GIDGEE GOLD PROJECT
SUBTERRANEAN FAUNA ASSESSMENT

PREPARED FOR:

PANORAMIC GOLD PTY LTD

PANORAMIC GOLD PTY LTD
Wholly Owned Subsidiary of Panoramic Resources Limited

SEPTEMBER 2013

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GIDGEE GOLD PROJECT
SUBTERRANEAN FAUNA ASSESSMENT

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EXECUTIVE SUMMARY

MBS Environmental (MBS) was engaged by Panoramic Gold Pty Ltd (Panoramic Gold) to identify potential subterranean habitats that may be affected by proposed mining activities at the Gidgee Gold Project (Gidgee). Gidgee is located in the East Murchison region of Western Australia. It is a historic mine that was continuously operated by a number of companies from 1987 to 2005, at which point it was placed on care and maintenance.

Panoramic Gold proposes to recommence mining at Gidgee. This will involve:

- Recommencement of open pit mining at the existing Wilsons, Swan Bitter and Swift deposits.
- Commencement of underground mining at Wilsons.
- Development of two new open cut mines; Specimen Well and Howards.

Following a desktop review of potential habitat for subterranean fauna it was determined that the geology and hydrogeology of Gidgee was suitable to support stygofauna but not significant or unique troglofaunal habitat. Based on this assessment no further investigation of troglofauna was undertaken. As Howards is a greenfields project within close proximity of the boundary for the Lake Mason Priority Ecological Community (PEC) (unique assemblages of invertebrates identified in the groundwater calcretes) it was decided that a preliminary stygofauna survey of the Gidgee area was necessary.

Based on the findings of the first sampling round conducted in September 2012, during which no stygofauna of significance were recovered from the central and northern tenements, a second round survey, with a focus on the southern tenements, including Howards, was conducted in December 2012. Stygofauna sampling comprised bailing and sieving of selected exploration holes, bores and wells within and outside the Howards pit area. 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was undertaken in accordance with Environmental Assessment Guideline 12 (for consideration of subterranean fauna), and Draft Guidance Statement 54a (for sampling of subterranean fauna) (Environmental Protection Authority (EPA) 2013, EPA 2007).

Sixteen stygofauna species were recorded from 10 of the 20 sites sampled during the sampling rounds. Nine of these are considered common and widespread within the region and Western Australia. One juvenile *Anzcyclops* sp. was collected and could not be identified to species level but is likely to be *Anzcyclops* sp. B04. The remaining six are new undescribed species based on morphological differences. These comprise:

- *Fierscyclops* sp. B07 – recovered from Howards only.
- *Anzcyclops* sp. B04 – recovered from three sample sites including Howards.
- *Australocamptus nr similis* – recovered from three sample sites.
- *Novanitocrella* sp. B1 – recovered from one sample site outside of proposed future mine dewatering areas.
- *Atopobathynella* sp. B14 – recovered from one sample site outside of proposed future mine dewatering areas.
- *Atopobathynella* sp. B15 (*nr hinzeae*) – recovered from three sample sites outside of proposed future mine dewatering areas.

One new and undescribed species was recorded at one location (HWRC185) within the anticipated dewatering cone of depression at Howards pit; *Fierscyclops* sp. B07. The presence of *Anzcyclops* sp. B04 at Howards and other locations, up to 13 kilometres west, implies that there is hydraulic connection linking the Howards aquifers to the regional hydrogeology which has allowed widespread colonisation of the species. This should equally apply to other species, including *Fierscyclops* sp. B07.

Western Australian Museum stygofauna records indicate that species composition associated with the Lake Mason PEC is markedly different to that found within the Howards and greater Gidgee area. This is indicative of the different aquifers within which these stygofauna reside, these being the secondary shearing/fracturing aquifer

system within the basalt and the near surface palaeochannel calcretes respectively. The absence of common stygofauna species also indicates that these aquifers are not hydraulically linked. Proposed dewatering and groundwater abstraction activities associated with the development of the Howards pit is therefore unlikely to impact on the distribution of the *Fierscyclops* sp. B07 species. The majority of species recorded are considered common and widespread at a regional level and elsewhere in Australia.

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1. INTRODUCTION

The Gidgee Gold Project (Gidgee) is located in the Gum Creek greenstone belt of the Yilgarn Craton in the East Murchison Mineral Field of Western Australia, approximately 640 km northeast of Perth (Figure 1).

Gidgee is owned and operated by Panoramic Gold Pty Ltd (Panoramic Gold), a wholly owned subsidiary of Panoramic Resources Limited (Panoramic). Gidgee is a historic mine that was continuously operated by a number of companies from 1987 to 2005, at which point it was placed on care and maintenance. The site consists of numerous pits and waste rock dumps, a processing plant, historical heap leach facility, tailings storage facility (TSF), airstrip, camp and other supporting infrastructure. The main infrastructure is located at Swan Bitter which is the central mining area servicing satellite pits to the north and south (Figure 2). The majority of the pits were extensively dewatered during the course of the mining below the water table.

Panoramic Gold proposes to recommence mining at Gidgee. This will involve recommencement of open cut mining at the existing Wilsons (M53/153), Swan Bitter (M57/19 and M57/33) and Swift (M57/19 and M57/72) deposits; commencement of underground mining at Wilsons; and development of two new open cut mines – Specimen Well (M51/186) and Howards (M57/236) (Figure 2).

Dewatering and lowering of the groundwater table is required to allow mining in dry conditions at depth. Groundwater will be abstracted and pumped to existing pits within the vicinity of each mining area and this water used for beneficiation. Potable water will continue to be pumped from Eagle Bore in the vicinity of Swan Bitter and the accommodation camp.

Surface disturbance, dewatering of the mine pit areas and groundwater abstraction from Eagle Bore are the main activities with the potential to impact subterranean faunal communities and habitat.

Following a desktop review of potential habitat for subterranean fauna it was determined that the geology and hydrogeology of Gidgee was suitable to support stygofauna but not significant or unique troglofaunal habitat. A detailed stygofauna survey comprising two sampling rounds was conducted during September and December 2012. The results of this survey and the potential for the proposed mining, dewatering and abstraction activities to impact on stygofauna are discussed in this report.

