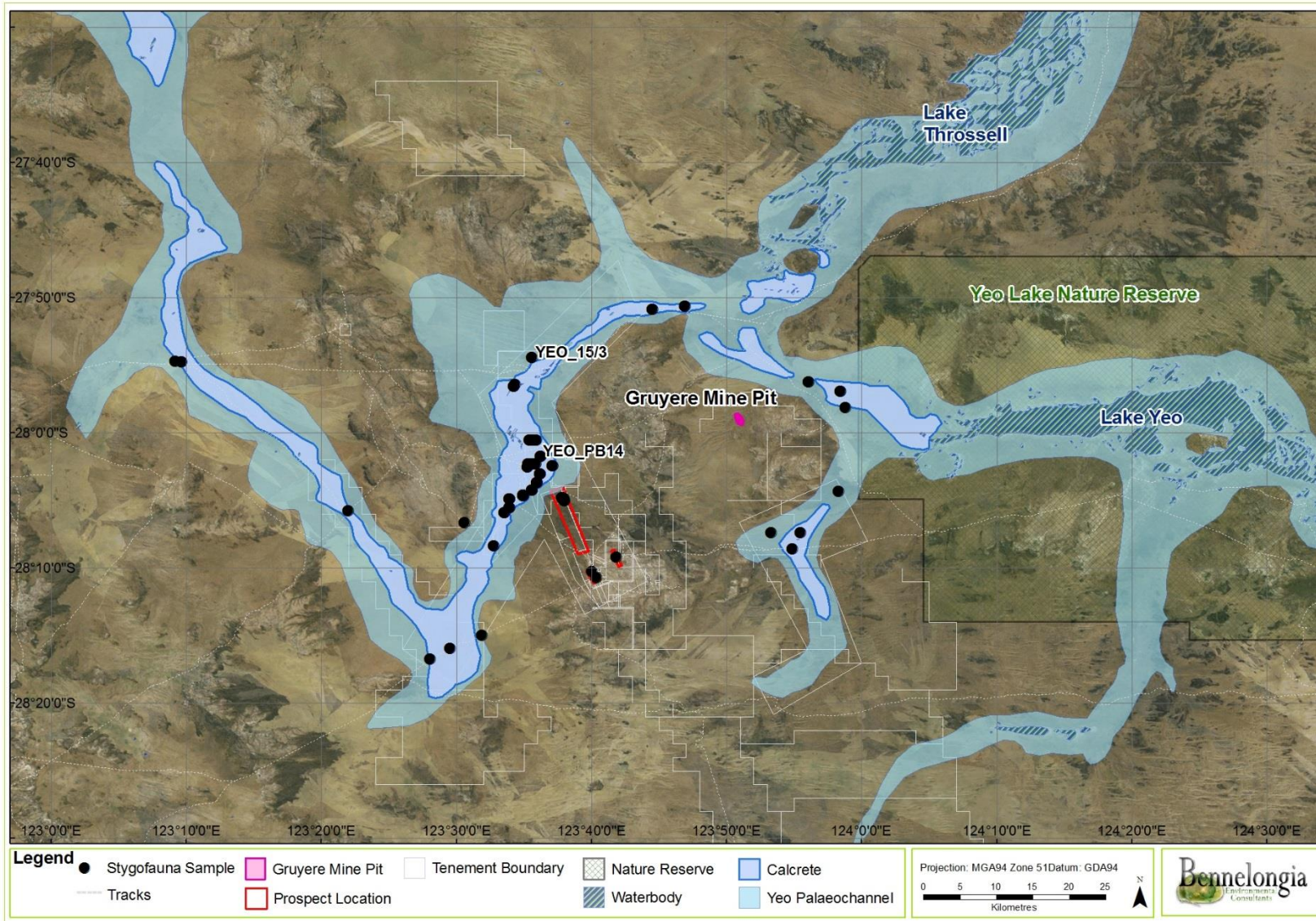


Figure 3-1. Bores sampled in the Yeo Palaeochannel and adjacent upland areas. Proposed location of the Gruyere mine pit is shown (information supplied by Gold Road Resources). See Figure 3-3 for longitudinal profile of palaeochannel, with YEO_PB14 and YEO_15/3 as reference points.

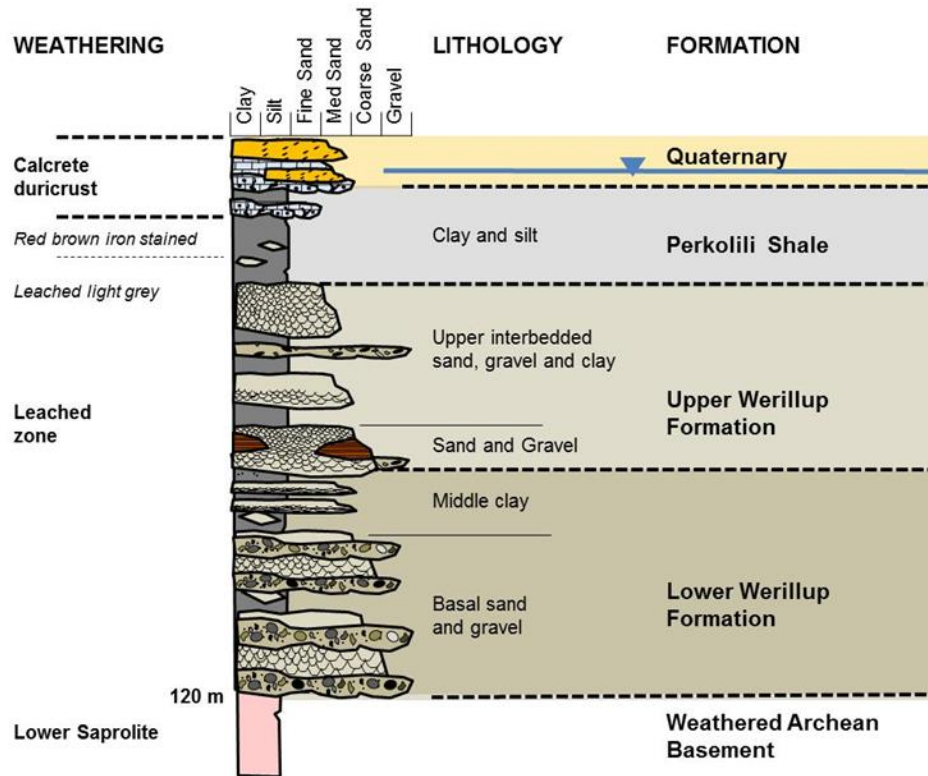


Figure 3-2. Profile through the Yeo Palaeochannel (from Pennington Scott 2016)..

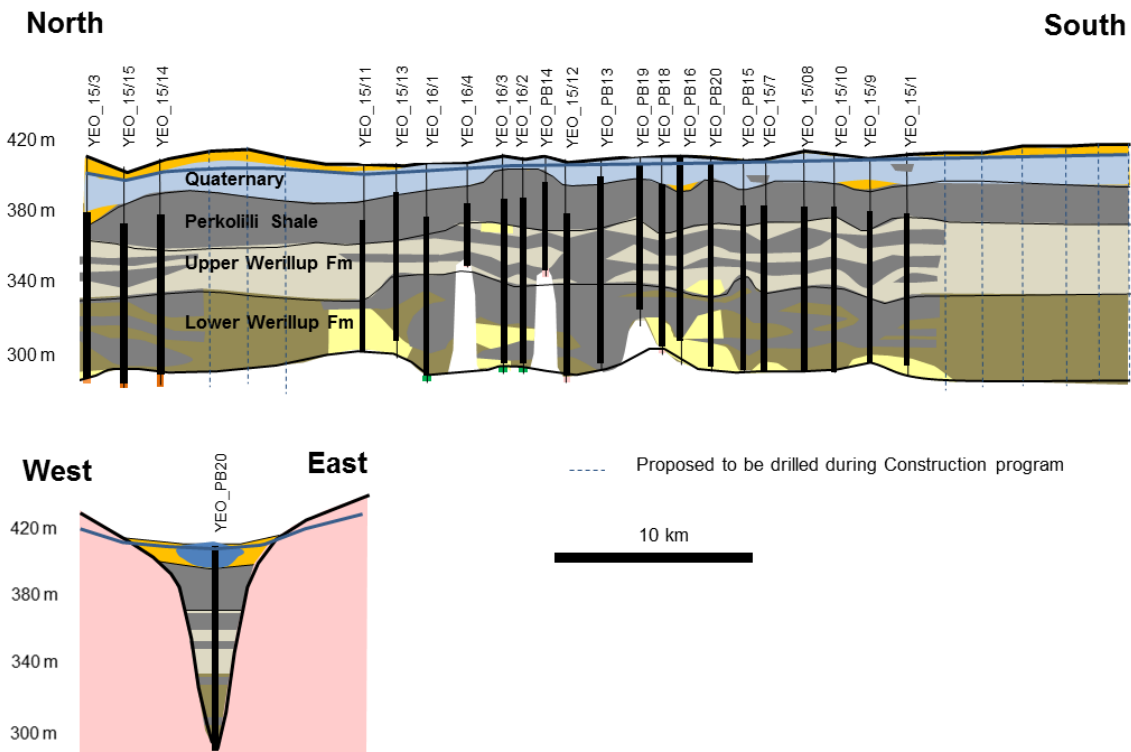


Figure 3-3. Longitudinal and cross section of the Yeo Palaeochannel. (from Pennington Scott 2016).