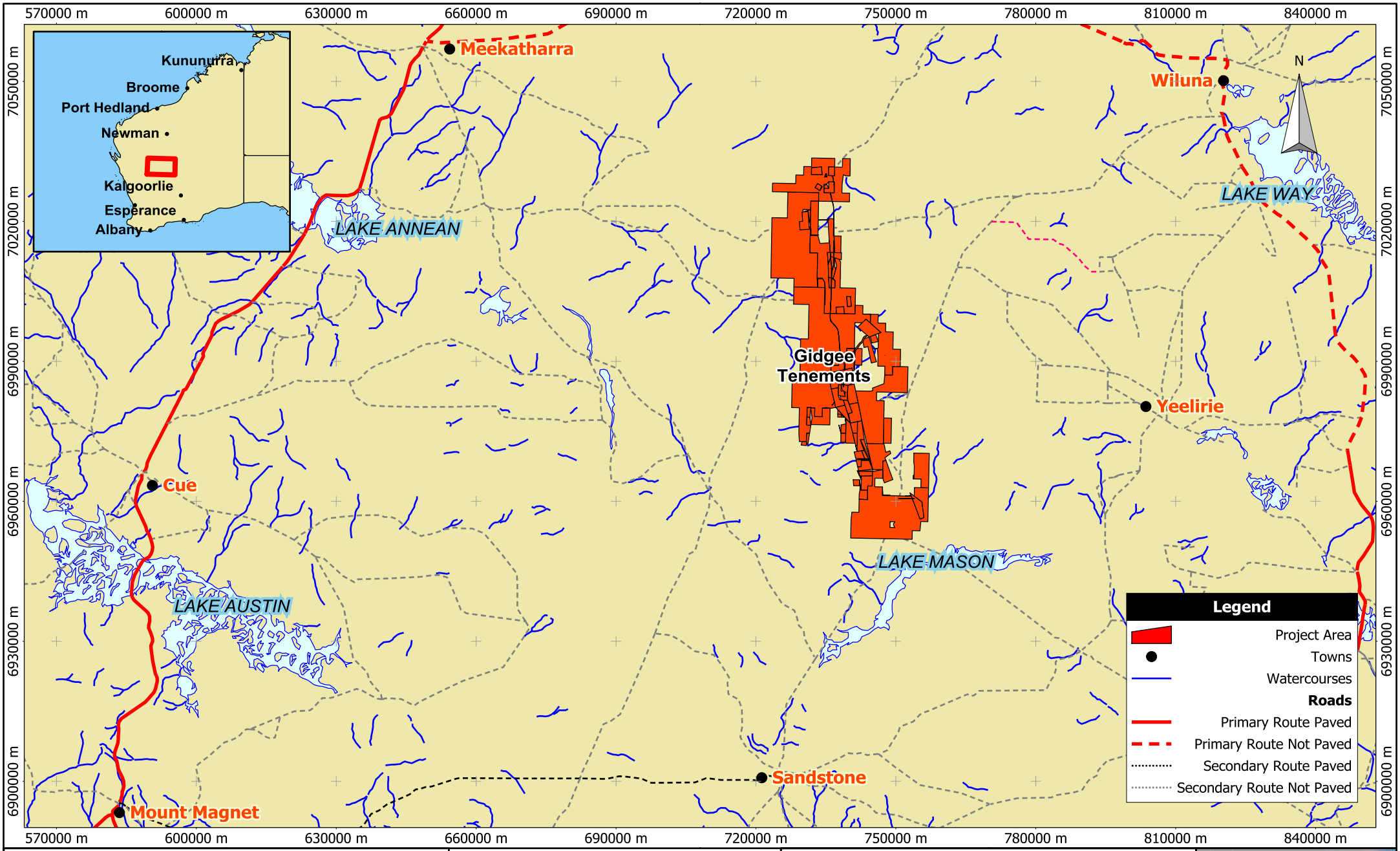

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Figure 1

Location Plan

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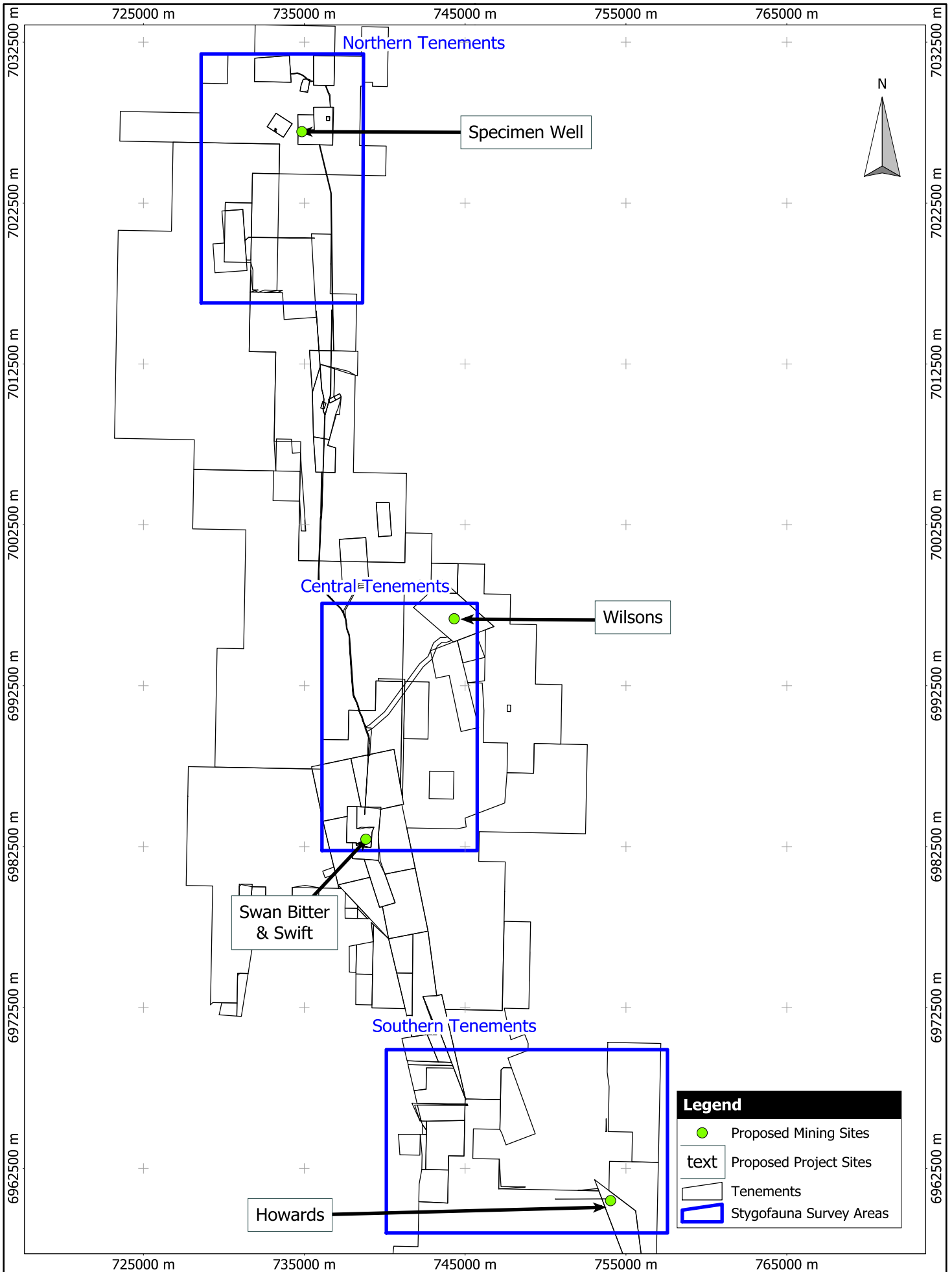

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Figure 2

Tenement and Mining Plan

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W:\Panoramic\Gidgee\Stygofauna\Drawings\Gidgee Stygofauna.map 2/07/2013 F2 Tenement and Mining Plan Layout

2. ASSESSMENT OBJECTIVES

The objectives of the Gidgee subterranean fauna assessment are to:

- Describe the geology, hydrogeology and the likely presence of subterranean habitat within and near the areas of potential impact at Gidgee.
- Where suitable habitat is identified, determine the presence of subterranean species and identify their distribution.
- Discuss the presence or absence of subterranean fauna in the context of potential impacts associated with proposed operations.

3. EXISTING ENVIRONMENT

3.1 CLIMATE

Gidgee lies within the semi-arid zone of Western Australia, characteristic of a Mediterranean climate with cool winters and hot, dry summers prevailing. The annual temperature regime is characterised by marked diurnal and seasonal fluctuations. The Sandstone weather station is the closest Bureau of Meteorology (BOM) weather station to Gidgee, located south of Gidgee tenements. Mean maximum summer temperatures may range between 35 and 40ºC, whilst the mean minimum winter temperatures may range between 3 and 9ºC (BOM 2012) (Chart 1).

Annual rainfall in the semi-arid zone is highly variable and subject to drought periods (Chart 1). The average annual rainfall is 250.3 mm, gauged by the Sandstone BOM weather station, with the months of May to July showing the greatest number of rain days. Rainfall is generally slightly higher during the winter months with typically light but consistent showers; whilst during summer, irregular storms occur resulting in higher intensity short duration rainfall events, typically from cyclonic activity. Total precipitation is unpredictable with annual totals recorded from as low as 120-570 mm after cyclonic rainfall in the summer/autumn months. Approximately once every 10 years, a large storm event may occur from the tail end of a subtropical depression, resulting in a typical rainfall of 200 mm over a 72 hour period. An important feature of rainfall in a semi-arid region is the localised nature of falls with one area receiving 20 mm or more in one rain event, whilst nearby areas may not receive any rainfall at all. Annual evaporation is high totalling approximately 2,500 mm.

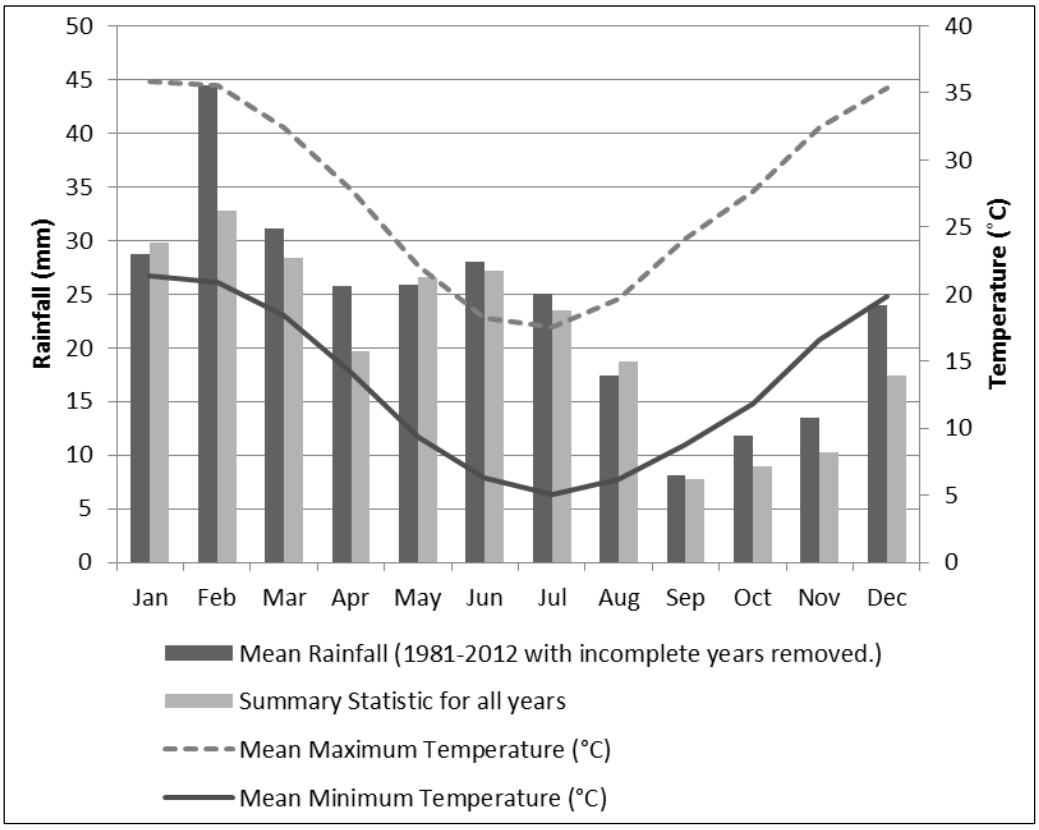

Chart 1: Mean Rainfall and Temperature at Sandstone Meteorological Station

3.2 GEOLOGY

Gidgee is situated within the Southern Cross Province of the Western Australian Archaean Yilgarn Craton. The project area covers most of the Gum Creek Greenstone Belt, a volcanic and sedimentary dominated sequence of Archaean rocks. A comprehensive geological map of the belt was completed in 1993 by Beeson et al. as shown in Figure 3.

The Gum Creek Greenstone Belt forms a lensoid, broadly sinusoidal structure about 110 km long (north-south) and 24 km wide (east-west). It is surrounded by intrusive granitoids that contain rafts of greenstones. The margins of the belt are typically dominated by contact-metamorphosed basalts and banded iron formations.

The greenstone sequence is relatively simple, with three broadly continuous major geological units occupying a large north-south synclinorium. The lowest unit consists of a sequence of interbedded banded iron formation and mafic and ultramafic volcanics overlain by ferruginous shales, shales and thin cherts. On the western margin of the belt this lower sequence has been partly intruded out by granites, and remains as thinner, discontinuous remnants.

The central unit consists of a sequence of basalts and felsic volcanics, contemporaneous dolerites, and lesser ultramafic volcanics and interflow sediments. The felsics contain quartz-sericite schists, quartz-biotite schists, and rhyolitic to andesitic fragmental volcanics, and contain sulphidic black shales. The unit has been intruded by differentiated gabbroic sills which range in composition from ultrabasic through pyroxenite to gabbro. The largest volume of gabbroic rock occurs in the central-eastern part of the belt, and the sills thin to the north and south.

The uppermost unit consists of shales, black shales, siltstones and minor cherts, with rare conglomerates and dolostones. It seldom outcrops, and has not been explored to the same extent as the lower units, so details of its lithologies and structure are not as well known.

Later granites are intruded along north-south zones for the length of the belt. They are generally unfoliated medium grained monzonitic bodies, and probably have a range of intrusion ages. They are not affected by the ductile deformation, but have been variously affected by later faulting. Intense silicification and epidotisation has occurred adjacent to all the internal granites.

The northern third of the belt is intruded by numerous west northwest to east northeast Proterozoic dolerite dykes. These do not crop out, but are clearly identified on the aeromagnetics.

Several early phases of tight to isoclinal folding have affected the banded iron formations of the lowest unit, and at least the latest of these has affected the upper units. Most axes have now been refolded into north-south parallelism.

The whole sequence has been refolded about tight north northeast axes, and this has produced two main synclines containing the upper sedimentary unit separated by a narrow anticline of the central unit basalts. This anticline contains the gold mineralisation at Gidgee, Heron, Reliance and Manakado. The western syncline appears to be doubly plunging, suggesting later open folding about east-west axes.

Faulting is complex throughout the Gum Creek Belt, and it is probable that the margins of the belt and many of the contacts between lithological units are fault controlled. The most prominent faulting occurs as regional-scale, north northwest ductile shear zones, which appear to control the gross distribution of gold mineralisation in the region.

Sinistral northeast to north northeast faulting and dextral and sinistral northwest faulting are common throughout the belt, and empirically the main mineralised areas, including Gidgee, are in zones where this faulting is more intense.

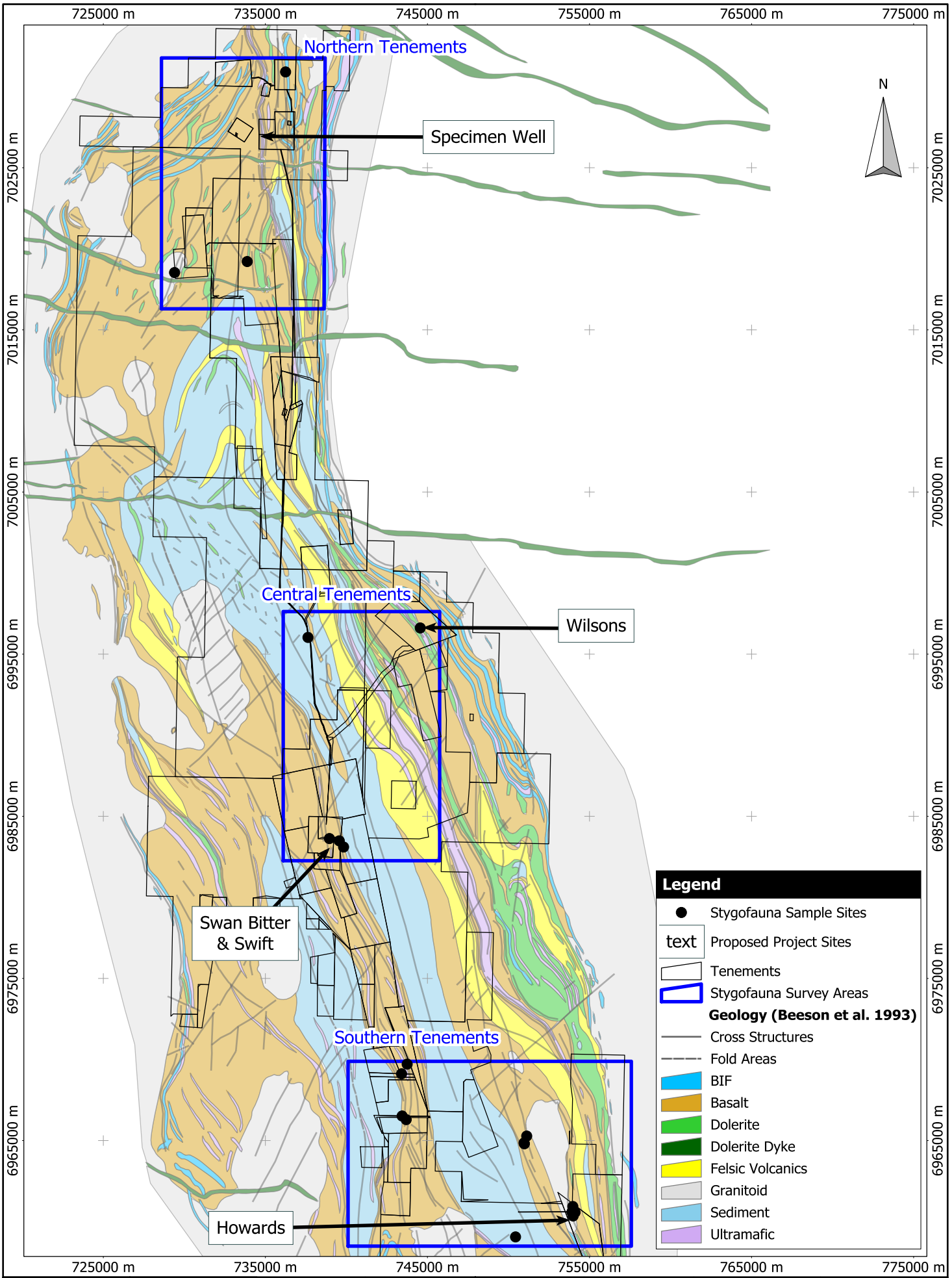

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Figure 3

Geological Map

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W:\Panoramic\Gidgee\Stygofauna\Drawings\Gidgee Stygofauna.map 2/07/2013 F3 Stygofauna Sample Sites Layout

Metamorphic grade in the supracrustal rocks is generally greenschist facies, with slightly higher grades (containing garnet-staurolite assemblages) in the northern areas. The margins of the belt have been contact-metamorphosed to amphibolite facies by the intrusion of the surrounding granites, with mafic amphibolites, garnet-muscovite and quartz-biotite assemblages being recorded.

3.3 HYDROGEOLOGY

The hydrogeology of the Gidgee area is being investigated by Groundwater Resource Management Pty Ltd (GRM). The description of the hydrogeology has been prepared in consultation with GRM.

3.3.1 Groundwater Aquifers

The greater Gidgee area is underlain predominantly by basalt, which hosts much of the gold mineralisation. Across most of the central prospects the basalt is weathered to variable depth, although within the Howards area, located to the south, the basalt is typically fresh rock near surface. The unweathered basalt is likely to have very low permeability except when associated with localised shearing/fracturing, where these are dilated (i.e. open). Geological mapping, by Legend Mining (2004) and Beeson et al. (1993), indicates extensive north-south trending shear/fracture zones traversing the various prospects (including Wilsons and Howards prospects) which potentially provide hydrogeological connection within the basalt to areas in the wider region.

Recent hydrogeological drilling has encountered multiple, minor groundwater strikes (0.5 to 2 L/s) at variable depths within most of the holes which GRM attribute to minor shearing/fracturing in the basalt. Some larger flows (between 4 and 6 L/s) were encountered at depth (between 70 and 130 m) within the proposed mining pit footprints of Wilsons (1 of 6 sites) and Howards (4 of 11 sites). The deeper water strikes within the vicinity of the Howards prospect are currently interpreted by GRM to be a deep seated groundwater occurrence which is associated with a shallow dipping confined aquifer although there is no information of the aquifer's depth and extent to the south of Howards.

It is possible that the presence of regional shear/fracture zones within the greater Gidgee area combined with a local network of lesser water bearing features forms a more regional scale groundwater system, with moderate to low permeability. Such an environment could provide sufficient hydraulic connection to link nearby stygofauna communities.

3.3.2 Groundwater Levels

Standing water levels vary across the Gidgee tenements ranging from:

- 7.6 to 32.4 metres below ground level (mBGL) in the northern tenements.
- 23.9 to 45.4+ mBGL in the central tenements.
- 1.4 to 14.6 mBGL in the southern tenements.

Water levels at Howards, recorded between 8.7 and 9.4 mBGL.

3.3.3 Groundwater Quality

Groundwater quality in the vicinity of Gidgee is generally fresh, with concentrations of total dissolved solids (TDS) ranging between 855 and 910 mg/L. High levels of sulfate are present in local groundwater due to the sulfide mineralisation within the ore body.

A summary of groundwater quality is provided in Table 1.

Table 1: Selected Chemical Analyses of Groundwater

Analyte	Range in Analyte Concentrations (mg/L)
pH	7.7 – 7.8
TDS	855 – 910
Ca	63 – 67
Mg	34 – 38
Na	170 – 175
K	8.5 – 1.4
HCO_3	123 – 129
Cl	255 – 260
SO_4	125 – 170
NO_3	65 – 75

Source: Payne et al. 1998

4. SURVEY METHODOLOGY

4.1 DESKTOP STUDY

A desktop study was undertaken as part of the subterranean fauna assessment. 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 Gidgee areas:

- The Department of Parks and Wildlife (DPaW) Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC) Database search including a 10 km buffer of the area bounded by northwest corner coordinate; 7,033,665 m north 724,186 m east and southeast coordinate; 6,958,877 m north and 755,475 m east.
- Western Australian Museum (WAM) subterranean fauna database search of the area bounded by northwest corner coordinate; 7,030,000 mN and 695,000 m east and southeast coordinate; 6,930,000 m north and 795,000 m east.
- EPBC Protected Matters Search Tool and the DPaW Threatened and Priority Fauna database search including an 80 km buffer around the central point 6,993,970 mN and 740,445 mE (Western Wildlife 2013).