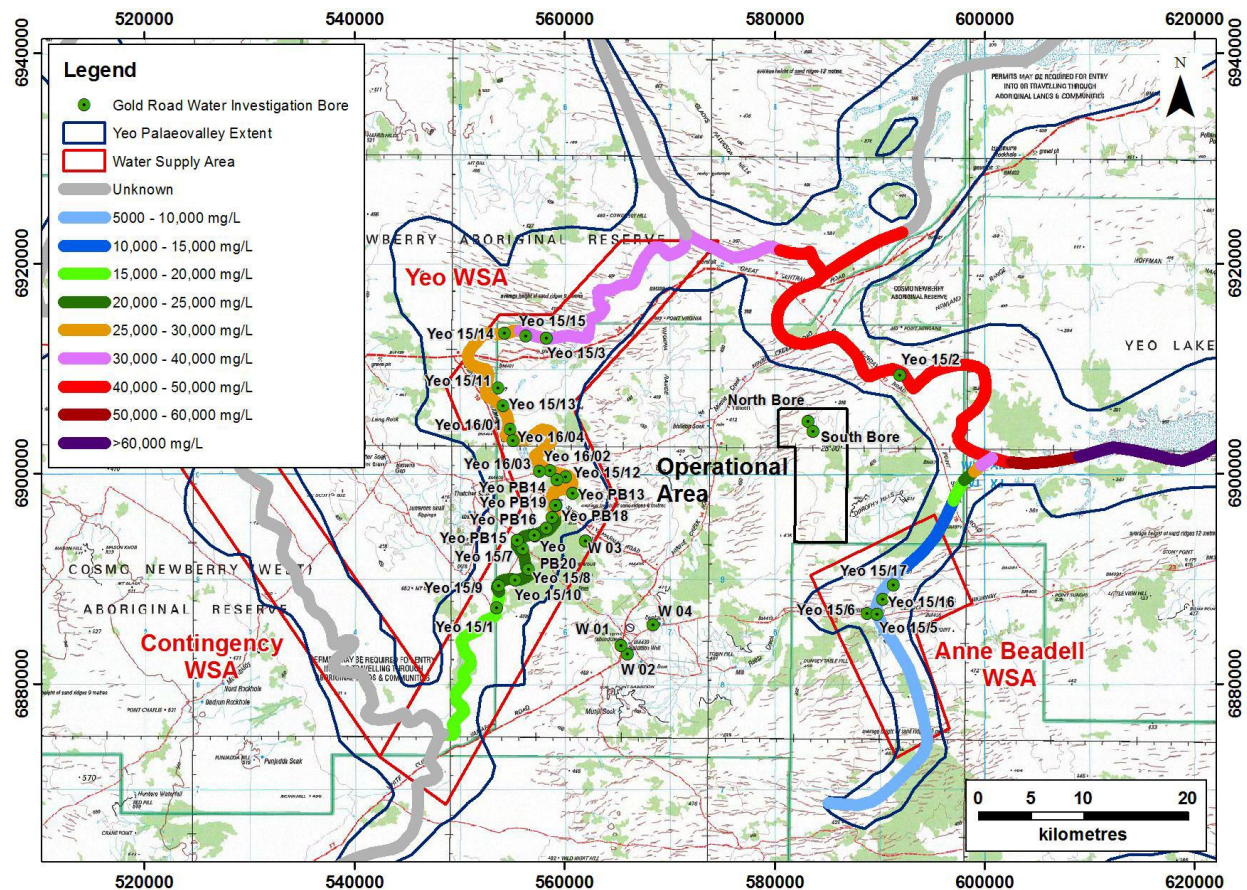


Figure 3-4.. Groundwater salinity at depth in the Yeo Palaeochannel.
(from Pennington Scott 2016).

3.3. Prospective Stygofauna Habitat

The Quaternary detritals aquifer in the Yeo Palaeovalley, which lies principally within colluvium, alluvium and saturated calcrete, is prospective habitat for stygofauna. This aquifer is only a few metres thick but is likely to comprise the main habitat for stygofauna in the Yeo Palaeochannel. The Werillup Formation aquifer lies under an aquitard formed by the Perkolilli Shale that reduces opportunities for colonisation by stygofauna and also reduces inflow of nutrients and carbon. Thus, while stygofauna species may be present below the aquitard in the Werillup Formation, they would be expected to be present in low numbers and to be relatively insensitive to changes in the upper aquifer.

The optimal salinity for stygofauna varies according to the particular species that occur at a site. While saline groundwater would be expected to have fewer species than fresh groundwater, the species occupying brackish and saline groundwater mostly have limited bands of tolerance and so seek out particular groundwater salinity (which may be brackish or may be quite saline). The salt levels that a species tolerates usually will sometimes occur in only a small proportion of a palaeochannel that exhibits a large salinity gradient. Given that groundwater salinity is variable both spatially and over time, it is possible that some species will occur in a series of disjunct, possibly quite small areas along the Yeo Palaeochannel where salinity is favourable. However, relatively few stygofauna species are likely to occur at groundwater salinities $>35,000 \text{ mg L}^{-1}$ and probably no species occur at salinities $>50,000 \text{ mg L}^{-1}$.

In addition to salinity, water chemistry characteristics, such as the amount of carbonate, and the physical structure of the habitat in the aquifer may affect species occurrence. Karstic spaces in calcrete have frequently been proposed as a critical stygofauna habitat. However, the collection of many species from areas that appear to be entirely alluvium within areas of 'calcrete' suggests the importance of karst may have been over-rated.

4. STYGOFAUNA SURVEYS

4.1. Sampling Method

The sampling methods used followed those outlined by Eberhard *et al.* (2005) and recommended in Guidance Statement 54A (EPA 2007). At each bore, six net hauls were collected using a weighted plankton net. Three hauls were made using a 50 µm mesh net and three with a 150 µm mesh net. After the net was lowered to the bottom of the bore it was jerked up and down briefly to agitate benthic stygofauna into the water column. The net was then slowly retrieved. Contents of the net were transferred to a 125 ml polycarbonate vial after each haul and preserved in 100% ethanol. Nets were washed between bores to minimise contamination among sites.

4.2. Sampling Locations and Frequency

Six rounds of sampling were conducted between 2012 and 2016, mostly from bores slotted at depth (Table 4.1). The first round of sampling occurred in July 2012 when 14 bores were sampled. The second and third rounds occurred in December 2012 and February 2013 when 39 bores were sampled to yield 69 samples because sampling effort during Rounds 2 and 3 was maximised by repeated sampling of the same bores on different days.

Table 1. Sample effort for stygofauna at the Project.

Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total Samples
2-3/07/12	3-6/12/12	19-23/02/13	29-31/10/15	9-11/12/15	14-18/01/16	
14	42	27	11	7	17	118

Eleven bores were sampled in the fourth round of sampling in October 2015 to gain additional information about the stygofauna of the Yeo Palaeochannel. Additional sampling of 24 bores occurred in December 2015 and January 2016.

Overall, 118 samples have been collected.

Sampling locations are shown in Figure 3-3 and details for all sampled bores are given in Appendix 3.

4.3. Other Sampling

Records of a small number of stygofauna collected as by-catch during troglofauna sampling at the Attila prospect in 2012 are included in survey results. These records provided additional information on species distribution and conservation significance. In addition, the results of sampling undertaken between 19 May and 21 July 2015 at the proposed Gruyere mine pit (MBS 2015) have been used to provide information on species distributions and aligns the species whenever possible. The proposed Gruyere mine pit is located outside the Yeo Palaeovalley and does not intersect calcrete aquifers like those present in the Yeo paleochannel.

4.4. Species Sorting and Identification

In the laboratory, samples were elutriated to separate out heavy sediment particles and sieved into size fractions using 250, 90 and 53 µm screens. All samples were sorted under a dissecting microscope. Stygofauna were dissected and examined under a compound microscope as necessary and identified to species using available keys and species descriptions or morphospecies using the characters employed in species keys and diagnoses.

4.5. Compiling Species Lists

In several cases, animals could not be identified to species level because they were damaged, juvenile or the wrong sex for species determination. These higher level (i.e. above species level) identifications were included in calculations of the number of species present only if the specimens could not belong to a species already recorded (e.g. the stygofaunal *Limbodessus* sp. was not included in species counts because three species of *Limbodessus* were already recorded).

4.6. Personnel

Fieldwork was undertaken by Jim Cocking, Dean Main, Jeremy Quartermaine and Sean Bennet. Samples were sorted by Jane McRae, Michael Scanlon, Jim Cocking, Grant Pearson, Dean Main and Jeremy Quartermaine. All identifications were undertaken by Jane McRae except for Aphanoneura, Oligochaeta and Nematoda which were identified by Mike Scanlon.

5. SURVEY RESULTS

5.1. Species Collected

A total of 3,388 stygofauna specimens were collected, representing at least 42 species and 12 higher taxonomic groups (Tables 6.3, 6.4). These included worms in the groups Nematoda (1 species), Aphanoneura (1 species), Oligochaeta (6 species) and Turbellaria (1 species), as well as rotifers (1 species), crustaceans belonging to the orders Copepoda (21 species), Syncarida (5 species), Amphipoda (2 species), and diving beetles in the insect family Dytiscidae (4 species).

Copepods were both the most diverse and the most abundant group, representing 50% of all species and 66% of all specimens collected (2,244 specimens in total). Amphipods also represented a significant proportion of total abundance (21%) with 698 specimens collected. The most abundant species were the copepod *Nitocrella* sp. B06 (925 specimens) and the amphipod *Stygochiltonia* sp. B02 (511 specimens); while the copepods *Fiersicyclops (Fiersicyclops) fiersi*, *Halicyclops eberhardi*, *Nitocrellopsis* sp. B04, *Nitocrellopsis* sp. B07, *?Parapseudoleptomesochra* sp. B03 and amphipod *Yilgarniella* sp. B02 were also collected at abundances of more than 100 specimens. A further 13 species had moderate abundances of greater than 20 specimens.

Thirty-six of the 42 species collected during all stygofauna sampling were found in the Yeo Palaeochannel while six species were recorded only from upland areas. All 36 species in the Yeo Palaeochannel were collected in the main trunk, with three of the same species collected in the eastern tributary to the south of Yeo Lake.

Bores yielding stygofauna are shown in Appendix 4.

Table 5.1. Stygofauna species recorded in Yeo Palaeochannel and adjacent uplands. Bores column shows the number of bores and samples in which the species was collected.

Taxonomy	Bores	Individuals	Range
Platyhelminthes			
Turbellaria			
Turbellaria sp.	1, 1	20	Not assessed in EIAs ¹
Nematoda			
Nematoda sp.	15, 16	51	Not assessed in EIAs ¹
Annelida			
Aphanoneura			
Aeolosomatidae sp.	2, 3	3	Uncertain
Clitellata			
Enchytraeida			
<i>Enchytraeus</i> sp. 1 (PSS) Pilbara	3, 3	7	Uncertain
<i>Enchytraeus</i> sp. 2 (PSS) Pilbara	2, 2	4	Uncertain
Haplotaxida			
<i>Insulodrilus</i> sp.	1,1	1	Uncertain
Phreodrilidae with similar ventral chaetae	2,2	2	Uncertain
Tubificidae sp. B01	8,10	48	Potentially restricted to Yeo channel
Tubificidae sp. B02	8, 8	56	Potentially restricted to Yeo channel
Rotifera			
Bdelloidea			
Bdelloidea sp. 2:2	1, 1	3	Not assessed in EIAs ¹
Arthropoda			
Maxillopoda			
Cyclopoida			
<i>Fierscyclops (Fierscyclops) fiersi</i>	12, 23	305	Widespread in Murchison ²
<i>Goniocyclops unarticulatus</i>	7, 10	26	Widespread in Murchison ²
<i>Halicyclops eberhardi</i>	14, 27	193	Murchison and Gascoyne ²
<i>Halicyclops kieferi</i>	2, 7	9	Widespread in Murchison ²
Harpacticoida			
<i>Kinnecaris</i> sp. indet.	1,1	1	Potentially restricted to Yeo channel
<i>Nitokra lacustris</i> sp. B02	4, 5	8	Potentially restricted to Yeo channel
<i>Nitokra</i> sp. B04	1, 1	6	Potentially restricted to Yeo channel
<i>Nitocrella</i> sp. B06	14, 40	940	Potentially restricted to Yeo channel
<i>Nitocrella</i> sp. B07	1, 1	1	Potentially restricted to Yeo channel
<i>Nitocrellopsis</i> sp. B04	8, 15	153	Potentially restricted to Yeo channel
<i>Nitocrellopsis</i> sp. B05	3, 5	5	Potentially restricted to Yeo channel
<i>Nitocrellopsis</i> sp. B06	7, 15	76	Potentially restricted to Yeo channel
<i>Nitocrellopsis</i> sp. B07	5, 13	106	Potentially restricted to Yeo channel
<i>Nitocrellopsis</i> sp. B08	5, 9	53	Potentially restricted to Yeo channel
<i>Parastenocaris</i> sp. B24	4, 4	39	Potentially restricted to Yeo area ³
<i>Parastenocaris</i> sp. B33	1, 1	20	Potentially restricted to Yeo channel
<i>Schizopera</i> sp. B08	3, 5	5	Potentially restricted to Yeo channel
<i>Schizopera</i> sp. B09	6, 12	16	Potentially restricted to Yeo channel
<i>Schizopera</i> sp. B11	2, 3	6	Potentially restricted to Yeo channel
<i>Schizopera</i> sp. B14	7, 9	34	Potentially restricted to Yeo channel
? <i>Parapseudoleptomesochra</i> sp. B03	7, 19	214	Potentially restricted to Yeo channel
Malacostraca			
Syncarida			
<i>Atopobathynella</i> sp. B13	1, 1	1	Potentially restricted to Yeo channel
<i>Atopobathynella</i> sp. B21	2, 2	2	Potentially restricted to Yeo channel
<i>Hexabathynella</i> sp. B07	3, 4	6	Potentially restricted to Yeo channel
<i>Kimberleybathynella</i> sp. B06	1, 1	4	Potentially restricted to Yeo channel
nr <i>Atopobathynella</i> sp. B19	1, 1	101	Potentially restricted to local area ³
Amphipoda			

Taxonomy	Bores	Individuals	Range
<i>Stygochiltonia</i> sp. B02	11, 26	537	Potentially restricted to Yeo channel
<i>Yilgarniella</i> sp. B02	8, 15	152	Potentially restricted to Yeo channel
Insecta			
Coleoptera			
<i>Limbodessus</i> sp. B05	6, 15	33	Potentially restricted to Yeo channel
<i>Limbodessus</i> sp. B06	2, 9	43	Potentially restricted to Yeo channel
<i>Limbodessus</i> sp. B07	3, 9	19	Potentially restricted to Yeo channel
<i>Nirripiriti</i> sp. B01	1, 1	2	Potentially restricted to Yeo channel

¹EPA (2007); ²Karanovic (2004); ³also known from the vicinity of the proposed mine pit (MBS 2015).

Table 5.2. Higher level identifications of stygofauna collected in the Yeo Palaeochannel and adjacent uplands.

Taxonomic Rank	Individuals	Probable Species
Annelida		
Enchytraeida		
Enchytraeidae sp.	23	Any of the Enchytraeidae in Table 6.3
Enchytraeus sp.	1	Any of the Enchytraeus in Table 6.3
Haplotaxida		
Tubificidae sp.	1	Tubificidae sp. B01 or Tubificidae sp. B02
Arthropoda		
Cyclopoida		
Cyclopoida sp.	3	Any of the cyclopoid species in Table 6.3
Harpacticoida		
Ameiridae sp.	3	Any of the Ameiridae harpacticoid species in Table 6.3
Harpacticoida sp.	20	Any of the harpacticoid species in Table 6.3
Parastenocarididae sp.	1	Any of the Parastenocarididae harpacticoid species in Table 6.3
Copepoda sp.	1	Any of the copepod species in Table 6.3
Syncarida		
Parabathynellidae sp.	2	Any of the Parabathynellidae species in Table 6.3
Amphipoda		
Amphipoda sp.	9	Any of the Amphipoda species in Table 6.3
Coleoptera		
Limbodessus sp.	13	Any of the <i>Limbodessus</i> species in Table 6.3

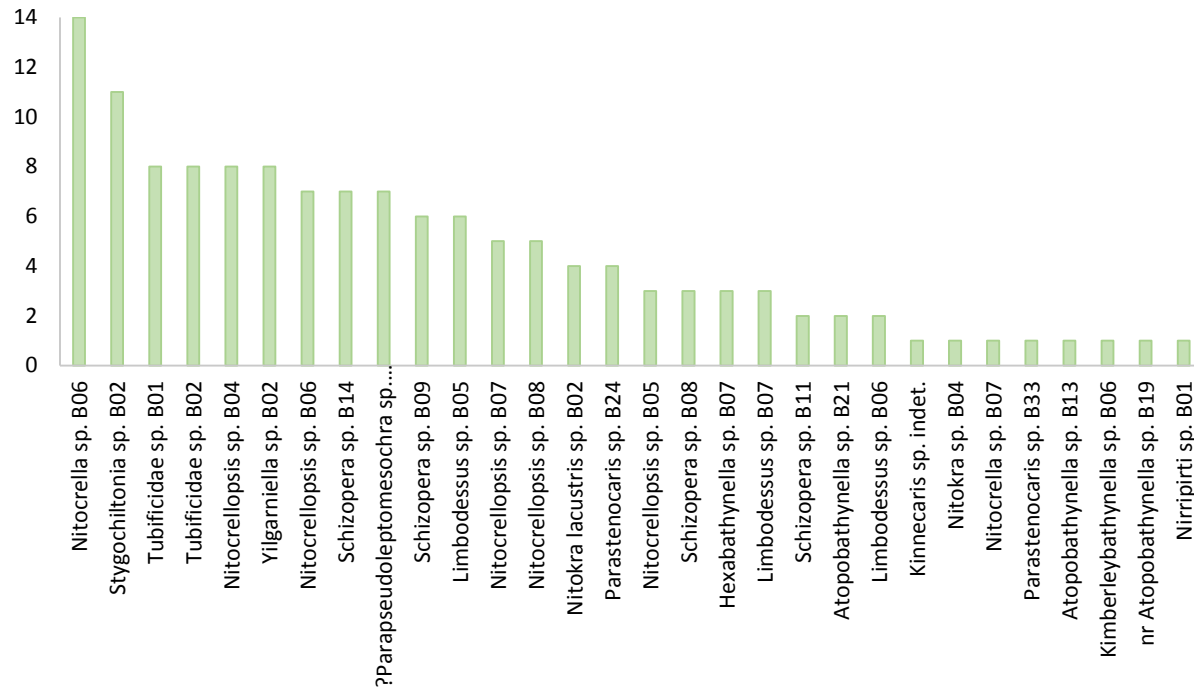


Figure 5-1. Number of bores from which 'restricted' stygofauna species were collected. 'Restricted' stygofauna species are known only from the Yeo Palaeochannel or surrounding uplands.

5.2. Distribution Patterns

Four of the 42 species collected appear to be relatively widespread across the Murchison (Table 6.3), although the copepod *Halicyclops eberhardi* is a species complex and the ranges of the component species are not well documented (Bennelongia 2015). A further five species were higher level identifications for which ranges cannot be determined (Table 5.1) and three species belonged to groups for which ranges are not usually assessed in impact assessment studies because their taxonomic frameworks are too poor. The remaining 30 species have ranges that are likely to be restricted to the vicinity of the Yeo Palaeochannel and adjacent uplands in the vicinity of the Gruyere Project.

Eight of the 30 species are known only from a single bore, three are known from two bores (but sometimes many samples) and 19 species are known from three or more bores (Figure 5-1).

6. DISCUSSION

Forty-two species of stygofauna were recorded during sampling in the Yeo Palaeochannel and its surrounding uplands in the vicinity of the Gruyere Project. The distributions of some species were not determined, usually because identification was to a higher level than species. Four species are considered to be widespread (though see earlier comments about *Halicyclops eberhardi*). The remaining 30 species are known only from the Yeo Palaeochannel and the adjacent uplands. One of these species, the syncarid nr *Atopobathynella* sp. B19, is known from upland areas only. The copepod *Parastenocaris* sp. B24 occurs in upland areas as well as in the palaeochannel. There are 28 species known only from the Yeo Palaeochannel.

Surveys elsewhere in the Yilgarn (Cooper *et al.* 2002; Watts and Humphreys 2006; Guzik *et al.* 2008; Karanovic and Cooper 2011) suggest it is likely that most of the 28 species recorded only from the Yeo

Palaeochannel are likely to be restricted to the Yeo Palaeochannel in the vicinity of the Gruyere Project, although their ranges may extend beyond the area sampled in the surveys reported here.

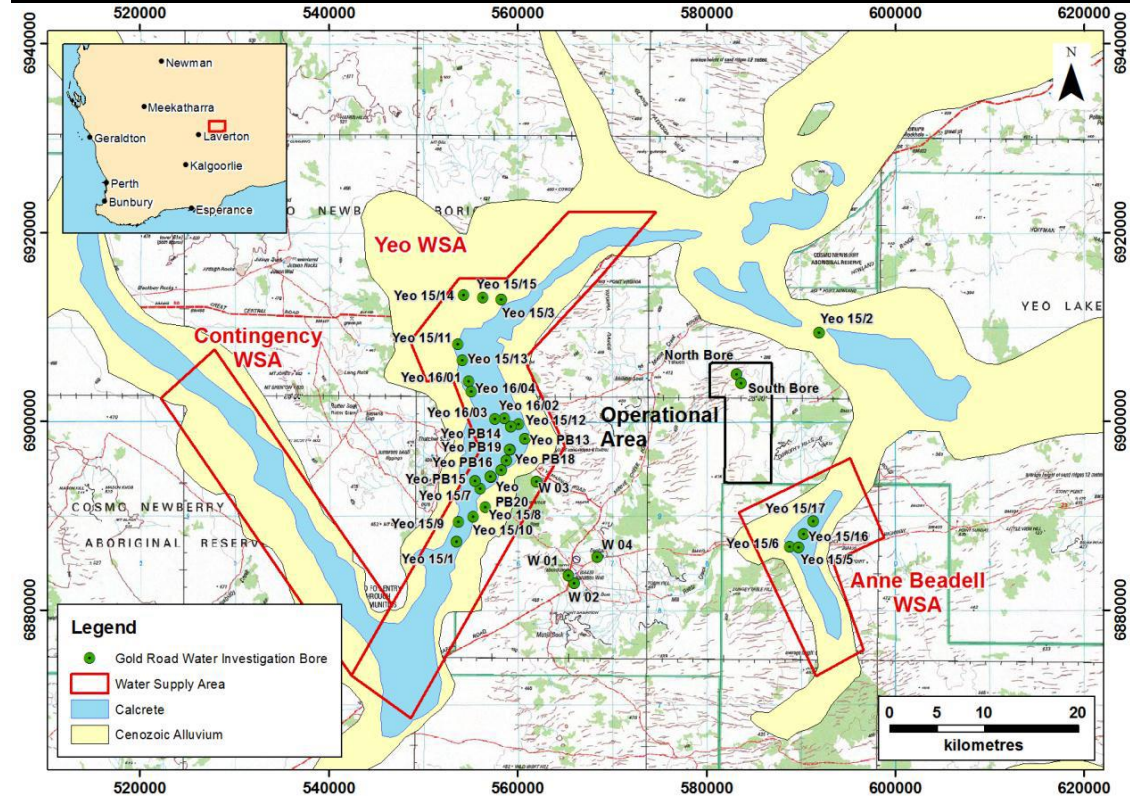
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8. APPENDICES