4.1.2 Review of Existing Literature and Survey Results

The results of stygofauna surveys including those conducted at Lake Way approximately 90 km northeast of Gidgee (Outback Ecology 2012) and those presented in an EPA bulletin on the Mt Margaret Nickel-Cobalt Project (EPA 2001), located approximately 108 km east southeast of Gidgee, were reviewed.

The species recorded at Gidgee were reviewed in the context of stygofauna records within the Pilbara, Murchison and Gascoyne regions, to establish their distribution and representation outside of the project area.

4.1.3 Subterranean Fauna Habitat Assessment – Gidgee Operations

A habitat assessment for the Gidgee project area was based on review of existing literature and consultation with Gidgee geologists and groundwater consultants (GRM) on exploration and hydrogeological drilling undertaken across the Gidgee tenements and most recently at Howards. This assessment included lithology, structural features, permeability, connectivity and presence of voids and vugs within the target geology.

This assessment determined that the geology of the Gidgee area did not provide significant or unique troglofauna habitat which would be adversely impacted by the proposed mining and dewatering operations while the geology and hydrogeology was assessed as having the potential to support stygofaunal habitats which may be impacted by the proposed dewatering operations (see Section 5.1.2). Based on this assessment no further investigation of troglofauna was undertaken or discussed in this report.

4.2 STYGOFAUNA SURVEY

The Gidgee stygofauna survey has been developed and undertaken in accordance with the methodology as approved by the Office of Environmental Protection Authority's (OEPA) 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). Stygofauna sampling was undertaken in accordance with DPaW Licence to Take Fauna for Scientific Purposes Number SF008403 issued to MBS Environmental.

4.2.1 Sampling Sites

Following the desktop study was a detailed stygofauna survey undertaken during September 2012 (Round 1) and December 2012 (Round 2).

Sampling sites (exploration drill holes, bores and wells) were selected based on their proximity to potential impact areas and suitable physical condition for sampling. Additional sampling sites located outside of the expected area of impact were sampled where possible to establish baseline stygofauna data. These sampling sites are anticipated to have intersected the fractured rock aquifers and associated network of shears within the wider Gidgee area as well as a sub-horizontal aquifer located at Howards.

A total of 18 sampling sites were sampled for stygofauna in Round 1. Round 1 targeted the proposed mining areas across the Gidgee tenements to establish presence/absence and distribution of stygofauna. Round 2 focussed on mining areas within the southern tenements where stygofauna were recorded in the first round. A total of nine sampling sites were sampled in December 2012, of which seven were previously sampled in Round 1. The sampling sites are located within as well as outside the areas of potential impact from mining and dewatering activities. Detail of sampling sites, inclusive of standing water levels, sampling depths and inferred aquifers are provided Appendix 1. The locations of the sampling sites are shown in Figure 4.

4.2.2 Sampling Method

The methods used to sample each site are described in the following subsections. Further detail on the sampling methods is provided in Appendix 2.

4.2.2.1 Sieving of the Water Column

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).

The water column was sieved a total of six times at each site during the sampling round with alternating use of a 50 µm and 150 µm mesh net. During Round 1, the sample was washed into a collection vial and kept on ice until they could be delivered to Bennelongia Pty Ltd. During Round 2, the sample was washed into a collection vial using ethanol for preservation.

4.2.2.2 Water Quality

Water was collected for onsite water quality analysis at each site. Temperature, pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS) and Dissolved Oxygen (DO) were measured in the field using a multi-parameter water quality meter and recorded on field data sheets.

4.2.3 Taxonomy and Identification

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

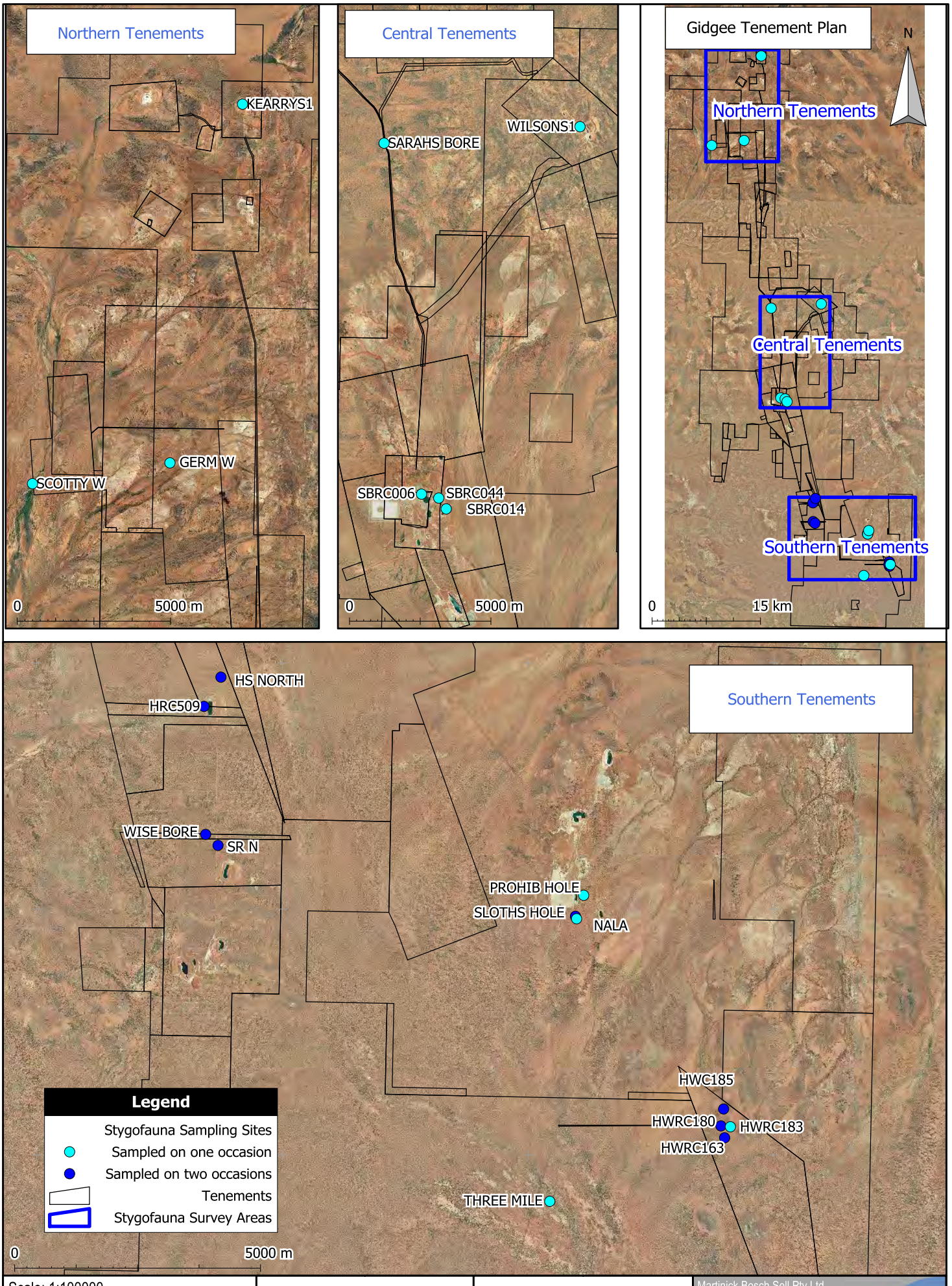

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Figure 4

Stygofauna Sample Sites

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5. RESULTS

5.1 DESKTOP ASSESSMENT

5.1.1 Database Search Results

A search of the DPaW Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC) Database identified a Priority 1 PEC within the vicinity of Gidgee, the centre of which is approximately 10.5 km south of the proposed Howards pit, which is associated with subterranean communities. Details of this community are summarised as:

- Lake Mason calcrete groundwater assemblage type on Raeside palaeodrainage on Lake Mason Station – unique assemblages of invertebrates have been identified in the groundwater calcretes.

A search of the WAM database (conducted by Dr Bill Humphreys) listed eleven stygofaunal crustacea species within the palaeochannel calcretes associated with the Lake Mason PEC. The search results are provided in Appendix 3 and the locations of sites where stygofauna were recorded are shown in Figure 5.

The following crustacea species were found on the WAM database within Lake Mason calcrete:

- *Amphipoda* sp. (Amphipoda).
- *Andrichophiloscia* n sp. 1 (Isopoda).
- *Andricophiloscia* n. sp. blind (close to *A. pedisetosa*) (Isopoda).
- *Chiltonidae* sp. (Amphipoda).
- *Crangonyctoid* sp. (Amphipoda).
- *Halicyclops eberhardi* Laurentiis, Pesce & Humphreys, 2001 (Copepoda).
- *Haloniscus* n sp. 10 (Isopoda).
- *Haloniscus* sp. (Isopoda).
- *Haloniscus* sp. n. (Isopoda).
- Isopoda: *Oniscidea* (Isopoda).
- *Maxillopoda* sp. (Maxillopoda).

5.1.2 Subterranean Fauna Habitat Assessment

The potential for troglofaunal and stygofaunal habitats within the target geology and surrounding areas of Gidgee are described in the following subsections.

5.1.2.1 Potential for Troglofaunal Habitat

Troglofauna, or more specifically troglobites, are obligate terrestrial subterranean fauna that inhabit air chambers in underground caves or other smaller voids in sub-surface regolith above the water table and are unable to survive outside the subterranean environment (Louisa Lawrance and Associates Pty Ltd 2009). Where small subterranean voids are present, then the pattern of their occurrence will affect the density and distribution of troglofauna. Lateral connectivity of voids is important because it enables animals to move about underground, while vertical connectivity with the surface is important for supplying carbon and nutrients to maintain populations of different species. Geological features such as major faults and dykes may block off the continuity of subterranean habitat and thus act as barriers to below-ground dispersal of troglofauna, causing species to have highly restricted ranges (Bennelongia 2010a).