Appendix 1. Stratigraphy of the Yeo Palaeochannel (Upper Panel); Pre-quaternary geology in the Project Area (Lower Panel)

Era	Period/Epoch	Formation	Unit	Lithology
Cenozoic	Quaternary		Alluvial & lacustrine	Clay, silt & sand; saline, gypsiferous, evaporite deposits
	<i>Pleistocene– Holocene</i>		Eolian sandplain and dune	Sand
	<2.6 Ma			
	Neogene	Perkolilli Shale	Palaeochannel deposits	Clay, silt and sand with calcrete
	<i>Late Oligocene to Miocene</i>			
	(~24-5.3Ma)			
	Paleogene	Werillup Formation	Palaeochannel deposits	Gravel, sand, silt and clay with lignite
	<i>Late-Middle To Late Eocene</i>			
	(~40-34 Ma)			
Palaeozoic	Permian	Patterson Formation	Glacio-fluvial	Coarse sand & gravel with basal matrix-supported conglomerate
	(~300Ma)		Glacio-lacustrine	Clay, silt and minor sand
Archean	Neoproterozoic	Yamarna Domain	Granite	Gneissic granitoid
	(2500 – 2800 Ma)		Yamarna – Mount Gill Greenstone Belt	Felsic – mafic and ultramafic igneous, and sedimentary rocks; greenschist to amphibolite facies



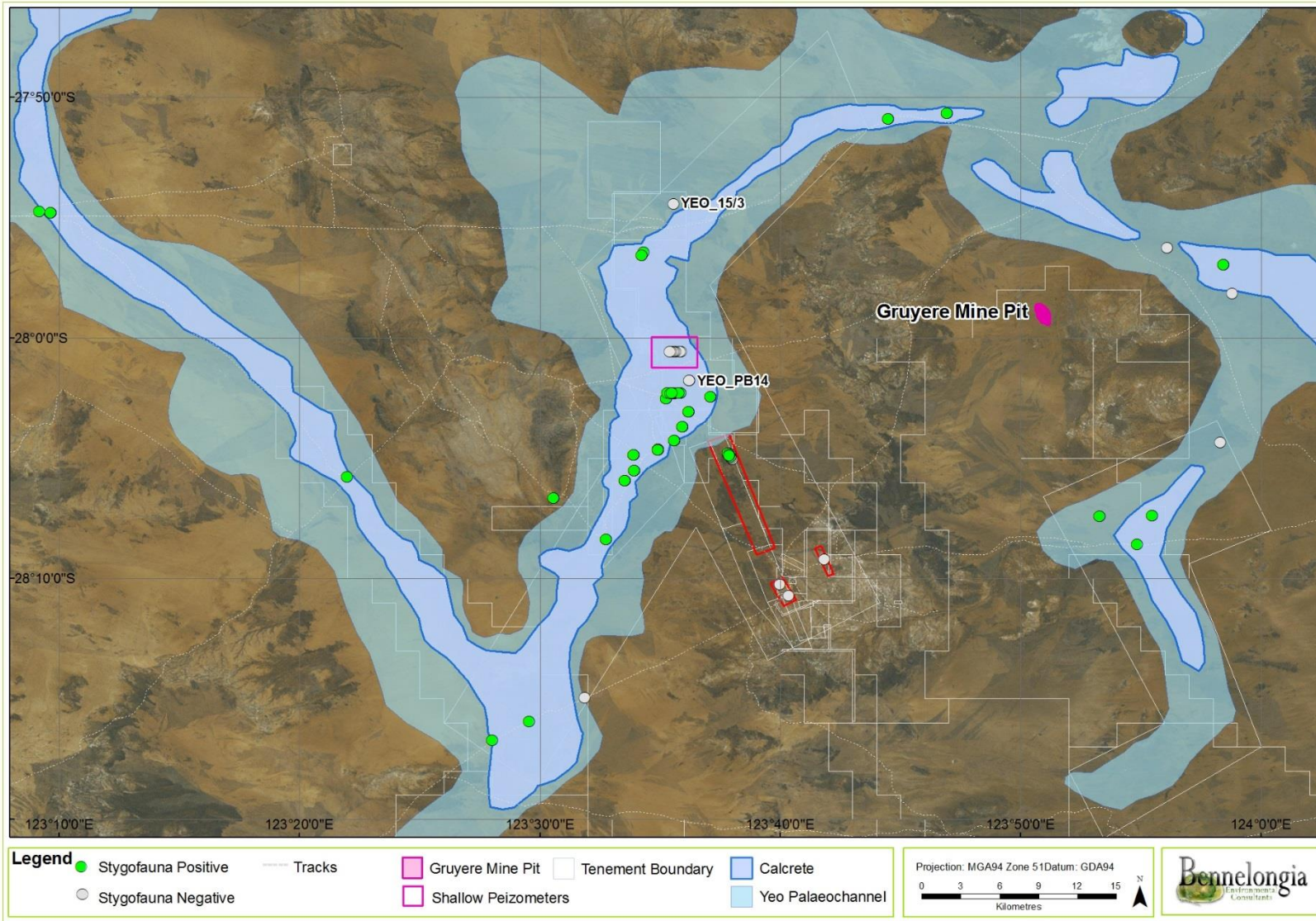
From Pennington Scott (2012, 2016)

Appendix 2. Bores Sampled for Stygofauna

Bore Codes	Latitude	Longitude
11THAC043	-27.8481	123.7414
11THAC135	-27.9493	123.9738
11THACUNK01	-27.8444	123.782
12ALRC0117	-28.0806	123.6308
15MNAC0169	-28.1234	123.8877
15MNAC0187	-28.1233	123.9244
AC267	-28.0384	123.5902
AC268	-28.0384	123.5911
AC269	-28.0384	123.5921
AC270	-28.0384	123.5932
AC271	-28.0383	123.5952
AC272	-28.0383	123.5971
AC273	-28.0384	123.5962
AC280	-28.0384	123.5881
AC283	-28.0421	123.5872
Bluey	-28.0806	123.6309
FYRC051	-27.9428	123.5703
LIMESTONE MRD BORE	-27.9132	123.1605
Near Cole Bore	-28.1109	123.5095
P501	-28.2787	123.4669
P502	-28.2657	123.4922
P503	-28.2495	123.531
P505	-28.0725	123.9714
P506	-27.9693	123.9798
P510	-27.9123	123.1527
PB13	-28.0407	123.6182
PB14	-28.0296	123.6035
PB15	-28.0813	123.5648
PB16	-28.0711	123.5931
PB17	-28.0771	123.5818
PB18	-28.0616	123.5988
PB19	-28.0512	123.6029
PB20	-28.0777	123.5818
RC0022	-28.0839	123.6332
RC0025	-28.0831	123.6325
RC0044	-28.0805	123.6318
RC0095	-28.0798	123.63
RC0096	-28.0798	123.6301
RC0109	-28.0801	123.6308
RC0110	-28.0805	123.6304
RC0151	-28.0823	123.6318
Soma Bore	-28.0962	123.366
TH01	-28.0095	123.5979
TH02	-28.0096	123.597
TH03	-28.0095	123.5939
TH04	-28.0095	123.5929
TH05	-28.0096	123.5919

TH06	-28.0095	123.5909
TH07	-28.0095	123.5898
W01	-28.1711	123.6664
W02	-28.1786	123.6723
W03	-28.0815	123.6313
W04	-28.1536	123.6972
YE0008A	-28.0987	123.5587
YEO 15/1	-28.1398	123.5455
YEO 15/2	-27.9377	123.9345
YEO 15/3	-27.9074	123.5926
YEO 15/5	-28.1432	123.914
YUNK02	-27.9404	123.5719
YUNK03	-28.0921	123.5652
YUNK04	-28.0798	123.6301

Appendix 4. Bores that Yielded Positive and Negative for Stygofauna



APPENDIX 9: STAKEHOLDER CONSULTATION REGISTER

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
29-Aug-14	14:00	Department of Mines and Petroleum	Various	Graham Cobby (DMP) Ian Mitchell (DMP) Ivor R / Mike Freeman / Tony Bullen	Ian Murray (Gold Road) Gordon Murray (Gold Road) Ziggy (Gold Road) Kristy Sell (MBS)	Gruyere	Meeting with DMP to discuss potential for lead agency status. Project overview, discussions re: heritage/NT issues, progress with Scoping Study, project plan timing, progress with baseline studies.	Formal Meeting	Gruyere Project Lead Agency Status Meeting	Lead agency Approvals
28-Aug-15	13:00	Department of Mines and Petroleum	Strategic Projects	Ian Mitchell Trent Richards Mike Wilde Graham Cobby	Glenn Firth Wayne Trumble	Gruyere Project Gas Pipeline	Provide DMP with an update on the baseline survey data, map out project approvals requirements for Gruyere, seek further advice from DMP on approvals pathways and timing, get clarity on which regulatory stakeholders we need to engage with and when this should occur. The gas pipeline project was also introduced to DMP- P at this meeting.	Formal Meeting Presentation	N/A	Lead agency Approvals
13-Nov-14	13:25	Department of Mines and Petroleum	Strategic Projects	Graham Cobby (DMP)	Nicole Garbin (MBS) Kristy Sell (MBS) Gordon Murray (Gold Road)	Gruyere	Email from Graham Cobby advising Gordon Murray that the Gruyere Project has been assessed by DMP and designated a Level 2 Lead Agency Project Proposal.	Email	Gruyere Project Granted Level 2 Lead Agency Status	Lead agency Approvals
13-Mar-15	9:00	Department of Mines and Petroleum	Strategic Projects	Graham Cobby (DMP)	Nicole Garbin (MBS) Kristy Sell (MBS) Gordon Murray (Gold Road)	Gruyere	Meeting with Graham Cobby to provide a project update briefing and discussion around level 2 lead agency status.	Formal Meeting	Approvals Meeting with DMP 2015 03 13 ppt	Lead agency Approvals
20-Mar-15	15:21	Department of Mines and Petroleum	Strategic Projects	Graham Cobby (DMP)	Gordon Murray (Gold Road)	Gruyere	Email to Graham Cobby to provide the approvals meeting presentation as an attachment.	Email	Approvals Meeting DMP Edited V3 2015 03 20	Lead agency Approvals
27-Mar-15	16:37	Department of Mines and Petroleum	Operations, Environment	Lawson Brandis (DMP)	Kristy Sell (MBS)	Central Bore	Email to Lawson Brandis regarding a query on gravel extraction from E38/2325 for maintenance of the airstrip and roads at Central Bore E38/2326.	Email	Gravel Extraction Query	Gravel extraction Approvals
30-Mar-15	8:40	Montezuma Mining Company Ltd	Exploration	Justin Brown	Gordon Murray (Gold Road)	Gruyere	Email from Gordon Murray to Justin Brown with attached 'Letter of Authority' addressed to Justin Brown (Managing Director of Montezuma Mining Company Ltd) requesting permission to conduct L2 autumn flora survey over Montezuma's tenement E38/2999.	Email Letter	20150327MontezumaLv2FloraSur veyAccess	Approvals Flora survey
30-Mar-15	10:31	Department of Mines and Petroleum	Operations, Environment	Lawson Brandis (DMP)	Kristy Sell (MBS)	Gruyere	Email from Lawson Brandis providing advice on the query for gravel extraction and how it can be developed under a PoW.	Email	Gravel extraction Query	Gravel extraction Approvals
30-Mar-15	13:29	Montezuma Mining Company Ltd	Exploration	Brad Drabsch	Gordon Murray (Gold Road)	Gruyere	Email between Gordon Murray and Bradley Drabsch with permission from Brad Drabsch (Exploration Manager) to conduct L2 autumn flora survey over Montezuma's tenement E38/1299.	Email	20150327MontezumaLv2FloraSur veyAccess	Approvals Flora survey
30-Mar-15	15:20	Montezuma Mining Company Ltd	Exploration	Brad Drabsch	Gordon Murray (Gold Road)	Gruyere	Email between Gordon Murray and Bradley Drabsch confirming that agreement to provide Montezuma with raw flora and vegetation data where it covers E38/2999 only. The final report will remain with Gold Road.	Email	20150327MontezumaLv2FloraSur veyAccess	Approvals Flora survey
30-Mar-15	16:19	Montezuma Mining Company Ltd	Exploration	Brad Drabsch	Gordon Murray (Gold Road)	Gruyere	Email between Gordon Murray and Bradley Drabsch confirming the agreement to provide Gordon with the signed letter to conduct the flora survey over Montezuma's tenement.	Email	Access For Level 2 Flora Survey Over Gruyere Area By Gold Road	Approvals Flora survey
20-Apr-15	9:15	Department of Parks and Wildlife	Nature Protection Branch	Danny Stefoni (DPaW)	Nicole Garbin (MBS) Talia Warda (MBS)	Gruyere	Email from Danny Stefoni providing a Licence to take fauna for scientific purposes for the subterranean fauna survey.	Email	Licence Copy	Subterranean Survey

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
23-Apr-15	10:10	Traditional Owners	Yilka People	HM (Harvey Murray senior) / HJ (Harvey Murray junior) / Rowan Murray / Sebastien Murray / Hayley Westlake / Kassey Murray	Kate George (Rapallo)	Gruyere	Email from Kate George to the Traditional Owners regarding conversations had during level 2 spring fauna survey 2014 and queries regarding names of Traditional owners and whether any of the habitats or fauna of the area are of particular cultural significance.	Email	Information request for Gold Road Fauna Survey Report.	Fauna survey
5-May-15	15:44	Western Australian Museum (WAM)	Research Associate	Erich S. Volschenk (WAM)	Nicole Garbin (MBS) Kristy Sell (MBS) Gordon Murray (Gold Road)	Central Bore	Email between Nicole Garbin and Erich Volschenk requesting a copy of the scorpion report for Yamama.	Email	Scorpion Report for Yamama	Fauna survey
5-May-15	16:52	Western Australian Museum (WAM)	Research Associate	Erich S. Volschenk (WAM)	Nicole Garbin (MBS) Kristy Sell (MBS) Gordon Murray (Gold Road)	Central Bore	Email between Erich Volschenk and Nicole Garbin providing the scorpion report as an attachment and stating it was provided to KLA on 23/03/12.	Email	Scorpion Report for Yamama	Fauna survey
19-May-15	14:44	Department of Mines and Petroleum	Mineral Exploration	Tonya Carter (DMP)	Meg Bagby (Gold Road)	Central Bore	Email from Tonya Carter to Meg Bagby with queries regarding the PoW for gravel extraction.	Email	REG ID 54439-Programme of Work - Further Information Required	Approvals Gravel Extraction
20-May-15	All day	Traditional Owners	Yilka People	Yilka Community Meeting	Ian Murray (Gold Road) Sharon Goddard (Gold Road) Gordon Murray (Gold Road) Shaun Richardson (Gold Road) Rhys Davies (DLA Piper) Rebecca Shanahan (Ashurst)	Gruyere	General discussion on the development of the Gruyere project, benefits to the company and community.	Community Gathering	N/A	Community Negotiations
22-Jun-15	6:10	Traditional Owners	Yilka People	HM (Harvey Murray senior) / HJ (Harvey Murray junior) / Rowan Murray / Sebastien Murray / Hayley Westlake / Kassey Murray	Kate George (Rapallo)	Gruyere	Email from Kate George to the Traditional Owners following up on conversations had during level 2 spring fauna survey 2014.	Email	Information request for Gold Road Fauna Survey Report.	Fauna survey
23-Jun-15	All day	Traditional Owners	Yilka People	Yilka people (numerous from Cosmo Newberry) Giacomo Boranga Sean Calderwell Mladen Mverlj (CDNTS)	Glenn Firth (Gold Road) Sharon Goddard (Gold Road) Gordon Murray (Gold Road) Exploration personnel Rhys Davies (DLA Piper) Rebecca Shanahan (Ashurst)	Gruyere	Yilka claim members attended a preliminary site visit to generally view the proposed pit areas and mine camp and have cultural heritage discussions.	Community Gathering	N/A	Community Negotiations
24-Jun-15	All day	Senior men	Wati	Yilka people (numerous from Cosmo Newberry) and Wati	None	Gruyere	CONFIDENTIAL: Following a Wati meeting, Yilka, confirmed that the Wati did not consider there to be any threshold cultural heritage issues to Yilka continuing negotiations in relation to the proposed Gruyere pit location. This is on the basis that the pit will not extend more than 200 metres north of the large, northern most sand dune (i.e. the sand dune past drill line 51012.5 as shown on the plan distributed during the site visit).	Community Gathering	N/A	Community Negotiations

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24-Jun-15	13:00	Department of Mines and Petroleum	Strategic Projects	Ian Mitchell (DMP)	Glenn Firth (Gold Road)	Gruyere	Introduction meeting between DMP and GOR Approvals Manager and to provide a project update briefing and discussion around level 2 lead agency status.	Formal Meeting	N/A	Approvals Lead agency
26-Jun-15	13:00	Western Australian Museum (WAM)	Research Associate	Erich S. Volschenk (WAM)	Nicole Garbin (MBS) Kristy Sell (MBS) Kate George (Rapallo) Glenn Firth (Gold Road) Marieke Weeheim (Rapallo)	Gruyere	Meeting with Rapallo, MBS, Glenn Firth and WAM regarding SREs found during level 2 spring fauna survey in 2014 and SRE proposal for future work.	Formal Meeting	SRE Proposal Meeting with Glenn Firth	Fauna survey SREs
29-Jun-15	11:04	Department of Parks and Wildlife	Environmental Management Branch	Sandra Thomas (DPaW)	Kristy Sell (MBS)	Gruyere	Phone call from Kristy Sell to Sandra Thomas regarding arranging a meeting to discuss SREs and future SRE surveys.	Phone Call	SRE Meeting	Fauna survey SREs
30-Jun-15	11:22	Traditional Owners	Yilka People	HM (Harvey Murray senior) / HJ (Harvey Murray junior) / Rowan Murray / Sebastien Murray / Hayley Westlake / Kassey Murray	Kate George (Rapallo)	Gruyere	Email from Harvey Murray to Kate George with information regarding queries on L2 fauna survey, last names and what fauna are significant to the Yilka people.	Email	Information request for Gold Road Fauna Survey Report.	Fauna survey Community Negotiations
02-Jul-15	10:04	Department of Mines and Petroleum	Mineral Exploration	Tonya Carter (DMP)	Nicole Garbin (MBS) Glenn Firth (Gold Road) Meg Bagby (Gold Road)	Gruyere	Email from DMP to Meg Bagby regarding approval for the PoW for gravel extraction.	Email	PoW Approval REG ID 54439 - PoW - Approval Letter	Approvals Gravel Extraction
02-Jul-15	13:32	Department of Parks and Wildlife & Department of Mines and Petroleum	Environmental Management Branch	Sandra Thomas (DPaW) Ian Mitchell (DMP)	Kristy Sell (MBS) Glenn Firth (Gold Road) Nicole Garbin (MBS)	Gruyere	Email from Kristy Sell to Sandra Thomas (cc'ed Ian Mitchell) outlining the current project status and a request to have a meeting regarding SREs found, future SRE surveys and the opportunity to discuss surveys to date.	Email	Gold Road Gruyere Project	Approvals Fauna survey
07-Jul-15	9:54	Department of Parks and Wildlife	Environmental Management Branch	Sandra Thomas (DPaW)	Kristy Sell (MBS)	Gruyere	Email from Sandra Thomas to Kristy Sell responding to the request to have a meeting and to discuss SREs and surveys.	Email	Gold Road Gruyere Project	Approvals Fauna survey
14-Jul-15	16:51	Traditional Owners	Yilka People	HM (Harvey Murray senior) / HJ (Harvey Murray junior) / Rowan Murray / Sebastien Murray / Hayley Westlake / Kassey Murray	Kate George (Rapallo)	Gruyere	Email from Kate George to MBS with a memo attached regarding types of fauna that are culturally significant to the Yilka people and their last names.	Email Memo	Cultural Significance Memo.pdf	Fauna survey Community Negotiations
21-Jul-15	16:00	Office of the Environmental Protection Authority	Mining and Industrial Assessments Branch (North)	Sally Bowman (OEPA)	Glenn Firth (Gold Road)	Gruyere	Provide OEPA with an overview of the proposal to enable the OEPA to provide useful advice at the meeting. Include location, type of proposal, scale and duration of the proposal, potential key environmental factors, studies conducted and discussions with other agencies.	Email	Gold Road Gruyere Project	Approvals OEPA Referral
Mid-late Jul-15	All day	Traditional Owners	Yilka People			All	Cultural mapping fieldwork (male and female).	Fieldwork	N/A	Cultural Survey