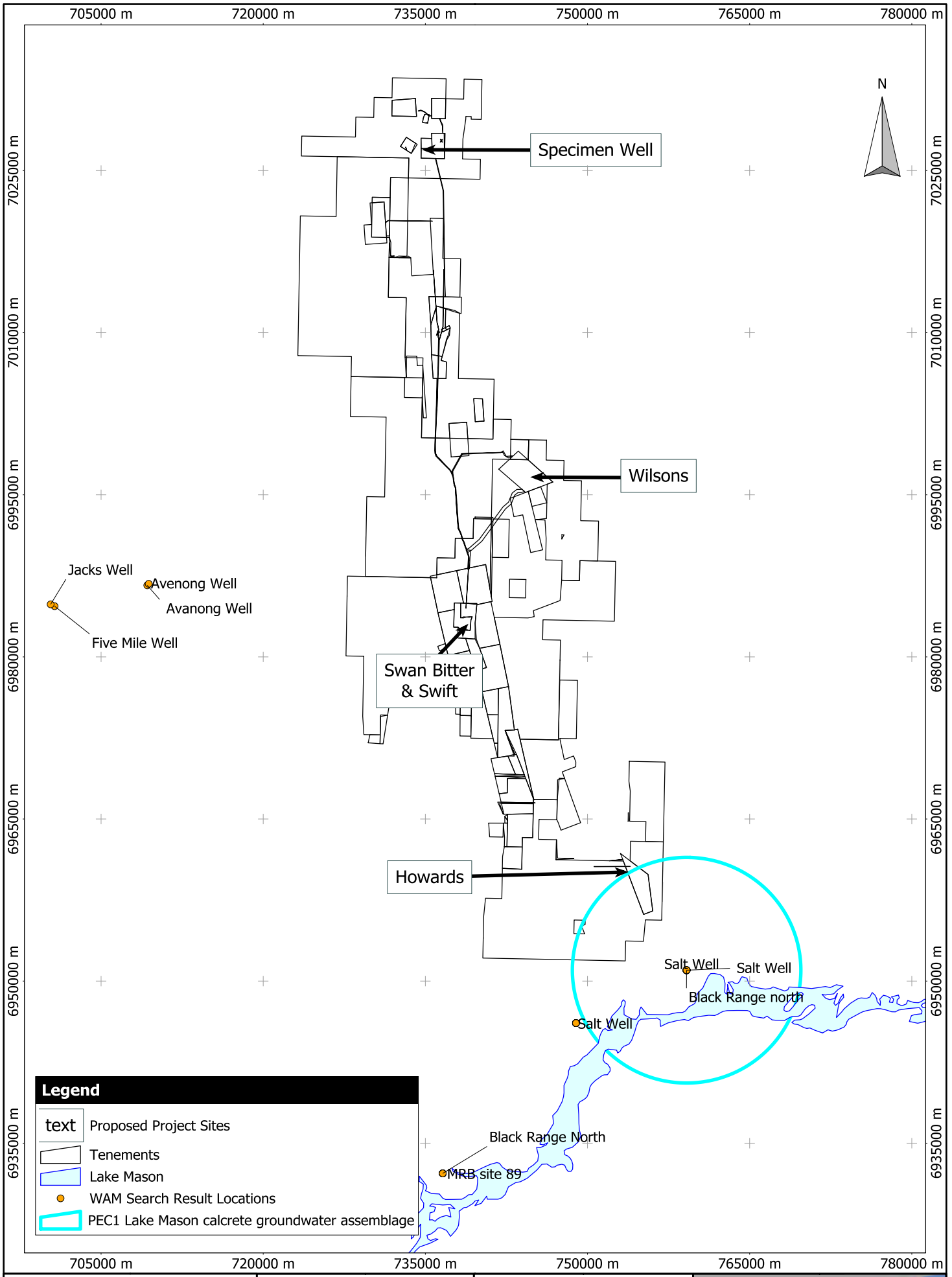

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Figure 5

Database Search Results

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The regional distribution of geology and regolith of the Gidgee area and its potential to provide suitable habitat for subterranean fauna was assessed. The geology of the strata above the water table consists of predominantly weathered basalts of clay and saprolite in the central and northern tenements. Southern tenements are similar with the exception of Howards that contains relatively fresh basalts within a metre of the ground surface. This geology is typical of the East Murchison Mineral Field within the wider region and is unlikely to provide significant or unique troglofauna habitat within the Gidgee area.

Based on this assessment no further investigation of troglofauna was undertaken.

5.1.2.2 Potential for Stygofaunal Habitat

Stygofauna are obligate, groundwater dwelling fauna known from a number of habitats in a variety of rock types including karst, larval tubes, alluvial sediments, fractured rock aquifers and subterranean carbonate deposits (calcrete aquifers) (King *et al.* 2012) with alluvial and carbonate deposits typically thought to be the most productive habitats (Bennelongia 2010b).

Based on the geology and hydrogeology associated with the Gidgee area and the proximity of Howards proposed pit to a groundwater assemblage PEC, it was identified that the fractured rock aquifers likely associated with the shears and deep seated sub-horizontal confined aquifer of Howards could potentially support stygofaunal habitats.

5.2 SUBTERRANEAN FAUNA RECORDED

A total of 20 sites were sampled and 16 stygofauna species recorded during the stygofauna survey undertaken within the Gidgee area. A detailed listing of results is provided in Appendix 4 and summarised in Table 2 with the locations of stygofauna recorded during these surveys shown in Figure 6.

Twelve stygofauna species were recorded from eight of the 18 sites sampled during Round 1. Twelve stygofauna species, (four of which were additional to those found in Round 1) were recorded in seven of the nine sites sampled in Round 2. Stygofauna species in the Gidgee area were only recorded from the northern and southern tenements. These comprise:

- Seven copepod species (*Mesocyclops brooksi*, *Microcyclops varicans*, *Fierscyclops* sp. B07, *Anzcyclops* sp. B04, *Anzcyclops* sp., *Australocamptus nr similis*, and *Novanitocrella* sp. B1) recorded in the southern tenements.
- Two tubificida worms (*Enchytraeidae* Pilbara sp.1 (PSS) and *Enchytraeidae* sp. likely to be the same species) were recorded in the southern tenements.
- Two species of Rotifera (*Bdelloidea* sp. 2:2 and *Proalinopsis* sp.) were recorded in the northern and southern tenements.
- Two species of syncarid (*Atopobathynella* sp. B14, *Atopobathynella* sp. B15 (nr hinzeae)) were recorded in the southern tenements.
- One Ostracoda (*Cypretta* sp.) was recorded in the southern tenements.
- A nematode (stygofauna and aquatic) was recorded in the southern tenements.
- One Tardigrada was recorded in the northern tenements.

In summary, of the 16 species recorded, nine are considered common and widespread within the region and Western Australia. One juvenile *Anzcyclops* sp. was collected and could not be identified to species level but is likely to be *Anzcyclops* sp. B04. The remaining six are new undescribed species based on morphological differences. These comprise:

- *Fierscyclops* sp. B07, recorded from HWC185 bore at Howards only.

- *Anzcyclops* sp. B04, recorded from HWC185 bore at Howards and Wise Bore and SR N bore, north of historic South Reliance pit (west of Howards). One juvenile *Anzcyclops* sp. was recorded from HRC509 north of Heron South and is likely to be *Anzcyclops* sp. B04.
- *Australocamptus nr similis*, recorded from HRC509 bore immediately west of historic Heron South pit and at Nala and Sloths Hole approximately 5 km northwest of Howards.
- *Novanitocrella* sp. B1, recorded from Wise Bore only, north of South Reliance.
- *Atopobathynella* sp. B14, recorded from SR N bore only, north of South Reliance.
- *Atopobathynella* sp. B15 (*nr hinzeae*), recorded from Nala and Sloth Hole approximately 5 km northwest of Howards and Wise Bore north of South Reliance.

Four of these undescribed species, (*Australocamptus* nr *similis*, *Novanitocrella* sp. B1, *Atopobathynella* sp. B15 (nr *hinzeae*) and *Atopobathynella* sp. B14) were recorded at locations near Heron South and South Reliance approximately 13 km northwest of the Lake Mason PEC buffer (Figure 6). Another undescribed species, *Anzcyclops* sp. B04, was recorded at locations near South Reliance and further south at Howards. The Heron South and South Reliance areas have been subject to previous mining and dewatering while Howards is a greenfields area.