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
6-Aug-15 / 7-Aug-15	2 days	Traditional Owners	Yilka People	Harvey Murray / Harvey Murray Junior / Gavin Murray Junior / Kassey Murray / Barron Bonney / Shaneane Weldon / Robyn Smythe	Ian Murray (Gold Road) Sharon Goddard (Gold Road) Glenn Firth (Gold Road)	All	Second negotiation meeting.	Meeting	N/A	Community Negotiations
13-Aug-15	17:00	Office of the Environmental Protection Authority, Department of Mines and Petroleum	Mining and Industrial Assessments Branch (North)	Sally Bowman (OEPA) Peter Tapsell (OEPA)	Glenn Firth (Gold Road)	Gruyere	Pre-referral information on the Gruyere Project	Email	N/A	Approvals OEPA Referral
14-Aug-15	All day	Representative members of Yilka and Central Desert Native Title Services	Yilka People / CDNTS	Harvey Murray / Gavin Murray Jnr / Barron Bonney / Kassey Murray / Harvey Murray Junior / Shaneane Weldon / Robin Smythe / Melissa Watts / Giacomo Boranga / Malcolm O'Dell / Marian Hennessy	Ian Murray (Gold Road) Gordon Murray (Gold Road) Sharon Goddard (Gold Road) Shaun Richardson (Gold Road) Glenn Firth (Gold Road)	Cosmo- Newberry	Gruyere Project Briefing meeting. Gold Road provided an update on the development of the Gruyere Project including discussion on the PFS which covered the proposed footprint and indicative infrastructure. There was a general discussion on required consents and what specific initiatives and benefits may be of interest to the Yilka people from mining at Gruyere.	Meeting	N/A	Community Negotiations
17-Aug-15 / 22-Aug-15	6 days	Representative members of Yilka and Central Desert Native Title Services	Yilka People	Harvey Murray / Harvey Murray Junior / Kassey Murray / Marika	Jim Williams (Botanica)	Gas Pipeline	Identifying and discussing flora, fauna and other matters that are significant to the Yilka that occur along the Midline gas pipeline route option.	Fieldwork	N/A	Fauna survey Flora survey Gas
20-Aug-15	11:16	Department of Mines and Petroleum	Strategic Projects	Ian Mitchell (DMP)	Glenn Firth (Gold Road)	Gas pipeline	Seeking a meeting with DMP-P as part of the 28/8 meeting to introduce the gas pipeline project and receive advice.	Email	N/A	Approvals Gas
27-Aug-15 / 28-Aug-15	All day	Traditional Owners	Yilka People	Yilka People community meeting	None	Gruyere	Yilka review and discussion on various expert reports regarding economics, environment and water for native title negotiations on the Gruyere Project. Meeting was attended by Yilka environmental and hydrological experts	Community Gathering	N/A	Community Negotiations
28-Aug-15	13:00	Department of Mines and Petroleum	Strategic Projects	Ian Mitchell / Trent Richards / Mike Wilde / Graham Cobby (DMP)	Glenn Firth (Gold Road) Wayne Trumble	Gruyere Gas pipeline	Provide DMP with an update on the baseline survey data, map out project approvals requirements for Gruyere, seek further advice from DMP on approvals pathways and timing, get clarity on which regulatory stakeholders we need to engage with and when this should occur. The gas pipeline project was also introduced to DMP-P at this meeting.	Formal Meeting and presentation	N/A	Approvals Gas
31-Aug-15	15:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA) Helen Lafuente (OEPA)	Nicole Garbin (MBS) Glenn Firth (Gold Road) Kristy Sell (MBS) Sharon Goddard (Gold Road)	Gruyere	Pre-referral meeting held with the OEPA to provide a project briefing presentation and discussion regarding Part IV approvals.	Meeting	150813 GF EPA Pre-referral Meeting (Mine).pptx OEPA meeting outcomes	Approvals

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
01-Sep-15	10:30		Cultural Mapping	Malcolm O'Dell / Giacomo Boranga / Mladen Mverjl / Sean Calderwell	Sharon Goddard (Gold Road) Glenn Firth (Gold Road) Rebecca Shanahan	Gruyere	Meeting to discuss arrangement and agree outcomes from the Gruyere Cultural Mapping desktop and fieldwork surveys	Meeting	N/A	Cultural Survey
01-Sep-15	13:50	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road)	Gruyere	Email from Glenn Firth to Peter Tapsell, thanking the OEPA for their time and feedback and invited the OEPA for a day trip to Gruyere.	Email	Site Visit	Approvals Site Visit
02-Sep-15	12:26	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road)	Gruyere	Email from Peter Tapsell to Glenn Firth stating that the pre-referral meeting was very useful and clarified matters. Peter declined the offer of a site visit and stated that if the EPA decides to formally assess the proposal then may take up the offer of a site visit.	Email	Re: Site Visit	Approvals Site Visit
02-Sep-15	14:18	Department of Environment Regulation	Licensing	Danielle Eyre (DER)	Nicole Garbin (MBS) Glenn Firth (Gold Road) Kristy Sell (MBS) Sharon Goddard (Gold Road)	Gruyere	Email from Nicole Garbin to Danielle Eyre to introduce the Gruyere project and request a briefing meeting. This was a result of the OEPA meeting held on 31/08/15 where OEPA suggested that Gold Road make contact with DER at this stage of the project as OEPA and DER liaise closely on Referral documents.	Email	Gold Road Gruyere Project - DER briefing meeting	Approvals Works Approval
03-Sep-15			Native Title Negotiations	Yilka		Gruyere	Received Yilka/CNAC Proposal for the Gruyere Native Title Agreement.	Email	N/A	Approvals
03-Sep-15	15:28	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road)	Gruyere	Email from Glenn Firth to Peter Tapsell, suggesting that Gold Road submit the draft Referral form and supporting document to give OEPA time to look at it before a second meeting is arranged with the OEPA.	Email	Re: Site Visit	Approvals Site Visit
03-Sep-15	15:36	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road)	Gruyere	Email from Peter Tapsell to Glenn Firth confirming that submission of the draft Referral form and supporting document to the OEPA before a second meeting is appropriate.	Email	Re: Site Visit	Approvals Site Visit
08-Sep-15	10:16	Department of Environment Regulation	Licensing	Danielle Eyre (DER)	Nicole Garbin (MBS) Glenn Firth (Gold Road) Kristy Sell (MBS)	Gruyere	Phone call to Danielle Eyre to discuss email from 02/09/15 regarding organising a briefing meeting. Voice message left and followup email sent.	Phone call Email	RE: Gold Road Gruyere Project - DER briefing meeting	Approvals Works Approval
09-Sep-15			Native Title Negotiations	Yilka			Provided Yilka/CNAC with Gold Road's response to their Proposal for the Gruyere Native Title Agreement	Email	N/A	Approvals
11-Sep-15	13:15	Wildflower Society WA		Brian Moyle (Wildflower Society of WA)	Glenn Firth (Gold Road)	Gruyere	Email introducing WSWA to the project and an offer to provide more information if the project is of interest to them. They will be available in October.	Email	N/A	Approvals
11-Sep-15	13:20	Conservation Council WA (Wilderness Society at same address)		Nic Dunlop	Glenn Firth (Gold Road)	Gruyere	Email introducing CCWA to the project and an offer to provide more information if the project is of interest to them.	Email	N/A	Approvals
11-Sep-15	13:25	Great Victoria Desert Biodiversity Trust		Kathryn Sinclair (GVD)	Glenn Firth (Gold Road)	Gruyere	Email introducing GVDBT to the project and an offer to provide more information if the project is of interest to them.	Email	N/A	Approvals

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
15-Sep-15	10:21	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista thanking Amy for going through the new process and informing Amy he will get the company registered. Nathan submitted a paper version of the 26D application and the Letter of Authority from Gold Road.	Email	26D Licence Application for Gold Roads Yamarna Project	Approvals Water
15-Sep-15	11:00	Great Victoria Desert Biodiversity Trust		Kathryn Sinclair (GVD)	Glenn Firth (Gold Road)	Gruyere	Meeting to discuss in more detail the function of GVDBT, how it contributes to biodiversity conservation, and how the Gruyere project may become involved in the trust if Ministerial conditions dictate.	Email	N/A	Approvals GVD
16-Sep-15	8:37	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Amy Evangelista to Nathan Tetlaw asking Nathan to clarify where the proposed bores are located.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
16-Sep-15	9:35	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista, providing proposed bore information.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
17-Sep-15	17:15	Shire of Laverton	Councillors	Steven Deckert (CEO) / Cr Patrick Hill / Cr Beatrice Fuamatu / Cr Geoff Walder / Russell Williams / Graham Stanley	Glenn Firth (Gold Road) Leigh Beck (Gold Road)	Gruyere Gas pipeline Access roads	Provide SoL with an update on the project and seek advice on local government approvals required and timing. The gas pipeline project, water supply and transport routes were also introduced to SoL at this meeting.	Formal Meeting Presentation	N/A	Local Government
21-Sep-15 / 22-Sep-15	2 days	Traditional Owners	Yilka People	Harvey Murray / Harvey Murray Junior / Gavin Murray Junior / Kassey Murray / Barron Bonney / Shaneane Weldon / Robyn Smythe.	Martin Pyle Sharon Goddard (Gold Road) Glenn Firth (Gold Road)	All	First formal native title negotiation meeting for the Gruyere Project. Prior to the meeting the parties had exchanged proposals for the Gruyere Project. The proposals covered all areas of interest including, Agreement Consents, Employment and Contracting, Communication and Consultation, Management Measures and Compensation and Financial Benefits.	Meeting		Community Negotiations
23-Sep-15 / 25-Sep-15	3 days	Senior men		Senior men	None	Gruyere Gas pipeline Access roads	Cultural mapping of the Gruyere project area footprint, including access roads, borefields and gas pipelines was conducted by <i>Wati</i> who have the cultural authority for the area.	Survey		Cultural heritage
1-Oct-15	9:00	Central Desert Native Title Services	Yilka People	Giacomo Boranga / Malcolm O'Dell	Justin Osborne (Gold Road) Glenn Firth (Gold Road) Sharon Goddard (Gold Road)	All	Outcomes of the cultural mapping exercise by TO's and identification of <i>tjukurrpa</i> 'windows' that GOR can design infrastructure corridors within.	Meeting		Cultural heritage
07-Oct-15	10:23	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Nicole Garbin (MBS)	Gruyere	Email to Peter Tapsell to enquire about the submission of the EPA referral document and supporting form as a 'draft' (as requested by the EPA during the meeting of 31 August) and the timeframe for assessment.	Email	Gold Road Gruyere Project Referral	Approvals OEPA Referral
08-Oct-15	9:38	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Nicole Garbin (MBS)	Gruyere	Email from Peter Tapsell to say that he would like to see a draft of the EPA referral document first and then the 28 days assessment period would start from the formal submission to the EPA of the final document.	Email	Gold Road Gruyere Project Referral	Approvals OEPA Referral
9-Oct-15			Native Title Negotiations	Yilka / CNAC	Gold Road	Gruyere	Gold Road provided and Updated Proposal on matters the subject of the native title negotiations for Yilka/CNAC to consider.	Email	N/A	Community Negotiations

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13-Oct-15	15:01	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista, asking about how the 26D licence application is tracking.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
14-Oct-15	9:18	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Amy Evangelista to Nathan Tetlaw, advising that an officer has picked up the 26D licence application as of 13/10/15 and that Amy has let them know that Nathan plans on commencing drilling on 1/11/15.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
15-Oct-15 / 16-Oct-15	2 days	Traditional Owners	Yilka People	Harvey Murray / Harvey Murray Junior / Gavin Murray Junior / Kassey Murray / Barron Bonney / Shaneane Weldon / Robyn Smythe.	Ian Murray (Gold Road) Justin Osborne (Gold Road) Sharon Goddard (Gold Road) Glenn Firth (Gold Road) Rebecca Shanahan / Tony Shaw / Geoff Gishubl / Phil Mirabella	Gruyere	Fourth negotiation meeting. Formal native title negotiation meeting. Meeting to discuss the further proposals by the Parties on matters pertaining to: Consents, Employment and Contracting; Management Measures; Communication and Consultation; Compensation and Financial Benefits. The Parties could not reach agreement on all matters and both Parties were agreed to provide further details on elements of their respective proposals	Meeting		Community Negotiations
22-Oct-15	15:23	Department of Water	Licensing Compliance	Amy Evangelista (DoW) Ellam Reception	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista, submitting an annual environmental monitoring report for the Yamarna Project for GWLs 176189 and 177087.	Email	Gold Road - Yamarna Project Annual Monitoring Report	Approvals Water
23-Oct-15	1 day	Traditional Owners	Yilka People	Yilka/CNAC	Ian Murray (Gold Road) Sharon Goddard (Gold Road) Glenn Firth (Gold Road) Wayne Foote	Tropicana	A tour of the Tropicana Gold Mine was undertaken with Yilka to provide a working example of an operating mine, noting differences in size and scale compared to Gruyere proposal.	Site Visit	N/A	Cultural Heritage Approvals
26-Oct-15	15:22	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS)	Gruyere	Email from Kristy Sell to Peter Tapsell advising that the EPA referral is ready for submission as a draft and asking for an indicative timeframe in which the EPA will be able to review prior to formal submission (Two phone messages were left for Peter Tapsell on 26/10/15 at 15:15 and on 27/10/15 at 12:00).	Email Phone Call	Gold Road Gruyere Project Referral	Approvals OEPA Referral
27-Oct-15	13:54	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista asking if there is any news regarding the 26D licence application.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
28-Oct-15	10:25	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS)	Gruyere	Email from Peter Tapsell to Kristy Sell advising that the EPA will be able to review the draft referral within a week.	Email	Gold Road Gruyere Project Referral	Approvals OEPA Referral
28-Oct-15	17:12	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS) Nicole Garbin (MBS) Glenn Firth (Gold Road) Sim Lau (Gold Road) Ian Mitchell (DMP)	Gruyere	Email from Nicole Garbin to Peter Tapsell, Helen Lafuente and Ian Mitchell, submitting a draft version of the EPA Referral Supporting Document and Form for EPA review (figures, appendices, fully compiled report available on dropbox link).	Email	Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
28-Oct-15	13:40	Department of Water	Licensing	Andrew Naskos (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Andrew Naskos to Nathan Tetlaw, providing a copy of the 26D licence application and stating that the hard copy is in the mail.	Email	RE: 26D Licence Application for Gold Roads Yamarna Project	Approvals Water
28-Oct-15	17:49	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS) Nicole Garbin (MBS) Glenn Firth (Gold Road) Sim Lau (Gold Road) Ian Mitchell (DMP)	Gruyere	Email from Nicole Garbin to Peter Tapsell, Helen Lafuente, Ian Mitchell, advising that the referral is for the Gruyere Project and potable borefield water supply and that that process water borefield will be subject to a separate referral submission upon completion of investigations.	Email	Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
29-Oct-15	9:43	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS) Nicole Garbin (MBS) Glenn Firth (Gold Road) Sim Lau (Gold Road)	Gruyere	Email from Peter Tapsell to Nicole Garbin, advising that Peter will provide feedback regarding the EPA referral by Wednesday 4th November 2015.	Email	Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
03-Nov-15	8:55	Office of the Environmental Protection Authority	Mining and Industrial Assessments Branch (North)	Ben Miles (OEPA)	Nicole Garbin (MBS)	Gruyere	Email from Ben Miles to Nicole Garbin, requesting a link to be sent in order to access the EPA referral documents.	Email	RE: Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
03-Nov-15	9:00	Office of the Environmental Protection Authority	Mining and Industrial Assessments Branch (North)	Ben Miles (OEPA)	Kristy Sell (MBS) Nicole Garbin (MBS) Glenn Firth (Gold Road)	Gruyere	Email from Nicole Garbin to Ben Miles with link to access EPA referral documents.	Email	RE: Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
04-Nov-15	12:21	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Nicole Garbin (MBS)	Gruyere	Email from Peter Tapsell with four review comments regarding the EPA referral.	Email	RE: Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
04-Nov-15	12:44	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Nicole Garbin (MBS)	Gruyere	Email from Nicole Garbin to Peter Tapsell thanking Peter and stating the matters and review comments will be addressed.	Email	RE: Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
04-Nov-15	15:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS)	Gruyere	Phone call from Kristy Sell to Peter Tapsell re: EPA's feedback on their draft review of the EPA Referral.	Phone Call	RE: Gold Road Resources EPA Referral Submission - Draft	Approvals OEPA Referral
04-Nov-15	15:32	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS)	Gruyere	Email from Peter Tapsell to Kristy Sell advising that a meeting has been arranged with Anthony Sutton for 6 November 2015 at 2pm at the OEPA offices.	Email	Meeting re Gruyere Gold Mine	Approvals OEPA Referral
04-Nov-15	16:24	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Kristy Sell (MBS)	Gruyere	Email from Kristy Sell to Peter Tapsell confirming attending at the meeting to discuss EPA's feedback on the draft EPA referral.	Email	RE: Meeting re Gruyere Gold Mine	Approvals OEPA Referral
04-Nov-15		Traditional Owners	Native Title Negotiations	Yilka/CNAC	Sharon Goddard (Gold Road)		Gold Road provided an Updated Proposal on matters the subject of the native title negotiations for Yilka/CNAC to consider.	Email	N/A	Cultural Heritage Approvals
05-Nov-15	15:47	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Nicole Garbin (MBS) Kristy Sell (MBS) Glenn Firth	Gruyere	Email from Nicole Garbin to Peter Tapsell confirming names of who will attend the meeting on 6 November 2015, this being Kristy Sell, Glenn Firth, Sim Lau, Don Scott and Nicole Garbin.	Email	RE: Meeting re Gruyere Gold Mine	Approvals OEPA Referral
06-Nov-15	14:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA) Anthony Sutton (OEPA)	Nicole Garbin (MBS) Kristy Sell (MBS) Glenn Firth (Gold Road) Sim Lau (Gold Road)	Gruyere	Meeting at OEPA offices to discuss the EPA feedback on the draft version of the EPA referral.	Meeting	EPA Referral Draft Version October 2015	Approvals OEPA Referral
16-Nov-15	16:00	Central Desert Native Title Services	Yilka People	Giacomo Boranga Malcolm O'Dell	Sharon Goddard (Gold Road) Ian Murray (Gold Road) Glenn Firth (Gold Road) Phil Mirebella (Gold Road)	Gruyere	Outcomes of the cultural mapping exercise by TO's and issues around the northern dune sensitive area.	Meeting	N/A	Cultural Heritage