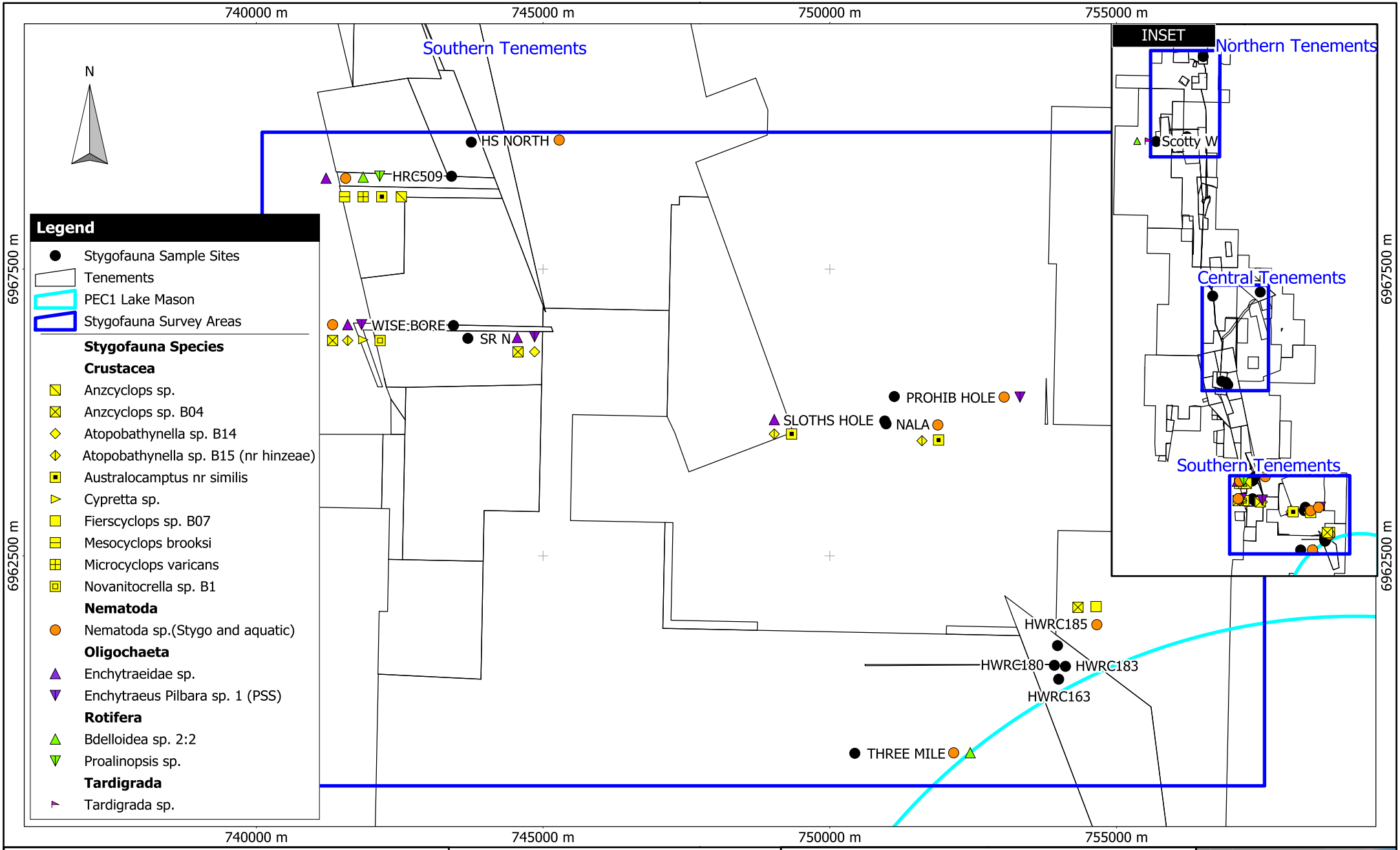
Table 2: Summary of Stygofauna Recorded at Gidgee

Class			Stygofauna																
			Nematoda	Crustacea										Tardigrada	Rotifera		Oligochaeta	
Order			-	Copepoda						Syncarida		Ostracoda	-	Ploimida	Bdelloidea	Tubificida	
Family			-	Ameiridae	Cyclopidae				Canthocamptidae	Parabathynellidae		Cyprididae	-	Proalidae	-	Enchytraeidae	
Lowest ID	Round	Stygofauna	*Nematoda sp.(Stygo and aquatic)*	*Novanitocrella sp. B1**	*Fierscyclops sp. B07**	*Microcyclops varicans*	*Mesocyclops brooksi*	*Anzyclops sp. B04**	*Anzcyclops sp.*	*Australocamptus nr similis**	*Atopobathynella sp. B15 (nr hinzeae)**	*Atopobathynella sp. B14**	*Cypretta sp.*	*Tardigrada sp.*	*Proalinopsis sp.*	*Bdelloidea sp. 2:2*	*Enchytraeus Pilbara sp. 1 (PSS)*	*Enchytraeidae sp.*
Site ID																		
Southern Tenements (Howards and Three Mile Well)																		
Sloths Hole	1	Y								X	X							X
Sloths Hole	2	Y								X	X							X
HWRC185	1	Y	X		X													
HWRC185	2	Y						X										
HWRC183	1	N																
HWRC183	2	Hole blocked above the water level																
HRC180	1	N																
HRC180	2	N																
HWRC163	1	N																
HWRC163	2	N																

Class			Stygofauna															
			Nematoda	Crustacea									Tardigrada	Rotifera		Oligochaeta	
Order			-	Copepoda						Syncarida		Ostracoda	-	Ploimida	Bdelloidea	Tubificida	
Family			-	Ameiridae	Cyclopidae				Canthocamptidae	Parabathynellidae		Cyprididae	-	Proalidae	-	Enchytraeidae	
Lowest ID	Round	Stygofauna	*Nematoda sp.(Stygo and aquatic)*	*Novanitocrella sp. B1**	*Fierscyclops sp. B07**	*Microcyclops varicans*	*Mesocyclops brooksi*	*Anzcyclops sp. B04**	*Anzcyclops sp.*	*Australocamptus nr similis**	*Atopobathynella sp. B15 (nr hinzeae)**	*Atopobathynella sp. B14**	*Cypretta sp.*	*Tardigrada sp.*	*Proalinopsis sp.*	*Bdelloidea sp. 2:2*	*Enchytraeus Pilbara sp. 1 (PSS)*	*Enchytraeidae sp.*
Three Mile Well	1	Y	X													X		
Nala	2	Y	X							X	X							
Prohib Hole	2	Y	X														X	
Southern Tenements (South Reliance/Heron South)																		
HS North	1	Y	X															
HWRC509	1	Y	X			X	X			X								X
HWRC509	2	Y	X				X		X	X					X	X		X
Wise Bore	1	Y		X				X										X
Wise Bore	2	Y	X	X				X			X		X				X	
SR North	1	Y										X						X
SR North	2	Y						X									X	
Central Tenements																		
SBRC006	1	N																
SBRC044	1	N																

Class			Stygofauna															
			Nematoda	Crustacea									Tardigrada	Rotifera		Oligochaeta	
Order			-	Copepoda						Syncarida		Ostracoda	-	Ploimida	Bdelloidea	Tubificida	
Family			-	Ameiridae	Cyclopidae				Canthocamptidae	Parabathynellidae		Cyprididae	-	Proalidae	-	Enchytraeidae	
Lowest ID	Round	Stygofauna	*Nematoda sp.(Stygo and aquatic)*	*Novanitocrella sp. B1**	*Fierscyclops sp. B07**	*Microcyclops varicans*	*Mesocyclops brooksi*	*Anzcyclops sp. B04**	*Anzcyclops sp.*	*Australocamptus nr similis**	*Atopobathynella sp. B15 (nr hinzeae)**	*Atopobathynella sp. B14**	*Cypretta sp.*	*Tardigrada sp.*	*Proalinopsis sp.*	*Bdelloidea sp. 2:2*	*Enchytraeus Pilbara sp. 1 (PSS)*	*Enchytraeidae sp.*
SBRC014	1	N																
Sarah's Bore	1	N																
Wilsons 1 (HWRC353)	1	N																
Northern Tenements																		
Kerry's 1	1	N																
Scotty's Well	1	Y												X		X		
Germ W	1	N																

**= New undescribed species based on morphological differences.*



Scale: 1:85000
Original Size: A4
Grid: MGA94(50)
0 5 km

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Subterranean Fauna Assessment

Figure 6

Stygofauna Recorded Within the Gidgee Tenements

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W:\Panoramic\Gidgee\Stygofauna\Drawings\Gidgee Stygofauna.map 2/07/2013 F6 Stygofauna Recorded Layout

5.3 WATER LEVEL AND GROUNDWATER QUALITY

Groundwater quality analysis of the stygofauna sampling sites is presented in Table 3. The field recordings indicate fresh to brackish groundwater. Dissolved oxygen levels are fairly low and groundwater is neutral to slightly alkaline.

Table 3: Groundwater Quality of Stygofauna Sampling Sites

Round	Bore ID	Sampled Depth (mBGL)	Depth to Water (mBGL)	Temp (°C)	DO % Sat	pH	TDS (ppm)	Conductivity (mS/cm)
Southern Tenements (Howards and Three Mile Well)								
1	HWRC185	10.7	8.03	24.00	5.80	7.66	651	1.18
2	HWRC185	10.7	8.01	26.9	6.8	7.42	480	0.877
1	HWRC183	unknown	7.94	23.40	7.60	7.70	805	1.47
1	HWRC 180	8.4	7.95	24.80	12.2	7.69	714	1.30
2	HWRC180	11.9	7.91	26.1	7	7.3	714	1.302
1	HWRC 163	9.7	7.44	25.00	7.60	7.80	755	1.38
2	HWRC163	10.0	7.47	26.2	8.8	7.5	760	1.377
1	Sloths Hole	41.4	10.50	25.90	11.9	7.54	724	1.32
2	Sloths Hole	30.5	10.76	26.9	9.5	7.6	736	1.34
2	Nala	42.4	9.76	26.4	8.4	7.54	700	1.267
2	Prohib Hole	28.8	14.38	26	8.7	7.57	562	1.024
1	Three Mile Well	1.7	1.40	Could not extract a water sample.				
Southern Tenements (South Reliance/Heron South)								
1	HS North	13.9	4.47	23.70	11.7	7.54	1,800	2.14
1	HRC 509	unknown	7.40	25.10	11.8	7.87	664	1.21
2	HRC 509	12.5	8.45	25.5	6.1	6.82	339	0.631
1	Wise Bore	25.8	6.75	24.80	11.9	7.79	1,170	2.14
2	Wise Bore	26.0	7.79	25.7	11.9	7.82	1,170	2.08
1	SR North	32.2	7.69	24.50	4.8	7.68	1,040	1.91
2	SR North	39.7	7.74	25.9	11.9	7.67	1,070	1.941
Central Tenements								
1	SBRC006	over 72	Over 60	21.60	4.70	7.59	1,800	3.28
1	SBRC044	40.0	39.17	23.90	5.70	7.50	1,170	2.14
1	SBRC014	unknown	38.05	21.80	10.6	7.81	911	1.66
1	Sarah's Bore	59.4	23.87	25.20	11.10	7.45	513	0.93
1	Wilsons 1 (HWRC 353)	83.6	unknown	19.10	13.40	8.10	2,310	4.24
Northern Tenements								
1	Kearry's 1	33.2	32.24	24.20	10.20	8.00	895	1.63
1	Scotty's Well	23.5	7.57	23.40	10.90	8.19	831	1.51
1	Germ W	22.1	19.16	22.90	11.90	7.68	8,060	14.95

6. DISCUSSION

6.1 STYGOFAUNA DIVERSITY AND DISTRIBUTION

A total of 20 sites were sampled and 16 stygofauna species recorded during the stygofauna survey undertaken within the Gidgee area. All these stygofauna were recovered from sample locations within the southern tenements, with the exception of one Tardigrada which was recovered from a single location, Scotty's Well, located in the northern tenements as shown in Figure 6.