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
19-Nov-15 / 20-Nov-15	2 days	Traditional Owners	Yilka People	Harvey Murray Harvey Murray Junior Gavin Murray Junior Kassey Murray Barron Bonney Shaneane Weldon Robyn Smythe	Ian Murray (Gold Road) Sharon Goddard (Gold Road) Glenn Firth (Gold Road) Rebecca Shanahan Geoff Gishubl Phil Mirabella Wayne Foote	Gruyere	Fifth formal native title negotiation meeting. Meeting to discuss the further proposals by the Parties on matters pertaining to: Consents, Employment and Contracting; Management Measures; Communication and Consultation; Compensation and Financial Benefits. The Parties could not reach agreement on all matters and both Parties were agreed to provide further details on elements of their respective proposals.	Meeting	N/A	Cultural Heritage Approvals
25-Nov-15	14:11	Department of Water	Licensing	Amy Evangelista (DoW)	Glenn Firth (Gold Road) Rob Braaten (Pennington Scott)	Gruyere	Meeting request from Amy Evangelista to Rob Braaten and Glenn Firth regarding meeting up to handover the H3 report to the DoW in Victoria Park, discuss licencing and provision of a small presentation in regards to the project.	Email	FW: Meeting to discuss Gold Road Resources	Approvals Water
27-Nov-15	17:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Peter Tapsell (OEPA)	Nicole Garbin (MBS) Kristy Sell (MBS) Glenn Firth (Gold Road)	Gruyere Gas Pipeline	Email from Glenn Firth to Peter Tapsell explaining that the combined mine and water EPA referral document for the Gruyere Project is being written. Also, that the flora and fauna studies along the gas pipeline route have been completed and requesting a pre-referral meeting for the gas pipeline with Ian Mitchell present for December 2015 or January 2016.	Email	Gas Pipeline Project	Approvals OEPA Referral
02-Dec-15	13:03	Department of Water	Licensing	Amy Evangelista (DoW) Chris O'Boy (DoW)	Don Scott (Pennington Scott)	Gruyere	Email from Don Scott to Amy Evangelista (Cc Chris O'Boy) from DoW, thanking DoW for meeting. Don Scott submitted two 5C amendment applications to DoW for L38/244, L38/248 and provided an FTP link to the updated version of the H3 report (hard copy also provided).	Email	Gold Road Resources 5C amendment application	Approvals Water
02-Dec-15	13:20	Department of Water	Licensing	Amy Evangelista (DoW) Chris O'Boy (DoW)	Don Scott (Pennington Scott)	Gruyere	Email from Amy Evangelista to Don Scott (Cc Chris O'Boy) , thanking Don for the revised H3 report. Amy Evangelista advised that she had forwarded the applications to Ellam Reception for processing.	Email	RE: Gold Road Resources 5C amendment application	Approvals Water
04-Dec-15	13:50	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Nathan Tetlaw to Amy Evangelista, submitting an application for an additional 26D licence at Yamarna, which covered drilling slightly east of the current drilling and included a list of targets in the area. Nathan also included a letter of authority and a typical bore construction picture.	Email	TRIM: 26D Licence Application for Gold Road Resources Yamarna Project	Approvals Water
04-Dec-15	8:12	Department of Water	Licensing	Amy Evangelista (DoW)	Nathan Tetlaw (Pennington Scott)	Gruyere	Email from Amy Evangelista to Nathan Tetlaw confirming receipt of the 26D licence application and stating she has passed the application onto reception for processing.	Email	TRIM: 26D Licence Application for Gold Road Resources Yamarna Project	Approvals Water
15-Jan-16	11:00	Gold Fields	Granny Smith Mine	Gemma Class	Sharon Goddard (Gold Road) Glenn Firth (Gold Road)	Gas Pipeline	Alignment around Granny Smith Mine. L38-245	Meeting	N/A	Approvals Gas
20-Jan-16	14:43	Office of the Environmental Protection Authority	Assessment and Compliance Division	Chris Stanley (OEPA)	Nicole Garbin (MBS) Kristy Sell (MBS) Glenn Firth (Gold Road)	Gas Pipeline	Email from Kristy Sell to Chris Stanely of OEPA requesting a meeting to make a presentation to the OEPA regarding Gold Road's gas pipeline project and to discuss whether there would be a need for a referral.	Email	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas
22-Jan-16	15:43	Office of the Environmental Protection Authority	Assessment and Compliance Division	Robert Hughes (OEPA)	Nicole Garbin (MBS)	Gas Pipeline	Phone call from Nicole Garbin to Robert Hughes, returning Robert's call.	Phone Call	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
23-Jan-16	16:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Robert Hughes (OEPA) Sally Bowman (OEPA)	Kristy Sell (MBS)	Gas Pipeline	Phone call and email from Robert Hughes to Kristy Sell regarding arranging a meeting to discuss the gas pipeline project for a week when Sally Bowman has returned to the office and questions regarding who will operate the pipeline and if the mine will operate under diesel gen sets in the early stage.	Email Phone Call	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas
29-Jan-16	9:26	Office of the Environmental Protection Authority	Assessment and Compliance Division	Robert Hughes (OEPA) Sally Bowman (OEPA)	Kristy Sell (MBS)	Gas Pipeline	Email from Kristy Sell to Robert Hughes advising that Gold Road would like to meet with Sally Bowman and for Robert to organise a meeting date and details.	Email	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals OEPA Referral
29-Jan-16	10:34	Office of the Environmental Protection Authority	Assessment and Compliance Division	Robert Hughes (OEPA) Sally Bowman (OEPA)	Kristy Sell (MBS)	Gas Pipeline	Email from Robert Hughes to Kristy Sell advising that Sally Bowman can meet up from 11-12pm on 4/02/16 and asks if that is a suitable time.	Email	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas
04-Feb-16	11:00	Office of the Environmental Protection Authority	Assessment and Compliance Division	Chris Stanley (OEPA) Sally Bowman (OEPA)	Kristy Sell (MBS) Glenn Firth (Gold Road) Sim Lau (Gold Road)	Gas Pipeline	Meeting with OEPA to discuss referral of the gas pipeline project.	Meeting	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas
12-Feb-16	11:56	Department of Environment Regulation	Licensing	Clarrie Green (DER)	Nicole Garbin (MBS)	Gruyere Project	Email from Nicole Garbin to Clarrie Green querying who to contact within DER to provide a briefing presentation about the Gruyere Project.	Email	Gruyere Gold Project	Approvals Works Approval
12-Feb-16	13:54	Department of Environment Regulation	Licensing	Clarrie Green (DER) Tim Gentle (DER)	Nicole Garbin (MBS)	Gruyere Project	Email from Clarrie Green to Nicole Garbin advising that Tim Gentle is the person to contact to discuss the Gruyere Project and that Tim will assign the Project to a DER officer and then a scoping meeting will be arranged after that.	Email	RE: Gruyere Gold Project	Approvals Works Approval
16-Feb-16	13:00	Department of Mines and Petroleum	Operations, Environment and Native Vegetation Branch	Ian Mitchell (DMP) Jeremy Quartermaine (DMP)	Glenn Firth (MBS) Nicole Garbin (MBS)	Gas Pipeline	Meeting with DMP to provide a briefing regarding the gas pipeline project and to discuss the project approvals and schedule.	Meeting	Meeting for Gold Road Gruyere Project Gas Pipeline Proposal	Approvals Gas
16-Feb-16	22:29	Office of the Environmental Protection Authority	Assessment and Compliance Division	Sally Bowman (OEPA)	Glenn Firth (MBS) Nicole Garbin (MBS) Kristy Sell (MBS)	Gruyere Project	Email from Kristy Sell to Sally Bowman regarding how Gold Road have continued baseline stygofauna studies for the borefields and Bennelongia are in the final stages of compiling results from sampling undertaken in late 2015 and early 2016. Kristy asked for a meeting with Sally and whoever in the OEPA has stygofauna technical expertise to discuss the referral and make sure it presents the information required for the OEPA to make a decision on the assessment level.	Email	Request for Gruyere Project Meeting	Approvals OEPA Referral Subterranean Fauna
17-Feb-16	12:03	Office of the Environmental Protection Authority	Assessment and Compliance Division Terrestrial Ecosystems Branch	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA)	Glenn Firth (MBS) Kristy Sell (MBS)	Gruyere Project	Email from Sally Bowman to Kristy Sell regarding Gold Road's request for a meeting on stygofauna. Sally advised that Chris Stanley and their Terrestrial Ecosystems branch will liaise directly with Kristy regarding setting up a meeting. In order to help the OEPA provide useful advice, an evaluation on how the proponent has applied the relevant considerations of policy and guidance relating to stygofauna and the proponent's view on whether there has been consistency with that policy, needs to be provided to OEPA.	Email	FW: Request for Gruyere Project Meeting	Approvals OEPA Referral Subterranean Fauna

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
17-Feb-16	22:21	Office of the Environmental Protection Authority	Assessment and Compliance Division Terrestrial Ecosystems Branch	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA)	Glenn Firth (MBS) Kristy Sell (MBS) Stuart Halse (Bennelongia)	Gruyere Project	Email from Kristy Sell to Sally Bowman regarding a meeting to discuss stygofauna. Kristy advised that Stuart Halse will put the information together regarding considerations of policy and how Bennelongia are mindful of EPA guidance statement requirements. Kristy advised that the main reason Gold Road is looking to meet with the OEPA is to get some guidance on what the EPA consider acceptable levels of drawdown for stygofauna habitat as it is a topical subject for some of the uranium projects undergoing assessment.	Email	RE: Request for Gruyere Project Meeting	Approvals OEPA Referral Subterranean Fauna
19-Feb-16	15:42	Department of Environment Regulation	Licensing	Clarrie Green (DER) Tim Gentle (DER)	Nicole Garbin (MBS) Kristy Sell (MBS) Glenn Firth (Gold Road)	Gruyere Project	Email from Nicole Garbin to Tim Gentle requesting to arrange a scoping meeting regarding the Gruyere Project to discuss works approvals and licencing.	Email	FW: Gruyere Gold Project	Approvals Works Approval
22-Feb-16	9:26	Office of the Environmental Protection Authority	Assessment and Compliance Division Terrestrial Ecosystems Branch	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Stuart Halse (Bennelongia)	Gruyere Project	Email from Chris Stanley to Kristy Sell and Sally Bowman stating that Chris has spoken to the Terrestrial Ecosystems Branch and advised they have a number of competing priorities and are not free to meet till next week at the earliest. It was advised to provide the information up front to have a quick review and from that they can provide early guidance on potential impacts to stygofauna. This may also negate the need for a meeting.	Email	RE: Request for Gruyere Project Meeting	Approvals OEPA Referral Subterranean Fauna
18-Feb-16	15:00	Shire of Laverton	Councillors	Russell Williams	Glenn Firth (Gold Road) Sharon Goddard (Gold Road)	Gruyere Project Gas Pipeline	I38-245 Alignment around Laverton.	Formal meeting	N/A	Approvals Local Government
18-Feb-16	17:15	Shire of Laverton	Councillors	Steven Deckert (CEO) Cr Patrick Hill Cr Beatrice Fuamatu Cr Geoff Walder Russell Williams Graham Stanley	Glenn Firth (Gold Road) Sharon Goddard (Gold Road)	Gruyere Project Gas Pipeline	Provide SoL with an update on the project and seek advice on local government approvals required and timing. The gas pipeline project, water supply and transport routes were also introduced to SoL at this meeting.	Formal meeting	N/A	Approvals Local Government
02-Mar-16	19:17	Office of the Environmental Protection Authority	Assessment and Compliance	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA) Registrar (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Sim Lau (Gold Road) Nicole Garbin (MBS)	Gruyere Project	Email from Kristy Sell to Sally Bowman, Chris Stanley, Maree Heath and the registrar, submitting the EPA Referral form. Kristy advised that the referral will comprise 2 documents i.e. the form and supporting document and that given document sizes, the submission will be sent in parts in addition to shapefiles and a hard copy will be sent in the mail.	Email	Gruyere Project EPA Referral	Approvals OEPA Referral
02-Mar-16	21:48	Office of the Environmental Protection Authority	Assessment and Compliance	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA) Registrar (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Sim Lau (Gold Road) Nicole Garbin (MBS)	Gruyere Project	Email from Kristy Sell to Sally Bowman, Chris Stanley, Maree Heath and the registrar, submitting the EPA Referral supporting document Part 1 and Part 2. Kristy advised that the appendices will be sent separately.	Email	Gruyere Project EPA Referral Part 2	Approvals OEPA Referral
03-Mar-16	12:09	Office of the Environmental Protection Authority	Assessment and Compliance	Sally Bowman (OEPA) Chris Stanley (OEPA) Maree Heath (OEPA) Registrar (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Sim Lau (Gold Road) Nicole Garbin (MBS)	Gruyere Project	Email from Nicole Garbin to Sally Bowman, Chris Stanley, Maree Heath and the registrar advising that Part 3 (the appendices) have been put onto dropbox due to their large size.	Email	RE: Gruyere Project EPA Referral Part 2	Approvals OEPA Referral

Date	Time	Govt Department/ Stakeholder	Section	Stakeholder Name(s)	Gold Road Member Name(s)	Project Area	Discussion/Outcomes	Consultation Type	Document Reference	Key Words
03-Mar-16	15:59	Office of the Environmental Protection Authority	Assessment and Compliance	Sally Bowman (OEPA) Chris Stanley (OEPA) Registrar (OEPA)	Glenn Firth (Gold Road) Kristy Sell (MBS) Nicole Garbin (MBS)	Gruyere Project	Email from Nicole Garbin to Sally Bowman, Chris Stanley and the registrar advising that the complete EPA referral submission i.e. Parts 1 to 3 as well as shapefiles and referral form have been put onto dropbox due to their large size and advising that a hard copy has been sent in the mail, express registered post. Nicole asked the EPA to provide receipt of the submission.	Email	Gruyere Project EPA Referral Submission	Approvals OEPA Referral
03-Mar-16	16:07	Office of the Environmental Protection Authority	Assessment and Compliance	Sally Bowman (OEPA) Chris Stanley (OEPA) Registrar (OEPA)	Nicole Garbin (MBS)	Gruyere Project	Email from Chris Stanley to Nicole Garbin to advise that the EPA has received the email submission of the EPA referral and that the referral will be processed through the EPA registrar email address.	Email	RE: Gruyere Project EPA Referral Submission	Approvals OEPA Referral
03-Mar-16	16:13	Office of the Environmental Protection Authority	Assessment and Compliance	Chris Stanley (OEPA)	Nicole Garbin (MBS) Glenn Firth (Gold Road) Kristy Sell (Gold Road)	Gruyere Project	Email from Nicole Garbin to Chris Stanley, thanking Chris for the receipt of EPA referral submission and advising Chris to contact Kristy Sell, Glenn Firth or Nicole Garbin if there are any queries.	Email	RE: Gruyere Project EPA Referral Submission	Approvals OEPA Referral
24-Mar-16	14:02	Office of the Environmental Protection Authority	Assessment and Compliance	Maree Heath (OEPA) Peter Tapsell (OEPA)	Glenn Firth (Gold Road) Kristy Sell (Gold Road)	Gruyere Project	Email from Maree Heath to Glenn Firth with a request for further information regarding the EPA Referral submission.	Email	FW: The Gruyere Project	Approvals OEPA Referral