Nine of these species are considered common and widespread within the region and Western Australia. These include:

- Copepod, *Mesocyclops brooksi*, is a widespread species known from a number of locations across Australia.
- Copepod, *Microcyclops varicans*, is a common and widespread species known from a number of locations across Western Australia.
- Tubificida worms, *Enchytraeidae* Pilbara sp. 1 (PSS) and *Enchytraeidae* sp., which are likely to be the same species, are regarded as being widespread. *Enchytraeidae* Pilbara sp. 1 (PSS) was recorded at Lake Way approximately 90 km northeast of Howards (Outback Ecology 2012) and has also been recorded throughout the Pilbara (Bennelongia 2011; Subterranean Ecology Pty Ltd 2010) with some *Enchytraeidae* species recorded in the South Coast bioregion (Rockwater Pty Ltd 2006).
- Two species of Rotifera, *Bdelloidea* sp. 2:2 and *Proalinopsis* sp., were recorded and these are not required to be taken to species level as stated in the EPA Guidance Statement 54A. *Bdelloidea* sp. 2:2 is known to occur in the Gascoyne near Meekatharra (MBS 2011). The *Proalinopsis* sp. could not be further identified as it had retracted into itself when preserved.
- Ostracoda, *Cypretta* sp., *Cypretta seurati* has a more or less tropical distribution around the globe and quite a few other northern Australian ostracods have the same distribution (Stuart Halse, personal communication).
- Nematoda are not required to be taken to species level as stated in the EPA Guidance Statement 54A. At the phylum level nematodes are everywhere and there are no conservation implications in their occurrence (Stuart Halse, personal communication).
- Tardigrada are known to occur in a number of environments including freshwater, moist soil or leaf litter and marine. Identification to species level is not currently required (Jane McRae, personal communication).

The remaining six are new undescribed species based on morphological differences. These include:

- *Fierscyclops* sp. B07 was recovered from the future Howards pit only.
- *Anzcyclops* sp. B04 was recovered from three sample locations including Howards. A juvenile *Anzocyclops* sp. was recovered from HRC509 near Heron South and is likely to be *Anzcyclops* sp. B04.
- *Australocamptus nr similis* was recovered from three sample locations.
- *Novanitocrella* sp. B1 was recovered from one sample location outside of proposed future mine dewatering areas.
- *Atopobathynella* sp. B14 was recovered from one sample location outside of proposed future mine dewatering areas.
- *Atopobathynella* sp. B15 (*nr hinzeae*) was recovered from three sample locations outside of proposed future mine dewatering areas.

With the exception of *Fierscyclops* sp. B07 (recorded at one location), all the other stygofauna species were recorded at sample sites that would indicate their wider distribution, through hydraulic connection within the secondary aquifer system, within the southern Gidgee tenements, both within historically dewatered areas and outside of future mining areas.

One male and nine female specimens of *Fierscyclops* sp. B07 were recovered from HWRC185 (located within the footprint of the proposed Howards pit) during the first sampling round. There are currently seven undescribed *Fierscyclops* species (based on morphological characteristics) that have been recorded in the Murchison and Pilbara several of which are single records.

Four holes were sampled at Howards of which only HWRC185 yielded stygofauna, with *Fierscyclops* sp. B07 recovered in Round 1 and *Anzcyclops* sp. B04 in Round 2. *Anzcyclops* sp. B04 was also found in two holes northwest of Howards in the South Reliance area, which is outside the potential drawdown area of the future Howards pit.

The wider presence of *Anzcyclops* sp. B04 implies that there is hydraulic connection linking the Howards aquifers to the regional hydrogeology, which has allowed widespread colonisation of the species. This should equally apply to other species, including *Fierscyclops* sp. B07. Furthermore the stygofauna within HWRC185 are expected to occur within the secondary aquifer system (as opposed to the deep seated Howards aquifer as described by GRM). This is substantiated by other holes drilled by GRM in the near vicinity of HWRC185 to depths of approximately 130 m which intersected minor groundwater strikes (0.5 to 2 L/s) at depths between 25 and 77 m (i.e. no significant groundwater was intersected at greater depths), which is indicative of the shallow secondary aquifer system.

A search of the WA Museum database listed eleven stygofaunal crustacea species associated with the Lake Mason PEC within the Raeside palaeodrainage on Lake Mason Station. None of these species were recorded in the Gidgee area. The difference in stygofauna composition between the Gidgee and Lake Mason areas is indicative of the different aquifers and geology within which these stygofauna reside, these being the secondary shearing/fracturing aquifer system within the basalt and the near surface palaeochannel calcretes respectively. The absence of common stygofauna species also indicates that these aquifers are not hydraulically linked.

6.2 POTENTIAL IMPACTS

Impacts on stygofauna may occur as a result of dewatering activities. Based on the regional hydraulic linkages within the secondary shearing/fracturing aquifer system and the widespread distribution of stygofauna occurring within the Gidgee area it may be predicted that the potential impact of dewatering on stygofauna (including *Fierscyclops* sp. B07) will be temporary and that the subsequent, anticipated recovery of water levels will allow stygofauna to recolonise the dewatered aquifers.

Dewatering of Howards is not expected to impact the Lake Mason PEC or any stygofauna that may be associated with the palaeochannel calcretes as the complete difference in stygofauna species composition indicates that the two aquifers are not linked. Furthermore, discussions with GRM in regard to the potential extent of lowering the water table indicates that the zone of dewatering drawdown of the Howards aquifer system will not extend as far as the palaeochannel calcretes and that there is no hydraulic linkage between the two aquifer systems.

7. STUDY TEAM

The stygofauna sampling was conducted by Ms Kirstin Wiseman (Environmental Scientist) with field assistance from Mrs Sarah Tremain (Graduate Environmental Scientist).

MBS Environmental would like to thank the staff of Panoramic Gold for their assistance in data gathering.

MBS Environmental would also like to thank Mike Scanlon from Bennelongia for his advice regarding subterranean fauna.

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APPENDICES

APPENDIX 1: STYGOFAUNA HOLE DETAILS

Table 1-1: Stygofauna Hole Details

Bore ID	GDA 94 (Zone 51)		Drilled Depth (m)	Round	Sampled Depth (mBGL)	Standing Water Level (mBGL)	Inner Casing Diameter (mm)
	Easting	Northing					
Kearry's 1*	736247	7030909		1	33.25	32.24	150
Scotty's Well*	729395	7018536		1	23.54	7.57	n/a
Germ W*	733879	7019214		1	22.11	19.16	n/a
Sarah's Bore*	737627	6996032		1	59.44	23.87	150
Wilsons 1 (HWRC 353)	744555	6996615	96.5	1	83.57	unknown	None
SBRC006	738950	6983626		1	Over 72	Over 60	150
SBRC044	739560	6983487		1	40.04	39.17	150
SBRC014	739825	6983104		1	Unknown	38.05	150
HS North	743749	6969712		1	13.90	4.47	n/a
HRC 509	743404	6969119	243	1	Unknown	7.40	150
HRC 509	743404	6969119	243	2	12.50	8.45	150
Wise Bore*	743438	6966516		1	25.76	6.75	120
Wise Bore*	743438	6966516		2	25.97	7.79	120
SR North	743689	6966293		1	32.22	7.69	150
SR North	743689	6966293		2	39.68	7.74	150
Sloths Hole	750958	6964852		1	41.42	10.50	150
Sloths Hole	750958	6964852		2	30.54	10.76	150
Nala	750981	6964802		2	42.44	9.76	150
Prohib Hole*	751125	6965278		2	28.76	14.38	150
HWRC 185	753971	6960935		1	10.71	8.03	150
HWRC 185	753971	6960935		2	10.68	8.01	150
HWRC 183	754109	6960574	263	1	Unknown	7.94	150
HWRC 180	753916	6960592		1	8.38	7.95	150
HWRC 180	753916	6960592		2	11.86	7.91	150
HWRC 163	753991	6960349		1	9.66	7.44	150
HWRC 163	753991	6960349		2	9.97	7.47	150
Three Mile Well*	750436	6959058		1	1.7	1.40	n/a

** Sample site drilled straight down. All other sample sites were drilled on a 60 degree angle which has been accounted for in measurements.*

APPENDIX 2: DETAILED NET HAUL SAMPLING METHODOLOGY

The sampling methodology implemented is as follows:

1. Labelled each sample vial with the bore ID, net size (150 or 50 µm), date and time.
2. With a vial attached slowly lower a 150 µm net to the base of the bore.
3. Pull net up and down six times to approximately one metre above the base, to gently agitate the sediment/benthos.
4. Slowly and steadily retrieve the net, to reduce the chance of animals avoiding capture by escaping on the bow wave.
5. At the surface, wash net down with deionised/distilled water to ensure all organics are flushed into the vial.
6. Decant excess water through net.
7. Repeat steps five and six until the entire sample is collected in the vial.
8. Remove the vial from the net and using ethanol pour contents into appropriately labelled sample vial (150 or 50 µm).
9. Repeat steps one to eight using a 50 µm mesh net.
10. Repeat steps one to nine two more times for each net size decanting each time into the same 150 or 50 µm labelled sample vial (e.g. a total of three 150 µm net haul samples and three 50 µm net haul samples). If the vial is too full to receive the following net haul, decant excess deionised/distilled water through a special vial with a 50 µm mesh as a base (Bennelongia supplied). Wash the 50 µm mesh vial with deionised/distilled water to ensure all organics are flushed into the appropriately labelled sample vial.
11. Store samples upright.
12. After completion of sampling at each bore, sterilise all equipment using a phosphate free detergent to prevent cross contamination between bores.

APPENDIX 3: SUMMARY OF MUSEUM DATABASE SEARCH RESULTS

Table 3-1: Summary of Museum Database Search Results

Phylum	Subphylum	Class	Subclass	Superorder	Order	Family	Lowest ID	Calcrete	Site	Number Found
Arthropoda	Crustacea				Amphipoda		*Amphipoda* sp.	Black Range south	MRB site 89	2
Arthropoda		Hexapoda			Coleoptera	Dytiscidae	*Dytiscidae* sp.	Black Range south	MRB site 89	1
Arthropoda	Crustacea	Malacostraca			Isopoda		*Isopoda* sp.	Hilllview	Five Mile Well	1
Arthropoda	Crustacea	Malacostraca		Syncarida	Bathynellacea	Parabathynellidae	*Parabathynellidae* sp.	Hilllview	Avenong Well	1
Arthropoda	Crustacea	Malacostraca		Syncarida	Bathynellacea	Parabathynellidae	*Parabathynellidae* sp.	Hillview	Avanong Well	1
Arthropoda	Crustacea	Malacostraca		Peracarida	Amphipoda		*Amphipoda* sp.	Lake Mason*	Black Range North	4
Arthropoda	Crustacea	Malacostraca		Peracarida	Amphipoda		*Amphipoda* sp.	Lake Mason*	Salt Well	1
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		*Andrichophiloscia* n sp 1"	Lake Mason*	Salt Well	3
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		*Andricophiloscia* n. sp. blind close to A. pedisetosa)	Lake Mason*	Salt Well	2
Arthropoda	Crustacea	Malacostraca			Amphipoda	Chiltonidae	*Chiltonidae* sp.	Lake Mason*	Black Range North	1
Arthropoda	Crustacea	Malacostraca			Amphipoda	Chiltonidae	*Chiltonidae* sp.	Lake Mason*	Salt Well	6
Arthropoda	Crustacea	Malacostraca			Amphipoda	Crangonyctidae	*Crangonyctoid* sp.	Lake Mason*	Salt Well	3
Arthropoda		Insecta		Panorpida	Diptera		*Diptera* sp.	Lake Mason*	Black Range North	1
Arthropoda		Insecta			Coleoptera	Dytiscidae	*Dytiscidae* sp.	Lake Mason*	Salt Well	7
Arthropoda	Crustacea	Maxillopoda	Copepoda		Cyclopoida	Cyclopidae	*Halicyclops eberhardi* Laurentiis, Pesce & Humphreys, 2001	Lake Mason*	Salt Well	5
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		*Haloniscus* n sp 10	Lake Mason*	Salt Well	1
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		*Haloniscus* sp.	Lake Mason*	Black Range North	1
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		*Haloniscus* sp. n.	Lake Mason*	Salt Well	1
Arthropoda	Crustacea	Malacostraca			Isopoda: Oniscidea		Isopoda: Oniscidea	Lake Mason*	Salt Well	1
Arthropoda		Insecta			Coleoptera	Dytiscidae	*Limbodessus masonensis*	Lake Mason*	Salt Well	8
Arthropoda		Insecta			Coleoptera	Dytiscidae	*Limbodessus ordinarius*	Lake Mason*	Black Range North	3
Arthropoda		Insecta			Coleoptera	Dytiscidae	*Limbodessus raesidensis*	Lake Mason*	Salt Well	2
Arthropoda	Crustacea	Maxillopoda					*Maxillopoda* sp.	Lake Mason*	Black Range North	1
Arthropoda	Myriapoda	Diplopoda			Polyxenida	Polyxenidae	*Polyxenidae* sp.	Lake Mason*	Black Range North	1
Annelida		Clitellata	Oligochaeta		Haplotaxida	Naididae	*Tubificidae immature*	Lake Mason*	Salt Well	1
Arthropoda	Crustacea	Maxillopoda					*Maxillopoda* sp.	Yarrabubba	Jacks Well	1

* Interpreted to be associated with the Lake Mason calcrete groundwater assemblage type on Raeside palaeodrainage on Lake Mason Station – unique assemblages of invertebrates have been identified in the groundwater calcretes (P1 PEC)

APPENDIX 4: BENNELONGIA STYGOFAUNA RESULTS

Table 4-1: Bennelongia Stygofauna Results

Field Bore Codes	Round	Visit Date	Class	Order	Family	Genus	Lowest ID	Number Identified	Comments
HS North	1	07-Sep-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	1	
HWRC185	1	06-Sep-12	Crustacea	Copepoda	Cyclopidae	Fierscyclops	*Fierscyclops* sp. B07	10	1 female , 9 males
HWRC185	1	06-Sep-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	3	
HWRC185	2	03-Dec-12	Crustacea	Copepoda	Cyclopidae	Anzcyclops	*Anzcyclops* sp. B04	90	Not all picked.
HWRC509	1	06-Sep-12	Crustacea	Copepoda	Canthocamptidae	Australocamptus	*Australocamptus nr similis*	3	does not have inner seta on P3 end 1 but has cephalic window
HWRC509	1	06-Sep-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	2	
HWRC509	1	06-Sep-12	Crustacea	Copepoda	Cyclopidae	Mesocyclops	*Mesocyclops brooksi*	3	
HWRC509	1	06-Sep-12	Crustacea	Copepoda	Cyclopidae	Microcyclops	*Microcyclops varicans*	3	
HWRC509	1	06-Sep-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	2	
HWRC509	2	04-Dec-12	Crustacea	Copepoda	Cyclopidae	Anzcyclops	*Anzcyclops* sp.	1	juvenile
HWRC509	2	04-Dec-12	Crustacea	Copepoda	Canthocamptidae	Australocamptus	*Australocamptus nr similis*	3	
HWRC509	2	04-Dec-12	Rotifera	Bdelloidea	-	-	*Bdelloidea* sp. 2:2	1	
HWRC509	2	04-Dec-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	2	Immature
HWRC509	2	04-Dec-12	Crustacea	Copepoda	Cyclopidae	Mesocyclops	*Mesocyclops brooksi*	4	
HWRC509	2	04-Dec-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	2	
HWRC509	2	04-Dec-12	Rotifera	Ploimida	Proalidae	Proalinopsis	*Proalinopsis* sp.	10	all contracted, id tentative
Nala	2	04-Dec-12	Crustacea	Syncarida	Parabathynellidae	Atopobathynella	*Atopobathynella* sp. B15 (nr hinzeae)	51	Not all picked.
Nala	2	04-Dec-12	Crustacea	Copepoda	Canthocamptidae	Australocamptus	*Australocamptus nr similis*	25	
Nala	2	04-Dec-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	3	
Prohib Hole	2	04-Dec-12	Oligochaeta	Tubificida	Enchytraeidae	Enchytraeus	*Enchytraeus* Pilbara sp. 1 (PSS)	4	
Prohib Hole	2	04-Dec-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	3	
Scottys Well	1	05-Sep-12	Rotifera	Bdelloidea	-	-	*Bdelloidea* sp. 2:2	10	
Scottys Well	1	05-Sep-12	Tardigrada	-	-	-	*Tardigrada* sp.	1	
Sloths Hole	1	06-Sep-12	Crustacea	Syncarida	Parabathynellidae	Atopobathynella	*Atopobathynella* sp. B15 (nr hinzeae)	9	
Sloths Hole	1	06-Sep-12	Crustacea	Copepoda	Canthocamptidae	Australocamptus	*Australocamptus nr similis*	9	does not have the inner seta on end1 of P3 but does have cepalic window
Sloths Hole	1	06-Sep-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	1	Fragment only
Sloths Hole	2	04-Dec-12	Crustacea	Syncarida	Parabathynellidae	Atopobathynella	*Atopobathynella* sp. B15 (nr hinzeae)	4	
Sloths Hole	2	04-Dec-12	Crustacea	Copepoda	Canthocamptidae	Australocamptus	*Australocamptus nr similis*	4	
Sloths Hole	2	04-Dec-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	8	Immature.
SR North	1	07-Sep-12	Crustacea	Syncarida	Parabathynellidae	Atopobathynella	*Atopobathynella* sp. B14	1	
SR North	1	07-Sep-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	5	Immature
SR North	1	07-Sep-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	10	Immature
SR North	2	04-Dec-12	Crustacea	Copepoda	Cyclopidae	Anzcyclops	*Anzcyclops* sp. B04	2	males
SR North	2	04-Dec-12	Oligochaeta	Tubificida	Enchytraeidae	Enchytraeus	*Enchytraeus* Pilbara sp. 1 (PSS)	3	
Three Mile Well	1	06-Sep-12	Rotifera	Bdelloidea	-	-	*Bdelloidea* sp. 2:2	2	
Three Mile Well	1	06-Sep-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	1	
Wise Bore	1	06-Sep-12	Crustacea	Copepoda	Cyclopidae	Anzcyclops	*Anzcyclops* sp. B04	20	
Wise Bore	2	04-Dec-12	Crustacea	Copepoda	Cyclopidae	Anzcyclops	*Anzcyclops* sp. B04	11	
Wise Bore	2	04-Dec-12	Crustacea	Syncarida	Parabathynellidae	Atopobathynella	*Atopobathynella* sp. B15 (nr hinzeae)	7	
Wise Bore	2	04-Dec-12	Crustacea	Ostracoda	Cyprididae	Cypretta	*Cypretta* sp.	2	2 x 1/2 valves only
Wise Bore	1	06-Sep-12	Oligochaeta	Tubificida	Enchytraeidae	-	*Enchytraeidae* sp.	1	Immature
Wise Bore	2	04-Dec-12	Oligochaeta	Tubificida	Enchytraeidae	Enchytraeus	*Enchytraeus* Pilbara sp. 1 (PSS)	40	
Wise Bore	2	04-Dec-12	Nematoda	-	-	-	*Nematoda* sp.(Stygo and aquatic)	7	
Wise Bore	2	04-Dec-12	Crustacea	Copepoda	Ameiridae	Novanitocrella	*Novanitocrella* sp. B01	30	
Wise Bore	1	06-Sep-12	Crustacea	Copepoda	Ameiridae	Novanitocrella	*Novanitocrella* sp. B1	20	